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Inferiority Complex: A Character Analysis of Elif Shafak's Honour

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Abstract- Western Media has always propagated incidents of honour-killings in order to tarnish the image of Muslim communities in the West without taking into account the actual social and psychological aspects that instigate the crimes. The present research will study the socio-psychological factors that motivate the perpetrators. This qualitative research work will employ the psychoanalytic literary criticism of the characters of Elif Shafak's novel Honour, especially Iskender, the matricide. The research aims at exploring the psyche of the character involved in order to determine the root-cause of his actions and behavior. The methodology adopted in this research work is analytical-cum-critical for psychoanalysis of characters with conceptual framework of theories of inferiority complex proposed by Alfred Adler. The research will be significant, as it will shed new light on Iskender's character, from the unique perspective of the matricide.

Index Terms- Pampering, Inferiority Complex, Adler, Shafak, Honour killing, Iskender

I. INTRODUCTION

Honour killing is the murder of a person, in most cases a female, by a close relative. The perpetrator usually believes that the victim has dishonoured the family and brought shame upon it by violating the laws of the community, or by not adhering to the moral and ethical code preached by a religion. The diasporic writers, who have taken up this theme in their books and have written about it, have not portrayed facts in support of their (fictional) crime. They have worked to propagate Western agenda by wrongly attributing honour killing with Islam and Muslim countries. *Honour* takes a different stance on the subject. Instead of stereotyping British Muslims and supporting the propaganda of Western Media by tarnishing Muslim communities, Elif Shafak has tried to show the other side of the coin.

It is imperative that perpetrators and their social, psychological, financial and biological history be taken into account, especially in case of incidents of honour killing in immigrant families of Muslim faith. Alfred Adler, the celebrated psychiatrist and philosopher, emphasized the importance of understanding individuals within the bounds of their social context. Adler addressed contemporary and crucial issues like social equality, birth order and its influence, parent education, holism and life style. According to Adler, we all have one

fundamental desire and ambition: to have a sense of belonging and to feel important.

Honour killing can be explained in cultural and psychological context. Steve Taylor, a senior lecturer in Psychology at Leeds Beckett University, and author of *Out of the Darkness* has discussed the phenomenon in his article "The Madness of Honor Killing" (2012). According to him, the crime is largely related to a form of "status anxiety" i.e. a phobia of losing the social status and the desire to protect it. It is a "pathological insecurity" in the society where such incidents occur because of a perpetual pressure to comply with the social conventions. It is also instigated by fear of being shunned by the community. The need to belong to the community is connected with the establishment of a normal social identity. An individual who refuses to conform to the social convention risks losing it. Taylor also refutes the connection between Islam and honour killing, stating, "I disagree that this practice is linked to religion. Islam does not condone honor killing at all. The practice is obviously a cultural one, as it's spread across peoples who have different faiths e.g. Islam, Hinduism, Sikhism" (The Madness of Honor Killing, 2012).

According to the Department of Justice, Canada (2015), the practice of honour killing is not associated with any specific religion. There has been recorded evidence of it across Jewish, Hindu, Sikh, Muslim and Christian communities. Generally, it is motivated by some personal agenda, hurt ego or programmed brainwashing. Studies have revealed that perpetrators sometimes have a case of mental illness that remains undiagnosed. Psychopathic tendencies are also a cause of this practice. Human rights activists have exposed cases and given coverage to this crime over the past decades. It has been reported throughout the world. It has occurred within various ethnic, religious and culturally diverse countries, including Israel, Afghanistan, Brazil, Bangladesh, Pakistan, India, Jordan, Turkey, Egypt, Iran, Lebanon, Nigeria, Palestine, Peru, the United States of America, the United Kingdom, Italy, Norway, Sweden, Germany and Canada (the Council of Europe, 2003).

The author writes about a son who is worshipped by the mother, and a father who is overthrown by his son. The book shows how a child can become lost if the structure of the family falls apart. Shafak does not condone the matricide; instead, she provides clues for the reader to understand cause and effect.

II. ADLER AND INFERIORITY COMPLEX

Alfred Adler deviated from conventional language and psychoanalysis by introducing “Organ Inferiority” which subsequently led him to coin the term “Inferiority Complex”. *The General System of Individual Psychology* (2006), is an unpublished manuscript by Adler and discovered in the Library of Congress, which contains a series of undated thirteen lectures that he wrote in English language. In these lectures, he emphasizes the role of individual in the creation of a better society. He also emphasizes how inferiority complex can hinder in the evolutionary process of a person, and subsequently the society, by creating individuals who are psychologically crippled and unable to handle the pressures and demands of the society.

The “Theory of Organ Inferiority” is discussed in the chapter three of the book. He has made some remarkable revelations regarding inferiority in children. The subsequent theories that originate from this organ inferiority highlight the beginning of neurosis and psychosis in children. He strengthens his diagnoses by giving examples from several case studies, pointing out the dangers of over indulgence and pampering, to the extent of calling it the greatest evil of humanity. The position of birth order and childhood recollections has also been discussed. The third section of the analysis employs these Alderian theories in order to unearth evidence of inferiority complex in Iskender and its origin.

Alfred Adler, with the “Theory of Organ Inferiority”, introduced the concept of Inferiority Complex in his monograph, “A Study of Organ Inferiority and its Physical Compensations”(1971). In *The Neurotic Character* (2002) and *The General System of Individual Psychology* (2006), Adler sheds light on his theory and its origin, how it affects the individual during childhood and its consequences in the later life. He clarifies that there exists a “relationship between organ inferiority and psychic compensation,” (Adler, 2002, p 1). These observations can be helpful in understanding behavioral patterns of neurotics. Since it has been established previously that Iskender’s character is psychotic, the term “psychotic” shall be referred to, instead of the term “neurotic”. This is done in order to remove any confusion that may arise in comprehension of the character analysis.

The two aspects of Adler’s theory that will prove fruitful in understanding Iskender’s character are

1. Inferiority Complex
2. Pampered Child and Adult

III. INFERIORITY COMPLEX

Adler observed that in humans, disease attacked inferior organs, those body parts and organs that were inhibited in growth (genetic) or altered due to some disease or accident (Lundin, 2015). In his monograph “A Study of Organ Inferiority and Its Physical Compensation”(1971), Adler stated that this organ inferiority could affect the individual’s psyche as well. Other organs make compensations; In case a kidney fails, the other enlarges to make up for the removed kidney. This can be illustrated by the example of “blind seer”. Beethoven was deaf, yet he wrote phenomenal compositions. Other examples are of people like Helen Keller, who make up for the loss of one or two

organs or impaired senses by compensating with healthier or exaggerated senses. Men who have small stature can be very intelligent, skilled or dictatorial, like Bonaparte, all in order to make compensations for inferior stature. The organ inferiority can profoundly influence the psyche: it lowers an individual’s self-esteem. Besides, it also increases the individual’s insecurities.

The struggle to assert one’s self, termed as Self-assertion, originates from this sense of inferiority. Its impact is greater than anticipated. In case the inferior organ learns to protect itself from the rest of the organism and compensates by participating actively in quantitative and qualitative way, “... then the predisposed child, in his feeling of inferiority, will elicit from his psychic capabilities the often conspicuous means to increase his own value, among which we may note most prominently neurotic and psychotic means,” (Adler, 2002, p 2).

Adler attributes inferiority complex to some impairment in the physical body part or organ; Self-assertion is a way to compensate for it. Iskender has to face bullying as a child. The incident is described as being part of his journal entry, emphasizing its significance. One day, while roaming beside a canal, he is ambushed by three boys, a few years older than him. They taunt him for his cowardice in running away from the circumcision, and make insinuations. They tackle him on the ground and take off his trousers to see for themselves if he had been circumcised or not. The boys ridicule him and poke fun at his child-sized penis: “What is this? So small! Like an okra,” (Shafak, 2013, p 163).

Iskender is so traumatized during this bullying, especially as the boys threaten to circumcise him again that he urinates in front of them, causing further humiliation for himself. The stress and anxiety causes regression; he sits hugging his knees and rocking himself. Pembe finds him in this position. During his circumcision, he also becomes agitated while on top of the tree, distressed and frightened, and he urinates while the men watch from below. His “inferior” organ, which is “small” due to his age, is still significant, because it plays a central role in building the self-esteem of male species. By grounding in his mind the insignificance of his body, the boys instill inside him a sense of inferiority. Prior to that, the circumcision had left him shocked by his public humiliation. He has not completely recovered from it or “healed”, when the bullying occurs. He feels that the source of all his problems arise from his private parts: “... (he) held his willy, the cause of all his distress,” (Shafak, 2013, p 28). Adler observes that the individuals who suffer on account of this inferiority (which has origin in organ inferiority), suffer from uncertainty brought on by this feeling, and feel pressurized. This can be detected easily in these children and adults. Sometimes these feelings remain hidden under the veneer of charm. But the problem takes root in the early childhood: “His will and thought are invariably built on a foundation of a feeling of inferiority,” (Adler, 2002, p 6).

Such is Iskender’s trauma after the circumcision, bullying and ram incident that he asserts himself by forming a gang of his own. Adler states that such children make a “keen estimation of themselves,” (Adler, 2002, p 6). These children, which he terms as the ugly child or the pampered child, will try to escape from the negativity within themselves. In order to escape further humiliation, Iskender forms a gang comprising of streetwise

gypsy boys who smoke cigarettes. Before his second confrontation with the bullying boys and his gang formation, the ram incident occurs. He does not show any submissiveness. His defiance is born out of his inferiority, which is subsequently a by-product of insecurity. His vulnerability as a child makes him suffer a "taste for (his) weakness," (Shafak, 2013, p 141). The retaliation on part of Iskender takes the shape of bullying as well. His gang beat the two kids out of the three, leaving the leader out, "to make him sweat" (Shafak, 2013, p 164). The gang makes the third boy drink his own urine, and throw him in the filthy canal.

The journey of such a child towards superiority is documented by Adler. Lundin explains the effect of such complexes on the individual's life. In order to feel adequate in the society and among other people, it is imperative that a person be able to overcome his deficiencies. In the external world, the demand posed by society is greater than the individual can imagine. His feeling of inferiority is enhanced by his inability to cope with life challenges, resulting in psychological, emotional and physical problems. The future does not hold any promise for such a child: "The child will need some expedient to do this, so that, in the insecurities of life, in his disoriented state of being, he will have a fixed image in his mind's eye," (Adler, 2002, p 6)

The child needs to create this tool; he will consider himself humiliated, inadequate, insecure and inferior through self-estimation. This child will find a fixed point and attribute all the power to this. Adler attributes this power to the father. In Iskender's case, Adam was not an ideal father (figure). Iskender's assertion of his own superiority is also a result of Adam's passivity.

IV. PAMPERED CHILD AND ADULT

In Chapter III of the book *The General System of Individual Psychology* (2006), entitled "Organ Inferiority & Pampering", Adler expounds on the adverse effects of pampering on a child, and the lasting impact of it on his adult life. Doctors who observed children born with organ impairment and go through suffering, explain how they do not thrive and easily turn away from life (Adler, 2006, p28). He asserts that his experience and statistics have shown that individuals who encounter hostility in life, forgo opportunities to grow and exist in a constant state of conflict with society, have a history of organ inferiority. The only way to understand the burdens of such individuals and the problems they encounter in life is by understanding "the relationship between the organs and the demands from outside," (Adler, 2006, p 30).

Adler asserts that such individuals develop, in relation to these organs, a fascination with that particular organ, explaining his view by exemplifying children with upset stomach. A child, as he grows, makes a relation between money and food. If that child suffers from a chronic case of upset stomach, he will develop a fascination with money and being rich. Often power drive in the rich is related to stomach problems. He gives the example of John Rockefeller (Adler, 2006, p 31). Another example is of a shortsighted man who was pampered as a child. This hindered his development and became burdensome for him. At thirty-six years of age, he got a job but could not settle there,

suffering from anxiety and bouts of weeping. Once he left the job and settled down at home quietly, he became contented.

There is enough evidence throughout the story to indicate that Pembe indeed pampered Iskender a lot as a child. Owing to her excessive fear and superstition, she never scolded or hit him, until he was seven years old. However, by then, he had become accustomed to being cosseted. During his confrontation with Adam over the ram meat, his father reveals: "Iskender, eat! ... I don't beat my children!" (Shafak, 2013, p 141). After the bullying and Iskender's revenge through his gang, Pembe does not scold or confront Iskender at all. He expects some kind of berating, but does not get any. Instead, his mother gives him enough proof of her approval through her silence: "She only looked at me long and hard, and I think I saw a trace of pride in her eyes," (Shafak, 2013, p 165).

This further makes him bold enough to carry on the bullying until it becomes a part of his personality. He even confesses to being a bully himself. In London, he becomes reputed to be a hard-boiled youth, in school and in neighbourhood, among his social circles: "That's the thing with bullies. Nobody says 'Enough' to them ... I should know, because I was, and still am, one of them," (Shafak, 2013, p 162).

These individuals have to struggle hard in order to achieve their goals. Everyone is affected by the external world in a different manner; their life and its style is determined by their perception and understanding of these external factors. However, these perceptions do not alter unless they acknowledge their blunders and try to change. Adler considers pampering to be "the greatest evil of mankind," (Adler, 2006, p 32). Individuals who are pampered lead a different life than other, less privileged people. Adler criticizes parents for this, blaming it on their "egotistical" tendency in pampering. Adler maintains that the mother and the child, who is pampered, do not have a strong connection; the mother dotes on the child and does everything for him. He only makes a connection with her because she meets his needs whenever required. It can also lead to resentment of others.

It has been discussed previously that Iskender, at one point, recalls the time when he used to be the only child, and wishes that it could happen again. Adler brings to lights another characteristic of these children. They are either very pleasant, or else have destructive fantasies about the father, simply because they do not wish to disrupt the comfortable situation with the mother: "The pampered child lives like a parasite in a symbiotic way," (Adler, 2006, p 32).

These children do not like being separated from their mother, and have a fear of being left alone. A child who is afraid of the dark or afraid of being left alone is a pampered child. The darkness disconnects the child with the mother. He sleeps beside the mother at night, wants the lights turned on at night (so that he can see the mother) and wants the door to the room open. Adler has his own interpretation of such behavior: "(This child's) goal of completion is to always be supported by and dependent on another person," (Adler, 2006, p33).

He does everything in his capacity to achieve this goal. He becomes attention-seeker, and in order to ensure the presence of the mother, keeps her busy with demands and behavior. This child, when enters the society as an adult, refuses to cooperate, believing that he is entitled to all, every favour and every opportunity. His only desire is "to receive, to accept, to expect,

(and) to take,” (Adler, 2006, p 33). He exploits other, finding it difficult to resist temptation; the demands of the society to become cooperative are met with disappointment. This child abhors new situations, because it deprives him of a “pampered” situation. They associate hostility with every new situation; they grow up to consider the world an extremely harsh and hostile place. They also become sensitive, shrinking for newness. This leads to a situation where we have a friendless child. The only people they eventually befriend are people these children can use, who meet their demands and pamper them. Pampered boys easily develop friendship with girls since they are not competitive, agreeable and friendly. These children would only take employment where they believe they will be appreciated, and where they can become leaders.

The Adlerian interpretation of pampered children is a befitting tool to dissect Iskender further. The aspects of his character that have not been touched upon previously, can be examined now. Once it is established that he is a “pampered child”, we see patterns of over-indulgence and its effects on his personality. He exhibits superiority, even before bullying event. The first glimpse of it is in the encounter with the old woman who names him. Iskender refuses to give her water, upon which she remarks that he desires only to be served, and not serve. He does not mingle with the children who are invited to be circumcised, considering them beneath him.

Adler makes distinction between the two types of pampered children: Active and Passive. A passive child manipulates the people around him through charm and good behavior. He seeks attention by drawing attention to himself through “passive” and socially acceptable ways: they vomit, the develop physical conditions like upset stomach, heart palpitations etc. These children lure adults to pamper them through good behavior, and win them. They also tend to become neurotics: “These passive children ... because of their desire for and attempt to retreat whenever confronted, tend to become neurotic later because neuroses and psychoses are retreats,” (Adler, 2006, p36).

Iskender is not a fussy child in the passive sense. He asserts himself through aggression later on. Turkey was place where he was cherished and beloved by all in the small village. He is friendly with his sister Esma, a girl. Adler gives examples of people, men and children alike, who has a fixation with looking at people on the streets. Iskender exhibits this fascination in the barrack-like basement flat, where he observes passer-bys through the ventilators (windows), not unlike a soldier. London is a hostile world for Iskender. His immigrant status does not help to alleviate his difficult situation. He deals the outside world in any way he can. He changes his name: Alex. These lines summarize an outsider’s view of his personality: “Alex. Alexander. Whatever ... Bloody full of himself. Always with his groupies, thinks he’s a gang leader,” (Shafak, 2013, p 125). Iskender does not speak Oxford English. His mode of communication is the London slang because he “had better luck with the slang: to me that had power, currency,” (Shafak, 2013, p 135).

His alteration of his name and adaptation of slang are ways to combat hostility by being one of the natives, and shedding his immigrant status. He unconsciously believes that by being “Alex” and remodeling his language with slang will make him less conspicuous. This instinct for survival collides with his desire for self-assertion and results in his chosen sport: “Boxing

was a one to one reflection of life ... (you are) on your own ... No team work ... No substitutes ... If you wanted to know a man ... watch him box ,” (Shafak, 2013, p 252).

The Orator praises Iskender for his skill and approves the fact the he does not “dodge risky fights,” (Shafak, 2013, p 253), and his defense is strong. This reveals that despite being the ‘leader’ of his gang, Iskender likes being alone and does not consider his friends to be his equal, either physically or psychologically. Even in prison, he forms a new gang since the existing ones are not to his liking. He relates himself with the Orator because he feels that the latter reciprocates his aura of superior manly traits: restraint, maturity, solitude.

A failing of the pampered children is that they are easily tempted and manipulated (Adler, 2006, p 36). Flattery works wonders for them, coercing them into disadvantageous situations. They are willing victims of others, robbing, stealing and even murdering in order to please others. They are ready tools for schemers and manipulators alike. Tariq, Iskender’s uncle, prompts him to act on behalf of him and save the family’s honour. He manipulates Iskender initially though flattery, by praising his ability to control the family and manage the household in Adam’s absence. Iskender comes to trust him more in the absence of a father, and his need to adhere to an expedient, a fixed image, leads him to become dependent on his uncle. The Orator also uses him as a tool to act out his “ideology”. It can be evident in their contrasting physique, Iskender being the muscular and taller of the two. The Orator needed a bodyguard who could also be turned into a scapegoat, should the need arise. The school gang, which comprises of immigrant kids, also nurtures Iskender’s need to feel significant and be-all and end-all. He likes the fact that they all look up to him: “I’m like a big brother to the boys,” (Shafak, 2013, p 228).

He in turn does his own manipulating, by making them hang on to his words, and making them feel secure in a hostile, racist atmosphere. Adler observes that the actual culprits in a crime are mostly “behind the stage” and “experienced” (Adler, 2006, p 36). The perpetrators are mere tools used to commit the crime. Iskender goes to his uncle and the Orator, even to his own father, seeking help and support on how best to act in the face of his mother’s (supposed) promiscuity. Adam acts indifferent, Tariq eggs him on and the Orator reinforces that “it’s down to” him to save his family’s honour (Shafak, 2013, p 254).

Both the manipulating people that witnessed his demise from behind the curtain, abdicated their hold on him and abandoned Iskender once they achieved their goal. Iskender belatedly realized that he was the means to an end: “Uncle Tariq, the Orator, my old buddy Arshad ... I blame them all for making me the person I was. And yet they are all free, enjoying their life, while I am here burning,” (Shafak, 2013, p 305). Adler states that children who are pampered, tyrannize the family through temper outburst (ram incident). He further predicts that these children consequently and as a result of their habits “become the tyrant of the family,” (Adler, 2006, p 36).

Since Adlerian theories do not give much emphasis to innate superiority, this analysis will refrain from straying in that direction. By the time Iskender was five, he had developed the attributes of a pampered child. His superiority and solitary, friendless status is proof of that. Additionally, his sobriquet

“Sultan” helped to solidify his sense of superiority. The trauma experienced during the ram incident and the bullying, in correlation with organ inferiority created an individual, who became a bully suffering from inferiority complex and curbing that sense of degradation through self-assertion.

V. CONCLUSION

The discussion in this study is about Iskender’s inferiority complex and the pampering that he received how it shaped his personality and its effects on his life later on. Iskender’s position in the family as the first-born makes Pembe and Adam over-indulgent in spite themselves. This excessive pampering in the first six-seven years created problems in his adult life. The result of this indulgence is that he is shocked when his parents are strict and hit him. This results in psychosis, as he retreats from harsh treatment and is ultimately unable to come to terms with criticism and berating. London turns out to be a hostile city in terms of racism. The Asian and Muslim community suffers verbal and physical assault. Iskender’s need to feel accepted, born out of his sense of inferiority and degradation makes him change his name from Iskender to more acceptable English version, Alex. He projects hostility as a defense against the fear of being rejected or rebuffed by the society. They are tempted by flattery, which is why they fall victim to manipulation:

(Pampered) boys who submit so easily to temptation have great difficulties because they can be ruined as easily as they are tempted. On the one hand is seduction, on the other the lure to steal, rob and murder; often when a gang commits a crime, the instrument was a dependent person. While others, much more experienced, are behind the stage of the crime, the actual

perpetrator is usually a dependent person, the tool of others, (Adler, 2006, p 36).

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A Comparative Study of Food Security in Africa Amid Growing Population.

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Abstract- Sustainable food security is every nation's goal. For a nation to achieve sustainable food security, the food supply must exceed the demand. Using trend analysis, this study is an attempt to compare the nature of food security from 2000 to 2014 in Nigeria to selected African countries in each region. These countries are Angola, Ethiopia, South Africa and Egypt. The paper shows that Nigeria is food insecure in comparison to the selected African countries in terms of their population and food productions. The index used to select the other African countries from each regions are based on GDP and population. The parameter used for food demand are Food production index, Crop production index and Livestock production index. Meanwhile the parameter used for food demand is population density. The result showed that Angola is more food secured compared to other African countries as they the only country among the selected countries to food production index and crop production index of over 200, though it later fell short of that in 2014 which may be as a result of the factors discussed in the paper. Angola has also recorded the highest livestock productions so far. Meanwhile, Nigeria has the highest population density out of the selected countries which is more than the combined population densities of three of the selected countries in 2014(South Africa, Angola and Ethiopia). This shows that Nigeria's demand for food is more than its supply due to the over population and low agricultural production which means Nigeria depends more on food importation than local food production. To achieve sustainable food security in Nigeria, this paper recommends a checkmate in the population growth and also improvement in agricultural production.

Index Terms- Africa, food insecurity, food security, population growth.

I. INTRODUCTION

Ever since the rise of food price and resulting protests across countries in Africa, the need to look at food security has risen dramatically in the sustainable development goal for 2050 which states food for all is in jeopardy of not been attainable. According to UNFAO, there are 37 Africa countries threatened by food crisis in 2018. Countries like Niger, Senegal, Sudan, Morocco, Mauritania, Guinea, Mozambique, Burkina Faso, Cameroon, Ivory Coast, Egypt, Tunisia, Gabon etc. has witness food crisis protest and civil unrest on food scarcity.

Food insecurity has emerged as a global crisis following the global economic meltdown (USAID, 2009). The united

nation food and agriculture organization defines food security as; (i) the availability of food that is nutritious and safe; (ii) an assured ability to procure and acquire food of good quality in a socially acceptable way. When this two fundamentals are violated i.e. food is not easily accessible and households have difficulty securing adequate food it becomes food insecurity (FAO, 2004).

FAO also defines food security as, "when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life." (FAO, 2004). Food security according to Abdulrahman (2013), is the inability to provide and secure high quality and quantity of food to its people as a result of high demand, shortage in the supply of agricultural commodities, and low purchasing power. He also highlighted reasons for food insecurity which includes rural urban migration, rise in the price of oil, increase in the demand of biofuel and natural calamities. Similarly, decline in agricultural commodity output, population growth and trade liberalization which leads to elimination of subsidies on agricultural inputs, trade restrictions and engaging in export promotion will have adverse effect on food security of a nation.

The global food security crisis jeopardize the lives of millions of people in vulnerable communities, particularly Africa where poverty, malnutrition and death from hunger thrived (IFP, 2001). The combined effects of spiraling food prices and lack of health care could be catastrophic for the poor, this will surely affects the sustainable development goals which state eradication of hunger in any part of the world. The united nation sustainable development goal for 2020 is to end hunger, achieve food security and availability of food improved nutrition and promote sustainable agriculture. According to the UN 2018 estimate Africa population is 1.2 billion people which is equivalent to 16.64% of the total world population.

According to UNEP Africa will attain an estimated 2 billion population by 2050 which makes the continent the second largest continent in the world, and has many distinctive climate zones, which makes the farming system different from each region of Africa. Traditionally, North Africa uses mostly Mediterranean style of farming and crop production, while the Eastern Africa engages in domestication type of farming. In the Western side of Africa there is a distinct cultural development which is mainly staple foods and in the Southern Africa is mainly hunter gathering and mix farming. The paper aim to make a comparative study of countries in Africa that are high in GDP ranking and with high population has they perform in the face of

challenges of their continuous population increase against their agricultural production.

II. RESEARCH ELABORATIONS

Causes of food insecurity in Africa

There are numerous causes of food insecurity in Africa, but this paper is going to review some of the important causes as its relevance to the study;

1. Population

The overall demand for food is affected by population growth, most of the countries with the highest number of people facing food insecurity also have high fertility rates and rapid population growth which affects meeting nutritional value. It is projected that by 2050 Africa fertility rate will have doubled even as at a low fertility rate, presently Africa has one of the highest population growth in the world. Africa holds the largest proportion of food insecure people, with one in four people undernourished (UNPD, 2009). The region also has the lowest agricultural productivity in the world and the highest percentage of people living in poverty (World Bank, 2007).

Food production depends on the cropland and water supply, which are under strain as human populations increase. Pressure on limited land resources, driven in part by population growth, can mean expansion of cropland. This often involves destruction of vital forest resources or over exploitation of arable land. Globally, the rates of growth in fish capture and aquaculture has slowed, raising concerns about the future supply of fish for human consumption (FAO, 2009). According to Castro J and Anges 2008, human pressure, including population growth, have adversely affect the productivity of fisheries. The fisheries had previously provided up to 80% of dietary protein for the human population is in decline.

2. Conflicts and Communal violence

Conflicts have always been a bane in food security in Africa. Where conflicts occurs there are tendencies to have food shortage, low agricultural production, destruction of food stocks, live stocks and other agricultural produce and assets. For instance the militias often sack villages and hamlets making the poor farmers flee. Which in turns reduces or eliminate the farming population and creating food insecurities?

Messer and Cohen, 2004 in their works noted that conflicts and communal violence contributes to serious fall in accessibility and availability of food which is the core basis of food security since agriculture is the main stake of rural livelihood in African. Conflict and war has a strong correlation to food security and production has been mentioned in a Food Agriculture Organization, 2004 report that stated communal violence costs Africa over \$120 million worth of agricultural production during the last third of the 20th century, given the importance of agriculture to the overall livelihood of the economy, especially in the conflict prone area of Africa.

A Food Research Policy Institute, (2004) identifies that conflicts limits food production and denies people access to food and availability of food supply. In most conflicts and post conflicts zones in Africa are home to substantial number of food insecure people, therefore making Africa countries a zone to high chronic food insecurity.

3. Climate Change

Agriculture is extremely vulnerable to climate change in Africa, high temperature and heat wave coupled with erratic rainfall pattern reduces agriculture yield, encourages weed and pest proliferation and increase the likelihood of short run crop failure and long run production decline (Nelson et al, 2009). In other to prove the impact of climate change on agriculture production Schlenker and Lobell, 2010 combined historical crop production and weather data together, the result shows that 5 major crop African crops (maize, sorghum, millet, groundnut, and cassava) yield will decrease by 7% by year 2046. With the current predictions has how climate change will affects the world. The negative adverse effect is going to have on food security is going to overwhelming in Africa. The projected drying up of many water sources, increased instances of drought and flash floods, the submersion of some land masses under rising sea levels, will all stress the agricultural system in Africa. Crops will suffer from heat stress and water stress with a rise in temperature and precipitation.

Between 1980 and 2014, over 363 million people in sub-Saharan Africa were affected by droughts. Droughts affect more people in eastern Africa with 203 million people affected, compared to southern Africa with 86 million and western Africa with 74 million. Ethiopia and Kenya together accounted for 30 percent of the total number of people affected, with nearly 61 million and 48 million, respectively (FAO, 2015). The countries the loss suffered in economical valuation is about \$31 billion in crop and livestock production after the droughts that occurred between 1991 and 2013, with the highest losses experienced in eastern Africa amounting to \$19 billion. In southern Africa, losses amounted to over \$10 billion and \$2.5 billion in western Africa. After the droughts that occurred between 1991 and 2011 in the region, food imports increased by \$6 billion and exports of the same commodities fell by nearly \$2 billion (FAO, 2011).

For example, in the horn of Africa every year 9.6 million people faced food insecurity caused by drought which indicates a strong relationship between climate vulnerability and food security. In many cases, there is a complex interaction of crises that may combine with drought to produce food insecurity, such as soaring and volatile food prices, livestock and plant pests and disease, resource-based competition, internal conflict and civil insecurity. These are among other important drivers of production loss and food insecurity, which can coincide with drought in a given year.

4. Gender

The women work force in Agriculture industry in Africa is more dependent on women labor than that of men because the livelihood of women is dependent on agriculture for survival. In Africa in 2008, 63% of female in compare to 48% of male workers depended on agricultural-based livelihood (world resources institute, 2008). Women now also constitute a substantial proportion of the total agricultural labor force. Doss, 2010 noticed that if we take time spent on food production, pressing and preparation, women contribute 60-70% of the total labor needed to bring food to the table in developing countries. The dependence of food security in Africa is now dependent on women than men who have moved to non farming job.

Even has at the ever increasing population of women in agriculture they are affected by constant like operating a small

farms and the Africa history of women not owing land. According to a World Bank report of 2007, women are typically those working on family farm where the farm is owned by the men or family, rather than the women themselves. Also there is gender brashness in access to technical information, credit, marketing (World Bank 2009, FAO 2011). All this disadvantages the women face limits the opportunities for higher value production thereby affecting a sustainable food security in Africa.

Food Security in the Case Studies

1. Food insecurity in Egypt

Agriculture is a major component of the Egyptian economy, contributing up to 14.5% of the gross domestic product and 28% of all the jobs (USAID, 2017). The agriculture sector in Egypt is dominated by small farms which use traditional practices that do not comply with internationally recognized standards. Egyptian economy is considered the backbone of the economic and social structure where it represents a major role in comprehensive development of the country. The Economist Global Food Security Index, 2014 observed that most North African countries suffer from triple burden of malnutrition, under nutrition, overweight and obesity are said to be above 50% in all countries of the region.

In 2014, 16.9% of children in North Africa are stunted and 7.3% of children are under weight which reflects the burden has large social and economic losses; productivity losses and direct health care cost (The Economist Global Food Security Index, 2014). Egypt is facing high rates of poverty and unemployment, with 17% of the Egyptians suffering from food security in 2011 has a result of the political unrest in the country. Child stunting rate, in Egypt, is above the regional average, ranging from 28-58% (FAO, 2014). Egypt is the largest wheat importer in the world, wheat import represent more than 50% of the Egypt consumption which make food security in Egypt vulnerable to volatility of international food price, which increases government budget and living costs of the Egyptian population contributing to poverty, under nutrition and other negative social welfare effects (FAO, 2014).

In Egypt, 5% of the population is under nourished in 2012 and 40% of adult population is already stunted by poor nutrition (Power, 2013 and World Bank Development Indicator, 2014). According to UN Egypt 2014, high population rates, increasing per capita income and urbanization are major factors for rising food demand, especially cereals. The country is facing important challenges with diminishing agriculture potential, water scarcity, climate change, deficit on its food balance and rising import bills. Breisinger et al (2013), noted that there is high correlation between poverty and food security in Egypt between 2009 and 2011, 12% of the population became food insecure and income poor, it can be concluded that with poverty rate around 26% in 2012-2013 food insecurity in Egypt is more of economic problem.

The challenges facing agricultural production in Egypt includes climate change, soil desertification, salinization and urbanization, construction on agriculture land in threatening the land availability. Between 2010 and 2011 the total cultivated area decreased by 1% because of such construction particularly in greater Cairo and Nile delta (Breisinger et al, 2013). The federal

ministry of water resources and irrigation in Egypt emphasizes that water shortage and the degradation of water quality is a major challenge facing agriculture in Egypt. Agriculture consumes the largest amount of water available taking 85% of the total demand of water.

2. Food insecurity in Ethiopia

Food insecurity remains a wide spread phenomenon and a great challenge in Ethiopia, the challenge is further enhanced by climate change such as rainfall failure, which affects agriculture activities, livelihood activities for the population (central statistics agency of Ethiopia, 2015). Ethiopia agriculture is weather dependent has such it is erratic and insufficient for even a successive rainy seasons, the entire country is prime to falling into famine (Birara, E; Mequant, M; and Samuel, T; 2015). A 2010 United Nation report, 5.2million people in Ethiopia face an uncertain food security situation. The worsening food security situation is also attributed primarily to poor rainfall (UN, 2010).

The problem of food insecurity has become persistent in Ethiopia as many rural households are already lost their means of livelihood due to recurrent drought and crop failure (Bogale, 2002). Drought and famine has become an everyday reality in Ethiopia, the drought of 1973 and 1986 was estimated to have affected over 50 million Ethiopian (Berhanu, 2001). There are many factors that is contributing to the case of food insecurity in Ethiopia, which are production fluctuations, low non-farm employment, low income, regular fragmentation of markets, high rate of natural degradation, low level of farm techniques, high level of illiteracy and inadequate quality of basic education, poor health and sanitation, high population growth, poor governance, conflicts and war. These factors all impede the achievement of food security and sustainable economic development.

In a UNICEF, 2014 report, about 10% of Ethiopians are chronically food insecure and this figure rises to more than 15% during frequent drought years (UNICEF, 2014). Around 12 million people in the country are regularly exposed to droughts, floods, landslides, epidemic and earthquakes. These incidents have negative consequences such as forced internal displacement of population, destruction of assets and livelihoods, extreme poverty, under nutrition and extreme food insecurity.

3. Food insecurity in South Africa

The government of South Africa has committed itself to fighting food security and poverty by adding adequate nutrition and the right to food to all to the bill of rights. In 2002, the South Africa government adopted the integrated food security strategy (IFSS) which vision statement is to attain universal physical, social, and economic access to sufficient, safe and nutritious food by all South Africans at all times to meet their dietary and food preference for active and healthy life (Jacob, 2009).

South Africa is likely not to feature in any agenda of an international dialogue on food security. In the country is a net exporter of agricultural commodities and has a high per capita income, even for an emerging economy but has at this can we say the country is food secured? About 14% of the population is estimated to be vulnerable to food insecurity, and 25% of children under the age of six are reckoned to have had their development stunted by malnutrition (HRSC, 2004). Food security in South Africa has taken a complex challenge during the country's food system given the rapidly changing complex in stress such as climate change, political unrest, socio-economic

and environmental vulnerability, rising food prices which puts South Africa livelihoods of millions at risk. These conditions, coupled with external threats, could again trigger widespread suffering and deepen food insecurity (Drimie and Casle, 2009).

In achieving food security in South Africa a multi-facet system must be taken to stem the fast changing reality of challenges such as climate change, urbanization, population growth and environment sustainability. In South Africa even though they are food secure at national level it doesn't translate it to accessibility to household benefits because food security at national level is different compared to food security at local level or household. The food security situation at household is less palatable as argued by De cook et al, a national survey carried out indicate 24% of children under 5yrs of age are stunted and approximately 57% of children under 5yrs of age shows sign of wasting (Ardington and Case, 2009). The 2005, national food consumption survey (NFCS) reports that despite the overall growth and food sustainability of South Africa economy, one or two household i.e. 51.6% experienced hunger; which is one out of three was at risk of hunger and only one of five appeared to be food secured (Labadano et al, 2008).

South Africa is a food secured country producing enough staple foods or having the capacity to import food if needed in order to meet the basic nutritional requirement of its population (FAO, 2008) but all in how readily accessible in the food to household in South Africa. A survey by South Africa Statistics in 2009 reports that an estimated 20% of South Africa households have inadequate or severely inadequate access to food. National food indicator reveals that South Africa has been able to meet the food needs of its growing population over the past years.

4. Food insecurity in Nigeria

In the last decade or so, Nigeria has become a major importer of basic staples such as wheat and rice and overall, the country account for a major part of Africa's overall food deficit. As at 2013, Nigeria has spent N1.3trillion on the importation of food items annually comprising of only rice, sugar, fish and meat. The UN on Food and Agriculture in 2017 declared that about 1.7million Nigerians are facing acute food insecurity and in need of urgent life saving and livelihood protection (FAO, 2017), even at that the record books, according to a CBN report shows that there have been a 3.5% increase in crop production and 5.9% in livestock and fishery (CBN, 2016)

Nigeria is the largest oil producing country in Africa, and she has 79 million hectares of arable land of which 32 million hectares been cultivated so far. She majorly practice rain fed agriculture and with her population of 160 million which depends on staple food, 70% of her population are under nourished and suffering from poverty (Nwajiuba, 2012). In the 1960s, agriculture was the leading contributor to the economy of Nigeria, the force driving it to global prominence, creating employment, income and foreign exchange. Nigeria was able to feed its population and export its surplus, the discovery of oil changed the system and funds were channeled away from the sector and agricultural production was substituted for oil then the issue of food insecurity became an instant national concern.

With the improvement in agricultural production in Nigeria since the democratic era in the country, both food and livestock production remains below potentials, despite a 7% growth rate between 2002-2008. The growing population is still

dependent on importation of staple food which can be seen in the food import bill. There are several factors that is driving Nigeria towards consistent food insecurity such has climate change, inadequate financing, high cost of farm machine, consistent attack by herdsmen on local villages and farmers prompting farmers to leave their homes and relocate. According to the Nigerian Emergency Management Agency highlighted that 65% of northern farmer have migrated to the southern part of Nigeria due to insecurity of the north.

5. Food Insecurity in Angola

Following four decade of conflicts, Angola has one of the worst humanitarian situation in the world. Despite its vast mineral wealth and agricultural potential, the country is ranked 160th out of 174th countries on the UNDP human development index (UNDP, 2000) not counting international refugees approximately 1.8 million people depend on food assistance. After the end of the 30 years civil war in 2002, Angola has seem considerable progress in terms of economic and social development, including its nutritional status in comparsim to other southern Africa countries. The nutritional level has improved from a 58 in 2002 to 33 in 2016 according to global health index (2016). Many programs were set in motion after the civil war to fortify food security and nutritional improvement. In 2003, a 10 year program of food fortification was initiated to produce fortified maize meal (T. Van dan Briel, E. Cheng, J. Zewari, and Khan, R., 2007) with one year production of the fortified maize reached 4 tons per hour and by 2006, almost 10,000 tons of fortified maize meal had been produced reaching 115, 000 people monthly.

In 2010-2011 a severe drought hit Angola which was marked by a shortage of rainfall for more than 60% when compared to normal years the impact is that agricultural production decrease by more than 400,000 tons nationally and an estimated 366,780 household will be affected across the country was projected. Food insecurity, high food prices and other factor linked to drought have impacted negatively on the giant stride taken on the nutritional status of children under 5 (UNICEF, 2012). Most household in Angola are generally food secured due to the augmented supply of food reserve from the nation harvest and steady import of food products.

III. RESULTS

The paper is structured to briefly discuss the causes of food security in Africa given that there are 53 Africa countries, we selected 5 countries from each region of the continent base on their population size and gross domestic product (GDP). The countries selected countries are; Nigeria, Ethiopia, Egypt, South Africa and Angola. Then a comparative study of their food demand using food production, crop production and livestock production as index against its food supply using population as index, to identify which country is food secured with all the challenges encountered and how they can improve on their food security amid the challenges they face. The data for food demand index was gotten from world bank data 2017.

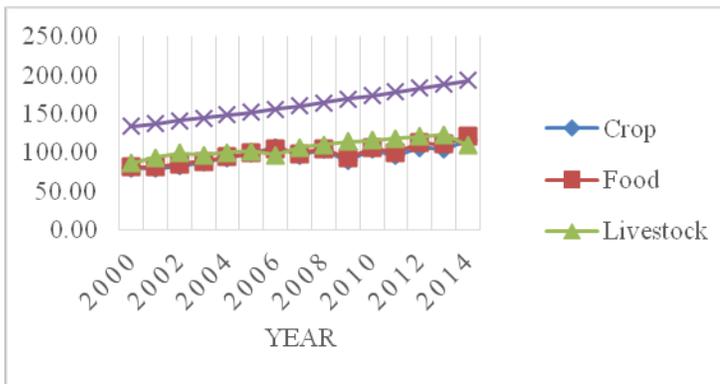


Figure 1: Demand for and Supply of Food in Nigeria (2000 - 2014)

From Figure 1, food, crop and livestock production index and population growth in Nigeria between the period under review shows an increasing trend, but the rise in population is faster than the rise in food production. Food production, a proxy for food supply of food increased from 81.8 in 2000 to 121.61 in 2014, meanwhile crop production also was also on an increase from 80.56 in 2000 to 116.88 in 2014, livestock production also increased from 86.3 in 2000 to 123.66 in 2013 and later fell to 109.4 in 2014; while the population density, a proxy for food demand increased from 134.33 in 2000 to 193.75 in 2014. Nigeria food equation is not balanced because the demand for food is rising faster than the supply of food. This shows that Nigeria is not food secured in terms of availability

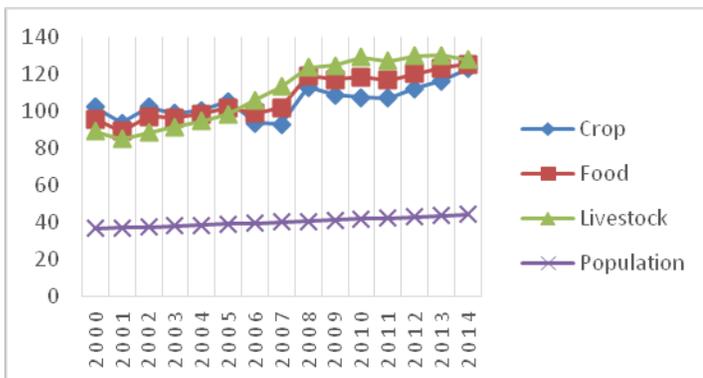


Figure 2: Demand for and Supply of Food in South Africa (2000 -2014)

From Figure 2, food, crop and livestock production index and population growth in South Africa between the periods under review shows an increasing but fluctuating trend, but the rise in population is lower than the rise in food production. Food production, a proxy for food supply of food increased from 96.06 in 2000 to 125.79 in 2014, meanwhile crop production also was also on an increase from 102.47 in 2000 to 123.22 in 2014, livestock production also increased from 89.41 in 2000 to 130.47 in 2013 and later fell to 127.93 in 2014; while the population density, a proxy for food demand increased from 37.01 in 2000 to 44.65 in 2014. South Africa food equation is more balanced because the demand for food is lower compared to the supply of food. This shows that South Africa is more food secured in terms of availability compared to Nigeria.

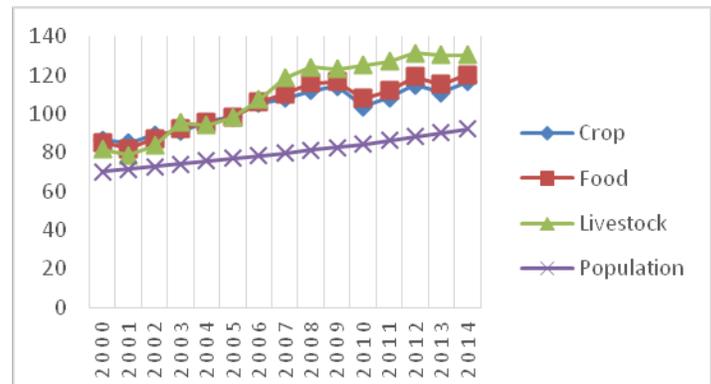


Figure 3: Demand for and Supply of Food in Egypt (2000 -2014)

From Figure 3, food, crop and livestock production index and population growth in Egypt between the period under review shows a rise and fall trend, but the rise in population is lower than the rise in food production. Food production, a proxy for food supply of food increased from 85.27 in 2000 to 120.38 in 2014, meanwhile crop production also was also on an increase from 86.77 in 2000 to 116.58 in 2014, livestock production also increased from 81.91 in 2000 to 131.58 in 2012 and later fell to 130.65 in 2014; while the population density, a proxy for food demand increased from 70.22 in 2000 to 92.23 in 2014. Egypt food equation is a little balanced because the demand for food is lower compared to the supply of food. Meanwhile, the supply for food is non reliable as the trend shows a rise and fall supply while the demand is steadily increasing. This shows that Egypt is a bit more food secured in terms of availability compared to Nigeria.

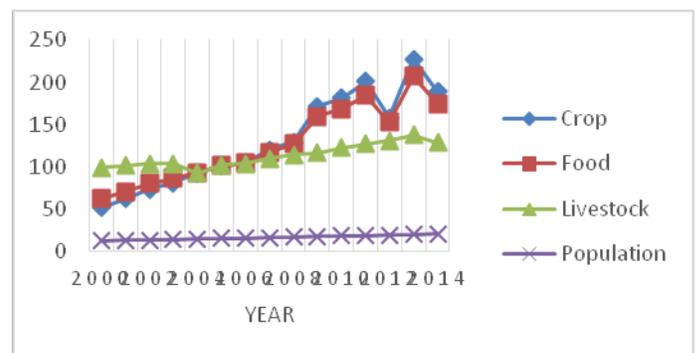


Figure 4: Demand for and Supply of Food in Angola (2000 - 2014)

From Figure 4, food, crop and livestock production index and population growth in Angola between the periods under review shows an increasing but fluctuating trend, but the rise in population is lower than the rise in food production. Food production, a proxy for food supply of food increased from 62.75 in 2000 to a record high of 207.44 in 2013, and later fell to 174.85 in 2014, meanwhile crop production also was also on an increase from 52.53 in 2000 to a record high of 227.3 in 2013 and later fell to 189.08 in 2014, livestock production also increased from 99.86 in 2000 to 138.01 in 2013 and later fell to 128.7 in 2014; while the population density, a proxy for food demand increased from 13.18 in 2000 to 21.59 in 2014. Angola food equation is more balanced because the demand for food is

lower compared to the supply of food. This shows that Angola is more food secured in terms of availability compared to Nigeria due to their low population density.

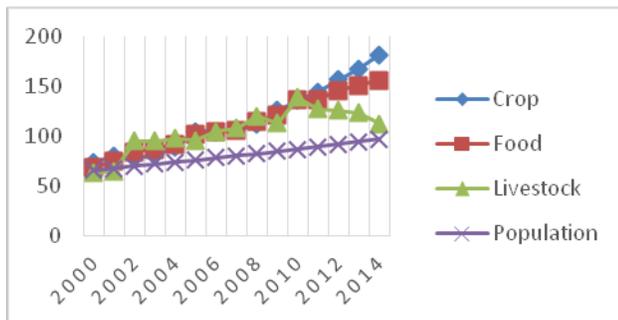


Fig. 2. Demand for and Supply of Food in Ethiopia (2000 -2014)

From Figure 5, food, crop and livestock production index and population growth in Ethiopia between the periods under review shows an increasing but fluctuating trend, but the rise in population is lower than the rise in food production. Food production, a proxy for food supply of food increased from 69.79 in 2000 to 156.55 in 2014, meanwhile crop production also was also on an increase from 74.92 in 2000 to 182.29 in 2014, livestock production also increased from 64.04 in 2000 to 139.02 in 2010 and later fell to 112.93 in 2014; while the population density, a proxy for food demand increased from 66.53 in 2000 to 97.4 in 2014. Ethiopia food equation is more balanced because the demand for food is lower compared to the supply of food. This shows that Ethiopia is more food secured in terms of availability compared to Nigeria.

The inability of food supply to match up with demand is attributed to low productivity in agriculture leading to a fall in locally produced food in Nigeria. To supplement the shortfall in domestic food production, Nigeria depends so much on food importation.

Too much reliance on food importation is not good for the economy of any nation, it could only lead to vulnerability and in case of down turn in the economy as we are expressing recently, the country will be left with no option than to depend on food aid and further exposing the country to a chronic food insecure situation. Since 2000, the prevalence of undernourishment in Nigeria has been decreasing even though the country did not achieve the millennium development goal of eradicating poverty and hunger in 2015. The downward trend in the prevalence of undernourishment maybe attributed to the improvement in food production during the period.

Having compared Nigeria's food security issues with some selected Africa countries, it shows clearly that Nigeria being the giant of Africa is not exhibiting the traits of real giant in terms of securing food security for its citizens. The parameters being considered in this papers shows clearly how the recent insurgent in the North has affected the livestock productions in the country. This also prompted consequent security threat being posed by the Fulani herdsmen who has lost their arable lands for grazing due to insurgency in some parts of the northern region. Thus, this paper recommends the following to the Nigeria government so as to achieve sustainable food security for its citizens.

- i. Population control: The rate at which the population is growing compared to food production index shows clearly the country is not food secured. In such case, government needs to control the population growth in the country by formulating policies which will help checkmate it.
- ii. Improved Agricultural productivity: There should be improvement in food, crop and livestock production. Though these indexes compared to other selected African countries are still close, but there should always be room for improvement as we can't compare the selected Africa countries' population to that of Nigeria.

IV. CONCLUSIONS

This paper compares food security in Nigeria to some selected Africa countries. The cause of food insecurity are also examined. The issues of food insecurity in the selected African countries are also discussed, recommendations were also made to achieve sustainable food security in Nigeria. Achieving sustainable food security in Nigeria means being able to meet with the present demand for food by the citizen without jeopardizing the chances of meeting up with the food demand of the future generation. Most literatures considers Africa to be one of those continents that is vulnerable to food security. This assertion might be true but this study has shown that the case is actually a fallacy. The rate of population growth in Africa some of the case studies except Nigeria are food sufficient and are capable to feed its population demand. The case of Nigeria is peculiar because of persistent causes of insecurity been prevalent in Nigeria.

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A Dream of Cashless Society: A Myth or Reality!

(Study of customers regarding the awareness and preference for plastic money)

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Abstract- In the world glance as per technology changes, suitable changes should be adopted by the economy. And among all the changes in economy lead to some drastic changes in to the transaction. The payments business in India is on the cusp of a revolution. With rapid growth and modernization of the economy, there is little doubt that a majority of India's 1.2 billion plus citizens will demand and get modern financial services that are far superior to what their parents' generation enjoyed. Nowadays in any payment transaction plastic money becomes inevitable part of the transaction and with it life becomes easier and development would take better place. Plastic money is a term that is used for the hard plastic card used by the consumers' everyday in place of bank notes. Plastic money is available in 5 forms: credit cards, debit cards, cash card, pre-paid cash card and store card. Basically it is the alternative to the money.

Keeping in mind the changing technology replacing the traditional concept of paying this article aims to understand the fact that whether the cashless society is accepted by customers or it is a challenge for them to understand the only term 'cashless'. The study also aims to check the preference of customers towards plastic money.

Index Terms- Plastic Money, Monetary transactions, Cashless society.

I. INTRODUCTION

India is a giant economic mediocrity and to resuscitate the country's underperforming economy, prime minister took the boldest decision in the financial history of independent India, by overnight demonetizing the high value currency notes of Rs. 500 and Rs.1000. the announcement was met with varied emotions and reactions shock, surprise, anger, panic and hope and relief for some of who believe that this would arrest the growth of a parallel economy. While the opposition says that demonetization has unleashed economic anarchy, subjected common people to hardship and trade and business, the Modi government insists on it as a bold move to counter black money, terrorism and fake currency.

The prime minister's surgical strike on black money is a bold historic move to weed out the evils in the country's parallel

economy. For a cash based Indian economy, the demonetization of the Rs 500 and Rs 1000 currency notes could spark a new digital economy wherein commercial players like Paytm, Master Card get a chance to expand their customer base. For e payment wallets and organized sectors it is a time to rejoice but for the unorganized sector this move could mark the end of their reign.

The demonetization has surely resulted in serpentine queues outside banks and ATM's, to exchange and withdraw new currency notes, but will eventually promote digital penetration and cashless transactions in the economy. But the major issue come out is that **ARE WE READY TO ACCEPT THE CONCEPT OF CASHLESS SOCIETY? ARE WE AWARE OF EXACTLY WHAT THE TERM CASHLESS MEANS?**

For understanding the term cashless first we have to understand what plastic money means is:

Plastic money is a term that is used for the hard plastic card used by the consumers' everyday in place of bank notes. Plastic money is available in 5 forms: credit cards, debit cards, cash card, pre-paid cash card and store card. Basically it is the alternative to the money.

- 1) Cash card: cash card is the form of plastic money that will allow us to withdraw money from bank through automatic teller machine. These cards are also known as ATM cards. But the main drawback of this card is that it is not used for purchasing purpose.
- 2) Credit card: credit card is the form of plastic money that will allow consumers to withdraw money from bank as well as for purchasing goods and services directly on credit basis.
- 3) Debit card: Debit card is the form of plastic money that is used to debit money from bank account. It is useful only if there is sufficient amount in the account that a consumer want to spend.
- 4) Store card: store card is the form of plastic money which is similar to credit cards. The basic idea of the store card is to purchase goods and pay bill at the end of month. Store cards are used at very few places basically at the famous brand stores like Shoppers stop, lifestyle etc. store cards are charged at very high rate.
- 5) Pre-paid cash cards: prepaid cash cards as name suggests credited by the user in advance and allow the

user to use it up to that limit only. These prepaid cards are reusable only if they are topped up.

Advantages of plastic money:

1. Eliminates the need of carrying huge cash:

This eliminates the need of carrying huge load of cash which is risky to the consumers and inconvenient too.

2. Minimize the risk of lost and theft :

In case of cash there is high risk of getting stolen. However, in case of debit/credit card we can report the matter to the bank and block the card by the help of them to avoid misuse by any other person.

3. Anytime/Anywhere Access :

Using plastic cards we have the unique advantage of using it anywhere in the country or even abroad for financial transactions.

4. Credit Facility:

In case of credit card we have the option of buying on credit or paying later. It helps us in case of emergencies and contingencies.

5. Online Payments:

We can use cards for online payments, transferring of funds and various other transactions, which become an important feature of everyone's life.

Disadvantages of plastic money:

1. Non-acceptance at small retail outlets:

Unless we are a person who shops only in supermarkets and hypermarket we will be forced to use cash.

2. Cannot be used for all daily needs:

We cannot pay our milkman, servant, paper wala, etc. by card.

3. Loss and misuse:

Once a card is lost we have to immediately report it and get the card blocked to avoid misuse. Sometimes when we are not aware that we lost the card the chances of misuse is higher.

4. Low value transactions:

There are cases where small and medium sized retailers don't accept cards for low value transactions.

5. Service charges:

In some cases the outlets charge additional service charges for cards. So this can be another burden on the pocket.

II. REVIEW OF LITERATURE

(Bisht, Nair, Dubey & Hajela, 2015) The result shows that the use of debit card is more beneficial than credit card because of their cash back policy, control over spending and security. The main usage of plastic money is in online transactions. The basic problems involving plastic money is the fear among consumers of losing card and high unnecessary formalities. (Sohani, 2015) The moreover success of plastic money greatly lingers on banks and government ensuring excellent customer relationship. Adequate use of technology, proper use of resources coupled with incentive structure for those involved in the system of plastic money will turn out to be a win situation for all. (N. Bazmi, M. Nazir & Z. Nadia, 2015) If comparison is done between eras connected with conventional consumer banking and current e-banking eras, the outcome indicates which e-banking features led absolutely in addition to

proliferated the profits connected with financial institutions. (Raghu, 2015) Indian consumers may implicitly recognize the cost and risks associated with the use of cash, yet prefer it for a variety of reasons. Easy avoidance of taxes, low access to financial services and patchy digital infrastructure and connectivity have put in motion and sustained a vicious circle in which cash thrives. (S. Deviranjitham & S. Thamilarasan, 2014) The study reveals that many people have knowledge about credit cards but do not possess credit cards because of the fear of falling into debt trap. Customer's satisfaction is also found to be less because of high rate of interest. (S. Sudhakar, 2014) In order to satisfy the cardholders, merchants may avoid the arbitrary fixing of minimum and maximum amount of purchases and levy of commission/ surcharges. In order to reduce high interest rates on credit card bill outstanding, the better way is to convert it into personal loans.

III. OBJECTIVES

- To determine the awareness among the customers regarding plastic money.
- To determine the preferences of customers regarding the usage of plastic money.

IV. HYPOTHESIS:

H₀₁: There is no significant association between Demographic Variables and Plastic Money.

H_{a1}: There is significant association between Demographic Variables and Plastic Money.

H₀₂: There is no significant difference between the preferences of customers using plastic money regarding different identified variables.

H_{a2}: There is a significant difference between the preferences of customers using plastic money regarding different identified variables.

For testing of Hypothesis the following factors will be taken:

- Apparel
- Banking
- Consumer Durables
- Utility Billings
- Online transactions

V. RESEARCH METHODOLOGY:

RESEARCH DESIGN:

Research design is a map or blueprint or basic framework which provides guidelines according to which the research is to be conducted. It also specifies the methods of data collection and data analysis. **Descriptive research design and empirical research design** are adopted for the research. **Descriptive research design** is adopted because it aims to study the demographic characteristics of customers who avails the services of plastic cards. **The empirical research design** is adopted because data is collected through primary sources and tests are applied for analysis accordingly. So the research is based on evidence.

Sample size is 150 respondents of Jaipur.
Sampling technique is simple random technique.

- **SAMPLE DESIGN:**
- **DATA COLLECTION METHODOLOGY**

Data collection method	Sources of Data
Primary Data	Structured questionnaires (using 5 point likert scale)
Secondary Data	Research papers & articles, Magazines & journals

VI. FRAMEWORK OF THE DATA ANALYSIS

However, before actual analysis was carried out, it was important to

- Check if data had been entered correctly and whether it contained out-of-range values.

- Check for missing values, and deciding how to deal with the missing values.
- Check for normality, and deciding how to deal with non-normality.

Thus observation of the distribution of data in reference to Kolmogorov-Smirnov and Shapiro-Wilk revealed that the data was approximately normal.

Normality test hypotheses

H0: the observed distribution fits the normal distribution

Ha: the observed distribution doesn't fit the normal distribution

[1] Tests of Normality						
[2]	[3] Kolmogorov-Smirnov ^a			[4] Shapiro-Wilk		
	[5] Statistic	[6] df	[7] Sig.	[8] Statistic	[9] df	[10] Sig.
[11] Apparel	[12] .147	[13] 150	[14] .000	[15] .946	[16] 150	[17] .000
[18] Banking services	[19] .250	[20] 150	[21] .000	[22] .919	[23] 150	[24] .000
[25] Consumer durables	[26] .223	[27] 150	[28] .000	[29] .900	[30] 150	[31] .000
[32] Utility billing	[33] .192	[34] 150	[35] .000	[36] .920	[37] 150	[38] .000
[39] Online transaction	[40] .228	[41] 150	[42] .000	[43] .904	[44] 150	[45] .000
[46] a. Lilliefors Significance Correction						

Source: Output of IBM-SPSS 22

The above table presents the results from two tests of normality, namely Kolmogorov-Smirnov test and the Shapiro-Wilk test. The Shapiro-Wilk test is more appropriate for small sample sizes (< 50 samples), but can also handle sample sizes as large as 2000. For this reason, the results of the Shapiro-Wilk test have been taken into consideration for assessing normality.

We can see from the above table that present survey data is significantly deviate from a normal distribution as the Sig. value of the Kolmogorov-Smirnov and Shapiro Wilk is less than **0.05**.

Chi-Square as Test of Independence

Chi-square test of independence is basically developed to know that there is an association among two different factors. Assume N observation are considered and classified according to two characteristics say A and B. It may be considered to test whether the two characteristics are independent. In such a case, Chi-square test for independence of two attributes is used.

Cross-tabulation is a prominent methodology that assists to describe the association amid definite variables. In present study with the help of this test study determined that if there is an association between demographic variables & preference of plastic money.

H₀₁: There is no significant association between Demographic Variables and preference of plastic money.

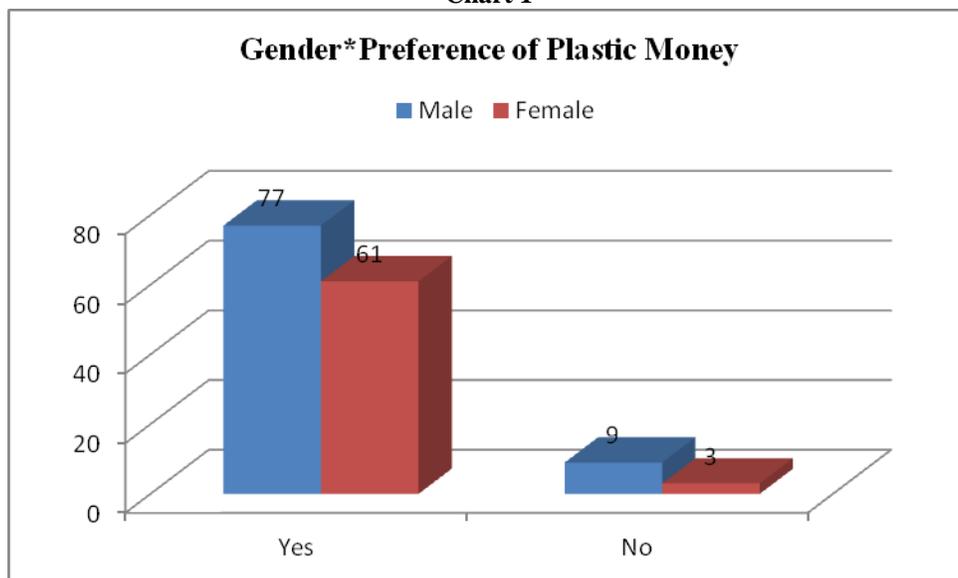
H₀₁: There is a significant association between Demographic Variables and preference of plastic money.

Association between Gender & Preference of Plastic Money

Table 1

[1] Crosstab				
[2] Gender*preference of plastic money				
[3] Demographic Variables	[4]	[5] Prefer of plastic money/cards		[6] Total
		[7] Yes	[8] No	
[9] Gender	[10] Male	[11] 77	[12] 9	[13] 86
	[14] Female	[15] 61	[16] 3	[17] 64
	[18] Total	[19] 138	[20] 12	[21] 150

Chart 1



Above table gives us information about the association between gender and preference of plastic money of respondents. It has been seen that **77** respondents were males who said they use plastic money whereas **9** respondents were males who said they do not use plastic money. While **61** respondents were

female said they use plastic money whereas **3** respondents were females who said they do not use plastic money. This table allows us to understand that both males and females prefer to use plastic money.

Table 2

[22] Chi-Square Tests			
[23] Gender*preference of plastic money			
[24]	[25] Value	[26] df	[27] Asymp. Sig. (2-sided)
[28] Pearson Chi-Square	[29] 1.664	[30] 1	[31] .197
[32] Likelihood Ratio	[33] .972	[34] 1	[35] .324
[36] Linear-by-Linear Association	[37] 1.760	[38] 1	[39] .185
[40] N of Valid Cases	[41] 150	[42]	[43]

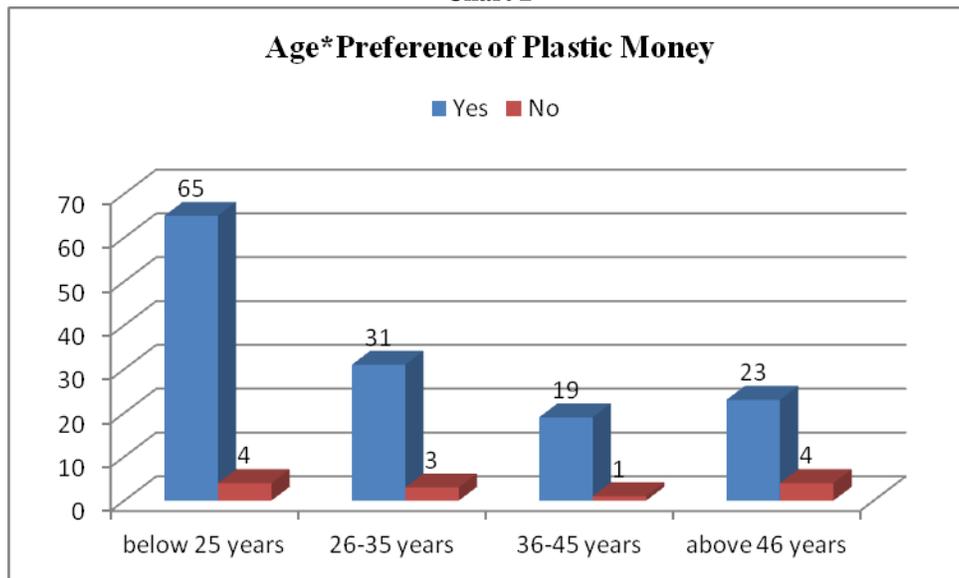
It can be seen here that $\chi(1) = 1.664, p = 0.197$. This tells us that there is no statistically significant association between gender and preference of plastic money. This implies that both males and females equally prefer to use plastic money.

Association between Age & Preference of Plastic Money

Table 4

[44] Crosstab				
[45] Age*preference of plastic money				
[46] Demographic Variables	[47]	[48] Prefer of plastic money/cards		[49] Total
		[50] Yes	[51] No	
[52] Age	[53] below 25 years	[54] 65	[55] 4	[56] 69
	[57] 26-35 years	[58] 31	[59] 3	[60] 34
	[61] 36-45 years	[62] 19	[63] 1	[64] 20
	[65] above 46 years	[66] 23	[67] 4	[68] 27
	[69] Total	[70] 138	[71] 12	[72] 150

Chart 2



Above table gives us information about the association between age group and preference of plastic money of respondents. It has been seen that **65** respondents were from age group of below 25 years who said they use plastic money whereas **4** respondents who said they do not use plastic money, **31** respondents were from age group of below 25-35 years who said they use plastic money whereas **3** respondents who said they

do not use plastic money, **19** respondents were from age group of below 36-45 years who said they use plastic money whereas **1** respondents who said they do not use plastic money, **23** respondents were from age group of below above 46 years years who said they use plastic money whereas **4** respondents who said they do not use plastic money. This table allows us to understand that all groups prefer to use plastic money.

Table 5

[73] Chi-Square Tests			
[74] Age*preference of plastic money			
[75]	[76] Value	[77] df	[78] Asymp. Sig. (2-sided)
[79] Pearson Chi-Square	[80] 2.435 ^a	[81] 3	[82] .487
[83] Likelihood Ratio	[84] 2.198	[85] 3	[86] .532
[87] Linear-by-Linear Association	[88] 1.451	[89] 1	[90] .228
[91] N of Valid Cases	[92] 150	[93]	[94]

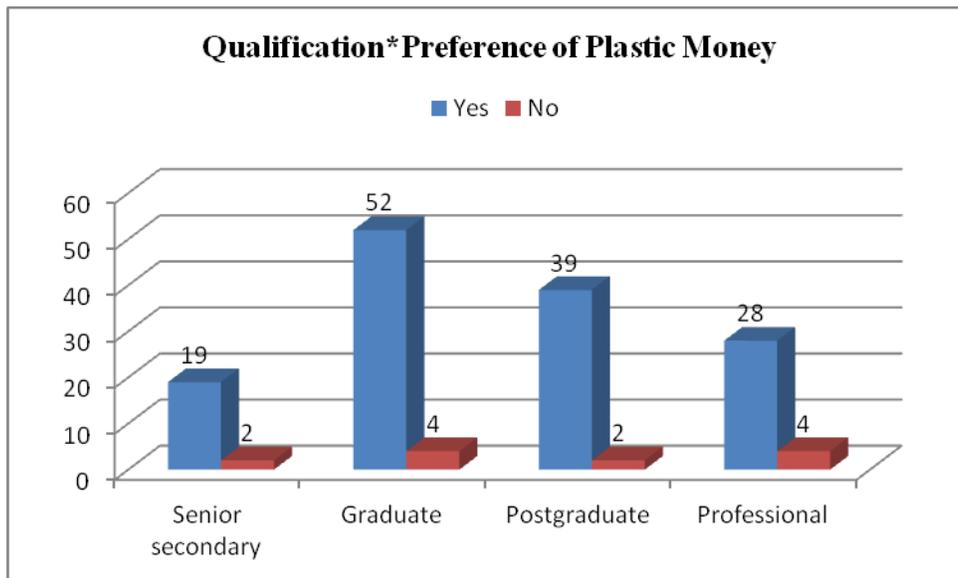
It can be seen here that $\chi(3) = 2.436, p = 0.487$. This tells us that there is no statistically significant association between age factor and preference of plastic money. This implies that both all age groups prefer to use plastic money.

Association between Qualification & Preference of Plastic Money

Table 6

[95] Crosstab				
[96] Qualification*preference of plastic money				
[97] Demographic Variables	[98]	[99] Prefer of plastic money/cards		[100]Total
		[101]Yes	[102]No	
[103]Qualification	[104]Senior secondary	[105]19	[106]2	[107]21
	[108]Graduate	[109]52	[110]4	[111]56
	[112]Postgraduate	[113]39	[114]2	[115]41
	[116]Professional	[117]28	[118]4	[119]32
	[120]Total	[121]138	[122]12	[123]150

Chart 3



Above table gives us information about the association between qualification and preference of plastic money of respondents. It has been seen that **19** respondents were in senior secondary who said they use plastic money whereas **2** respondents were who said no, **52** respondents were graduate who said they use plastic money whereas **4** respondents who said

they no, **39** respondents were postgraduate who said they use plastic money whereas **2** respondents who said no, **28** respondents were having professional qualification who said they use plastic money whereas **4** respondents who said no. This table allows us to understand that all groups prefer to use plastic money.

Table 7

[124]Chi-Square Tests
[125]Qualification*preference of plastic money

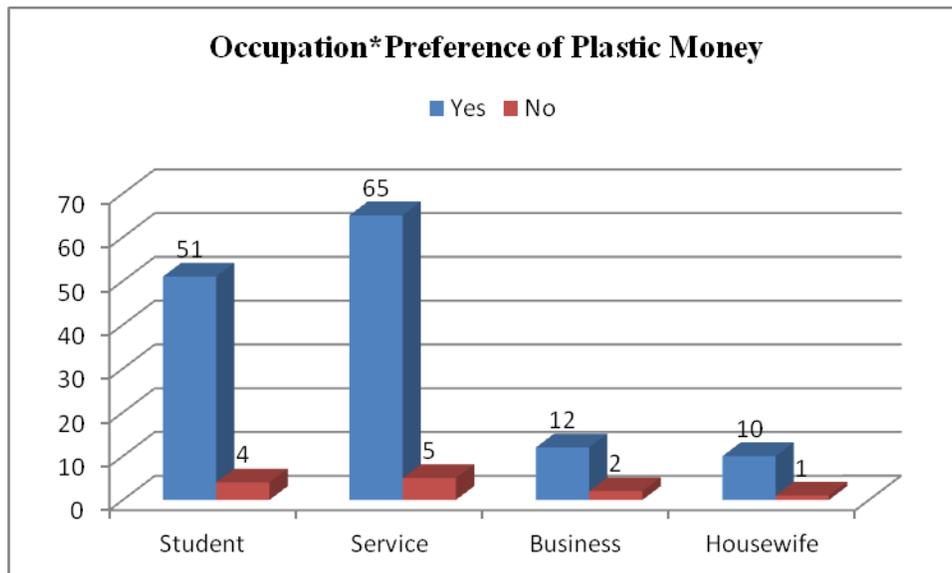
[126]	[127] Value	[128] df	[129] Asymp. Sig. (2-sided)
[130] Pearson Chi-Square	[131] 1.765 ^a	[132] 4	[133] .779
[134] Likelihood Ratio	[135] 1.778	[136] 4	[137] .776
[138] Linear-by-Linear Association	[139] .111	[140] 1	[141] .739
[142] N of Valid Cases	[143] 150	[144]	[145]

It can be seen here that $\chi(3) = 1.765, p = 0.779$. This tells us that there is no statistically significant association between qualification factor and preference of plastic money. This implies that both all qualification groups prefer to use plastic money.
Association between Qualification & Preference of Plastic Money

Table 7

[146] Crosstab				
[147] Occupation*preference of plastic money				
[148] Demographic Variables	[149]	[150] Prefer of plastic money/cards		[151] Total
		[152] Yes	[153] No	
[154] Occupation	[155] Student	[156] 51	[157] 4	[158] 55
	[159] Service	[160] 65	[161] 5	[162] 70
	[163] Business	[164] 12	[165] 2	[166] 14
	[167] Housewife	[168] 10	[169] 1	[170] 11
	[171] Total	[172] 138	[173] 12	[174] 150

Chart 4



Above table gives us information about the association between occupation and preference of plastic money of respondents. It has been seen that **51** respondents were students who said they use plastic money whereas **4** respondents were who said no, **65** respondents were service person who said they use plastic money whereas **5** respondents who said they no, **12** respondents were businessman who said they use plastic money whereas **2** respondents who said no, **10** respondents were housewives who said they use plastic money whereas **1** respondents who said no. This table allows us to understand that all groups prefer to use plastic money.

Table 8

[175] Chi-Square Tests			
[176] Occupation*preference of plastic money			
[177]	[178] Value	[179] df	[180] Asymp. Sig. (2-sided)
[181] Pearson Chi-Square	[182].879	[183]3	[184].831
[185] Likelihood Ratio	[186].751	[187]3	[188].861
[189] Linear-by-Linear Association	[190].282	[191]1	[192].595
[193] N of Valid Cases	[194]150	[195]	[196]

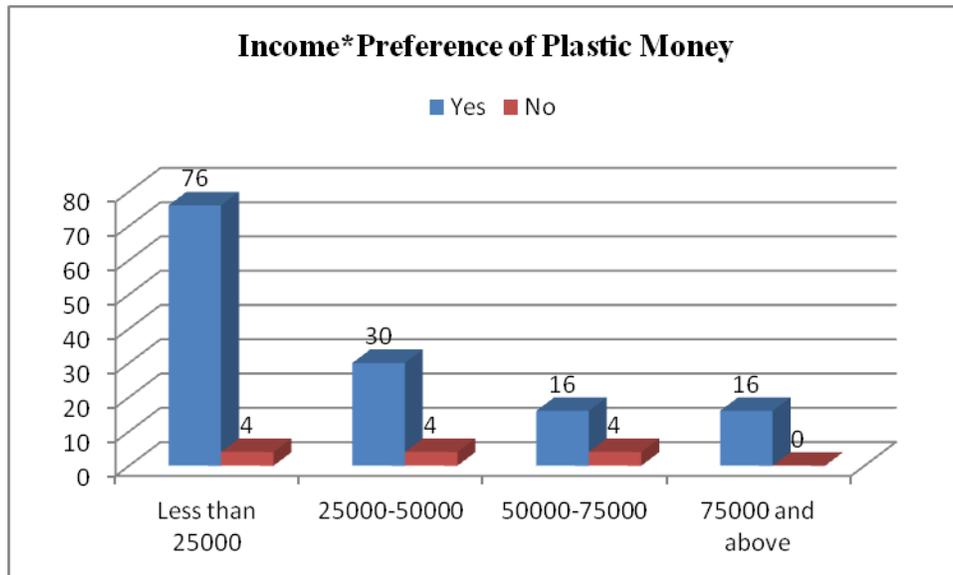
It can be seen here that $\chi(3) = .879, p = 0.831$. This tells us that there is no statistically significant association between occupation factor and preference of plastic money. This implies that both all occupation groups prefer to use plastic money. This implies that both all qualification groups prefer to use plastic money.

Association between Income & Preference of Plastic Money

Table 8

[197] Crosstab				
[198] Monthly Income*preference of plastic money				
[199] Demographic Variables	[200]	[201] Prefer of plastic money/cards		[202] Total
		[203] Yes	[204] No	
[205] Income	[206] Less than 25000	[207] 76	[208] 4	[209] 80
	[210] 25000-50000	[211] 30	[212] 4	[213] 34
	[214] 50000-75000	[215] 16	[216] 4	[217] 20
	[218] 75000 and above	[219] 16	[220] 0	[221] 16
	[222] Total	[223] 138	[224] 12	[225] 150

Chart 4



Above table gives us information about the association between income and preference of plastic money of respondents. It has been seen that **76** respondents having monthly income less than 25000 said they use plastic money whereas **4** respondents were who said no, **30** respondents having monthly income 25000-50000 said they use plastic money whereas **4** respondents who said they no, **16** respondents having monthly income 50000-75000 said they use plastic money whereas **4** respondents who said no and **16** respondents having monthly income 75000 and above said they use plastic money whereas **no** respondents said no. This table allows us to understand that all groups prefer to use plastic money.

Table 8

[226] Chi-Square Tests			
[227] Monthly Income*preference of plastic money			
[228]	[229] Value	[230] df	[231] Asymp. Sig. (2-sided)
[232] Pearson Chi-Square	[233] 7.326	[234] 4	[235] .120
[236] Likelihood Ratio	[237] 8.320	[238] 4	[239] .081
[240] Linear-by-Linear Association	[241] .676	[242] 1	[243] .411
[244] N of Valid Cases	[245] 150	[246]	[247]

It can be seen here that $\chi(4) = 7.326$ $p = 0.120$. This tells us that there is no statistically significant association between income factor and preference of plastic money. This implies that both all income groups prefer to use plastic money.

H02: There is no significant difference between the preferences of customers using plastic money regarding different identified variables.

Ha2: There is a significant difference between the preferences of customers using plastic money regarding different identified variables.

Table: Ranks

[248]				
[249] Preference of Customers		[250] N	[251] Mean Rank	[252] Sum of Ranks
[253] Apparel	[254] Yes	[255] 138	[256] 78.96	[257] 10377.50
	[258] No	[259] 12	[260] 75.20	[261] 947.50
	[262] Total	[263] 150	[264]	[265]
[266] Banking Services	[267] Yes	[268] 138	[269] 77.83	[270] 10391.00
	[271] No	[272] 12	[273] 75.30	[274] 934.00
	[275] Total	[276] 150	[277]	[278]
[279] Consumer Durables	[280] Yes	[281] 138	[282] 84.25	[283] 10314.00
	[284] No	[285] 12	[286] 74.74	[287] 1011.00
	[288] Total	[289] 150	[290]	[291]
[292] Utility Billing	[293] Yes	[294] 138	[295] 81.29	[296] 10349.50
	[297] No	[298] 12	[299] 75.00	[300] 975.50
	[301] Total	[302] 150	[303]	[304]
[305] Online Transaction	[306] Yes	[307] 138	[308] 74.49	[309] 10279.00
	[310] No	[311] 12	[312] 87.17	[313] 1046.00
	[314] Total	[315] 150	[316]	[317]

From the above table it shows that there is a difference in mean ranks between preference of plastic money and no preference of plastic money. Customers prefer to use plastic money having higher mean rank in all the variables. It can also see that customers seem much more enthusiastic to prefer plastic money regarding ‘*consumer durables*’ and ‘*utility billing*’

Table: Mann-Whitney U Test

[318] Mann-Whitney U Test						
[319] S. No.	[320] Variables	[321] Mann-Whitney U	[322] Wilcoxon W	[323] Z Value	[324] Asymp. Sig. (2-tailed)	[325] Null Hypothesis Accepted/Rejected
[326] 1	[327] Apparel	[328] 786.5	[329] 10377.5	[330] 0.289	[331] 0.020	[332] Rejected
[333] 2	[334] Banking Services	[335] 800	[336] 10391	[337] 0.203	[338] 0.039	[339] Rejected
[340] 3	[341] Consumer Durables	[342] 723	[343] 10314	[344] 0.757	[345] 0.029	[346] Rejected
[347] 4	[348] Utility Billing	[349] 758.5	[350] 10349.5	[351] 0.486	[352] 0.027	[353] Rejected
[354] 5	[355] Online Transaction	[356] 688	[357] 10279	[358] 0.978	[359] 0.032	[360] Rejected

From the above table, it is evident that in all identified variables null hypothesis is rejected as sig. value is less than 0.05 in all the variables. In other words, it can be concluded that there is a significant difference between the preferences of customers

using plastic money regarding apparel, banking services, consumer durables, utility billing and online transaction. It denotes that in all the identified variables customers prefer to use plastic money.

VII. LIMITATIONS OF THE STUDY

- The foremost limitation of the study is small sample size.
- Sample may not represent the true population.
- The conclusions drawn in the study cannot be stated as universally acceptable.
- Preference level to environment factor may differ from person to person.
- Study may be absolute because of changing environment and needs.

VIII. FINDINGS OF THE STUDY

- The majority of the people prefer to use plastic money specially in banking services, apparels, consumer durables and in billing of various services.
- Both men and women these days are well equipped with plastic money and are using them without any hesitation. There were only few respondents who still choose to stay with cash in hand and use it for all the purposes.
- Plastic money is mostly preferred by the young generation though from the research we can say that still there are people from age group of above 45 years who still like to use cash instead of plastic money and do not trust it much.
- People with high education level prefer plastic money over cash.
- People from lower income group use plastic money as much as people from higher income group.

IX. CONCLUSION OF THE STUDY

The field of modern banking techniques and payment system behave with extreme rationality. From the research conducted we could also conclude that education plays an important use and it also affects the perception and preference of different people towards plastic money. In the end from this research we could conclude that plastic money is being used by most of the people these days for different uses and mostly for billings of different services used by them in their daily life.

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The Measurement Methods in the Evaluation of Banks Performance

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Abstract- The study focuses on the measurement methods in the evaluation of banks performance in a Libyan context. It is the first study in Libya which involves three major Libyan banks. The aim of the study is to realise the fitness of applying the measurement methods in the evaluation of banks performance to Sahara Bank, Gumhouria Bank and the Al-Umma Bank and the objectives are to: recognise dimensions of the measurement methods with the strongest impact on the level of the evaluation of banks performance, try to identify the financial performance assessment of the banks and the indicators used in the criteria, interpretation and knowledge of trends and developments and recent studies in this area, clarify that the indicators and methods in one of the financial and economic institutions have a very important impact in improving the performance and efficiency and develop conceptual framework for the measurement methods in the evaluation of banks performance in a Libyan banking sector context, employs from Arab and Western literature and the findings of the study. The study is a basic quantitative research, descriptive, positivist, deductive, employing a survey research approach using questionnaires.

The key contribution of the study is the development of a conceptual framework of the measurement methods in the evaluation of banks performance, which contributes to the conceptual and theoretical knowledge in the topic of the evaluation of banks performance provided by the banks in a Libyan context.

Index Terms- measurement methods. evaluation of banks performance financial performance assessment

I. INTRODUCTION

The performance evaluation is of the subject of great importance seriously evaluate for any economic institution was or financial, especially in the current period in which the world is witnessing new developments in all fields, leading to the collapse and bankruptcy of many companies and banks, which were among the main causes of its collapse or bankruptcy and the difference in contradiction issued by these institutions and the real performance accounting data. And banks process is necessary and urgent to assess the performance of the banking sector is witnessing shifts and important reforms; and assess the impact of these reforms on the performance, and the efficiency and productivity of the banks, and the extent of rehabilitation to compete with regional and international banks. In order to determine the actual performance of the banks used many of the

indicators and methods, the most important of the so-called indicators and methods of model ROE who knows the traditional manner, and in view of developments in the banking industry and economic reach some bankers researchers to seek other models as an alternative to the traditional indicators the economic value added in the model as a new approach in the performance appraisal process, as well as banks assess the system in accordance with the indicators resulting from field-testing process.

That measure the performance of a permanent and continuous banks operating indicators for its guidance, warning decision makers and policy makers the possibility of banks' exposure to the financial crisis and to address the problem of research, has been relying on the following:

-The collection of information is an important step to facilitate the process of evaluating the financial performance of the one who provided the enterprise.

-The adoption of the measurement and evaluation of performance by the bank's management, would give a positive and allows them to determine the possibility of deviations and their causes and how to address them.

Measurement indicators

Performance evaluation indicators are ratios reflect the mathematical relationship between two variables have the meaning and interpretation of an analysis tool that provides the analyst in most cases be inferred and the keys of knowledge, analysis and interpretation properly paid analyst to areas that need further research and survey, a future-oriented tool, any analyst will be able to adjust and settle matters relating to or in a relationship to fit the shape and size of the potential in the future, and therefore the usefulness of financial ratios based on its interpretation smartly and skill, which represents the most difficult aspect of ratio analysis.

As previously noted that the financial ratios is a relationship between two variables are designed to reflect a certain evolution of financial numbers homogeneous benefit in comparison with the previous financial ratios or with patterns established, as stating the bank's management in decision-making and policy-making, this relationship must be clear and specific and significant, we can measure their strengths and weaknesses, and enables us to make horizontal comparison of certain financial ratios for another period comparisons vertical or a comparison harmonious proportions to each other and find a correlation between them.

Based on the foregoing, we can classify the criteria and indicators on which to base them in the

evaluation of the efficiency of the banking performance into two groups:

The first group:

And it includes criteria and indicators that are based on how the achievement and the method used in the implementation of the directives administration, which more than to get to the best banking services and that from it can achieve the objectives underlined, in other words, that these standards relate to workers and how to deal with customers and try to satisfy them and include the following:

- good reception and the way of dealing with customers.
- speed of service provided to customers.
- the extent to which bank customers to deal with him.
- stability of the employees in the bank and their association with him.
- conviction Career Center workers who occupy and responsibilities assigned to them.

These interrelated indicators and overlapping can not be separated, as when there is a conviction among working career his position and he felt relieved because he holds his rights, it creates has the desire to work, and adhere to the institution in which it operates, which lead to stability in it.

Generate the desire to work for the employees in the bank means to provide the necessary efforts to satisfy customers, and that is evident in the good reception of customers, and the completion of tasks and services as soon as possible, which the customer pays to stick to the bank that deals with him and be faithful to him.

These indicators have a role and a direct impact on the second set standards, which we call the digital standards of the results achieved from exercising banking functions and which seeks to achieve the objectives of the bank.

The second group:

Digital criteria for the results of the exercise of banking functions, that these criteria and indicators show us digitally what has been achieved as a result of the exercise of workers to their jobs in the framework of which the objectives are and include the following:

Making profit and profitability indicators

Considering that profitability is the goal pursued by the bank, so there is a set of standards that can be built upon in the assessment of that, and we mention the most important below:

- 1) the rate of return to private capital.
- 2) the rate of return to funds available for hiring.
- 3) the rate of return to total assets.
- 4) the ratio of dividends to owners
- 5) the ratio of net assets available for benefits for employment.

Model economic value added (EVA) (economic value added)

As a result of developments in the banking industry, has become a model ROE fact the financial position of banks does not appear accurately and on this basis I had to make financial search for a new measure of the decision-making methods and performance evaluation, such as the use economic value added model.

1. Definition of economic value added

Economic value added is a measure of the remarkable performance, measure if net income exceeds the established cost of capital.

1 - economic value added benefits

(A) have a stronger link with the composition of the market value of any measure of profitability- and that as economic value added more accurate measure of profitability measure.

(B) it can be used as the basis for all decision-making processes, and the development of financial strategies to accurate the results obtained using the basis of economic value added scale and thanks to which the Department can make sound financial decisions and to develop appropriate strategies. (C) considered effective as a program of incentives: results from the use of economic value added programs motivate employees and which is characterized by justice and relying on productivity through the use of performance information as a basis for wage where managers can motivate be able to compete.

2 - aspects of economic value added difference from the indicators ROE

economic value added is different from the traditional standards in that they move away from the accounting imbalances when Gains: allow the accounting principles generally accepted set of accounting rules accepted each accounting problem, allow any management falsifying statements Finance resulting in redistribution of wealth and risk distribution, and thus distortion of the Bank's performance using those policies that affect on its financial position, and therefore the extracted ratios of the financial statements.

3- equation of economic value added (EVA) (economic value added)

This is among the most modern doorways which raised financial concerns and specialists and gave the comprehensive nature of the concept of value creation in his philosophical and practical also, entrances EVA and MYA Despite the presence of a huge number Assessment of the proposed indicators, which is characterized by frequent criticism in the application and above this, and it is not the most dynamic, all entrances or indicators proposed by the specialized consulting offices agree to adopt the concepts of:

- * Economic result.
- * The cost of capital.

However, the differences among these approaches are limited in most cases the treatment method and the extent of interdependence:

- * Financial architecture and established economic environment.
- *The overall market (active, competition, risks, the laws that govern it,).
- *Accounting methods (which change with the change of activity established).

It is worth mentioning in general reminder to the concept of value, which is given to the relationship of the following

Value= economic result- the cost off unds and in our conversation about the cost of funds, is meant by the cost of all of the entity's resources, ie, the cost of money and the cost of debt or third party funds. Taking into account the correlation rate of acquisition debt in the market and is the interest rate, and the money they take reference rate of regular distributions and the ultimate aim is to increase the value of the stock and then additional value for shareholders. In other words, increase the economic result on the total cost and thus create value for the owners, and the economic value added represents the difference between the result of exploitation and the cost of funds and is given by the following:

$EVA = (+\text{exploitative result after tax (RE)}) - (\text{Investment funds} \times \text{weighted average cost of funds})$

(WACC. CE)).

EVA = economic value added, or cash flows (in the form of liquidity) after all possible transfers and rebates.

CE)) represents the capital and which consists of: private funds+ version as the value of

accumulated premiums + Support and semi-private funds+ net financial debt of the Treasury advances

RE)) as a result of exploitation and are the same economic result.

WACC =weighted average cost of funds.

Banks assess the system according to the CAMELS indicators resulting from field-testing process

The importance of leading and early warning systems of their value as permanent and continuous tool for guiding and warning and warning to decision-makers and policy-financial indicators policies the possibility of exposure economy, financial crisis or currency crisis, and the introduced them prospects occur in early before the event to take the necessary policies, procedures and preventive or proof of the occurrence of crises.

The emergence of standard CAMELS

One of the first countries that used the criteria for early warning of the United States because of the banking collapses that suffered in 1933 and declared under bankruptcy more than 4000 almost a local bank, and that was one of the reasons for the establishment of guarantee bank deposits Foundation, where the entire banking system to the phenomenon of loss exposure and defends public confidence towards the banks to withdraw their deposits, and then a similar collapse in the science event in 1988 led to 221 bank failures.

Began using the criteria for early warning in the United States since 1979, where the Federal Reserve Bank under the classification of banks and extending banks the results of the classification without dissemination to the public that the banking authorities were able to predict collapse banking before it occurs, tell the number to only 3 in 1998, reflected the results ofthe classification of American banks by Standard CAMELS a comparison for the periods mentioned good results for the performance of banks in the end of the first quarter of 1998 compared to the results in 1988, the results of the classification for the first quarter of 1998 showed that all local banks are located in category I and 2 and that more than 40% enjoying the classification No. 1.

We have raised the results of the analysis conducted by the US Federal Reserve Bank many questions about the credibility ofthe standard in the safety of the financial conditions of banks measure, and economic analysts find this bank that the results shown by the use of this standard in the detection of anomalies banks and the extent of determining the banking safety were better than the results wh ich used traditional statistical analysis, which was followed by the use of the standard, as studies have also demonstrated the ability of the standard to determine the degree of risk the bank before undetected across the market and the price mechanism and several months later and it has demanded a lot of researchers and analysts need to disseminate these results to the public in order to know the facts and thus improve their abi lity in the evaluation and selection to deal with that pose less risk banks and the best performance, and saw these researchers need to include the results of the analysis of standard CAMELS within the annual financial statements disclosed the bank to the public and thus achieve a high level of transparency as helping to impose market discipline is one of the fundamental pillars upon which the decisions of the Commission Basel II banking su pervision.

But there is disagreement about the possibility of publishing the results ofthe analysis of standard CAMELS to the public between the pro and exhibitions, there are those who see it in a very secret so only limited to the regulatory authorities even published does not affect the public in banks, trust and banking system as a whole, while others see the need for dissemination of the ownership of the facts to the public and then take a decision on the matter as long as aware of that publication does not affect the safety of the banking system and lead to failure and collapse as a whole.

Second: the evolution of the standard CAMELS and working mechanisms of this standard has passed through several stages before it becomes in this way

A. Standard CAEL:

I -defined: The tool Banking Supervision office depends on the analysis and review of rents (profit annual) sent from the banks of the Central Bank and then work to assess and classify them based on the four elements of the six components of the standard CAMELS is the capital adequacy, the quality of the products, profitability, liquidity and Standard includes an element management and direction of the market risk sensitivity.

2. Standard features CAEL:

- is a tool for early warning and to identify weaknesses in the banks and the index for field

inspection across the way CAMEL and is therefore complementary to the standard CAMEL is no alternative to him.

- rely upon the regulatory authorities to take the necessary decisions in the case of lapse of three- quarters or more from the date of CAMEL report the percentage of change is expected to occur in the financial position of the bank in question during that period.

- You can work from a standardized assessment of banks combined on a specific date unli ke CAMEL standard, which depends on the evaluation on the date of the inspection, which makes it difficult to work a comprehensive assessment of the banks at a specified date.

Financial ratios according to the financial statements

A- The balance sheet ratios

As the accountants know, the balance sheet consists of two sides, the funding structure and the uses. So, there are ratios belonging the funding structure, and other belonging the uses. In this case, the researcher will talk about these ratios, are as follows:

1- Consistency in the funding structure.

We will extract the ratio of each major group of funding sources to the total funding sources as follows:

- Rates of shareholders' equity in the funding structure

$$= (\text{Shareholders' equity} + \text{liabilities}) \times 100$$

- Ratio capital to liabilities

$$= (\text{capital} + \text{liabilities}) \times 100$$

- Ratio of retained earnings to liabilities

$$= (\text{retained earnings} + \text{liabilities}) \times 100$$

- Ratio of current liabilities to liabilities

$$= (\text{current liabilities} + \text{liabilities}) \times 100$$

- Ratio of long-term liabilities to liabilities

$$= (\text{long-term liabilities} + \text{liabilities}) \times 100$$

2- Consistency in uses structure investment

These ratios related to the uses side which done by finding the proportion of each element in the assets and compared to the group which it belongs, and this process is to see the side of asset in the balance sheet in order to complete the picture in the process of assessing the facility and the most important of these ratios as follows:

Ratio of fixed assets to total assets

$$= (\text{Fixed assets} + \text{total assets}) \times 100$$

- Ratio of current assets to total assets

$$= (\text{Current assets} \dots, \text{total assets}) \times 100$$

Thus, we calculate the ratio of each element of the fixed or current assets to total current assets or fixed. In order, to know the relative weight of that element, we are calculating the ratio of cash to total assets or machines to total fixed assets and so.

B- Income Statement ratios

I - Profitability ratios:

We have referred to these ratios in the past, but they consist of the following:

- Ratio of total operating profit.

This ratio uses to determine the efficiency of management in dealing with the elements of cost of sales and their ability to control in these costs. And this ratio as follows:

$$\text{Ratio of profit gross from operations} = (\text{total operating profit} + \text{sales net}) \times 100$$

And this ratio can be formulated as follows:

$$\text{Ratio of profit gross from operations} = [(\text{sales net} - \text{cost of sales}) / \text{sales net}] \times 100$$

- Operating profit margin (before the interest and taxes):

$$= (\text{Net profit from operations before interest and taxes} / \text{net sales}) \times 100$$

This ratio use as a measure to the operating efficiency, because the administration cannot control the benefits or tax or revenue and other expenses, and therefore should be a screening process for all elements of expenses to know the trends of expenses, then determine the defects and then look for solutions. This procedure is necessary as one of the control procedures and performance evaluation.

- The margin of profit (after-taxes):

$$= (\text{Profit} - \text{taxes} / \text{net sales}) \times 100$$

The margin of profit after-tax is important because it tells investors the percentage of money a company actually earns per dollar of sales. This ratio is interpreted in the same way as profit margin - the after-tax profit margin is simply more stringent because it takes taxes into account.

2- Expense ratios.

After we knew the direction of profitability in the company by using the profitability ratios, we should know the direction of expenses which called the cash flow. As we know, the expenses lead to lack in assets or increase in liabilities or both.

Many companies make big profits, but some unjustified and unnecessary expenses lead to reduce the profits. So, the management can use these ratios as one of the control methods to know the good decisions in expenditures, wages and salaries. For example, were the increases in wages and salaries based on productivity or no? Also, has the individual productivity increased or no?

In other hand, helping the marketing department to increase the demand for goods by highlighting the advantages Item that produced by the entity and the definition of the public out. Then, there is a possibility to the demand for the goods will increase. That helps the entity to read contribution of marketing department through sales analysis and knowledge of its direction to other methods. Also can take advantage of these ratios in matters of administrative corruption and abuses by comparing and analysis the cost elements with similar entity to determine the prices, costs and expenses real. And these ratios as follows:

$$\text{Total expenses to total revenues} = (\text{total expenses} / \text{total revenue}) \times 100$$

$$\text{A- Capital expenditure to net sales} = (\text{capital expenditure} / \text{net sales}) \times 100$$

$$\text{A- Marketing expenses to net sales} = (\text{marketing expenses} / \text{net sales}) \times 100$$

$$\text{B- Commercial expenses to net sales} = (\text{commercial expenses} / \text{net sales}) \times 100$$

$$\text{C- Ratio of wages to expenses} = (\text{wages} / \text{total expenses}) \times 100$$

$$\text{D- Ratio of rents to expenses} = (\text{total rental} / \text{total expenses}) \times 100$$

And so, the analyst continues in calculate the proportion of each element of the expenses to the sum of total expenditures. In order, to know the relative weight of each element of the expenses as well as to find out which expenses have significant weight and affect the profitability of the entity, studying the reasons that behind the increase in these expenses and try to treat these reasons.

3- Standard ratios.

Standard ratios are placed according to scientific bases as well as on some forecasting methods which are based on the outcome of the values of the actual implementation of the entity for the previous years. So, the entity management is seeking to achieve them, and taken advantage from these ratios in the process of planning and control of the various activities. Also, provide these ratios to entity management or financial analyst the possibility to compare of these ratios with actual ratios that have been achieved, and by them we can know the amount of distractions and then analysis the underlying causes of these deviations.

And these standard ratios differ from each other. Some are specific to a particular industry where there are acceptable rates or convention in a particular industry, and there ratios adapted from similar entities or competition that successful in their work. Also, there are ratios derived from the same entity, through the experience which gained in previous years. The standard ratios are very important to the planned to develop plans for the future and performance evaluation.

There are different ways to extract these ratios, including:

a. Method of SMA.

We take the arithmetic average for a number of years. Where are collected the values of those years and divide the total by the number of years, as in the following:

Example:

The balance of debtors to the entity for the years 2001-2006, respectively (in dollars) as follows:

7000-9000-8000-10000-11000 -12000

The answer:

The arithmetic average = $(7000 + 9000 + 8000 + 10000 + 11000 + 12000) \div 6 = 9500$

So, it is expected to be the balance of debtors of this entity in 2007 (\$ 9500).

b. Time-average method.

It calculates as follows:

Example:

The Inventory turnover for one of companies for the years 2001-2006 was, as follows:

1.5 - 1.7 - 1.8 - 1.6 - 1.9 - 1.4

The answer:

First, we arrange the values in ascending or descending order. Here, we will arrange

them in ascending order as follows:

1.4 - 1.5 - 1.6 - 1.7 - 1.8 - 1.9

Second, to extract standard ratio for the year 2007 will do as follows:

We take the arithmetic average of the first two proportions $(1.4 + 1.5) \div 2 = 1.45$

Now we will take this result (1.45) with a third average 1.6 and calculate the arithmetic average as before $(1.45 + 1.6) \div 2 = 1.525$

And so, we continue until last value as follows: $(1.525 + 1.7) \div 2 = 1.6125$

$(1.6125 + 1.8) \div 2 = 1.70625$

$(1.70625 + 1.9) \div 2 = 1.803125$

The last result is a standard ratio of inventory turnover in 2014.

II. RESULTS

};>Forcing commercial banks to give real estate and commercial loans as well as loans to the public sector and without economic feasibility studies and without the presence of any guarantees sufficient and this is what was noted from the financial statements analysis ratios.

};> Rising is not mentioned in the solvency ratios despite the high volume of assets and property rights.

};>Deficiencies in the administrative organization. Through the questionnaire notes that most of commercial banks do not have a modern administrative structures holds the process of determining the functional levels and functions involving underneath, and functions corresponding to each function, and the functions of these functions and responsibilities, and described the theoretical and practical to her, and specific requirements for the occupants of these functions, and evidence of the work written for how to accomplish Business related to each of them.

};>Lack of benefit from the results of the financial analysis and this is what is observed by the opinions the respondents who agreed unanimously on the lack of interest of decision makers in the upper departments to data presented to them and reflected on the oscillation in the high and low financial statement items.

};> Commercial banks depends on the financial analysis in evaluating their performance, but not significantly, and it turns out that during the financial ratios of the analysis, which showed a large increase in credit facilities as well as deposits

};>Not to take advantage of the courses research and development that are given to employees and this is what has been observed through the extrapolation of the opinions the respondents who agreed unanimously on the existence of such courses and research but not reflected in the financial statements of these banks.

};>Lack of investment incentives for commercial banks, and focus only on investment in deposits and credit facilities.

};>By extrapolation of the opinions the respondents in the commercial banks, it turns out there are Laws and regulations by regulatory agencies restrict some of the measures that may help commercial banks avoid financial failure.

};>Recent events that happened in Libya, which led to the weak control devices and reflected in rising some budget items to commercial banks and this is what was observed during the analysis of financial ratios.

};>Shortcomings in management performance in spite of the existence of financial analysis departments and staff who are able to conduct financial analysis effectively because of the bureaucracy resulting from the public ownership of commercial banks and its relation to the Central Bank of Libya.

III. RECOMMENDATIONS

In the light of the findings of the researcher from the results of this research, we can draw a number of recommendations may be useful in raising the level of the

measurement methods in the evaluation of banks performance and banking sector development which provide financial and economic institutions with modern survival and continue and support economy growth in Libya. The most important of these recommendations based on what was presented by findings by our study of the practical realities of how to do this using financial analysis in performance evaluation and prediction of financial failure in the modern business environment, because it is a great service to commercial banks, which avoids impact in financial problems, include:

);> More attention to development in the technical aspects that help financial analysts at the speed of information access and utilization

);> Give flexibility in the rules and regulations issued and encourage the channeling of funds towards large-returns investments.

);> Giving the Central Bank of Libya more than authority of commercial banks as a shortcut for the time, effort, and this may contribute to avoid some of the financial problems and increase efficiency.

);> Show no leniency in the application of international standards when preparing financial reports and forcing commercial banks to abide by them.

);> Work on the return of investor confidence in the commercial banks by encouraging them to return to financial reports that help them make the right investment decision.

);> Working to solve the financial problems first hand when discovered and not leave it in the file.

);> Forcing commercial banks to more transparency in the issuance of information that will help financial analysts to prepare of financial reports.

);> Investigate the credibility of the financial reporting and zero tolerance in the dissemination of information.

);> Work to take advantage of liquidity and try to invest at home and abroad.

);> Not to cover up the financial irregularities and try to disseminate to the public, as well as easier to punish the wrongdoers.

);> Find investment alternatives and not to focus on certain investments.

);> Trying to benefit from international analysis centers and follow the latest International Publications in the field of financial analysis and send specialists in this field to attend international conferences.

);> Doing more research and studies that contribute to raising the efficiency of commercial banks and try to benefit from the experiences of others.

IV. CONCLUSION

In general, the study focused on the measurement methods in the evaluation of banks performance in a Libyan context. It is the first study in Libya which involved three major Libyan banks. The aim of the study was to realise the fitness of applying the measurement methods in the evaluation of banks performance to Sahara Bank, Gumhouria Bank and the Al-Umma Bank and the objectives were to: recognise dimensions of the measurement methods with the strongest impact on the level

of the evaluation of banks performance, try to identify the financial performance assessment of the banks and the indicators used in the criteria, interpretation and knowledge of trends and developments and recent studies in this area, clarify that the indicators and methods in one of the financial and economic institutions have a very important impact in improving the performance and efficiency and develop conceptual framework for the measurement methods in the evaluation of banks performance in a Libyan banking sector context, employs from Arab and Western literature and the findings of the study.

The study is a basic quantitative research, descriptive, positivist, deductive, employing a survey research approach using questionnaires.

The key contribution of the study was the development of a conceptual framework of the measurement methods in the evaluation of banks performance, which contributes to the conceptual and theoretical knowledge in the topic of the evaluation of banks performance provided by the banks in a Libyan context.

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Review: Quality Control Approaches in Clinical Laboratories

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Abstract- Lately, researchers are firmly believing that quality control is one of the key requirements to provide reliable and accurate data recording and measurements for patients tests and treatment plan.

Method: Referring to some significant different resources, precise information of the quality control and standard test procedures were provided. In addition to that statistical analysis of processed data was used to evaluate, monitoring and improve performance. Based on obtained data from mean value, standard deviation, Levey-Jennings chart and Westgard rules.

Conclusion: Convenient maintenance and periodic calibration of laboratory equipment's is a very significant part of the entire QC system. As well as, QC improves the efficiency and traceability to the overall output and decreasing the cost of running.

Index Terms- Laboratory Quality Control, mean value, standard deviation, Levey-Jennings chart, Westgard rules.

I. INTRODUCTION

Quality control in the medical laboratory is a statistical procedures used to monitor and evaluate the analytical process that produces measurement and results of patient's tests. Good Laboratory Practices (GLP) is a ceremonial foundation that was created by the American Food and Drug Administration (FDA) in 1978. This formal regulation has a world-wide impact. Indeed, in 1981, the Organization for Economic Co-operation and Development (OECD) produced the GLP principles that become internationally standards for the quality control measurements and calibrations for the various equipment, machines and tests [1]. However, researchers do not confined quality control to only laboratory operations, but they insist that quality control must be involved in all decisions, i.e., concerning with the quality of the product. In fact, quality control deals firmly with systems that accept or rejects any activity or parameter that might affect the quality of the product and thus prevent quality deficiency [2].

In general, during the design stages of a clinical laboratory, there are some principles that should be taken into account, such as the suitability of construction materials and ventilation. Moreover, the laboratory should be supplied with regular amounts of water of appropriate quality, as this water will be used in cleaning as well as testing purposes. In addition, the laboratory should be provided with separate air handling units for

biological, microbiological and radioisotopes testing areas [3]. One of the most important points that should be considered when installing a quality control laboratory is the division of it into separate sections. For example, the microbiology section should have special arrangements such as airlocks and laminar air flow work station.

On the other hand, diagnostic tests in medical laboratory could be quantitative (a number) or qualitative (positive or negative) or semi-quantitative (limited to a few different values). Therefore, QC play a significant role for patient's outcomes during diagnosis and treatment. It is ensure and validate whether the laboratory devices are operating within pre-defined specifications and accuracy, inferring that patient test results are reliable for decision making and treatment planning.

Commonly ,normal practiced routine controlled procedures are used to define quality control process in clinical laboratory. These rules include the following points according to (Taylor et al. 2018) [4]:

- 1- The instruments in the laboratory and the laboratory itself should be cleaned daily.
- 2- All the instruments in the laboratory should be validated as well as checked and the results should be recorded carefully.
- 3- The samples arrived at the laboratory should be registered in an incoming registration section.
- 4- Humidity and temperature inside the laboratory should be recorded daily.
- 5- Log books should be filled for every instrument used inside the laboratory correctly and carefully.
- 6- Any fault in any instrument inside the laboratory should be immediately reported to the quality control manager, so that an action will be taken immediately to overcome this fault

However, quality control is a wide field of research, there are some terms that are associated with this field and it is very important to distinguish between these terms, such as verification, validation, calibration and qualification. Indeed, verification is one the quality control processes. This process is used to estimate whether a system, product or service associated with quality control is respond to rules, conditions and specifications implied by the standards. Another term associated with quality control is the validation [5]. Validation is a quality assurance process. Validation process core is establishing an evidence that performs high degree of assurance that the product

will meet in an advance stage its intended rules. Calibration is another term associated with the quality control. It is a set of operations demonstrates the relationship between values specified by an instrument and the corresponding known values of reference standards. Finally, qualification is the primary responsibility of the quality control managers. In this process, the staff ensure that the products meet both quality and efficiency standards set by the company.

II. METHODOLOGY

Quality control is reported in the graphical, chart and statistical analysis of process data for the purposes of evaluating, monitoring, and improving clinical laboratory test performance. Therefore, QC statistics data for each results performed by laboratory medical device can be calculated from the QC database obtaining by test control materials at specific control level. These obtained data represents the behavior of test results at specific concentration. The most common statistical formulas used in laboratory are the mean value $[\bar{x}]$ and the standard deviation $[s]$.

The mean or the average value of the control material at specific level reflect the best estimation of analyst true value. The calculation of mean value for controller at specific level can be obtain by adding all results of controller material in the data set then divided by the total number of data set for the controller at specific level, according to the following formula:

$$[\bar{x}] = \sum Xn/n$$

Where, Xn : is the result value of controller at specific level

n : is the total number of test value for controller at specific level.

During the running of controller at specific levels it is important to note the accepted range of controllers. For example Level 1 (Normal Controller) for Potassium test is between (3.7 to 4.3) mmol/L. while the accepted ranges for level II (Abnormal Controller) is (6.7 to 7.3) mmol/L. the below table shows the daily obtained data for QC controller for Potassium test compared to patient results during the first week of November.

QC Test	Level I Normal Control Range 3.7 – 4.3 mmol/L	Level II Abnormal Control Range 6.7 – 7.3 mmol/L	Patient Results
1 November	4.0	7.0	4.2, 4.0, 3.8, 5.0, 5.8, 4.2
2 November	4.1	7.0	3.8, 4.4, 4.6, 3.9, 4.8, 4.4
3 November	4.0	6.9	4.4, 3.9, 3.7, 4.7
4 November	4.2	7.1	4.7, 5.6, 4.2, 3.7, 4.3
5 November	4.1	7.0	4.2, 4.3, 4.1, 4.3
6 November	4.1	7.0	4.6, 4.4, 5.5, 3.8, 3.2
7 November	4.2	8.0	2.8, 4.6, 4.2, 3.2, 3.9, 4.1

Table 1: QC value for Potassium Test using Level I and Level II Controllers.

Standard deviation is a statistical value which quantify the relation for numerical values of QC and represent how are these values close together. Also, the term precision is commonly used interchangeably with standard deviation. As well as, the term imprecision express how numerical QC values far apart from each other. Significantly, the standard deviation values are used to monitor ongoing day to day performance of medical laboratory devices. For example, if the calculated standard deviation goes from previous value such as 0.08 mmol/L to 0.16 mmol/L, indicating that there is a critical loss of precision. Which reflects a malfunction of system used to obtained test results.

The standard deviation can be calculated according to the following equation:

$$S = \sqrt{\sum(Xn - \bar{X})^2 / (n - 1)}$$

The standard deviation is calculated from the same data used to calculate the mean at specific level of controller. Providing an important estimate for results consistency and repeatability. The good result reflect a trend of low standard deviation and low imprecision. While inconsistent results high standard deviation and high imprecision as shown in below figure.

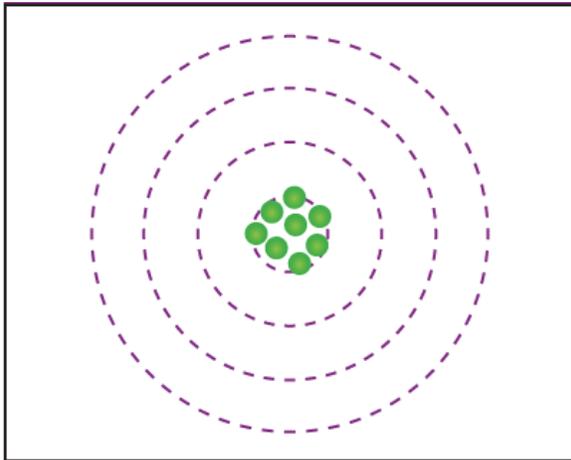


Figure 1: Low standard deviation and low imprecision

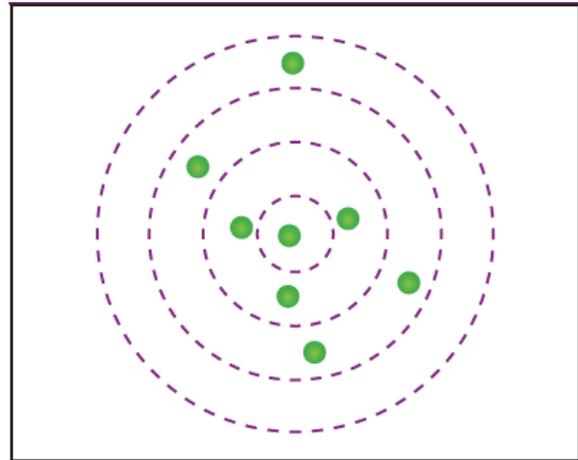


Figure 2: High standard deviation and high imprecision

After a test has been set up and standardized using a controllers at specifics levels. The simplest way to keep track and monitor of these results is to build up certain type of QC graphs usually known as Levey-Jennings Chart. Standard deviation and mean value are the basic input for Levey-Jennings Chart which is

useful for monitoring run-to-run or day-to-day distribution of quality control values. Actually, Levey-Jennings chart illustrates the value of standard deviation and mean value of specific controller against days, months or the run number as shown in below figure.

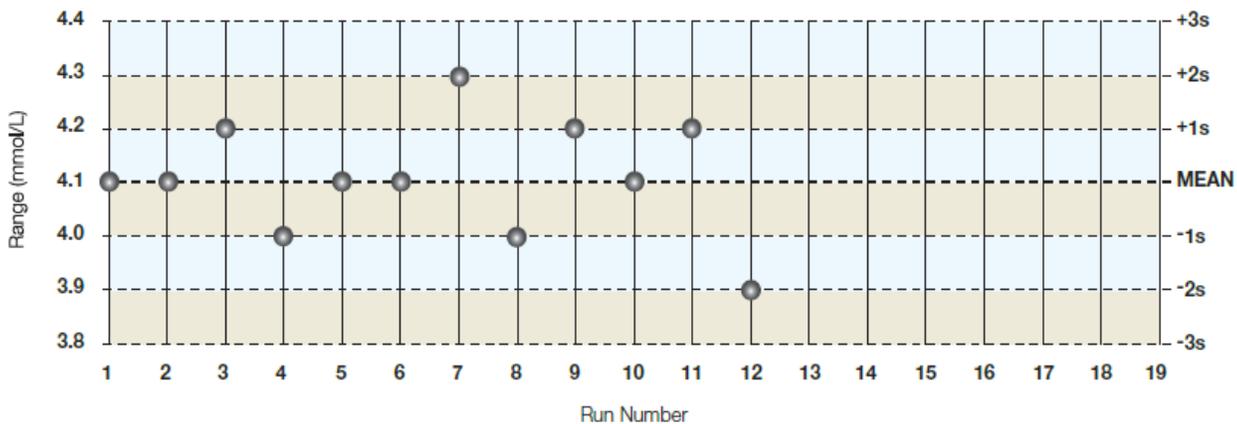


Figure 3: Levey-Jennings chart for Potassium Test using Normal Controller (Level 1).

Another way to express the QC for specific controller can be achieved by using normal distribution curve. Figure 4 shows the distribution of all QC value obtained by the test around the

mean value. It is useful to estimate the accuracy and precision of the medical laboratory device under certain specification.

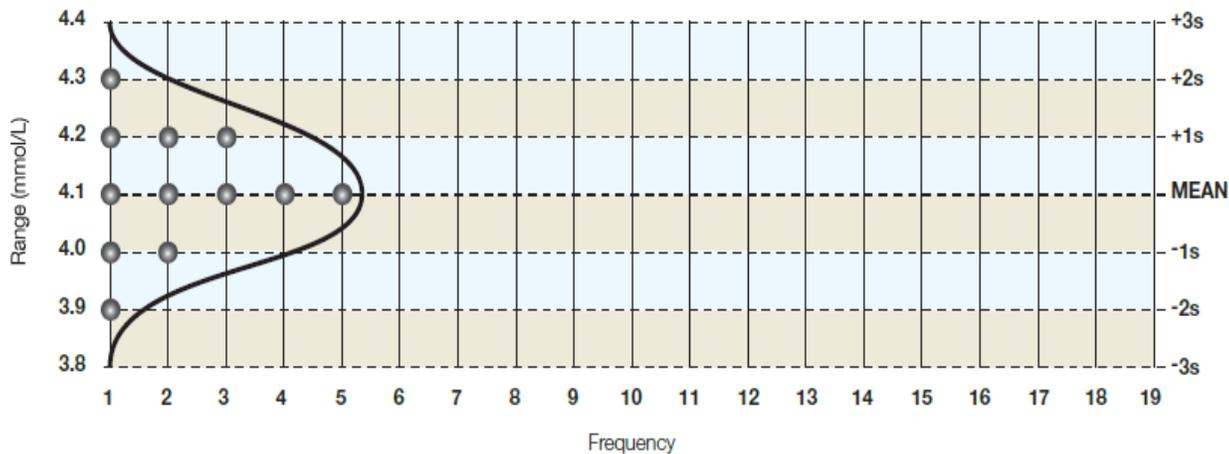


Figure 4: Relative Distribution of QC Values for Potassium Test using Normal Controller (Level 1).

However, Good Laboratory Practices (GLP) requires to document the assayed QC materials and the QC results to ensure optimal monitoring of analytical tests. Levey-Jennings and normal distribution chart have a great potential to summarize the data of QC tests and identify the test type, the medical laboratory device, units, operator who performed the test, and the total results of quality controller at each level.

III. DISCUSSION

During performing QC tests, it is possible to obtain some type of systematic errors, which are evidenced by the change of mean value or standard deviation values. These systematic errors could be demonstrated in gradual trend of QC values which reflect loss of reliability or could be unexpected shift in QC values which reflect sudden and dramatic positive or negative change in test system. Also, random errors may occur during QC tests. Random errors can be defined as any positive or negative deviation between obtained results and accepted result. For any QC test, there are accepted and non-accepted range of results values. In general, QC for clinical laboratories use the value of standard deviation to define the accepted range for QC values. The criteria of (± 2) of standard deviation is usually used to limit the accepted range for QC test. Which means that, when the obtained results of QC test falls between (± 2) of standard deviation, this produce 95.5% of the measurement is correct and only 4.5% of measurement fall outside the unaccepted limit.

To define specific performance limits Westgard rules are usually used for QC tests in clinical laboratories including two types of rules; warning rules that trigger a review of test procedures, calibration of laboratory equipment, controller material and reagents performance when systematic error is detected, and the obtained QC results goes out the limit of (± 2) of standard deviation. While the mandatory rules states that the results should be rejected when the obtained QC value exceed the standard deviation by (± 3), or when the obtained results are fall in the same side of mean.

Consequently, the most significant benefit of applying quality control tests for clinical laboratories procedures is to predict malfunction and problems before it actually happened,

then a corrective procedure should be taken to the tested system. In addition to that, QC has many objectives to improve the performance of medical laboratories, including the following main points.

- 1- Reduce errors made by instruments and technicians, and this will improve quality and productivity in advance stages.
- 2- Create more efficient teamwork.
- 3- Reinforce job involvement and participation.
- 4- Increase the motivation associated with employees.
- 5- Influence the capability of problem-solving efficiently.
- 6- Promote communication inside the organization and between the technicians.
- 7- Promote a consistent manager-worker relationship.
- 8- Develop a greater safety awareness.
- 9- Encourage cost reduction either in reagents or in samples.

Obtaining these objectives will be with the great benefits for the organization. Not only this, understanding of quality and cost leads to a new significant of relationship between these two concepts, which is "Improving in quality lead to reduction in costs" according to Parvin et al. 2017 [6]. Figure 5 illustrates this relationship.

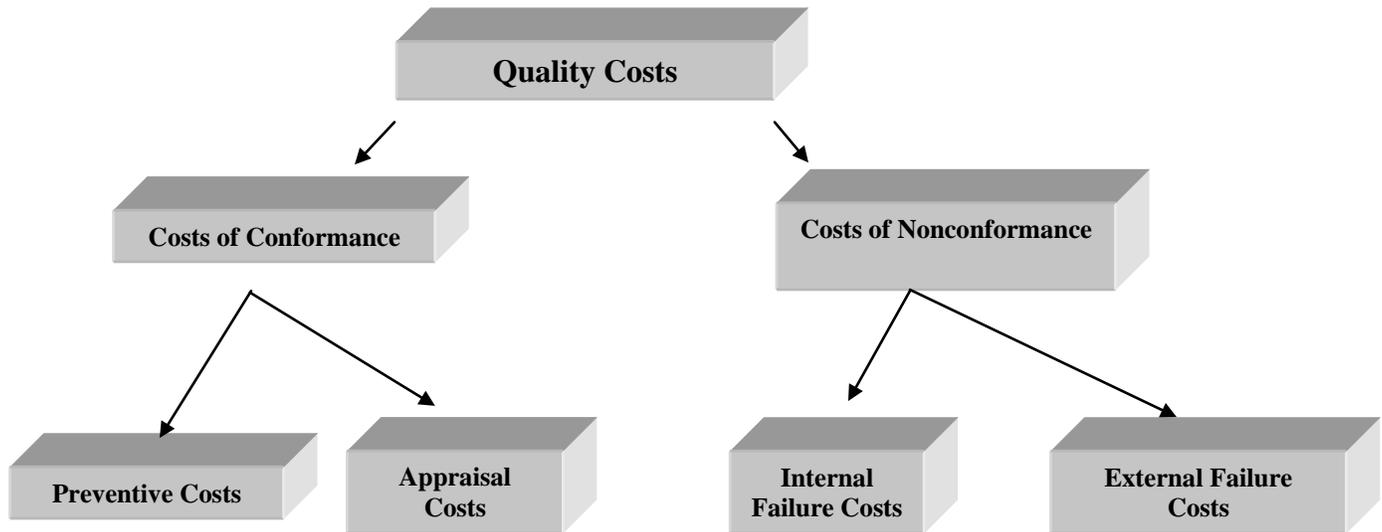


Figure 5: Relationship between Quality and Costs

The main relation between QC and cost prevention can be accomplished by training staffs who perform their responsibility and tasks in correct way according to specified standards and have the ability to educate new staff member on QC procedures. On the other hand, this will reduce the cost of quality testing which is known as appraisal cost. As well as, internal and external failures will dramatically reduced by ensuring that the quality control criteria is applied to the complete system of clinical laboratory.

IV. CONCLUSIONS

Quality control implementation is a novel process with different stages, started from the decision of management for clinical laboratory, selecting an appropriate standards, collecting information and defending the responsibilities. However, QC requires a lot of energy, time and specific regulation. All invested time and cost will potentially return in term of increased quality, confidence and reliability in test results for patients, and improvement of system's procedures. Leading to higher efficiency and traceability to the overall output for the complete system. In addition to that, QC chart and statistical process provides an effective monitoring and documentation for all parameters and results obtained by the QC process. Levey-Jennings Chart and Westgard rules are useful to determined the accepted range of test results and ensure that laboratory process and equipment meet the requirement of quality control criteria.

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Medical Survey: The Preferred Age and Gender of Therapists According to Patients with Mental Illness

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Abstract: *This study aims to explore the preferences of mental illness patient regarding to the age and gender of their therapists. A sample of 261 patients with mental disorders were involved in this study. Statistical information was obtained from a survey which categorized the participated patients according to their age, gender, current relationship, education and socioeconomic level. Finally, the output results was expressed graphically to provide a clear situation and evaluation which is describe the preferences for patients with mental illness regarding to the age and gender of their therapists.*

Keywords: *Mental Illness, Statistical analysis, Preferred Age, Preferred Gender of Therapists.*

I. INTRODUCTION

Generally, many people believe that mental disorders are infrequent and always happen to someone else other than the person who knows him. Indeed, a mental illness is a disease that causes disturbances that range from mild to severe in either thought and/or behavior, resulting in a problem to deal with life's usually demands [1]. Many symptoms are associated with this disease such as changes in mood, personality, depression, disability and inability to sleep [2]. The specifications of the treating physician for patients with mental problems in terms of age and gender in form of statistics and questionnaire is a popular form used to investigate differences in patients' opinions about this issue. Statistics in research is not just about formulas and calculations [3]. In fact, a lot of wrong conclusions have been performed from not amitying basic statistical issues [4]. In this study, statistics deduction helps us to obtain significant conclusions from samples of 261 patients of ages ranges from 20 to 70 years old from both genders, males and females.

II. SCOPE AND METHODOLOGY

This statistics survey provides a guide to help understanding some key concepts of choosing the treating doctor for mental illness patients. In this research, 261 patients with mental disorder were asked different questions about what mental illness patients prefer to be their treating doctors at any age and of any gender. 39 patients were between 20 and 30 years of age, or 14.49 %. In addition to this, 80 patients aged 30 to 40 were asked with a percentage of about 30.65 %. In this research as well, there was a sample of people aged between 40 and 50 years and the sample represented a sector of 21.46%. Other patients aged 50 to 60 were also asked and the sample accounted for 18.01% of the total sample population. Finally, patients aged 60 to 70 formed 14.49% of the samples. Figure (1) below illustrates the percentages and the numbers of this questionnaire.

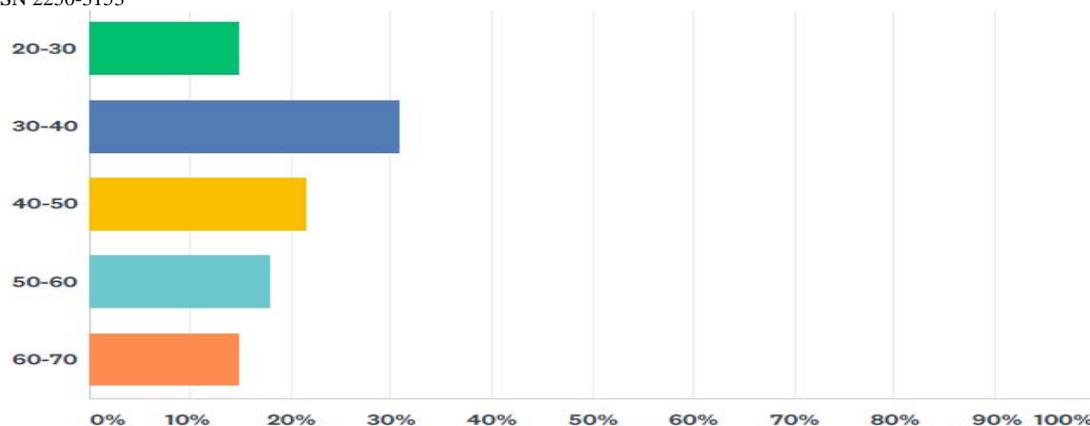


Fig (1): The Percentages of the Ages of the Participants

However, the sample of patients was normally distributed since there were 125 of the sample from males and about 135 were females and there was only one skipped person. Indeed, figure (2) below represents the percentages of the genders of patients who were asked

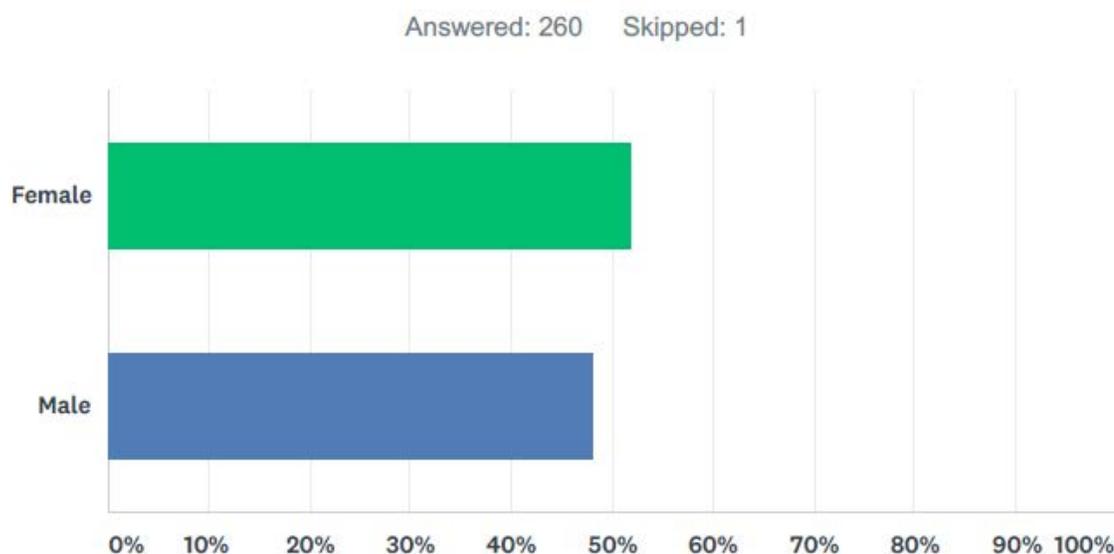


Fig (2): The Percentages of the Genders of the Participants

The majority of the involved patients who participated in the questionnaire was married with a social status that reflects 66.54% of the total survey sample. Just 2 persons were widowed. Only 8 persons of the sample interviewed were divorced. The rest of the sample never experienced the marriage. Figure (3) below represents the percentages of the status relationships of the people that participated in the questionnaire.

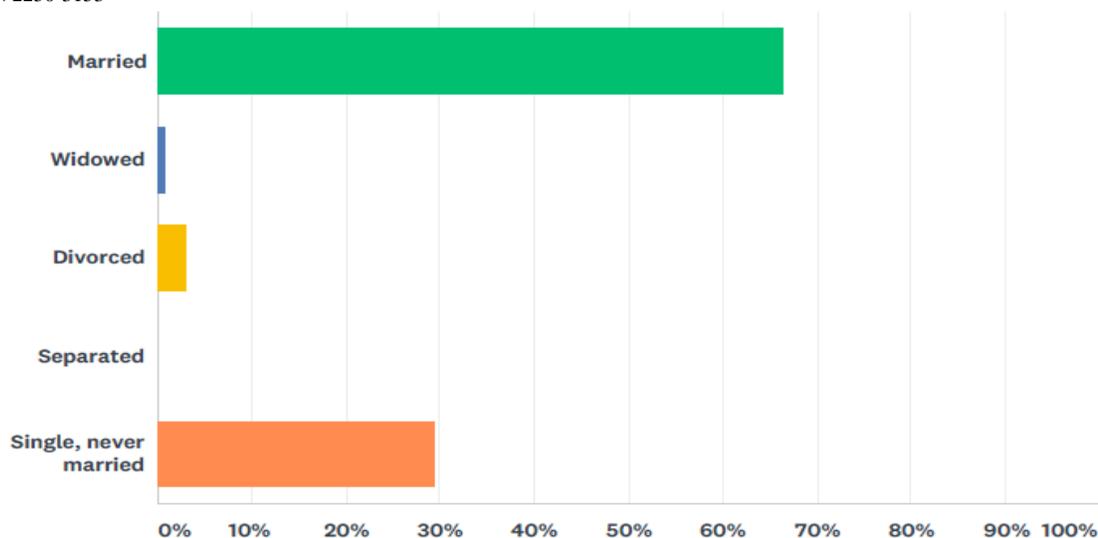


Fig (3): The Current Status Relationship of the Participants

To determine the educational level of the persons involved in the sample, they were divided into 6 groups. The first group of involved patients represents the group who did not enter schools at all, indeed, this group contains 23 persons. The second group accounted for 1% and contains 18 people actually. This group consists of patients who graduated from high schools only. The third group contains people who graduated from college. In fact, this group, contains 40 persons. The majority of the persons involved in the sample has appeared in the fourth group. This group contains about 89 persons, all of them were participated in some graduate school. The sample which contains persons who completed graduate school is not considered a small sample really. This group consists of 69 persons. The last group contains persons who finished their university with high degree. This group contains of about 22 persons. Figure (4) below illustrates the percentages of people participated in this questionnaire according to their level of education.

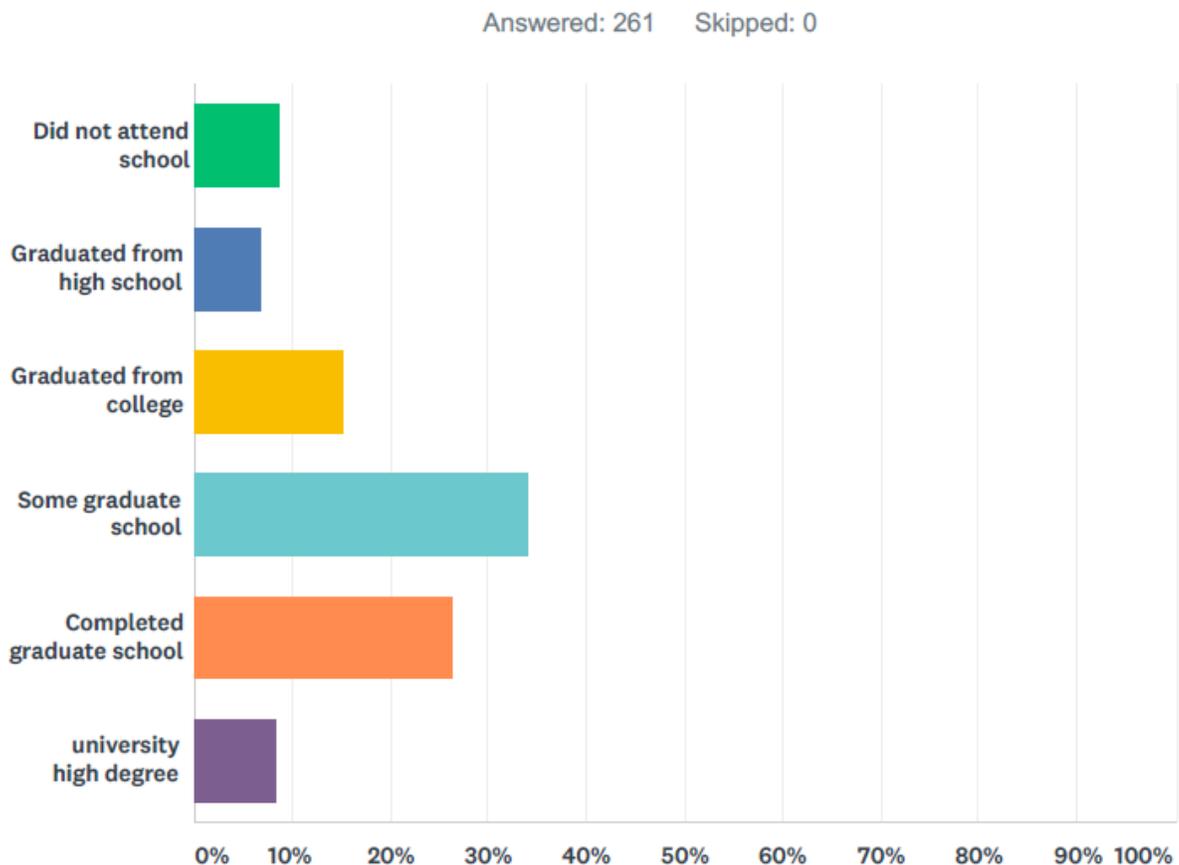


Fig (4): The Percentage of People According to Their Level of Education

Patients were classified according to their socioeconomic class into three groups, which were low, mild and high. Indeed, the first and third groups were too similar, they contain 44 and 43 persons respectively. The second group contains 169 persons, this number forms a percentage of 66.06%. In fact, when analyzing these percentages, we can observe easily that the majority of people involved in this questionnaire are of mild level, figure (5) below represents the percentages of people involved in the questionnaire according to their socioeconomic classification.

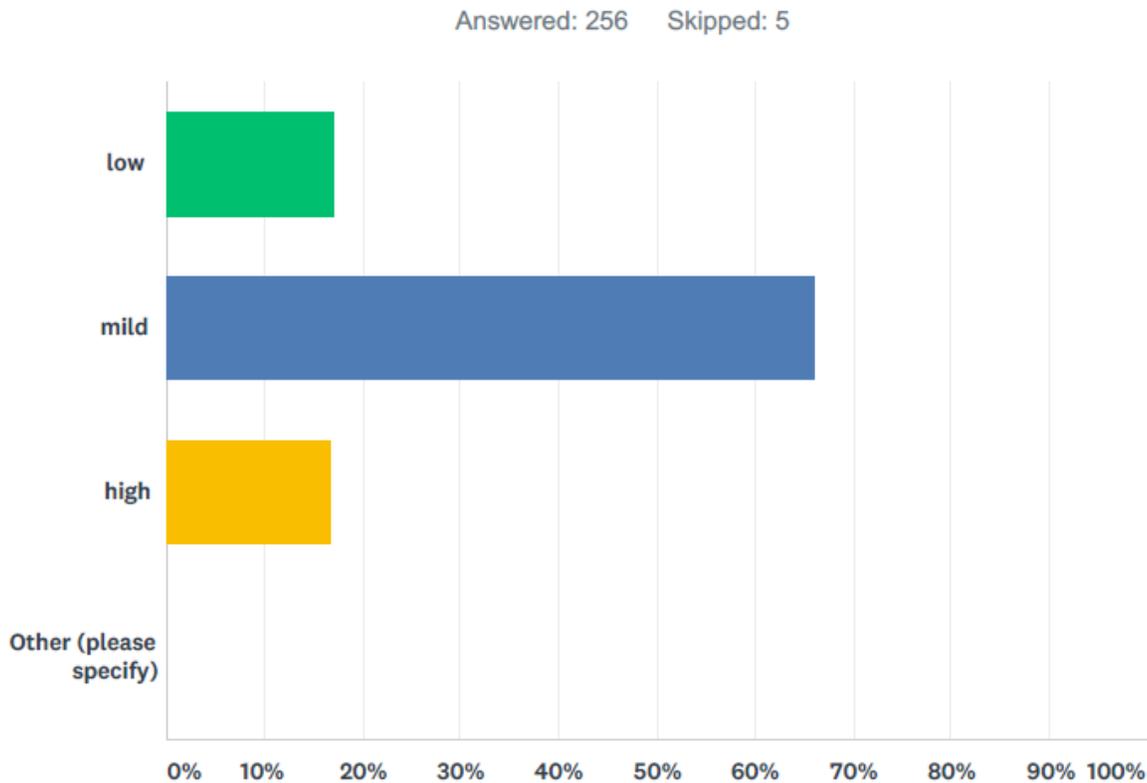


Fig (5): The Percentage of People According to their Socioeconomic Class

This research study treats a phenomenon which is, in general, considered ethically problematic, then the true experimental design is replaced by this quasi-experimental approach [5]. Figure (6) below illustrates good information to point out the advantage of this study

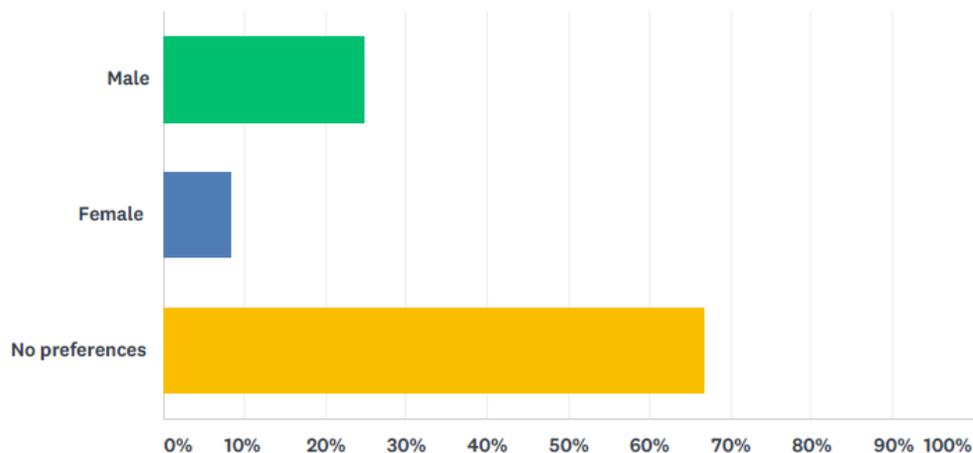


Fig (6): The Percentage of the Choice of the Participants to their Treating Doctors According to Gender

As it is shown in the figure, most of the people who participated in this study (about 66.67%) do not prefer a specific gender of their treating doctors either males or females. Indeed, 24.90 % of the people participated in the study prefer their treating doctors to be males. On the other hand, only 8.43 % of the participants in this study prefer the gender of their doctors to solve their mental illness problems from females.

Figure (7) below, illustrates the answer to a significant question in this study. Participants were asked about the age of the treating therapists. And it was noted that most participants do not prefer a specific age of the doctor answered this question about 157 people, which is what accounted for more than 60%. What is unique in the study is that very few, specifically four people, only wanted to be their treating physician between the ages of 60 and 70 years. Furthermore, 27 participants prefer their treating doctors to be in ages range between 30 and 40 years old. In addition, 39 of the participants in the study, preferably the age of their doctors treated between 40 and 50 years. Not far from this figure, 33 people preferred a treating doctor aged between 50 and 60 years.

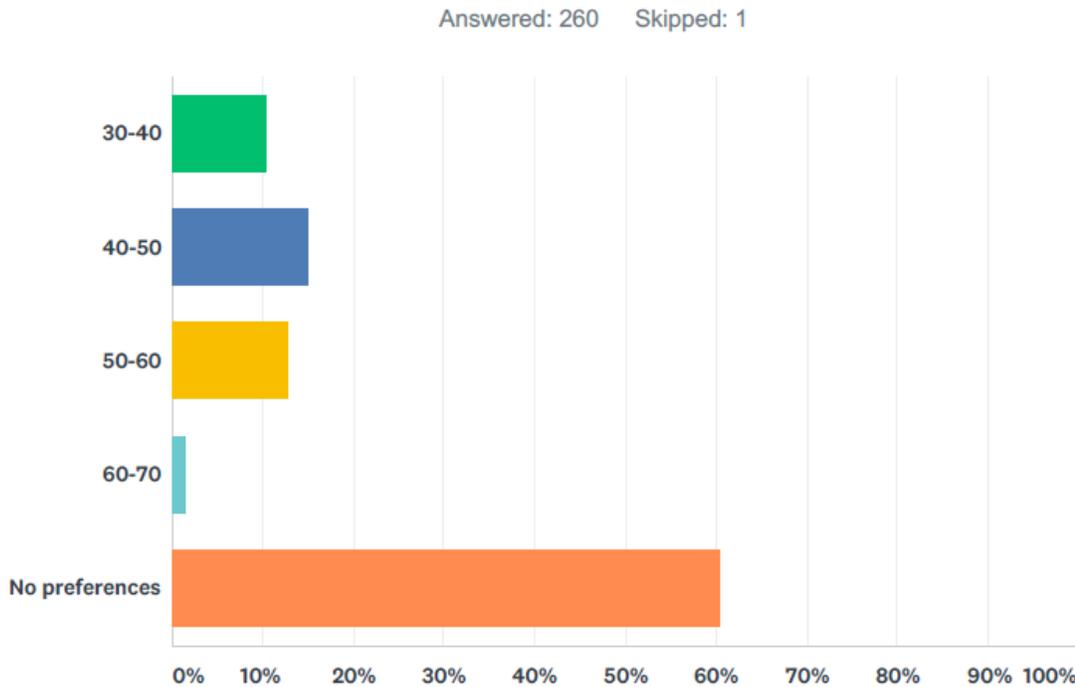


Fig (7): The Percentage of the Choice of the Participants to their Treating Doctors According to Age

III. RESULTS AND DISCUSSIONS

This study aims to correlate statistical information about age and gender of therapists with a preference of patients with mental illness. This survey provides a clear situation and evaluation of patients with mental illness regarding to the age and gender of their therapists. The output of this study shows that there is a low preference to specific age and gender. Only 15% and 10% of the total patients who was involved in the survey have specific preferences for therapists age (40-50) and (30-40) respectively. On the other hand, around 25% of mental illness patients would like to choose male therapists compared to 15% who preferred female. Finally, more than 65% of patients who was covered in this study don't have any specific preferences for age and gender of their therapists.

In fact, some limitations faced the direction of this survey, so it is important to mention these limitations and restrictions to provide some possible improvement in future research to overcome these limitation. One of the limitations is that patients with mental disorders do not like to talk about their mental problems in front of anybody. Another problem faced by the study was the size of the sample as 261 patients, which is relatively few to launch generalizations and obtain demonstrated conclusion.

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Effect of Liquid Organic Fertilizer and Defoliation Interval on Growth Characteristics and Quality of Elephant Grass CV.Taiwan

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ABSTRACT

The objective of the research was to determine the effects of liquid organic fertilizer and defoliation interval on growth characteristics and quality of elephant grass cv. Taiwan. The research was assigned in completely randomized 3 x 3 factorial design with 3 replications. The first factor was liquid organic fertilizer with three doses (0, 300, and 600 ml/polybag) and the second factor was defoliation interval with 3 intervals (30, 45 and 90 days). Parameters observed were plant height, number of leaves, leaf area, number of tillers, dry weight, crude protein, ADF and NDF contents. Results showed that liquid organic fertilizer had significant effect ($P<0.05$) on plant height, number of leaves, leaf area, number of tillers, and dry matter yield but had no significant effect on crude protein, ADF and NDF contents. Defoliation interval significantly ($P<0.05$) influenced growth characteristics and quality of the plant. As increasing defoliation interval, plant height, number of leaves, leaf area, and number of tillers increased, but crude protein decreased while ADF content increased. NDF levels did not significantly influenced by defoliation interval. It can be concluded that liquid organic fertilizer and manipulation of defoliation interval can be used to increase the growth characteristics and quality of elephant grass cv. Taiwan.

Key word: liquid organic fertilizer, defoliation interval, growth characteristics, quality, elephant grass cv. Taiwan

I. INTRODUCTION

For several years in 1970s, Indonesia had been exporting livestock to Hongkong. However, three decades later, it begun to import meat and livestock, especially from Australia. Presently, Indonesia has been importing nearly 50% of her meat needs, not only from Australia, but also from other countries like India.

Based on this condition, since year of 2005, the government has been programming self-sufficiency of meat and consequently, limitation of import of meat and livestock is being imposed, but until present, self-sufficiency of meat never attained; livestock population is hardly to increase and the price of meat is still high.

There are many problems faced by the farmer and government to increase livestock productivity and reducing meat import, like low reproductive performance, low growth rates, prevalence of many livestock diseases, etc., but the main root problem is the low availability and quality of forage, especially during the dry season.

During the wet season, the growth of forage that mostly comprises of natural grasses is high but after entering the dry season, the growth of forage begin, to slow and at the peak of dry season, the growth of most forages are slower and even stop. The growth of animals grazing on natural grassland also follows the same pattern, it is high during the wet season but it is low during the dry season. At the peak of dry season, many ruminant animals are dead because of starvation and the pregnant animals often abort. Due to poor growth during the dry season, the animals need longer time to reach puberty and market weight.

To overcome the above problems, the government of Indonesia has been promoting the cultivation of elephant grass, a grass that well known because its high dry matter production and drought resistance. In Indonesia, there four cultivars of elephant grass are being cultivated, one of them is elephant grass cv. Taiwan. This grass has been growing naturally throughout Southeast Asia where the annual rainfall is about 1000 mm (Mannetje and Jones, 1992), plant height of 4 – 5 m, drought and shade resistant, soft leaves, high digestibility and palatability. Because of its high production potential, it needs high fertility soils (Agustin, 2018).

Until now, chemical fertilizers has been used to increase soil fertility where elephant grass is grown. Although they have role in increasing plant nutrients during adverse weather conditions or during the plants need additional nutrients, they also

have several harmful effects such as waterway pollution, soil acidification and mineral depletion of the soil. For these reason, application of chemical fertilizers should be limited.

In Indonesia, there are many agricultural wastes that can be used as sources of organic fertilizers. These agricultural wastes are regarded as un-used commodity and commonly thrown away in the field, causing environmental pollution.

The objective of the research was to determine the effects of liquid organic fertilizer (LOF) and defoliation interval on growth characteristics and quality of elephant grass cv. Taiwan (*Pennisetum purpureum cv Taiwan*).

II. MATERIALS AND METHODS

This research was carried out for 3 months, starting from February to April 2018 at the experimental field of Hasanuddin University, Makassar, Indonesia with altitude of 650 m above sea levels.

This research was assigned in completely randomized design (CRD), in factorial 3 x 3 with 3 doses of liquid organic fertilizer (0, 300, and 600 ml/polybag) and three defoliation intervals (30, 45 and 90 days) with 3 replication for each treatment (Steel and Torrie, 1993).

Liquid organic fertilizer (LOF) was made by blending 100 g of fresh noni fruits, over-ripened tomatoes, banana peels, pineapples peel, and mixed with 10 liters of beef urine and 280 ml of and molasses. The ingredients then were fermented in fermentation batch for two weeks under an-aerobic conditions. After fermentation period ended, the fermented materials were filtered using cloth. Nutrient contents of LOF were N 0.51%, P₂O₅ 0.18% and K₂O 0.19%.

Elephant grass cv. Taiwan (Taiwan grass) stem cuttings with two nodes were planted in polybag measuring 30 x 40 cm that had been filled with 10 kgs of light clay oil. The nutrient contents of soil used were: C 1.91%, N 0.16%, C/N ratio 12, P 0.21%, K 0.28% and pH was 6.1.

Fertilization of LOF on Taiwan grass is done three times, i.e. at 15, 45 and 75 days after grass planting with the doses of 0, 300 and 600 ml/polybag.

Defoliation intervals were 30, 45 and 90 days or frequency defoliation of were three, two and one time, with defoliation height was 10 cm above soil level surface.

Parameters of growth characteristics measured were plant height, number of leaves, number of tiller, dry weight and parameters of quality were crude protein, NDF and ADF contents. Crude protein was determined according to the method of Association of Official Analytical Chemist (AOAC, 2005), analysis of NDF and ADF contents followed the methods of Goering and Van Soest (1970).

III. RESULTS AND DISCUSSION

1. Growth characteristics

Effect of LOF and defoliation interval on growth characteristics of Taiwan grass are shown in Table 1.

Results showed that liquid organic fertilizer and defoliation interval had significant effect (P<0.05) on growth characteristics of Taiwan grass (Table 1).

As increasing LOF doses, plant height, number of leaves, leaf area, number of tiller, and dry weight increased, but with increasing cutting interval, plant height, number of leaves, leaf area, number of tiller, and dry weight were increased.

The results of this study is in agreement with Safitri (2015) and Nuraida (2015) that application of LOF made from noni fruits, tomatoes, pineapple peel and banana peel at dose of 400 ml/polybag each, significantly increased plant height, growth rate and dry matter yield of Taiwan grass.

Table 1. Effect LOF and defoliation interval on growth characteristics and dry weight of elephant grass cv Taiwan.

	Plant height (cm)	Number of leaves (sheet/polybag)	Leaf Area (mm ² /polybag)	Number of tiller (/polybag)	Dry weight (g/poly-bag)
LOF doses (ml/polybag)					
0	93,14 ^a	23,83 ^a	1677,0 ^a	2,03 ^a	8,64 ^a
300	119,04 ^b	63,56 ^b	1748,9 ^a	4,87 ^b	35,31 ^b
600	132,82 ^b	77,27 ^b	2701,0 ^b	5,92 ^b	46,09 ^b
Defoliation Interval (days)					
30	101,60 ^a	33,48 ^a	1649,2 ^a	1,55 ^a	15,31 ^a
45	128,75 ^b	49,38 ^a	2228,0 ^b	3,72 ^b	32,23 ^b
90	114,67 ^b	81,78 ^b	2300,6 ^b	7,55 ^c	42,50 ^b

Different superscripts at the same column are significantly different (P<0.05)

The enhanced growth characteristics of Taiwan grass as application of LOF indicates the positive effect of N from LOF on parameters of growth characteristics, as the higher N content of LOF than N content of the soil used in this study. Compared to control, application of LOF at doses 600ml/polybag on the grass significantly yielded higher plant height, number of leaves, leaf area, number of tiller and dry weight. LOF with doses 600 ml/polybag with N content of 0,51% might be able to meet nutrient

needs of Taiwan grass. The higher plant height as influenced by LOF probably makes the grass can absorb more light for photosynthesis and this in turn produces more leaves and dry matter yield. This is in line with Uminawar and Rahmawati (2013), that the more leaf area produced, the greater intensity of sunlight received and the more chlorophyll in leaves produced. The chlorophyll which function to capture solar energy will increase the rate of photosynthesis so that more carbohydrates will be produced for cell division and cause leaves grow bigger and wider. Sawen (2012) stated that factors needed in growth of plant is water supply, light and nutrients. Sunlight is very important factor in photosynthesis because it acts as energy source for plants. Interference caused by lack of light can be seen from increasing of plant height and width of leaf.

Addition of LOF improves soil structure; soil become more crumb and has more pores make easier for new shoots to grow, and this probably, in part, make number of tiller in this study increased (Kang et.al., 2013).

Defoliation interval can influence growth characteristics productivity of forage plants. In the present study, defoliation interval of 90 days significantly increased plant height, number of leaves, leaf area, tiller number and dry weight of Taiwan grass compared to 30 days defoliation interval (Table 1). The enhanced growth characteristics of Taiwan grass as increasing defoliation interval is agree with other studies on other elephant grass cultivars (Unpuch et.al., 2011). This can be related to the higher number of tiller, plant height and number of leaves as plant ages. In lax defoliated plants, the plants has more opportunity to make more number of tiller and leaves, leaf area and carbohydrate reserves. Carbohydrate reserve then can be translocated to stem base or roots that can be used to sustain the growth. The shorter defoliation interval results in shorter time needed to collect food reserves for growth activities. Although enhancing effect of increasing cutting interval to growth characteristics and dry yield of Taiwan grass, however, as feed, its quality should be considered.

2. Nutritional Compositions and their yields

Effect of LOF and defoliation interval on nutritional compositions of taiwan grass and yield of are shown in Table 2.

Table 2. Effect liquid organic fertilizer and defoliation interval on nutritional composition of elephant grass cv Taiwan.

	Contents			Dry Yield (g/polybag)		
	Crude Protein (%)	ADF (%)	NDF (%)	Crude Protein	ADF	NDF
LOF Doses (ml/polybag)						
0	14,57	38,14	64,71	125,88	329,53	559,09
300	12,94	40,63	65,69	456,91	1434,64	2319,51
600	13,69	39,50	63,27	630,97	1820,55	2916,11
Defoliation Interval (days)						
30	15,39 ^a	37,35 ^a	64,54	235,62	571,82	988,11
45	12,54 ^b	41,11 ^b	64,77	404,16	1324,98	2087,54
90	13,27 ^b	39,80 ^b	64,35	611,61	1691,50	1806,25

Different superscripts at the same column are significantly different (P<0.05)

Crude protein, NDF and ADF contents of Taiwan grass were not significantly influenced by LOF, but they were influenced significantly by defoliation interval (Table 2).

Defoliation interval of 90 days significantly decreased crude protein and increased ADF contents of Taiwan grass compared to the grass defoliated at 30 days (Table 2). The reduced crude protein content of plant as increasing defoliation interval is not unusual in grasses and in Taiwan grass had been reported by many authors (Budiman et.al., 2012; Novieta et.al., 2016). This is attributed to the dilution of N by increasing dry matter yield as plant ages.

In the present study, crude protein contents of Taiwan grass defoliated at 45 days (12.54%) and 90 days (13.27%) were higher than values reported by Budiman et. al., (2012) who reported crude protein of 10.67% and 6.31% when Taiwan grass defoliated at 56 days and 84 days, respectively. This might be attributed to the differences of soil fertility and climatic conditions of both experiments. Based on crude protein contents, Taiwan grass can be classified as high quality forage, because with crude protein contents of 13 – 15%, they can fulfill the protein requirements of beef cattle with body weight of 450 lbs and daily gain of 2.5 to 3.0 lbs (Anon., 2018). However, much of crude protein in the grass might be wasted because of high rumen degradable protein content of grass, especially young grass (Hoffman and Brehm, 2015).

Besides crude protein content, ADF content of Taiwan grass also affected by defoliation interval. Defoliation interval of 45 and 90 days significantly (P<0.05) increased ADF content, but not on NDF content (Table 2). The increased of ADF content of elephant grass as increasing defoliation interval was also reported by Lounglawan et.al., (2014) and Budiman et.al., (2012). NDF and ADF are structural components of plant that has a role to support the increasing biomass of plant as plant ages. The significant effect of long defoliation interval on increasing NDF content indicates the bad effect of long defoliation on digestibility as ADF content and digestibility is highly correlated.

NDF and ADF contents of feed can be used to categorize feed. Singh and Oosting (1992) stated that NDF values of less than 45% can be classified as high quality, values ranging from 45% to 65 as medium quality and values higher than 65% as low quality. Based on above category, Taiwan grass can be classified medium to low quality as its NDF contents ranging from 63.27 to 65.69%. Based on ADF contents, Taiwan grass also can be categorized medium quality forage, because according to Kellems and Church (2001), roughage with less 40% ADF are categorized as high quality and when less that 40% can be categorized as low quality.

IV. CONCLUSION

1. Liquid organic fertilizer improved growth characteristics and dry matter yield of Taiwan grass, but has no significant effect on its quality.
2. Increasing defoliation interval improved growth characteristics but decreased quality of Taiwan grass.
3. Based on crude protein content, Taiwan grass can be categorized as high quality forage, but based on its NDF and ADF contents, it can be categorized as medium quality forage.

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Observations on Liver Abscess: Recent Trends In Aetiopathogenesis and Management Modalities

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ABSTRACT

Background:- Liver abscess continues to be an important cause of morbidity and mortality in tropical countries. However, recent advances in interventional radiology, intensive care, progress in antibiotic therapy, liberal use of sonography and computerized tomography scanning of abdomen have led to early diagnosis and treatment of patients of liver abscess, thus improving the patient outcome.

Materials and methods:- The study was a prospective study of diagnosed cases of liver abscess from August 2014 to November 2016 conducted at Patna Medical College & Hospital, Patna. A total of 66 patients were included in the study. The patients were randomly allocated into two groups on basis of treatment modality, Group A: USG guided percutaneous aspiration (n=33) and Group B: Percutaneous pigtail catheter drainage group (n=33). Both the groups were investigated to ascertain etiopathogenesis and to compare the treatment modalities.

Results:- Most common organism isolated on pus culture was E.coli in both the groups. Pus samples of 20 out of 66 patients had culture positive results for E.coli. Most common type of abscess was pyogenic in both male (55.9%) and female (71.4%). We found average duration of stay in catheter drainage group (9.33 days) was less compared to aspiration group (10.69 days), this difference however didn't had statistical significance. 72.7% of the subjects presented with complications in USG guided aspiration group whereas only 33.4% of people presented with complications in USG guided catheter drainage group.

Conclusion:- Liver abscess is common in male having habit of drinking alcohol or today. E.coli is most common causative organism causing pyogenic liver abscess. Percutaneous catheter drainage appears better in terms of duration of hospital stay, complications and complete resolution of abscess cavity.

Keywords:- Amoebic & pyogenic liver abscess, Etiopathogenesis, Observation, Percutaneous aspiration, Pigtail catheter drainage

I. INTRODUCTION

Liver abscess is pus filled mass inside the liver. Recognised since Hippocrates (Circa 400 B.C) who speculated that the prognosis of the patients was related to the type of fluid within the abscess cavity³⁷. It is a suppurative cavity in liver resulting from the invasion and multiplication of micro-organisms, entering directly from an injury through the blood vessels or by the way of the biliary ductal system. Liver abscess are most commonly pyogenic, amoebic or mixed infections. Less commonly these may be fungal in origin.

Amoebic Liver Abscess

Amoebic liver abscess is an inflammatory space occupying lesion of the liver caused by *Entamoeba histolytica* and is an important clinical problem in tropical regions of the world and accounts for a high number of hospital admissions. It is commonest extra-intestinal clinical syndrome associated with *E.Histolytica* infection and its incidence has been reported to vary between 3% and 9% of all cases of amoebiasis.

In 1995, the world health organization (WHO) estimated that 40 to 50 million people suffer from amebic colitis or amebic liver abscess worldwide resulting in 40,000 to 100000 deaths each year. Often starting with non-specific symptom, amoebic liver abscess must be excluded in all patients presenting with pain in right upper quadrant of abdomen or right lower thoracic pain, radiating to scapular region and right shoulder with or without fever. Nausea, vomiting, anorexia, weight loss may also be present.

Fortunately Amoebic liver abscess is a readily treatable form of hepatic infection & mortality is negligible and treated in its early course. However if left untreated, it may lead to serious life threatening complications like rupture into the pleural, peritoneal, or pericardial cavities.

Pyogenic Liver Abscess

Pyogenic liver abscess is a rare, life-threatening disease that has an increasing incidence rate in the United States and Europe. Multiple pathogens are associated with cases of pyogenic liver abscess like:

Gram-positive cocci: *Streptococcus sp* (especially *S. intermedius* group), *enterococci* and *Staphylococcus aureus*.

- Anaerobes: *Bacteroides* species, *Fusobacterium sp*, *Actinomyces sp*, *Clostridium sp*, etc.
- Enterobacteriaceae (*E. coli*, *Klebsiella sp.*, etc) and other Gram negative bacilli.
- *Yersinia enterocolitica*: rare cause of liver abscess, consider underlying hemochromatosis.

Pyogenic hepatic abscesses generally occur in middle-aged adults (40's and 50's) and signs and symptoms: include fever (60%) associated with chills and malaise, RUQ pain, tenderness and or hepatomegaly. Diaphragmatic irritation from abscess may refer pain to the right shoulder +/- cough or pleural rub.

Treatment of Amoebic Liver Abscess

Amoebicidal drugs alone or in combination with antibiotics appear to render relief only in number of cases. Bigger abscesses require repeated aspiration or operative drainage in combination with above drugs. For quite a long time aspiration with amoebicidal drugs has been considered to be the sheet anchor of treatment of Amoebic liver abscess. The period of morbidity is long and mortality rate is high. Still majority of workers favor aspiration to open drainage procedure. Recent works in different parts of the country and abroad show a new trend of treatment of Amoebic liver abscess depending whether it is uncomplicated or complicated.

Complicated Amoebic liver abscess mainly treated by open drainage (anterior or posterior approach), laparoscopic drainage and in fewer cases with hepatic resection while in uncomplicated cases USG-guided needle aspiration with amoebicidal drugs are the treatment of choice.

Surgical drainage was the standard of care until the introduction of percutaneous drainage technique in mid 1970s. With the refinement of image guided technique, percutaneous drainage and aspiration have become the standard of care. Image guided technique include either USG-guided or CT-guided of which USG is readily available, cheap with no hazards of radiation.

Ultrasound gives the details of amoebic liver abscess in terms of its lobe involvement (right/left), site (posterior/superior/inferior), number single/multiple), size and whether it is unruptured or ruptured (intra peritoneal, intra pleural or into pericardial cavity). At the same time we can perform diagnostic and therapeutic USG-guided aspiration. Overall it also lessens the duration of anti-amoebic drugs. In case of multiple abscesses, USG-guided aspiration has an important role in localizing multiple sites of aspiration. It provides a god view for the approach of needle/catheter into the abscess cavity. Percutaneous catheter (PCD) drainage is a preferred method most widely used to drain liver abscesses; recent studies have shown percutaneous needle aspiration (PNA) to be simpler, less costly, and equally effective. Usually needle aspiration is preferred for smaller abscesses and catheter drainage is done in larger ones. But no clear cut guidelines have been laid¹⁵³.

Both these techniques have certain disadvantages. Multiple attempts of PNA needed for large abscesses may be uncomfortable and perceived as more traumatic by patients. Also during the period between two aspirations pus may get re-accumulated. For smaller abscesses, daily production of pus may be small, but a larger abscess cavity may produce large quantity of pus, which needs to be drained continuously. PCD has the obvious advantage over the PNA, which may accounted for quicker clinical recovery, lesser failure rate among patients treated with PCD. On the other hand, placing the catheter needs more expertise, nursing care.

Percutaneous aspiration are more effective than conservative medical management alone, however co-morbid conditions of patients and size of liver abscess also influence the outcome.

Surgical open drainage is rarely indicated and may be required in the setting of:

- Large abscess with poor yield on needle aspiration or percutaneous drainage
- Clinical deterioration despite attempted needle aspiration
- Complicated Amoebic liver abscess (like ruptured abscess in peritoneal cavity with feature of peritonitis)
- Complicated Amoebic liver abscess (ruptured in the pleural cavity / pericardial cavity / adjacent viscera)

Treatment of Pyogenic Liver Abscess

Abscess drainage is the optimal therapy for pyogenic liver abscesses. Aspirate should be sent for gram stain and aerobic/anaerobic culture; evaluation for fungal and mycobacterial pathogens. *E. histolytica* should be considered based on epidemiologic factors.

CT or US-guided percutaneous needle aspiration +/- catheter drainage initial method of choice with a success rate in up to 90% of cases.

If drainage inadequate, surgical drainage may be required.

Percutaneous aspiration without catheter placement, recently found to have better success rates as compared to catheter placement. Catheter placement should be considered in larger abscesses (>5 cm diameter).

Complications of percutaneous drainage: include perforation of adjacent abdominal organs, pneumothorax, hemorrhage and leakage of abscess contents in peritoneum.

Surgical drainage: may consider as primary treatment in certain settings.

- Complex abscess
- Multiple abscesses
- Percutaneously unreachable abscess
- Larger abscesses (> 5 cm)
- If associated surgical problem also present
- Drainage may be done laparoscopically

Hepatotomy: generally successful approach, but improvements in percutaneous techniques make it secondary management in most cases.

Medical management: consider in patients at high risk for drainage procedures or with small/multiple abscesses not amenable to drainage.

Antibiotic treatment

Empiric coverage should include coverage for Enterobacteriaceae, enterococci, anaerobes, and in certain situations staphylococci and streptococci.

In stable patient antibiotics may be deferred until post-aspiration/drainage to increase culture yield. Culture results may help narrow coverage, but for pyogenic abscess anaerobic coverage must not be discontinued considering the difficulty in culturing these organisms.

Empiric regimens: may narrow based on culture results.

Inj Ceftriaxone 1 g IV 12 hourly, Inj Amikacin 500 mg IV 12 hourly and Inj Metronidazole 200 mg IV 8 hourly.

Duration: If adequate drainage achieved with resolution of fever and leukocytosis, often 14-42 days total. Longer courses (up to several months) may be required in the patient who is inadequately drained or treated without drainage.

II. MATERIAL AND METHODS

The study was a prospective study of diagnosed cases of pyogenic and amoebic liver abscess from August 2014 to November 2016. A total of 66 patients were included in the study. The patients were randomly allocated into two groups on basis of treatment modality, Group A: USG guided percutaneous aspiration (n=33) and Group B: Percutaneous pigtail catheter drainage group (n=33). Both the groups were investigated to ascertain aetiopathogenesis and better treatment modality.

The patients included in the study were diagnosed cases of liver abscess; admitted through surgical outdoor or emergency department in the indoor wards of Rajendra Surgical Block of Patna Medical College & Hospital or those referred from Department of Medicine, Patna Medical College and Hospital from August 2014 to November 2016.

INCLUSION CRITERIA

1. All the patients diagnosed to have liver abscess clinically and radiologically (on USG and /or CT-scan) irrespective of its size.
2. Patients who didn't respond to drug therapy alone within 48-72 hours

EXCLUSION CRITERIA

1. Uncertain diagnosis
2. Uncorrectable coagulopathy
3. Ruptured liver abscess
4. Patient who didn't consent for the study

A. PERCUTANEOUS USG-GUIDED NEEDLE ASPIRATION OF LIVER ABSCESS

PROCEDURE

The patient was kept NPO for a period of six hours. The procedure was carefully explained to patient. Risk bond was duly signed by patient attendant describing him the risk of operation. Intravenous line was maintained using wide bore cannula and oxygen was made available. Inj. Atropine 0.6 mg was given half an hour before procedure to counteract the vagal stimulus. Inj. Ceftriaxone 1g was also administered.

The aspiration was undertaken in radiology department under proper aseptic precautions. Affected area was prepared and painted with savlon, spirit, betadine and draped.

The site of aspiration was determined by as per following criteria:

- ✓ Abscess cavity to be localized under ultrasound guidance and a shorter and a safer pathway to be looked for (no vitals structure should be encountered in path).
- ✓ Presence of a pointing abscess or a localized buldge of the chest wall.
- ✓ The location of point of tenderness.

During the procedure, USG was done to guide the needle to the right spot, to indicate the depth to be introduced. When an abscess was pointing and the overlying skin was taught and thin, then puncture was made in the surrounding normal, healthy skin to avoid sinus formation and subsequent secondary infection.

Position of patient was determined by the site chosen for puncture. If anterior or lateral, the patient laid semi recumbent leaning against a back rest, if however the site was posterior, the patient was made to lean forward. The selected area after proper cleaning and draping, was infiltrated with 5-6 ml of 1% xylocaine using 24G needle, 2 to 3 minutes prior to insertion of lumbar puncture needle.

Percutaneous aspiration was done using 16G lumbar puncture needle and a syringe of 50 cc.

Patient was asked to take shallow breath throughout the procedure and to hold his breath while the needle was being manipulated, to minimize the risk of liver trauma and hemorrhage. While aspiration, effort was made to avoid traversing the pleural or peritoneal cavity.

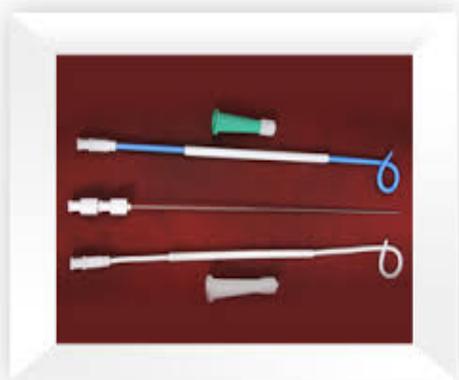
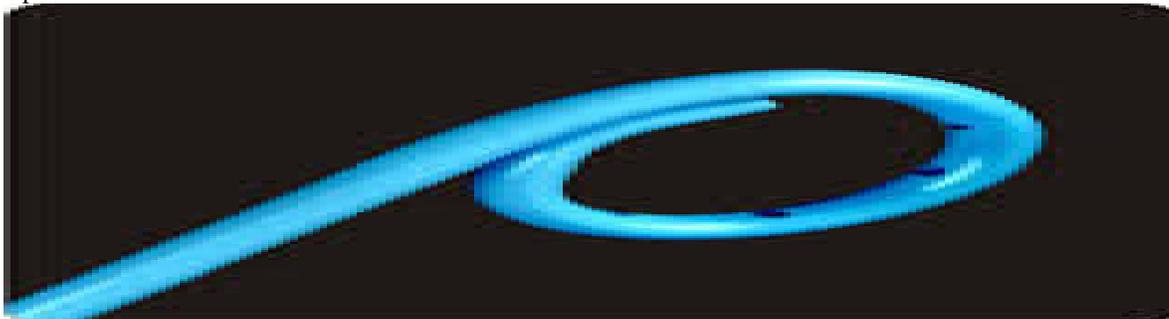
Pus came out from free end of needle, once it entered the abscess cavity. A 50 ml syringe was then attached to create a negative force which was regulated according to the resistance to the flow of pus.

The pus was aspirated. The last part of aspirate had a more bloody appearance and at this stage patient might experience an aching pain in the liver or right shoulder and occasionally coughing. The terminal aspirates were rich in trophozoites and therefore sent immediately for culture and smear in sterile container. USG was repeated at the end of procedure to check complete evacuation or any residual abscess. If residual abscess was found, then position, depth of needle or even the puncture site was changed till there was complete evacuation. The number of aspiration was noted. The procedure was withheld if the patient was in distress.

At the end of procedure, needle was taken out with caution and puncture site was sealed and covered with dressing. Inj. Dilon was given to relieve pain. Patient was kept under observation for pulse, B.P, temperature, respiration, abdominal girth for initial period of 12-24 hrs so that signs of haemorrhage or peritonitis might not be missed. Also patients were examined daily for clinical improvement. Improvement in pain, fever, anorexia, hepatomegaly was considered successful treatment. To see the resolution of abscess, ultrasonic scan were repeated.

REPEATED ASPIRATIONS

The need of repeat aspiration in any patients depended on clinical symptoms and signs and any residual abscess after first aspiration. It is required in any patients with large abscess in whom the symptom persisted or worsened in a few days after first aspiration. Persistence of abscess on repeat USG after first evacuation of a sufficient quantity of pus also contributes an indication of repeating aspiration.



Pus being drained through pigtail catheter



Prior to procedure USG guided localization being performed

B: PIGTAIL CATHETER DRAINAGE PROCEDURE

A trocar with a 14 Fr multi-sidehole pigtail catheter was inserted into the abscess cavity under local anesthesia and USG guidance. The contents of abscess were aspirated and the catheter was fixed to the skin and connected to a bag. The first review USG was done when drainage over 24 hours had declined to <10 ml. If the abscess had resolved, the catheter was removed. If residual cavity was present, the catheter was flushed with metronidazole injection and aspirated till no material was aspirated. Any loculations of residual cavity were treated with catheter manipulation under local anesthesia. Further rescan were done every third day and the catheter was

removed if the catheter drainage had remained minimal. Otherwise, the catheter was left until catheter drainage had stopped. US was repeated until the cavity had either decreased by 50% or more of its original size, or been static with clinical recovery.

AFTER CARE

Monitoring of pulse, b.p, respiratory rate, abdominal girth 2 hrly. Monitoring of drain output, urine output, input-output chart. When the drainage from the catheter completely stopped then it was removed in about 5-7 days.

A comparative study has been done to evaluate advantage and disadvantage of each procedure i.e. percutaneous USG- guided aspiration vs open surgery in terms of hospital stay, operative time, antibiotics used, cost-effectiveness, complications in each case with their final outcome and follow-up.

FOLLOW UP

Patients were assessed daily for clinical improvement and for abscess size using USG. Intervention was considered successful, if there was complete clinical recovery and disappearance of abscess cavity. Duration to attain clinical recovery (relief of pain and fever), duration of antibiotics use, duration of hospital stay, complications, failure of intervention and death were recorded. After the discharge, the patients were followed clinically and by US, in the outpatients clinic biweekly for the first 2 months and then monthly for next 4 months.

III. RESULTS

The results are represented in following table and charts

Case

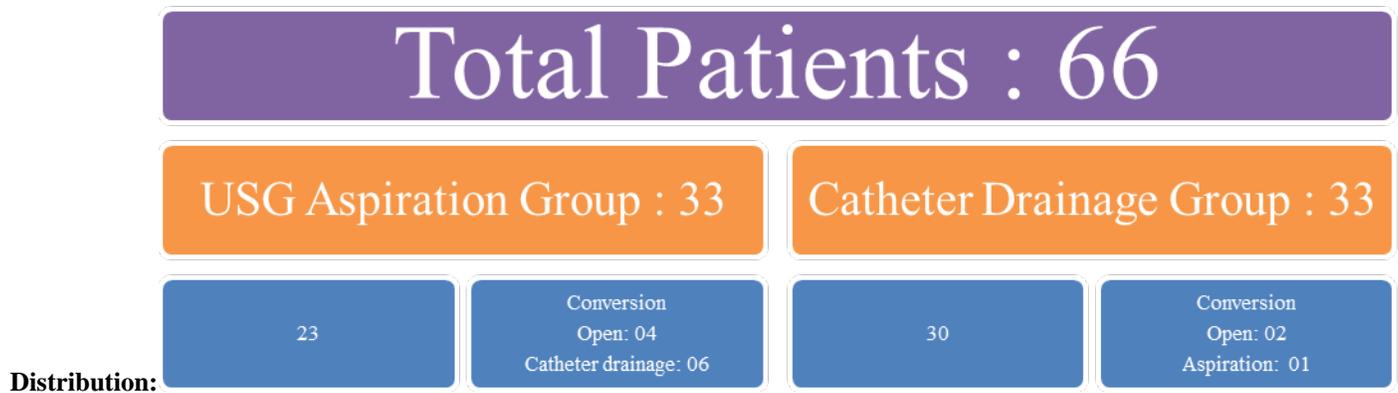
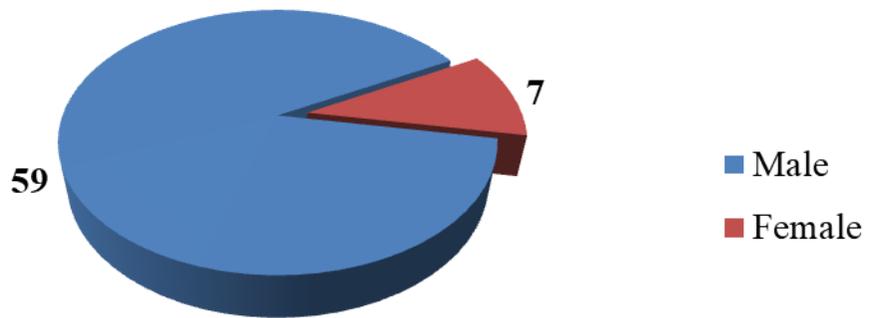


Figure 1: Case Distribution in the Catheter Drainage and USG Guided Aspiration Group



Sex Distribution

Chart 1.1: Sex distribution of study subject

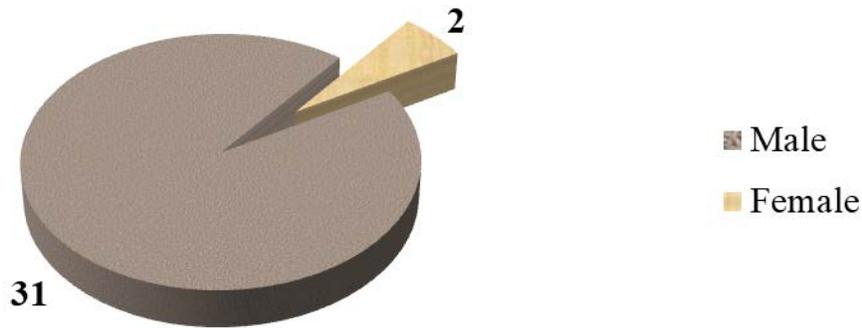


Chart 1.2: Sex distribution in USG guided aspiration group

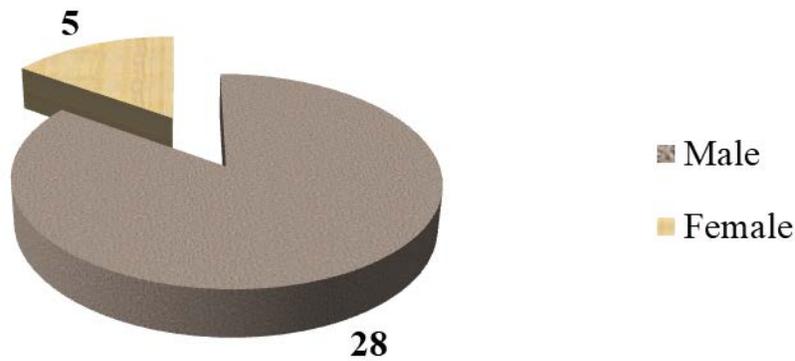
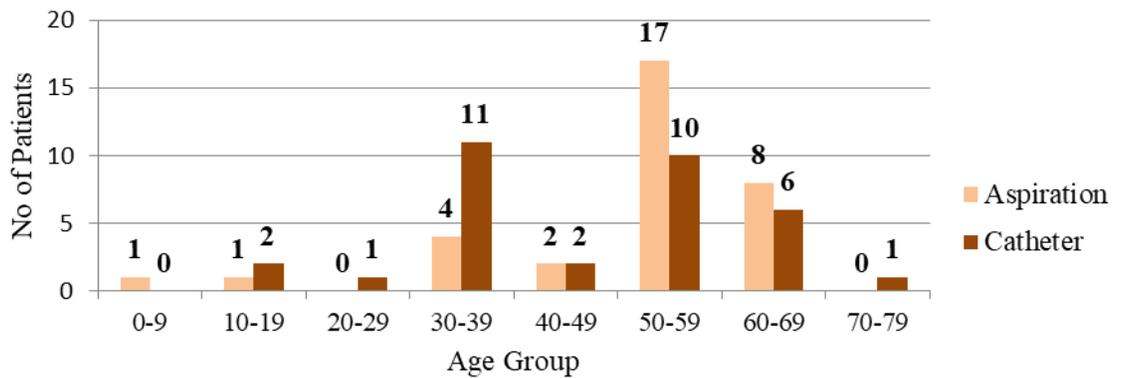


Chart 1.3: Sex distribution in catheter drainage group

The male / female ratio (chart1.2 and 1.3) in the two groups were compared with chi-square test and the difference was found to be non significant (p value = 0.42).



Age Distribution

Chart 2: Age distribution of patients in both groups

The mean age of patients in two group was compared with chi-square test and the difference was found to be non significant (p value >0.05)

Association with Alcohol:

	Alcohol Consumer		Alcohol Non Consumer
	Todi	Others	
Aspiration	14	13	15

Catheter	16	13	17
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Table1: Representation of study subject with habit of alcohol consumption

About 50% of patients in both the groups had the habit of drinking alcohol toddy or other forms of alcohol containing beverages.

Symptom:

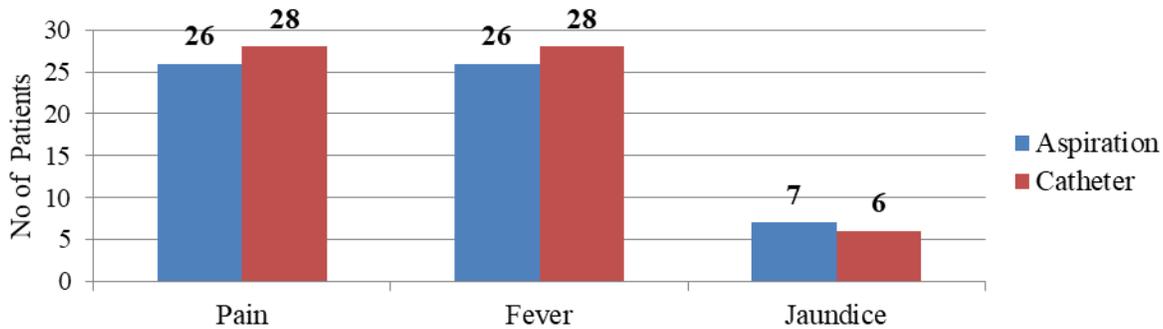


Chart 3: Symptom distributions in both groups

The incidence of presenting symptoms like Pain, Fever and Jaundice were compared between the two groups with p value being 0.52, 0.52, 0.76 for the three symptom category respectively and hence the patients in two groups were comparable in terms of presenting symptoms.

Duration of Symptoms:

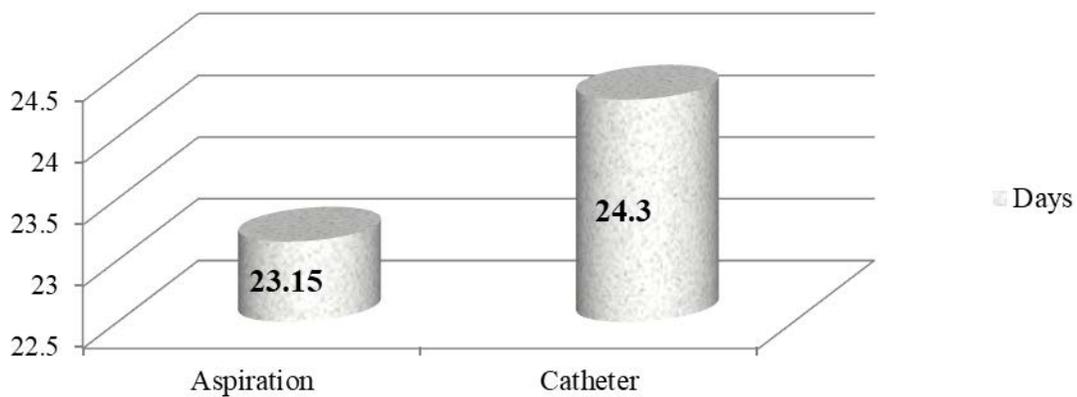


Chart 4: Duration of symptoms in both groups

Mean duration of symptoms at time of presentation was found to be 23.15 days in aspiration group whereas in catheter drainage group was found to be 24.30 days. There was no statistical difference (p value>0.05).

General Examination:

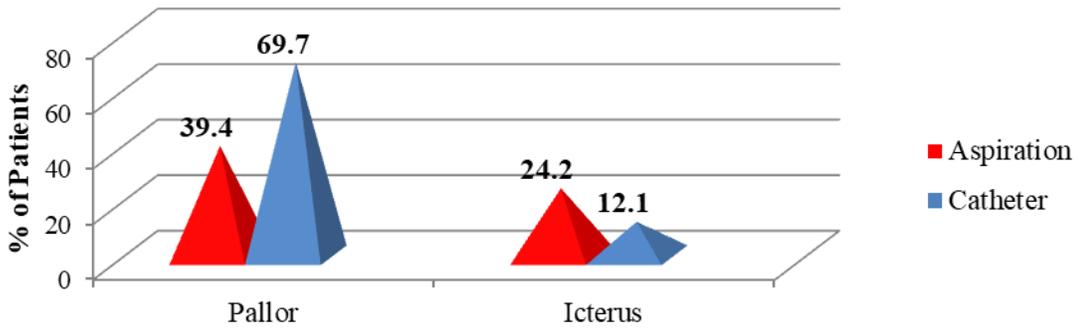


Chart 5.1: Comparison of general examination findings (Pallor and Icterus in %)

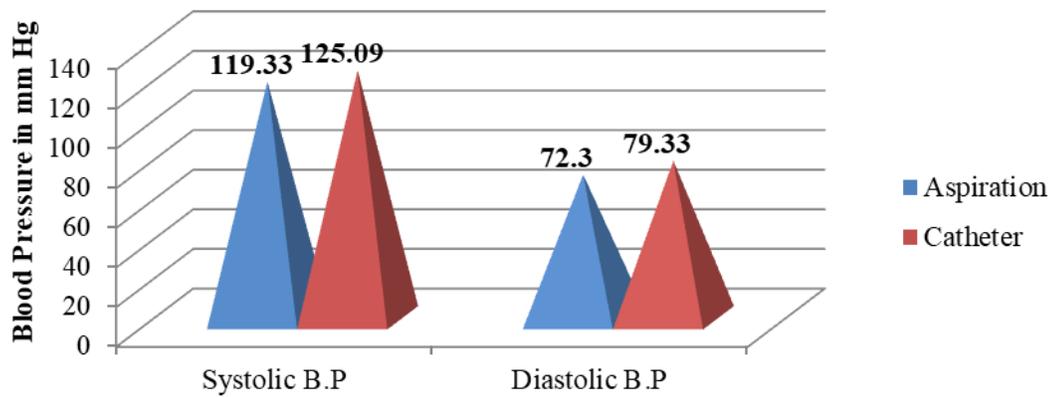


Chart 5.2: Comparison of general examination findings (mean systolic and diastolic B.P)

Hepatomegaly:

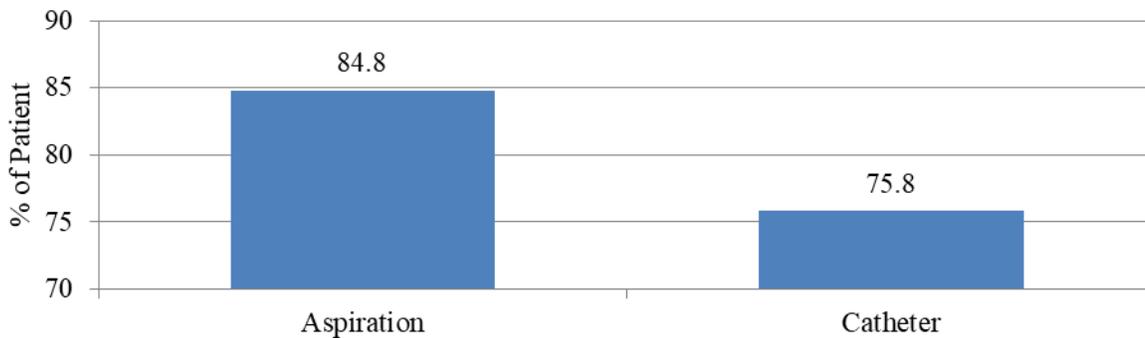


Chart 6:

Percentage of patients presenting with hepatomegaly in each group In the two groups hepatomegaly was found in 28/33 patients (84.8%) in aspiration group and 25/33 patients (75.8%) in catheter drainage group.

Solitary versus Multiple Abscess:

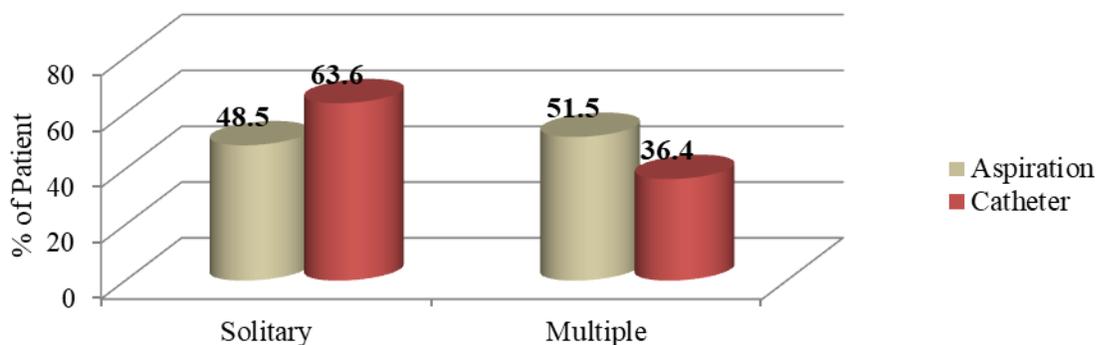


Chart 7: Percentage of solitary and multiple liver abscesses in both groups

Distribution of patients in two groups were irrespective of the types of abscesses i.e. solitary or multiple, however by chance solitary abscesses were more common in catheter drainage group (63.6% in catheter versus 48.5% in aspiration group had solitary abscess).



Abscess Volume:

Chart 8: Comparison of average volume (in ml) of abscess cavity in both groups

Mean volume of abscess cavity in aspiration group was 411.45 ml (Maximum volume: 1300 ml and Minimum volume: 50 ml) and in catheter drainage group was 330.9 ml (Maximum volume: 1130 ml and Minimum volume: 80 ml). However there was no statistical difference and both groups were comparable in terms of volume of cavity.

Microbiological Analysis:

Growth	Aspiration		Pigtail	
	No	%	No	%
E. coli	14	42.4	6	18.2
K. pneumoniae	9	27.3	4	12.1
Proteus	1	03.0	0	00.0
Pseudomonas	1	03.0	1	03.0
S. aureus	1	03.0	4	12.1
S. viridans	2	06.1	2	06.1
Serratia	1	03.0	1	03.0

Table 2.1: Isolation of different bacteria in both groups as evident from pus culture

Most common organism isolated on pus culture was E.coli in both the groups. Pus samples of 20 out of 66 patients had culture positive results for E.coli.

	Aspiration Group		Catheter Group	
	No.	%	No.	%
Growth +ve, Elisa +ve	7	21.2	2	6.1
Growth +ve, Elisa -ve	22	66.7	16	48.5
Growth -ve, Elisa +ve	4	12.1	14	42.4
Growth -ve, Elisa -ve	0	0.0	1	3.0
Total	33	100	33	100

Table 2.2: Distribution of Pyogenic, Amoebic and Amoebic with secondary infection types of liver abscess

Most of the abscesses (66% in aspiration group and 48% in catheter drainage group) were purely pyogenic as is evident from growth from pus culture and negative Elisa test for E.histolytica. Rests of the abscesses were either purely amoebic (growth -ve Elisa +ve) or secondarily infected amoebic abscess (growth +ve Elisa +ve).

	Female		Male	
	No.	%	No.	%
Growth+ve Elisa+ve	1	14.3	8	13.6
Growth+ve Elisa-ve	5	71.4	33	55.9
Growth- ve Elisa+ve	1	14.3	17	28.8
Growth-ve Elisa-ve	0	0.0	1	3.0
Total	7	100	59	100

Table 2.3: Sex wise categorization of different types of liver abscesses

Most common type of abscess was pyogenic in both male (55.9%) and female (71.4%).

	Solitary		Multiple	
	No.	%	No.	%
Growth+ve Elisa+ve	4	10.8	5	17.2
Growth+ve Elisa-ve	18	48.6	20	69.0
Growth-ve Elisa+ve	15	40.5	3	10.3
Growth-ve Elisa-ve	0	0.0	1	3.5
Total	37	100	29	100

Table 2.4: Solitary versus multiple liver abscess according to causative micro organism

Microbiological analysis of pus from both solitary and multiple types of liver abscess showed positive growth on culture and also showed positive Elisa antibody test.

Hospital stay:

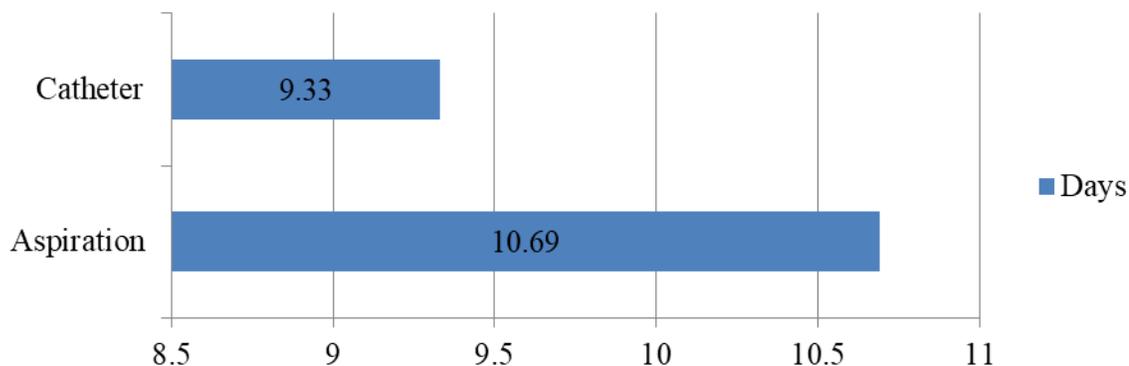


Chart 9: Comparison of average durations (in number of days) in aspiration and catheter drainage group

Average duration of hospital stay in catheter drainage group (9.33 days) is less than aspiration group (10.69 days).

Complication:

Complication	Aspiration Group
Death	12.1%
Repeated Aspiration	48.5%
Rupture	12.1%
Total	72.7%

Table 3.1: Percentage wise complication in aspiration group

Complication	Catheter Group
Bleeding	3.0%
Death	6.1%
Blockage of drain	18.2%
Rupture	6.1%
Total	33.4%

Table 3.2: Percentage wise complication in catheter group

72.7% of the subjects presented with complications in USG guided aspiration group whereas only 33.4% of people presented with complications in USG guided catheter drainage group. The most common complication in aspiration group was repeated aspiration 48.5%. The most common complication in catheter drainage group is blockage of drain due to thick pus 18.2%.

IV. DISCUSSION

A total of 66 patients were included in the study. The patients were randomly allocated into two groups on basis of treatment modality, Group A: USG guided percutaneous aspiration (n=33) and Group B: Percutaneous pigtail catheter drainage group (n=33). 6 patients out of 33 in USG guided aspiration underwent conversion to catheter drainage later due to need for repeated aspiration. 4 patients out of this group later on underwent laparotomy and peritoneal toileting due to rupture of liver abscess into peritoneal cavity. Out of 33 patients in USG guided pigtail catheter drainage group, 2 patients underwent laparotomy due to rupture of liver abscess into peritoneal cavity. Also 1 patient out of this catheter drainage group underwent conversion to USG guided percutaneous needle aspiration.

In the present series of 66 cases, male have been found to suffer more from amoebic liver abscess than females, with male : female ratio of 8.4:1 as shown chart 1.1. Also the male and female ratio (chart 1.2 and chart 1.3) in aspiration and catheter drainage groups were compared with chi-square test and the difference was found to be non significant with a p value=0.42, and hence the two groups were comparable. Preponderance of liver abscess in male has been observed by Min (1971), Teh LB (1988), Kapoor (1990), Rmani (1995), Dyossou F (2000), Zafar & Ahmed (2002)¹³⁷. Wells and Arguedas (2004) reported that male constitutes about 86% cases of Amoebic liver abscess and it occurs 10 times more frequently than in females. Above findings of sex incidence of liver abscess is favored by Singh V, Bhalia A (2008), evaluated 12 patients prospectively presented with features of liver abscess and found 11 cases were male and 1 female women who is close to it¹⁴². Preponderance in male has been also observed by Mukhopahyay M, Saha A.K (2010) who studied 72 patients and found that there were 66 males (91.67%) and 6(8.33%) females¹⁴⁷.

Preponderance of liver abscess in male has been mainly attributed to toddy drinking and alcoholism (Rogers 1921)⁸⁸. Alcohol causes nutritional deficiency due to gastrointestinal catarrh and poor appetite. Also they are exposed to more hard labour causing greater stress and strain of life. No other apparent cause has been described for this male preponderance so far.

In study of 66 patients, it was observed that most common age group of liver abscess is 50 to 59 years and 40.9% cases belonged to this age group (chart 2). Overall disease is more common in third to fifth decade of life. Also the mean age of patients in USG guided aspiration group and catheter drainage group was compared and the difference was found to be non significant (p value>0.05).

Above observation is similar to that of **Patren (1914)**, who observed that maximum number of patients suffering the liver abscess belonged to 3rd and 4th decades of life¹¹⁴. Similar age incidence have also been reported by Napier (1946), Manson Bahr (1950), Misshra S.C. (1952), Singh H.S.K (1959), S.J.Aptekar and Bhalerao etal (1970)^{73&146}. According to Wells and Arguedas (2004), most cases of liver abscesses are found in 3rd to 5th decades of life. Above finding is favored by Singh V, Bhalia A (2008) who evaluated 12 patients prospectively and found mean age OF 41.3 years. Mukhopahyay M, Saha A.K (2010), studied 72 patients and found the age of incidence of liver abscess ranged from 21-71 years (the mean age being 43.64 yrs)¹⁴⁷. The 31-40 years age group showed the highest incidence, consisting of 40.28% cases. Sharma N, Sharma A, Verma S (2010), in his retrospective study of 86 indoor cases of liver abscess, observed the mean age of 41.3 years¹⁴⁸. Sukhjeet Singh, Poras Chaudhary (2013), found in his study of 60 patients that age of patients varied from 16 years to 58 years with the age range from 31-40 years (21 patients), 2nd most common age 21-30 (19 patients) and then the number of patients was less in extreme of age¹⁵⁵. Above age incidence is also favored by Alpesh B Ami, Rajesh D Patel (2015), observed in his study of 51 patients with age range was between 16-75 with mean age of 40 years with higher number of cases of 12 in 35-45 of age group. From observations of different workers it is evident that disease is more common in 3rd to 5th decade of life which favors present study.

It is observed from the table 1, out of 66 cases, 34 patients (51.51%) had the habit of drinking alcohol or toddy or other forms of alcohol containing beverages. Toddy (which is fermented palm extract) drinkers are more susceptible because of ingestion of large doses of *E. histolytica* and bacteria. Above data is favored by Ramani (1995) in prospective study of 200 cases of liver abscess found that 64% of patients gave history of alcohol consumption which is locally fermented brands¹³⁷. Mathur (2002) observed that alcohol intake was seen in a significant number (43%) of patients of liver abscess⁷⁰. Makkar (2006) observed that higher incidence of liver abscess in alcoholics is possibly due to their high Iron content. Singh V, Bhalia A (2008), evaluated 12 patients prospectively presented with features of Amoebic liver abscess and noted that 44 (61.11) patients gave history of alcohol consumption which support the above finding of association of alcohol consumption and Amoebic liver abscess¹⁴². Alpesh B Ami, Rajesh D Patel (2015), observed in his study of 51 patients that alcohol addiction was among males with 28 (48%) cases having less than 10 years duration and 16 (33%) cases with > 10 years duration also supports the present findings⁷⁷.

In the present work, pain in right upper quadrant of abdomen was observed in 81.8% cases, fever in 81.8% and jaundice in 19.7% (chart3). Singh V, Bhalia A (2008), evaluated in 12 patients prospectively that pain was most commonly located in right hypochondrium in 60 patients (83.33%) cases. Fever was observed in 58 patients (80.56%). Mukhopahyay M, Saha A.K (2010), studied 72 patients and found fever, pain abdomen and diarrhoea in 94%, 90% and 10.5% cases respectively¹⁴⁷. Above present finding is favored by Sukhjeet Singh, Poras Chaudhary (2013), found in his study of 60 patients, noticed pain in RUQ of abdomen as most

common symptom found in 93% cases¹⁵⁵. Weakness (90%) and fever (88%) were frequently presenting symptoms. So the symptoms which are found in the study are in general agreement with those of other authors.

Mean duration of symptoms at time of presentation was found to be 23.15 days in aspiration group whereas in catheter drainage group was found to be 24.30 (chart 4). So the above observation does not hold well with the findings of Mukhopahyay M, Saha A.K (2010), who studied 72 patients and found that that duration of symptom < 2 week in 48% cases¹⁴⁷. Sharma N, Sharma A, Verma S (2010), in his retrospective study of 86 indoor cases of liver abscess, found mean duration of illness 13.8 days¹⁴⁸.

On systemic examination pallor was found in 36 (54.5%) cases, and icterus was found in 12 (18.2%) cases. It shows that persons having poor hygiene and poor health are more prone to develop liver abscess.

According to Kapoor (1990) the general signs are less important in the diagnosis of liver abscess but give the idea about the prognosis. Pyrexia, sweating, pallor were commonly found. Rarely edema of feet, mild ascites and icterus may be present⁴⁵.

Tachycardia was due to toxemia and bacterial peritonitis and tachypnoea was due extension of liver abscess pushing diaphragm upward or due to rupture into pleural cavity or due to toxemia.

On abdominal examination, enlarged tender liver was found in 53 (80.3%) cases with upward shifting of liver dullness. 28 (84.8%) patients in aspiration group and 25 (75.8%) patients in catheter drainage group presented with hepatomegaly.

Mukhopahyay M, Saha A.K (2010), studied 72 patients and found hepatomegaly in 76% cases¹⁴⁷. Sukhjeet Singh, Poras Chaudhary (2013), found hepatomegaly in 48 (80%) cases in his study of 60 patients¹⁵⁵. The above findings are consistent with the findings of present series of study.

Overall solitary types of liver abscess were more common in both groups (56.1%). Categorization of patients in two groups was irrespective of the type of abscess i.e.; solitary or multiple, however by chance solitary abscess was more common in catheter drainage group. 63.6% in catheter versus 48.5% in aspiration group had solitary abscess.

Mean volume of abscess cavity in aspiration group was 411.45 ml (maximum volume: 1300 ml and minimum volume: 50 ml) and in catheter drainage group was 330.9 ml (maximum volume: 1130 ml and minimum volume: 80 ml). However there was no statistical difference and both groups were comparable in terms of volume of cavity.

Most common organism isolated on pus culture was E.coli in both the groups. Pus samples of 20 out of 66 patients had culture positive results for E.coli (Table 2.1). This finding was similar to the analysis of 47 cases of liver abscess by Ochsner, DeBakey and Murray²². Sukhjeet Singh and Poras Chaudhary et al, (2013) found E.coli as the causative agent in 30% of cases¹⁵⁵.

Most of the abscesses (66% in aspiration group and 48% in catheter drainage group) were purely pyogenic as is evident from growth from pus culture and negative Elisa test for E.histolytica (Table 2.2). Rests of the abscesses were either purely amoebic (growth -ve Elisa +ve) or secondarily infected amoebic abscess (growth +ve Elisa +ve). About 3% of subjects did not show any growth on pus culture and were also Elisa negative which may be attributed to faulty laboratory techniques. As several of our patients prior to reporting to our surgery department had been given antibiotics as well as anti amoebic drugs, this might explain the findings of 3% cases with indeterminate etiology. Similar experience has been reported by S.Singh et al, Urbaniak GC and others.

Most common type of abscess was pyogenic in both male (55.9%) and female (71.4%) (Table 2.3). Pyogenic liver abscess which used to be mainly tropical in location is now more common due to increased biliary interventions, stenting, cholecystitis and cholangitis etc.

Microbiological analysis of pus from both solitary and multiple types of liver abscess showed positive growth on culture and also showed positive Elisa antibody test (Table 2.4), which proves an age old axiom that both amoebic or pyogenic abscess can be either solitary or multiple.

When comparing the hospital stay in USG guided percutaneous aspiration group USG guided pigtail catheter drainage group (chart 9) we found that average duration of stay in catheter drainage group (9.33 days) was less compared to aspiration group (10.69 days). This difference however didn't reach statistical significance. The increased duration of stay in aspiration group is mainly attributed to failure to resolve and hence repeated aspiration and finally such abscesses were drained with pigtail catheter.

72.7% of the subjects presented with complications in USG guided aspiration group whereas only 33.4% of people presented with complications in USG guided catheter drainage group (Table 3.1 and Table 3.2). The most common complication in aspiration group was re accumulation leading to repeated aspiration 48.5%. The most common complication in catheter drainage group is blockage of drain due to thick pus 18.2%. Both these techniques have certain disadvantages. Multiple attempts of PNA needed for large abscesses may be uncomfortable and perceived as more traumatic by patients. Also during the period between the two aspirations pus may get re-accumulated. For smaller abscesses, daily production of pus may be small, but a larger abscess cavity may produce larger quantity of pus, which needs to be drained continuously. PCD has this obvious advantage over PNA, which may have accounted for quicker clinical recovery, lesser duration of parenteral antibiotics and lesser failure rate among patients treated with PCD. On the other hand, placing a catheter needs more expertise followed by nursing care.

Thus USG guided pigtail catheter drainage and USG guided percutaneous needle aspiration are equally effective in the management of large liver abscesses. PCD appears better in terms of duration of hospital stay, complications and complete resolution of abscess cavity.

The higher success rate of PCD over PNA has been supported by several other studies e.g, by Baek SY et al (1993), Rajak CL et al (1998), Singh, et al (2009), Sukhjeet Singh, Poras Chaudhary (2013), and by others.

V .CONCLUSION

Liver abscesses, both amoebic and pyogenic, continue to be an important cause of morbidity and mortality in tropical countries.

- Presentation of liver abscess is varied from asymptomatic to life-threatening septicemia, if timely intervention is not made.
- Male have been found to suffer more from amoebic liver abscess than females, with male : female ratio of 8.4:1.
- Maximum number of patients suffering the liver abscess belonged to 3rd and 4th decades of life.
- 51.51% of patients had the habit of drinking alcohol or toddy or other forms of alcohol containing beverages. Toddy (which is fermented palm extract) drinkers are more susceptible to formation of liver abscess.
- Pain in right upper quadrant of abdomen was observed in 81.8% cases, fever in 81.8% and jaundice in 19.7%.
- Average duration of symptoms at time of presentation was found to be 2 to 3 weeks.
- On systemic examination pallor was found in 36 (54.5%) cases, and icterus was found in 12 (18.2%) cases. It shows that persons having poor hygiene and poor health are more prone to develop liver abscess.
- On abdominal examination, enlarged tender liver (hepatomegaly) was found in 53 (80.3%) cases with upward shifting of liver dullness.
- Overall solitary types of liver abscess were more common in both groups (56.1%).
- There was no statistical difference and both groups were comparable in terms of volume of cavity.
- Most common organism isolated on pus culture was E.coli in both the groups. Pus samples of 20 out of 66 patients had culture positive results for E.coli.
- Most common type of abscess was pyogenic in both male (55.9%) and female (71.4%). Pyogenic liver abscess which used to be mainly tropical in location is now more common due to increased biliary interventions, stenting, cholecystitis and cholangitis etc.
- When comparing the hospital stay in USG guided percutaneous aspiration group USG guided pigtail catheter drainage group we found that average duration of stay in catheter drainage group (9.33 days) was less compared to aspiration group (10.69 days). This difference however didn't reach statistical significance.
- 72.7% of the subjects presented with complications in USG guided aspiration group whereas only 33.4% of people presented with complications in USG guided catheter drainage group. The most common complication in aspiration group was re accumulation leading to repeated aspiration 48.5%. The most common complication in catheter drainage group is blockage of drain due to thick pus 18.2%.
- Earlier the only option for management of liver abscess was blind aspiration or open surgery which used to be with various complications.
- Present study has been taken up with the aim to compare advantages and disadvantages of USG guided percutaneous needle aspiration to USG guided pigtail catheter drainage.
- USG guided pigtail catheter drainage and USG guided percutaneous needle aspiration are equally effective in the management of large liver abscesses. PCD appears better in terms of duration of hospital stay, complications and complete resolution of abscess cavity

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Legal Norm Protection for Inter-Faith Marriage of In Indonesia In The Framework of Legal Pluralism

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Abstract- The existence of legal void in marriage law for Indonesian citizens who engage in inter-religion marriages raises legal uncertainty. Meanwhile, perhaps due to the fact that Indonesia has plural society, the number of potential couples who engage to inter-religion marriages increases. The purpose of this study is to formulate the concept of legal norms protection for inter-religion marriages in Indonesia. The material of legal components consists of primary and secondary legal which obtained from literature study. We found that the state should provide a space which is recognized by every citizen to exercise his or her rights including the right to raise a family and the right to have freedom related to religion and belief. The basis of the recognition is that inter-religion marriage is philosophically justified because of human rights and it is legally required to provide legal certainty. Meanwhile, sociologically it is increasing in society. The construction of the concept of legal protection norms that have been formulated for the Indonesian citizens who engage to inter-religion marriages are as follows: Inter-religion marriages is a marriage performed by a man and a woman of Indonesian citizens who have different religions. Prospective couples of inter-religion marriages can apply the establishment of marriage to the District Court. The form of state recognition for the citizens, especially pre-married couple with different religion, must register their marriage to Civil Registrar Office.

Index Terms- Legal protection, inter-religion marriages, and pluralism of law

I. INTRODUCTION AND REVIEWS

The void of legal norms for inter-religion marriages in Indonesian Law No. 1 Year 1974 on Marriage (Law on Marriage) raises legal uncertainty and unfairness for spouses. During this time, several ways have been done by prospective couples to be able to legalize the marriage, namely: a) by performing the marriage abroad, b) the marriage is done according to their respective religious law and belief, c) by applying for marriage to court, and 4) by temporarily submitting to spouse religion, [1]. The last one is the common one.

The right to raise a family and the right of freedom related to religion and belief for every potential couples with different religions is impeded by the provision of Article 2 Paragraph (1) of the Marriage Law which states that "the marriage is valid if it is done according to the law of their respective religions and

beliefs". Meanwhile, the fact is that the number of inter-religion marriages in Indonesian society is increasing. In the special region of Yogyakarta, for example, in 1980, there were at least 15 couples of inter-religion marriages out of 1000 recorded marriages. In 1990, it increased up to 18 couples, [2]. Harmony Family Counseling and Advocacy Program held by the ICRP (Indonesia Conference on Religion and Peace) noted that since 2005-2007, out of a hundred couples wishing to engage inter-religion marriages, sixty of them managed to marry and the number grew in the following year. Since 2004-2012, it has been recorded that the number of inter-religion marriages has reached 1109 couples and it is still counting. Meanwhile, there was also rejection of the petition for determination of the case No. 527/Pdt/P/2009/PN.Bgr dated July 16, 2009 because the judge gives consideration based on only the religious values of one spouse. Furthermore, the Decision of the Constitutional Court through Decision No. 68/PUU-XII /2014, dated June 18, 2015, rejected the Material Test against Article 2 paragraph (1) of Law Number 1 Year 1974 regarding marriage. With the rejection of the request, inter-religion marriage still leaves a problem for the prospective couple.

Another problem is the existence of a conflict of norms between the provisions of Article 35 Number 24 Year 2013 on Civil Registrar with Law Number 39 Year 1999 on Human Rights. In the elucidation of Article 35 of the Law on Civil Registrar, the marriage set by a court is the inter-religion marriages. But, the Civil Registrar Office uses to refuse registering register it. Article 10 paragraph (2) of the Law on Human Rights mentions "... in accordance with the provisions of legislation". The phrase raises the interpretation that the validity of a marriage refers to Article 2 paragraph (1) of Marriage Law. Problem arising with the provisions of Article 2 paragraph (1) of Marriage Law is a philosophical problem that the essence of marriage according to Marriage Law does not provide space for inter-religion marriages. It means that the theoretical problem is legal uncertainty, and the sociological problem is the increase number of potential couples of inter-religion marriages.

Today, it is necessary to understand how the state can give space in the form of recognition of citizens who engage to inter-religion marriages considering that the marriage is a fundamental human right. Based on the problems faced by potential couples of inter-religion marriages, this paper examines: how is the concept of protection of legal norms for inter-religion marriages to ensure legal and justice in the framework of legal pluralism? The purpose of this paper is to offer the concept of protection of

legal norms for inter-religion marriages so that legal certainty is guaranteed.

Studies on inter-religion marriages have been conducted in Indonesia but they are limited to describe the issue of inter-religion marriages. Office of Civil Registry has not provided space for inter-religion marriages. The common way is that, in order for the marriage to be registered, the prospective couple must submit to one of the couple's religions even though most of the time, the office refuses it. Comparisons of marriage laws in various countries by government institutions (National Legal Assessment Bodies) are not comprehensive, [3]. Further study on religions' point of view to inter-religion marriages have only highlighted from a single religion that generally does not agree to the existence of inter-religion marriages. Almost all studies provide illustrations and facts but have not yet offered a comprehensive solution to the treatment for the inter-religion marriages. This is understandable because most community groups refer to the views of religious values in Article 2 paragraph (1) of the Marriage Law. While comparative studies of marriage law in various countries showed a significant development towards the formal recognition of the existence of inter-religion marriages. This study continues in a more concrete

The provision of Article 2 paragraph (1) of Marriage Law does not explicitly prohibit inter-religion marriages. There are 3 opinions regarding the inter-religion marriages in the community: 1) First opinion; It is said that inter-religion marriage is illegitimate as in accordance with Article 2 paragraph (1) and the provisions of Article 8 letter *f* of the Marriage Law, where the respective religion also prohibits the marriage, 2) Second opinion; a religious marriage is legal, and therefore can be done, because the marriage falls into the category of mixed marriage. The emphasis of Article 57 of the Marriage Law on mixed marriages lies in "two persons in Indonesia subject to different laws", and 3) Third opinion; It is stated that the Marriage Law does not regulate inter-religion marriages at all. Based on these opinions, and with reference to Article 66 of the Marriage Law, the old rules may apply. However, the definition of mixed marriages is deemed unenforceable because the Marriage Law already regulates mixed marriages, but in limited area. Consequently, following the entry into force of the Marriage Law under the terms of mixed marriages set forth in Article 57 of the Marriage Law in the presence of various opinions, the implementation of inter-religion marriages is likely to be impeded.

Other impacts arise with various interpretations among the public, especially law enforcement in interpreting the substance of Article 2 paragraph (1) of Marriage Law that the prospective couples who will do the marriage must be in the same religion. The state should be obliged to serve and protect every citizen's interests without discrimination, especially those related to fundamental rights. The right to freedom of religion and belief is regulated in the provision of Article 29 of the 1945 Constitution of the Republic of Indonesia (the 1945 Constitution).

Indonesia is a country with plural society, which includes religion, custom, tribal, and law. The state should present to provide protection and assurance to every citizen without discrimination. The State should guarantee the rights of citizens including the right to marry. It is necessary to establish the

direction by arguing the importance of the state to give recognition to the legal protection so that legal certainty is created.

II. RESEARCH METHODOLOGY

For general legal research such as this research, the method of collecting legal materials has been conducted by literature studies. There are two types of legal materials in this research which are primary and secondary. The primary legal materials were derived from the Laws and judge's decisions, while the secondary legal materials were derived from legal textbooks including theses, legal dissertations, journals, legal dictionaries, and official records or treatises in the development of the Law No. 1 Year 1974 on Marriage and comments on court decisions related to inter-religion marriages. The approach of the study is comparison between law and case studies. The legal theory of pluralism, the principles of human rights, and the theory of legislation are used as the basis for formulating a draft concept of legal protection.

III. RESULT AND DISCUSSION

concept of protection for potential couples who engage inter-religion marriages into a shelter of the rule of law norms in order to create a certainty of law and justice.

The study of legal pluralism is based on critical thinking on the dominant flow of centralist thought and legal positivism in studying the relationship between law and society. Centralism according to [4] is the idea that the concept of law merely includes the notion of the law of state products and applies uniformly to all citizens, [5]. Furthermore, the concept of legal pluralism (legal pluralism) proposed by [4] is basically intended to show the existence and interaction between legal system applicable in society. Thus substantively, legal pluralism is generally defined as a situation in which two or more legal systems work side by side in a similar field of social life, or to explain the existence of two or more social control systems in one area of social life. The multiplicity of marriage law applicable in Indonesia consists of marriage law according to the western civil code, customary law, religious law and beliefs as well as human rights values. It is to provide protection with legal certainty and justice for potential couples of inter-religion marriages. The efforts should be pursued is by understanding the concept of Griffith's legal pluralism, because pluralism occurs not only limited to the aspects of the rule but also to the mechanical mechanism (procedural or procedure) of their own.

Argument that potentially-married couples with different religions need to get protection in the form of legal certainty in the framework of legal pluralism are as follows: Firstly, the nation of Indonesia is a pluralistic nation ranging from religion, customs, tribes, traditions that cannot be denied. Secondly, the state of Indonesia is a state of law (*rechtstaat*). Article 1 paragraph (3) of the State Gazette of the Republic of Indonesia Year 1945 stated explicitly that the state of the Republic of Indonesia is the State of Law. And Thirdly, the perspective of human rights. The recognition and protection of human rights is one of the characteristics of the state of Indonesia as a state of law.

Attributed to a global era that touches all the lives of people in the world, there is no exception to the aspect of marriage. The law of marriage in various countries, both countries that adhere to common law and civil law systems require the validity of marriage that lies solely in the aspects of registration. In Indonesia, the legal requirement of a marriage is done based on the law of each religion and belief. Then, it must be registered. The substance of Article 2 paragraph (1) of Marriage Law is based on the values of Pancasila which is on the principle of Supreme Deity of God and to the Law of Human Rights. It leads to the fact that the validity of a marriage in Indonesia must go through ritual process according to religious law and belief of the prospective couple, and if only recorded, the marriage is still considered as invalid. On the basis of the above law to provide protection, this study provides solutions by considering aspects of legal pluralism in Indonesia, especially pluralism in the field of religion and belief. To respect the values held by each religion and belief, the arrangement of inter-religion marriages should be prioritized on the aspect of recording/registration (Article 2, paragraph (2)). While the religious ritual (legally valid Article 2 paragraph (1) shall be submitted to each prospective spouse. The state's obligation should be limited to the aspect of its registration. The state should recognize inter-religion marriages by requiring the Civil Registry Office to register their marriage. The model of marriage law in Singapore and the Western country, especially Turkey can be used as a consideration to provide solutions for potential couples in Indonesia, in terms of its registration aspect. The marriage model in Turkey is used because of its resemblance to Indonesia since the majority of the population embraces Islam. In Turkey, the marriage of different religions is not a problem because according to the rules; all marriages must be registered, which then continued to the ceremonial process according to the religion.

In establishing the concept of legal norms protection for inter-religion marriages, some fundamental aspects need to be given attention and considerations are as follows: Pancasila as a source of Indonesian law and human rights is the source of law to provide protection for the right to raise family and to freedom of religion for potential couples of inter-religion marriages.

Talking about the right to freedom of religion and belief to mankind is not easy because it is related to the complexity of the values involved in the context of cultural and historical differences. The existence of institutional governance in a given society is inevitable will vary greatly in many respects. But there are certain core values that will be protected and the forms that will appear if freedom of religion or belief is respected.

International protection on freedom of religion has undergone a tremendous historical transformation in the last five centuries. According to [6], international protection to freedom of religion needs to go through three stages and consist of three models, namely: (1) model *cuius regio, eius religio*, [7]; which means that an international peace treaty that determines the separation of territories for people of different religious beliefs, (2) Models of minority protection: international treaties (bilateral or multilateral) that provide protection for minority religions within the territory of the majority ethnic or religious majority dominating power, and (3) Human rights models: international treaties (global or regional) that codify international standards and provide international monitoring of the universal human

rights of religious individuals and communities or a view of life on freedom of religion or belief.

According to [7], from the three models of internationally determined freedom of religion, freedom that is satisfying to today's world is colored by a plurality of religions and worldviews. In other words, only universal human rights on freedom of religion or belief are capable of keeping the freedom of faith and belief. Thus it maintains peace among religions, ethnic groups and nations. It is thereby protecting what is demanded by the respect to human dignity. Therefore, Pancasila emerges as a solution to the disharmony of perception in the frame of freedom of religion in the debate on human rights, both universal and particular (cultural relatives). The disharmony is long and if both views are combined. The debates of both will not end because the used views have different starting points, especially in terms of ideology and socio-culture of different societal systems.

The view of the universality of human rights is based on an individual view (absolute universal ideology), especially the demands of individual freedom (citizens) arising from a liberal system of society. This view understands that as a basic right inherent in human since he was born in the world, freedom of religion has no limits and restrictions by anyone, [8]. While this particular cultural view (cultural relativism) understands that human rights and freedom of religion is absolutely in particular. Freedom of religion in one place cannot be applied elsewhere. Or in other words, there is no freedom of religion that is completely free and applies to every place, condition, and time.

Philosophically, belief in the Almighty is contained in the first principle of Pancasila which is based on the philosophy of the State of Indonesia. Therefore, the first precepts become the philosophical basis for the life of nationality and statehood in terms of state and religious relations. Indonesian legislation does not regulate the faith space of the adherents but organizes the public spaces of citizens in human relationships. Based on the above three paradigms, Indonesia is a country that uses a symbiotic paradigm.

The moral fundamentals in the principle of God Almighty are solid, because they contain the "creed ontology" of the nation, the country, and the Indonesian people. The existence of the country, the nation, and the Indonesian people are related to *Alkhalik* or God which is believed to be the source of all noble-holy-good-fair.

There are four clusters of Indonesian problems that must be managed with the noble spirit of the Godhead (doing everything right, fair, and good) namely: the problem of humanity, nationality, state, and society. Principle on the Almighty serves as the fundamental value/moral. It is not presented as a divine concept according to certain religious and philosophical claims burdened with orthodoxy (exclusive doctrines and beliefs of religion).

Belief in the Almighty is no longer just respectful of their respective religions but also becomes the basis that leads to the path of truth of justice, goodness, honesty, brotherhood and others. Doctrine and dogma are the heart of religion. A religious belief is a very personal matter between a man and the Creator. It is a private space for a person with the Creator he believes in. The belief of each religion is a matter related to the private space. While Almighty, in the context of Pancasila, is a matter related to

public space. It does not refer to any particular religion/belief, instead, it is a joint vessel of persons who praise God. The common space must be governed by laws and authorities of the country where justice and welfare for all citizens are defended and protected. It should not be left to the private roles of a particular religion or belief.

Furthermore, in Second Precept of Pancasila, Indonesia's legal duty is to take care of humanity. It is a doctrine of human quality. That is, human with humanity on the one side and human who are being capable of doing fair and civilized on the other side. In humanity itself, there are implicitly civilization and justice. There is no justice and civilization without awareness of the value of humanity. Likewise, there is no respect for humanity without a commitment of justice and civilization.

Every human being has the right to humanity. The meaning of humanity for Indonesian law carries two implications. First, humanity becomes the guiding norm for the world of law (legislation, judicial, execution, and or substance, structure, and legal culture) because humanity is a moral substance of God. Then, it becomes an ideal benchmark as well as the normative character which always guiding. Any instruments used to regulate human beings, should not deny humanity and human dignity. Commitment and idealism to respect humanity and human dignity are fundamental to law as a dignified order. The second implication is that the law must manage and care for the humanity. This means that the law must help human beings develop according to their nature, uphold their dignity, being fair, guarantee equality and freedom, and develop the interests and welfare of human, [9].

It is supposed to be in the formation of the concept of legal norms protection for potential couples of inter-religion marriages in order to provide legal certainty in Indonesia. Legal protection for inter-religion marriages should be aimed at bringing benefits to potential couples. If there is a change to the Marriage Law, it will be included in one of the articles concerning the aspect of the formality of the registration if the aspect of ritual by the religion and belief in Article 2 (1) temporarily cannot be interpreted differently.

In the right to freedom of religion, there are at least five juridical characters that cover, [10]. First, the right to freedom of religion is the constitutional right of citizens; second; the right to freedom of religion is based on the principle of Godhead of the Almighty; third, the right to freedom of religion is based on the principle of tolerance; fourth, the right to freedom of religion consists of aspects of the internal (internum) forum and aspects of the external (externum) forum; and fifth, the right to freedom of religion has the legal protection to the religion. Assurance to the right to freedom of religion in Indonesia covers the protection of aspects of the internum and externum forum. The aspects can be known from the provisions of Article 28E paragraphs (1) and (2) and the provision of Article 29 Paragraph (2) of the 1945 Constitution of the Republic of Indonesia. Protection of the internum forum is indicated by the phrase of "embracing religion" in Article 28E paragraph (1), the phrase "believes in faith" in Article 28E paragraph (2), and the phrase "to embrace his religion" in Article 29 paragraph (2). While the protection of the externum forum can be understood from the phrases: "worship according to his religion" in Article 28E paragraph (1), and the phrase "expressing thoughts and attitudes" in Article 28E

paragraph (2), as well as the phrase "worship according to his religion and belief" in Article 29 paragraph (2).

Under the provisions of Article 28I Paragraph (1) of the 1945 Constitution of the Republic of Indonesia, the fulfillment of the right to freedom of religion cannot be reduced in any circumstances. The freedom that cannot be reduced under any circumstances is specific to the aspect of the internum forum only. This means that the internum forum is constitutionally guaranteed to be protected by its fulfillment under any circumstances. While the guarantee against externum forums, of course, can be restricted by the state with legislation to maintain public order and the rights of others.

In line with the above statement, [11] said that the internum forum signifies the private territory of an internal right where the state cannot interfere in any way. The embracement of a person to his or her religion and beliefs is not possible to be regulated in legislation, because it is personal matter.

The legal certainty (*Reschtssicherheit*) means that the law must be performed and be enforced, whereby everyone expects to apply the law in the event of a concrete event, [12]. Legal certainty refers to the concept of juridical acts because it meets the procedural requirements to be established as a law. Legal certainty is possible only if the predictability of its application is high. Every legal subject must have belief that if anything happen related to legal norms, then he or she can predict what conclusions or decisions it will be received, [13].

The theory of legal certainty has been applied to inter-religion marriages is the theory of legal certainty by Gustav Rudbruch because of the idea of the ideals of law and the three basic ideas of law that are in accordance with the purpose of law. So in order to fill the legal vacuum for inter-religion marriages, it is needed to construct of the concept of norms in order to create legal certainty characterized by legal protection. That substance is important to raise family and to freedom of religion for potential couples of inter-religion marriages and justice by taking into account the diversity of values that exist in Indonesian society.

The purpose of the formation of the law is no longer to create codification for the norms and values of life that have settled in the community. Instead, the main purpose is to create modifications or changes in community's lives, [14]. The change in the life of the community that gives happiness is the main purpose of legislation to be made, besides to provide security. The establishment of good legislation which is easy to implement in the community is one of the main pillars for a country, as Burkhardt Krems argued and quoted by [15].

The formulation of legislation includes activities related to content, methods of formation, as well as processes and procedures for the establishment of regulations. Such activities shall be carried out so that the product of such law may be applicable, jurisdictionally, politically, and sociologically. Therefore, the establishment of legislation is not merely juridical activity, but an interdisciplinary activity which means that any legislative formulation activities require the help of other sciences so that the resulting legal products can be accepted and receive recognition from the public, [16].

In addition, law makers are required to have holistic thinking constructs based on the ideals of Pancasila. The norms explicitly contained in every article of legislation are actually concrete

values and excavated in the life of a pluralistic Indonesian society, regardless of political interests, power, and party blocks. According to [17], there are several principles in the formation of legislation used as a consideration in drafting the concept of protection for inter-religion marriages, namely: a) Principle of a Clear Purpose, which means that every legislation must function to provide protection in order to create peace of society, b) The principle of humanity, which means that every material of the legislation should reflect the protection and assurance of human rights and the dignity of every citizen and people of Indonesia, and c) The Principle of Justice, which means that every component of the content of legislation should reflect proportional justice for every citizen without exception. In the case of the protection for inter-religion marriages, the state should pay attention to the right to raise family and to freedom of religion. Therefore, the material content of norms of inter-religion marriages should provide the same benefits to prospective couple of inter-religion marriages. Whereas the content of statutory regulations shall not contain any distinction based on the background, including religion, ethnicity, race, class, gender, or social status.

Regarding justice, its concept for the establishment of norms in Indonesia should be translated in relation to Pancasila, which then associated with the interests of the Indonesian nation. Therefore, in relation to the legal arrangement according to Pancasila, the arrangement is done through a law regulation that is nurturing the nation, i.e. protecting people passively by preventing arbitrary and active actions by creating a human society condition which allows the community process to take place fairly. So, in a fair way, every human being has a wide opportunity to develop all of his human potential as a whole. *Pengayoman* (protection) means that the sense of justice that exists in the human conscience in Indonesia must be fulfilled, [18].

IV. CONCLUSIONS

Recognizing the existence of Article 2 paragraph (1) is supremely interpreted that marriage should be performed in one religion. Therefore to provide protection for inter-religion marriages, the concept of protection of legal norms against changes in the Marriage Law needs to be facilitated as follows: a) Inter-religion marriage is philosophically justified because it is based on human rights, b) Inter-religion marriage is juridically required to provide protection for the right to marry or to raise a family and the right to freedom to embrace religion for the couple of inter-religion marriages, and c) Sociologically, the number of inter-religion marriages is increasing in society, which means that there is development of ways of thinking and behavior patterns in view of the value of a marriage. That will bring juridical impact on marriage and the status of his son in the future.

Meanwhile, the construction draft of the concept of norms are: a) Inter-religion marriage is a marriage performed by a man with an Indonesian citizen woman who has a different religion, b) Prospective couples of inter-religion marriages may apply for the establishment of the marriage to the district court, and c) The State recognition to inter-religion marriages is in form of requiring Civil Registry Office to register the marriage of inter-religion marriages couples.

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Black Hole: A Hole to Nowhere

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Abstract- A black hole is a region in space-time. It's a region from where nothing can escape not even time. Some physicist believes that this is due to the strong gravitational force exhibited by the black hole. It can also be observed that not even electromagnetic radiation such as light can't escape from black hole. But I have a different view at this behavior of black hole and will also explain about the existence of more than one cosmos in this paper. Cosmos is very beautiful if we perform thought experiment, look inside it and concentrate we can observe things that can answer lots of our questions that have disturbed us from centuries. Like how many universes are there and how big is our cosmos. How time changes its speed at different positions in space and which phenomenon works behind it. What happens if we go inside a black hole? Where the antimatter did come from?

Index Terms- antimatter, black hole, cosmos, thought experiment.

I. INTRODUCTION

Some physicist believes that big bang was the reason for the creation of the complete cosmos. An accident that is the reason of existence of the entire cosmos. If we observe carefully everything around us is an outcome of an accident. Like let's take few examples to understand this fact that everything happening around is an accident.

Imagine what would have happened if your father and mother have never meet, then you never would have come to existence. You can simply denied this fact and can say that your father or mother was in same college and your mother was very beautiful so your father fall in love with her but if you observe carefully then your mother getting in the same college that your father was an accident and not even this your father falling in love with your mother is also an accident. There were millions of sperms present, Still came into this world is an accident. If you feel like something is not an accident go deeper and observe carefully then you will see that the reason that thing occurred is due to an accident. And everything is a result of chain of reactions.

I guess this have given you an idea of the fact that everything occurring around you is an outcome of some kind of accident and so is our complete cosmos.

And if you still have a doubt then start comparing everything around you with the fact that its being in existence is due to an accident.

II. CREATION OF COSMOS

It was said to be created around 13.7 billion years ago, when a very intense ball OF energy is said to blast and the spread out to create the cosmos. Space and time also came to existence at that moment when that explosion took place. So let's try to imagine what was there 13.7 billion years ago, where that intense ball came from which we talk about. So according to me and thought experiments that I conducted ,13.7 billion light years ago there was nothing but a complete emptiness no space no time, nothing existed before big bang not even that intense ball which created the complete cosmos , so let us denoted this position to be zero. Zero here denotes there was nothing. Now let us assume that the zero get separated into two cosmos let us call this cosmos -x and x. Which might have been further divided in more cosmoses but for easy understanding let's assume there were only two cosmoses.

0= complete emptiness before big bang.

X= positive cosmos.

-X= negative cosmos.

Equation of creation: $0=x-x$

Now let us assume that there were two cosmoses which came out of nothing and both of them were growing at a very fast speed and as it is not possible for us to find its end points so let us assume it to be infinite in size.

Now, if we see practically we live in one of the cosmos and so there is a cosmos which is opposite to ours. And parallel universe is something that is present inside the cosmos so if we ever discovered the presence of parallel universe in our cosmos than it is also present in the other opposite cosmos. And for now keeping everything simple let us name the opposite cosmos to be anti-cosmos.

So, now as there is more probability that anti-cosmos exists so let us study some of its features:

** Anti-cosmos and cosmos both have matter and energy, for now let us say both are made of energy only. Now as matter can be converted into energy and vice-versa.

** Now energy in anti-cosmos is opposite to energy in our cosmos so when they came into contact they cancel out each other and both the energies losses their existence.

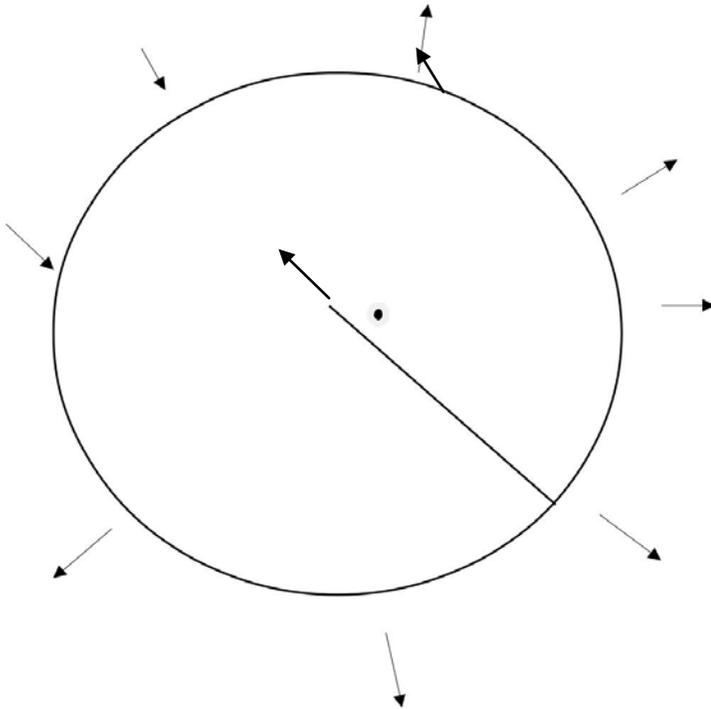
** The anti-cosmos and cosmos are separated with some kind of separation force which is not letting both the cosmos to come in contact completely and lose their existence.

But both the cosmoses are connected to each other with small holes and these holes are the black holes

III. HOW TIME CHANGES IT'S SPEED IN DIFFERENT POSITION IN SPACE

As we know that the cosmos are growing, so all the elements in cosmos is expanding and so is the time. And time moves very faster as we move towards the corner of the cosmos.

Let us take an example to understand it more clearly.



Let us assume that this circle is our cosmos and it's circular and it's growing at very fast speed. Now, that black point denotes the position where our galaxy and our neighbor galaxies exist. And now for a moment let's stop the growth of the cosmos and take its radius and denoted it by r . And let us denoted the distance of our galaxy from the corner of the cosmos be x . so as we calculated the are difference between the area between earth and center to the area of earth to end of cosmos which is growing at very high speed, the area between earth and end point will always be much much bigger than the area between earth and centre point.

Let's understanding it using figure 1.1.

Let x be the radius of smaller circle where the radius moves from centre to our galaxy.

Let r be the radius of the complete cosmos when its growth is stopped.

Let $(r-x)$ be the radius between our galaxies to the end point of the cosmos.

Q = area between our galaxy and the end point. P = area between our galaxy and the centre. $Q = \frac{22}{7} * (r-x) * (r-x)$

IV. WHERE THE ANTIMATTER CAME FROM?

The anti-matter is formed at time of big bang, this is the believe of some physicist .But if we use the above explained theory then at the time of big bang due to the explosion some of the energy came from the anti-cosmos to our cosmos which have the power to completely

Vanish the existence of matter of our cosmos and we call this energy which get converted into matter over time, we call it anti-matter.

V. WHAT HAPPEN IF WE GO INSIDE A BLACK HOLE.

As black hole is the way to the anti-cosmos so it vanishes our complete matter and so our existence also vanishes.

And we know that time also stops near black hole, this is because of the fact that time is also an element so in black hole time also loses its existence and that's the reason due to which time stops near black hole. So using black hole for travelling in time could be dangerous.

VI. CONCLUSION

There are two cosmos and both are created with the energy that can destroy the other ones existence.

Black hole connects both the cosmos and it completely destroys the existence of whatever goes into it. And time moves very fast when we move in the direction of expansion and it slows when we move in the opposite direction to the expansion. Anti-matter is the matter that came to our cosmos at the time of big bang.

$$P = \frac{22}{7} * x * x$$

Now if we compare the

$$Q \gg P$$

So there is a lot of area is present in q so what happens if you take little amount of molecules of gas and put it in an empty container they start moving till they bounce back from the corner but imagine if there is no corner they will keep moving at very high speed and there speed will grow as they approaches the end of the container.

So as same as the gas molecules if we observes time run at a very high speed if we move in the direction of expansion and it speed of time will decrease if we in the opposite direction of the expansion.

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Information Communication Technology Still Need For Teacher Educators

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Abstract

This present investigation is carried out to find the ICT need (**Information Communication Technology Need**) of the teacher educators. 100 respondents from 12 Education Colleges in Cuddalore District of Tamilnadu was randomly selected. **ICT need assessment scale** (2017) developed and standardize by the researcher is used to collect data. The collected data were analysed with the help of SPSS IBM19 and results were interpreted. Most of the teacher educators ICT Need is moderate. Experience and gender show significant relationship with ICT need score of the teacher educators. Gender, Subject handling and Experience show positive significant correlation but Marital status shows negative significant correlation with ICT need of the teacher educators. **The Subject handling, Gender were relatively strong indicators of ICT Need, and marital status was a moderate indicator of ICT Need.** The prediction model contained three of the ten predictors and was reached in three steps with 7 variables removed. The model was statistically significant, $F(3, 96) = 12.607, p < .001$, and accounted for approximately 28% of the variance of ICT Need ($R^2 = 0.283$ Adjusted $R^2 = 0.26$).

Key words: *ICT need, Teacher Educators*

INTRODUCTION

ICT need of the teacher educator decides the ICT competency of the student teachers. The prospective student teachers are going to handle 21st century students. They are born with ICT and techno friendly. Those students can access world of knowledge with technology at anytime and anywhere. Their learning environment is entirely different from past decades. Teachers are forced to learn technology and introduce themselves to the 21st era education environment. They must acquire much faster than their students and use those learned technology in their class rooms. Few teachers are keeping away from technology and unaware of current learning environment. Today, from the time we awaken in the morning to the time before we sleep, we are surrounded by media, such as newspapers, radio, television, and computers. Sometimes we are not even aware that we are surrounded by these media. All these media come under the overall umbrella of what are known as today's ICTs. Knowing and using ICTs is important in today's fast changing knowledge society, but we very often are confused about what these media are.

ICT NEEDS ANALYSIS

ICT Needs Analysis is the collection of data to find out where there are gaps in the existing skills and knowledge of individual Teacher educators. A successful ICT Needs Analysis can result in people being more productive and happier in their roles. The ICT Needs Analysis process will also help identify skills that already exist within the organization. ICT Needs Analysis can often help to identify where there might be significant gaps in the knowledge or skills of the organization as a whole.

NEED FOR THE STUDY

Student teachers are more advanced in usage of technology than teacher Educators. Our students are easily exposed to technology and learn its usage and operation. There is a gap exist between teacher Educators's technical competency and student's technical competency. There is shift from teaching to learning in the minds of educators and learners. The application of ICT knowledge will make this process very easy for the both educators and learners. The Teacher educators are equipped with ICT knowledge will transfer the same to their student teacher during their course of study itself. **The Teacher educators are training forces of perspective teacher. So the researcher wants to find out the ICT needs of the teacher educators.**

SIGNIFICANCE OF THE STUDY

The ICT need score explore the weakened areas in ICT competency like computer Operation skill, Word processing skill, Power Point Presentation skill and Internet usage skill. This gives an idea for the educational administrator and policy makers about the current scenario. **This ICT need analysis helps to develop refresher courses based on need of the teacher educators and helps to develop specific objectives of the training program.**

STATEMENT OF THE PROBLEM

The problem taken up for the present study by the investigator may be stated as **“The study on ICT need analysis of teacher educators”**

OPERATIONAL DEFINITION

1. **ICT Need:** The deficiency found among the teacher educators in ICT related knowledge and skill.
2. **Teacher Educators:** Those who are teaching in education colleges for student teachers.

OBJECTIVES OF THE STUDY

1. To assess the level of ICT need of teacher educators.
2. To find significant difference in ICT need of teacher Educators and their subsamples.
3. To observe the correlates of ICT need of teacher Educators.
4. To discover the predictors of ICT need of teacher Educators.

HYPOTHESES OF THE STUDY

1. The teacher educator ICT need is low.
2. There is no significant difference in ICT need of teacher Educators and their subsamples.

3. There is no significant correlates of ICT need of teacher Educators.
4. There is no significant predictors of ICT need of teacher Educators.

LOCATION OF THE STUDY

The locale of the present study is colleges of education which are affiliated by Tamilnadu Teachers Education University, Chennai in Tamilnadu. There are totally 731 colleges Affiliated to this University including government, government-aided and self-financing colleges. Numbers of Education Colleges in Cuddalore District is 30. The present investigation was conducted in the teacher educators working in education Colleges situated in Cuddalore district.

RESEARCH METHODS

Normative survey method is used in the present study. It seeks to obtain precise information concerning the existing status of phenomena and to draw valid general conclusions from the facts revealed. This study is not restricted only to fact findings but in formulation of important principal knowledge and solution of significant problem related to ICT need of the Teacher Educators and other significant variables related to it.

SAMPLE OF THE STUDY

Education colleges were randomly selected from 30 Education colleges in Cuddalore district for the present study. In Cuddalore district all the Education colleges are comes under self-financing nature. The respondents were randomly chosen from the randomly chosen twelve teacher educational institutions in Cuddalore district.

DISTRIBUTION OF THE SAMPLE

The random sampling method was used to select the samples. The sample was divided into different categories on the basis of the gender, qualification, subject, subject handling, experience, monthly income, medium of institution, age, marital status, location.

SAMPLE SIZE

100 samples were selected randomly from 12 Education Institutions. In these 100 samples 33 male teacher educators and 67 female teacher educators are collected.

RESEARCH TOOL

ICT need assessment scale (2017) developed and standardize by the researcher is used to collect data. The tool contains 50 items in five point scale with four dimensions as computer Operation skill, Word processing skill, Power Point Presentation skill and Internet usage skill. The reliability and validity of the scale is **0.93** and **0.96** respectively

STATISTICAL TECHNIQUES

The following statistical techniques were used for analysis and interpretation of data Descriptive analysis

- a. Measure of central tendency (Mean).

- b. Measure of Variability (Standard Deviation).
- c. Inferential Analysis 't' test & 'F' test
- d. Multiple Correlation and Regression Analysis

ANALYSIS OF THE LEVEL OF ICT NEED OF TEACHER EDUCATORS

Collected data were analysed with **SPSS IBM19** and tabulated for interpretations of results

. Table-1. Percentage analysis of ICT Need score of the total sample			
S.No	ICT NEED	Score	Percentage
1	Very Low	0-50	1
2	Low	51-100	11
3	Moderate	101-150	64
4	High	151-200	24
5	Very high	201-250	0

From the above **table-1** it is found that 1% and 11% of respondents require low and very low ICT Need, 24% of respondents require high level of ICT Need and 64% of the respondents require moderate level of ICT Need. **So most of the teacher educators require moderate level of ICT Need.**

Table-2 Mean and Standard Deviation of ICT Need of Teacher Educators				
S.No	Variable	N	Mean	SD
1	ICT Need	100	125.85	28.16

The above **table -2** shows the mean score and standard deviation of ICT Need of teacher educators are found to be **125.85** and **28.16** respectively. **It is concluded that the Teacher Educators ICT Need is Moderate (101-150).**

Table- 3. t- Test Showing Relationship between Personal variables and ICT Need Score of Teacher Educators.							
S.No	Variables		N	Mean	SD	t-value	Result
1	Gender	Male	33	110.88	35.74	-3.34	S
		Female	67	133.22	20.07		
2	Subject Handling	Optional	23	106.52	31.13	-4.03	NS
		Core	77	131.62	24.61		
3	Income	Below 25	62	124.47	28.80	-.63	NS

		Above 25	38	128.11	27.32		
4	Age	Below 30	47	121.60	30.43	-1.43	NS
		Above 30	53	129.62	25.69		
5	Marital Status	Married	69	131.03	24.28	2.84	NS
		Unmarried	31	114.32	32.89		
6	Locality	Rural	63	124.54	29.39	-.61	NS
		Urban	37	128.08	26.17		

It is inferred from the above **Table-3** obtained t-value there is a significant difference in male and female teacher educator's ICT need score. Since the calculated t-value (-3.34) is significant at 5% level. Therefore the stated null hypothesis is rejected and alternate hypothesis is accepted. **Therefore it is concluded that the male and female respondent differ in their ICT need score.**

It is inferred from the obtained t-value there is no significant difference in option and core subject teaching teacher educator's ICT need score. Since the calculated t-value (-4.03) is not significant at 5% level. Therefore the stated null hypothesis is accepted and alternate hypothesis is rejected. **Therefore it is concluded that the option and core subject teaching respondent do not differ in their ICT need score.**

It is inferred from the obtained t-value there is no significant difference in ICT need score of teacher educator's income group below Rs: 25,000/- and above Rs: 25,000/-. Since the calculated t-value (-.63) is not significant at 5% level. Therefore the stated null hypothesis is accepted and alternate hypothesis is rejected. **Therefore it is concluded that the below Rs: 25,000/- and above Rs: 25,000/- earning respondent do not differ in their ICT need score.**

It is inferred from the obtained t-value there is no significant difference in ICT need score of teacher educator's with age group below 30 years and above 30 years. Since the calculated t-value (-1.43) is not significant at 5% level. Therefore the stated null hypothesis is accepted and alternate hypothesis is rejected. **The respondents in the age group below 30 years and above 30 years do not differ in their ICT need score.**

It is inferred from the obtained **t-value** there is no significant difference in married and unmarried teacher educator's ICT need score. Since the calculated t-value (2.84) is not significant at 5% level. Therefore the stated null hypothesis is accepted and alternate hypothesis is rejected. **Therefore it is concluded that the married and unmarried respondent do not differ in their ICT need score.**

It is inferred from the obtained **t-value** there is no significant difference in rural and urban teacher educator's ICT need score. Since the calculated t-value (-.61) is not significant at 5% level. Therefore the stated null hypothesis is accepted and

alternate hypothesis is rejected. **Therefore it is concluded that the rural and urban respondent do not differ in their ICT need score.**

Table- 4. <i>f</i> - Test Showing Relationship between Personal variables and ICT Need Score of Teacher Educators.							
S.No	Variables	N	Mean	SD	<i>f</i> -value	Result	
7	Qualification	MEd	59	122.25	29.21	2.01	NS
		MPhil	39	129.77	25.60		
		PhD	2	155.50	31.82		
8	Subject	Arts	45	119.44	28.23	2.83	NS
		Commerce	10	122.20	30.18		
		Science	45	52.24	13.81		
9	Experience	Below One Year	48	118.50	30.31	3.29	S
		2-5year	40	132.83	24.28		
		Above5year	12	132.00	25.81		

It is inferred from the obtained **f-value** there is no significant difference in different qualified teacher educator in their ICT need score. Since calculated *f*-value (2.01) is not significant at 5% level. Therefore stated null hypothesis is accepted. **Therefore the teachers with different qualification do not differ in their ICT need score.**

It is inferred from the obtained **f-value** there is no significant difference in different subject handler in their ICT need score. Since calculated *f*-value (2.83) is not significant at 5% level. Therefore stated null hypothesis is accepted. **Therefore the teachers with different subject handling do not differ in their ICT need score.**

It is inferred from the obtained **f-value** there is a significant difference in different experienced teacher educator in their ICT need score. Since calculated *f*-value (3.29) is significant at 5% level. Therefore stated alternate hypothesis is accepted. **Therefore the teachers with different experience differ in their ICT need score.**

Table: 5. Multiple Correlation Analysis			
S.NO	Variables	r	Result
1	Gender	0.38**	S

2	Qualification	0.18	NS
3	Major Subject	0.14	NS
4	Subject Handling	0.38**	S
5	Experience	0.22*	S
6	Income	0.06	NS
7	Age	0.14	NS
8	Marital Status	-0.28**	S
9	Location	0.06	NS
** -significant at 1% level. *-significant at 5% level.			

The above **table-5** show the coefficient of correlation between Gender, Qualification , Major Subject, Subject Handling, Experience, Income , Age , Marital Status , Location and ICT need score is **0.38****, 0.18, 0.14, **0.38****, **0.22***, 0.06, 0.14, **-0.28**** and 0.06. Hence it is found that Gender, Subject handling and experience show positive significant correlation but marital status shows negative correlation with ICT need of teacher educators.

Table- 6.						
STEPWISE REGRESSION BETWEEN ICT NEED AND OTHER VARIABLES						
Model	B	Std. Error	Beta	Pearson r	Sr²	Structure Coefficient
(Constant)	72.50	16.056				
Subject Handling	21.55	5.814	.324	.377	0.102	0.709
Gender	17.65	5.308	.296	.375	0.082	0.705
Marital Status	-10.89	5.382	-.180	-.276	0.030	0.519
Note: The dependent variable is ICT Need . R²=0.283 Adjusted R²=0.26						
Sr ² is squared semi-partial correlation. * <i>p</i> < .05						

Table 6 shows gender, Main subject, Subject handled, Experience, Income, Age, Marital Status, Locality and ICT Need were used in a stepwise multiple regression analysis to predict ICT Need of the Teacher educators. The correlation of variables is

shown in table.4. As can be seen correlations with Gender, Subject handling, Experience, Marital status and ICT Need were statistically significant.

The prediction model contained three of the nine predictors and was reached in three steps with 6 variables removed. The model was statistically significant, $F(3, 96) = 12.607, p < .001$, and accounted for approximately 28 % of the variance of ICT Need ($R^2=0.283$ Adjusted $R^2=0.26$). ICT Need is primarily predicted by the lower levels of marital status, and to the lesser extent by the higher levels of gender and Subject handling. The raw and standardized regression coefficient of predictors together with their correlation with ICT Need, their squared semi-partial correlations, and their structure coefficients are shown in table-5. The Subject handling received the strongest weight in model followed by Gender and Marital status. Marital status received the lowest weight of the three weights. With the sizeable correlations between the predictors, the unique variance explained by each of the variables indexed by the squared semi-partial correlation was relatively low: The **Subject handling, Gender and Marital status** uniquely accounted for approximately **10%, 8%, and 3%** of the ICT Need. Inspection of the structure coefficient suggests that **the Subject handling, Gender were relatively strong indicators of ICT Need, and marital status was a moderate indicator of ICT Need.**

MAJOR FINDINGS

- ❖ It is concluded that the teacher Educators ICT Need is Moderate (101-150).
- ❖ The male and female teacher educators differ in their ICT need score.
- ❖ The respondents in the income group below Rs:25,000/- and above Rs:25,000 /- teacher educators do not differ in their ICT need score.
- ❖ The respondents in the age group below 30years and above 30 years teacher educators do not differ in their ICT need score.
- ❖ The married and unmarried teacher educators do not differ in their ICT need score.
- ❖ The rural and urban teacher educators do not differ in their ICT need score.
- ❖ The teachers with different qualification do not differ in their ICT need score.
- ❖ The teachers with different subject do not differ in their ICT need score.
- ❖ The teachers with different experience differ in their ICT need score.
- ❖ correlation
- ❖ The Subject handling, Gender were relatively strong indicators of ICT Need, and marital status was a moderate indicator of ICT Need.

CONCLUSION

Teacher educators in Cuddalore district are require moderate level of ICT NEED. Female teacher educators, handling Core Subjects, having above 20 years of age, getting above Rs.25000/- as salary, living in urban, with Ph.D.

qualification, Studied Commerce as major subject and having more than five years of experience are having more ICT Need than others. So the teacher educators should be given **ICT Training as orientation by the university and Administrators of Teacher education colleges**. The ICT Training objectives should be based on the current requirements of the teacher educators. The quality of teacher education decides the quality of student teachers. It is essential to implement necessary measures to improve the ICT skills of the teacher educators. So Educational College administrators should give training in following skills to their teacher educators.

- ❖ Computer Operation Skill,
- ❖ Word Processing Skill,
- ❖ Power Point Presentation Skill
- ❖ Internet Usage Skill
- ❖ E- Communication skills
- ❖ Document handling skills
- ❖ Storage and recovery skills
- ❖ Protection of information skills
- ❖ Knowledge about internet service providers
- ❖ Protection of school campus from unwanted websites.

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Effects of Internal Plasticization on the Physical and Mechanical Properties of Castor Oil - Based Polyurethane Foams

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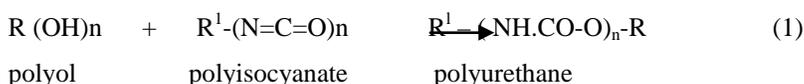
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Abstract - Flexible castor oil-based polyurethane foams were produced by the one-shot method of foam synthesis. Foam formulation involved pure castor oil/castor oil modified with heptachloroheptadecane (HCHD), a novel C-17 chlorinated hydrocarbon internal plasticizer, 80:20 mixture of 2,4 - and 2,6 - toluene diisocyanate (TDI) at room temperature (30 - 35^oC). Foam reaction took place in presence of stannous octoate and dimethylaminoethanol (DMAE) catalysts, methylene chloride (physical blowing agent) and silicone oil (surfactant). Isocyanate/polyol (NCO/OH) ratio was 1/1. Concentration of plasticizer used varied from 0.4 - 2.4 wt%. Foams obtained were tested for their physical and mechanical properties. Suggested mode of action and the influence of the incorporated internal plasticizer (HCHD) on these properties are discussed. Results indicate reduction in the density and compressive strength of the foams, but enhancement of their % creep recovery and water absorption as plasticizer concentration increased. These property changes suggest greater flexibility, extensibility and workability of foam. The most flexible foams were obtained at 2.4wt% concentration of the incorporated plasticizer. Areas of potential applicability or end-use of the new products are highlighted.

Index Terms - castor oil; plasticizer; flexible foam; properties.

INTRODUCTION

Polyurethanes (PUs) are polymers containing the urethane linkage (-NH-CO-O-) in the main chain. Polyurethane foams (PUFs) can be produced by reacting a polyol with an excess of organic polyisocyanate (in presence of catalysts and other additives) according to the generalized PU reaction.



(where $n \geq 2$)

The replacement of petroleum-based polyols or petropolyols such as polyether and polyester polyols with polyols derived from renewable materials of plant origin in the synthesis of PUFs has resulted in cheaper, safer, more environment friendly products with excellent thermal stability and oxidation resistance. Superior thermal stability and oxidation resistance of plant oil polyols over petropolyols are believed to be due to higher hydrocarbon content in the former (Javni *et al.*, 2000, Petrovic *et al.*, 2005; Badri; 2012). In the adhesive industry, for instance, this innovation has yielded degradable castor oil-based PU adhesives (Somani *et al.*, 2003; Gayki *et al.*, 2015).

However, most PU products obtained from unmodified triacylglycerol (TAG)-based oil polyols (chiefly soybean, castor, palm and canola oil polyols) are reported to be crosslinked materials or thermosets (Guo *et al.*, 2000; Zlatanovic *et al.*; 2002; Petrovic *et*

al.; 2005); except in plant oils containing secondary hydroxyl groups, where so-called ‘dangling’ chains in the oil’s TAG molecules are believed to exert steric hindrance to crosslinking (Xu, 2008; Fan, 2012). These crosslinked materials are characterized by high mechanical strength, high hardness index, but low resilience (Randall, 2002; Bleys, 2012). The materials are therefore hard to melt and reprocess, making them non-recyclable. Thus in the PUF industry where flexible PUFs used in cushioning, bedding and packaging applications are the chief products, use of unmodified plant oil polyols is definitely not a viable option.

In recent years, researchers have resorted to the chemical modification of plant oils to obtain PUs of desired physical and chemical characteristics. In castor oil-based PUF synthesis, a major attempt at remedying the situation involved the use of ‘mixed’ polyol formulations in which the conventional, commercial (polyether/polyester) polyol is mixed with low or moderate proportions of castor oil to obtain flexible PUFs (Xu *et al.*, 2008; Zhang, 2008; Xing, 2014; Sharma *et al.*, 2014). However, despite cost-benefit analysis of blending the conventional base polyol with castor oil indicating some level of cost effectiveness (Ogunfeyitimi *et al.*, 2012; Thorat and Patil, 2015), these mixed polyol recipes were not quite successful on grounds of low local content input (often no more than 15-25% castor oil) that cannot support sustainability. Another drawback is the compatibility question arising from mixing the two components.

The advent of inter-penetrating polymer networks (IPNs) presents another dimension to the modification of plant oils to obtain PUs. These materials are obtained as a result of permanent entanglement between two or more distinctly crosslinked polymers and the excellent properties they exhibit are believed to be as a result of the interlocking of polymer chains in their structure (Sperling, 1981; Islam *et al.*, 2014).

Mention should also be made of the many other chemical modification recipes involving castor oil polyols (transesterification, epoxidation, acrylation etc) that often result in improved and varied polymer characteristics and end-uses. These have been adequately reported in literature (Ogunniyi, 2006; Del Rio, 2011; Mubofu, 2016). But one area in which very little has been investigated and reported is the introduction of an internal plasticizer into the castor oil component prior to foam synthesis (Murkherjea *et al.*, 1978; Pandey and Vatsa, 2010). A plasticizer is an additive used to increase the flexibility and extensibility of a material by lowering its glass transition temperature (T_g) and softening the final product, with attendant loss of material strength and hardness, among others.

The present investigation reports on the application of heptachloroheptadecane (HCHD), a C-17 straight chain chlorinated hydrocarbon, as an internal liquid plasticizer introduced into castor oil polyol component of foam formulation prior to foam synthesis. The effects of this novel, oil-compatible plasticizer on the physical and mechanical properties of the castor oil-based PUFs synthesized are also reported.

MATERIALS AND METHODS

Materials

Mechanically extracted castor oil from wild *Ricinus communis* Linn seeds (Yusuf, 2016) was used as polyol. TDI (80:20), silicone oil (surfactant), stannous octoate (gelation catalyst), DMAE (amine catalyst) and methylene chloride were the other foam-making chemicals used. They were kindly supplied by Vitafoam Nig. Plc, Jos. Distilled water was used as chemical blowing agent. 2,5,6,7,8,11,15-heptachloroheptadecane (HCHD) (Fig. 1) was purchased from a local supplier in Nigeria and used as internal plasticizer.

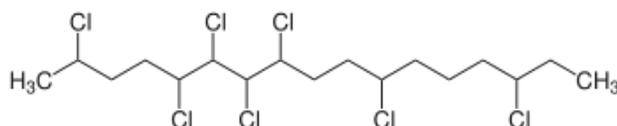


Fig. 1: Structure of HCHD (C₁₇H₂₉Cl₇)

Methods

Foam Preparation

Foams were prepared by the one-shot method (ASTM D 7487) of foam synthesis. Foams were prepared in locally fabricated open moulds of dimension 18x15x9 cm³ at room temperature, by the free rise method. Castor oil and all other foam-making chemicals (less TDI) were accurately measured as per formulation (Table 1) into a plastic mug, with constant vigorous stirring using a high speed (1000 rev/min) mechanical stirrer. This is the polyol component. 0.4, 0.8, 1.2, 1.6, 2.0 and 2.4 parts per hundred (pph) polyol portions of the internal plasticizer (HCHD) were separately added as part of polyol component, with continuous stirring. TDI, measured out separately in another container, was then rapidly added to this uniform mixture with continuous stirring, to ensure the formation of homogeneous foam. Solidifying foam product was kept in a fume cupboard for 24 hrs to cure completely, before demoulding.

Table 1: Foam formulation – NCO/OH (1/1)

Component	Actual weight (g)	Pph polyol
Neat/modified CO polyol	50.00	100.00
TDI	49.10	98.20
Methylene chloride	1.50	3.00
Stannous octoate	0.25	0.50
DMAE	0.225	0.45
Silicone oil	0.25	2.50
Water	1.00	2.00

Pph = Parts per hundred (polyol)

Determination of Physical Properties

Density determination

ASTM D 1622-08 procedure was used to evaluate the apparent density (kg/m³) of foam samples based on mass/volume measurements.

Water absorption

Water absorption test was performed in accordance with ASTM D590-98 and ASTM D2842-12. Water absorption of foam was evaluated as.

$$\% \text{ water absorption} = \frac{\text{Weight of wet foam} - \text{Weight of initial foam}}{\text{Weight of initial foam}} \times 100 \quad (2)$$

Determination of Mechanical Properties

Compressive Strength

Compressive strength of plasticized and unplasticized castor oil-based PUFs was measured in accordance with ASTM D1621-10 procedure using Instron universal tester. Compressive strength was taken as the force (N/M²) required at 10% deformation based on the original specimen thickness.

Creep recovery

Creep recovery test for the plasticized and unplasticized foams was performed on a Creep Machine - TecQuipment (TQ) SM 1006 (Cell load 250N) - as per ASTM D2990-09 procedure. Creep recovery was evaluated as the difference between the total extension (mm) on application of load and the relaxation (mm) on removal of load after 5 seconds. Percentage creep recovery was then calculated as:

$$\% \text{ creep recovery} = \frac{\text{Creep recovery or resilience}}{\text{Extension on application of load}} \times 100 \quad (3)$$

RESULTS AND DISCUSSION

Physical Properties of the Castor Oil-Based PUFs

General physical features

Synthesized foams were observed for colour, texture and shrinkage post-cure. No foam showed signs of shrinkage post-cure, suggesting that the foams were of good dimensional stability. The colour of the (neat) foam was pale yellow while colour range for the plasticized foams was pale yellow to colourless. Texture varied from semi-rigid (neat foam) to soft and flexible (plasticized foam).

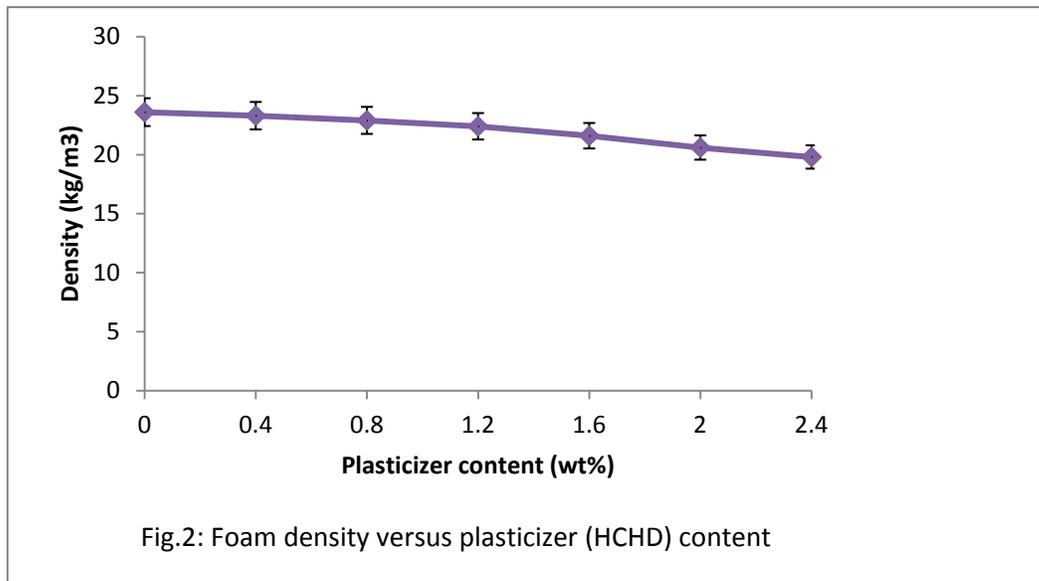
Table 2: Observed general physical features of the PUFs

PU foam	Colour	Texture	Post-cure state
Unplasticized (neat)	Pale yellow	Semi-rigid	No shrinkage
Plasticized (wt% modifier)			
0.4	Pale yellow	Semi-rigid	No shrinkage
0.8	Pale yellow	Semi-rigid	No shrinkage
1.2	Pale yellow	Soft to semi-rigid	No shrinkage
1.6	Pale yellow	Soft to semi-rigid	No shrinkage
2.0	Colourless	Flexible	No shrinkage
2.4	Colourless	Soft and flexible	No shrinkage

Colour assumed by foam seemed to depend either on the natural colour of the base polyol - castor oil (yellow) or that of the modifier (colourless) or both. On the other hand, changes in foam texture and feel are consistent with structural changes undergone by the PUF as a result of increased plasticization.

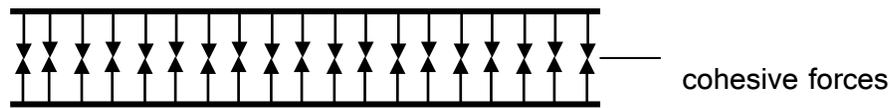
Effect of plasticization on foam density

It is observed that foam density decreased gradually with increased plasticizer concentration (0.4 - 2.4 wt%) (Fig. 2). According to Fox (2008), the effect of plasticization is to reduce the cohesive intermolecular forces between polymer chains and create greater free volume between them. The incorporated internal plasticizer in this study (HCHD) is an oil-compatible chlorinated hydrocarbon known for enhancing material flexibility and extensibility, in addition to its fire retardancy characteristics (Klorfin, 2012). It is thought that during the polymerization and foaming stages which occur simultaneously, reacted HCHD moieties are chemically grafted onto PU main chains (with the double bonds and ester linkages in castor oil TAGs likely serving as grafting centres) and the unreacted dispersed in between them. However, migration of plasticizer out of the PU matrix would be unlikely because of the fairly big size of the HCHD chain molecules.



This development creates greater free volume between PU chains and weakens cohesive intermolecular forces of attraction between them, resulting in greater segmental mobility within the PU matrix (Fig. 3). The C-17 HCHD chain molecules aligned between the PU main chains tended to mask or block interaction sites for the formation of cohesive intermolecular forces of attraction. Longer plasticizer chain means ability to block greater number of such interaction sites along the PU main chains. These are consistent with the observed density decline and relatively more flexible and softer structural features of foam with increase in HCHD content from 0.4 - 2.4 wt%.

(a) Unplasticized



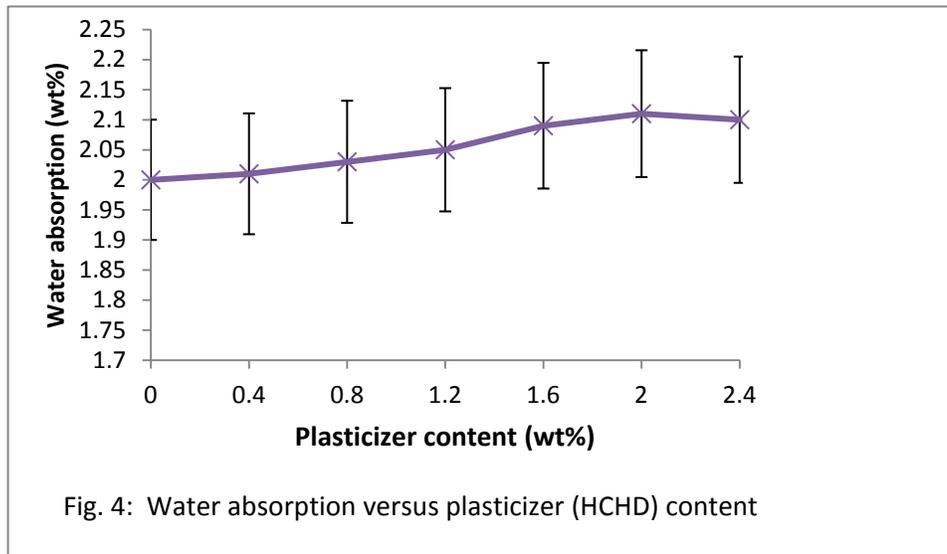
(b) Plasticized



Fig. 3: Schematic arrangement of reactive plasticizer molecules in PU matrix.

Effect of plasticization on water absorption

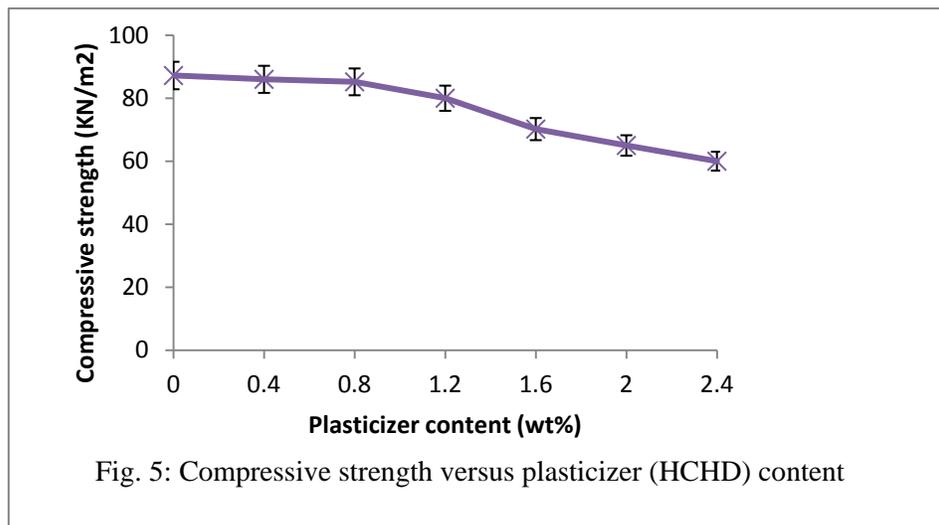
Greater free volume in PU foam matrix with increased HCHD content resulted in increased water absorption (Fig. 4). This explains the observed greater water sorption in the plasticized foams which are structurally more porous compared to the control (neat) foam, where the PU main chains are strongly held by cohesive forces of attraction, typically involving mono- and bidentate hydrogen bond formation (Yilgor, 2000). Water absorption is an important parameter for consideration, especially with regard to materials with outdoor application.



Mechanical Properties of the Castor Oil - Based PUFs

Effect of plasticization on compressive strength and percentage creep recovery

In Fig. 5, foam compressive strength declined steadily with increase in HCHD content. This is consistent with foam density decline as HCHD content increased (Fig. 2). Mechanical properties of PUFs such as tensile strength, compressive strength, compressive modulus, creep recovery etc are known to depend strongly on density (Saint-Michel *et al.*, 2006; Song *et al.*, 2009) as well as on the material composition. Foam density therefore is a very important physical property which has great influence on the mechanical properties of PUFs (Thirumal *et al.*, 2008). For a foamed polymer generally, compressive properties are important because they describe the behaviour of the foam when it is subjected to compressive load. HCHD plasticized PUFs exhibited lower compressive strengths than the control (neat) PUF.



This is explained in terms of the C-17 HCHD chain molecules constituting a great impediment to inter-chain polymer interactions that could produce rigid or semi-rigid foams, and at the same time offering substantial free volume in the PUF matrix for segmented mobility.

Conversely, %creep recovery of foam was substantially enhanced with increase in plasticizer content (Fig. 6). Creep recovery describes the extent to which a polymer under plastic deformation recovers its original shape over time. In other words, creep recovery is a function of foam resilience.

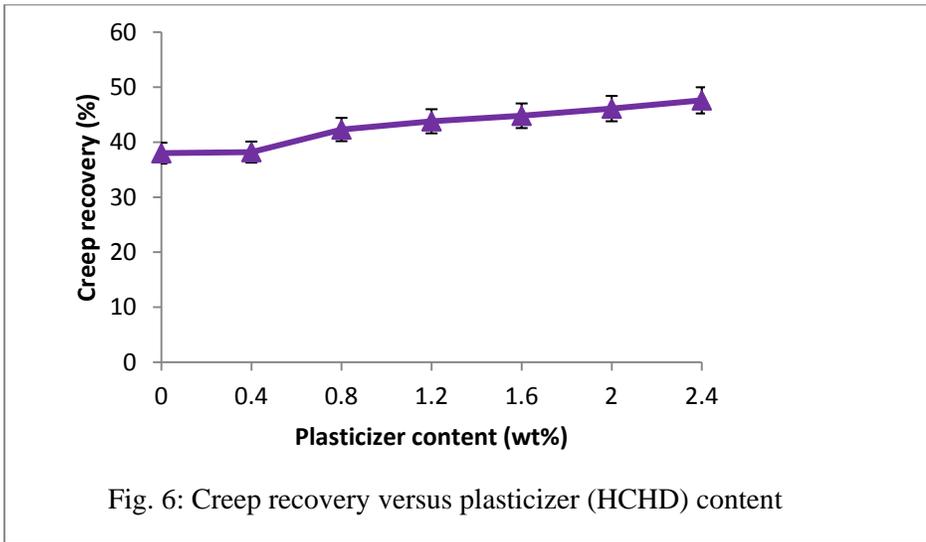


Fig. 6: Creep recovery versus plasticizer (HCHD) content

Compressive strength is a support-factor that is related to foam load-bearing capacity or ‘firmness’, while creep recovery is an indicator of foam resilience. These parameters are very important especially in PUF application that requires high energy impact absorption such as packaging, furniture and beddings, foot wears etc.

Conventional (Standard) Flexible PUF Versus Plasticized Castor Oil-Based PUF

The ability of HCHD plasticization to produce fairly soft and flexible castor oil - based PUFs has prompted a comparison between their physical and mechanical properties, and those of conventional (standard) flexible PUFs (Table 3).

Table 3: Values of physical and mechanical properties of flexible castor oil-based PUFs *versus* international standards for the conventional flexible foam.

Property	Observed	Standard
Density (Kg/m ³)	19.50 – 21.45	12.81 – 40.05 ASTM D 3574-11
Water absorption (wt.%)	2.24 – 2.26	<3 (ASTM D570-98)
Compressive Strength (KN/m ²)	48.80 – 51	>172 (ASTM D1621-10)
Creep recovery (%)	44.20 – 47.60	-

Divergent compressive strength and to a lesser extent density values between the two foam types might be as a result of the application of reinforcing fillers in some formulations to enhance foam firmness in the commercial flexible PUF.

Scanning electron microscopic (SEM) analysis of the castor oil - based PUFs has shown that soft, flexible foams can be produced at relatively higher plasticizer content in the formulation (Fig. 7).

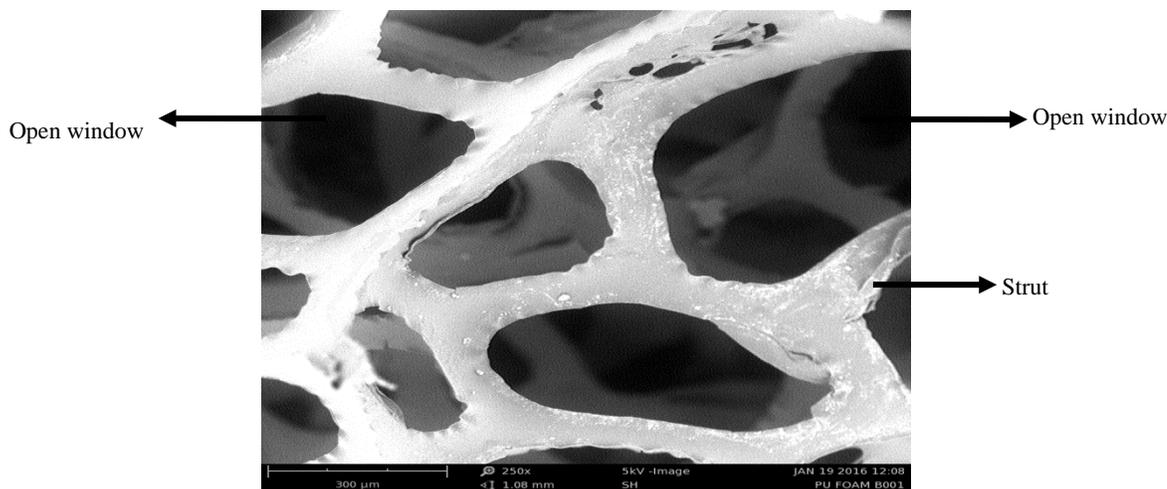


Fig.7: SEM image of HCHD plasticized castor oil-based PUF at 2.4 wt% plasticizer concentration, showing open-cell cellular structure.

CONCLUSION

The *in-situ* chemical modification of castor oil with a novel, oil-compatible C-17 chlorinated hydrocarbon internal plasticizer (HCHD) prior to foam reaction with TDI has yielded soft, flexible castor oil-based PUFs with physical and mechanical properties comparable to those of the conventional, standard flexible PUF. The new products should provide a number of advantages including processability, mouldability, high impact absorption and provision of comfort if applied in furniture, beddings, foot wears etc. But more importantly, having been obtained from almost 100% castor oil polyol, their availability could assist in reducing the importation of commercial polyol by the foam industry in Nigeria, thereby conserving foreign exchange for the country. The control (neat) foam showed typical characteristics of semi-rigid foam and therefore can be used in thermal insulation, refrigeration, packaging and transportation.

Another major advantage of the new products is their fire retardancy (Yusuf *et al.*, 2016). However, the use of low concentrations (0.4 - 2.4 wt%) of HCHD in the foam formulations was in order not to drastically alter the polymerization and foaming stages of the foam reaction that occur simultaneously, and to reduce the potential toxicity of the chlorinated hydrocarbon plasticizer.

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Impacts of Coastal Agricultural activities on freshwater fish diversity in Guyana

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Abstract– Studies on coastal biodiversity of agro-ecosystems in Guyana are limited. The agriculture sector contributes significantly to Guyana’s economic growth and most of these agricultural activities are concentrated on the Low Coastal Plain of Guyana. This study assessed the impacts of agricultural activities mainly rice and sugarcane farming on freshwater fish diversity within Mahaicony and Enmore areas, located in Region 4 of Guyana’s Coastal Plain. It was hypothesized that agricultural activities would adversely impact fish species diversity within the disturbed sites by lowering species richness and species evenness compared with undisturbed sites. In total, fourteen sites were sampled, where nine were disturbed and five undisturbed. For each site, the water quality parameters: Turbidity, Temperature, Dissolved Oxygen, pH, phosphate and Total Kjeldahl Nitrogen (TKN) were tested. Examination of 525 sampled fish species revealed a high taxonomic diversity. Fishes collected were distributed among 5 orders, 13 families and 25 genera. The Shannon – Wiener Diversity (H) Index showed that undisturbed sites had greater species diversity of 2.165 compared to disturbed sites at a value of 2.016. The Single Factor ANOVA tests proved that the statistical differences for species richness, species evenness and species diversity between disturbed and undisturbed sites were not significant. As such, agricultural activities have mild but no significant influences on fish diversity within the sampled disturbed sites when compared with the undisturbed sites.

Index terms– Agricultural activities, Coastal Biodiversity, Fish Diversity, Water Quality

I. INTRODUCTION

The Low Coastal Plain of Guyana lies on the northern edge of the country and is topographically flat and low-lying [1]. Though it accounts for 5% of the total land area of Guyana, it is inhabited by 90% of the country’s population. This region is the center of economic activities in Guyana, where agriculture is one of the major sectors [1]. Because the low coastal region of Guyana is found to be rich in heavy fluvio-marine clays, it became the hub for significant economic agricultural activities mainly sugarcane and rice cultivation and cash-crop farming [1]. Apart from these, rearing of cattle and other livestock for food consumption is also common in this region [1]. The irrigation system to maintain such agriculture activities comes from natural waterways or by channels that have been dredged to provide that source of water, which in turn links to a natural source [1].

Agriculture is fundamental to Guyana’s food security. In order to satisfy consumption, both locally and for export, the industry incorporates drastic means such as increase in pesticides and fertilizers use to surge production, and clearing and excavating of lands and waterways for better drainage and irrigation [1]. These activities ultimately threaten habitats and diversity of aquatic species. Fish species, like all other organisms, require healthy habitats to reproduce; grow and survive [2] and these agricultural activities may alter, damage or even destroy aquatic habitats and mostly importantly destroy fish populations some of which are still unknown to Guyana. As such, this research aimed to determine the freshwater fish diversity within disturbed sites highly impacted by agricultural activities (mainly sugarcane and rice cultivation) and to ultimately compare that diversity with undisturbed sites that experience little to no impacts by such activities.

II. MATERIALS AND METHODS

▪ Study Location

Field samplings were conducted in two areas dominated by commercial cultivation of rice and sugarcane. The areas were Mahaicony, an area noted for commercial rice farming and Enmore, where sugarcane cultivation was commercially grown. In both areas, specific irrigation canals were selected for sampling which allowed for comparisons between fish species found in areas that are influenced by agricultural activities (classified as disturbed sites) and those found in sites that are more pristine or natural in nature (categorized as undisturbed sites).

▪ **Water Quality Assessments**

Water quality samplings were conducted at each site prior to the collection of fish species. Turbidity was measured using a Secchi disk to determine penetration of light of the water for each site. This was done at three different sections of each site: outer, middle and inner regions, providing that each region was accessible and the average depth was recorded in cm. Temperature readings were taken using a standard mercury thermometer submerged in the water body of each sampling site. Readings were taken at the outer, middle and inner sections of the sampling sites, providing that all were accessible. This procedure allowed for the comparisons of all three regions of each site where the average values were recorded.

Dissolved Oxygen (DO), pH, phosphates and TKN were analysed by an external laboratory, GUYSUCO INC. in Guyana. 300 millilitres (ml) of water samples were collected from the center region of each sampling site, labelled and placed into an icebox, which allowed for its integrity to be maintained. Subsequently, all the water samples were submitted to laboratory for analyses.

▪ **Fish Sampling**

Field sampling of fish diversity was done using drag seines. The use of drag seines allowed for complete sampling of each site which meant that every time a new species was caught in a drag, an additional of three drags were added to the total number of drags. This technique allowed for a more precise representation of the fish species in each sampling area since it increased the probabilities of exhausting all the species within that habitat. Species were collected from the drag seines and placed in a container with water for further processing. Where necessary, clove oil was utilised to euthanize live species.

▪ **Preparation, Storage and Identification of Fish Species**

Fish species collected for each site were transferred to an appropriately labelled container with 10% of formaldehyde that allowed for the specimens to be fixed and kept in streamlined positions. Subsequently, all samples were placed in labelled storage containers and 70% alcohol was added to each for preservation. All samples were kept under clean, dry and cool conditions in order for proper storage and preservation to be maintained. Identification was done by expert help and available publications. Verification of species was done at the Center of Study of Biodiversity (CSBD) at the University of Guyana where identified specimens was compared with the museum’s collection. Also, species names were validated using FishBase.org.

III. RESULTS & DISCUSSION

A. Water Quality

Table 1: Mean Values obtained for Water Quality Parameters tested at Disturbed and Undisturbed Sites

Water Quality Parameter	Mean Value	
	Disturbed sites	Undisturbed sites
Turbidity (inches)	8.67 ± 4.69	7 ± 5
Temperature (°C)	30.44 ± 1.13	29.40 ± 0.55
Dissolved oxygen (mg/L)	2.47 ± 1.59	1.97 ± 1.29
pH	6.08 ± 0.77	6.26 ± 0.29
Phosphate (mg/L)	1.09 ± 1.99	0.23 ± 0.17
TKN	7.87 ± 8.20	4.06 ± 0.40

Turbidity described as a measure of light penetration is usually positively correlated with sediment erosion and in-stream production [3]. This study expected the waters for disturbed sites to be more turbid when compared with the undisturbed sites. As evident in Table 1, the data confirmed this expectation. The high turbidity for the disturbed sites can be attributed to high rates of sediment erosion [3] from the agricultural fields. However, there were no significant differences among the turbidity values obtained for both disturbed and undisturbed sites. This means that both sites had similar turbidity types.

Moreover, the concentration of dissolved oxygen in the water column measures aeration and photosynthetic activity [3]. For both disturbed and undisturbed sites there was no substantial difference between the mean values and standard deviation for this parameter (Table 1). We therefore suggest that aeration and photosynthetic activity for both sites are similar regardless of the varying impacts of agricultural activities.

pH measures the acidity or alkalinity of the water column. It was expected that the pH for the disturbed sites would be more acidic than undisturbed sites. This was projected for the disturbed sites since they were directly influenced by the run-off of fertilizers, pesticides and other agro-chemicals. However, the mean and SD values showed that there were no major differences between the pH of disturbed sites compared to undisturbed sites which was slightly acidic.

Data collected for water concentration of total phosphates and TKN showed significant differences between disturbed and undisturbed sites. Both phosphate and TKN concentrations were greater for disturbed sites compared to undisturbed sites. This was expected for disturbed sites since those water bodies were used to drain and irrigate agricultural fields, as such run-off of fertilizers and pesticides was expected to be more prevalent within such systems compared to undisturbed sites.

B. Species Diversity

A total of 311 individuals were sampled from the disturbed sites, while 241 were sampled from undisturbed sites. These individuals were distributed across 5 orders, 13 families and 25 genera. The species richness of the disturbed sites was calculated to be 18, while it was 22 for undisturbed sites. This was expected for the undisturbed sites on the premise that such areas are not heavily impacted by the agricultural activities as compared with the disturbed sites. A Single Factor ANOVA test showed no statistically significant difference ($F(1,12) = 1.671, p = 0.22$) in species richness for disturbed and undisturbed sites. In addition, lowered species evenness was expected for the disturbed sites due to impacts of agricultural activities within those areas. The species evenness (0.700) was greater for undisturbed sites when compared with disturbed sites (0.698). A Single Factor ANOVA test showed no statistically significant difference ($F(1,12) = 0.170, p = 0.69$) in species evenness for sampled species between the disturbed and undisturbed sites. This indicated that the species are distributed in similar proportions. Finally, the Shannon – Wiener Diversity Index was calculated for both disturbed and undisturbed sites. The index was calculated to be 2.165 for undisturbed, compared to an index of 2.016 for disturbed sites. This was expected for the undisturbed sites since there were moderate impacts of agricultural activities on those areas as compared with disturbed sites. A Single Factor ANOVA test confirmed that there was no statistically significant difference ($F(1,12) = 0.303, p = 0.592$) in species diversity between the disturbed and undisturbed sites.

The results of this study are similar to the findings of Jha, *et.al* (2009). When the distribution and abundance of fish species collected for that study were compared, it showed a clear sign of mild impact on the downstream of the rivers sampled. That indicated that the rapid increase in the use of agricultural inputs such synthetic fertilizers and pesticides has the potential to change the integrity of the rivers' channels [4]. For this study, the disturbed sites that were influenced by agricultural activities and inputs such as use of fertilizers and pesticides had high TKN and phosphates mean values which contributed to lower species richness, species evenness and species diversity when compared with the undisturbed sites. Additionally, the single factor ANOVA tests confirmed that there no statistically significant differences among the different variables: species richness, species evenness and species diversity between the disturbed and undisturbed sites. Therefore, using the variable species diversity as the indicator, it was found that agricultural activities had mild but no significant impacts on the fish species diversity for the disturbed sites compared with undisturbed sites.

IV. CONCLUSIONS

This study assessed the impacts of agricultural activities mainly rice and sugar-cane farming on fish diversity within Mahaicony and Enmore areas in Region 4 of Guyana's Coastal Plain. The results showed that the mean values for the parameters TKN and phosphate were higher for the disturbed sites compared with the undisturbed sites and contributed to the lower species richness, species evenness and species diversity of the disturbed sites having compared to undisturbed sites. The Single Factor ANOVA tests proved that the statistical differences for species richness, species evenness and species diversity between disturbed and undisturbed sites were not significant. As such, it can be concluded that agricultural activities have mild but no significant influences on fish diversity within the sampled disturbed sites when compared with the undisturbed sites.

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Verbal Harassment of Women at Workplaces of Kandahar City, Afghanistan

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Abstract: Since decades, verbal harassment of women is a concerning topic throughout the world. Also in Afghanistan, women employees are faced with verbal harassment at workplaces. This study is conducted to examine the presence of verbal harassment of women and its kinds at workplaces of Kandahar city, Afghanistan. In order to discover the presence of verbal harassment, a quantitative approach, snowball, and purposive method, in particular, were employed and the data was gathered through the questionnaire from a sample of 120 respondents of governmental and private sectors. The questionnaires are distributed equally to both sectors having both male and female employees. The results, as the data was analyzed using Statistical SPSS to test the hypothesis and the results revealed the presence of verbal harassment and its kinds at 42.5% at workplaces in Kandahar city. Findings accept two objectives of the study and one hypothesis out of three hypotheses. Overall, verbal harassment of women at workplace in Kandahar city is under 50%, but it is a confusable phenomenon.

Keywords: harassment, sexual, verbal, workplace, Kandahar

I. INTRODUCTION

Men and women are complementary of each other in a society and both have equal rights in all their life privileges, but most of the times one of these genders create the environment for discrimination and harassment. As the historical documents determine male domination and activities in daily life, so in most era, male domination create the environment for the harassment of women. Women's harassment is a global phenomenon that exists in all countries whether they are developed, developing or underdeveloped.

Scholars all over the world including Asian countries are considering this phenomenon, especially in developing and underdeveloping countries. Harassment, specifically sexual harassment, and its main type, verbal harassment is a discussable issue in current decade. The ILO (International Labor Organization) reports, sexual harassment is an absolutely clear means of sexual

discrimination which is purely on the basis of gender, which also includes unequal powers given to men and women (Chawla, 2016).

Also, U.S. Equal Employment Opportunity Commission (1999) defines sexual harassment as any form of uninvited sexual attention that either explicitly or implicitly becomes a condition of one's work. The European Commission's (EC) code of practice defines sexual harassment as conduct affecting the dignity of women and men at work (Rena, 2008).

Verbal harassment is an offensive and obvious form of sexual harassment that takes shape by sending email, slurs, name-calling, comments, jokes and requesting frequent sexual dates. It is an undesired compliment of sexual nature. In Wise Greek web site, verbal harassment is defined as language that is directed at another person causing that person harm, typically in an emotional or psychological sense. Calling a person names, making him or her feel useless, or otherwise diminishing a person's self-worth can all be forms of verbal harassment. This type of harassment is recognized as a serious offense, but unlike physical harassment, it is very difficult to collect evidence that attests to the existence of verbal abuse. Recording the abuse or finding witnesses may be the only solution to the problem if a verbal harassment case must be pursued (Para- 1). Making sexual comments or innuendos, telling sexual jokes, or asking about sexual fantasies, making insults based on a person's sex or rating their sexuality turning work discussions to sexual topics, requests for sexual favors are often related to promotion (Kumar, 2016). Verbal harassment is a form of violence which takes shape in different places like in public sphere, street, home, and workplace. Verbal harassment at workplace is verbal aggression which takes shape by men on other men or women. Most of the times, this type of harassment is done by men on women in working area. Verbal harassment at work as Sherman (2018) identified ranges from racist jokes to threats (sleep with me or you are fired).

Afghanistan, an Asian country where the phenomenon of starving is high, however, official record show a low stage as it is a hidden phenomenon that majority of the women workers faced and did not complain formally because of social, economic and cultural reasons. According to Afghan Analytical Network (2015), a comprehensive survey specifically focusing on sexual harassment of women was carried out by the women and children's legal research foundation based in Afghanistan interviewed 346 women from Kabul, Badakhshan, Herat, Balkh, Nangarhar, Kandahar and Kapisa. 90 % of the women interviewed said

that they faced harassment at least once in public spaces, 87 % experienced it in their workplace and 91 % experienced in educational institution. A smaller survey, carried by the Youth Development Association (2016) focused on Daykundi province, showed the occurrence of sexual harassment at an alarming rate of over 80 % of the 115 women and girls interviewed and different forms of harassments are reported as well. In this survey, the proportion of verbal harassment is substantially high among other types (Qaane, 2017).

Kandahar, as a second largest city of Afghanistan also suffers from women verbal harassment at working areas where most of the opinions and customs depend on blind beliefs and cultural framework plays a key role in political and social decisions of the country. From past up to now, men are dominant in working environment. Men play an important role in social, economic and cultural issues of the society. The role of women in society, however, especially in an administration is not much purer. Since few decades, especially after 2001 when the Taliban regime collapsed and the new government established with the support of United Nations and alliance countries, the role of the women in administrations increased and took part in most of the government decisions. In addition, their fundamental rights developed and got the approval to get secondary and higher education including working opportunities. However, the new phenomenon which prevents women from their fundamental rights like education and working, is sexual and verbal harassment at working area. Currently, it is a big challenge for women and their family that most of the times while women work or want to go to their work, they face with verbal harassment. Usually, the families do not permit their female members to work and get education because of harassment. In this sense, it is essential to seek out the existence, percentage and cause of this phenomenon in Kandahar, Afghanistan. To be more precise, the objectives and hypotheses that guide this study are as follow:

Objectives of the study:

- The main objectives of the study are:
 - To know whether verbal harassment exists at workplace of Kandahar city, Afghanistan.
 - Which types of verbal harassment is more while women work or want to go to work.

Main Question:

- Does the verbal harassment of women exist at work places in Kandahar city?

Hypothesis:

- Women's verbal harassment is in high level at workplace of Kandahar city.
- Women's verbal harassment existing at workplace of Kandahar city, Afghanistan but in low level.
- Women verbal harassment is in not exist in at workplace of Kandahar city, Afghanistan.

II. Literature of Review

Industrial, social and political revolution provided privileges to women in different segments of the society. Beside these privileges, some obstacles are also generated such as physical and verbal harassment. Verbal harassment is one of the types of sexual harassment and sexual harassment itself is an old concept (Thornton, 2002), which is acknowledged as a socio-legal phenomenon in recent times, coming to the limelight partly due to the rise of radical feminist movements sprouting in the US (MacKinnon, 1979). Also, sexual harassment began to be the focus of sustained research on vocational behaviors by the later 1980s (Fitzgerald, et al., 1988; Fitzgerald & Shullman, 1993). According to McCann (2005), when the women entered to the working environment to become financially stable and taking fundamental rights, the graph of sexual harassment increased.

The author stated that harassment, specifically sexual harassment and its important type verbal harassment has been recognized and addressed at international level by various organizations including the International Confederation of Free Trade Unions, International Labor Organization, the United Nations Committee on the Elimination of Discrimination against Women, and the European Union. Moreover, to confront the challenge, associations and organizations have formulated policies and introduced mutually agreed clauses, provided direction to abide by the laws, organized training, and introduced procedures with regards to filling sexual harassment complaints (McCann, 2005). This phenomenon has received an increased attention over the past decade. For example, workplace verbal harassment, or bullying.

The studies and researches show that women movements established in 19 century in Afghanistan to facilitate the rights of education, freedom and employment in Afghan society. Soraya Tarzi, Hummaira (wife of King Zahir Shah) and Anahita Ratibzada (the head of Afghanistan democratic women movement) are the best examples who struggled for the enhancement of women social status. Particularly, the significance Afghan women gained started in 2001 while the United Nations and U.S entered Afghanistan struggling with terrorism and making capacity building of human sources. As the US took over, different jobs, educational, vocational and constructive opportunities established. Women and men both started working outside of their homes and social and economic status increased, but many new obstacles generated. Precisely, cultural, social and home honor did not permit to the victims specifically women for revealing their problems. Verbal harassment, for example, existed for decades in Afghanistan, but because of different reasons women employees silently endure.

In August 2009, the Afghan government presented a law called EVAW (Elimination of Violence against Women) for preventing and controlling all types of harassments and violence. This law represented a landmark in the adoption of legislation addressing violence against women in Afghanistan. Furthermore, the law has established a list of abuse against women that constitute crimes, accompanies with specific sentences for perpetrators. Despite the establishment of EVAW units at the Attorney General Office in various provinces and the rule out of a variety of training in support of the governmental bodies by international organizations, the law still experiences major obstacles in its implementation and attempts of further revision and rejection. In 2016, the parliamentary Judicial Commission continued their efforts to amend the law to remove provisions regulating the minimum age of marriage, prescribing punishments for domestic assault, and providing shelters for women.

As first points of contact, the Afghan National Police (ANP) and prosecutors play a key role in the protection of women victims of violence and in setting a course for proper application of the EVAW law. Later, the AIHRC (Afghanistan Independent Human Rights Commission) has accused the ANP of not only lacking support for women's access to justice, but actually committing abuses against women. The June 2013 report from the AIHRC found that policemen committed nearly 15% of honor killings and sexual assaults recorded between 2011 and 2013. Similar attitudes were also shared by the workshop participants as they tended to describe police as corrupt, discriminating against women, and being unaware of women's rights (Medica, 2017).

However, according to Qaane (2017), different laws, departments and NGOs work for eradicating verbal and all types of harassment but still results from researches declare that there is very little official record found of harassment against women in Afghanistan. Harassment, the author further stated that whether it occurs within the family or educational institutions, workplace or the public sphere is a little talked about phenomenon. Similarly, the same problem over the past several years is going on in Kandahar province. The graph of verbal harassment is high, while it is quietly endured by the victim of this phenomenon. The author also highlighted that there are very few efforts made for the prevention of this starving phenomenon.

With regards to harassment, numerous studies have attempted to explain harassment and its kinds. A large number of those studies conclude that overall the harassment exists and majority of the victims quietly bear this particular phenomenon. The results of some of these studies are below:

Qaane (2017) in Afghan Analysts Network established an article under the title of "Harassment of Women in Afghanistan: The objective of the article was to figure out the presence of harassment and its types in Afghanistan. The analyzed data in this article determined 24.7% verbal Harassment, 22.7% phone calls, 13.9 % staring at women and girls, 10.3% street harassment, 9.3% bothering and disturbance and 7.2% is workplace harassment (touching, staking etc.). This study proves that verbal harassment and workplace harassment exist, but all the victims silently endured and did not claim against this inequality. The author of the article emphasizes on pen cod implementing for the proprietors and reducing this social fact, and makes the government and people to perform their human responsibility.

Mamarui, Getachewi & Yasmin (2015) conducted a study exploring psychological distress among Jimma University female students. The objective of this study was to identify the rate of sexual harassment and its different forms like physical, verbal, and non-verbal and psychological distress among female student. Overall, 385 females were asked and the majority of the participants were within the age range of 20-25. The outcomes of this research revealed that harassment such as physical, verbal and nonverbal exist. The prevalence of various forms of sexual harassment was higher and strongly associated with psychological distress. Important implications for university officials and policymakers including creating harassment-free

university have been drawn. Otherwise, female students tend to dropout and their academic achievements suffer a lot as a result of psychological distress, and the government's effort for realizing the gender parity in education would be compromised.

III. Theoretical Background

Research is closely based on theory and the theory presents a conceptual model for research. Theory is a set of system of ideas intended to explain something, particularly one based on general principles independent of the thing to be explained. Life experiences of youth in present societies evolved significantly. The changing effect on their personality and brought big changes in their relationship with their friends, family and many other sections and keep them as independent in all of their activities. Several of these activities direct the youths for enhancing knowledge, work experiences, flexible employment practices and making social policies. As a result of these changes, youths have to negotiate uncertainties with their parents which are unknown. Since this study is concerned with harassment, the following social theory is closely related to harassment.

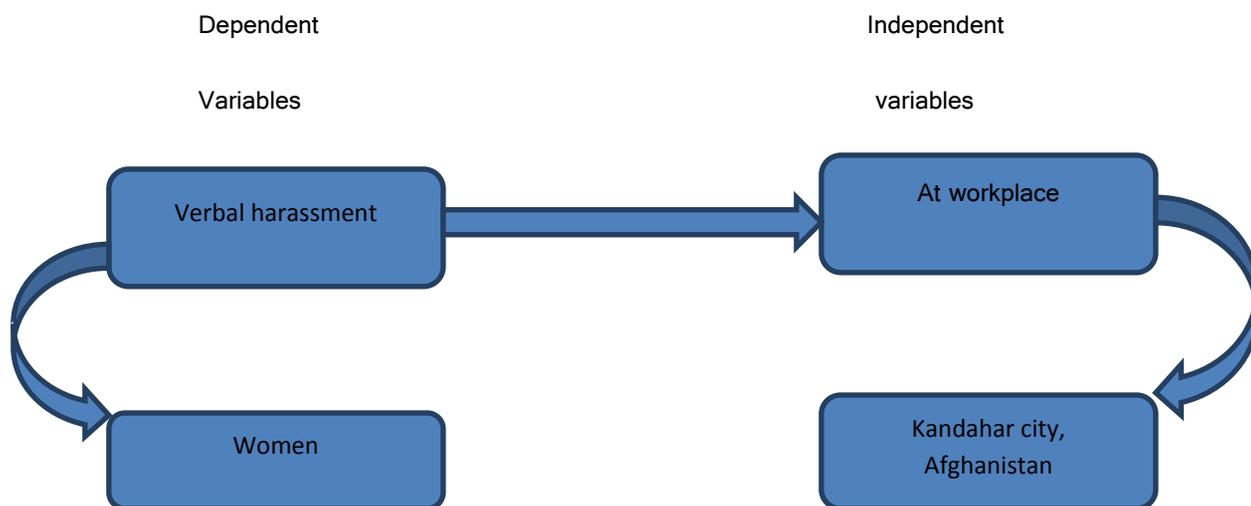
While Islam (2005, p. 117) focuses on social dominance theory formulated by Jim Sidanjus and Felicia Partto which is more concerned with social and intergroup relations. According to the author, it focuses on how people develop hierarchy supporting belief structures as a support for institutional dominance. With regards to this theory, the author further added that it involves studies of who is likely to hold such attitudes, how they come to do so, and what are the ramifications for thoughts and actions. In addition to this observation, all human societies are interested to be structured as systems for group-based social hierarchies. Also, Jim and Partto (2000) determined two kinds of social hierarchy such as individual-based social hierarchy and group-based hierarchy. The prior is related to individual characteristics as they enjoy great prestige, wealth or power with regards to their achievements and the latter refers to social power, privilege individual possesses because of particular social groups such as race, religion, tribe, or ethnic group. Furthermore, social hierarchy consists system namely gender system, which men have unequal social or political power over women.

Moreover, in relation to harassment, social dominance orientation theory is summarized as a measure of individual difference in levels of group-based discrimination. In this theory, men are higher in representing military, law and finance than women representing attenuating roles such as social work and charity work (Pratto and Stewart, 2001). In the same manner, one's level

of social dominant orientation, according to Sidanius and Pratto (2000), depends on one's gender where the males will have significantly higher average levels social dominance orientation than females have. Overall, social dominance theory and social dominance orientation point out that normative institutional discrimination and ideology play an important role in group oppression. Lastly, social dominance theory analyzes that least oppressive type of peace that societies can realize would result from reducing social inequality and from recognizing the rights of all groups to be empowered to obtain what they need.

In addition to harassment, legitimizing myths are only known within a society that includes values, beliefs, stereotypes and ideologies that provide a moral and intellectual justification for social practices for influencing groups. Legitimizing myths is the ideology of Marx and Durheim's notion of collective representations. The theory of social dominance identifies the function of legitimizing myths in two broad functional types such as hierarchy-enhancing legitimizing myths and hierarchy-attenuating legitimizing. The prior helps maintain or increase group-based inequality and promote egalitarian relations among social groups. This kind of myths includes universal rights of myth, multiculturalism, socialism and Christian brotherhood. Additionally, legitimizing myths have a direct relationship with issues of human rights and social justice. By offering these rights to all people, these legitimizing myths argue for a reduction of the disparities that exist between social groups in their access to resources, power and legitimacy (Pratto and Stewart, 2011).

Conceptual framework:



IV. Methodology

This study investigated the existence of harassment against women and its kinds in Kandahar, Afghanistan. According to Fraenkel, Wallen & Hyun (2016), in a survey method, the researcher collects information from a large group of participants through their responses to the questionnaire items. The authors added that quantitative study essentially tries to explain the problem using numbers and attempts to generalize the results of the study to a larger population.

- Sample:

The available respondents were all female workers from private and governmental sectors which were selected purposively because in line with this, an appropriate sampling technique should be purposeful and it should be based on the assumption that researcher wants to discover, understand and gain insight (Kassing, 2011). In governmental sector, 60 questionnaires were distributed to Mirwais Hospital of Kandahar province, Women School, Agriculture department, Women affairs directorate and Kandahar radio-television department. In private sector, 60 questionnaires were distributed to save the children organization in Kandahar city, promote (NGO), private radios.

- Research Design and instrument:

This is a quantitative study which collected data through a questionnaire. A questionnaire is a well-established tool within social science research for obtaining data on participant social characteristic, present and past behavior, standards of behavior or attitude and their belief and reasons for action with respect to the topic under investigation (Blumer, 2004 cited in Bird, 2009). Before the questionnaire was distributed, the researcher consulted with experienced Ph.D. holder for constructive feedback and comments in terms of context, content, structure, and to validate and ensure that the questions included in the questionnaire covered all features of the research and its objectives. The

questionnaires were submitted to the respondents directly by the researcher and all the doubts are explained to the respondents. The questionnaire had different sections related to verbal harassment.

V. Data Analysis and Result:

This part presents the result collected from the participants. The entire participants were responsible for answering the oriented question which is given by the researcher.

Your Boss/co-worker/subordinate/client		Never	Once	A few time	Very frequently	Total
1	Told any dirty joke to you	82 68.3%	16 13.3%	14 11.7%	8 6.7%	120 100%
2	Made comment on your figure	78 65%	13 10.8%	19 15.8%	10 8.4%	120 100%
3	Stared at you from head to toe with dirty look	75 62.5%	18 15%	16 13.3%	11 9.2%	120 100%
4	Tried to make you site with him on lame excuses	92 76.3%	19 15.8%	8 6.7%	1 0.8%	120 100%
5	Tried to talk about your or his sexual life	95 79.2 %	12 10.0 %	9 7.5 %	4 3.3 %	120 100%

Table – 1: Collected data from different departments of Kandahar city

Table -1 illustrates the collected data from different departments of Kandahar city, Afghanistan. From the above 5 questions 68.3%, 65%, 62.5% 76.3% and 79.2% of the responses seem that respondents never faced with dirty joke, comment dirty look, lame excuse and talk about sexual life. However, 31,7%, 53%, 37.5%, 23.7%, and 20,8% of the responses present that respondents faced once, a few time and very frequently in each status of the question.

No	Boss/co-worker/subordinate/client	Never	Once	A few time	Very frequently	Total
6	Admired your dress or makeup	89 74.2 %	12 10.5 %	7 5.8 %	9 7.5 %	120 100%
7	Hummed filthy songs in your presence.	89 74.2 %	20 16.6 %	6 5.0 %	5 4.2 %	120 100%
8	Obnoxious calls to you on the telephone	83 69.2 %	14 11.7 %	15 12.4 %	8 6.7%	120 100%
9	Took interest in your personal life with the intention that you might start responding favorable to him.	78 65.0 %	14 11.7 %	15 12.5 %	13 10.8 %	120 100%

Table – 2: collected data from different administrations of Kandahar city

Table -2 explain the collected data from different administrations of Kandahar city, Afghanistan. From the above 4 question 74.2%, 74.2%, 69.2% and 65% of the respondents declared that they never faced with admiring makeup, hummed filthy song,

No	Verbal harassment	Agree	Disagree	Undecided	Strongly Disagree	Total
25	Verbal harassment is very common in Kandahar Administration.	51 42.5 %	35 29.2 %	26 21.6 %	8 6.7 %	120 100%

obnoxious, took interest in your personal life, but 23.3%, 25.8%, 30.8%, and 3.8% of the respondents stated that they faced once, a few time and very frequently in each status of the question.

Table-3: specific question related to verbal harassment at Kandahar workplaces and administrations

Table – 3 is a specific question related to verbal harassment at Kandahar workplaces and administrations. The above table shows that 42.5% verbal harassment exists in Kandahar province. 29.2 % of the respondents disagreed and believed that it does not exist. 21.6 % of the respondents had no idea regarding verbal harassments. Lastly, 6.7 of the respondents strongly disagreed with verbal harassment at workplace of Kandahar city, Afghanistan.

HYPOTHESIS -1: Women's verbal harassment is in high level at workplace of Kandahar province.

- Due to percentages and results in the above tables, this describes that verbal harassment of women in Kandahar city is not in high level. Therefore, it directs us that this hypothesis is rejected.

HYPOTHESIS – 2: Women's verbal harassment existing at workplace of Kandahar city, Afghanistan, but in low level.

- From percentages and results in above tables, we can infer that verbal harassment of women in Kandahar city exists but in low level. Thus, the achieved data directs us that there is the existence of verbal harassment.

HYPOTHESIS -3: Women verbal harassment does not exist in a workplace of Kandahar city, Afghanistan.

- To determine women verbal harassment does not exist in Kandahar city, the percentages are drawn. This can be concluded that presence of verbal harassment of women at workplace of Kandahar city exists. Due to this consideration, the hypothesis is rejected.

VI. DISCUSSION

This study investigated whether or not the participants of this study faced any discourteous behaviors such as dirty jokes, dirty looks, lame excuses, or talk about one's sexual life. The findings of this research indicate that the majority of the participants

never encountered with any of the above behaviors, whereas a low percentage of the participants revealed that they once, few times and frequently faced such kind of harassments. Meanwhile, this result is different from a previous study which reported a case that a senior male staff member who was famous for sharing ill-intentioned behaviors, engaging with lady staff members in talk, sharing dirty jokes, talks about nakedness and eventually ending up with blocking a female staff's passing way in the unit (Naveed and Alwani, 2010). Also, the results of this study is not in harmony with Çela (2015) who reported statistics from six European countries which showed a similar increasing trend in sexual jokes women frequently experienced.

In this study, a large proportion of the participants pointed out that they never experienced any kind of admiring makeup, hummed filthy songs, obnoxious and took interest in their personal life. This research is not in accordance with a study conducted by Aquino et al (2014) who discovered in their study that a female banker admitted that she usually gets an admiration of her physical appearance from her colleagues. The researchers further specified that the woman banker was admired and flirted of her dress and legs and with this kind of declarations, women seem to become aware of that women's worth is intensely related to their look in many societies. Moreover, the current study tried to find whether or not the verbal harassment exists at Kandahar workplaces and administrations. The findings of this study revealed the existence of verbal harassment at workplaces in Kandahar province, but at a low level. A small percentage of the participants in this study indicated no clue regarding verbal harassment. However, these findings are in contradiction with the findings discovered by Unnikrishnan et al.(2010) who carried out a study in India where the majority of the women were verbally harassed at workplaces. Similarly, with regards to verbal harassment, Burnes and Pope (2007) indicated in their study that majority of the common forms of harassment took place at workplaces was verbal harassment.

VII. CONCLUSION

This study could be useful in determining women status in Kandahar environment. Verbal harassment which is offensive and obvious form of sexual harassment always takes shape by sending email, slurs, name-calling, comments, joking and requesting repeatedly sexual dating favors. It is a psychological and social problem of the society. Currently, most of the countries prevented this offensive and unwanted phenomenon in their countries. The purpose of the prevention is to provide equal

opportunities for both males and females. Afghanistan is also one of these countries which struggle for prohibition of all types of harassment against women especially verbal harassment of women in working environments. Even this study found that verbal harassment exists less than fifty percent, it is still a worrying phenomenon considering social and cultural sides in Kandahar. Yet, survey evidence shows that verbal harassment workplace is common in Kandahar city. The result and researches show that verbal harassment is silently endured by women in Afghanistan especially in Kandahar but the complaints are not registered by the victims of harassment in responsible organizations and administrations.

VIII. Recommendation

There is a need for further studies to be carried out and find out other types of harassment and their types. There should be collective efforts by the government, employers and employees towards the elimination of this unreasonable phenomenon. More importantly, there needs to be independent awareness of the individuals. Lastly, a legal remedy for avoiding this phenomenon is to pressurize the administrations by the government and Human Resource for implementing Afghan constitution and law and forming strict sustainable policy to those who are involved.

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Contribution of Risk Sharing Mechanisms in Flood Management and Control in Kilosa District, Tanzania.

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Abstract

The application of risk sharing mechanisms is seen by many in developing countries as a remedy for lessening effects of disasters. However, this notion has not been thoroughly tested in the context of floods in Kilosa District. The focus of this research, was to assess the effectiveness of both formal and informal risk sharing mechanisms, applied in flood management and control, as well to examine challenges confronted the effective operation of them. Four sub-villages were selected for the study in Magomeni and Mbuni Wards. Several methods were used to provide an indication of the performance of the mechanisms. Ninety householders and 10 key informants were interviewed. Field assessment visits, focus group discussions, and a review on archive data were also carried out. Results of the research have revealed four major findings: (i) The local people were aware of the risk sharing mechanisms used in the flood management and control; (ii) only informal risk mechanisms were applied to manage and control floods; (iii) informal risk sharing mechanisms were moderately effective to curb floods; (iv) challenges confronted risk sharing mechanisms were poverty, poor leadership, inadequate education on formal risk sharing, lack of cooperation, inadequate and unequal distribution of reliefs. The study recommends that, the government and others stakeholders should strengthen risk sharing mechanisms education to the community, through the most attainable ways like Village meetings and seminars at Ward and Village levels, better protection of Mkondoa River and other river banks, and that should be soon after offering training to the local leaders on disaster management.

Key words: Flood, Kilosa, Risk, Risk sharing, Risk sharing mechanisms.

1. Introduction

Climate related disasters have been a major source of risks to the poor in developing countries. Many of these disasters have been realized through floods and droughts among others. In recent decades, they have escalated into wide spread deaths and injury of people, environmental destructions, as well as economical losses in many parts of Sub-Saharan Africa (World Bank, 2007; Steitz & Nyangena 2009).

Of these disasters, floods have been the most frequent and devastating with the most frequently recorded destructive events, which accounted for almost 30% of the world's disasters each year (Julie, 2008). The frequency of floods, has been increasing faster than any type of disaster in the planet (Noralene & Rajib, 2008; World Meteorological Organization, 2011). This situation has been caused by the increasing pressure on uncontrolled urbanization, deforestation, and climate change (Bates *et al.*, 2008; Intergovernmental Panel on Climate Change, 2012).

Efforts to reduce human, social, economic, and environmental losses due to floods have been noted to be difficult to achieve, with projections of more intense and frequent floods. Stern's Review estimated that, if no action taken to mitigate floods, damages could cost up to 20% of the global Gross Domestic Product. Failure to implement control measures, could also compound the situation (Stern, 2007).

Moreover, there is a growing recognition that control measures should go hand in hand with flood risk reduction strategies, which aimed to reduce vulnerability and minimize threats to human. Flood risk reduction strategies, are also critical to reduce risk and vulnerability to natural and related technological and environmental hazards. Control measures aims at moderating the adverse effects of floods by reducing vulnerability to flood effects through a wide range of interventions. The use of risk-sharing/transfer mechanisms, is one of the interventions.

Many countries globally, have developed risk sharing mechanisms as tools to manage and control floods. For example, in the United States of America, the Galloway Report produced by the U.S. Interagency Flood Plain Management Review Committee, which was established after the Midwest Floods of 1993 recommended the introduction of cost sharing provisions, for the State and local participation in recovery, response and mitigation activities (Galloway, 1994). In Japan also, the River Law (enacted in 1896, and totally revised in 1964, last amended in 1997) has played an important role in forming the policy for flood management. The River Law assigned the costs related to river administration to the central government for class A rivers, and to prefectural government for class B rivers (Cabinet Office, Government of Japan, 2011).

As for developing countries, especially those in Africa, have been also using risk sharing mechanisms to manage and control floods, though they have been facing challenges in operating them. They are highly vulnerable and the least equipped of all countries to mitigate floods. They have also a limited capacity to spread risk geographically, and their insurance markets are vulnerable to changes in the international markets as well they have underdeveloped non-life insurance markets (Surminski, & Oramas-Dort, 2013).

Furthermore, they lack financial means for adapting to the adverse effects of floods and the capacity to manage the financial risks from the direct impacts of floods, which threatens sustainable development and poverty reduction strategies (GECHS, 2008).

Regarding Tanzania, Morogoro Region has been among of the regions in the country inundated by floods almost every year (European Commission, 2010). Floods have been destroying infrastructures, farmlands, loss of lives, and displacement of people (*Ibid*).

Kilosa District, has been one of the Districts of Morogoro Region which mostly affected by floods (URT, 2005; Maringo, 2014; Ringo *et al.*, 2016). The District, has been subjected to flooding as river Mkondoa has been swollen and burst its banks inundating many parts of the district. This has been causing havocs to people and properties/infrastructures.

In view of the growing magnitude of the problem and the severity of the consequences associated with floods in Kilosa, the government has been put in place numerous efforts to avert the problem. These included the establishment of the displacement camps (temporary settlements), provision of emergency relief and shelter, and water sanitation services (European Commission, 2010; United Nations Children's Fund, 2013; Ringo, *et al.*, 2016). However, the impacts have been still persisting and in some cases they have escalated. In view of this, therefore, exposition of the extent at which risk sharing mechanisms have been crucial tools to enhance resilience of the flood victims in curbing threats inflicted by floods, is deemed necessary, and this paper is a contribution towards it.

In this paper, risk sharing refers to the allocation of costs of taking risks, encompassing bearing the financial and other costs of flood risk management as well explains the shared responsibility of each stakeholder, within the relevant physical, technical, economic and political contexts. In terms of risk sharing mechanisms, it encompasses methods for spreading both the financial and non-financial burdens exacerbated by floods in a given area, over a specified period.

2. Materials and Methods

2.1 The study area

Findings discussed in this study, are based on surveys in four sub-villages of Mbuni (Mbuni A and Mbuni B) and Magomeni (Kiyangayanga, Mbwamaji) which are Wards in Kilosa District (Morogoro Region). Kilosa District is among the Districts in Tanzania where floods have been reported to be on the increase in recent years with devastative havocs on human and properties. The District lies between 6°S and 8°S, and 36°30'E and 38°E, and has semi-humid climate, receiving an average rainfall of 800mm annually while the temperature ranges from 25°C to 28°C (Kilosa District Council, 2010).

The district topographically, is divided into three zones, namely: (i) Flood plain-comprise both flat and undulating plains extending to foothills in the west, with an altitude of almost 550m. Soils are poorly drained, cracking clays in the central parts subjecting to seasonal flooding; (ii) Plateau-situated in the north of the District, with an altitude of 1100m. It has plains and hills and is made up of moderately fertile, well-drained sandy soils which are highly erodible; (iii) Highland-runs from north to the south on the western side of the district, with an altitude of 2200m.

According to URT (2012), the human population of Kilosa District was 438,175 people. Major land uses in the area includes agriculture, wildlife conservation, forest conservation, grazing, and human settlements (Kilosa District Council, 2010).

2.2. Data collection

This study has employed a mix of research methods which include field site visits, key informants interviews, household questionnaires surveys, and focus group discussions. Regarding field site visits, the researcher and field assistants visited the study areas so as to compliment information obtained through other methods of data collection. Issues which were observed were the visible impacts of floods, economic activities, resources available, and types of risk sharing mechanisms.

As for the key informants' interviews, in-depth interviews were held with Kilosa District Disaster Coordinator as well as with Wards and Village Officers. These people were selected because they possessed deep information into the findings. Interviews were guided by the usage of checklists which set up to capture risk sharing mechanisms, the effectiveness of risk sharing mechanisms in flood management and control, and challenges of implementing flood risk sharing mechanisms.

During the survey, focus group discussions furthermore took place. In selecting participants, however, a proportional representation of sex (males and females) as well as age (youths and elders) was taken into consideration. Participants provided valuable insights into the findings pertinent to risk sharing measures which were used to tame floods, contribution of the government and other stakeholders in managing and controlling floods, effectiveness of risk sharing mechanism in flood management and control, as well challenges which were associated with the implementation of the mechanisms.

In addition to focus group discussions, household questionnaire surveys, were similarly used to achieve data. Both open ended and closed ended questions, were administered face to face to 90 respondents in their residents. One field assistant from each Sub-village was used to facilitate data collection. Questionnaires were pretested in each Sub-village to check wording, clarity, lay out, to train field assistants, and to

familiarize them and the study areas. Issues which were encompassed in the questionnaire were the socio-economic aspects of the respondents, flood impacts, available flood risk sharing mechanisms, contribution of risk sharing mechanisms in flood management and control, and challenges impeded them.

2.3 Data analysis and presentation

Collected data were coded and summarized which quantitative data were analyzed by using Statistical Package for Social Sciences (SPSS) 16.0 computer program for windows. Thematic data analysis also was used to analyze qualitative data and they were presented in figures and tables.

3. Results and discussions

3.1 Socio-economic characteristics

The socio-economic characteristics of the population samples for Kiyangayanga, Mbwanaji, Mbumi A, and Mbumi B, are presented in Table 1&2 below. Almost half of the respondents in the total sample (51%; n=90) were males and 49% were females. This could have arisen by a chance. In terms of marital status, 50% were married, 40% singles, 9% widows, and only 1% divorced (Table 1 below).

Table 1: Sex and marital status of the respondents

Sub-villages	Sex of the respondents		Marital status			
	Male	Female	S	M	D	W
Kiyangayanga	55	45	30	55	0	15
Mbwanaji	53.3	46.7	45.7	37.1	2.9	14.3
Mbumi A	50	50	40	55	0	5
Mbumi B	46.7	53.3	45	55	0	0
Total	205	195	160.7	202.1	2.9	34.3
Average	51.25	48.75	40	50	1	9

S=Single, M=Married, D=Divorcee, W=Widow.

As for the ages, less than half of the respondents (46.125%) were aged between 18 and 35 years. This implied that, the economic activities were performed by youths and elders whom were energetic. With reference to education, 41.075% of them had attained primary education and 37.725% secondary education (Table 2 below). This indicated a normal literacy level.

Table 2: Age and education

Sub-villages	Age of the respondents			Education level			
	18-35	36-59	> 60	NF	PE	SE	PSE
Kiyangayanga	30	40	30	10	50	40	0

Mbwamaji	42.9	45.7	11.4	17.1	34.3	48.9	0
Mbumi A	65	15	20	30	40	40	0
Mbumi B	46.6	26.7	26.7	13.3	40	30	0.6
Total	184.5	127.4	88.1	70.4	164.3	158.9	0.6
Average	46.125	31.85	22.025	17.6	41.075	37.725	1.675

NF=Non-formal education, PE=Primary Education, SE=Secondary Education PSE=Post-Secondary Education.

3.2 Risk sharing mechanisms

Findings have revealed that, all surveyed respondents were aware of flood risk sharing mechanisms. Further to that, all of them have disclosed the presence of informal risk sharing mechanisms, which were used to manage and control floods (Figure 1 below). As for the formal mechanisms, it was found out that, people had no interest of them due to lack of education and poverty. This was supported by the argument of the Head of Kiyangayanga Sub-village during key informants’ interview that:

“We do not have education about insurance and other formal risk sharing mechanisms. We even do not know how they are helpful in halting floods. Even if we would be aware, still poverty would hinder us to use them”.

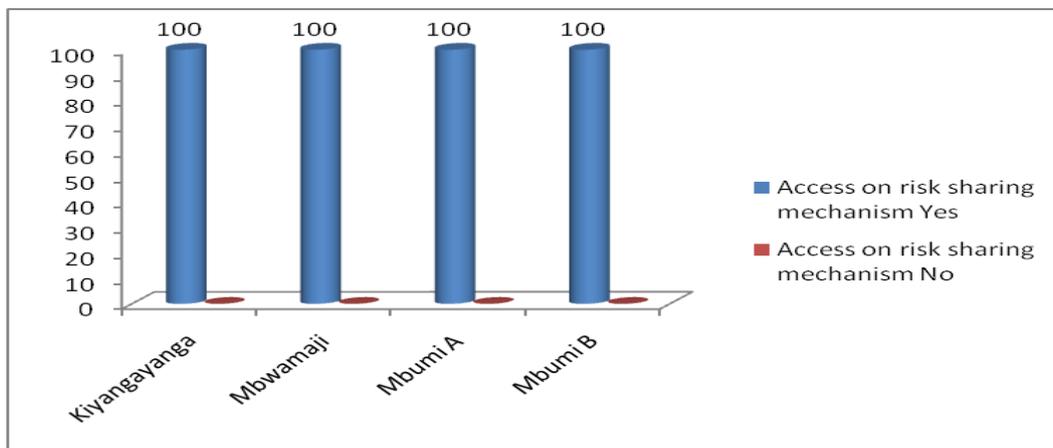


Figure 1: Risk sharing mechanisms.

Regarding the informal risk sharing mechanisms, it was noted that, they were mostly used because they were cost-effective and easily accessible. They encompassed foodstuff items, temporal shelter services, local money borrowing, and building materials (Table 3 below).

Table 3: Types of risk sharing mechanisms

Sub-Villages	Types of risk mechanisms		Informal risks mechanisms		
	Formal	Informal	Food items	Temporal shelters	Building materials

Kiyangayanga	0	100	100	0	0
Mbwamaji	0	100	3	95	0
Mbumi A	0	100	55	25	20
Mbumi B	0	100	34	0	68
Average	0	100	48	30	22

In terms of foodstuff items, 48% of the respondents argued that, they used them to curb food shortage due to floods. Items provided included beans, maize flour, sugar, water guards, and salts among others and they were distributed to flood victims under the supervision of local leaders, in collaboration with stakeholders whom offered them including Red Cross Society, religious institutions (such as SUNNI and Catholic society), private companies (such as CRDB Bank, AL-Saedy Bus Company), individuals as well relatives.

At the village level, findings unveiled that, people in Kiyangayanga had more access to food items than others. This could be due to reasons that, most of them at this Sub-village were poor, a situation which influenced relief providers to concentrate more to them because of the fragile condition which they possessed including lack of basic infrastructures (like resistant houses and roads) and the absence of terraces as well embankments as the researcher observed it during field site visits.

Regarding gender, males were given less foodstuff items than their female counterparts in each Sub-village. More provision of the foodstuffs to females is probably an illustration of the fact that, females in these communities are given priority in issues related to family chores like food issues.

Out of the 30% of the respondents also reported that, temporal shelters were given to the homeless flood victims (Table 3 above), and were accompanied by other items i.e. tents, blankets, mosquito nets, buckets, and jerry cans, water purification tablets, sleeping mats, soaps and mattresses. Stakeholders whom offered these items were World Vision, Islamic Foundation, banks (National Microfinance Bank and CRDB), Al-Saedy Bus Company, Tanzania Social Action Fund (TASAF), Mass Medias (like Star Television, Independent Television and Tanzania Broadcasting Company), United Nations Children’s Fund-UNICEF, and the relatives of the flood victims.

The provision of temporal shelters varied across Sub-villages. Of the four Sub-villages, the access to temporal shelters was more in Mbwamaji. This study has found that, this was because Mbwamaji was in one of the areas where floods exacerbated widespread destruction of roads and houses, as the area lacked terraces and other flood control measures. This was revealed by the argument of the Mbwamaji Chairperson who had this to say:

“The District Council refused to construct terraces in our area by arguing that, we poses poor houses. So, they can not waste money to prevent biscuit houses”.

Results of the research have revealed that, building materials were similarly provided to flood victims. This was disclosed by 22% (Table 3 above) of the respondents whom stated that, they were provided cement, woods, poles, nails, and iron sheets by different stakeholders (Islamic Foundation, Tanzania People’s Defense Forces, Red Cross, World Bank, World Vision, TASAF, Ward, Village and District governments).

Furthermore, it was noted that, people from Mbumi B had more access to buildings materials than other residents, and this could be influenced by the location of this Sub-village, which was geographically close to Kilosa Town. With this background, its residents could have more interactions with institutions at Kilosa Town, hence, influenced easy accessibility of building materials.

3.3 Effectiveness of risk sharing mechanisms to manage and control floods

Respondents had different views on the effectiveness of risk sharing mechanisms in managing and controlling floods. Their views dwelt on the accessibility, affordability, and the capacity of the mechanisms to respond flood risks.

Findings have furthermore revealed that, 52% of them had viewed that the mechanisms were moderately effective. Others, 38% asserted that, they were effective, 5% very effective, and 5% ineffective (Figure 2 below). This means that, many of them felt that, risk sharing mechanisms were effective to manage and control floods. As for those whom perceived the mechanisms were effective, had the views that, risk sharing mechanisms played a great role to tame floods, hence, protected people and increased their resilience against floods.

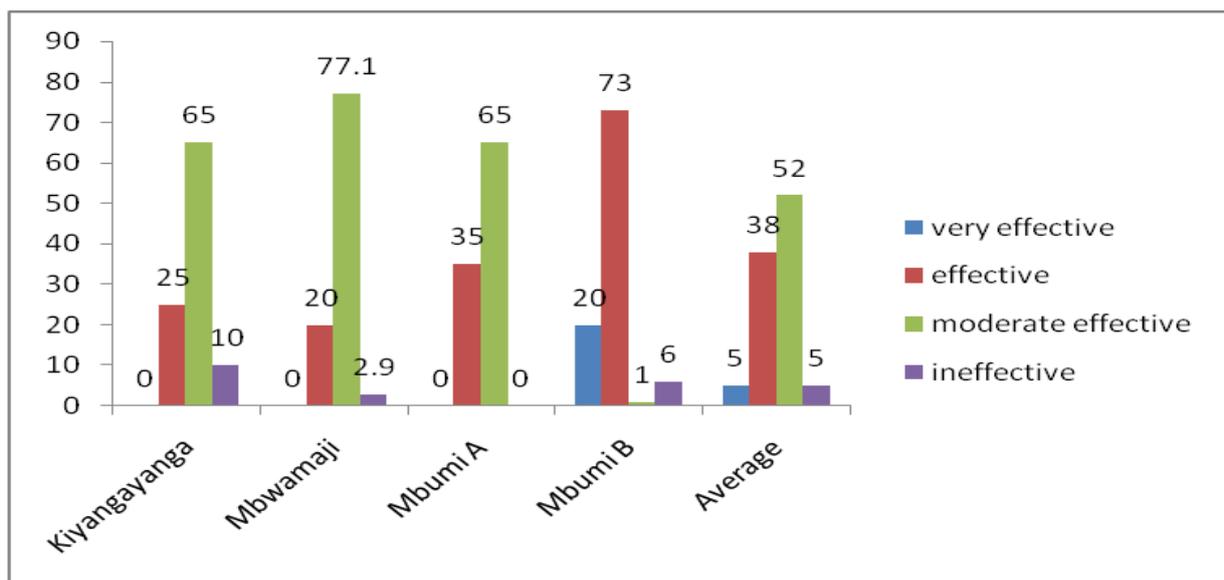


Figure 2: Effectiveness of the risk sharing mechanisms in managing floods.

Furthermore, the range of activities attempted by the local and the central government by including other stakeholders to curb floods in the study area were assessed. Results have showed different activities (Figure 3 below). These involved the constructions of embankments (by Tanzania People’s Defense Forces), rehabilitation and restorations of broken roads and railways (by Kilosa Town Council and Tanzania Railway Limited). However, there were assessment of the damaged infrastructures, planting of trees and reeds alongside Mkondoa river to control erosion (by the Kilosa Town Council and other stakeholders), by providing food, shelter, clothes and medical items to flood victims, construction of temporal houses, and restriction of anthropogenic activities close to Mkondoa river.

Results have further disclosed that, 50% of the respondents reported the construction of terraces and contours, which controlled floods at the steep slopes (Figure 3 below). During field site visits, an embankment along Mkondoa River was observed in Mbumi A and Mbumi B villages.

The embankment was made purposively to block haphazard flows of the water from Mkondoa River to peoples’ residents. As for terraces and contours, they were constructed at the steep slopes to reduce the speed of the water and to control soil erosion.

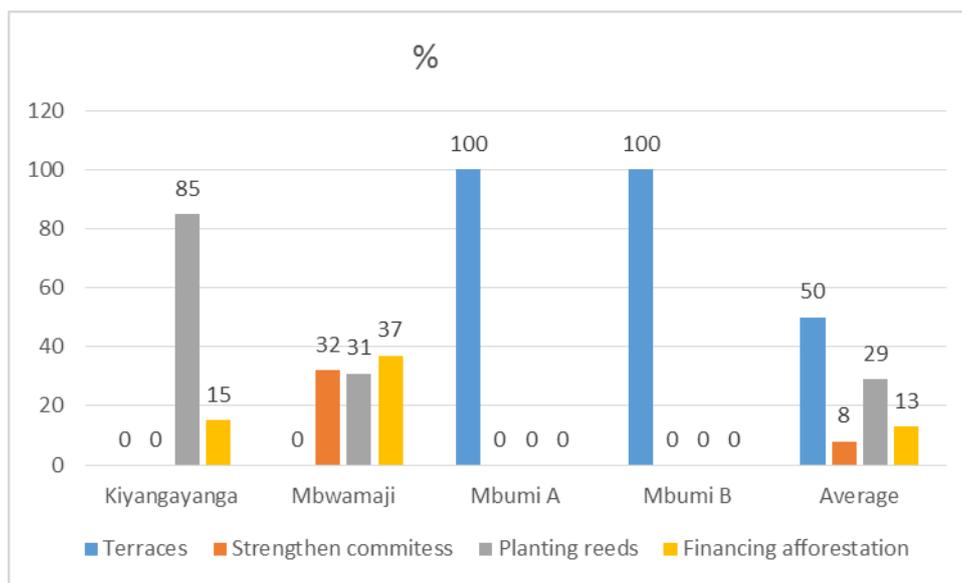


Figure 3: Roles of risk sharing mechanisms.

Results have similarly indicated that, 29% of the respondents stated the plantation of reeds on the contours to control floods at the steep slopes. Elephant grasses, reeds, and sugar canes were also plated in the farmlands along the hill contours, to divert water to the sides of the steep slopes.



Figure 4: Flood control reeds (“*Matete*”) along river Mkondoa banks.

Out of the 13% of the respondents posited that, afforestation was done to control floods. It was observed that, trees were planted on hilly slopes and at the banks of Mkondoa River and other streams. The planting of trees was done by the local residents and private stakeholders including *Mkaa Endelevu* organization, while the afforestation aimed at reducing the velocity of water in the streams, surface run off, and soil erosion.

Nonetheless, some of them had viewed that, the above mechanisms were not effective. They said that, despite of those enthusiastic efforts (like planting of reeds and other trees), effects exacerbated by floods have been escalating and the ensuing consequences were becoming unbearable. Factors such as lack of monitoring and evaluation were identified as the cause of such unsuccessfulness. A Village Chairperson of Kiyangayanga argued:

“Measures taken to ameliorate floods are not active due to inadequate funding from the government and private stakeholders. For this, some measures started and ended up unfinished”.

3.4 Challenges faced risk sharing mechanisms

A number of factors were identified to cause to the unsuccessfulness of risks sharing mechanisms. They include, poverty, lack of cooperation among stakeholders, unequal distribution of aids, relief items, poor leadership, and the lack of education on risk sharing mechanisms (Table 4 below).

Table 4: Challenges hindered operation of risk sharing mechanism

Sub-village	Challenges					
	P	PL	LE	LC	IR	UDR
Kiyangayanga	45	5	15	10	15	10
Mbwamaji	34.3	11.4	2.9	22.9	17.1	11.4
Mbumi A	20	15	10	25	15	15
Mbumi B	46.6	6.7	13.3	6.7	0	26.7
Average	36.475	9.525	10.3	16.15	11.775	15.775

P=Poverty, PLA=Poor leadership, LE=Lack of education, LC=Lack of cooperation, IR=Inadequate relief, UDR=Unequal distribution of relief.

Poverty was revealed by 36.475% of them as a challenge, which hindered the effective implementation of flood risk sharing mechanisms. Among other aspects, it was unveiled that, poverty confronted the provision of risk sharing mechanisms education. Also, it impeded the usage of formal mechanisms such as an insurance. Poverty similarly, pushed people whom failed to help each other due to deprived livelihood. This was supported by arguments of one of the respondents during focus group discussions who asserted that:

“We are all poor, we can not help each other as floods affect all of us. So, everyone has to concentrate on recovery from the impacts by finding assistance from external community as all we are poor”.

Moreover, unequal distribution of relief items was an obstacle which was raised by 15.775% of the respondents. They argued that, leaders lacked transparency in the distribution of relief items. They went far to the extent that, as there was also a favoritism whereby some of the flood victims, did not get the amount/quantity of the allotted relief and some did not completely. Unequal distribution of reliefs left some of the flood victims in hard time to recover the impacts of floods. This was confirmed by the argument of the Village Heads of Mbwamaji during key informants’ interviews that:

“Some leaders are not patriotic, they have been distributing more reliefs to their relatives and friends, sometimes for personal gains and left many flood victims suffer from harsh impacts of floods without help”.

Furthermore, they argued that, reliefs which were offered to them were not enough to satisfy their needs. It was disclosed that, the local government and other stakeholders provided foods and shelters items which meant for temporary recovery. One of the respondents corroborated that:

“The assistance has not been suffice. For example, you are given two pieces of wood and five iron sheets, how will you build or repair a house?”.

This was further echoed by one of the key informants, a representative of the Disaster Management Committee from Kiyangayanga Village that:

“The satisfaction of the aids/reliefs to manage and control floods is moderate but at least, people receive and share a little help which has been provided”.

Moreover, lack of education on risk sharing mechanisms, was another challenge confounded effective operation of risk sharing mechanisms. Respondents revealed that, they lacked education of formal mechanisms like insurance. They did not understand even how to access them. Kilosa District Disaster Management Coordinator disclosed that:

“People lack education about risk sharing mechanisms, especially the formal ones like an insurance. They even did not know how to access them and how they functions in disasters, particularly floods”.

The preceding discussion has shown that, education was associated with the lack of the operation of formal risk mechanisms. This situation could be in place as many of the surveyed respondents were found to have a primary school education (Table 2 above). A few of them had attained secondary school education. Such moderate level of literacy, could have the limited of understanding formal risk sharing mechanisms, such as an index-based insurance, catastrophe bonds, and micro-insurance.

Poor leadership was also contributed to shortfalls in flood risk sharing mechanisms. Respondents blamed the existed local government leaders that, they lacked cooperation with flood victims, they were blamed for being the source of misunderstandings due to their favoritisms and the tendency of using reliefs for personal gains. This was confirmed by District Disaster Management Coordinator that:

“Problems arise between the community and local leaders due to unequal distribution of reliefs and failure, to manage conflicts arise during relief distribution”.

Furthermore, some leaders were reported to be weak to stand for the by-laws enacted to control the activities, which carried a proximity to the banks of the rivers. However, an interview with Mbumi Ward Executive Officer, shoots blames to the local people in repudiating by-laws in place. He put a way forward that:

“Local people should respect by-laws which are in place, and stop pretending that, they do not understand what they have been told or directed by their leaders to stop practicing activities which influenced flooding”.



Figure 5: A poster prohibiting to cultivate or building within 100m from the river and 30m from the railway reserve.

4. Conclusion

Disasters risks are challenging to manage, particularly through formal mechanisms which are often high. Results of the study have revealed that, only informal risk sharing mechanisms were used to manage and control floods. As for the formal ones, they were not in place, partly due to lack of education and poverty. The informal risk sharing mechanisms in place were moderately effective to manage risks exacerbated by

floods. The informal risk sharing mechanisms also were associated with challenges in the study area, emanated from the environmental, political, economic, and social settings.

To make informal risk sharing mechanisms effective, this study suggests that, leaders and members of the disaster management committees, should have a background in disaster management, to have auditing of the aids/reliefs offered to manage floods, local leaders have to be patriot, transparent and ethical in organizing and distributing aids, as well as strengthening cooperation among public and private stakeholders, whom assisted flood victims. Regarding the formal mechanisms, it is suggested that, stakeholders have to invest on educating people about the usefulness of them in curbing flood risks.

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Community Perceptions towards Participatory Forest Management, A Case of Kazimzumbwi Forest Reserve in Kisarawe, Tanzania

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Abstract: Forests are vital resources in the earth ecosystem. They play an important role in the survival of human beings and the whole ecological system. The effective community based conservation and management of these resources is a necessary step to their sustainability. This paper assessed the Community Perceptions towards Participatory Forest Management at Kazimzumbwi Forest Reserve (KFR). A cross-sectional study was carried out to assess the Community Perceptions towards Participatory Forest Management by using questionnaire survey, focus group discussion, field visits and documentary review. The study was carried out in Kazimzumbwi and Chanika villages which are among the five villages surrounding the reserve and a total of 100 households were participated during questionnaire survey. The data were analyzed by the use of Statistical Package for Social Sciences (SPSS), Microsoft Excel and Geographical Information System (GIS). The study revealed that, 97.3% of respondents showed negative perceptions towards top-down forest management regime. The main reasons behind negative perceptions are the increased rate of deforestation, conflicts between local community and government, poor community involvement in forest management and strict regulations that do not allow them to access the forest resources. Factors behind perceptions are social, economic and political systems within the society. Level of education, degree of access to forest resources, improvement of local people's livelihoods and awareness of the strict forest regulations have a significant relationship with the rejection of the regime. The results indicated that, the majority of the respondents proposed Active Joint Forest Management that addresses the root causes and immediate causes of negative perceptions of forest management regime. Due to poor performance of the top down forest management regime, the study recommended that, the local people should be actively involved in the management of the resources. Also, clear buffer zone area should be established around the forest reserve in order to halt deforestation that would ensure the sustainability of forest ecosystem for current and future generations.

Index Terms: Kazimzumbwi Forest Reserve, Community Perceptions, Participatory Forest Management, GIS

I. INTRODUCTION

The forest sector plays an important role in the economic development of many countries and livelihoods of many communities in the world (World Bank, 2001). Ecologically, forest ecosystems contribute to the protection of watersheds. Forests are key elements in the regulation of hydrological cycles, climate and the reduction of atmospheric pollution and they play an essential role in the global carbon cycle (FAO, 2011). Almost, 1.6 billion people in the world rely heavily on forest resources for their livelihoods (WB, 2001). Also, forests account for about an average of 6 per cent of Growth Domestic Product (GDP) in the African regions which is the highest in the world (WB, 2003).

Many forest resources in the world have been designated as forest reserves, national parks and nature reserves as the best way of biodiversity preservation (Pimbert and Pretty, 1995). One-fifth, approximately 21% of the global forest resources are managed primarily for conservation and protection (UNDP, 2007). About 13% of forest resources in Europe, 30% in Asia and the Pacific, and 21% in Africa are managed under protection and conservation (UNEP, 2007).

In developing countries, many forest reserves are managed through Participatory Forest Management (PFM) as stressed in many African countries' forest laws and policies like Gambia, Ethiopia, South Africa, Zambia, Uganda and Kenya, among others (Wily, 2002). For instance, the PFM approach is widely spread in many African countries, like Penessaulou Reserve in Benin, State Forests of Oromiya Region in Ethiopia and Mafungabusi Forest Reserve in Zimbabwe (Wily, 2002).

In Tanzania, PFM is adopted and in 1998 Tanzania Forest Policy was introduced, and 2002 Tanzania Forest law was to use PFM in managing her forest resources (URT, 1998). Despite the adoption of PFM in Tanzania, like other developing countries, deforestation and conflicts on forest resources management are still persisting in many forest reserves. Kazimzumbwi, in particular, is characterized by conflicts and violation of human rights. For instance in 1998, the Tanzanian police forcibly removed approximately 1000 people from their homes, burned homes and agricultural fields, a villager was killed (Yonge Nawe Environmental Action Group, 2003) and at least 700 people were injured (WRM, 1999). Therefore, this study intended to explore community perceptions towards Participatory Forest Management to the community around KFR.

II. MATERIALS AND METHODS

2.1 Study area

The study centred on KFR in Kisarawe district, Tanzania. The rationales for selecting this district were, first the reserve has an increasing rate of deforestation (Mchome, 2001); secondly, its management is challenged by

frequent conflicts between the central government and surrounding villagers (Yonge Nawe Environmental Action Group, 2003). The third reason was its easy accessibility. KFR is located on the Pugu hills 20 km southwest of Dar es Salaam. The reserve lies between latitudes 6° 55' and 7° 02'S and longitude 39° 02' and 39° 04'E covering an area of 3800 hectares. Climate of KFR and the surrounding villages is generally influenced by south and monsoon winds. The area receives annual total rainfall between 1000 mm to 1248 mm which falls within two periods: the short rain period begins in November and ends in December, and the long rain is experienced between January to mid-March (Ndumbaro, 1999). KFR is a catchment area of Msimbazi River that flows to the Indian Ocean. It is also a source of streams and rivers of Dalu, Mzumbwi, Nyebura, Vikongoro, Mzinga, Bulampaka, Nzasa, Mnyundo, Kinyamwezi and Kimwani. There are also two wetlands namely Dalu and Ng'azi in the reserve. Vegetation cover in the forest reserve has been described as Zanzibar-Inhambane Undifferentiated Forest which has a characteristic of ridged, valley slope and valley bottom variation (Ndumbaro, 1999). Ridge tops and steeper slopes support dry evergreen forest while gentler slopes support moist forest stands dominated by *Antiaris toxicaria* and *Dialium holtzii* and transition woodland predominates on the lower slopes grading to wetland species in the valleys (Mung'ong'o *et al.*, 1997).

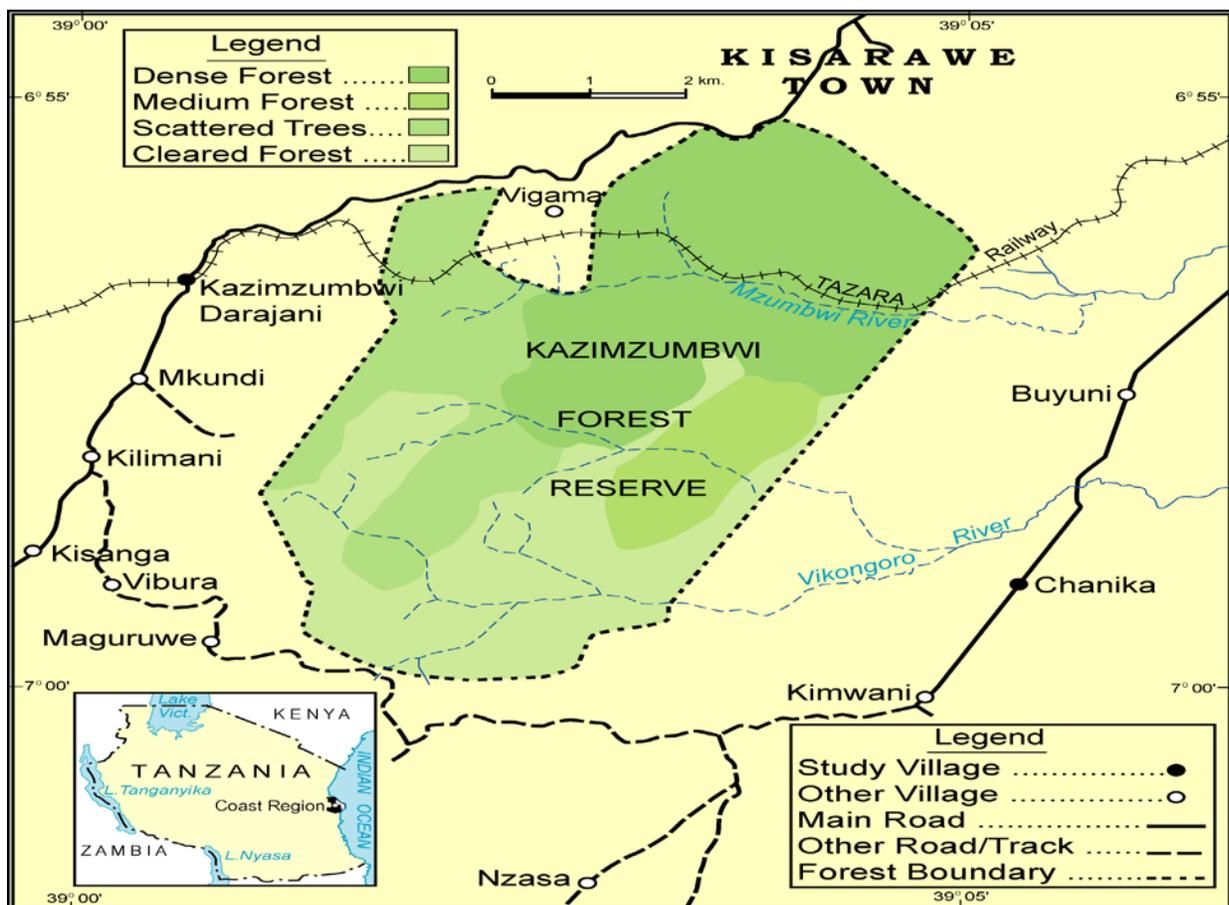


Figure 1: Location of Kazimzumbwi and Chanika villages and KFR

Source: UDSM Geography Department Cartographic Unit

2.2 Sampling Procedures

Both probability and non-probability sampling methods were employed. Probability sampling included simple random sampling to obtain representative of community members from the villages around forest reserve while non probability sampling using purposive sampling method was used to select key informants. Purposeful sampling was done for the selection of head of forestry department , head of water department, head of environmental department, head of agriculture department, head of livestock department, community development officers, environmental conservationists, Non-Governmental Organization (NGOs), village and ward executive officers.

2.3 Data Collection Methods

Primary data were done through questionnaires survey using structured questionnaire, focused group discussion (FGD) by using check list or guide questions and key informants interview by using interview guide. According to Berg, (2009) FGD is the method that provides in-depth qualitative insights gathered from a relatively small group of people concerning behavior, past experience, differences in perceptions, opinions and suggestions. FGD comprises 8-12 of people from both villages around KFR. These are dwellers, farmers/peasants and livestock keepers. This approach was used to provide room for effective interaction of all members and therefore various issues for example the main reasons behind negative perceptions are the increased rate of deforestation, conflicts between local community and government, poor community involvement in forest management and strict regulations that do not allow them to access the forest resources were discussed as well as the way forward. Also, it was used as a triangulation tool for incorporating other information which was collected by other methods. Secondary data were collected through review of various reports, books, journals and other publications related to the study. Data captured through use of survey method were sorted for clarity and then entered into SPSS software (20 versions) for analysis. Moreover, Content Analysis (CA) was used to analyze data collected through FGD and Key Informant interviews. Furthermore, Geographical Information Systems (GIS) was used for land cover detection in KFR and were analyzed based on the interpretation of satellite images. GIS analysis revealed the changing nature of deforestation of the reserve in three periods since 1956 to 2008. The analysis quantified the amount of forest being deforested, regrowth and the remained least disturbed forest cover.

III. RESULTS AND DISCUSSIONS

3.1 Education, household size, housing status, economic activities and land holding of the respondents

Based on level of education, it showed that, more than half (62%) of respondents had not attained formal education whereby Kazimzumbwi had a high rank (Table 1). In Kazimzumbwi, no respondent had attained tertiary education. Education is an important component of the human resource base because it influences

someone’s knowledge of and dependence on the Mother Nature including forest resources. This implies that, less educated people in the study area were much more dependent on the forest resources for their livelihood than their educated counterparts. There is large number of respondents without formal education because they are living along the forest reserve hence they do not give due importance to education. Mngumi et al, (2013) who reported that, the majority have got low education which can be a stumbling block towards utilizing forest resources sustainably.

Table 1: Education Level of the Household Respondents (N = 100)

Education	Villages				Total	
	Kazimzumbwi		Chanika			
	Freq	Percent (%)	Freq	Percent (%)	Freq	%
No Formal education	10	62	46	54	31	31
Primary education	5.9	37	30	35.7	42	42
Secondary education	0.1	1	16	7.1	15	15
Adult education	0	0	1	1.2	1	1
College/university	0	0	1	1.2	1	1
Total	16	100	84	100	100	100

Key: Freq = Frequencies

Regarding the household size, the findings depicted that, most households in Kazimzumbwi and Chanika villages comprised of six to ten family members and few households had more than eleven household members (Table 2). Household size is very important in determining the rate of exploitation of the forest resources. This is due to the fact that, more mouths to feed increase the demand for forest resources and thus encourages encroachment. Families with large numbers of household members positioned themselves to abject poverty as revealed by level of income, land holding and excessive dependency from the forest resources. As supported by Makunga and Misana (2017) who observed that, larger household size resulted to higher need of land for cultivation in order to meet food demand and forest products for generating income. Large family size in the study area is attributed by polygamous marriages which is likely to increase the number of children in the family.

Table 2: Household Size (N = 100)

Family members	Villages				Total	
	Kazimzumbwi		Chanika			
	Freq	%	Freq	%	Freq	%
1-5	6	37.5	31	36.9	37	37
6-10	9	56.2	33	39.3	42	42
11+	1	6.3	20	23.8	21	21
Total	16	100	84	100	100	100

Field observation revealed that, some of the houses in Kazimzumbwi village were built of poles and roofed by grass as supported by Figure 2. Conversely, Chanika village, a peri-urban area located about 20.1 kilometres

from Dar es Salaam City centre, has houses built of bricks and roofed with iron sheets. Housing status is very crucial in assessing the level of livelihood and their relation to Mother Nature. The nature of housing of the population detects the way these people view nature. The nature of houses in Kazimzumbwi particularly in Vibura sub-village reflected the way villagers were dependent upon Mother Nature for poles, grass and thatches. Chanika, on the other hand, a more modernised village, brick-iron sheets houses dominated the area which signifies reduced reliance on the forest resources for construction purposes.



Figure 2: A thatch-roofed house built with small poles and mud reflecting reliance on Mother Nature in Vibura sub-village in Kazimzumbwi village

The majority (87%) of villages around Kazimzumbwi were involved in agricultural activities while the rest (13%) in Chanika were government employees as well as petty traders (Table 3). The kind of crops grown include cassava, sweet potatoes, paddy, cashew nuts, vegetables like cabbages, cucumber, okra and fruits such as mangoes, jack fruits and water melons. This implies that, the community in Kazimzumbwi villages were predominantly engaged in subsistence farming which is heavily affects the forest resources. Also, discussion with key informants revealed that, during the dry season youths engaged in harvesting forest resources within KFR for charcoal and poles as a substitute to agricultural activities. As revealed by Kahyarara et al, (2002) who pointed out that, communities living closer to KFR are affected by poverty and limited sources of income hence the involvement with forest products is the simplest way to generate income.

Table 3: Occupation of respondents

Economic activities	Villages				Total	
	Kazimzumbwi		Chanika		Freq	%
	Freq	%	Freq	%		
Agriculture	14	87.5	51	60.7	65	65
Petty trading			5	6	5	5
Wage employment			9	10.7	9	9
Petty trading and agriculture	2	12.5	18	21.4	20	20
Non income generating activity			1	1.2	1	1
Total	16	100	84	100	100	100

Field observations and discussion with key informants revealed that, farming activities are encroaching to the KFR (Figure 3); contributing to the degradation of forest resources hence threatened the sustainability of forest

resources in Kazimzumbwi. As supported by Mdem et al, (2012 in Mulungu 2007) who portrayed that, illegal activities carried out by human beings in the forest reserve like logging, charcoal burning, farming, cutting of trees for construction purposes and gravel quarrying resulted to degradation of the forest.



Figure 3: Picture showing Cassava farming closure to KFR

Based on land holding, field observation found out that, most of respondents in both villages owned farms ranging from 3 to 4 acres. About 25% of respondents in Kazimzumbwi village held farms greater than seven acres by size while none of the respondents in Chanika owned a farm more than seven acres as depicted (Table 4). Farm sizes of respondents have implications both on the utilization of land for different uses and the impact on the forest reserve. Also, during FGD, Nzasa respondents disclosed that villagers especially who live closure to KFR and who owned small portions of land, and had large families, tend to cultivate crops by crossing the forest reserve border so as to increase food production for their livelihoods. Furthermore, the interview with the executive village officer at Nzasa revealed that, Chanika experienced competition over land due to its location near Dar es Salaam City. This was contributed by transformation from peri-urban and rural lands to the urban fabric. The competition over land does not concur with the conservation objectives of the reserve. As supported by Mulungu (2007) who revealed that, those who have owned 1 and 2 acres are regarded as poor while those who have owned more than 4 acres are considered as well-off families and these are people who moved from Dar es Salaam or still conduct their activities from Dar Salaam City.

Table 4: Land Holding of the Household Respondents in Two Villages (N = 100)

Size of a farm (acre)	Villages				Total	
	Kazimzumbwi		Chanika			
	Freq	%	Freq	%	Freq	%
None			15	17.9	15	15
1-2	1	6.2	25	29.8	26	30.6
3-4	6	37.5	33	39.2	39	45.9
5-6	5	31.3	11	13.1	16	18.8
7+	4	25			4	4.7
Total	16	100	69	100	100	100

3.2 Effects of KFR degradation

Field observation and during FGDs, it was revealed that, deforestation of KFR has resulted to degradation of the forest ecosystem and consequently has exacerbated poverty among the residents surrounding the reserve. The majority of respondents were able to identify the effects of deforestation including variation of rainfall pattern in terms of quantity and season, food insecurity and floods as narrated in Box 1. Also, Lupala et al,

(2014) observed that, the degradation of forest reserve resulted to the vanishing of honey, waxy, mushrooms as well as the drying of river sources due to anthropogenic activities.

Currently we are facing floods in my homestead during rainy seasons. My homestead is often covered by rainwater; we cannot walk out of the house until flood recedes. That situation was rarely seen in the 1980s when I settled in the area (village).

Box 1: Narration of a woman respondent during FGD in Kimwani sub-village at Chanika village.

3.4 Residence Time of the Respondents

A substantial number of respondents (75%) had been in their villages for more than twenty years and none of the respondents had been at Kazimzumbwi village for less than ten years (Table 5). Chanika experienced in-migrants comprising of 14.3% of all respondents in Nzasa and Kimwani sub-villages of Chanika village. Residence time was fundamental in assessing the perceptions of local people on conservation and management initiatives of forest resources. The longer the residence time the more people get used to the importance of the forest resources. Despite the existence of forest regulations, people who had longer interaction with the resource tend to struggle to access the forest resources because of the hidden value of the resource on which their livelihood is dependent upon. In-migrants (14.3 %) in Chanika village based on urban-rural migration were poorly informed of the hidden value of the forests to the surrounding environment. These findings are in line with Mdemu, et al.; (2012) who observed that, population increase due to the growth in per-urban areas have created pressure on natural resources especially in KFR as almost the communities surrounding it are overdependence for the last twenty years and they still depend on it.

Table 5: Respondents’ Residence Time in the Study Area

Residence time (years)	Villages				Total	
	Kazimzumbwi		Chanika			
	Freq	%	Freq	%	Freq	%
Less than 10	0	0	12	14.3	12	12
6-10	4	25	36	42.9	40	40
20+	12	75	36	42.9	48	48
Total	16	100	84	100	100	100

3.5 Community Awareness of the Forest Resources within KFR

Results (Table 6) showed that, majority (87%) of all respondents interviewed acknowledged the existence of the KFR with the identification of tree species like *Brachystegia microstachys*, *Pterocarpus angolensis*, khaya antothica, ruber, cassia, eucalyptus, pine, shrubs and grasses including elephant grass; wild animals included wild pigs, monkeys and baboons; there were also insects and a stream/river (Mzumbwi River the only permanent river that has remained in the reserve). However, 13% did not recognize or disregard the existence of the reserve. This implies that, although they lived with forest resources, did not know or neglect if the resources were protected. The large percent of the respondents in Kazimzumbwi Village recognized the

existence of the reserve mainly due to the fact that, the village was located in remote areas close to KFR with less influence of urban culture unlike semi-urban Chanika village which is located near Dar es Salaam City. As supported by Mngumi et al.; (2013) who portrayed that, the communities around KFR have taken it as the backbone for their livelihoods.

Table 6: Natural Forest Resources Found within KFR*

Natural Resources	Freq	(%)
Vegetations	87	46.8
Streams/rivers	3	17.2
Wild animals	33	17.7
Insects	34	18.3
Total	186	100

*Multiple responses

3.6 Local community participation in the Management of KFR

The aim here is to identify if the communities were fully involved in the conservation of KFR. It showed that, a vast number (89.5%) of respondents interviewed reported that they were not involved in the conservation and management while the rest (9.5%) accepted that, they were involved in the management as indicated in Figure 4. During FGD, it was revealed that, forest education was only provided to the few forest committee members and it had been undertaken in previous years when the Wildlife Conservation Society of Tanzania (WCST) sponsored by Care International Organization was working in the study area. At the time of study, there was no active participation of local community. This indicated that local people who were also part of forest ecosystem were denied their rights to care their Mother Nature from where their livelihood accrued. These findings are in line with Shabani (2009) who pointed out that, there is poorly participation of the communities surrounding KFR in the management of the reserve due to the failure of the management approach (top-down approach) which does not allow fully involvement of the communities.

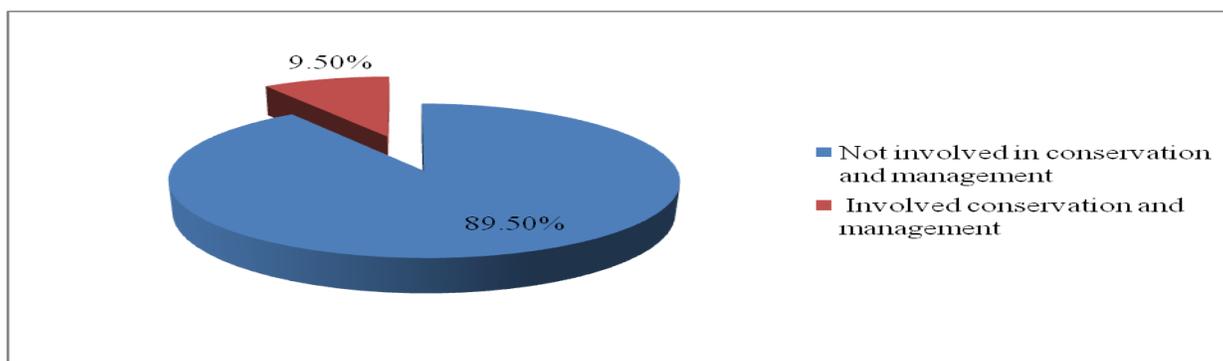


Figure 4: Local community participation in the Management of KFR

3.7 Types of participation to small number of the community

Based on community participation as indicated (Figure 4), it showed that, a small number of respondents (9.5%) who were involved in conservation and management reported that, they participate only in tree planting (52.8 %) and education and training (41.2%). During FGD, the chairman of Forest Management Committee in Kazimzumbwi village revealed that, they occasionally planted trees especially on 1st January (National Tree Planting Day). This, however, was not observed every year, as reported by Nzasa Village Executive Officer, none of the respondents in their area participated in the action in this year (2018). Also, it was observed that, none of the respondents were involved in decision making and planning concerning the issue of forest resources conservation and management. This kind of management generally suggested that, there was no active involvement of the local community in the management of KFR. As supported by Shabani (2009) who revealed that, there is poorly participation of the communities surrounding KFR in the management of the reserve due to the failure of the management approach (top-down approach) which does not allow fully involvement of the communities.

3.8 Communities awareness of Forest Regulations Guiding Management of KFR

With regard to forest regulations or laws guiding the use and management of KFR, the study (Figure 5) revealed that, 97.3% of respondents were aware of the existence of forest laws while only few respondents (2.7%) seemed unaware. This implies that, minority (2.7%) of respondents were freely accessing the forest resources. About 97.3% of respondents who approved the existence of the forest laws mentioned that, they were not allowed to access the forest resources within the KFR as expressed by 50% of all responses. It was also prohibited to undertake any kind of human activities within the reserve (40%) including agriculture, settlement, charcoal making and lumbering as well as they were not allowed to set fire within the reserve (10%). During FGD, it was revealed that, most of the respondents used to acquire information from their fellows, the media, NGOs previously working in the study area, and also from various meetings conducted by the government officials especially during the conflict periods. This implies that, forest officials were not actively engaging in disseminating information concerning forest laws to the local people. There were also no specific laws for managing KFR; they only used the Forest Act of 2002 in managing the reserve. Despite using it, there were no sufficient copies available at the district forest offices or at village level. Harsh laws and regulations practiced during colonial rule for management of forest reserves were inherited by the independent states which prohibited illegal utilization of these natural resources (IIED, 1994). The use of similar harsh laws and regulations accompanied with brutality to protect forest reserves from encroachment and poaching has created hatred behaviour from the indigenous people against the forest resources (Pimbert and Pretty, 1995).

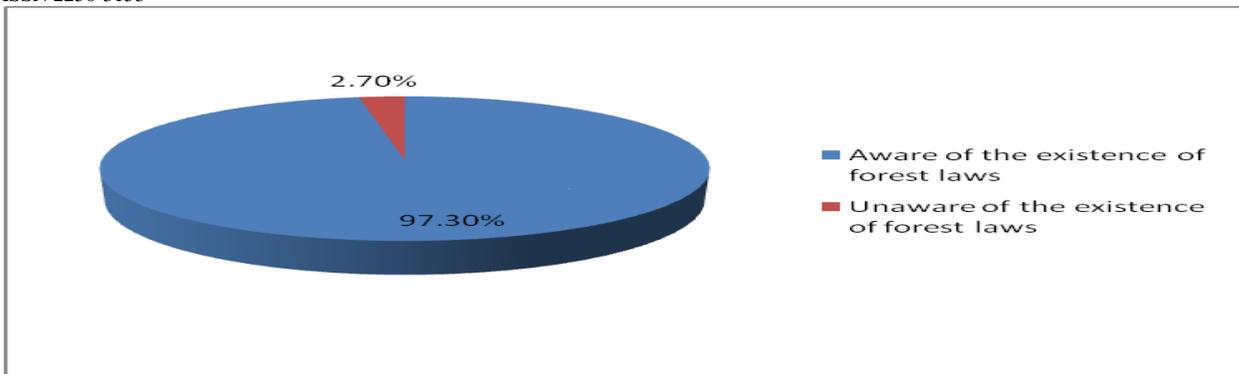


Figure 5: Communities awareness of Forest Regulations Guiding Management of KFR

3.9 Ineffectiveness of the Existing Forest Management Regime

Results (Table 7) showed that, a significant proportion (97.7%) of respondents revealed that, the forest management approach was not performing well while 2.3% of respondents on the other hand pointed out that it was doing well. During FGD, it was revealed that, the forest cover had been reduced in size over time since 2006. Also, discussion with some key informants revealed that, deforestation and degradation of forest resources due to farming, settlement, firewood, charcoal making and poles especially to areas closure to the communities. This implies that, there is a need to strengthen patrol activities to prevent destructives human activities within the reserve. These findings concurred with Mdem (2016) who observed that, KFR has declined its forest cover between 1980 and 1995 by 11.9% as well as 41.3% in 1995 and 2010.

Table 7: Reasons for Poor Performance of Existing Forest Management Approach

Indicators of poor performance	Freq	%
High rate of deforestation	83	29.3
Lack of local people participation	78	27.6
Conflicts	67	23.7
Strict laws	55	19.4
Total	283	100

***Multiple responses**

Field observation (Figures 6 and 7) witness clearance of forest areas was undertaken near Chanika village where there was an influence of urban-rural migration.



Figure 6: Deforestation and hence degradation of KFR near Chanika village reflected by the dominance of Guatemala grasses at the foreground.



Figure 7: Part of KFR being deforested due to charcoal making and poles cutting in Kazimzumbwi village being dominated by shrubs and stunted trees.

Apart from that, it revealed, that, the community was dissatisfied with the regime due to the persistence of deforestation and degradation (Box 2); the use of strict laws in managing the KFR that exclude local people from accessing the forest resources within the KFR; poor participation of local people; and conflicts between the government and local community surrounding the KFR as reasons behind their position.

During the 1970s the forest (KFR) was covered by numerous forest tree species including Pterocarpus angolensis and Brachystegia microstachys. In those times, even wild animals were abundant including Mbega the endemic specie to this reserve which could not be found in other areas. There were also plenty of streams and rivers flowing from the reserve through our village to Pugu Forest Reserve. Currently however, the reserve is a mere bare with tree), it is under bad condition and if no appropriate measures are undertaken to effectively manage the reserve, I do not know what will be status of the forest in five years later.

Box 2: Narration from one of the respondents in Kazimzumbwi village during FGD

Moreover, during FGD, the Chairman of WAHIPUKA at Kimwani sub-village in Chanika village complained that, the forest officials were responsible for the increasing rate of deforestation within the reserve. They rarely visited the reserve and there was no effective monitoring of the reserve surrounded by five villages namely Kazimzumbwi, Chanika, Maguruwe, Vigama and Kisarawe. Discussion from FGDs also revealed that, some forest officers were alleged to collect kickbacks (bribes) to people who participated in illegal activities within the reserve and some of them did collude with business people to illegally harvest forest resources and make charcoal within the reserve (Box 3). Furthermore, an interview with natural resources management officers, it was disclosed a weak cooperation in the management of the reserve, as the reserve is surrounded by two districts namely the Kisarawe and Ilala, but all the management is based only at Kisarawe. Due to this weakness the reserve has been reduced in its coverage. These findings coincide with WSCT (1999) which pointed out that, the pseudo-devolution of power gives Kisarawe district a mandate to conserve the reserves on behalf of the central government though it occupies two districts.

When we want to patrol within the reserve we have first to inform the forest staff at Kisarawe district, the forest officers secretly inform their people who carry out illegal activities in the reserve. When we go to the reserve we find nobody doing illegal activities. Sometimes, we can arrest their tools and then hand over to the district forest office; they tend to sell those tools without our knowledge. Those actions do facilitate the illegal activities within the reserve and eventually deforestation increases at a great rate.

Box 3: A complaint by one member of the Forest Management Committee during the FGD at Kazimzumbwi village

Field observation witnessed the least disturbed forest cover by human activities in the western part of KFR near Kisarawe district offices (Figure 8). FGD in Kazimzumbwi village pointed out that, the maintenance of least disturbed forest canopy being dominated by *Brachystegia microstachy*) species was due to reduced illegal harvest of trees, reduced fire occurrences as a result of being close to the Natural Resources offices at Kisarawe district.



Figure 8: Least disturbed forest cover in the western part of KFR near Kisarawe district offices. Note *Brachystegia microstachy* species dominate the forest cover.

GIS analysis revealed the changing nature of deforestation of the reserve in three periods since 1956 to 2008. The analysis quantified the amount of forest being deforested, regrowth and the remained least disturbed forest cover. Between 1956 and 1981 GIS analysis revealed that, about 915 hectares out of 3800 ha of the forest were deforested (Figure 9). According to Kisarawe district forest officer, the reserve faced human pressures as a result of villagilization policy adopted in early 1970s. During this period the reserve experienced severe deforestation because of resettlement of people into villages particularly at Chanika and Vigama villages. The officer explained further that, the situation was contrary to the one observed during the period after 1954 (time of gazettement of the reserve) when British colonial government prohibited all human activities to be undertaken in the reserve. The prohibition was accompanied by strict colonial laws which helped to maintain the protected forest into its original state.

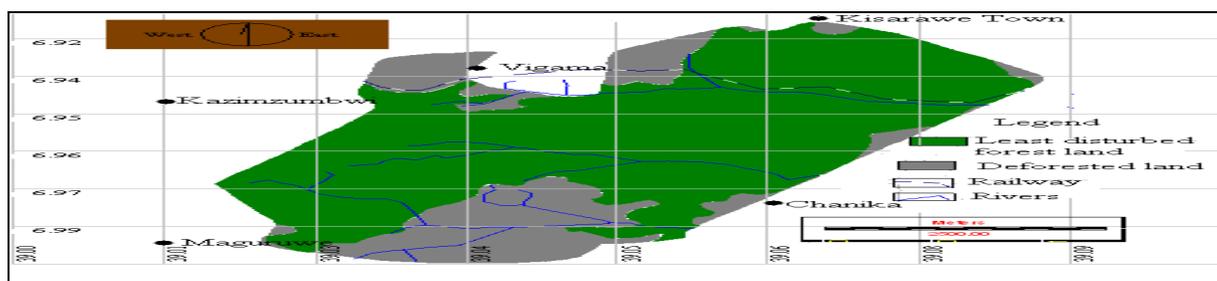


Figure 9: Change in forest cover between 1956 and 1981

The analysis between 1981 and 1996 showed that, about 790ha of forest were deforested and 362ha regrew (Figure 10). Kisarawe district forest officer revealed that, the restoration of the forest cover was due to the operation of the WCST in 1991. The NGO employed eight forest guards that greatly helped to reduce the level of illegal activities in the reserve through arresting illegal loggers and charcoal burners. WCST was also used to

raise awareness on the importance of forest resources to the communities. As a result, pressures and threats including illegal timber harvest, pole cutting and encroachment for farming greatly reduced to the level that put more promises of the improvement of the reserve. In response to the efforts of the NGO, local people planted trees around their residential areas, schools, and farm areas. This aimed at reducing pressure on the future of forest-based resources. However, following the liberalisation of the Tanzanian economy in early 1990s where the private sector was allowed to engage in trade, the conservation initiative failed to achieve its goals. This led to a new deforestation of the reserve. During FGD in Nzasa sub-village, villagers reported the actions of the business people to be involved in the illegal harvest of the forest resources (Box 4).

During the early 1990s, business people with their tracks carrying tonnes of poles, used to pass our village during the night hours for the fear of being arrested by the forest officers and policemen. At that time also, illegal harvest of the forest resources were openly undertaken in the reserve. This was fuelled by corruption that operated in that time.

Box 4: A respondent at Chanika village explaining the impact of traders on the KFR

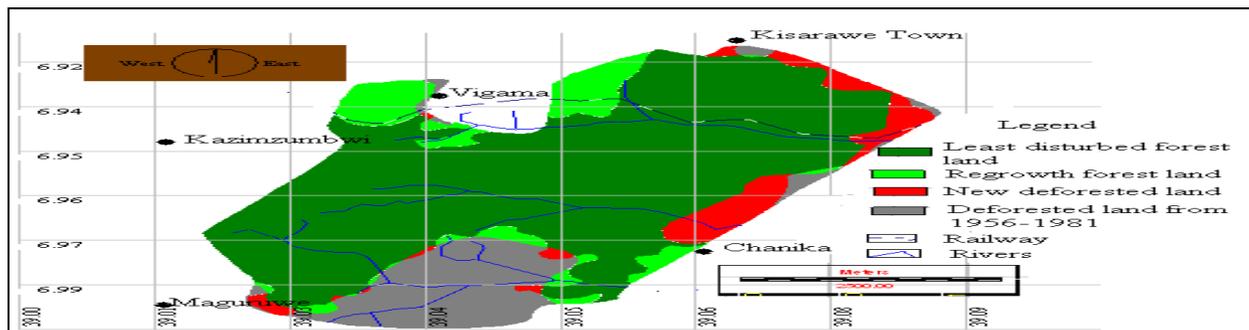


Figure 10: Change in forest cover between 1981 and 1996

Findings of the GIS analysis tool depicted that, between 1996 and 2008, the reserve faced severe deforestation of about 1446ha with a minor regrowth of 160ha (Figure 11). According to Kisarawe district forest officer, the high level of deforestation was due to increased urban-rural migration resulting to the rapid expansion of Dar es Salaam City in the turn of the century as some indigenous people tend to sell some portions of land with the reserve to the city residents. The expansion also is reported to have also caused high demand for charcoal, poles and timber. This situation was an obstacle to the achievement of the conservation goals. The causes of deforestation were also reported by the villagers in both villages. They reported that, corruption among dishonest officers, poor involvement of local people in the management and poverty were the major causes of deforestation. According to these respondents, these causes were more pronounced after the phase out of WCST in 2005.

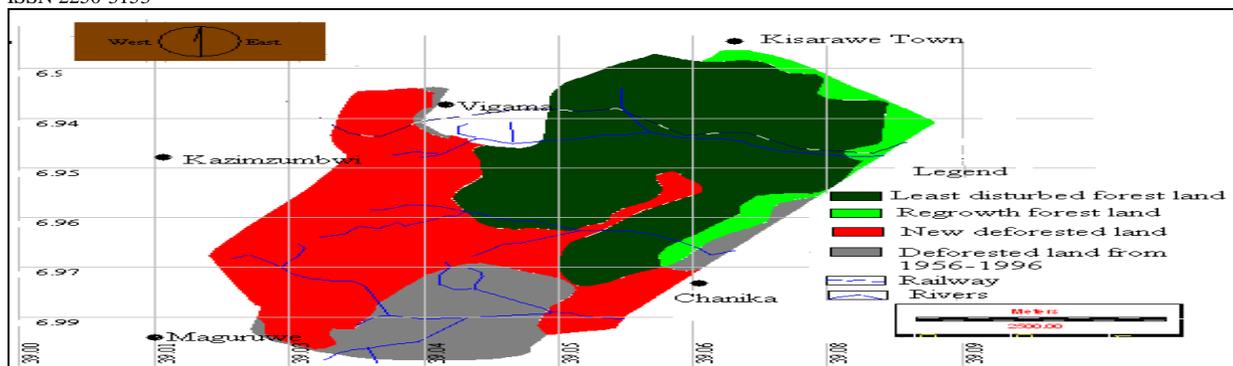


Figure 11: Change in forest cover between 1996 and 2008

3.10 Factors influencing low Perceptions of Local Community’s towards KFR

The findings showed that, the majority of respondents were not satisfied with the way the government conserved and managed the KFR; hence they held negative perceptions toward the existing forest resources management regime (Figure 12). The reasons behind the dissatisfaction with the regime were the increasing rate of deforestation (31% of responses), lack of improvement of local people’s livelihood (29%) persistent conflicts (26%) and lack of community participation (14%). As supported by Mchome (2001) who observed the persistence of conflicts between the central government and the local communities residing in the study area as sign of dissatisfaction of the regime which resulted to the filling of a case by the local communities to the court due to change of border.

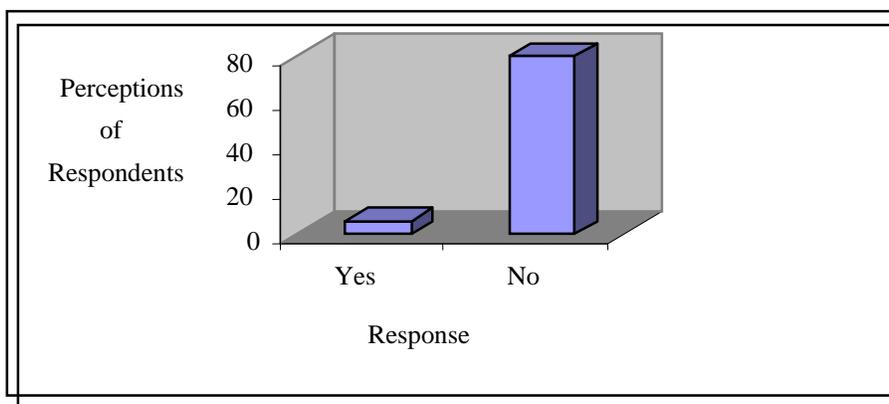


Figure 12: Response on the satisfaction of the existing forest management regime

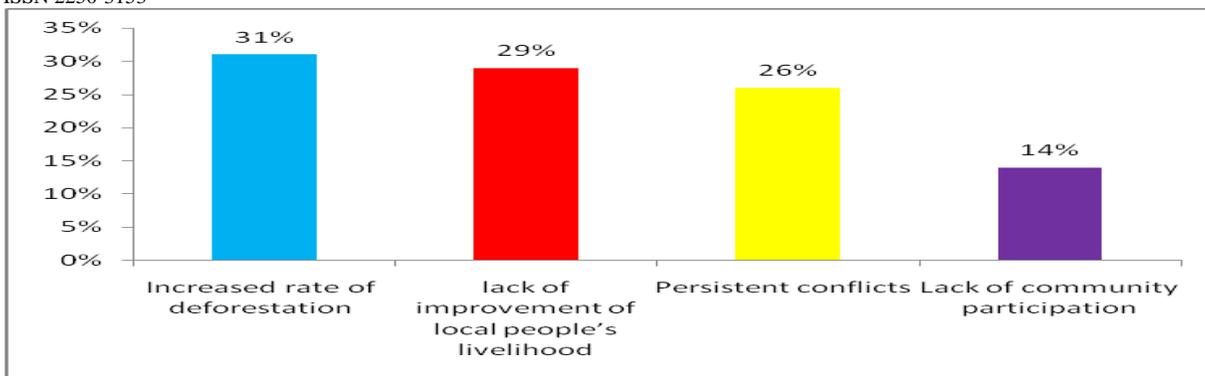


Figure 13: Reasons behind the dissatisfaction with the regime

3.11 Ways for Ensuring Sustainable Management of Kazimzumbwi Forest Ecosystem and Improved People's Wellbeing

3.11.1 Harmonising Environmental and Human Factors

The majority (69.8%) of respondents proposed Active Joint Forest Management (AJFM), the other 25.6% of respondents were excited to witness the reserve being privately managed while 2.3% recommended retaining the centralised forest management regime (Figure 14). During FGD at Kazimzumbwi, it was revealed the intention of local people to change the management system from centralised to AJFM approach in which the local community would also benefit from the management of the reserve. AJFM entails collaboration between local people, forest management, Community Based Organizations (CBOS)/NGOs and central government in managing KFR. Also, the supporters of AJFM were able to indicate the strategies to be incorporated in the management of the reserve which included participation (16.9%). According to the findings, participation of local people meant the active involvement of inhabitants in the conservation and management of KFR that would help to empower people in terms of knowledge and income. In addition to that, the training and education were also suggested that consisted of 16.4% of responses. Education concerning wise forest management was preferred by local people in order to ensure sustainable forest ecosystem featured with improved people's livelihood. Other suggestions were active forest management committee (9.2%), active forest management CBOs/NGOs (8.3%), alternative income generating activities (11.1%), development of socio-economic infrastructure (8.6%), government support (9.7%), conflict resolution (8.1%) and clear buffer zone establishment (11.7%).

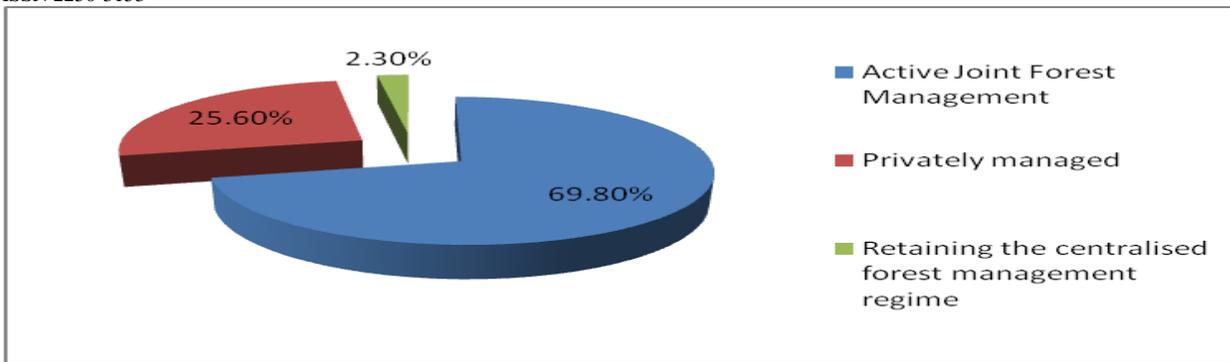


Figure 14: Communities suggestions for better KFR conservation

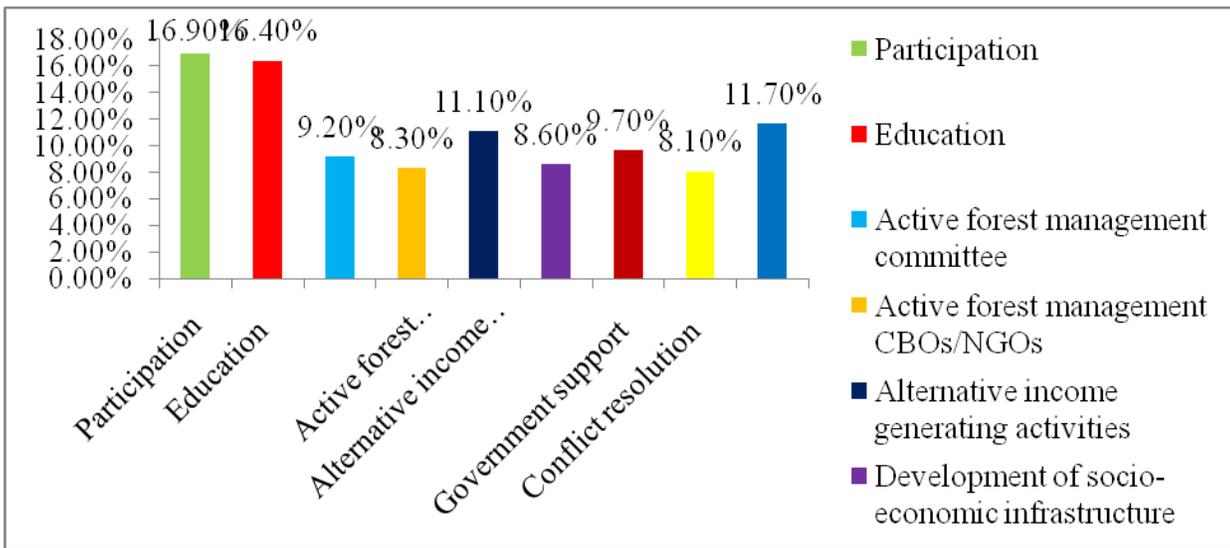


Figure 15: Additional communities' suggestions for better KFR conservation

Field observation and during FGD, it was observed that, all these responses signify an aspiration of the community to participate in the conservation and management of KFR due to the realization of the significance of the KFR to the surrounding communities as justified by one the respondent (Box 5).

It is better to conserve forest resources since conservation will bring more rain, reduce soil erosion, increase fresh air in our village and increase food. But to ensure sustainability of these resources, local people should be the guards and managers of the reserve in their respective areas. Hence, ineffective forest management should be discarded and another management approach that cares for local people and the forest simultaneously should be developed.

Box 5: Narration of a female respondent during FGD in Kazimzumbwi village.

3.11.2 Other suggestions based towards better Management of KFR

Field observation and during FGD with the villagers in Kazimzumbwi and Chanika villages, it was insisted that local people should be allowed to have a direct extraction of some species of the forest resources within KFR, but only at a reasonable amount which did not endanger the survival of the forest ecosystem while at the same time helping to satisfy their daily needs. Villagers continued to insist that, extraction of forest species should be

identified and there should be a replacement for the species harvested. Furthermore, villagers in Kazimzumbwi village contended that, they were facing a shortage of forest resources in the public forest land that had resulted to mounting pressures on protected forests, hence allowing them to access the resource base would help to meet their basic needs.

IV. Conclusion

Based on the findings, it can be concluded that local people are key and important stakeholders for effective and sound management of the forest resources. Hence, it is necessary to understand and integrate their perceptions of forest management in conservation of the forest resources so as to strike a balance between ecological objectives and societal goals.

Also, it was found out that, the majority of local community surrounding KFR had a low education level or had not attained the formal education. Almost all the households (87%) engaged in agricultural activities as their backbone of the economy. It is, therefore, evident that, given their poor socio-economic conditions, the local community lacking a forest management plan was mostly dependent on the Mother Nature for their survival and hence a threat to the forest resources.

Noting that, the majority of the respondents had negative perceptions on the regime, it would be safely stated that local community did not abide to the strict forest regulations a feature which signals future sporadic violent conflicts at national dimensions.

It is also pertinent to be stated here that, local community's perceptions of the forest management regime were greatly influenced by poverty and a poor and undemocratic political system in the management of KFR. It may be asserted that, active involvement of local people including provision of education and economic benefits, and participation in decision making in the conservation of forest resources is very crucial for them to feel that they are part and parcel of the management of the forest ecosystem.

Furthermore, it was observed that poor involvement of the communities and citizen groups like CBOs and NGOs prohibits public support in conservation and management of forest resources because they act as a platform where various aspects are channelled from the government to the local community. It is worth stating that, for effective community involvement, the role of CBOs and NGOs in changing local people's mindsets in conservation issues is of prime importance.

Given that the 2002 Tanzania Forest Act particularly in national forest reserves is more restrictive and discriminatory with respect to local communities, it may be concluded that such type of forest regulations increase poverty amongst forest dwellers and in turn exacerbates deforestation of the resource base.

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Improving Traditional Somali Justice Based Conflict Resolution Mechanisms in Garissa County, Kenya

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Abstract- The Traditional Somali Justice Based Conflict Resolution Mechanisms have been an important aspect of peace building processes among members of the Somali community of northern Kenya. Based on this systems of alternative dispute resolution mechanisms members of this community have lived together in harmony for a long time. However, modernity the system has faced a variety of challenges hence calls for improving the system. This study therefore is aimed at improving effectiveness TSJBCM to make more effective. The study was conducted in Dujis constituency in Garissa County where the respondents were mainly ethnic Somalis. The results of the study reveal that the system can be strengthened if among other things there is structured cooperation with formal government conflict transformation mechanism, training TSJBCM practitioners in some conflict areas and defining specific areas of competence for TSJBCM and formal conflict transformation actors.

Index Terms- Justice, Conflict resolution, Traditional Somali Justice

I. INTRODUCTION

Colonial regimes discouraged the use of traditional conflict resolutions techniques and instead advocated for the establishment of Court systems similar to those operating in the colonizing states (Agatha,2016). Many post-independent African regimes continue to use judicial systems inherited from the colonizers. Unfortunately, many countries largely ignore traditional justice based mechanisms (Oko *et al.*, 2010). As Pkalya *et.al* (2004) contend, independent African states continue to perpetuate the colonial mentality that viewed local conflict resolution mechanisms as archaic, barbaric and thus lack a place in the modern global village. As a result, the governments fail to appreciate, collaborate, and complement the traditional methods of resolving Conflicts (HRW, 2008).

Article 159 (1) (c) of the Constitution of Kenya provides for the promotion of alternative dispute resolution (ADR) mechanisms like reconciliation, mediation and arbitration (CoK, 2010). The recognition of the mechanism by the supreme law of Kenya is a big boost for TSJBCM, a traditional Somali justice based mechanism that has been the sole recourse to justice for the Somali community resident in the Northeastern Counties of Kenya. Although the Constitution has recognized ADR, its processes remain undocumented and it operates outside Kenyan Judicial system. Thus in North Eastern and other places where traditional justice based mechanisms are prevalent; they operate

parallel with the formal judicial processes (Alie, 2008). Consequently, traditional justice based mechanisms remain at the periphery of official dispute resolution mechanisms and lack resources to develop them and minimizes their potential to complement the government's conflict resolution functions.

II. THEORETICAL FRAMEWORK

The study was guided by the restorative theory of punishment. In the recent past, scholars, activists and peace practitioners have questioned the efficacy of formal judicial systems as represented by the courts in transforming conflicts. Discontent with courts has arisen with increasing cases of 'miscarriage of justice', the inability of retributive justice to deal with mass atrocities like genocide and the incompatibility of retributive justice with traditional or alternative mechanism for justice. Consequently, there is a move to adopt a different approach, thus the emergence of restorative justice embodied in the restorative theory of punishment (Maigua,2012). The theory is more inclusive and places the victim of crime at the core of punishing the offender as opposed to the retributive system where the state is the complainant on behalf of the victim and the latter takes unilateral decisions affecting the offender on behalf of the victim. Restorative theory attempts to make a cohesive process more consensual, transparent, constructive and communicative (Dzur, 2003).

III. METHODOLOGY

The study used Dujis constituency as the case study and adopted descriptive statistics approach in collecting data from different households within the area. The strength of case study lies in its ability to collect both quantitative and qualitative data and covers a very limited geographical region or number of respondents who provide the required detailed and representative data (Zainal, 2007). By using, a descriptive case study technique, an accurate profile of persons, events, or account of characteristics, for instance behavior, opinions, and knowledge of particular individual, situation or group are captured (Kothari, 2009). The study area was Garissa Township Sub-County, Garissa County. It is one of the six Sub-Counties in Garissa County. The study involved surveys of the existing indigenous conflict resolution mechanisms, conduct interviews with *xeer* elders, administrators, police officers, judicial officers men and women. The researcher also held plenary

discussions within the study community. The experiences from various respondents provided divergent perspectives thus played a significant and leading role in the fulfillment of the study. Data was collected through questionnaires, interviews and Focus Group Discussions. Data analysis was done through SPSS, qualitative data was transcribed and analyses through thematic techniques. Data was presented in form of graphs, charts narrative and narrative reports.

IV. STUDY FINDINGS AND DISCUSSIONS

4.1 Government Officers Support to Improving workings of TSJBCM (police, administrators and judicial officers)

The study sought to establish whether or not, the government officials including administrators, Police officers and Judicial officers supported the work of the TSJBCM. The Results were as indicated in Figure 4.1

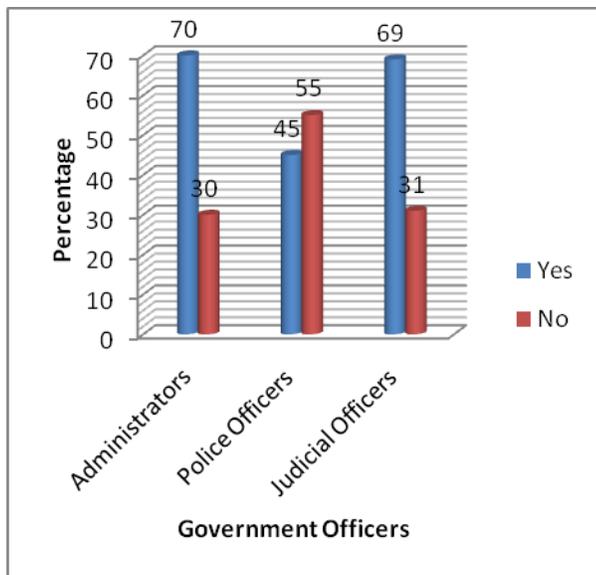


Figure 4.1 Whether or not the TSJBCM Workings should be Improved

Source: Field Data

The results in figure 4.1 revealed that 70% of administrators, 45% of police officers and 69% of Judicial officers were in support of improving the work of the TSJBCM. In this regard therefore, it was evident that the TSJBCM had support of various government institutions that were responsible for peace building in the study area.

Administrators generally agreed that TSJBCM are vital avenues of dealing with conflict among the Somali in Garissa County. That granted, data showed that administrators would rather there was a structured manner in which TSJBCM practitioners and administrators would work together. That will define clear areas of cooperation and thus facilitate maximization of skills and expertise by both sides. Where the need may arise, administrators advocate for joint determination of disputes with TSJBCM practitioners. A local chief noted that he has designed a

way in which he uses the expertise of TSJBCM practitioners in handling conflict that arise in his area of jurisdiction. He averred: *I always use elders to help me determine cases that are brought to me. Their involvement is very important because if one of the parties fails to honor whatever commitments that are imposed during the determination of the conflict, the elders will help in applying pressure on them. I make sure that I use elders who are either related to the parties to a conflict or those who are respected within their communities. Religious leaders are another important group that I use to determine disputes. Our people are God-fearing and take advice from religious leaders very seriously.*

Administrators also vouched for the establishment of a recording system for TSJBCM. That will not only provide future reference points but will also minimize inconsistent decisions and create predictability, a very important consideration for conflict transformation. This view is rendered valuable by observations of an Assistant County Commissioner (ACC) working in the research area.

I wish to point out that there are many good things with maslaa. For one, many petty disputes are handled by elders and by and large community members abide by the rulings. The challenge especially for us administrators is to get to know these strengths. Since most of us expect disputes to be handled by trained officers or judicial personnel, when one works among the Somali, it requires a bit of time to get used to how things are done. This challenge is compounded by the fact that maslaa decisions are never recorded and are mostly presided over by old and illiterate people. It would make our work easier if these proceedings were recorded and made available to administrators. Otherwise good aspects of the maslaa system will only be known among practitioners themselves or locals at large and administrators will have to cultivate some patience before appreciating the true value of maslaa.

Equally administrators felt that TSJBCM practitioners are insufficiently equipped with the skills and knowledge to embrace emerging governance and conflict transformation good practices like gender mainstreaming and integrating the dangers of the HIV/AIDS work in conflict transformation work. They decried the fact that TSJBCM were primarily controlled by adult males although females had been incorporated in the recent past. Below is an extract from an interview conducted with a serving Deputy County Commissioner (DCC)

The government is very concerned with the manner in which traditional Somali conflict mechanisms handle serious offences. For instance, the law is very punitive when dealing with sexual offences with penalties ranging from ten years in prison or even a life sentence. Yet, local elders casually treat sexual offences. Their standard approach is to impose some penalties that are paid by the clan of the accused and the matter is settled there. What they do not seem to appreciate is the fact that contemporary sexual offenses have attendant and emerging dangers. Would you for instance appease a rape victim by fining their attacker who has infected them with HIV/AIDS which is a long term illness that almost always leads to death? Unless such matters are brought to the attention of traditional conflict handlers with the view of changing their attitude towards sexual violence, the vice would continue and many victims will suffer.

Another important concern raised by administrators was the treatment of individual acts that cause harm as clan offences. They felt that whereas certain offences like land disputes and disputes over watering points can be viewed and resolved at the communal level, some wrongs like sexual violence have a severe and direct impact on individual victims and thus cannot be handled as communal wrongs. They noted that sexual violence related trauma affects the entire lifetime of victims and clan restorative tendencies often ignore the victim who has to individually cope with the resultant effects of sexual violence. Administrators noted therefore that such crimes ought to be treated with caution and one way of achieving that would be to equip TSJBCM practitioners with counseling skills or facilitating victims who have resolved their differences through TSJBCM to access government counseling services.

Police officers were generally dismissive of the role of TSJBCM in conflict transformation mechanisms. They perceived the mechanism as an irritant to law enforcement. The police who participated in the study felt that efforts must be commenced to ensure that traditional conflict practitioners are stopped from unduly interfering with legal processes.

Although the police felt that arresting non cooperating parties to a dispute as a way of ensuring that they cooperate with TSJBCM processes was not a prudent way that the former can enhance the work of the latter, a reasonable balance between what level of cooperation by the two systems would help mitigate the level of mistrust, especially held by the police towards TSJBCM. When asked how the police would help traditional justice practitioners to improve their work a raft of recommendations were given as demonstrated in figure 4.2. The most notable way that would be achieved was aiding in investigations and effecting arrests. As noted earlier police officers were apprehensive of arresting offenders reported by traditional justice operators because they felt that they were being used to serve the interests of TSJBCM which were not necessarily the interests of justice.

Judicial officers averred that TSJBCM lack competence to deal with serious crimes that if adjudicated through the courts will attract a custodial sentence. They also felt that complex civil matters that require specific technical skills are beyond the realm of TSJBCM practitioners. Hence, judicial officers advocated for the practitioners to limit their conflict adjudication practices to petty community offences and leave the others to the courts as the latter possess the requisite competencies.

The resident magistrate in Garissa pointed out that the Judiciary was in the process of rolling out reforms in the sector to strengthen the role of alternative dispute resolution. This she reiterated will go a long way in streamlining the role of traditional conflict handlers in the wider justice system. This development has been attested by a series of reforms that were being undertaken by the judiciary in ensuring that there was wider access to legal redress by inculcating local wisdom in conflict transformation which was advocated for in the work of Doak (2015) where it was revealed that reforms in the judiciary are a crucial element of a smooth judicial process.

The introduction of Court annexed mediators and the deployment of senior judicial officers within the area that these have been introduced demonstrates the importance that the Judiciary is attaching to local wisdom in conflict transformation.

That is one of the steps that the Judiciary is taking to bring effect to Article 159 of the Constitution that advocates for the recognition and use of alternative and traditional dispute resolution mechanisms. Indeed the Courts have been persuaded by this transformative trend adopted by the Judiciary as was witnessed in the case of Mohamed Adow. In that case the Court dropped a case against the accused that had killed after having submissions from the prosecution pleading for the termination of the case since parties had been subjected to a traditional mechanism and agreed to compensate the family of the deceased.

The ruling of the Adow case has been reaffirmed in another High Court Case, the matter of *Republic v Denu Lallafa Omar [2016] eKLR*. In that Denu case just like the Adow case, the High Court in Garissa accepted the request of the prosecution to drop proceedings after the prosecution presented an agreement between the family of the deceased and the family of the accused. The agreement was a commitment of the families to help raise the children of the deceased as well as for the family of the accused with the support of the clan to pay compensation in the form of twenty head of cattle to the family of the deceased.

4.2 Recommendations on Improving TSJBCM from the practitioners

TSJBCM practitioners were of the view that the effectiveness of their work would significantly be improved if the police would share their crime investigation findings with them. They noted that police officers had the skills and equipment to investigate crime and since community members generally accepted TSJBCM decisions, if the latter had the benefit of the skills and equipments of the former, it would contribute towards fair adjudication of conflicts. TSJBCM were asked how best their work would be enhanced, and many felt that they needed some formal recognition in government circles.

As demonstrated in figure 4.2, many traditional justice practitioners felt that their work needed to be recognized in the constitution. That desire may be grounded on ignorance since traditional justice resolution mechanisms have been constitutionally recognized by article 159 of the Constitution of Kenya 2010. Others expressed the desire to work hand in hand with judicial officers whereas others advocated for the training and paying traditional justice practitioners. Further still, others felt that the role of traditional justice elders should be limited to clan and family matters.

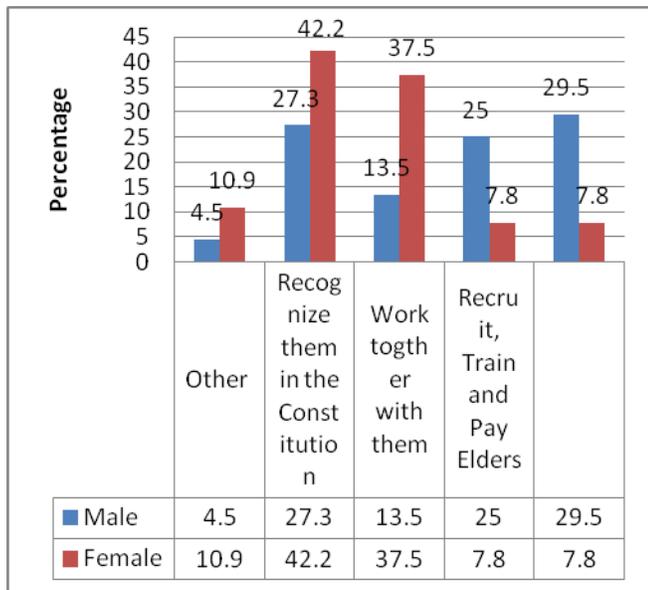


Figure 4.2: Improving TSJBCM in modern legal system
Source: Field Data, 2018

Traditional practitioners also reflected on what they would do as a group to enhance their work. When asked the question what they would do to improve their work, they recommended among other things undergoing training on the Kenya Constitution, peaceful coexistence, conflict resolution and fair justice. That evaluation points to a possibility that some TSJBCM practitioners felt that they needed to do more work in promoting peaceful coexistence among communities. That was an apparent admission that perhaps they were caught with belligerent behavior that compromised their work. Female TSJBCM practitioners on their part alluded to the fact that traditional justice mechanisms remained captive of old biases and practices that needed to be cast away to facilitate the inclusion of modern realities and approaches to conflict transformation.

V. CONCLUSION OF THE STUDY

Traditional Somali justice based conflict resolution mechanisms are an important component of conflict management within the Somali community of Garissa County. Despite that, the system faces certain challenges if addressed will go a long way towards improving its efficacy. As reflected by the analysis of responses given by administrators, police officers, judicial officers, TSJBCM practitioners and ordinary men and women, the system can be strengthened if among other things there is structured cooperation with formal government conflict transformation mechanism, training TSJBCM practitioners in some conflict areas and defining specific areas of competence for TSJBCM and formal conflict transformation actors.

VI. RECOMMENDATION OF THE STUDY

The study recommends Inclusion of youths into the TSJBCM work as this will open up opportunities to integrate knowledge gained in formal education into the process as well as allow for inclusion and diversity as the Somali community in Garissa County is currently mixed with people from other communities settling there.

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Effect of Conflict on Gum Arabic Production in Sudan

"Case Study of Abujebeaha, South Kordofan State-Sudan"

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Abstract- The main objectives of this study were to assess the causes of decline of gum Arabic production, its effect on socio-economic and environmental settings and to identify the appropriate strategies to develop this subsector after the breakout of 2011 war. Gum Arabic is an important agricultural product in Sudan economy, and it is considered the main livelihood for many people in Kordofan, particularly in Abujebeaha locality-South Kordofan State. Following the breakout of the war in 2011, the production of gum Arabic has rapidly deteriorated, consequently, the socio-economic has negatively influenced. To meet the above quoted objectives, a questionnaire was designed; when about 302 questionnaires were distributed to individuals. Moreover, semi-structured interviews (SSI) were conducted, furthermore, observations were also considered. The said collected data were statistically analyzed. The results revealed 91.7% of the respondents stated that the war, insecurity, and frequent fir settings were the main causal of drop in gum Arabic production. About 23% of the respondents attributed drop to natural calamities such as drought, flood, natural pests (locust attack). and diseases. 94% of the respondents expressed that there is no association between decline of gum Arabic production and fund availability. The study concluded that several reasons were behind the decline of gum Arabic production in the study area including human activities and natural calamities. As recommendations, peace building is important to achieve ample security. Raising the awareness of the local community in regard to gum Arabic trees management and conservation is highly recommended. Introduction of new regulations to manage the utilization of gum Arabic in sustainable manner, and create value added through gum processing.

Index Terms- Conservation, sustainability, Community. Processing.

I. INTRODUCTION

Abujebeaha locality, the study area belongs to South Kordofan State. It is about 52 Km from Kadoguli, and 481

km from Khartoum, the capital of Sudan, with total population of 181,116^[1].

The gum Arabic is produced from naturally growing tree known as *Acacia Senegal* (Hashab) which grows natural across the country in the gum belt, which is located in the arid and semi-arid zones within the latitudes 9° 30' - 16° 24' N and longitudes 27° - 32° E, where various vegetations are distributed according to the soil types and trend of rainfall distribution in the area.

Sudan is the world largest producer country of gum Arabic. It alone contributes to more than 60 percent of world gum production^[2].

Kordofan area has the lion share in terms of gum Arabic production in the domestic and international trade. However; the crop yield has sharply declined due to many factors, including environmental, social, political and economic (imposed sanction on Sudan). Therefore, Sudan lost the markets, and left a room for other countries like Chad and Nigeria to rank the top in international market of gum Arabic.

Gum is usually produced conventionally by small scale farmers; using simple hand tools. They represent about 20% of Sudan's population, and considered among the poorest people in the country^[3].

Studies reflected that the long experienced devastating conflict in South Kordofan including Abujebeaha with huge gum Arabic potentiality, showed significant gum Arabic yield decline since 2011, where production declined and remained below 25% of total contribution to Sudan average annual production^[4]. Nevertheless, the evidences revealed diminishing of *Acacia Senegal* species (Hashab trees) due to several factors, among these human activity such as the horizontal expansion of rain-fed farming, firs, wood collection, tree browsing and natural factors like frequent spells of drought, flood, pest and disease. Economical factors like low prices, lack of fund etc.

Despite these challenges, a good amount of rainfall in 2012 pushed the production of gum Arabic to 80,000 MT. The local trade Association was very ambitious to produced 90,000 MT, Unfortunately, the actual production was 40,000 Mt, and the Sudan's global market share was 40 %^[5].

From the aforementioned, great effort is needed to increase and promote the gum Arabic production and productivity. Among the possible solutions, the Sudan Government has to reconcile with armed oppositions. Such approach builds confidence, encourages urban-rural migration, particularly the displaced people, and brings back peace, security, and attracts more investors. Eventually, the engagement of business partnership in gum Arabic production will lead to improved livelihoods, rural development as well as the increasing the opportunities for achieving higher Gross Domestic Product (GDP).

From empirical studies, three aspects are of great concern in the area of gum production in greater Kordofan, namely:

- **Policy:** The Khartoum meeting in 2017 focused on assessing the impact of the Government policy on the export and marketing of gum Arabic, identified options for changing the current marketing arrangements in order to increase and stabilize gum exports, capture more value added and provide producers with a larger share of export prices. The outcomes of the study were (1) Controlling the gum Arabic export market could increase export revenues for Sudan and raise the income of small scale farmers. (2) Ample security is crucial for providing recovery on the gum belt to encourage investors in gum production chain. (3) Establishing Governmental Gum Arabic Bank to fund the producers, processors and marketing monopoly.
- **Environmental aspects:** The *Acacia Senegal* grows best in sandy soils with annual average rainfall between 200-400 mm, and in clay soils with average annual rainfall between 400-800 mm^[6]. Climate change brought variable changes, pertaining the ecosystem services, and agro-biodiversity in the gum Arabic belt, where, the local communities practice a subsistence economy, They harvest gum Arabic, cultivate some crops, rear animals, collect firewood, charcoal,

medicinal plants. The land mi-sue made the economic value of the ecosystem is not properly recognized; hence the livelihood system is likely to be adversely affected. Among the possible remedy is the introduction of business partnership between the government, international companies and local producers to invest and support the funding in gum production, processing and marketing^[7].

- **Pricing system:** The gum Arabic Company in 1997 declared policies referred as privileges of Gum Arabic Company. This included non-pricing policy as an incentive to protect gum producers from smugglers and middlemen. Another aspect in this system is the constraints in gum production including biological, natural, organizational, planning, conflict, fires, roads, socio-economic, marketing, high commissions, smuggling, and the lack of fund.

II. METHODOLOGY

In this study, qualitative and quantitative research methods were followed. Questionnaire was designed, and randomly distributed to 302 respondents. Semi-structured interview (SSI) was conducted; involving gum Arabic producers. Moreover, value chain approach, and Focus Group Discussion (FGD) were carried out with gum producers, gum labors, traders, Banks, Cooperatives' Administrations, Ministry of Agriculture, National Forest Cooperation, and Gum Arabic Board services in four villages of Abujebeaha [Abujebeaha town (43 respondents), Tummar (36), Jedeid (157), and Siragia (66)]. Finally; observations were considered.

The collected data were statistically analyzed; using Statistical Packages for Social Science (SPSS).

III. RESULTS AND DISCUSSION

Table (1): Respondents' answers about war effect on gum Arabic production in the Study area (2018).

Did the conflict cause a decline in gum production in Abujebeaha? Yes or No		Frequency	Percent
Valid	Yes	277	91.7%
	No	025	08.3%
	Total	302	100%

Source: Field Survey 2017

From the above table (1), most respondents (91.7%) believe that conflict was the main causal of declined in gum Arabic production, and few respondents (8.3%) said other factors caused the decline in gum Arabic production in the study area.

Table (2): Effect of war on Gum Arabic business, and trade in the study area (2017).

Has the war in 2011 any impact on gum Arabic business and trade?		Frequency	%
Valid	Yes	285	94.4%
	No	17	5.6%
	Total	302	100%

Source: Field Survey 2017

Table (2), revealed that the majority of the respondents (94.4%) stated that war has resulted in fear among the gum actors including the investors. Moreover, the conflict has displaced the producers influenced on gum Arabic business and trade in the study area, while few respondents (5.6%) believed that other factors contributed to the diminishing business and trade in the stay area following the war in 2011.

Table (3): Relationship between fund availability and gum Arabic production in the study area (2017).

Did the lack of fund has impact on gum Arabic production in the study area following the war in 2011?					
			Lack of capital		Total
			Yes	No	
Question: Did the 2011 conflict cause a decline in gum Arabic production in Abujebeaha area? Yes or No	Yes	Count	219	58	277
		%	72.5%	19.2%	91.7%
	No	Count	18	7	25
		%	6.0%	2.3%	8.3%
Total		Total Count	237	65	302
		%	78.5%	21.5%	100.0%

Source: Field Survey 2017.

From the above table (3); the majority of the respondents (78.5%) confirmed that lack of fund is associated with the drop of gum Arabic production in the study area, while few respondents (8.3%) did not agree with this argument.

IV. CONCLUSION AND RECOMMENDATIONS

Conclusion:

This study identified several factors contributed to the decline of gum Arabic production in Abujehaea locality, including natural, human, economic and political factors.

Recommendations:

1. Reconciliation between the government and the armed opposition to avail peace and security to resume gum Arabic production.
2. The local communities should take part in gum Arabic policy formulation and implementation.
3. New arrangement for gun Arabic funding, production, processing and marketing is of great concern.
4. Provision of basic infrastructures and services to gum Arabic production area is important.
5. A forestation program is important for the recovery and conservation of gum Arabic belt.

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Factors Affecting Financial Performance of Deposit Taking Saccos in Nairobi County, Kenya

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Abstract- The main objective of this study was to investigate on the factors affecting the financial performance among deposit taking SACCOs in Kenya with specific reference to SACCOs in Nairobi County. The independent variables were investment decisions, funds misappropriation, loan defaults and membership withdrawal. The study was anchored on the agency theory, financial literacy theory, stewardship theory and the modern portfolio theory. The study adopted a descriptive research design in which the opinions of employees in the Saccos were sought. The study targeted a population of 654 management employees working in the registered Saccos in Nairobi County. The sample size was 87 management employees. Primary data was used and which was collected by aid of questionnaires. The study established that the Saccos had well established investment committees which participated in making all investment decisions with stakeholder involvement. The investment decisions made by the SACCOs in Kenya are based on risk management. Moreover, the management in the SACCOs is insightful in creating both short and long term investments. The Study also established that misappropriation of funds in the Saccos is prevented through stakeholder involvement in financial decision making.

Index Terms- Investment decisions, Funds Misappropriation, Loan Defaults, Membership Withdrawal, Financial Performance

I. INTRODUCTION

SACCOs are an autonomous association of persons united voluntarily to meet their common economic and social needs through jointly owned and democratically controlled enterprises, which are organized and operated under the principles of cooperatives (Alfred, 2011). All SACCOs are formed on the basis of values of self-help, honesty, openness, self-responsibility, social-responsibility, democracy, quality, equity, solidarity, mutual caring, efficiency, transparency and accountability (Sammy, Philemon & Juma, 2013). Sacco's have been recognized worldwide as important avenues of economic growth. Many countries that have achieved economic development have a vibrant and dynamic cooperative sector which contributes substantially to the growth of those economies (Kwame, 2012). SACCOs play a significant role in the provision of financial services to the poor. They provide savings and credit and investment opportunities to individuals, institutions and group members.

According to Muriuki (2013), the primary purpose of savings and credit co-operative society is to meet the common needs of members. Sacco's have been recognized worldwide as important avenues of economic growth. Sacco's perform an active financial intermediation function, particularly mediating from urban and semi-urban to rural areas, and between net savers and net borrowers while ensuring that loan resources remain in the communities from which the savings were mobilized.

The modern co-operative concept began in 1844 in Rochdale village, Manchester in England. It has since developed globally as a socio-economic movement with its own distinct identity, history and purpose (Sebhatu, 2011). In 1864 the first rural credit union was established by Raiffeisen in German to cater for the needs of the rural people. The rural communities were deemed nonbank able owing to very small, seasonal flows of cash and shortages of human resources (WOCCU, 2012).

Ongore (2013) reveals that the cooperative movement spread all over Europe, Northern America, Latin America and Asia from 1900 to 1930 and thereafter to Ghana by a catholic Bishop. In Africa, the farmers promoted and registered cooperatives towards the end of 1950s for cash crops like pyrethrum and coffee. Kwame (2012) asserts that the success of the cooperative movement in Ghana has been widely replicated throughout the African continent.

Today there are many Saccos being formed across the country as members seek to pool efforts together for better lives and also tap on the support offered to Saccos by the two tiers of the government and non-governmental organisations. Therefore, in pursuit of serving the members, contribution to the economic growth and provision of employment opportunities, SACCOs should ensure they record positive financial performance in term of return to assets, liquidity and also generate revenue to pay dividends to shareholders (Nguai, 2010). However, this has not been the case since information in the public domain is that most Saccos are grappling with the challenge of continuous losses despite the existing legal and regulatory framework hence the need to undertake a study to establish the cause of this challenge.

Several studies have been done locally on the factors affecting the growth and performance of SACCOs. For instance, Wasike (2012) did a research on factors affecting performance of SACCOs and pointed out that inadequate capital, poor asset quality, poor liquidity and non-compliance were the key factors affecting the SACCOs. In his study, Mathuva (2016) established that inadequate marketing strategies, limited product and

services, and poor image as the factors affecting the performance of SACCOs in Kenya.

Odhiambo (2013) study on factors affecting performance of SACCOs found out that the issues affecting performance are membership size, poor profitability and loan defaulting. Despite the various studies being conducted, insufficient literature exists to link up the variables identified in this study such as investment decisions, fund misappropriations, loan defaulting, member's withdrawal and the performance of deposit taking Savings and Credit Cooperative Societies hence creating a research gap which this study seeks to fill. The study therefore fills this gap by determining the factors that influence financial performance of deposit taking Saccos in Nairobi City County, Kenya

The general objective of this research is to assess the factors that affect financial performance of deposit taking Saccos in Nairobi City County, Kenya. The specific objectives were: to determine how investment decisions affect the financial performance of deposit taking Sacco's in Nairobi City County, Kenya, to find out how funds misappropriations affect the financial performance of deposit taking Sacco's in Nairobi City County, Kenya, to establish the effect of loans default on the financial performance of deposit taking Sacco's in Nairobi City County, Kenya and to investigate the effect of members withdrawal on the financial performance of deposit taking Sacco's in Nairobi City County, Kenya.

II. LITERATURE REVIEW

2.1 Investment Decisions

According to Pandey (2015) an efficient allocation of capital is the most important finance function in the modern times. It involves decisions to commit the firm's funds to the long term assets. Investment decisions are of considerable importance to the firm since they tend to determine its value by influencing its growth, profitability and risks. Investment decisions require special attention because of the following reasons: they influence the firm's growth in the long run, they affect the risks of the firm, they involve commitment of large amount of funds, they are irreversible or reversible at substantial loss and they are among the most difficult decisions to make. Co-operatives have failed without a market-driven approach that allows them to compete. They need a competitive advantage through professional management, operational and financial efficiency, high quality products, and competitive pricing (OCDC, 2012).

According to Dunn *et al.* (2010) in his study which included co-operative managers and directors, he was concerned that owner-directors too often make political decisions for their own personal gains rather than prudent financial decisions with economic sense. These participants believed that, on occasion, co-operative directors may be motivated to make decisions that benefit the individual at the expense of the co-operative. This is the reason why governance issues are more exaggerated at co-operatives unlike in corporations

According to DFID (2010), Saccos are at liberty to undertake financial investments since members and or shareholders can respond to the management decision of investment proposal among co-operatives by increasing co-operatives' access to finance in a range of ways, including: providing revolving loans funds, bank guarantees, or equity

capital to increase their capitalization. This is done simply because the shareholders clearly understand that the funds when wisely invested will lead to financial benefits to then in the future from the dividends. Shareholders can increase capital for investment through engaging with commercial banks to increase their willingness to lend to co-operatives on good terms; and in some cases providing low interest loans directly to co-operatives to support expansion of their business.

Mwaura (2015) argues that the annual delegates meetings and the ministry of co-operatives are to blame for investment activities undertaken by SACCOS because they are the ones who are supposed to approve the same investment. Muchemi (2005) notes that non profitable investments should be discouraged because, despite the enormous amount of resources invested in such projects, returns are almost none hence reducing the capital base where interest is drawn from. Co-operative Management Committees are notorious for diverting members' funds into investments of dubious value. The law hence needs to be amended to strengthen the Ministry's regulatory hand. It should clearly prohibit investments that are not related to the core objective of the society (KUSCCO, 2013)

Co-operatives are complex social organisations with many interests coalescing in one place and with a focus on inclusive decision-making. SACCO's shareholders want more than just attending an annual general meeting as shareholders of private companies but would like to be involved in investment decisions to be undertaken by the management. Clarity of purpose, on-going participation by members and competent leadership clearly focused on the agreed upon objectives are key factors in ensuring that these complex organisations remain successful (Kithunzi, 2014).

Olao (2014) investigated influence of financial stability on deposit taking SACCOs. Descriptive survey was adopted. Population comprised all the 34 DTS which had complied with SASRA regulations by December 2013. The study used secondary data from all the SACCOs sampled. The study concluded that financial stability positively and significantly influences performance of deposit taking SACCOS.

2.2 Funds Misappropriations

Kanu and Okorafor (2013) carried out a study on the nature, extent and Economic impact of Fraud on Bank Deposits in Nigeria to determine the amount of Bank funds involved in fraud. They collected quarterly Fraud and Forgeries report on Nigerian Banks for the period between 1993 and 2010. The study found that the most frequent type of fraud in Nigerian Banking Industry is fraudulent withdrawals.

According to Odera (2012), financial management problems specific to the SACCO pose challenges not faced by many other forms of organizations. However, when a number of controls are brought to bear on the problems including; well-defined financial reporting procedures, internal controls, service adequacy, prudential management disciplines and external supervision, the problems can be overcome to produce a stable and balanced financial management. Boards of Directors in SACCOs are empowered to make decisions they believe will benefit the organization (section 28 of the Co-operative Societies Act CAP 490). They must be held accountable and responsible for performance results. In Kenya, the Centre for Corporate

Governance in Liaison with the Ministry of Co-operative Development and Marketing (2008) has developed guidelines that must be adhered to in the management of co-operatives with regard to specific key areas to enhance performance. For example have regular and timely elections and allow members to participate without interference; maintain up to date and accurate records of the organizations and ensure audited accounts are presented and read to members on time and members allowed to deliberate and resolve on them among others.

In his study Odhiambo (2013) concluded that most Saccos in Kenya have been grappling with the challenge of funds mismanagement from the board of directors as well as the managers. As a result, members have been left decrying the kind of leaders they have entrusted with their funds. Misappropriation and embezzlement occurs in several ways including unauthorized withdrawal, fraudulent funds transfer and even improper accounting practices.

According to Odhiambo (2013), unauthorized withdrawals are where an individual obtain funds from another person's account without proper authorization. It may take the form of an individual forging another person's signature and thereby obtaining money over the counter. It may also take the form of an individual having authorized access to Person Identification Number (PIN) of another person and using it to withdraw cash through Automatic Teller Machine (ATM).

Akinyomi (2012) investigated fraud in the Nigerian banking sector and its prevention, fraudulent money transfer is where a fraudster generates a fraudulent request or alters a legitimate Funds Transfer Request for the purpose of committing fraud. The fraudster will then collude with fraudulent Bank staff to withdraw the ill-gotten money. According to Akinyomi (2012), theft and embezzlement represent another form of fraud which involves the illegal collection of financial items such as cash, traveller's cheque. In Kenya, directors have transferred money from Sacco accounts into their business accounts and claim to have obtained loans while others supply "air" to the Saccos and are paid huge sums leading to loss of cash (Muriuki, 2013). Recently, there has been a case reported where Saccos members of Busia Agricultural Training Centre stormed the Sacco offices and demanded for all their contributions. The agitated members accused the Sacco leadership of funds embezzlement and lack of accountability

Another form of funds misappropriation among the Saccos is through improper cash management systems leading to loop holes where managers and directors can siphon funds from the Saccos. Cash management is a crucial activity in every business and involves planning and controlling cash flows in and out of the business, cash flows within the business, and cash balances held by a business at a point in time. Cash management is a broad term that refers to the collection, concentration, and disbursement of cash. Sacco leadership go around the set financial policies to embezzle the funds. For instance, it has been reported by Wasike (2012) that board members and managers in Kenyan Saccos go for training that cost millions of shillings only to be trained on what they already know and others never even attain the training. All they need is the funds and they disappear since nobody can make follow up on their whereabouts.

2.3 Loan Defaults

According to the study of Clement & Martin (2012) evidence from many countries in recent years suggests that collateral values and recovery rates on corporate defaults can be volatile and, moreover, that they tend to go down just when the number of defaults goes up in economic downturns. This link between recovery rates and default rates has traditionally been neglected by credit risk models, as most of them focused on default risk and adopted static loss assumptions, treating the recovery rate either as a constant variable independent from the probability of default. This traditional focus on default analysis has been partly reversed by the recent significant increase in the number of studies dedicated to the subject of recovery rate estimation and the relationship between default and recovery rates.

Alfred (2011) researched on loan repayment performance is an important concept for all the lending institutions. It is a measure of whether loans are settled up in full according to the loan contract or not. The higher loan repayment performance leads to the higher probability of the collecting interest revenues and lower loan losses in a lending institution (Alfred, 2011). On the other hand, the poor loan repayments have a harmful impact on institutions capital, earning as well as in realizing its objectives and may even lead to a financial institution collapse.

For instance, failure to manage loan repayment performance results in losses and high delinquency management costs (Huseyin, 2011). The higher expenses are for closer monitoring, more frequent portfolio and legal fees for pursuing seriously delinquent loans. Such costs adversely affect the generated income, and, in general, the operation of the lending institution, thus, the institution becomes unsustainable.

Gekara and Joseph (2013) used a discriminate analysis to identify defaulters from non-defaulters of agricultural bank recipients in Iran. Results showed that use of machinery, length of repayment period, bank supervision on the use of loan had significant and positive effect on the agricultural credit repayment performance. On the other hand, waiting time for loan reception had a significant effect on its repayment.

In a study by Clement and Martin (2012) on determinants of successful loan repayment, in order to avoid delays in repayment, 100% rule was applied i.e. no new credit was granted until the former had been repaid in full. This rule was later relaxed and loans granted as long as the payment rate reached 90% of outstanding loan. Every borrower had to have savings amounting to 20% of the loan in order to access credit. Every member had to subscribe to a number of shares in order to access credit. Guarantor ship was also required for credit beyond specified amounts (Paxton, 1996).

A study by Mwangi (2012), on Microfinance Default Rates concluded that the probability of default decreased with the frequency of monitoring, the availability of non-business income, years in business, the number of guarantors and whether the client was a first time borrower. In a research carried out by Wakuloba in Uasin Gishu on the causes of loan default in Uasin Gishu District Trade Development Joint Loan Board scheme, it was noted that it had high and rising default rates over the period. The main causes of default were poor business performance, diversion of funds and domestic problems. The recommendations were that the board be strengthened through capacity building in computer applications to speed up loan processing and ensure

timely disbursements. Despite these noble practices and theoretical expectations, the current experiences do not concur with the premise that SACCOS are risk-free institutions. The current situation signals the possible severe and unrestrained financial risk problem in SACCOS and some members have defaulted to pay affecting the financial performance.

Kioko (2016) studied the effect of capital adequacy regulations on Saccos in Kenya. Three questions were answered, namely: Why is it necessary for SACCOS to adhere to capital adequacy regulations? What challenges have SACCOS faced in complying with capital adequacy requirements and what strategies have SACCOS undertaken to meet the requirements for capital adequacy?

Muriuki (2010) did a study on factors affecting Sacco performance in Meru South district: a case of Tharaka Nithi Teachers Sacco. Descriptive survey was adopted. The total population was stratified into the SACCO members, management committee members and staff sub-samples. The results showed that governance has enormous effects on financial performance.

2.4 Membership Withdrawal

A SACCO member is a person who belongs to that SACCO willingly by filling in the membership form and paying the required membership fees. Most SACCO members have a common bond either of occupational or production nature. This characteristic makes a SACCO to be an association of people who have come together with common goal geared at improving their livelihood economically (Sacco's operations report, 2016).

Under the current law most of the SACCOS in Kenya may close their doors if they do not meet the minimum threshold. For a SACCO to be registered, it must have a minimum of 30 people. The members must also meet the ksh.10 million capital adequacy requirements. Investment of SACCO funds in non-core business must not be more than 10% of its total assets. In addition some 15% of SACCO assets must be in cash form to adequately provide for its liquidity requirements. SACCOS will also be expected to make adequate provision for loan losses as is done by the commercial banks and other financial institutions (SASRA, 2012). Despite the continuous growth of Saccos in Kenya, members have been withdrawing their membership status due to financial losses of then Saccos.

According to SASRA (2013), Sacco membership is significant as it provides a source of business and hence economic viability of the Sacco. However, during a Sacco formation, the promoters will interest members who are in the same occupation or geographical area. This ensures that all members have a common goal to pursue and a common interest in the affairs of the Sacco.

Recently, due to fear of losing money through the widespread corruption members have withdrawn from Saccos. For instance, when in 2016 The Sacco Societies Regulatory Authority (Sasra) revoked the licences of five credit unions and effectively barring them from taking deposits from the public, most of the Members had to withdrawal their membership immediately to avoid loss of funds, shares and any benefit accumulated from their savings.

2.5 Critique of Literature and Empirical Gaps

Many studies have concentrated on the context of developed nations leaving the developing countries less researched (Pandey, 2015; OCDC, 2012; Dunn *et al.*, 2010; DFID, 2010; Clement & Martin, 2012; Alfred, 2011; Huseyin, 2011; Gekara & Joseph, 2013; Clement & Martin, 2012).

Also, it has been noted that many studies have not been able to show clearly what the relationship between varied factors and how they affect financial performance (Mwaura, 2015; Muchemi, 2005; KUSCCO, 2013; Pandey, 2015; OCDC, 2012; Dunn *et al.*, 2010; DFID, 2010; Clement & Martin, 2012; Alfred, 2011; Huseyin, 2011; Gekara & Joseph, 2013; Clement & Martin, 2012; Kithunzi, 2014).

Existing studies have concentrated on different sectors thereby neglecting the deposit taking Saccos context which is crucial as Saccos have now been ranked as the vehicles that propel economies (Pandey, 2015; Dunn *et al.*, 2010; DFID, 2010; Mwaura, 2015; KUSCCO, 2013; Kanu & Okorafor, 2013; Odera, 2012; Akinyomi, 2012; Wasike, 2012; Clement & Martin, 2012; Paxton, 1996; Mwangi, 2012).

III. RESEARCH METHODOLOGY

The study employed a descriptive research design. The major purpose of descriptive research design is to describe the state of affairs as it is at present. In this study, the population was the management employees working in different SACCOS in Nairobi County.

According to SASRA (2017), there is 654 management staff among the top performing 38 registered Saccos in Nairobi County. These encompassed 321 from the administration and 333 from the Finance Department.

The study adopted a stratified random sampling design to select the sample population. Stratified random sampling is a sampling technique in which the entire population of interest is divided into homogenous subsets that share similar characteristics and select respondents from each subgroup so as to ensure equitable representation of the population in the sample (Cooper, 2012).

The sample size consisted of 87 respondents selected proportionately from the two departments. The study adopted the formula of Naissuma (2010) to calculate the sample size as shown in equation below;

$$n = \frac{NC^2}{C^2 + (N-1)e^2}$$

Where;

n = is the sample size

N = is the population size

C = is the coefficient of variation

e = is the level of precision.

With a confidence level of 95%, coefficient of variation of 0.5 and precision level of 5%, the sample size was equal to 87 as derived in the equation below;

$$n = \frac{654(0.5)^2}{(0.5)^2 + (654-1)(0.05)^2} = 87$$

This constituted approximately 13.3% of the sampling population. In this study, questionnaires were used to collect primary data from the sample population. For the purpose of this

study, 5 respondents were picked for pilot testing who are more than the 1% threshold whom Adams *et al.* (2007) considers as being satisfactory for pilot testing.

Creswell (2003) asserts that validity is the strength of qualitative research, although other researchers prefer to substitute validity with terms such as trustworthiness, credibility, transferability, dependability, and conformability. Validity exists when the knowledge sought is arrived at through descriptions that make possible a understanding of the meanings and essences of experience (Castillo, 2009). To make valid inferences from the text, it is important that the classification procedure be reliable in the sense of being consistent: different people should code the same text in the same way (Waber, 1990). Strategies for validating the accuracy of research findings offered by Creswell (2003) included obtaining data from three different sources of information or triangulation, member checking, which involves having the research participants review final reports to determine accuracy, and documentation using rich, thick descriptions. The researcher adopted Creswell (2003)'s criteria to ascertain validity of the study instruments.

The study used the Cronbach (Alpha – α) model to test the reliability of the data. Brown (2002) indicates that Cronbach's alpha reliability coefficient normally ranges between 0 (if no variance is consistent) and 1 (if all variance is consistent). The closer the coefficient is to 1.0 the greater the internal consistency of the items in the scale. An alpha (α) score of 0.70 or higher is considered satisfactory (Gliem & Gliem, 2003).

The research data was coded into Microsoft Excel and Statistical Package for the Social Sciences software (SPSS) to enable the responses to be grouped into various categories and analysed using descriptive statistics. Weighted Mean was used to get the average number of the respondents on their feeling determined in the Likert scale. The findings were presented using tables and charts. Regression analysis was used as it provides a mean of objectively assessing the degree of the relationship between the independent variables and the dependent variables in the prediction of the dependent variable. The regression equation will be as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \epsilon \dots \dots \dots (1)$$

Where Y = Financial Performance among Saccos in Kenya

β_0 = Constant

X1 = Investment Decisions

X2 = Misappropriation of Funds

X3 = Loans Default

X4 = members withdrawal

$\beta_1, \beta_2, \beta_3$ and β_4 = Regression Coefficients

ϵ = Error term

Analysed data was presented in the form of tables and charts.

IV. FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

4.1 Summary of Findings

This section addresses the major findings of the research drawn from the objectives as discussed in the previous sections. This includes the effect of investment decisions, funds misappropriations, loans default and members' withdrawal on the

financial performance of deposit taking Sacco's in Nairobi City County, Kenya.

4.1.1 Investment Decisions and Financial Performance

From the findings, the study as supported by a mean of 4.3571 established that the SACCOs had well established investment committees. The committees guided their investment decisions which contribute to the financial performance of the SACCOs. Secondly, the study established that to a great extent, investment decisions made by the SACCOs are based on risk management in Kenya. This was supported by a mean of 4.6429. In addition, the study established that stakeholders were involved in all investment projects undertaken by the SACCOs as supported by the mean of 4.2714. Moreover, the study established that investment projects are undertaken with integrity and accountability. This was supported by a mean of 4.4429 from the response. It was also established that most of the SACCOs are not undertaking product innovation as part of investment portfolio. This was supported by a mean response of 2.5429. Finally, as supported by a mean of 4.1857, the study established that the management in the SACCOs is insightful in creating both short and long term investments.

4.1.2 Misappropriation of Funds and Financial Performance

The study as supported by a mean of 4.2857 established that that the management in the SACCOs involves all stakeholders in financial decision making. Also the study established that there was a mechanism that was used to detect misappropriation of funds in most of the SACCOs. This was supported by a mean of 3.8143. Moreover, the study established that to a great extent there was existence of independent internal audit functions to ensure compliance and proper use of funds in the SACCOs. This was supported by a mean of 4.5714 from the response. The study also as supported by a mean of 4.3143 established that financial management of the SACCOs was subjected to both internal and external audits. Consequently, it was established that management leadership terms are controlled to avoid long stay which may lead to embezzlement of funds. This was supported by a mean response of 4.7429. The study as supported by a mean of 4.3714 from the response established that there was a significant relationship between funds embezzlement and the SACCOs poor performance. Furthermore, the study also confirmed that misappropriation of funds was at minimal levels in the SACCOs.

4.1.3 Loan Defaults and Financial Performance

The study established that to a great extent that the SACCOs have access to credit information of the borrowers. This was supported by a mean of 4.1857 from the response. Secondly, the study as supported by a mean of 2.6429 established that most of the SACCOs did not have established committees set to manage credit portfolio. The study established that there were well laid regulations on the credit facilities extended to internal staff. This was supported by a mean of 4.1571 from the response. In addition, the study as supported by a mean of 4.7857 established that the SACCOs request for adequate collateral on all loans to reduce the risk of loan default. Overall, the study established that there were well structured mechanisms in the SACCOs to ensure that all issued loans are repaid.

4.1.4 Members' Withdrawal and Financial Performance

The study established that there was an increase in membership to the SACCOs for the last five years. This was supported by a mean of 4.1857 from the response. The study was supported by a mean of 2.7429 established that there were no incentives for new members which would encourage more people to join the SACCOs. The study established that delays in dividend payment contribute to membership withdrawal from the SACCOs. This was supported by a mean of 3.9571 from the response. In addition, the study as supported by a mean of 4.3571 established that there was a significant relationship between members' withdrawal and financial performance of SACCOs in Kenya. It was also established that members shift from one SACCO to another due to mismanagement. This was supported by a mean response of 3.6286. Finally, the study established that there was the likelihood of the staff in the SACCOs to leave as supported by a mean of 3.3429 in the response.

4.2 Conclusion of the Study

4.2.1 Investment Decisions and Financial Performance

From the findings, the study concluded that the SACCOs had well established investment committees which participated in making all investment decisions with stakeholder involvement. The investment decisions made by the SACCOs in Kenya are based on risk management. Moreover, the management in the SACCOs is insightful in creating both short and long term investments. However, most of the SACCOs are not undertaking product innovation as part of investment portfolio.

4.2.2 Misappropriation of Funds and Financial Performance

The study concluded that misappropriation of funds in the SACCOs is prevented through stakeholder involvement in financial decision making. Moreover, there are mechanisms to detect misappropriation of funds in the SACCOs. Both internal and external audits were conducted in the SACCOs to ensure compliance and proper use of funds. Leadership terms in the SACCOs were controlled hence members could not overstay in leadership positions which would give them room to embezzle with funds.

4.2.3 Loan Defaults and Financial Performance

The study concluded that the SACCOs have access to credit information of the borrowers which is used to determine their credit worthiness. Also, well laid regulations on the credit facilities extended to internal staff existed and that the SACCOs requested for adequate collateral which helped in reducing loan defaults. The SACCOs had well laid down mechanisms to ensure all loans issued were paid. However, majority of the SACCOs did not have committees to manage the credit portfolio.

4.2.4 Members' Withdrawal and Financial Performance

The study concluded that there was a significant increase in membership in the SACCOs due to the financial performance witnessed although it was discovered that there were no incentives for new members to join. Delays in dividend payment were seen to contribute to membership withdrawal from the SACCOs as well as the financial performance. It was concluded that due to mismanagement of the SACCOs, members would

shift to other SACCOs that were well managed. Finally, the staff in the SACCOs did not show an intention of leaving which shows that they comfortable with their job.

4.3 Policy Recommendations

From the study findings, the researcher recommends that the SACCOs should undertake product innovation as part of investment portfolio which will provide a variety of financial tools to offer to its members hence improve their financial performance. Secondly, the SACCOs should come up with terms that provide some incentives to motivate people to join the SACCOs. Such incentives may be in terms of selective interest rates imposed on certain members who hold a significant level of credit.

Finally, the SACCOs should establish committees to manage the credit portfolio. Such committees will come up with strategies that will help in fast credit processing and payments. This will modify the services offered by the SACCOs to their clients who will allow more people to join as well as access the credit services hence improving the financial performance.

4.4 Suggestions for Further Studies

Further research can be done to investigate how the financial performance of the SACCOs in Kenya can be influenced by both increased and reduced interest rates other financial institutions which offer similar services.

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Tauhid Accounting for Accountant

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Abstract- The development of accounting has become more widespread, technically accounting has been able to describe things that have not been studied before. Conscious or not, accounting has developed further not only as a means of recording, reporting, and decision making, but also as a representative God in providing justification. Accounting gradually becomes a living guide to market behavior, few even of companies and even countries that have a crisis or even die because of the loss of market believe.

Accounting has become a lifestyle, not only discussed about its ability in terms of recording and predicting the company's economic capabilities, accounting has now been discussed in more detail even to the side of the social, emotional and religious character of an accountant. The behavior of accountants is now in the spotlight because often the failure of the financial statements presents the report appropriately not because of the inability of regulates, but the behavior of the accountant who is not responsible for what he presents.

This article tries to argue that accounting needs to be considered as an accountant's way of serving his religion. The author believes that the religious side of an accountant needs to be developed in order to be a shield so that accountants do the accounting process correctly, *Tauhid* is able to guide accountants to always act in every aspect of life, such as accounting that has become the joint of every line of life. The

limitation in this article in the writing character, the use of the literature study method makes this paper weak in statistical verification. Apart from these weaknesses, the author believes the need for an accountant to improve his ability is not only from the technical side. A part from these weakness, author believes the need for an accountant to improve his ability not only from the technical side.

Index Terms- Accounting, Responsibility, Religious, Behaviour Accounting.

I. INTRODUCTION

This article presents an opinion about the need for an accountant to not only improve his technical abilities, but also pay attention to emotional and spiritual intelligence. Accounting needs to be considered as a way for an accountant to worship his Lord. Through accounting, an accountant practices religiosity such as honesty, responsibility, and other good behavior. Accounting as a social science, it is fitting in practice to contain moral elements of society that are far from individualism and other immoral behavior.

II. IDEA & FINDINGS

A. *Science and Behaviour Accountant*

Science is a gift from the God that can be captured, understood, and practiced by humans as a form of difference between humans and animals. Scientific knowledge assumes the existence of physical world.

However, some people believe that the separation between religion and modern science is still needed to consider cult religion. This principle is known as secularism which it asserted by the right to be free from the religious rule. They consider the religion is traditional thing that impede the science evolutions.

Substantively, studying about science is not forbidden for religious people. Faith provides knowledge obtain from the words of God. Scientific knowledge required to figure out how the universe works to believe the existence of God. Knowledge help the people to be good believers and to recognizance all of what they did during their life in this world.

However, some people do not have a deal with these basic assumptions that we have responsibility for our own life to God. For example, an accountant that influenced by secularism concept will be act as positivism accountant. Refer to Watts and Zimmerman (1986), the functions of positive theory are to explain the relation between variables and to predict what will happen in the future according to the theory or current event. Therefore, the normative question, such as what should we do, is neglected and tend to emotional feelings.

Even though, the accountant (especially corporate or private accountant) is servant who have responsibility of his manner and the result of work to the Manager or Corporate Management. Being an obedient servant, an accountant, has to obey the rule and do his work as good as possible to deliver good financial reporting so it can be used by Managerial Level for decision making process.

As a servant, it is natural that accountants have spiritual behavior. Having believe in the presence of God's supervision, believes that his behavior in the world must be accounted for. So, when an accountant already has monotheism, fraud behavior must not be

done. Tauhid will be a shield on him, a godly man. Tauhid can guide Accountant to be honest in all conditions.

B. Accountant has No Religion?

Accountant is common related to capitalism idea. Yusran (2002) stated education systems in the world mainly influenced by capitalism such as pluralism, syncretism, nationalism, liberalism, secularism, etc. People consider those education systems involves accounting discipline produce accountants with secular mind. It is the result of this discipline accentuate practical and conceptual theory without concern for accountant's professional responsibility.

Those education schemes affect accountant's manner in taking their professionalism requirements. They generally focus of the standard compliances and hardly look at their target or personal benefit without any considering to the responsibilities not only to higher level management but also to God.

An accountant who aware of his responsibility as the God servant hopefully can bring up the positive impact so he is more carefully to do professionalism accountants job with high integrity performance. It is reduce and prevent fraud in financial reporting that could detrimental the users. An accountant who have great Tauhid concept in his mind will lead to the assumptions that all of what he did is always in the sight of God so having positive manner is big ideal.

C. Behaviour Degradation Accountant Responsibility

Accountancy can't be separated from its environment because they have strong interaction and give influence for each other. Environment will always change as a necessity of life. The fact show that a lot of scandals and frauds in financial reporting entity and the lack of concern in social responsibility

implied big evolution is occur in accountant behavior.

The behavior of accountants is a determinant in the financial statements, it does not mean that regulation is not important, but accountants who only have technical capabilities without having a spiritual value have the potential to take irresponsible actions through rules gaps. Many events have proven that an accountant is an actor behind financial report fraud. As a result, many disadvantaged parties, including the accountants themselves, both economically and non-economically. Accountants who act fraudulently cause stigma in society that accountants have experienced moral degradation.

Accountants as the human have two sides, managerial and spiritual. Modern accountancy assert the accountant to be more materialistic so the spiritual values are neglected. Therefore, human is heading to be profit oriented and to practice materialistic accountancy. In the way to achieve that objective, the offense and the loss of ethics values and morality are possible to come up due to moral degradation of accountant.

This conditions implied that accountancy deteriorate in reflecting business reality perfectly. Triyuwono (2006) claimed that modern accountancy is not be able to reflect non-economic reality created by the company and only able to admit and to reflect economic events. Refer to Harahap (2008), financial report, the main product of conventional accounting (modern), has some following points of limitation:

- Financial accounting customer is the people who embrace secularism, materialism, and rationalism. They belief in absence of God.
- The purpose of the financial accounting is for certain ideologist or Americans.
- The majority user of financial accounting is a large or go public company.

- The aim of capitalism in financial accounting is obtaining information to get the accreditation of wealth.
- The financial accounting is historical based.
- The main service of financial accounting is public, so this is not private.
- Focus on materialistic information.
- Qualitative information is ignored.

D. Accountant as Servant

Professional behavior values of accountant is engaged ethics, while the fundamental values of self influenced assumptions about how to construct and to deal with the reality. Self perception's as homo economics (economic man) will generate an opinion become more realistic in economical point view. The consequences will tend to the reality configuration which is more concentrated in economy than social reality.

Taking behavior in just one point of view such as economic view leads to accountant to be more individualist in social reality. The reality often cause the accountant against the rule without any consternation. A book by Kamayanti (2012) titled "Cinta: Tindakan Berkesadaran Akuntan (Pendekatan Dialogis dalam Pendidikan Akuntansi)" explained that life is not only having religious but also nationality while people can embrace both like ideology Pancasilaism. Pancasilaism can deeply embedded as fundamental mind as accountant profession in financial reporting.

The existence of Pancasilaism ideology that becomes the spirit of the accounting profession is one example that accounting is part of social science. As a social science, it is natural that accounting has social values. Individualism, cheating, and other immoral behavior must not be in an accountant behavior because it will damage accounting as a social science. An

accountant who has no morals, he measures religious and social values.

It will be an optimistic view for the accountants to have a comprehensive perception about their religion to realize who they are as the servants that obligatory to create the best reporting as much as possible by obeying the rule.

III. CONCLUSION

Based on the description, it has been explained that accounting has been discussed in more detail to the side of the accountant's social, emotional and religious behavior. Accountant's responsibility is a joint review after several frauds in the presentation of financial statements. Some opinions actually consider the moral degradation some accountant's due to the immoral behavior. In this article it is stated that should be an accountant's has the ability in the technical field as well as in emotional and spiritual abilities. This article believes that the attitude of an accountant servant helps guide him to believe that he must be responsible for his behavior.

Accounting needs to be considered as a way for accountants to serve their religion. The author believes that the religious side of an accountant needs to be developed in order to be a shield so that accountants do the accounting process correctly, Tauhid is able to guide accountants to always act in every aspect of life, such as accounting that has become the joint of every line of life.

This article has the hope that accountants are not only concerned with technical and regulatory capabilities, but also the hope of improving the behavior of accountants. As a representative of God, the financial statements made by accountants have become the source of life for some companies and even the State. The increasing impact of the financial statements

needs to be accompanied by an increase in the emotional and spiritual side of the accountant, not only for accountants, but also for the lives of many people.

The limitation in this article in the writing character, the use of the literature study method makes this paper weak in statistical verification. Apart from these weaknesses, the author believes the need for an accountant to improve his ability is not only from the technical side.

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Socio-Economic Effects of Land Displacement on Talai Households Living in Kericho Township Location, Kenya

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Abstract- Land displacement is a contentious issue affecting many countries in the world. In Africa It has caused numerous Land conflicts dating back to colonization by the Europeans where public land was declared crown by the Her Majesty the Queen of England. It was during this period, when Land Tenure was introduced in Kenya, which led to socioeconomic challenges, land conflicts, dispossessions, displacement and emergence of squatters. Many communities like the Kikuyus, Maasais and Coastal people in Kenya lost their ancestral land to white settlers. However, this research study focused on Talai clan living in Kericho County because it has suffered one of the longest historical land injustices in Kenya. Therefore, the general objective of the study was to examine socio economic effect of land displacement on Talai households living in Majengo-showground in Kericho township location. The study adopted a conceptual framework guided by relative deprivation theory. Literature was reviewed using primary and secondary data from global, regional, and Kenya context. The study employed descriptive research design. The target population was 5000 Talai households and simple random sampling was used to sample 300 respondents using 6% of the target population. The key informants comprised Land officials, County Commissioner, Chief and village elders were selected purposively. Research tools were questionnaires, interview schedules, observation and focus group discussion. The study established that the socioeconomic effects of land displacement on the Talai clan had affected their source of income, number of households, making them vulnerable to land conflicts, environmental waste disposal and cultural erosion. This study established that their source of income was below average earning per day. The study concluded that there was need to address socio economic challenges by resettling the Talai clan permanently. The findings would be useful for policy formulation and adding knowledge to existing gap of victims suffering from historical land injustices and socio economic challenges they face.

Index Terms- Clan, Displacement, Historical land injustices, Resettlement, Squatters,

I. INTRODUCTION

Land is often seen as a key cause of conflict, a central element in the varied and complex social relations of production and reproduction within which conflicts between individuals and groups are bred ((Deininger *et al*, 2011). This stems from the vital economic and social importance of land as the foundation of shelter, food, work, and a sense of nationhood' and is particularly the case in contexts characterized by rapid urbanization, extreme inequality and the legacies of colonialism (Reynolds, 2010). However, alongside understanding land as the basis for livelihoods, and an object of sale and exchange, the emotional dimension is often ignored during displacement and resettlement among the communities who are entanglement with group identity. According to Kasanga & Kwapong (2009), land income is a leading indicator of socioeconomic disparities that is regarded as a crucial factor associated with social conflict and political instability. Social and economic inequalities have been used in different contexts to mean different things. This research study adopted the definition of Manahan, (2010) who defined socio economic inequality as inequalities in access to use of land ownership of assets financial, human social or natural resources and inequalities in income levels and employment opportunities. In South Africa, dispossession and forced removals are the key themes running throughout South African history which focused on displacement and resettlement with a view of looking at apartheid which is related to forced removals. Racially removals in South Africa can be traced back to 1652 when Jan Van Riebeeck displaced the local Khoi from their lands to establish a base for the Dutch East India Company at the Cape. Forced removals continued throughout the period of colonial conquest up to the apartheid era (Platzky & Walker 1984). Forced Removals in South Africa examined how the apartheid government's policy of forced removals of black people fit into the whole apartheid system (Hall, 2009). Massive forced removals and exclusion lay at the heart of apartheid. (Platzky & Walker 1984), estimate that apartheid led to the displacement of three and a half million people between 1960 and 1983. Similarly, Kenya was officially declared a British Protectorate on June 15th, 1895. This declaration marked the beginning of a massive land take-over from the natives to create settlements for the British settlers (Syagga, 2010). The British colonial

government declared vast tracks of land in the colony, including land occupied by indigenous Africans, to be crown land. Crown land was the property of her Majesty, the queen of England (Huggins, 2012). It also created “native” reserves in which indigenous Africans were forced to live on. This left the best arable land to be cultivated by white settlers. As European settlers continued to expropriate more and more land during the 2nd half of the nineteenth century, colonialists rapidly displaced the vast majority of Kenyans from their lands. It was this injustice that fueled the Mau Mau struggle in Central Kenya for independence (Anderson, 2011). Unfortunately, the post-colonial government failed to address the land issue and millions of Kenyan who had been kept in the reserves after the lost land to settlers, remained squatters in their own lands. The vicious struggle for land during the colonial period was due to displacements of Africans from their land. Land tenure led to global displacements of various indigenous communities in the world as witnessed (Harvey, 2006). The only difference is that the displacements in Africa in the period before independence involved the use of brutal force on the Africans by the colonialists thus there was hardly any market-oriented forces. It involved the use of dictatorial and draconian laws, which ensured that the best quality land went to the colonial settlers (Zwan, 2011). Massive population displacement and resettlement increases vulnerability to illness and causes serious declines in health levels due to the change in the environment and the unavailability of appropriate health services. Vulnerability to illness also resulted from an unsafe and insufficient water supply and poor sewerage systems that spread epidemic infections such as diarrhea, dysentery and waterborne diseases. Displacements caused social stress and psychological trauma which sometimes was accompanied by the outbreak of Malaria. De wet (2009), argues that emotional attachment that people can feel about their villages and land that their families have lived on for generations cannot be replicated in the resettlement areas because of the social disruptions involved in relocation. Land displacement often involves a change in the pattern of people accesses to resources as well as a change in livelihood strategies.

Kenya attained independence in 1963, and all public land became a commodity used by the different regimes to buy political patronage (Hughes, 2006). Unfortunately, the post-colonial government failed to address the land issue and millions of Kenyan who had been kept in the reserves after they lost land to settlers, remained squatters in their own lands. The struggle for reforms on land has been exacerbated by injustices and maladministration on land matters like conflicting land laws, outdated land laws being practiced, cumbersome process of planning, surveying, adjudication, settlement and land registration among others. Also manual land records accumulated over years, many land disputes and poor service delivery in government institutions (Syagga, 2006). This led to many historical land injustices meted on many communities in Kenya. Historical land injustices refer to wrongs that were committed against people and included forceful evictions from their rightful lands. It is coupled with the acquisition of land after independence and, more particularly, the rights of communities that were displaced by colonialists (Kameri, 2009). A few civil society institutions have been at the forefront in agitating for a relook at the issue as it threatens to disrupt peace and harmony in

the country. It has been a cause of many deaths and social tensions as portrayed in post election violence in 2008 which led to many communities being internally displaced from their land. Therefore it was in view of this background that this study sought to examine the socioeconomic effect of land displacement on the Talai community living in township location in Kericho County

II. STATEMENT OF PROBLEM

When Kenya gained independence in 1963, there were hopes that those dispossessed would be resettled on their land or compensated with allocation of land elsewhere. To address the land question, Kenya voted for a change of the constitution in the promulgation of 2010 constitution to address land issues. However, the issue of resettling the squatters in Kenya has not been addressed to the fullest. According to The Truth Justice Reconciliation Commission of (2014) the Talai clan has been classified as minority group which have suffered the longest historical land injustices since the colonial period in East Africa. Talai clan is a minority group among the larger Kalenjin community in Kenya. They are known as *orkoiik* or *Laibons* by another name. However, the colonial government referred to them as laibons (Orchardson, 1961). The clan was displaced after Nandi resistance that lasted for over 10 years when their chief, Koitalel Samoei was killed in 1905 by British captain Meinertzhagen for resisting the British colonial government. As a result, the family members of Koitalel Arap Samoei were displaced to Baringo, Narok and Kericho according to (Ngasura, 1995). This is how the Talai clan members found themselves in Kericho. Their stay in Kericho was cut short in 1934 when 700 Talai clan members from Nandi, were rounded up and deported to Gwasssi Island in Homabay South Nyanza for refusing to hand over their land to British investors to plant tea bushes. The Talai clan remained in Gwasssi until 1962 when the departing British colonial government returned them to their old district of Kericho and allowed them to settle down on the outskirts of Kericho town on government land pending possible resettlement by the new government of Jomo Kenyatta. Since then, the Talai clan members are still squatting waiting for the government to resettle them. It was in view of this background that this study sought to assess the socioeconomic effects of land displacement on the Talai households living in Kericho Township location in Kericho County.

1.1 Overall Objective

To analyze socio-economic effects of land displacement on Talai households living in Kericho Township Location in Kericho County, Kenya

1.2 Scope of the Study

The study focused on Talai clan living in Majengo, Showground, Township, and prison farm, in Kericho Township and part of kapkugerwet location. The study was limited to socioeconomic effects of land displacement only on resettlement of Talai clan with a possible aim of attaining permanent resettlement. Data collection was done between December 1st, 2017 and January 30th, 2018.

1.4 Justification

In scholarly terms, there is little information pertaining to the displacement and resettlement of the Talai clan living in Kericho since colonial period. The Talai clan is one of the communities in Kenya that have experienced the longest historical land injustices. Most studies that have been done on land displacement has focused on the causes of inter -intra ethnic land conflicts missing out on historical land injustices. Apart from contributing to existing knowledge in land conflicts, this research was deemed to be significant in the formulation of government policies on land conflicts that leads to permanent resettlement of squatters in different parts of the country. It would also reduce land conflicts caused by the landless in Kenya through formulation of land conflict resolutions

III. LITERATURES REVIEW

Land conflicts arise from a variety of socio-economic, cultural, environmental, demographic and political processes. Discrimination and marginalization occur when households lose economic power and fall into lower socioeconomic category than that which they occupied in their home areas. According to Cernea (2000), such socioeconomic marginalization eventually results in low self-esteem. It has been a major reason why communities clash especially on the basis of inequitable sharing of resources. Discrimination and marginalization based on ethnic grounds are particularly detrimental for displaced persons as seen in the case of the Balkans. In Croatia, some displaced persons Serb returnees in particular report facing ethnic discrimination, which they feel constraints most of them from finding a stable employment situation and thus limits livelihoods opportunities (Toal & Carl, 2011).

In Russia, discrimination against ethnic Chechens in particular and people from the Caucasus, in general, is long-standing. Ethnic Chechens have met discrimination with respect to access to employment and to housing opportunities in the private sector, thus reducing their livelihood opportunities. Reportedly, instances in which Chechens have been denied a job based on ethnic grounds are common. According to a recent study, displaced Chechens living in other parts of the Russian Federation mainly find an employment in the informal sector, which prevents them from enjoying equal rights, access to benefits and a sustainable source of income (IDMC, 2008). According to De wet (2009), the challenge surrounding resettlement includes physically displaced people which he argues that emotional attachment that people can feel about their villages and land that their families have lived on for generations cannot be replicated in the resettlement areas because of the social disruptions involved in relocation. Resettlement often involves a change in the pattern of people accesses to resources as well as a change in livelihood strategies. Specifically, such change occurs in patterns of land use, land tenure access to grazing land in rural areas and high transport costs and higher prices in urban areas because as they resettled far away from marketplaces or workplaces (Anderson, 2011).

Peters (2009), moots that, morbidity and mortality is a common feature that affects resettlement. Massive population displacement and resettlement increases vulnerability to illness

and causes serious declines in health levels due to the change in the environment and the unavailability of appropriate health services. Vulnerability to illness also results from an unsafe and insufficient water supply and poor sewerage systems that spread epidemic infections such as diarrhea, dysentery and waterborne diseases. Displacements causes' social stress and psychological trauma are sometimes accompanied by the outbreak of relocation. Related illness infants, children and the elderly are affected disproportional (Cernea, 2000).

According to Kibugi (2011), income is a leading indicator of socioeconomic disparities that is regarded as a crucial factor associated with social conflict and political instability. Social and economic inequalities have been used in different contexts to mean different things. Mulemi (2010), defines economic inequality as inequalities in access to use of land ownership of assets financial, human social or natural resources and inequalities in income levels and employment opportunities. Boone (2012), explains socioeconomic in horizontal and vertical inequalities. According to Boone, Horizontal inequalities are inequalities that exist between culturally defined groups while vertical inequalities exist between individuals. However, both horizontal and vertical affect all individual welfare hence intersection between the vertical and horizontal inequalities.

2.1 Relative Deprivation Theory

This study was guided by relative deprivation theory which focuses on socioeconomic inequality. Lerche, (2013) assert that if people perceive that there is a gap between what they are currently getting and what they deserve to get, it creates discontentment or a conflict. There is a general feeling that the society owes them what they have been deprived. This theory was used by Atuahene, (2009) and Appendini, (2001) to explain that, if the gap is too big for a reasonable group of people within a specific population, there is a likelihood that the people will rebel especially if they have been marginalized from acquiring resources especially land. According to Li, (2009) relative deprivation theory is assumed gaps between individual's value expectations and how they anticipate the value of their capabilities. The origin of the relative deprivation theory stresses the degree of the economic inequality in a community where the squatters feel they have been deprived land that belongs to them by the government or the land grabbers (Levien, 2013). In the case of Talai clan, they allude that they have been deprived land since colonial period and unfair displacement from their ancestral land. The variable economic inequality may not necessarily comprise the poor on one side and the rich on the other. It includes those who are rich on one side and those who are extremely rich on the other. Chakravorty, (2013) emphasizes that, the element of poverty and the degree of poverty is not directly linked to an occurrence of violence in communities. A conceptual framework guided by relative theory has been analyzed whereby the independent variable which is socioeconomic effect. The dependent variable in this study is resettlement of the Talai households. However, the independent variable cannot be achieved because there intervening variables which affect permanent resettlement of the Talai clan such as corruption, various land polices and land grabbing among others. However, this paper would not dwell on intervening variables.

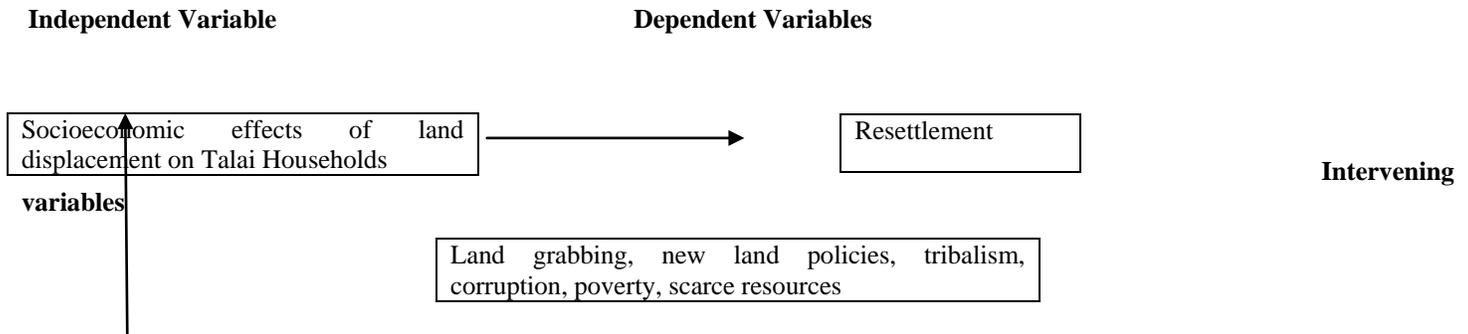


Figure 2:1 Conceptual Framework Showing Interaction of Variables
Source: Researcher, 2018

IV. RESEARCH DESIGN

The study adopted a descriptive survey research design. The descriptive research design was appropriate for it was a fact finding. According to Rea & Parker, (2012), descriptive research has the capacity to describe the present status of a phenomenon, determining the nature of prevailing circumstances, practices and institutions and seeking an accurate description of activities.

3.1 Study Area

The study was conducted in Kericho County in Majengo in Kericho Township location. The County covers an area of 3,224.9km. The study population as per KNBS (2009) was 5,525. The study focused on Talai clan found in Kericho County.

3.2 Data Collection Methods and Instruments

The researcher used both primary and secondary data. Different research instruments were used for the complementary purpose. This ensured a triangulation approach to data collection. Primary data were collected through the use of semi-structured, self-administered standard questionnaires which were used to elicit both qualitative and quantitative data. An interview guide was used during the unstructured in-depth interviews between the researcher and key informants.

3.4 Ethical Considerations

Fraenkel & Wallen, (2006) point out that the term “ethics” in research refers to questions of what is right and wrong in relation to conducting a particular study or carrying out certain procedures so that the researcher is clear on whether there is some kind of studies that should not be conducted. According to Leedy & Ormrod (2005), most ethical issues in research fall into one of four categories: protection from harm, informed consent, right to privacy and honesty with professional colleagues. The researcher safeguarded against these ethical issues by putting a number of relevant measures in place.

V. FINDINGS

4.1 Household Size of Talai clan

In order to determine how many Talai members exist in every household, the respondents were asked to indicate in the questionnaires how many family members lived in one house. Results are summarized in Table 4.1

Table 4.1: Talai Household Size

Size of Talai Households	Frequency	Percentages
0-3	45	15.0
4-6	154	51.0
7-10	75	25.0
More than 10	26	9.0
Total	300	100.0

Source: Researcher, 2018

Table 4.1 indicated that 45 (15%) had between 0-3 people while 154(51%) had between 4-6 occupants. Another 75(25%) had between 7-10 members while a paltry of 26(9%) had more than 10 occupants. These results indicate that there were high numbers of people in Talai households. The results are in tandem with KISIP programme impact assessment report which puts an average household size at 4-6 persons per house in Talai settlement area. The many members in a household can also be attributed to cultural practices where relatives are accorded hospitality in form of extended family. A family that comprised of many individuals is vulnerable to displacement and suffered a higher level during resettlement than that of fewer individuals. Findings by Kasanga & Kwapong, (2011) concur with this, that the higher the households size, the lower the social status and the higher the number of people affected by displacement or resettlement. On the contrary, this may not be necessarily the case as the study established that households with many more members would easily cope with the provision of labour and manpower as casual labourers in multi-national tea plantations and construction sites. This study found out those with many members benefited conspicuously when the squatter settlement area was subdivided into plots. The many the family members, the many the plots allocated to the Talai households.

The FGDs revealed that many households stayed with relatives and many of these children are orphaned and vulnerable

to any displacement. Having a large family could also imply that family planning had not been fully embraced in this informal settlement. It can be concluded that Talai household size can affect permanent resettlement of the Talai clan. It implies that the government has to look for a big piece of land to resettle the growing Talai population once and for all.

4.2 Source of Income

A strong relationship has been observed to exist between the educational attainments of the participants and the kind of employment and occupations they were engaged in.

Occupational characteristics served as the basis for assessment of income and earnings of the participants. The prospect of acquiring employment in the formal sector in Kericho town or outside is becoming increasingly remote for this group, especially for those with low levels of education. The Talai households were asked to indicate their main source of income so as to determine how being displaced has imparted on their socioeconomic life for the last over 50 years. The findings are recorded in Table 4.2

Table 4.2: Talai Source of Income

Source of income	Frequency	Percentages
Farming	72	24%
Bodaboda	82	27%
Tea plucker	44	15%
Employed	12	4%
Manual jobs	34	11%
Domestic	35	12%
Business	21	7%
Total	300	100%

Source: Researcher, 2018

Table 4.2 indicated that 72(24%) said they practiced farming in small scale, while 82(27%) said they earned income through driving motorcycles better referred to as *Bodaboda*, 44(15%) said they were tea pluckers’ in the neighborhood of Talai settlement area. Another 12(4%) were employed either by private companies in town or government civil servants, 34(11%) claimed they earned their income through manual jobs in town such as loading cement, timber among others. Another 35(12%) said they were domestic workers while 21(7%) were running their small business like kiosks and canteen. Despite, the generally low profits, the participants intimated that their trading activities allowed them to meet the everyday expenditures of the household and to fulfill their responsibilities as breadwinners of the family. This study found out that the motorcycle better known as *bodaboda* was a booming business among the youths. This study found out that the main source of income which the respondents were shy to comment on during focus group discussion was brewing and selling the local illicit brew known as *“busaa”*. According to focus group discussion, the main source of income in Talai squatter settlement was sale of illicit brew which was carried out in secrecy because it is illegal according to Penal Code. The finding of this study is similar to that of Oyo, (2014) who found out that squatters living in Zimbabwe earned their living through brewing the local brew. Similarly Doshi (2010) found out that people informal areas consume too much alcohol compare to those leaving in rural base. It can be concluded that the source of income among the Talai was below poverty line and that gave the reason why they engaged in illegal brewing as a source of income.

4.3 Type of Housing and Vulnerability to Diseases

Baarta (2007) asserts that housing condition reflects the socio-economic condition of people. He also emphasizes that the housing quality is an indicator of poverty vulnerability. Respondents were asked to indicate the type of housing they lived in the results are recorded and summarized in Figure 4.1

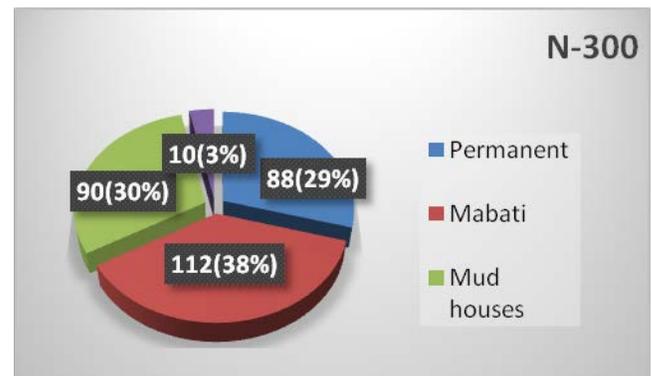


Figure 4.1 Type of Talai Housing
Source: Researcher, 2018

Results in Figure 4.1 indicates that 112(38%) of the Talai family were living in corrugated iron sheets (mabati) houses, while 88(29%) lived in permanent houses. Another 90(30%) lived in mud houses while 10(3%) lived in makeshifts. This finding implies that the housing condition of the population of the Talai clan is not up to standard. The types of dwellings are good indicators of the socio-economic status of the respondents indicating that majority were resourced poor. Kasanga & Kwapong, (2009) alludes to the fact that households leaving in mud houses or makeshifts are vulnerable to diseases, displacement and eviction in the event of a land conflict while

those with permanent housing are more resilient to any eviction. This study established that majority of the housing occupied by Talai clan were either living in mabati house or mud house or makeshifts.

4.4 Psychosocial Effect on Cultural Values

Talai community, the displaced households by the colonial government in 1934 had developed a set of feelings and networks about among the Kipsigis as a geographic and cultural location that emotionally bounded them as one community. Displacement interrupted the feelings of security, belonging and esteem associated with Nandi Kipsigis as their ancestral home. While Doshi (2012), observed that the aim of resettlement is to minimize the disturbance of community's routine culture, evidence from this study has shown that forced removal always shattered community cultural practices and assets in a study he carried out in the informal sector in Mumbai-India. For example, the cultural relationship between Talai Kipsigis was bounded on mutual help mechanisms under the trusteeship of (Orkoiyot) system. Their exited cultural mobilization of labour through various forms of "morik" (work parties) fastened the families together in their former origin in Nandi County according to (Toweett, 2009). This was partly because social connections and mutual help largely depended on mutual trust developed over staying together as a community for a long time.

This study found out that the Talai suffered from trauma which this study observed emotions during interviews and FGDs through emotional comments and expression by shedding tears. This study found out that their culture has been violated in cases where sons and daughters, including wives in a polygamous family, were forced to share bedrooms in their current squatter settlement because the sizes of their house comprised of one or two bedrooms. According to Deinniger, (2012), in his book "Attachment to Place and the Representation of the Life Course by the Elderly" he alludes that the displaced are normally attached to their original home to an extent of willing to die than be taken to a new area. Globally, according to Koen (2012) in a study, he carried out in Eastern Congo on displaced families. Koen found out that Psychosocial cultural disruption of involuntary displacement always inflicts psychological mental torture on the displaced. Even more damaging is the case of forced displacement dispossession and resettlement according to (Oliver, 2009). It can be concluded that Talai has suffered cultural erosion since displacement and squatting is not part of the Kalenjin culture (Toweett, 1979).

4.5 Access to Credit for Development

Credit is borrowed funds with special repayment terms regarding interest rates, installment sizes, and repayment frequency. Individual credits may be provided to individuals on their ability to provide evidence of their capacity to repay such strong cash flows or collateral. This study sought to establish if Talai households had the economic power to access loans for development. The results are recorded in Figure. 4.2

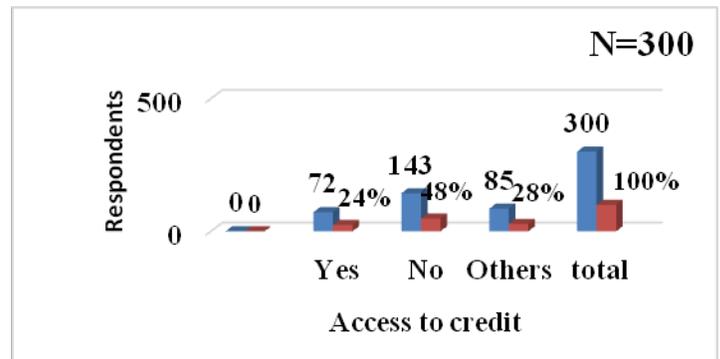


Figure. 4.2 Access to Credit
Source: Researcher, 2018

The results in Figure. 4.2 revealed that 72(24%) of the respondent were able to access credit from banks, SACCOs and other government funding, 143(48%) said no while 85(28%) said they access to credit through their own personal arrangements such as "chamas". The respondents claimed that it was difficult for them to access bank credit because the plots the government allocated did not have titles. Even those with titles they have a challenge of getting loan guarantors. When asked whether they benefited from government funding such as Youth Fund and Uwezo fund, the youth in focus group discussion said they were discriminated when it comes to funding. In corroborating the findings, focus group discussion, had this to say

We have formed our own association of the Talai community where we loan ourselves up to hundred thousand Kenya shillings. We noticed we were discriminated in government funding like Uwezo and Youth Fund. No bank can give us loan for development because we do not have land security title deeds to our plots (FGD held on 17th January, 2018 at study site)

VI. SUMMARY

It was also established that socioeconomic effect of land displacement on Talai households was immense. The plot sizes allocated to the Talai clan are too small for a household of more than six children who are married with families. This study found out that 85% of the Talai households were affected by socioeconomic challenges making them vulnerable to diseases, discrimination, among others. This study established that Psychosocial trauma had affected the Talai clan since they were unable to practise their cultural factors such as burial rites, intermarriages, and initiation rites for men due to socio economic challenges. This study established they did not have where to bury their people, or where they carry out initiation rites of their young boys due to the urbanization and upgrading projects aimed at improving the informal settlement area. The effect of trauma could be expressed by shedding of tears during focus group discussion. This study established that the plot sizes allocated by the government did not have security titles exposing Talai clan to become vulnerable to plot buyers who pay fewer amounts and resell it for higher prices. Because of their level of education, accessing to employment in Kericho town requiring technocrats posed a challenge since this is a community. The size of

households was more than 5-6 members, meaning that there was a high population of families living together in small plots.

VII. CONCLUSION

The socioeconomic effects of land displacement on Talai households in squatter settlement have made the Talai become vulnerable to socioeconomic challenges ranging from source of income, titles security, and rise in the land rates, and psychosocial trauma. The current settlement has been subdivided to small plots with no tenure security. Plots sold by some Talai have led to infiltration of non Talai clan due to plots which are up for sale. Source of income is a challenge as a result they are forced to seek casual jobs in Kericho town such as loading working in constructions building and plucking tea to fend for their families while, others have turned into brewing illicit brew as a source of income.

VIII. RECOMMENDATION

Socio-economic effects of land displacement on the Talai households in squatter settlement, based on this there is a need for improvements in the socio-economic conditions which have multiple consequences on the livelihoods, well-being and housing conditions which were in a dilapidated state. The implications were manifested in the social and economic conditions of the affected people by their source of income, number of the households, and access to credit, waste disposal and house structures. There is need to improve housing in Talai squatter settlement area through giving them loans to construct better housing. This will empower them when they earn income from rental houses. The government should fast track and waive charges for title processing for this community since they cannot afford the fee. If they are issued with titles they are able to access financial assistance from the bank which many do not have the capacity and possession. The landless people are the poor and there is a need for the establishment of the subsidized loan-scheme to advance credit to enable them to purchase land elsewhere. The government should provide counseling services to this community because they have suffered the longest historical injustices. Counseling would promote cohesion and acceptance to move to alternative resettlement.

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Factors Affecting the Performance of Polytechnic Institutions in Sierra Leone

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Abstract- This study critically examined the factors affecting the performance of Polytechnic Institutions in Sierra Leone; the study takes in to considerations both internal and external factors hindering the performance of Polytechnic Institutions. There were 200 respondents drawn from four Polytechnic Institutions including males and females. Meanwhile, the study was preceded by a pilot study and specifically focusing on performance of Polytechnic Institutions. Questionnaire informed by instruments used in earlier studies Klass (2007) and Samuel (2008) were adapted and modified to suit the pilot study. A questionnaire constitutes questions on performance of Polytechnic Institutions and its effects on the educational standards in Sierra Leone. Results indicate that polytechnics are essentially paramount and contribute significantly to the sustenance of Sierra Leone's economy. The study found out that polytechnic Institutions performance is hindered by both internal and external factors.

Index Terms- Polytechnic, performance, education, institution, training and teaching

I. INTRODUCTION

Polytechnic Institutions are part of the tertiary institutional network responsible for training of middle level manpower in Sierra Leone to fill in the vacuum currently existing within both private sectors and government parastatals. Polytechnic Institutions in Sierra Leone could be categorized based on their establishment : the first premier Polytechnic Institution established was the Milton Margai College of Education and Technology in 2001 and it comprises three Campuses; viz: Goderich Campus, Congo Cross and Brookfields Campus respectively. Furthermore, the Eastern Polytechnic and Freetown Polytechnic were also established in 2001. Meanwhile, the Freetown Polytechnic is yet to be fully functional whilst the Makeni Polytechnic and Port Loko Polytechni have now formed a merger to form the Ernest Bai Koroma University of Science and Technology.

Like all formal organisations, tertiary institutions of which polytechnics are part, it comprised a number of attributes such as: goals, technologies, programmes and courses. Oshagbemi (2000) argues "that the achievement of organisational goals is dependent on the availability of a qualified and competent work force". This view is reinforced by an Expert Group (EG 1998) when they assert that: "a highly skilled and motivated work force is essential to maintain globally competitive". The core

objectives of Polytechnics in Sierra Leone are to: train the middle level manpower with the necessary skills in Science, Technology, Engineering and Mathematics. The capacity of Polytechnics Institutions to fully meet the aforementioned objectives lies squarely on the quality and quantity of its workforce. Polytechnic Institutions were established as part of Sierra Leone's educational system to reduce the high rate of illiteracy and to make Tertiary Education more accessible to the huge quantum of youths waiting to be educated at the door-steps of the then few tertiary institutions.

There are currently Four regional polytechnics in Sierra Leone namely: Milton Margai College of Education and Technology, which is a premier, located out skirts of Freetown, Eastern Polytechnic, and located in the Eastern region of Sierra Leone in Kenema Town, Makeni and Port Loko Polytechnic Institutions (currently merged and formed Ernest Bai Koroma University of Science and Technology; EBKUST) Freetown Polytechnic, which is yet to be a functional Institution. Between 2001 and 2017, polytechnic institutions have increased their programmes, courses, campuses and staff strength. Furthermore, since the establishment of polytechnic institutions in 2001, there has been no significant research under taken to assess their impacts with respect to their roles and contributions to national development. Also, these polytechnics are plagued with both internal and external myriad of problems. Internally, lack of physical and infrastructural facilities, poor institutional management, low capacity building of staff, persistent industrial actions by Junior and Senior Academic Staff, and high staff turnover. Externally, inadequate funding; poor conditions of service for all categories of staff; negative public perception; under representation, academic progression of graduates, job placements of graduates and coupled with delay in payment of subvention and the high influence of national politics in the affairs of these Polytechnic Institutions. These external factors have caused a significant brain drain. Therefore, to maintain qualified workforce in the polytechnic institutions, there must be adequate support from the external bodies if polytechnics are expected to be successful. As a result of these inadequacies, polytechnics are experiencing a massive brain drain. For Allen (2002), "labour turnover mirrors the rate at which an employer gains or losses employees". The cost involving in replacing a trained, qualified and certified is not only financially challenging but also time consuming to address such situation.

The impact of turnover is strongly expressed by Guin (2004) as follows: "Attracting qualified people who do not stay

on the job is dysfunctional from the organisation's point of view because this kind of turnover uses up money, time and resources. Attracting unqualified people is costly because they have to be processed and ultimately rejected frequently resulting in their forming a negative impression of the organisation." A noticeable worrying trend is the fact that polytechnics invest training resources on employees only to lose them to other employers. Lochhead and Stephens (2004) assert that "when a business loses employees, it is not only robbed of skills and experiences but essentially its 'corporate memory". They further argue that, the scale and nature of staff losses is a critical management issue since its effect does not only affect productivity and profitability but extends to product and service quality. Replacing experienced work force with an inept work force affects considerably both the administration and trainees in the polytechnics. However, due to the massive brain drain in polytechnics, their sustainability is highly critical and threatened

II. LITERATURE REVIEW

2.1. The Evolution of Polytechnic Education

The question of polytechnic education is closely connected to the problem of updating the relationship between general and vocational education. Although a specific form of polytechnic education, a form shaped by the given historical period as well as by the development of crafts, trade and a newly self-asserting social class, can be found in the works of J. A. Comenius during the late Renaissance, the phenomenon aggressively asserted its importance towards the end of the 19th century in connection with the growing industrialisation (S. Hessen, 1936). The earliest forms of polytechnic education can further be found in the works of J. Pestalozzi and the Philanthropist movement. The question of polytechnic education became even more acute after the First World War, in particular in relation to the reconstruction of national economies, but also in relation to the attempts to establish new economies in the USA and the former USSR (P. P. Blonskij, see Dýma, 1975). Any viable analysis of the work school as a concrete example of implementing the need for polytechnic education must further take into account the conception of Th. Litt (1958; see too F. Singule, 1992) who identifies experiencing, direct living-through, and the expression of real life as the characteristic features of the work school. The ideas of our predecessors concerning the definition of the term polytechnic education, ranging from the inclusion of handicraft activities to the transfer of class instruction to manufacturing facilities, stand much removed from our recent position. The questions connected with the concept of polytechnic education are thereby articulated on the level of creativity, although in the given concept of production, this represents only its elementary layer.

The idea of a productive school in Germany, but other countries back in the 90s of the last century, though other reasons are purely economic nature. It solves the issue of having enough skilled workers in technical fields and services. They talk about the so called dual education system, which is intended to reduce youth unemployment.

Theoretical training takes place in state and public educational institutions and provides practical training, including economically, businesses. The basic feature of the dual system is

that the student has a dual status – at the school has a pupil position, and at the company has concluded a contract of employment. Without polytechnic education, however, this system cannot do, because it assumes that students have a deeper relationship mastery of the technique, not only at the user level. This assumes recovery polytechnic education in the full breadth of that term in primary and lower secondary education (Pícl, 2014; MŠMT&NÚV, 2015)

Polytechnic education has become more topical in relation to the mass dissemination of digital technologies, their impact on human personality and social relations, but also in connection with the growing professionalization and intellectualisation of manufacturing processes, and the widening gap between humans and their physical environment. The digitalisation of society has further changed the traditional conception of industrial production. Traditional producers and working men have become lab technicians, specialised workers, assistants and employees in the sense of white-collar workers. Digitalisation influences socialisation and has thereby introduced a new dimension into social relationships precisely because these relationships can exist primarily as facilitated by digital technologies. On the other hand, digital technologies seem to provide more space for creativity; however, in reality, digital technologies in fact also limit and hinder creativity. Furthermore, this process sidelines physical and mental pre-dispositions for manual skills which in the past constituted the foundation of the ethnographic, folkloristic, and cultural heritage of a given society.

A polytechnic college by definition is an institution offering higher education in a wide spectrum of subjects which are predominantly technical in nature. In comparison to mainstream study, a polytechnic college aims more at applied aspects of education and less at the theoretical ones. A great majority of polytechnic colleges offer polytechnic diplomas and courses in vocational and technical subjects. One of the features of polytechnic education is the strong emphasis on practice-based learning. Work attachments with industry partners are part of the curriculum and can vary in duration from six weeks to six months or longer for selected courses. These work attachments will enable you to gain valuable on-the-job experience and provide you with opportunities to work with industry experts.

In addition to academic knowledge, the Polytechnics also emphasize the acquisition of certain important life skills. These are the key skills of communication and presentation as well as problem-solving skills. These are intended to develop the students' confidence and critical faculties which are necessary if they are to be effective participants in society. Students will also learn to develop original and creative thinking and to behave as responsible young adults

2.2. The importance of Polytechnic Institutions to National Development

Researchers agreed that for sustainable development to ensue in any country, it needs a diversified educational system (Bennell 1996); including technical education. Education enhances human capacities of the citizenry and thus increases the skilled workforce for rapid development. Dike (2009) argues that technical education is crucial to national development. There is growing awareness of the contributory potentials of technical

vocational educational training to national development (Tansen and Monzur 2012).

However, Colin (1999) contends that having a technical vocational educational system *per se* will not guarantee national development and prosperity unless it is backed up by sustainable funding, quality faculty and facilities. Likewise, Mustapha (2002) has observed that the global competitiveness of any nations is shaped by the quality of its workforce. Arguing, Bennell (1996) underscores the importance of technical education as it emphasis practical know-how and thus inculcates in learners practical knowledge, skills and other temperaments desirable for the world of work. Similarly, Akyepong (2002) identified technical vocational educational training as a tool for addressing the economic, political, socio-cultural stability of national development.

Globally, India has one of the largest stocks of quality technical human resources. Albeit, the number is disproportionate to its population (Goel 2007). India's technical education has benefited the nation in many ways. First, its vibrancy has not only made it an important global investment destination for multi-national companies, but it has opened up employment opportunities for nationals. For instance, Bloom (2002) claims that flowing from the investments of multinationals; the Bangalore city alone has created about 80,000 jobs. Individuals employed contribute revenue directly or indirectly to national development. Nations with strong technical education bring in its wake the generation of local and foreign exchange (FE) needed for economic growth. Also, training locally brings about savings in FE that would have been used to secure the services of expatriates.

2.3. Management of Polytechnic Institutions in Sierra Leone

All polytechnic **Institutions** in Sierra Leone are referred to as subvented institutions, this means government provide the required funding for the smooth running of all Institutions and determines what fees candidate must pay per programme. Polytechnic Institutions are manned by their respective Councils, who are charged and sole employing authorities and meet when deemed necessary. Each of these Polytechnic Institutions is headed by a Principal, Vice Principal, Registrar, Senior Finance Officer, Deans of Faculty, Heads of Department, In the case of the premier Polytechnic, Milton Margai College of Education and Technology that comprises three Campuses have Dean of Campus that manage the affairs of his/her Campus and report when and where necessary to administration during one of their several meetings. All of these Polytechnics have a Senior Staff Association charged with responsibility of seeking the welfare of its members and as a result, such academic staff is represented **on the Polytechnic Council Meeting by their Presidents**. The five associations have formed an umbrella association to consult with the appropriate authorities on staff matters.

III. RESEARCH METHODOLOGY

3.1 Introduction

This chapter intends to give a brief description on how the study was carried out. The chapter describes the area of study; population; sampling technique; and methods of data collection; the unit of inquiry investigated, research design and

research procedure used and also the methods of data analysis applied.

3.2. Research Type and Approach

Kothari (1990) says that there are two basic approaches to research, quantitative and qualitative approach. The researcher used both the qualitative and quantitative approaches to analyze the data collected.

The qualitative approach was used because the study was concerned with an assessment of the performance of Polytechnic Institutions in Sierra Leone. The aim was to find out reasons why Polytechnic Institutions behave the way they do. First the researchers tried to see why most Polytechnic Institutions are not performing better, then asked the Polytechnic Institutions concerned if they are aware of problems in their sister Polytechnic Institutions. In depth questions seeking open-ended answers were used to get direct to the point without guiding their views. This approach enabled the researchers to get insights and impressions as the conclusion from what answers were found. However, a quantitative approach was used seeking structured responses that could be summarized in numbers like averages and percentages. The researchers used the Statistical Package for Social Sciences (SPSS version 16) in analyzing the data collected.

3.3 Study Design and area of Study

The study is an assessment of the factors affecting the performance of Polytechnic Institutions in Sierra Leone. The researcher chose all the Four Polytechnic Institutions based in Sierra Leone because these educational institutions offering courses to meet the current market demand and constituted the highest populated institutions in Sierra Leone

3.4. Study population

3.4.1. Population characteristics of Polytechnics

Two of the Polytechnics are based in Freetown with approximately academic staff strength of four hundred (400) and the other three with staff strength of two hundred (200) including male and female

3.5. Sampling Unit

The study targeted four geographical areas; North, South, East and Western Area which are all in Sierra Leone. The investigation involved academic staff and administration in these Polytechnic Institutions.

3.6. Variables and their Measurements

These Polytechnic Institutions were measured by adapting scales developed by the type of courses offered, duration, managerial competence and the Polytechnic itself. As a variable, the type of performance included delivery of lectures, academic staff attitude towards their work and performance of students in external examination. Managerial competence measurement was in terms of education levels and experience/ skills.

3.7. Sampling Procedure and Sample Design

The research considered the costs that would be incurred in the sampling analysis; namely cost of collecting data and the cost of an incorrect inference. This was done carefully by

selecting a sampling technique that would minimize both sampling errors and systematic bias. Sample design was taken by considering representation and element selection based on the nature of the population of the study, and problem definition, the sample designs tied to the non-sampling and require selection of Polytechnics. Therefore the researchers used a sampling for a fixed number of academic staff that was being sought from the Polytechnics.

3.8. Sample Size

The researcher surveyed Four Polytechnic Institutions and two hundred (200) academic staff were targeted Fifty (50) from each Polytechnics. The researchers considered this number as an optimum sample that fulfilled the requirements of effective and efficient representation, reliability and flexibility. The size of sample was achieved in consideration of cost and precision desired.

3.9. Sampling Technique

The study used a convenience sampling technique because the researchers wanted to reach the academic staff of these Polytechnic Institutions who are convenient or reachable to participate in the study. Thus, convenience sampling technique was the one feasible for the study.

3.10. Types and Sources of Data

This research included both primary and secondary data sources

3.10.1. Primary Data

The researchers used interview, questionnaires and observation. The questionnaires were distributed to academic staff and administration, especially those who did not have enough time for interviews. The interviews were granted to heads of Polytechnic Institutions, Deans of Faculties and Campuses who had time. The observations were conducted to academic staff of these institutions that were too busy with daily activities or unwilling to cooperate with the researchers.

3.10.2. Secondary Data

Secondary data in this research was obtained and gathered through Polytechnic documents, pamphlets, books, journals and other sources which were obtained from the library. More than one method of data collection method was used because there was no single method that claimed to offer convincing information.

3.11.0 Data Collection Methods

Data collection methods used in this reward was observation, questionnaire and interview. This research design helped the researchers to get in-depth information relating to the topic in this study.

3.11.1 Interview

The researcher interviewed several Deans and Heads of Department that didn't have time to respond to the questionnaires

3.11.2 Observation

The researchers observed these Polytechnic Institutions when they were too busy with their activities; visited different Campuses, especially at the end of the term or semester so it can be observed how internal exams are conducted.

3.11.3. Documentary

Different documents were reviewed, including Journals and several publications from UNESCO-TVETs section, library research and relevant books at the University of Sierra Leone, Fourah Bay College Campus.

3.11.4. Questionnaires

About 200 questionnaires were distributed to specific academic and administrative staff that would surely return them back. The researchers used kind language, respect, and were member of staff to one of the Premier Polytechnics. All this made it possible for all the questionnaires to be answered.

3.12.0 Data Processing and Analysis

3.12.1 Data Processing

Raw data are meaningful after being processed. The categorization and application of categories are done through coding, tabulation, drawing inferences which have been done by using Statistical Package for Social Science.

3.12.2 Data Analysis

The researchers used the quantitative method of data analysis which aimed at determining relationship between variables of research data. All data collected have been organised and checked before they are presented and analysed to ensure completeness, accuracy, and validity. By completeness, it means all questionnaires were checked to see whether all questions have been answered and handed - over. Either, questions were checked if they are complete and the meaning corresponds to the data needed. By clarity, it means data were checked if they are correct and correspond to the question's requirements. By validity, data were checked in terms of time reported and if they conform to the objectives of the study. This has facilitated proper presentation in terms of tabulation, charts and graphs generation and computation of percentage and frequencies through SPSS version 16. Discussion and Analysis were done in accordance with percentage and frequencies generated and interpreted accordingly. By so doing, the researchers were able to discover whether data collected or information provided has been in alignment with the stated research objectives and questions. The method of data analysis was descriptive in most cases.

IV. RESULTS AND DISCUSSIONS

In order to achieve the aim of this research, the researcher administered a structured questionnaire as the main data collection method. The questionnaire provided rich information derived from descriptions and explanations of events that occurred within a specific subject's environment. The researcher examined the interview data against the approaches and strategies referred to in the literature review. The analysis is in two sections; demography of respondents and research questions. Two hundred and fifty (250) questionnaires were administered,

only two hundred (200) were returned filled which makes 80% respondent rate.

Table 1.Respondents per Polytechnic

	Frequency	Percent
Milton Margai College of Education and Technology	85	42.5
Port Loko Teachers College	25	12.5
Eastern Polytechnic	40	20.0
Northern Polytechnic	30	15.0
Freetown Teachers College	20	10.0
Total	200	100.0

Table 1 from above reveals that, 42.5% of the respondents contacted are from Milton Margai College of Education and Technology, 12.5% from Port Loko Teachers College now a Campus of the Ernest Bai Koroma University, 20% from Eastern Polytechnic, 15% from Northern Polytechnic now a Campus of the Ernest Bai Koroma University and 10% from Freetown Teachers College. It can be concluded that majority of the respondents contacted were from Milton Margai College of Education and Technology, Reasons being that, it was the first Polytechnic established in Sierra Leone and comprise three (3) Campuses namely Goderich, Congo Cross and Brookfields

Table 2.Gender of respondents

	Frequency	Percent
Male	120	60.0
Female	80	40.0
Total	200	100.0

Table 2 from above reveals that 60% of the respondents contacted for this research are males and 40% are females. It can be concluded that majority of the respondents contacted were males as compared to their female counterpart. The reason being that most of the courses offered by these Polytechnics are engineering bias and as a result female lecturers are mostly found in departments like Languages, Education, Home Economics, Business Studies, Secretarial Studies, Catering Guidance and Counselling.

Table 3.Age group of respondents

	Frequency	Percent
18 years - 30 years	5	2.5
31 years - 43 years	40	20.0
44 years - 56 years	85	42.5
57 years - 69 years	60	30.0
70 years and above	10	5.0
Total	200	100.0

Table 3 from above reveals that 2.5% of the respondents contacted are within the age group between 18 years – 30 years, 20% are between 31 years – 43 years, 42.5% are between 44 years – 56 years, 30% are between 57 years – 69 years and 5% are within 70 years and above. It can be concluded that majority of the respondents are between 44 years – 56 years as compared to above 70 years. The reason being that, 70 years and above is being considered as retirement age and few of such lecturers are found in these Polytechnics.

Table 4.Length of service

	Frequency	Percent
1 year - 5 years	20	10.0
6 years - 10 years	40	20.0
11 years - 15 years	70	35.0
16 years - 20 years	60	30.0
21 years and above	10	5.0
Total	200	100.0

Table 4 from above reveals that 10% of the respondents contacted have worked with their Polytechnic between 1 year – 5 years,20% between 6 years – 10 years,35% between 11 years – 15 years,30% between 16 years – 20 years and 5% within 21 years and above. It can be concluded that majority of the respondents have worked between 11 years – 15 years as compared to above 21 years. The reason being that these Polytechnics were established from 2002 and those who have served over 21 years were working before the college was transformed into Polytechnic.

Table 5.Educational background of respondents

	Frequency	Percent
Below first degree	30	15.0
First degree	50	25.0
Master	90	45.0
Ph.D	10	5.0
Others	20	10.0
Total	200	100.0

Table 5 from above reveals that 15% of the respondents contacted are in the category of below first degree,25% are holders of first degree,45% are holders of master,5% are holders of Ph.D. and 20% are in the category of others such as holders of professional qualifications like ACCA.It can be concluded that majority of the respondents contacted were holders of master’s degrees as compared to Ph.Ds. The reasons being that,Ph.D courses cost are not easily affordable excepts through a scholarship schemes which are not easy to secure.Secondly,the duration and most courses are not offered in Universities in Sierra Leone .Thirdly, it is now becoming compulsory for any lecturer in the Polytechnic to be at least a master holder.

Table 6.Current position held

	Frequency	Percent
Principal	5	2.5
Vice Principal	5	2.5
Registrar	5	2.5
Deans of Faculty	20	10.0
Deans of Campus	5	2.5
Heads of Department	60	30.0
Heads of Unit	80	40.0
Exams Officer	5	2.5
Examination Task Force	5	2.5
Finance Officer	5	2.5
Others	5	2.5

	Frequency	Percent
Principal	5	2.5
Vice Principal	5	2.5
Registrar	5	2.5
Deans of Faculty	20	10.0
Deans of Campus	5	2.5
Heads of Department	60	30.0
Heads of Unit	80	40.0
Exams Officer	5	2.5
Examination Task Force	5	2.5
Finance Officer	5	2.5
Others	5	2.5
Total	200	100.0

Table 6 from above reveals that 2.5% of the respondents contacted are Principals, 2.5% are Vice Principals, 2.5% are Registrars, 10% are Deans of Faculty, 2.5% are Deans of Campus, 30% are Heads of Department, 40% are Heads of Unit, 5% are Exams Officers, 2.5% are Examination Task Officers, 2.5% are Finance Officers and 2.5% are others like Public Relation Officers, Estate Officers, Performance Contract Focal Persons, Procurement etc. It can be concluded that majority of the respondents contacted were Heads of unit .The reason being that there many Units under a Department.

Table 7.Designation of respondents

	Frequency	Percent
Below lecturer	25	12.5
Lecturer 1	30	15.0
Lecturer 2	70	35.0
Senior Lecturer	40	20.0
Principal Lecturer	20	10.0
Senior Principal Lecturer	15	7.5
Total	200	100.0

Table 7 from above reveals that 12.5% of the respondents contacted are below lecturer,15% are lecturer 1,35% are lecturer 2,20% are Senior Lecturers,10% are Principal Lecturers and 7.5% are Senior Principal Lecturers. It can be concluded that majority of the respondents contacted were in the category of Lecturer 2 as compared to Senior Principal. The reason being that promotions within these Polytechnics are now pegged to qualification, length of service and publications and most of those in the category of Lecturer 2 are staff that has no publication.

Table 8. Approximate monthly salary

	Frequency	Percent
Le 1,500,000 - Le 2,000,000	15	7.5
Le 2,500,000 - Le 3,000,000	65	32.5
Le 3,500,000 - Le 4,000,000	50	25.0
Le 4,500,000 - Le 5,000,000	30	15.0
Le 5,500,000 - Le 6,000,000	20	10.0
Le 6,500,00 - Le 7,000,000	10	5.0

Le 7,500,000 and above	10	5.0
Total	200	100.0

Table 8 from above reveals that 7.5. % of the respondents' contacted salary is between Le 1,500,000 – Le 2, 000, 000, 32.5% between Le 2,500,000 – Le 3,000,000,25% between Le 3,500,000 – Le 4,000,000 ,15% between Le 4,500,000 – Le 5,000,000,10% between Le 5.500,000 – Le 6.000.000,5% between Le 6,500,000 – Le 7,000,000,5% within Le 7,500.000 and above. It can be concluded that majority of the respondents contacted were within the salary bracket of Le 2,500,000 – Le 3,000,000 which means that comparing to the economic trends of things in the country this amount is inadequate and has a negative impact on the performance of staff in these Polytechnics.

Table 9. Access to personal computer with internet facility

	Frequency	Percent
Access with Internet	30	15.0
Access without Internet	70	35.0
No access	100	50.0
Total	200	100.0

Table 9 from above reveals that 15% of the respondents contacted have access to computer with Internet, 35% have access to computer without Internet and 50% have no access to computer. It can be concluded that majority of the respondents contacted have no access to computer and this can affect their level of performance. The reasons being, that the cost of laptop computers with internet facilities are relatively higher than the one month salary of some lecturers.

Table 10. Publication

	Frequency	Percent
None	140	70.0
1 - 5	35	17.5
6 - 10	20	10.0
11 and above	5	2.5
Total	200	100.0

Table 10 from above reveals that 70% of the respondents contacted have no publication, 17.5% has published between 1 – 5, 10% has published between 6 – 10 and 2.5% had published within 11 and above. It can be concluded that majority of the respondents contacted has no publication and the reason for this could be lack of interest, lack of knowledge and skills, cost of publication, inadequate support for publication from these Polytechnic authorities, the absence of recognised publication journals either in the country or the Polytechnics.

Table 11. Professional Body

	Frequency	Percent
None	140	70.0
Associate Member	30	15.0
Member	20	10.0
Fellow	10	5.0
Total	200	100.0

Table 11 from above reveals that 70% of the respondents contacted are not member of any professional body both at home and abroad, 15% are Associate Members, 10% are Members and 5% are Fellows. It can be concluded that majority of the respondents contacted were not member of any professional body. The reasons are associated with yearly subscription and their perception about the benefits one will derive from being a member of a professional body. This makes them not fully aware of latest development with the industries they found themselves.

Table 12. Internal problem

	Frequency	Percent
Inadequate funds	40	20.0
Inadequate learning and teaching materials/equipment	30	15.0
Inadequate accommodation and other facilities	30	15.0
Poor institutional management	50	25.0
Slow capacity building	20	10.0
Weak linkage with outside institutions	10	5.0
Corruption	5	2.5
Unattractive courses	15	7.5
Total	200	100.0

Table 12 from above reveals that 20% of the respondents contacted on internal problem indicated inadequate funds either from government or internally generated, 15% indicated inadequate learning and teaching materials/equipment, 15% indicated inadequate accommodation and other facilities, 25% indicated poor institutional management, 10% indicated slow capacity building, 5% indicated weak linkage with outside institutions, 2.5% indicated corruption and 7.5 indicated unattractive courses. It can be concluded that majority of the respondents indicated poor institutional management such as recruitment process of staff, putting their personal interest over the institution, putting square pegs in round holes, mismanagement of funds generated internal and from government, transparency and accountability, favouritism, wrong decision making and failing to address issues and targeting individuals etc.

Table 13. External problem

	Frequency	Percent
Inadequate fund from government	80	40.0
Delay in payment of salary	50	25.0
Political interference into Polytechnic management	40	20.0
Conditions of Service	30	15.0
Total	200	100.0

Table 13 from above reveals that 40% of the respondents contacted on external problem indicated inadequate fund from government. 25% indicated delay in payment of salary, 20% indicated political interference into Polytechnic management and 15% indicated Conditions of Service. It can be concluded that majority of the respondents indicated inadequate fund from government. The reason being that the money allocated to these Polytechnics is small and not paid on time. As a result they are unable to construct or rehabilitate building, purchase adequate furniture, under take developmental projects etc.

Table 14. Negative impact on the Polytechnic

	Frequency	Percent
Internal conflicts	60	30.0
Poor service delivery	70	35.0
Bad public image	30	15.0
High level of malpractices	40	20.0
Total	200	100.0

Table 14 from above reveals that 30% of the respondents contacted on the negative impact on the Polytechnic indicated internal conflicts, 35% indicated poor service delivery, 15% indicated bad public image and 20% indicated high level of malpractices. It is apparent that poor service delivery is one of the major causes of the negative impacts on the polytechnics. Polytechnics are limited in their activities due to the above highlighted problems

Table 15. Negative impact on graduates

	Frequency	Percent
Struggle to acquire knowledge/skills	70	35.0
Difficult job placement	30	15.0
Academic progression becomes difficult	40	20.0
Incompetence	60	30.0
Total	200	100.0

Table 15 from above reveals that 35% of the respondents contacted on the impact on graduates indicated struggle to acquire knowledge and skills, 15% indicated difficult job placement, 20% indicated academic progression becomes difficult and 30% indicated incompetence. It can be concluded that majority of the respondents indicated struggle to acquire knowledge and skills. The reason being due to the above highlighted problems graduates are now finding it difficult to understand simple concept or demonstrate simple practical due to the lack of facilities

Table 16. Negative impact on the country

	Frequency	Percent
Under development	70	35.0
Hiring of expatriates	40	20.0
Unemployment	60	30.0
Others	30	15.0
Total	200	100.0

Table 16 from above reveals that 35% of the respondents contacted on the negative impact on the country indicated under development, hiring of expatriates, 30% indicated unemployment and 15% indicated others such as high dependency rate on families and government, the increase of social evils etc. It can be concluded that majority of the respondents indicated under development, the reason being that the rate of the country development is hinged on its middle level man power

performance of these Polytechnic Institutions in Sierra Leone. The researchers are of the view that there are other internal factors that are critically crucial to their performance such as competence of staff, development of their capacity and many other factors therefore need to be addressed in future research. Polytechnic Institutions should therefore be committed and willing to develop strategies that will enhance their performance.

V. CONCLUSION

In this research work, an attempt was made to identify factors that affect the performance of Polytechnic Institutions in Sierra Leone. The researchers focused on both internal and external factors and noticed that they are crucial in producing skills manpower for national development. Even though analysis of the data using descriptive statistics proved that: no access to laptop computers with internet facilities, inadequate funds, poor institutional management, inadequate learning and teaching materials/equipment, inadequate accommodations and other facilities, delay in payment of salary and political interference into Polytechnic Institutions management are found to affect the

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Party-Based Local Government Election in Bangladesh: Problems and Comprehensive Solution

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Abstract- This study has been conducted to provide a better understanding of party-based local government election that is an integral part of the body of politics in Bangladesh. Local government was always there in Bengal but its' forms differed from time to time. The governments of ancient and medieval Bengal were heavily dependent on village institutions, which made the structure of the local government. This study is an effort specifically to investigate about the political participation of local government; its problems and comprehensive solution. Different kinds of problems rigorously restricted the local government system from realism such as financial control, interruption of politician, corruption, central government control and limited budget. Recently politicization leads to changes political culture at the local areas of Bangladesh. Party- based local government elections and party symbol in local elections is not democratic culture. Many scholars and civil society members threw question in this system. The study has been conducted depending on secondary sources of data such as related articles, Newspapers, Journals, books etc. Moreover different scholars' views have been included so that a comprehensive solution strategy can be provided properly.

Index Terms- Government Institution, Local Government, Local Level, Party-based Election, and Political Party.

I. INTRODUCTION

Local government is an administrative body in which a majority of contexts, exists as the lowest tier of administration within a given state. The success of any country's socio-economic and political development depends not only on central government but also local government. The power of local government is concerned with legal authority, financial autonomy central-local relations, personality and politics. Local government institutions have a great role for ensuring strong democracy. The local government bodies had never been independent Bangladesh. Since the emergence of Bangladesh it can be pointed out easily that units are being used by the periodical governments for its own political gains [1]. A great change occurred in the political culture of Bangladesh that party-based and party symbol elections are conducting in local government. Gradual politicization of local government institution is a serious threat to democracy. Local government is gradually weakening in Bangladesh [2]. The institutions of local government should free from politics to ensure democracy at grass-roots. Local government can help to establish democratic process and practice as well as ensure participatory development at grass-roots. Without any doubt, local government has a tremendous role to play in the efficacious existence and maturation syndrome of democracy. Local government also depends on central government to run its overall business. So, central government should keep local government free, non-partisan & participatory. Therefore, this paper tries to show the party-based local government election, its present scenario, problems and comprehensive solution.

II. STUDY METHODS

The aim of this paper is to discuss the political participation of local government. In this regard, the problems of local government election have been discussed and some policy recommendations have been suggested to overcome this problem. This paper has been written based on secondary materials i.e. related journals, books, newspapers, reports and Internet. Information has been presented in this study on the basis of various works, which have been done on local government. The study also used data from different website. In this study qualitative information has been used to explain the problems of party-based local government election and to find out the solution for effective & efficient local government system in Bangladesh.

III. STUDIES AND FINDINGS

A. Local government meanings

Local government is the administrative body of a particular country or district, with representatives by those who lived there. Collins English dictionary defines 'Local government is the system of electing representatives to be responsible for the administration of

public services and facilities in a particular area'. The United Nations Organization (UNO) defines Local government as 'The term Local Government refers to a political subdivision of a nation or a state which is constituted by law and has substantial control over local affairs, including the power to impose taxes, on exact labor for prescribed purposes.' Local self- government means such government, which is formed and empowered by law in a small range of certain geographic area to meet the local demand [3]. It is recognized not only by laws but by the constitution also. According to Article 11 of the constitution of Bangladesh that effective participation by the people through their elected representatives in administration at all levels shall be ensured. Local government is such government which is formed at lower levels or locally formed. By Local self- government we mean the administration of Local areas run by its selected representatives [4].

B. Local Government Reforms in Bangladesh

As a result of the long history of struggle for freedom and democracy, Bangladesh saw the importance of developing a sound democracy and increasing people's participation in the political process, decision-making and developing of the country after it emerged as an independent nation. After the independence of Bangladesh in 1971, the Awami League government, headed by Sheikh Mujibur Rahman, brought the following reforms in the local government.

First: the system of Basic Democracies was abolished and government bodies carried over from the days prior to independence were dissolved.

Second: public officials were authorized to form committees at different tiers of government to fill the void created by the termination of some bodies of government. The committees created would, for the interim, perform local functions.[5]

Third: District government was introduced in 1973; this provided the three tier system with a directly elected Union parishad (council), a Thana Development Committee under the control of the sub-divisional officer, and Zila parishad under the control of Deputy Commissioner. The Awami League government led by Sheikh Mujibur Rahman did not hold elections to the higher-level councils, nor did it take any measures to devolve authority to any of them. There was a substantial lack of political and behavioral support among Awami League Leaders for democratizing local government in Bangladesh.

The BNP government headed by Ziaur Rahman played a critical role for reviving the local government institutions in Bangladesh. The Local Government Ordinance 1976, promulgated by Zia, created Gram Sabha (Village councils) for decentralizing government down to the local level. The Local Government Ordinance 1976 made provisions for the formation of three types of rural local government; Union parishad (Up), Thana parishad and Zila parishad [6]. Local Government Ordinance in 1976 also prescribed detailed provisions as regards the qualifications and removal procedures of the union parishad chairman/members as well as how the Union parishad proceedings were to be conducted. But the government retained much controlling power over the Ups in that its prescribed authority i.e. SDOs (Sub-Division officer) in the case of Ups, could veto any of Ups decisions. The decentralization scheme implemented under Ershads' government was the most ambitious attempt in the history of Bangladesh to bring responsible government to the local level. The government adopted a resolution on 23 October 1982 to recognize the administration at thana level [6]. But, there were some major problems with this scheme of decentralized administration. First, the electoral system tended to represent only the wealthiest and most influential members of society. These persons made decisions that strengthened their own patronage networks and influence at the grass root. Second, Civil service members were slow to cooperate with elected members of local committees. Finally, the total system of decentralized politics was viewed by opposition politicians as a patronage network designed to attract local elites to the party of the regime in Power instead of decentralized democracy, the system only strengthened the national party controlled by central level. In 1991, the Bangladesh Nationalist Party (BNP) government appointed a high powered 'Local Government Structure Review Commission'. The recommendations were required to be consistent with institutional provisions on local government as laid down in Article 59 and 60 of the twelfth amendment of the constitution in 1991, [5]. Bangladesh Nationalist Party led by Begum Khaleda Zia came to power it chose to change the Upazila system within a few months and reinstated the previous bureaucracy-dominated Thana administration by promulgating the Local Government. Nothing appreciable, however, was done during the five years of BNP rule. When, Bangladesh Awami League Government led by Sheikh Hasina came to power in 1996, it formed a high- powered Local Government Commission in 1996, to suggest viable local bodies based on the principles of local democracy [6]. The commission recommended a four-tier local government structure including Gram/palli (Village) parishad at village level, Union parishad at Up level, Thana/Upazila parishad at Thana level, Zila parishad at District level. The four-party alliance government led by Begum Khaleda Zia in 2001 initiated a change in the local government Structure. Gram Sarker in place of Gram parishad had been introduced. These bodies were created at the ward levels. Each Gram Sarker (GS) represented one or two Village comprising about 3,000 people at an average. The UP member elected from the ward was the chairman of the GS, which will have other members both male and female elected in a general meeting of the voters of the ward under the supervision of a chair-man of Gram Sarkar. In 2008, the Awami League government led by Sheikh Hasina came to power and kept the three tiers of Local Government body like i) Union parishad .ii) Upazilla parishad iii) Zila parishad. But, On October 12, 2015 with the decision of cabinet, local polls hold on partisan basis. The century old practice of non-party poll of local bodies has been changed to a first-ever partisan poll that brought major challenges of political parties of Bangladesh.

C. Party-based Local Government Election in Bangladesh

A paradigm shift in the political system took place in Bangladesh On October 12, 2015 with the decision of the cabinet to hold local polls on partisan basis. We can observe a political culture in Bangladesh that when government changes in time to time, they amending laws and constitution in favor of their party interests. The century old system of non-party poll of local bodies has been

change to a first-ever partisan poll that brought major challenges for political parties of Bangladesh. Bangladesh Awami League considers demonstrating its popularity at grass-roots level through the election. The local government institutions are weakened as autonomous bodies due to recent politicization [7]. Local government experts, politicians and many civil society organizations are in hot debate about the politicization of local government to hold local poll on party line, having no discussion with referendum to elicit public opinion towards such a major shift. There are two groups of people who are advocating and opposing of the politicization of local government. Those who are advocating partisan polls are citing examples of India, USA and UK where local elections are held with the identity of political parties. Thus, it is not a political departure or a new idea in party politics. Even in Bangladesh, local polls like city corporations and Upazila elections were held in the past with clear political identity of candidates although they used no symbol of party. On the contrary, those who are opposing the decision are in view that this decision might obviously destroy the value system cherished so long at local level. As observed in the past, chairman and members are elected at Union Parishad on the basis of their family background, tradition, reputation for social work etc. They belong to no party but elected with massive voted in cognizance of their commendable social works in the locality. The partisan election will surely drive away these whistle-blowers of the value system in the local level to be replaced by party followers who might have controversial identities in the community [7]. The major challenges of political parties are now to organize themselves with their dedicated supporters steering the wheel of the party at the grass-roots level. As of now, almost all political parties are centrally governed. Election, whether partisan or non-partisan, is a political process, who said that non-partisan elections are non-political seem to lack clarity in their thinking [8]. Jatiya party chief said, the partisan local poll will generate hatred, violence and lack of discipline in the country [8]. As our wise poet Tagore aptly put it, 'Bengalis know only to fight in the name of parties, but they cannot build parties'. The Cabinet of Bangladesh has decided in principle to allow the use of party symbols in local elections. Three arguments are usually offered in favor of party-based local government elections. First, it would allow political parties to impose their discipline on representatives elected with party nominations. Second, it would make the local government elections 'political' as non-partisan elections are 'not-political'. Third, the political parties do not abide by the existing system of non-partisan elections; hence we should change the laws. However, Some Scholars and intellectuals opined that these arguments are weak and erroneous. Politicization of bureaucracy in local government areas to central government is another problem of Bangladesh. Politicization of bureaucracy in a descriptive sense refers to the right of government to appoint their own people to senior public service positions. There were a large number of officers are deprived of due promotions, which generate a turmoil of in the civil administration. Actually, Bureaucracy has an extensive ascendancy in the state organization of Bangladesh. There was a time, the bureaucracy in Bangladesh was considered as the "Steel frame" of the British Empire, is now hanging between professional neutrality and political loyalty. Since 1991, almost all the democratic government politicized the civil services for serving their narrow political interests.

D. Problems of Party-based Local Government Election in Bangladesh

The local government bodies had never been independent in Bangladesh, 'self-government' bodies in the true sense of the term. They could simply be labeled as an extension of the central government with guided and limited local participation. Local government have always been institutionally and financially weak, poorly managed and lacked social and political credibility. Latterly, more politicization of local institutions, government elections has been added with those cruxes and weakened the overall local government system in Bangladesh. The electoral process of Bangladesh has a long history, which may be traced back to 1885 conducted by the colonial rulers. Though, Bangladesh achieved independence in 1971 and conducted several elections before and after colonial rule, however, Khan said nine major democratic elections held at national level in Bangladesh (1919, 1935, 1946, 1954, 1970, 1991, 1996, 2001, and 2008) during the last 138 years and rest of the elections (1958-71, 1975-81, 1982-90, and 2007-08) were nondemocratic conducted by the military rulers ran political parties and these elections were controversial and full of manipulation. However, after ending the tenure of Awami League (AL) government (2009-13), the 10th national elections was held under AL government On 5th January 2014, but the Bangladesh Nationalist party (BNP) leads allies totally boycotted this elections and 153 of the total 300 seats being uncontested AL lead allies won with more than an absolute majority and formed a government for next five years. The parliament is run by one party though Jatiya party (Ershad) now acts as the opposition of the parliament who is part or AL lead allies and currently two MPS of Jatiya party act as cabinet members of the current government. That's why the question of legitimacy and acceptability is still questioning from various corners of politics, civil society and academic Scholars of national and overseas domains. That means the policy and works of the government are suffering from lack of legitimacy. The politics and governance of Bangladesh are practicing a culture of one party lead authoritarian government instead of real parliamentary democracy. At this situation, On 12 October 2015, with the decision of the cabinet to hold local polls on the partisan basis, without any discussion, research or evaluation with stakeholders, local government experts and civil society organizations, the government suddenly decided the law for local government elections. The change in the law mean that nominated candidates will be able to run with party symbols in elections at all local government bodies- union councils, Upazila councils, district councils, municipal corporations and city corporations. The century old practice of non-party poll of local bodies has been changed to a first-ever partisan poll. While BNP'S spokesperson Asaduzzaman Ripon has opposed these partisan local government elections, saying it is a political trick with an ill-motive. The chief of Liberal Democratic party, Oli Ahmed has expressed that 'politics and politicians are becoming controversial through the party-based local poll and democracy is being destroyed in a planned way' [8].

1. Party-based local government election and party symbol poll is contrasted with democratic values. The free, fair and credible election is the key elements for democracy and credible election is the key components for democratic government, which ensuring citizen's participation, government accountability and encourages political competition. But the ruling AL took the decision without

desirable changes in the political culture and reforms, partisan local government elections are tainted by the widespread use of money and muscle power for securing nominations and bringing down the quality of candidates. Nowadays, 'party cadres and government power used to make threats, file cases and harass the potential candidates from opposition parties that are totally opposition from democratic culture. Party-based local government elections are a dangerous decision for developing democracy and the politicization is weakening local government institutions as a democratic body. Amartya Sen Aptly put it right that 'Famines do not occur in democracies, this is because any hunger death would immediately be politicized' [7].

2. Partisan polls have created conflicts and violence's in the local government elections in Bangladesh. The partisan elections drove away the value system of locality replaced by the party followers who have controversial identity in the society. It also destroys the peace of city corporation's polls which were peaceful before the non-partisan period. BNP-Backed mayor candidate of Dhaka North city corporation Tabith Awal shared his experience with bdnews24.com after visiting some polling centers, 'I did not see anyone other than the ruling party-backed candidates and the agents of their councilor aspirants. Our agents were chased off' he alleged. One of the basic democratic norms is to show tolerance and respect for political opponents and dissenting voices. But in Bangladesh, our political parties not only can't tolerate political opponents, but also engaged in violent confrontational politics and even efforts to annihilate each other. Due to the widespread politicization, local polls have promoted only party-arch, reflected by blind allegiance to parties, rather than strengthening our democratic system.

3. Election results are frequently manipulated by the party in power. Many studies in developing democracies show that partisan polls always created a scope for electoral manipulation because of the party in power. Sohul Hossain, former Election commissioner told that, 'it is true that in partisan elections, ruling party have a influence in the local government polls'. However, people not are interested anymore in participating in these elections under the proposed new system.

4. The Zila parishad elections with partisan and party symbol manner also widened the politicization in local level institutions. Because of partisan appointment of administrators, the Zila Parishad is now under the control of ruling AL government. The ruling parties MPs have also take control of the Upazila Parishad. Now, they captured local government bodies through partisan elections, and controlling over all political institutions, which is an ominous development, threatening the very foundation of the democratic polity of Bangladesh.

5. Politicization of local government created an impediment for the women participation and empowerment in local level. Ruling party captured the local government bodies and the practice of 'party-arch' lead to deprivation of people, who did not belong to the ruling party. In addition, because of the dominant influence of party 'symbols', the independent candidates, eased out of race. Since only limited numbers of women were nominated by the ruling party, opportunities for women to get elected in local government bodies also shrink. So, politicization of local government not only lowers the quality of elected local representatives, but also impeded the political empowerment of women and the growth of women leadership.

6. Politicization of bureaucracy from central to local level is another major barrier for ensuring democracy. There were a large number of promotions and transfers of the civil servants at the previous time, completely on political concerns. Having necessary qualifications a large number of officers are deprived of due promotions. Many competent officers are suffering as officers on Special Duty (OSD), inactive at home and getting their salaries simply, due to the politicization.

7. It always becomes difficult for the election commission to ensure a level playing field for all local candidates in partisan elections. Candidates and leaders from the ruling party always try to interpose a "code of conduct", which destroys the level playing field, thereby changing the local elections outcome.

Thus, politicization of local government becoming controversy among the stakeholders, civil society organizations, local government experts, international domains and the media of Bangladesh as a developing democracy. So, if the ruling government wants to ensure democracy in Bangladesh, it is of utmost importance the ruling party and the EC consider those issues for strong local and urban local governments.

E. Comprehensive Solution for Party-based Local Government Elections in Bangladesh

Participation, Accountability, Transparency, Empowerment, Equity and all other elements of good governance can become a part of the daily work of both the government and local bodies. The free, fair and credible election is one of the basic and crucial prerequisite and elements of democratic government and governance in local and national levels. Therefore, free, fair and credible election means most of the political parties will have the opportunity to participate in all local and national's elections without any fear and hindrance. This type of election offers absolute people participation without fear and domination of any parties to elect their chosen candidates. For credible, neutral and acceptable elections, non-partisan and non-party symbol elections have no alternative as a developing democracy. The following issues should take into consideration in any future attempt to reform this law and to recognize it to make strong, participatory, transparent and accountable governing bodies.

1. Politicization of local government has only promoted 'party arch' rather than strengthening our democratic norms. As a developing democracy, the ruling party should conduct non-partisan and non-party symbol elections in local government bodies.

2. Local government experts Dr. Tofail Ahmed and Dr. Niaz Ahmed khan expressed that partisan local poll will create chaos among the local government institutions [10]. So, ruling party should change this law immediately for free and fair elections of local government bodies like union councils, Upazila councils, district councils, municipals corporations and city corporations.

3. Local government elections in Bangladesh like city corporations and Upazila elections were held in the past with clear political identity of the candidate but they used no symbol of party. Many civil society organizations, academic scholars, and stakeholders alleged that the partisan poll and party symbol in local elections obviously destroys the value system of local government which has

cherished so long [9]. So, ruling AL government should call a meeting about this issue, with opposition stakeholders, civil society members and local government experts for solving this problem.

4. Politicization of local institutions and polls system reduces the participation of all political parties in local government elections. As was seen in the Dhaka and Chittagong city corporations polls earlier in 2015 and created conflicts, Opposition parties, especially the BNP announced halfway through the voting day that they were withdrawing from the race, raising allegations of rigging by the candidates backed by the ruling AL government. So, for free, fair and neutral elections, this law should be banned and ensuring local polls with non-partisan manner.

5. Partisan local polls have already created a scope of unhealthy influence of political parties, lead to unnecessary party alignments. Local problems not to be subjected to party line in political squabbles. We observed that most of the local elections in the USA and California were non-partisan with the provision of political parties to endorse, support or oppose the candidates. However, people especially rural areas might be interested in participating non-partisan local body's elections.

6. Most of the elections held under ruling political government are manipulated, less competitive and controversial [11]. On the hand, elections held under non-political and interim caretaker government were more competitive, fair and credible, and accepted by national and international election observers and media. However, for ensuring equal voting rights of the citizen, and universal adult franchise, non-partisan and non-party symbol elections should be conducted in local government and urban local government.

7. Prime Minister Sheikh Hasina told in the parliament, On 1 April 2015, local government polls should be held like the general elections on party line. It ensures transparency and accountability; Lack of trust among political parties is one of the vital problems in Bangladesh. As a result, lack of reliability in holding elections under ruling government and claim and blame game is going on from the very beginning of independent Bangladesh. At this circumstance, partisan elections under ruling government were not accepted in many political stakeholders.

F. Recommendations for the Strong and Non-partisan Local Government in Bangladesh

a) Re-starting non-partisan and party symbol elections in union councils, Upazila councils, district councils, municipal corporations and city corporations should ensure.

b) Arranging a discussion with opposition political parties, local government experts and civil society's organizations about the issues by the ruling government.

c) Ruling government should conduct a free, fair and credible election in local bodies with the participation of all political parties, which is possible in non-partisan elections.

d) Politicization of bureaucracy is another barrier for ensuring democracy in local government bodies, ruling party should take action about the appointment and promotion of civil servants on the merit based.

e) The free, fair and credible election is the crucial and integral part of democracy. It is only possible, when local government elections held on non-partisan basis.

f) For ensuring universal adult franchise and equal voting rights, non-partisan and non-party symbol elections have no substitute.

Throughout the discussion, it has been found that democratic government depends on non-partisan free, fair and credible elections in national and local government bodies. Other countries of the world like South Africa the Election Commission (EC) has an electoral court, with the status of Supreme Court. The electoral court practices huge power to conduct non-partisan free and fair elections, Therefore, an electoral court may setup in Bangladesh.

IV. CONCLUSION

In modern democratic states there is a vital role of the local government because the burden of central government is lessened to it. Therefore, Local government institutions of Bangladesh should be democratic in nature. But nowadays partisan local polls and demonstrating party symbol in local elections are not similar with the political norms. Though, the current local government units are working well but violent activities by the local politicians and violation of human rights by them are still continuing. The conflict among the local politicians of rolling party is in extreme position. This is really unexpected for the sound local government system and also for the rule of law and good governance. It is assumed by the academician, civil society members, politicians and general people that all these incidences existing because of the unexpected influence by the rolling party. Therefore, non-partisan local government election system may be reintroduced for ensuring sound local government.

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Examining the Geographical Coverage of Floods Using Satellite Images and Discharge In LNRB

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Abstract- Flooding continues to be a common environmental hazard in both developed and developing countries. Crops, settlement and infrastructure are usually impaired wherever flooding occur. The severity of damage as a result of floods has been documented to have a relationship with the flood magnitude, flood frequency and settlement of population on flood prone areas. Whereas various intervention measures have been implemented, the problem still persists. This is partly due to lack of adequate information on the extent of Lower Nzoia River Basin Flood Flows. This has affected efforts to design and plan for proper intervention measures in the affected areas. This research focused on examining the geographical coverage of floods in Lower Nzoia River Basin for a period of 42 years from the year 1975 to the year 2017.). The research design employed in the study is time series design and the analysis of Satellite imagery data was performed using ArcGIS 10.3, to detect, delineate and map flood extent in the LNRB; Discharge data analyzed using excel. Flood trending results show that bare land increased with 42.20%. while vegetation reduced by 51.96% and water mass increased with 22.38% between the year 1975 and the year 2017. The continued reduction in vegetation and increase in bare land loosens the soils exposing them to erosion and incase of floods the outcome is more hazardous. The study recommends that when erecting the dykes the flood mapped area of 112km² (22.38%) Water mass be considered in developing interventions, planning and preparedness for future management of the basin. Policy makers should ensure that the riverine areas are free from human activities which are attributed to land and vegetation destruction in the lower basin

Index Terms- Geographical extent; Satellite imagery; flood magnitude and dyke

I. INTRODUCTION

Flooding is considered as the world's most costly type of natural disaster in terms of both human casualties and property damage (Campillo *et al.*, 2017; Aslam *et al.*, 2017); (Singh and Sharma, 2009). The extreme flood events could cause severe damage to property, agricultural productivity, industrial facilities/installations, communication networks and infrastructure, especially in the downstream parts of catchments. The increasing frequency and intensity of disasters over the past three decade poses greater risk. According to projections, such disasters will continue to increase, making the need for more and

better disaster risk reduction strategies ever more urgent. The Asia-Pacific region is particularly vulnerable to disasters. According to the International Strategy for Disaster Reduction's (ISDR) 2006 *Global Assessment Report*, 75 percent of the global flood mortality risk is concentrated in only three countries: Bangladesh, China and India. Bangladesh and India account for 85 percent of cyclone deaths. The Asia-Pacific region has over 50 percent of the total world disasters, representing the widest and most disaster-prone area in the world, with a regular frequency of geological hazards such as earthquakes and tsunamis and increased frequency of weather-related hazards such as typhoons, floods, droughts and wildfires. More than 70 percent of lives lost to disasters occur in this region. Germany have also concluded that mitigation measures substantially reduce flood damage (Kreibich *et al.*, 2005, 2011, 2012; Olfert and Schanze, 2008; Kreibich and Thielen, 2009). Kreibich *et al.* (2005) and Kreibich and Thielen (2009) estimated that the use of flood adaption for buildings and furnishing reduced the flood damage to buildings by between 46 and 53 percent, and the flood damage to home contents by between 48 and 53 percent. Installing heating and electrical utilities on higher floors, adapting the structure of the home to floods, and water barriers, respectively reduced the damage to buildings by 36, 24, and 29 percent (Kreibich *et al.*, 2005; Kreibich and Thielen, 2009). Although the aforementioned studies provide useful insights into the potential damage savings from flood damage mitigation measures, it is evident that this empirical literature is scarce and focused on a few river basins, which are located in a few countries (mainly Germany). Moreover, few studies examined the effectiveness of these measures by putting in consideration the water mass extent of flooding; Kreibich *et al.* (2011, 2012). The determination of flood mapping to identify areas that is flooded or not flooded and water versus non-water areas before and during the flood event, respectively; have little been applied in the Lower (Wang *et al.* 2002). Disasters also disproportionately affect the most vulnerable, eroding hard-won development gains and setting back progress toward the Millennium Development Goals. High-income countries are exposed to 39 percent of tropical cyclones while bearing only 1 percent of the mortality risk. (Yengoh *et al.*, 2017) The majority of disasters in Africa are hydro-meteorological in nature, with droughts still affecting the largest number of people on the continent and floods occurring frequently along the major river systems and in many urban areas (Yengoh *et al.*, 2017). Cyclones mainly affect Madagascar, Mozambique, and some of the Indian Ocean islands Inter-

governmental Panel on Climate Change (IPCC, 2007c. Most African countries have limited resources to invest in disaster risk reduction and minimal fiscal space to fund relief and recovery efforts after a major disaster (Noy and Edmonds, 2016). Disasters can be a tremendous setback for economic growth and performance. Poor, small island states and land-locked countries are particularly vulnerable to the economic impact of disasters. The capacities of many national and local DRM authorities remain limited. In many areas, the economy is based on rain-fed agriculture, which is highly susceptible to climate variability, (Venäläinen *etal.*, 2016). Critical infrastructure such as roads, telecommunication, and dams often lag behind rapidly growing needs or are not constructed according to risk prone standards. In Kenya floods occur due to natural factors like flash floods, river floods and coastal floods. They may also occur due to human manipulation of watersheds, drainage Basins and flood plains (Cutter, 2017). For example, in some cases floods have occurred in the river Basins even with normal rains because of excess surface water runoff occasioned by deforestation, land degradation upstream. Kenya is affected by floods following torrential rainfall (Karanja and Saito, 2017). These force thousands of people living in the lowlands to move to higher grounds. Further empirical research is needed on the effectiveness of individual flood damage mitigation measures. Such information is imperative for policy-makers who are involved in the design of flood risk management policies, insurance companies who are interested in reducing flood vulnerability of their policyholders, and households and businesses who want to reduce the flood risk to their property (Kull *et al.*, 2013). This study, therefore, aims at examining the geographical coverage of floods using satellite images and discharge to provide data on land cover and its trending. Flood extent is estimated by satellite images using Arc Hydro tools under Arc- GIS 10.3 for the stipulated period of 42 years from the year 1975 to the year 2017. Discharge data was estimated using excels to provide trending for stream flows obtained from Webuye (RGS-IDA02) and Rwamba (RGS-IEFE01)

II. RESEARCH MATERIALS AND METHODS

2.1 Study site

The study was conducted in Lower Nzoia River Basin which lies between Latitude 00 04' North and 00 11' North and Longitude 33⁰ 57' East and 34⁰ 14' East with area of 8500KM² flat and swampy; elevation range from 1130m to 1225m, with annual rainfall variations. The study site for this research is indicated in Figure 1

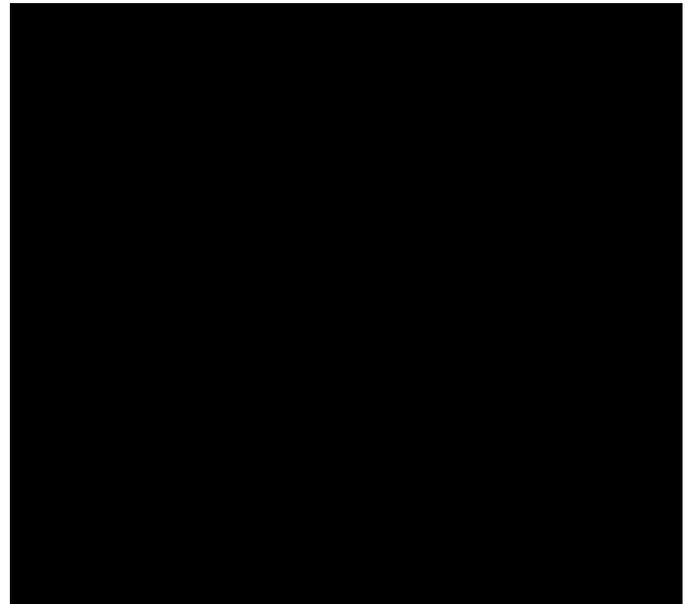


Figure 1: Lower Nzoia River Basin showing administrative areas, lakes and elevation derived from Digital Elevation Model (30m DEM) using ArcGIS 10.3

2.2 Digital Elevation Model (DEM)

In this study the Advanced Space borne Thermal Emission and Reflection Radiometer (ASTER) Global Digital Elevation Model (GDEM) a 30m by 30m launched by US and Japan mid-2009, downloaded from <https://wist.echo.nasa.gov> was used to provide the physical characteristics of the study area that are required for Flood Mapping. The interface allows DEM to use real numbers for elevation values to generate basin topographic characteristic. DEM was used to delineate the basin and analyze drainage patterns using discharges

2.3 Satellite imagery data

Satellite imagery data obtained from (RCMRD) within 42 years period (the year 1975, 1985,1986,2010 were compared with, 2014, 2015 and the year 2017, were extracted ,composed and developed into maximum likelihoods for determination of LNRB Flood extent. The years had good data. The LANDSAT images of TIFF Format were sourced courtesy of U.S Geological Survey <http://eros.usgs.gov/products/satellite>) with a resolution of 30m x 30m.

2.4 Stream flow data

Stream flow datasets were obtained from Water Resource and Management Authority. These were collected from three river gauging stations (IDA02, IEG02 and IEF01), Webuye, Wuoroya and Rwambwa), Stream flow data for the period from the year 1974 to the year 2017 were used in this study. The method used to compute the discharge for the station was use of excel that determined the trend in the flow.

2.5 Flood Extent determination

Multi-temporal LANDSAT Thematic Mapper satellite imagery was used to detect, delineate and map out land cover change on LNRB. The data were extracted and developed into

maximum likelihood for determination of LNRB geographical flood extent. Emphasis was extent of water mass on the land surface with time and changes in land area with time. The

LANDSAT obtained were clipped using LNRB Shape file in ArcGIS10.3 Methodology for flood extent is indicated in Figure 2 see (Appendix I) steps

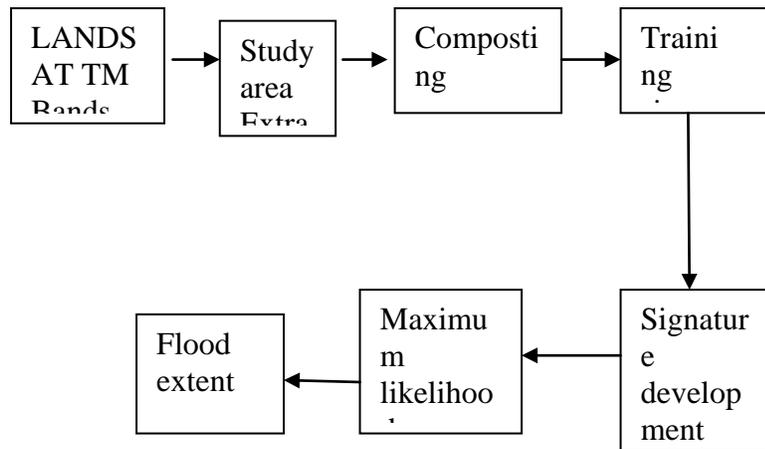


Figure 2 Methodology for flood extent determination adopted for research study in LNRB in Western Kenya
Source: Adopted from (Gadain, 2006)

III. RESULTS AND DISCUSSION

3.1 Trend analysis of LandSat data

The results from this images (Appendix II&III) shows how the flooding trends were increasing at the LNRB between the year 1975 and the year 2017 by estimating the vegetation cover, bare land and water in terms of square Kilometers. The results indicated that vegetation has reduced since the year 1975 where it was highest occupying 988 km² to the year 2017 where it was lowest occupying 393 km² representing 51.96%. Reduction of vegetation is due to clearance of land for settlement, farming, building material and fuel. The trend in Figure 4.8 shows that the land will be bare in the near future a factor which increase flood occurrence. Bare land is increasing due to clearance of vegetation, the trend shows that bare land has increased from the year 1975, (58km²) to (541km²) in the year 2017 representing 42.20%. Water areas have also increased with a margin of 112km², representing 22.38% of the total area of the study. This scenario is likely to continue based on climate change projections in Western parts of Kenya (USGS, 2010) and human activities being carried out in the basin. This means that the flood extent when extrapolated the LNRB is still at risk experiencing floods despite the existence of dykes.

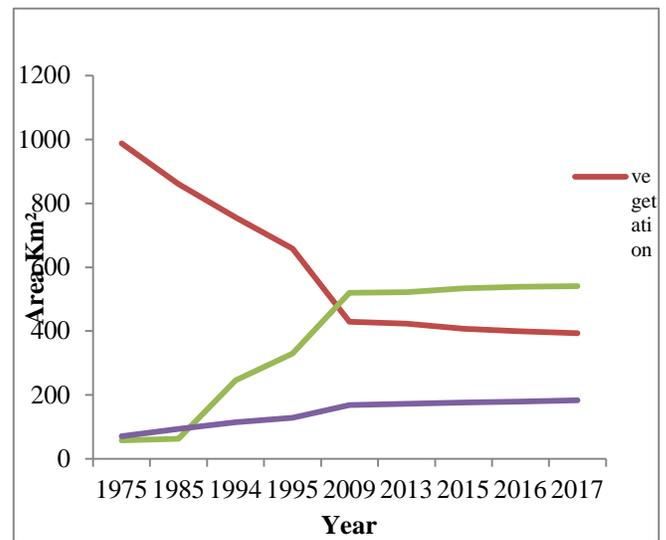


Figure 3 LANDSAT image analysis from the year 1975 to the year 2017 for LNRB

Source: Author, 2016

Looking at the trend analysis interception curve in Figure 3.1 clearly indicates that the water level was actually increasing with dynamics in the years. The gradient factor is positive; the land also indicates an increase with the years. The vegetation however shows a decrease with dynamic in the years. The gradient from the graph indicates a negative meaning there is continuous destruction of the riverine areas

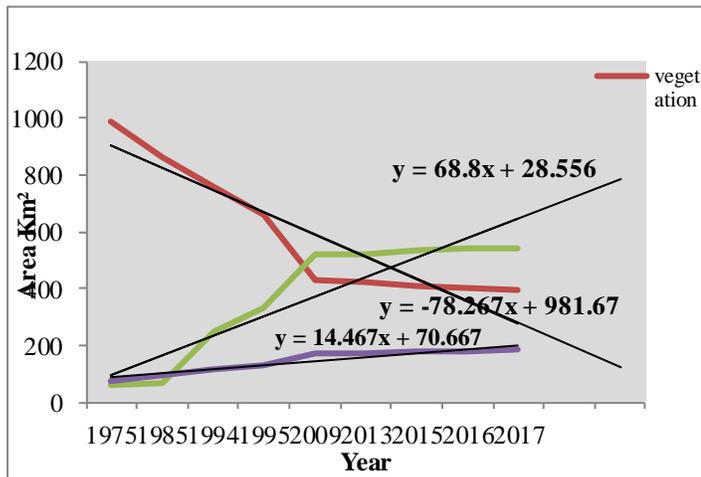


Figure 3.1 LANDSAT image trend analysis between the year 1975 and the year 2017

Source: Author, 2016

3.2 Discharge and rainfall data Results to map out flood area extent

The discharge data from the selected area were used to compliment the Landsat images and obtained a trend to see if the flooding effects were likely to continue being experienced at the LNRB. Figure 3.2 indicates the comparison between the upper stream and downstream discharge flow results shows the stream flow in cubic meter per second indicates that at the Upstream in Webuye the flow was increasing as per the trend line from the year 1974 to the year 2017. This means that the increase in upstream leads to increase of water capacity at the downstream this therefore has implication in the amount the basin can accommodate. The carrying capacity of the river is compromised meaning water will find its way out leading to flooding of the areas and land within the reach, this is in line with Akali, (2015) in his study on GIS-Based modeling of land use Dynamic in River Nzoia Basin Kenya where he indicated that the Upstream has effect on the Lower stream of the basin hence the problems of land-use dynamics must be emanating from the upper down to the lower basin. The stream flow in cubic meter per second indicates that at the Downstream in Rwambwa the flow was increasing as per the trend line from the year 1974 to the year 2017. The gradient in the trend line in the Downstream clearly indicates a high value of 0.743x compared to the upstream that has 0.685x creating a margin of 0.038. This therefore means the carrying capacity of the lower basin is compromised. Once the capacity is beyond; this is a factor that contributes to flooding. The extent of how far the water will spread should assessed and be used in the enactment of the dykes which will contribute to its role in flood mitigation at the basin.

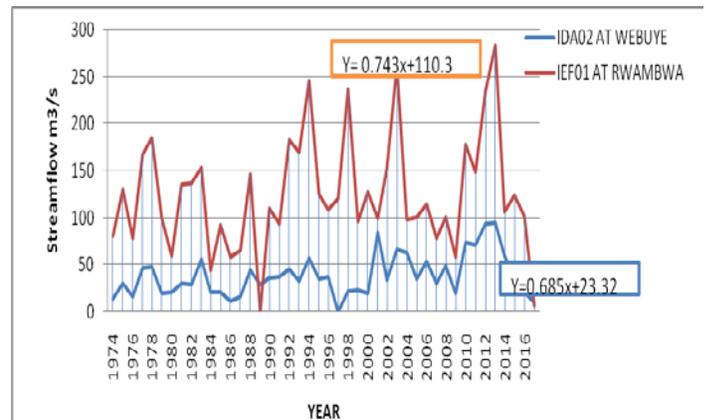


Figure 3.3 Annual Average stream flow trend for downstream River Nzoia at Rwambwa (RGS-IEFE01) and Webuye (RGS-IDA02), 1974-2017

Source: Author, 2016

IV. CONCLUSIONS AND RECOMMENDATIONS

Conclusion

The mapped out flood area extent change in water mass of 112km² should be considered when planning especially by Busia County Government when enacting the dykes to streamline its role in flood mitigation since the findings indicates that the area lacks a permanent solution in control of floods

Recommendations

The developed flood extent maps should be intensified by the real time data to beef up or complement satellite Imagery data to obtain actual output and that the gauging stations be guarded well to obtain actual data and avoid missing gap in the data due to destruction of gauging stations

Acknowledgements

We wish to express our sincere thanks National Commission for Science, Technology and Innovation (NACOSTI) for permitting us to carry out this research work and Masinde Muliro university administration for providing the required facilities and working environment through school of Disaster management, Department of Disaster Preparedness and Engineering Management making the research successful.

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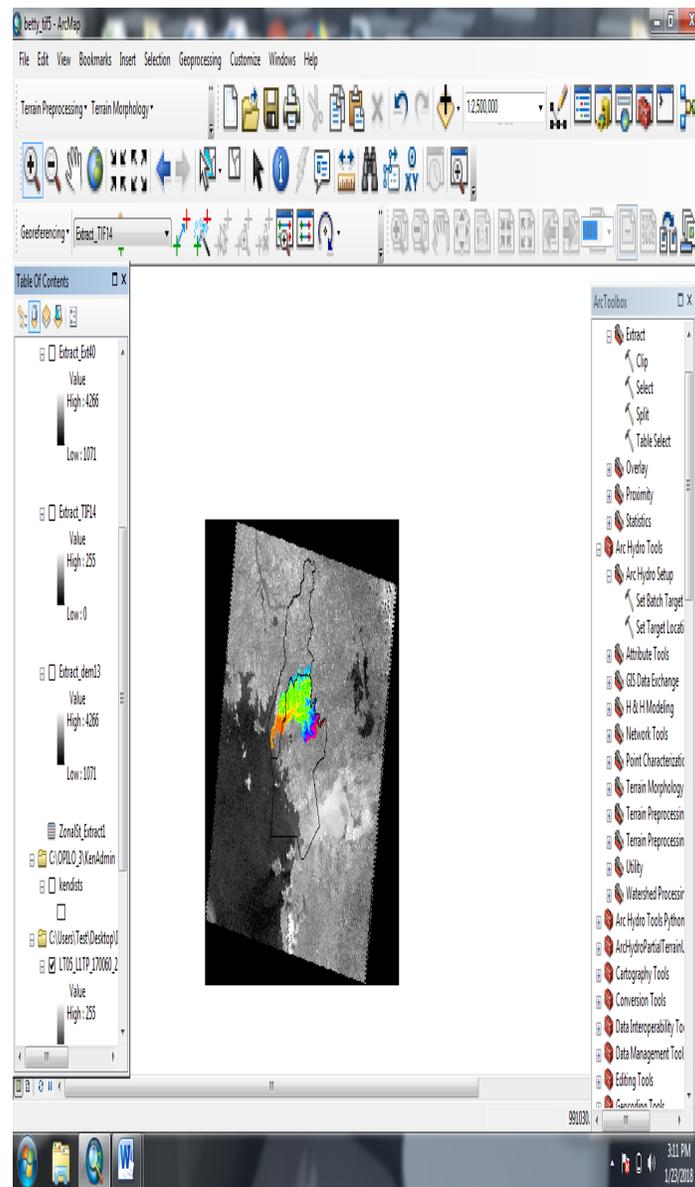
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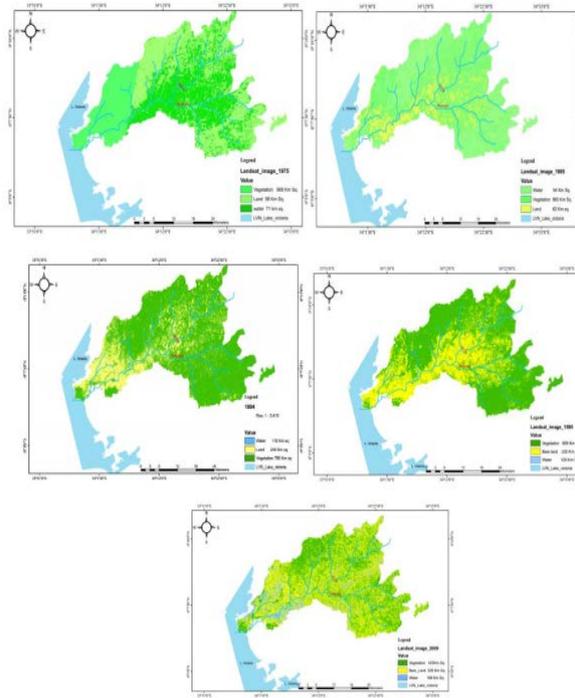
APPENDICES

APPENDIX I: Steps involved in Delineating the Landsat Images for LNRB



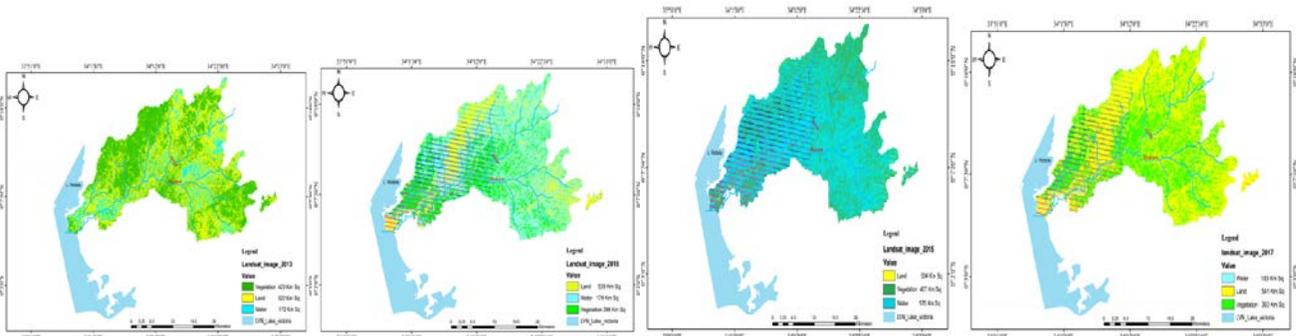
Source: Author, 2016

APPENDIX II: Raw Clipped Landsat Image for Flood Area Extent mapping for the Year 1975 to the year 2009



Source: Author, 2016

APPENDIX III: Raw Clipped Landsat Image for Flood Area Extent mapping for the Year 2013 to the year 2017



Source: Author, 2016

The Environmental and Social Impacts of Oil Exploration and Production on Melut basin of South Sudan.

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Abstract- In view of the environmental impacts of crude Oil exploration and production, it has caused more adverse impact than its beneficial desired end in the oil-bearing enclaves of Melut basin in the Republic of South Sudan. Crude oil exploitation has had and continues to have a deleterious impact on the environment in the region adversely impacting on the people inhabiting the area ever since its discovery in the 1970s. This review paper dwells much on the analysis of secondary source data such as gray literature, journals and primary data (field reports) on the environmental and social impacts of oil exploration and production on Melut basin. The Melut basin consists of a diverse ecosystem of savannah grassland, Machar wetland, and the Sudd wetland one of the Ramsar sites in the heart of the African continent but due to oil pollution the area is now characterized by contaminated streams and rivers, forest destruction and biodiversity loss, in general, the area is an ecological wasteland as accidental and unmonitored oil spills take place. This affects the livelihood of the indigenous people who depend on the ecosystem services for survival leading to increased poverty and displacement of people. This review paper has identified some of the factors that have led to the fluctuation in oil production level in South Sudan as follows; (1) the secession of the South Sudan from Sudan in 2011, (2) dispute of transit fee with Sudan government on transfer tariffs of crude leading to a temporal halt of the flow of the crude oil in 2012 through the pipeline since the country depends on Sudan for the exports of its oil products to the port terminal in the Red Sea, (3) civil war (armed conflicts) between the ruling government and rebel factions that rebel right after the secession of the country and the 2013 crisis. (4) The shutdown of the Thar Jath oil procession plant and (5) the maturity of other oil wells and high level produced water than crude oil (6) accidental spills due to malfunctioning of the valves and malicious sabotage by individuals who against social welfare of the people. The review also shows that much of the oil spills occurring in the study area has limited/ to none reporting making it hard for quantification of the oil spills/lost, the pollution levels on land, water bodies and biodiversity are alarming. Here we also show that as much as oil is the desired product, during the production stage, a good amount of gas and produce water is produced as by-products in the due caused. South Sudan oil production is characterized by high level of produce water with limited treatment facility and a potential energy source (natural gas) is wasted or flared due to

limited or no infrastructure for tapping and using this potential energy. The oil industry in this region has contributed immensely to the economic growth and development of the country in the recent past which is a fact that cannot be ruled out as the country heavily dependent upon but unsustainable exploration and production activities have severely threaten the ecosystem wellbeing of the region. We suggest that the Republic of South Sudan should employ the best technology to tap the product gas and to have a monitoring mechanism to detect oil spills and sound spills management system. Additionally, it is also evident that mud pits/ borrow pits have become a source and a habitat for disease-causing pathogens and pollution of water bodies. We also recommend that a combined technology of high efficient halophile oil-degrading microorganisms in biological treatment and membranes (SBR) biological treatment systems can be used for effective management of produced water since skimming and phytoremediation ponds/ lagoon are used for treatment which are less effective given the current produce water level and the acidity of the crude in the Melut basin.

Index Terms- Environmental and Social Impact, oil Exploration and Production, Paloich, Melut basin, South Sudan

I. INTRODUCTION

1.1. Background:

The exploration and production of oil and gas is a major industrial development and is regarded as a blessing. The sector is a major source of jobs and revenue for many oil producing economies globally. In August 1859, Colonel Edwin Drake drilled 70 feet well in Titusville, Pennsylvania, and discovered oil. By the end of 1800's a number of wells were drilled in Pennsylvania, Kentucky, and California. The birth of the modern oil industry is credited to the discovery of oil at spindle top in 1901 atop a salt dome near Beaumont Texas¹. Oil spillage is a global issue that has been occurring since the discovery of crude oil which was part of the industrial revolution. Oil exploration was started in the then Sudan in 1959 but no oil, however, was found by the Italian oil company Agip after getting an offshore concession in the Red Sea area North - East from the Sudan government. It carried out seismic surveys and drilled six wells. Following Agip, western oil companies – Oceanic Oil Company,

Total, Texas Eastern, Union Texas and Chevron – moved in to search, but to no avail and most companies relinquished their concessions².

In 1974 Chevron took a 25% interest from Shell (Sudan) and was granted permission to search for oil. In 1978 Chevron found the first oil in the Muglad Basin which stretches deeply into Western Upper Nile in the South. In 1981 it made a second, more moderate find in the predominantly Dinka area Adar Yale in Melut Basin, east of the White Nile³⁻⁵. Four exploratory wells showed flow rates of 1500 and more barrels a day. Chevron believed there was a potential all the way south to Malakal and east to the Ethiopian border. In 1982 Chevron made a third, much large discovery at Heglig, 70 km north of the Unity field, home of the Nuer and began to develop Unity and Heglig oilfields.

In 1984 Chevron suspended operations and removed personnel, after the SPLM/A attack Chevron's base at Rub Kona, near Bentiu, killing three expatriate workers resulting into the splitting of Chevron's concessions into smaller units by the Khartoum government^{4, 6}. In 1992, Melut Basin – Blocks 3 & 7 was awarded to Gulf Petroleum Corporation – Sudan (GPC) and in October 1996 GPC was able to drill and reopened Chevron's wells and built an all-weather road from Adar Yale to Melut. Adar Yale was inaugurated in March 1997 with a production capacity of only 5,000 b/d and 10,000 b/d in 1998 respectively. Adar Yale site was the first site to produce crude oil to be exported using trucks from Adar Yale to Melut then by boats to Khartoum.

In 1997, Greater Nile Petroleum Operating Company (GNPOC), a consortium of China, Malaysia, and Sudan, built a 1540 km oil pipeline from the oilfields to a marine export terminal on the Red Sea⁷⁻⁸.

On 31 August 1999, the first 1,500 barrels of crude oil traveled through the pipeline to be loaded onto a tanker which sailed for refineries in the Far East. Oil production and export have increased steadily since then and new discoveries have been made. In 2003 the China National Petroleum Corporation (CNPC) announced the discovery of a "world class" oil field in blocks 3 and 7 east of the White Nile, oil production was on average 270,000 b/d and 304, 000 b/d in 2004 respectively⁷.

The signing of the comprehensive peace agreement (CPA) in January 2005 between the government of Khartoum and the Southern Armed forces (SPLA) ending to the long civil war had improved conditions for oil production and export. However, the CPA culminated in a referendum with a 98.8 % votes for succession. And in 2011, the Republic of South Sudan has officially declared as a sovereign country. With the development of the oil sectors, oil industry is seen as one of the most contributing sectors that will improve on living condition of the citizens and after the succession of South Sudan from Sudan, it inherited most of the oil wells which gave raise to high

expectations from the South Sudanese as a catalyst for high income and wealth creation and others were apprehensive because no oil producing country with a history of inland or of offshore hydrocarbon has escaped the negative impacts of the sector on the Environment and the socio economic activities of the host communities.

II. MATERIALS AND METHODS

2.1. Study area:

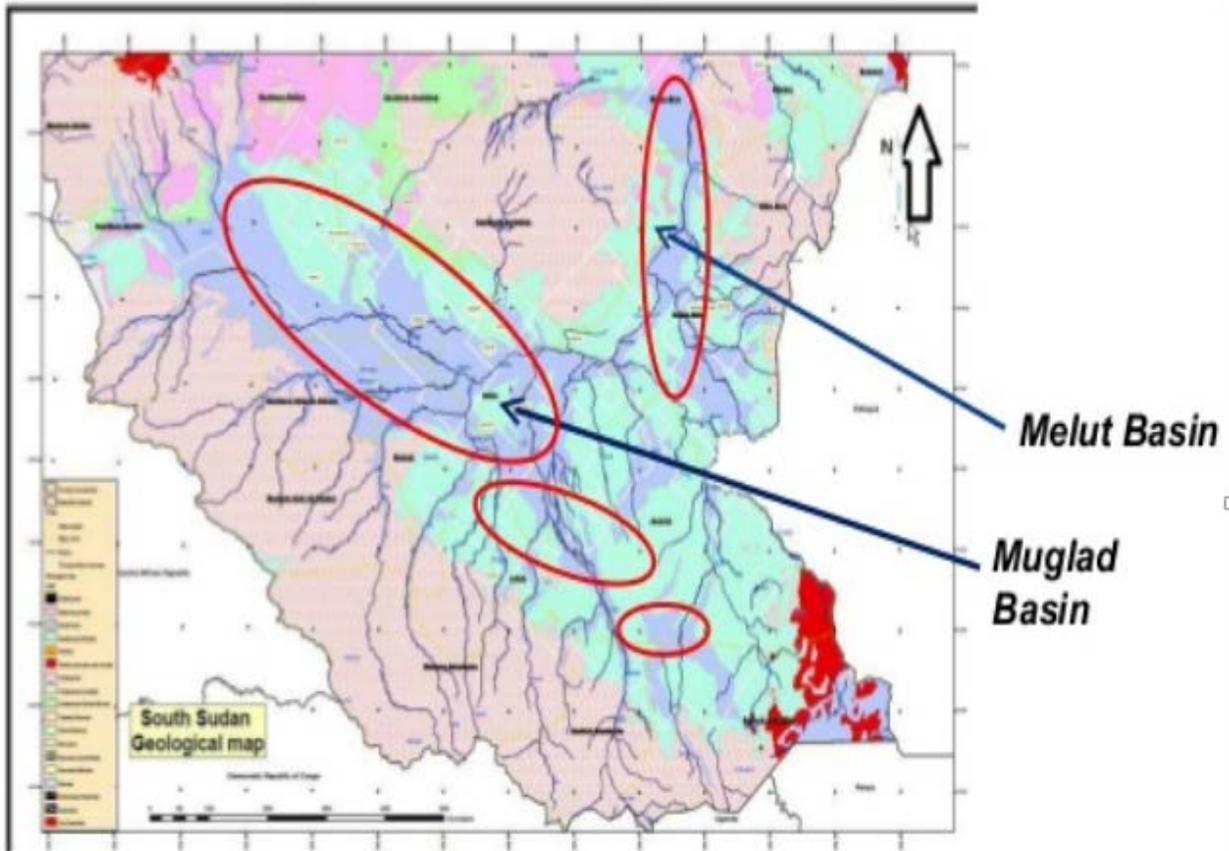
South Sudan gained independence from Sudan in July 2011. Most of the oil production capacity is now in South Sudan, but the country is landlocked and remains dependent on Sudan because it must use Sudan's export pipelines and port.

The Greater Upper Nile is a region of northeastern part of the Republic of South Sudan with its capital Malakal, the region comprises of Unity, Jonglei, and Upper Nile.

The Melut basin is one of the counties of the northern Upper Nile region, South Sudan. The Melut basin is remote and it lies on the northernmost edge of South Sudan. The oil development in blocks 3 and 7 falls under Melut basin and has so far not been publicly scrutinized due to it being marginalized by the civil wars and the current conflict in the country. Oil development in northern Upper Nile is concentrated in Melut County and Maban on the plain east of the White Nile, which hosts one of the world's largest and best-conserved wetlands, the Machar marches. The oil works cut right through it, from Melut to the Sobat River, 200 kilometers further south on the Ethiopian border.

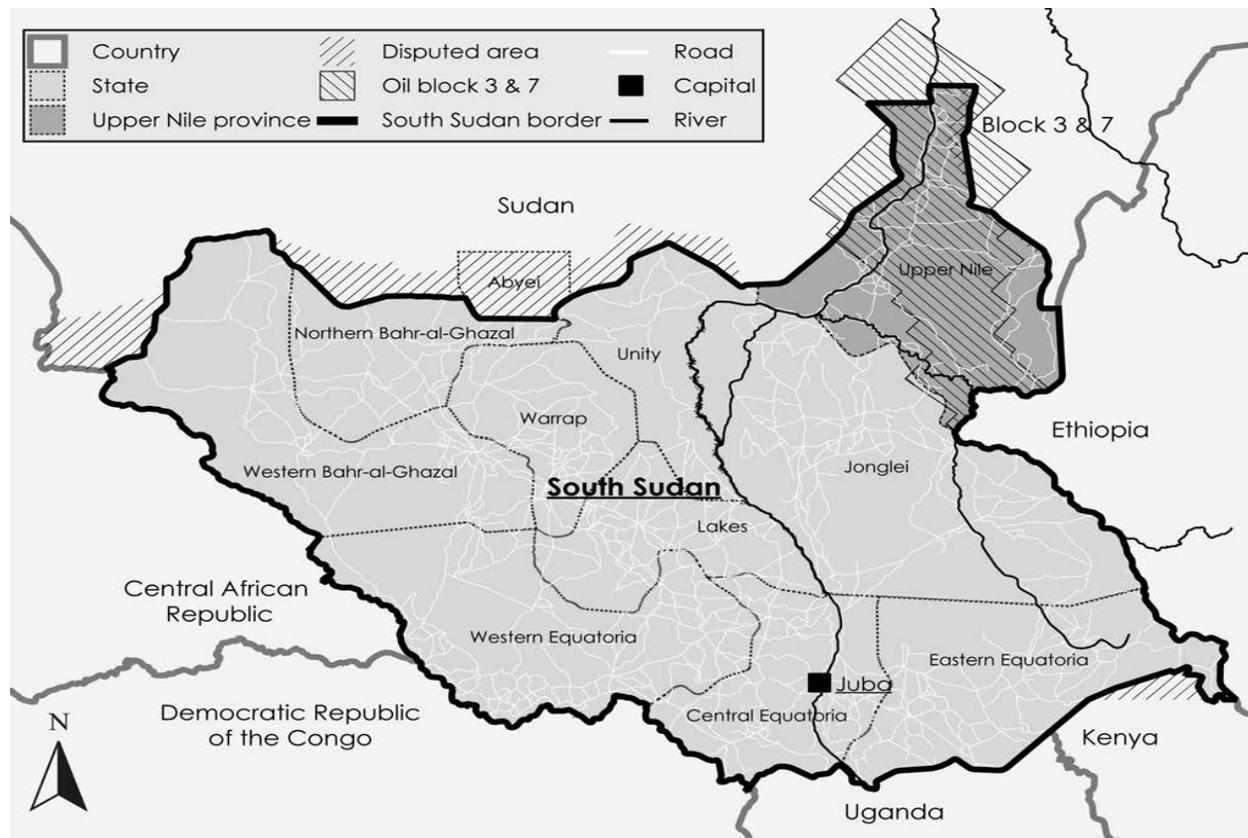
Melut and Maban counties are part of a flat clay plain with seasonal streams (Khor) running from the east to the White Nile in the west. The climate is hot and the area is swampy in the rainy season, between June and October, and increasingly dry during the rest of the year. The inhabitants are predominantly Dinka and Maban agro-pastoralists and non-Muslim. They mostly live by herding, cultivation, and fishing. During the wet season, they stay in permanent settlements on the slightly higher ground, for the most part, small sandy ridges, surrounded by the black clay soil that floods and is not fit for settlement. A village in this area would typically count between 200 and 500 inhabitants. There are also numerous smaller settlements, sometimes with a handful of "tukuls" only. In the dry season (i.e. from October to May) the land becomes parched hence pastoralists move their herds toward the river for water, to graze on and for fishing ground. While in wet seasons, they move to higher ground. Although Melut basin is one of the richest oil areas, northern Upper Nile is very poor and is characterized by lack of infrastructures such as schools, health centers, paved roads, portable drinking water infrastructures, poor hygiene, and sanitation.

Map 1. 1 South Sudan Basin



Source: MPM, 2012

Map 1. 2. Republic of South Sudan and Oil Blocks 3 & 7 in Upper Nile Region



Source: ECOS, 2007, Geonames, 2012, Natural Earth Dataset, 2012, MPM, 2012

2.2. Data Sources

The study review of oil exploration and production at Melut Basin in Greater Upper Nile and its impact on the Environment was developed through analysis of secondary source data. These sources include reviewed materials present in the journal, books, national presentations, supplemented by non-peer reviewed literature from a wide range of other sources, including international and non-governmental organizations, and some commercial organizations. These sources were collected through comprehensive and extensive literature search using academic reference databases including Web of Knowledge, Science Direct and Google scholar (including databases such as aquatic science, conference papers index for life, Environment and Aquatic science, GeoRef, International Bibliography of the Social Science, Oceanic Abstracts) were all used to identify relevant literature and articles in the news line from the country. This review involved obtaining data from the past and present studies, and current literature including field reports. The study relied on secondary data, and the data were analyzed using descriptive methods to obtain logical deduction and sequential presentation of facts from the data obtained that gave a precise picture of the subject matter.

2.3. Petroleum and other Natural Resources

Oil remained the world’s leading fuel, accounting for a third of global energy consumption. Oil gained global market share for the second year in a row following 15 years of declines from 1999 to 2014. According to BP, the Dated Brent oil price averaged \$43.73 per barrel in 2016, down from \$52.39 per barrel in 2015 and its lowest (nominal) annual level since 2004. Global

oil consumption growth averaged 1.6 million barrels per day (Mb/d), or 1.6%, above its 10 year average (1.2%) for the second successive year. China (400,000 b/d) and India (330,000 b/d) provided the largest increments⁹.

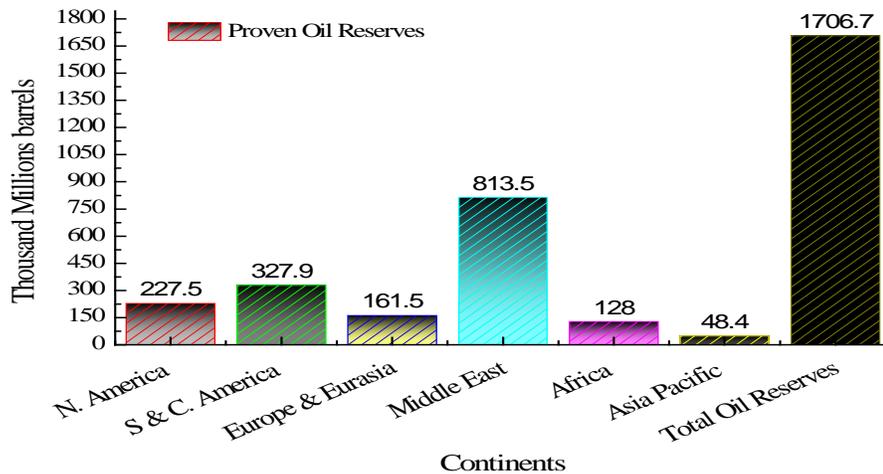
Global oil production, in contrast, rose by only 0.4 Mb/d, the slowest growth since 2013. And production in the Middle East rose by 1.7 Mb/d, driven by growth in Iran (700,000 b/d), Iraq (400,000 b/d) and Saudi Arabia (400,000 b/d). Production outside the Middle East fell by 1.3 Mb/d, with the largest declines in the US (-400,000 b/d), China (-310,000 b/d) and Nigeria (-280,000 b/d)⁹. Refinery throughout growth slowed from 1.8 Mb/d in 2015 to 0.6 Mb/d last year. Refining capacity grew by only 440,000 b/d, versus 10-year average growth of 1 Mb/d, causing refinery utilization to rise¹⁰.

Table 1. Proven oil reserves

Continents	Total proven oil reserves (Year)		
	1996	2006	2016
North America	127.3	221.7	227.5
South and Central America	90.7	110.8	327.9
Europe and Eurasia	142.8	137.6	161.5
Middle East	674.0	755.9	813.5
Africa	74.9	116.9	128.0
Asia Pacific	39.0	45.5	48.4

Source: BP report, 2017.

Total proven oil reserves



Source: **BP, 2017**

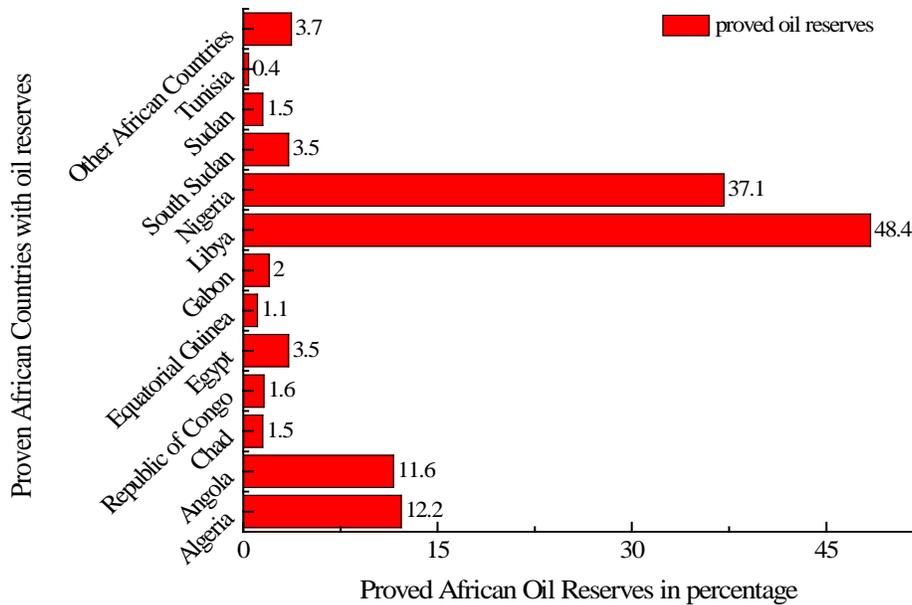
Africa is rich in natural resource ranging from arable land, water, oil, natural gas, minerals, forests, and wildlife. The continent holds a huge proportion of the world's natural resource both renewables and none-renewables¹¹.

Africa is home to some 30 percent of the world's minerals reserves, 8 percent of the world's natural gas, 12 percent of the world's oil reserves; the continent has 40 percent of the world's gold and up to 90 percent of its chromium and platinum. The largest reserves of cobalt, diamonds, platinum, and uranium in the world are in Africa.

According to the oil and Gas Journal (OGJ), South Sudan had 3.5 billion barrels of proved oil reserves, as of January

1, 2014. Accordingly, the majority of the oil reserves are located in the oil-rich Muglad and Melut basins of which currently Melut basins is the only operating oil field in South Sudan because of civil conflict and it does produces the Dar blend Crude oil which is sold at less compared to the Nile blend of the Muglad oil fields.

Natural gas associated with oil fields is mostly flared or re-injected. Despite proved reserves of 3 trillion cubic feet, gas development has been limited in South Sudan. The Republic of South Sudan produce natural gas around 368,417 and are accordingly being flared.



Source: BP, 2017

2.4. Environmental implication of oil exploitation/production

2.4.1. Oil exploitation and production

It is referred to a process in which usable petroleum is extracted and removed from the ground. It involves seismic activities resulting into the degradation of the environment in form of depletion, oil spills, and deforestation without due consideration to its regeneration to the impoverishment of the host communities¹². Both exploration and exploitation degrades the environment in varying capacity and they are used interchangeably in this work across the globe.

2.4.2. Impacts of gas flaring on air quality

Gas flaring is the process of separating and burning of the gas produce during oil resources extraction from the ground. In countries like the Republic of South Sudan that lacks the technological advancement to tap the product gas, burns the produced gas in a massive flares as waste and are release into the atmosphere (into the air/ environment) without giving due consideration of its effects in the environment¹³. Gas flaring without temperature or emissions control pollutes the air and released unacceptably high levels of carbon dioxide into the atmosphere for example in the Niger Delta, an independent study have revealed that 75% of gas is being flared and contributes to air pollution¹⁴.

Environmental degradation is critical because the ability of the environment to support and sustain life depends on the proper natural balance of its parameters such as the water, air, soil, flora and fauna, temperature, oxygen for the sustenance of life on the life-supporting planet.

Oil exploration and production involve various chemical and seismic wave generation is a major source of environmental degradation particularly through liquid discharges and oil spills as well as gas flaring. Petroleum renders the soil infertile, burns vegetation and kills useful soil microorganisms thereby hampering agricultural productivity¹⁵. Accordingly, before mineral resources are harnessed, they pass through the stages of exploration, mining, and processing; different types of environmental damages and hazards inevitably accompany these three stages of mineral development¹⁶.

Oil spills (either in crude or refined form), natural gas flaring and deforestation which are highly associated with oil extraction are common phenomena in the oil communities and have caused severe environmental degradation in the oil-producing enclaves this is because they contaminate the environment, cause water and land pollution with grave consequences on both human and natural environment due to the toxic nature of the chemical discharged as it is in the case of Niger delta¹⁷⁻¹⁸.

2.4.3. Effluent and Waste discharges on soil

Another source of oil related pollution is the discharge of effluents into the surrounding environment, sometimes into the water, by the oil companies.

Oil production has a significant impact on the landscape and local environment. Contamination of soil and water is a major common consequence of oil production, particularly in areas with nonexistence or not enforced environmental regulation. For example in Ecuador, oil and water separation stations in the Oriente generate millions gallons of effluents each day, most of which are discharged untreated into the environment¹⁹. Groundwater is particularly susceptible to high contamination from the produced water and other uncontrolled chemicals during oil drilling. These effluents contained contamination of both oil fractions and heavy metals

Oil spills are a major concern, according to the Ecuadorian government, the trans- Ecuadorian pipeline has spilled about 17 million gallons of oil since it began operating in 1972. This has not only impacted on the environment directly but raises the potential as well for both surface water and underground water. In a country like South Sudan, the potential for accidental leakage and intentional leakage from skirmishes has not been assessed and it should be noted however that most of the south Sudanese people and their livestock in the area and beyond, depending on the untreated water of the river Nile for their domestic needs.

For instance, during exploration or seismic surveys by oil companies, drill cuttings, drilling mud, and fluids are used for stimulating production. There is also the use of chemicals during seismic activities. The major constituents of drill cuttings such as barytes and bentonitic clays and the production of unusually high total acid values (TAN, up to 10.4 mg KOH/g oil)²⁰ when dumped on the ground prevent local plant growth until natural processes develop new topsoil. In the water, these materials are dispersed and sink and may kill local bottom living plants and animals by burying them²¹. In addition to the pollutants introduced into the environment from exploration and exploitation operations, refinery wastes also have characteristics which constitute potential land, water, and air pollutants²². The disposal of wastes into the sea from oil facilities has direct effects on fish stocks and other microorganisms.

2.4.4. The impact of oil exploration and production on Paloich biodiversity

The most profound and adverse impact of oil pollution in Paloich with far-reaching implications on all other aspects of our traditional lifestyles and livelihoods had been the total loss of biodiversity and destruction of habitats largely due to soil degradation²³ as this affects the right of animals and the unborn generation²⁴.

The results of the unchecked oil pollution in Paloich as in many parts of the world have been the complete destruction of ecosystems, the savannah grassland and the flat plains has fallen to the axe of oil companies, wildlife and game have been driven away and farmlands have been rendered infertile with gross implication on the right to adequate food²⁵. During oil spills, the process of photosynthesis which enhances plant diversity is impaired since the process is reduced due to the fact that spilled crude has a high absorbance property so when

the crude spreads on to the surface of leaves, the latter find it difficult to photosynthesize and thus die, leading to biodiversity loss.

The toxic crude also affects underground herbs and shrubs, while microbial organisms which form important groups in the food web are also destroyed, this phenomena is evident in the uncheck oil pollution²⁶ as it is in case of Paloich area as the dark blend crude oil is acidic in nature.

The oil industry, especially the exploration of oil has destructive environmental impacts, according to kadafa ²⁷⁻²⁸ destruction of the environment is referred to as engendering ecological balance. Oil extraction involves several environmental pollution processes. Extractive activities can have a profound social and economic impacts¹⁸. They can have a positive effect on the development by creating jobs, encouraging business and providing vital infrastructure for remote communities such as roads, electricity, education and health. Oil exploration and production impacts on the environment in many negative ways by exposing it to oil leakages and spills, gas flaring and deforestation as a result of the creation of access routes to new areas¹⁸. The environmental pollution associated with oil exploration and production has serious implications for the survival of species in communities near/ within oil reserves.

2.5. Impact of oil exploration and production activities on Socio- Economic conditions

2.5.1. Nutritional styles and Food Shortage

Oil production all over the world is associated with oil spills or pollution which may have health implications for human lives from consuming contaminated water as leakage of carcinogenic compounds gets their way into water bodies²⁹. An empirical research also links oil activities to fever due to heat generated by gas flaring activities as produce gas are flared on daily basis.

Various disorders are contracted through the consumption of polluted water from water bodies in oil producing communities, a report published by a German aid agency “sign of hope” (sign of hope) revealed high level of lead and barium found from the hair samples taken from volunteer living around Thar Jath oil processing plant in South Sudan^{25, 30}. This shows that there is a direct link between the contamination of the people and the activities of the petroleum industry working in the Republic of South Sudan.

Crude oil exploration and production often lead to greater social consequences than other forms of development induce socio-economic disruption hence affecting the communities' livelihoods³¹. Oil exploitation, in the Eastern Upper Nile region and the connected construction of a pipeline, led to the burning of 48 enclaves and displacement of 55,000 people, the worst situation was in Bentiu and Rub Kona regions there was a massive forceful eviction of the populace causing social disruption and loss of livelihoods³¹. According to the United Nation Report in September 2001 more than 100,000 people were displaced between 1999 and 2001². The environmental pollution caused by oil drilling also results in a destruction of livelihoods in local communities making it difficult for the present and future generations to make a living off of their land.

Farming activities, as the mainstay of these economies, literally grind to a halt with the exploration of oil.

One fallout of oil pollution in the Paloich area is the destruction of the traditional local economic support system of fishing, farming, and livestock rearing.

The combination of the effects of the oil spill and acid rain resulting from gas flaring has been soil degradation which affects crop yield and harvest as it is in the case of the Niger Delta³². The ultimate result of this is the poor crop yield as the soil has been rendered infertile and poor fish catch, as most fish has been driven into deep waters and the indigenous people do not have an alternative source of balanced diet. The whole impact of this is the food shortage and which has affected the ability of most families to feed themselves.

2.5.2. Destruction of Traditional Means of Livelihood

Another implication of oil pollution is that having destroyed biodiversity, it has also rendered the agricultural sector, which is the largest employer of labour in most of the world's wetlands for example in the Niger Delta, environmental change of the wetlands are due to oil exploration and exploitation resulting into loss of its valuable services³³. In the flat plains, much of the wetland is threaten with the oil activities and thus may render the wetland unprofitable to the local communities rendering most of the youth and women jobless since their local economic support system of pastoralism and farming is no longer sustainable.

An example is the case of the swampy flat plains of the Greater Upper Nile Region where the livelihood of the local people have been sustained by living in the midst of a once healthy and productive swamp by fishing, farming and green pastures for animals feeds. They also gathered papyrus for making mats and for local energy and fuel. However, due to it being subjected to ceaseless oil spill incidences, oil have coated the breathing roots of this plant killing off parts of the vegetation, animals and aquatic life that depend on it yet this accidental spills are unaccounted, remediated and reported.

This flat plains and the swamps which serve as habitats for fish and other microorganisms, as well as a source of raw materials for communities in Paloich have been lost to the ravages of oil pollution. The land, the water, and the environment can no longer support the subsistence life that this local Paloich community, which they have been dependent upon for thousands of years.

2.5.3. Migration and the Rise of Environmental Refugees

Socio-culturally, the Paloich people live in closely knit communities and are more endogenous. The Paloich people were not used to mass outflows/movement from their territory as their subsistent economy provided them with their basic needs. To the average indigenous people, movement from the area, which was considered a place of abundance into alien lands, means subservience, poverty in the new area, and loss of pride and self-esteem and it is only being practiced in the search of greener pastures for cattle exposing them at risk as cattle wresting among the cattle herders in South Sudan is inevitable.

But due to the discoveries of available commercial crude oil reserves in the area in the early 1970s, Oil pollution has resulted in the destruction of the Upper Nile Region

environment. This, in turn, has led to the unsustainability of land for the traditional economic livelihood patterns that once thrived in the area³⁴. As a result, there are many women and youth immigrating out of the area into cities especially to big towns like Malakal, Rent and Juba while the disable are left in the wilderness, where they have become environmental refugees and because of their poor economic status, have had to take up accommodation in shanties, slums and watercourse with its attendant risks especially in terms of rights protection.

2.5.4. The Impact on Cultural Values and Spirituality

Oil spills and Gas flares know no boundaries so there are adverse impacts on cultural values and social harmony. One of the most telling impacts of oil pollution on the Paloich community is that it has led to the death and possible extinction of medicinal plants and herbs that are rooted in our traditional medicine and spirituality that have deep spiritual significance to the community. This degradation is brought about by the fact that most of these herbs and plants are found in sacred places of worships (*Ngundeng shrines*), which have fallen under direct destruction in the course of oil exploitation and the toxicity of oil pollution.

2.5.5. Impact on Traditional Institutions of Authority and Social Harmony

One area in which oil pollution has dealt a death knell to our customs and traditions is the rugged individualism which it has fostered amongst members of our communities which is contrary to our communal lifestyles as this has resulted into the disintegration of customs, traditions and social values, such as respect for our elders.

By the Dinka tradition (a common practices among the tribes in the whole of South Sudan), elders are given the traditional authority to be custodians of the community and its protectors in times of stress and inconvenience such as during oil spills and other environmental incidents.

The traditional system ensures that no single individual has the right to take what belongs to the community for him or herself. However with the arrival of the oil companies, a new level of relationship is created between the oil companies and the elders led by the traditional rulers who most times now see their community people as subjects and them as big men because of the largesse and special treatment that are given to them (individuals rather than the communities) by the oil companies thus alienating them from the people.

The result is that in times of distress or oil pollution like oil spills and fire conflagrations, most of these elders think of themselves first and collect monies and others from the oil companies or them will form companies in order to front them for contracts to do the "clean up exercises" which are actually euphemisms for "cover-ups".

Rather than being the supposed protectors of the people, most elders are being seen as collaborators with the oil companies thereby eroding community respect for their status and subsequent conflict between them and the youth. In this way, the social harmony that once existed is broken and discord ensues.

III. RESULTS AND DISCUSSION

The presence of substantial amounts of oil and gas reserves has been identified by many authors as a potentially mixed blessing for oil producing countries³⁴⁻³⁶. Although the discovery of oil creates a sense of hope and expectation that the revenue would lead to the development of local communities and country as a whole, in most cases, this expectation has remained illusory as the exploration and production of the oil resources has led to the destruction of local communities livelihoods and the environment in oil-producing developing countries. Evidence around the world suggests that whether or not a community/country benefits from its discovery of oil and gas is a function of the global position of the oil-producing country in question³⁷. In most cases, local communities and oil producing nations in the highly developed countries seem to derive more blessings from the oil discovery and exploration in comparison to those in the less developed countries. A typical example in this regards is Norway which was the poorest country in Scandinavia at the end of the 1960s but had by the end of 1990 become the wealthiest, this was attributed to oil discovery in late 1969. Larsen³⁸ attributes this success to Norway's ability to prevent rent-seeking and corruption which have been identified as core elements of the resource curse key elements of Norway's success include the existence of policymakers and politicians who had refrained from dipping their hands into the government pool, a highly efficient judicial system that prosecutes the few defiant rent-seekers in an expeditious manner, a transparent reporting system that provides information to every Norwegian citizen about exactly how much revenue has been generated from the oil industry via both newspapers and the internet as well as a strong media that serves as a watchdog. But in the Republic of South Sudan context, this has not been the case especially after it inherited most of the oilfields from Sudan right after the secession through a peaceful referendum in 2011 with less to limited experience in the management of such industry.

2.6. Oil sector Management

National oil companies from Asia dominate the oil sectors of South Sudan and Sudan. The China National Petroleum Corporation, India's oil and Natural Gas Corporation and Malaysia's Petronas hold large stakes in the leading consortia operating oil fields and pipelines. National oil companies Sudapet (Sudan) and Nile pet (South Sudan) also hold small stakes in operations.

South Sudan enacted the Petroleum act 2012 and Petroleum Health, Safety and Environmental Management System and Plans Regulations 2015 which outlines the institutional framework governing the hydrocarbon sector. The act established the national petroleum and gas corporation (NPGC)³⁹. NPGC is the main policy-making and supervisory body in the upstream, midstream and downstream segments of the hydrocarbon sector and is authorized to approve petroleum agreements on the government's behalf. The Ministry of Petroleum (MoP) is responsible for the management of the petroleum sector.

The Sudan national petroleum corporation (Sudapet) is the national oil company in Sudan and the Nile Petroleum Corporation (Nilepet) is its counterpart in South Sudan. At the end of 2011, South Sudan nationalized Sudapet's assets in the

south and transferred them to Nilepet. Both companies are active in their respective country's oil exploration and production and are often minority shareholders in production sharing contracts with foreign oil companies because of their limited technical expertise and financial resources contrary to the section 81 of the Act.

Table 2. Main Oil companies in South Sudan

Consortium/Subsidiary	company	Country of Origin	Share (%)
Greater Nile Petroleum	CNPC	China	40
	Petronas	Malaysia	30
	ONGC	India	25
	Nile pet*	South Sudan	5
Dar Petroleum Operating company (DPOC)	Petronas	Malaysia	40
	Nile pet	South Sudan	8
	Sinopec	China	6
Sudd Petroleum Operating company (SPOC)	Nile pet	South Sudan	41.9
	Petronas	Malaysia	33.9
Star Oil	ONGC	India	24.1
	Ansan	Yemen	66
	Wikfs		

Note: *Nile pet is the main national operating corporation in South Sudan.

Source: www.dev.eia.gov/countries/analysisbriefs/sudan

2.7. Oil production in South Sudan

South Sudan has experienced frequent disruptions to production over the past few years. In January 2012, the country voluntarily halted its production because of a dispute over transit fees with Sudan. South Sudan's production was partially shut down again at the end of 2013 because of civil conflict⁴⁰.

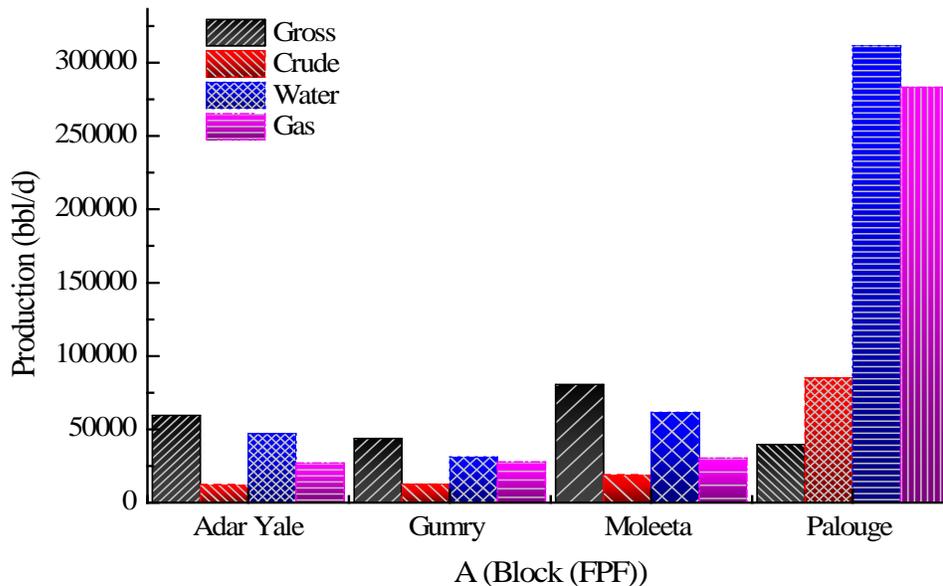
For the first half of 2014, South Sudan's oil production average 260,000 barrels per day (bbl/d), down from almost 490,000 bbl/d in 2010⁴¹. Disagreements over oil revenue sharing and armed conflict have curtailed oil production over the past few years. Also, the oil fields in the country are mature, and output has naturally declined compared to the previous years. South Sudan's production averaged 129,193 bbl/d per day as of 2017 down from 245,000 barrels per day before the 2013 crisis. However, the country plans to get the industry back on track with a production target of 290,000 barrels per day for the 2017/2018 fiscal year⁴².

For the first time in 2017, South Sudan is attracting new oil companies to its acreages and with around 70% of the country unexplored, the country's large and somewhat virgin territory represents huge hydrocarbons potential, as it can be witness by the signing of Nigerian based Oranto Petroleum in early 2017 to explore and produce oil in the country with an investment worthy \$500 million dollars in Block B3 of the Unity State oil fields⁴² as this will increase the current production level from the Melut basin of Block 3 and 7 which are now producing almost 90% water as evident from the field report.

Table 3. Oil production statistics in South Sudan's Melut basin (Block 3 & 7).

Block (FPF)	Daily Crude Production			
	Gross (BBL/D)	Crude (BBL/D)	Water (BBL/D)	Gas (M ³ /D)
Adar Yale	59571	12448	47123	26918

Gumry	43862	12652	31210	27850
Moleeta	80571	19106	61465	30304
Paloich	39660	84987	311653	283345
Total	580644	129193	451451	368417
Source:	DPOC	2/2018,	MoP/RoSS	2018



This disruption estimates take into account adjustments to South Sudan's effective capacity and assume that a portion of pre-shut in production was compromised because of technical issues surrounding the shut in and its duration. Thus even if there are no production outages in South Sudan, the country's production cannot recover to its pre shut in 2011 average level of 340,000 bbl/d at least in the near future because of permanent damage and natural decline, particularly at mature fields in Unity state and currently all of the oil being produced in South Sudan originates from the Melut basin (Blocks 3 and 7) which has also impacted on the production level, where by less crude oil is produce than produced water.

Natural gas associated with oil fields is mostly flared or re-injected. Despite proved reserves of 3 trillion cubic feet, gas development has been limited in the Sudan and South Sudan. In 2016, the proved natural gas estimates was 503.3 trillion cubic meter of potentially available gas in Africa (39.3 trillion cubic meters in other African countries)². In 2016, Africa produces 208.3 billion cubic meter of natural gas is being consumed and the resultant 70.1 is flared as it is evident in South Sudan that produces around 368417 cubic meter of natural daily as it is evident from the field report adding to the global average of

flared gas in 2008 which was estimated at 139 BCM⁴³, resulting into an elevated total carbon dioxide emission from 422.9 to 426.6 cubic meter, a remarkable increase of 1.3 %⁹.

It is also evident that most of the gas production with the crude oil is being flare hence rising concerns about the environment and human health with less or without any due consideration. However efforts have not been made to effectively tap the produce gas for other uses, they are being flare or re-injected to recover oil. Additionally, the majority of South Sudanese depends solely on fuel wood as a primary energy leading to a massive deforestation and increase greenhouse gases in the atmosphere since less trees are left that acts carbon sink thus it could have become an alternative source of energy if tapped and supplied to homes for domestic use.

2.8. Health and conservation implications of the oil industry

The presence of oil infrastructure per se is known to lead to a wide range of environmental impacts⁴⁴. Oil spilled on terrestrial environments will undergo volatilization and biodegradation. On soil, a significant fraction will infiltrate into the subsurface and remains there while the remaining oil fraction with heavy molecules have attracted significant concern due to

carcinogenic potentials and the ability to bio accumulate⁴⁵. Thus the effect of the oil spills on ecosystems is detrimental to both humans and wildlife through the food chain since degradation of such hydrocarbon pollution or the recovery of a polluted medium such as the soil is slow⁴⁶ as witness in Paloich oil fields.

2.9. Effect on Underground Water

A serious threat posed by oil-related pollution is the impact on both surface and underground waters. When oil spills occurs or when there is an effluent discharge, it seeps into the ground and becomes mixed in the underground water system⁴⁷. It has been found that polluted underground water take many years before it can be remedied. Yet this underground water moves into streams and wells which are the only sources of local water supply in the community which results in the rise of water-borne diseases. This has affected the traditional relationship of the people with water in the oil bearing enclaves. There is a perceptible fear that rather than being the source of life, these water systems have become sources of misery, disease and death.

South Sudan oil production is characterize with low oil productivity due to the maturation of the fields and thus crude oil production as seen from the field report is characterized with a high level of produced water of which only a portion is re-injected into the wells for oil recovery process.

Table 4. Total produced water

Block (FPF)	Daily (bbl/d)	Monthly (Mbbl.)	Yearly (MMbbl)
Adar Yale	47123	571.94	2,132.94
Gumry	31210	380.62	1,382.86
Moleeta	61465	711.14	2,542.65
Paloich	311653	3,734.59	13,271.09
Total	451451	5,398.30	19,329.54

Source: DPOC 2/2018/ MoP/RoSS/ 2/2018

Operational discharges from the oil industry have created public concern because they represent a very large continuous input of contaminants to the environment from many widely dispersed point sources. According to the American petroleum institute, about 18 billion barrels (bbl) of produced water was generated by U.S onshore operations in 1995. A large volume of produced water is generated at the Melut basin oil fields on a daily basis which post a threat to the life since apparently there is not effective treatment at the site.

IV. RECOMMENDATION

To minimize environmental risks in a wet and swampy area of the Melut basin, requires adequate technology for resource recovery, ambitious and clear standards and procedures, their integration into effective management systems and commitment from the highest management to curb the environmental pollution taking place.

There should be a continues Environmental impact assessment and a periodic Environmental Impact Statement defining the State of the Environment of the local area.

It is also evident that most of the gas production with the crude oil is being flared hence rising concerns on the environment and human health with less or without any due

consideration, tapping of gas production with oil will proof to be a potential source of energy, the development of gas infrastructure for the treatment of produce gas into a compressed or pipe gas is strongly recommended as this will provide a potential energy source that can be consumed locally minimizing/ reducing the alarming rate of deforestation in search of fuel wood as a primary source of energy.

Oil is always pumped together with water and they must be separated. There are big volumes of produced water stagnant in ponds with apparently inadequate treatment such as skimming which is less effective⁴⁸. The discharge of produced water causes serious environmental risks to both human and the natural environment and the use of technologies such as high efficient halophile oil-degrading microorganisms in biological treatment should be combine with membranes (SBR) biological treatment systems for effective management of produced water since the Dar blend crude oil is acidic in nature and contain heavy metals²⁰, The pipelines are causing major problems from leaking leading to massive oil spills along the transportation line to the sea terminal at port Sudan requires proper maintenance and monitoring.

V. CONCLUSION

Oil exploration and production have had serious implication on the environment, oil spill and gas flaring have contaminated, degraded and destroyed the forests, and water bodies of the Melut basin, thereby causing serious destruction of its biodiversity over the years.

The harmful effects of oil exploration and exploitation on the environment are many. Oil spill kills plants and animals in both the plain and the estuarine. Oil settles on green plants hence preventing the photosynthesis process leading to reduction of its ability to sustain life especially in the agro-pastoralist community as it is in the case of Melut basin. oil endangers fish hatcheries in the swamps and also contaminates the flesh of commercially valuable fish since Sudd wetlands and Machar wetlands is a home to millions of fish stock that forms the primary diet of the community surrounding the oil enclaves. Soils and river sediments, in the vicinity or downstream, respectively from oil extraction and processing infrastructure in the savannah grassland of Paloich area of the greater Upper Nile region contain an oil pollution signature. This is not an unexpected finding in a worldwide context given that the oil industry infrastructure commonly has a significant environmental impact in the surrounding lands, be it during exploration, extraction, processing, transport and distribution processes.

The hydrocarbons in sediments in the water courses could have eventually reached the main watercourse of the Nile as already noted for other chemical components present in produced waters and surface water around the oil fields^{25, 30}. Spillages in soils are likely to have a local impact.

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Polyaxial Compaction of Depleted Rocks

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Abstract- This study examined vertical compaction of depleted reservoirs in a new way. From Hooke's laws of elasticity, we generated polyaxial compactions in the rock by applying the Lagrange averaging technique, which gave a result for the stress-path parameters in the maximum horizontal stress direction. The formulation considered the pore pressure depletion in the reservoir. In addition, we provided a monograph, which can serve as a quick chart for reading up vertical compactions in the reservoir considered. Compaction of depleted rock is important, especially in reservoir geomechanics, as millions of US dollars are required in solving issues related to them. Engineers have used uniaxial compaction, in the vertical direction, to model surface subsidence and construct platforms for offshore drilling, but there are issues when using such compaction. The systems of reservoir stress are orthogonal in nature, vertical and lateral stresses exist at the subsurface, and the intermediate principal stress plays a role in a tectonic region. Thus, it is important to carry out a study of this magnitude. From the results, we find that, in normal stress regime, there is a significant difference between results of polyaxial compaction and uniaxial compaction at shallow depths. The difference diminishes to zero at much deeper depths, as the rock's Poisson ratio approaches 0.5. The distribution of this Difference with Poisson's ratio follows a near parabolic trend or a bell shape. In addition, the distribution varies with reservoir aspect ratio with a trend reversal.

Index Terms- Stress path parameters, Lagrange interpolation, depleted rocks, polyaxial compaction, uniaxial compaction.

I. INTRODUCTION

Rock compaction and surface subsidence are important phenomena in the study of the geomechanical behavior of depleted reservoirs. Rock compaction results from the increasing load of sediments deposited in a basin, ([1], [2], [3]), of which the primary effect is to reduce porosity, as pore space tends to close up in the process. When compaction occurs in a formation, the ground level must subside to maintain equilibrium, depending on the stiffness of the rock. Most drilling activities are in shale or clay formations, [4] that are susceptible to compaction because of plasticity and the tendency of releasing adsorbed water. The large-scale consequence of compaction and the corresponding subsidence are operational problems including surface flooding and onshore/offshore platform safety concerns [5]. Flooding can destroy natural habitat and make urban settlement unbearable. Platform safety concerns in the offshore environment can be detrimental to lives and property. The resulting surface subsidence can affect wellbore casing integrity. In petroleum geomechanics, these effects can reach up to millions of US dollars when solved. Particularly, platform jack-up requirement needed to solve the subsidence in the Ekofisk field of 1984 was at a cost of US \$1MMM, [6].

The application of the theory of compaction, like the undercompaction theory, in predicting pore pressure is important. One problem is that such theory employs uniaxial compaction without considering the effect of 3D compaction, otherwise called polyaxial compaction. The overburden load together with the laterally compressing forces (or tectonic forces of the earth) acting on the formation can put the rock in the latter compaction state. At the subsurface, *in situ* stresses are orthogonal ([7] page 51, [8], [9] [10]). Stress changes are also orthogonal. For the uniaxial compaction, the stress regime is taken as normal with the maximum principal stress as the vertical stress and the minimum principal stress as the horizontal stresses. Here, the intermediate stress bears equal magnitude as the minimum stress.

In a tectonic zone, the intermediate stress can be very active ([11], [12]). Therefore, it is important to consider whether polyaxial compaction of rocks yields similar results as uniaxial compaction or not. The stress state for a significant number of formations is distributed such that the vertical stress is the maximum principal stress while the horizontal stresses can have the intermediate and minimum principal stresses.

Depleted rocks are those having pore pressure reduction due to production from the formation. The change in the pore pressure serves to promote change in the total and effective stresses [13]. As more fluids leave the pore space, the reservoir pressure will reduce. This allows the effective stress to increase and the rock shrinks, leading to compaction. This stress change is usually dependent on the *in situ* stresses, rock geometry, and mechanical properties. The stress changes are defined in terms of stress path coefficients, which are easily obtained for an isotropic change. Under a triaxial stress system, a change in pore pressure promotes a change in the effective stress and total stress as follows, [13]:

$$\Delta\sigma'_v = \Delta\sigma_v - \alpha\Delta p \quad (1)$$

$$\Delta\sigma'_h = \Delta\sigma_h - \alpha\Delta p \tag{2}$$

Where $\Delta\sigma'_v$ = change in effective vertical stress, $\Delta\sigma_v$ = change in total vertical stress, Δp = change in pore pressure, α = Biot's coefficient, $\Delta\sigma'_h$ = change in effective horizontal stress, and $\Delta\sigma_h$ = change in horizontal stress.

The three stress path parameters, for triaxial stresses, introduced to define the stress changes are the following expressions [5]:

$$\gamma_v = \frac{\Delta\sigma_v}{\Delta p} \tag{3}$$

$$\gamma_h = \frac{\Delta\sigma_h}{\Delta p} \tag{4}$$

$$k = \frac{\Delta\sigma'_h}{\Delta\sigma'_v} \tag{5}$$

Where γ_v = vertical stress path parameter, called the stress arching, γ_h = horizontal stress path parameter, k = deviator parameter.

In eq. (3) to eq. (5), the intermediate stress does not play any part, as the horizontal stresses are equal. This is not always the case for a 3D formation, where the horizontal stresses are unequal. Thus, it is important to introduce the intermediate stress path parameter to account for polyaxial compaction in a formation. During loading, part of the overburden stress transmits to the sides of the formation, a phenomenon that is known as stress arching ([14], [15]). Depleted reservoirs are good candidates for wellbore stability analysis and can serve as sites for CO_2 sequestration and infill drilling [5]. The reduction in pore pressure leads to a reduction in horizontal stresses, which implies a reduction in the fracture gradient. Wellbore collapse and/or wellbore fracture ensue in such a well. From stress evolution studies, pore-collapse prediction, reactivation of faults and bedding parallel slip prediction are possible, [16].

The aim of this study is to develop a model for reservoir compaction from the theory of polyaxial stress state, useable in geomechanical studies. The objectives of the study are to devise a scheme for obtaining the intermediate stress path parameter, then to estimate the vertical compaction of reservoir rocks in terms of pore pressure depletion and to consider the variance between uniaxial and polyaxial compactions. In addition, the authors strive to produce a monograph for quick read-up of vertical compaction in a depleted reservoir.

II. LITERATURE

Rock compaction can be plastic or elastic. Rock compaction can be plastic or elastic, ([2], [3]), the former entails the squeezing of minerals such as shale and clays into pore spaces as reservoir pressure increases and pore fluids flow out [1]. When rocks compact this way, they do not return to their initial volume upon removal of the load. For elastic compaction, the rock can return to almost its initial volume upon removal of the load. This depends on hysteresis. Reservoir compaction can be modeled using 3D or 1D analytical solution, depending on the complexity of the reservoir [17]. From the 1D analysis, critical parameters are understood and the importance of 3D modeling becomes obvious. More importantly, poor estimation of rock compaction can lead to the wrong estimation of reserves [18]. The method used in obtaining reservoir compaction is to determine earth deformations from the constitutive strain-stress equations of the poroelastic material. Then, the uniaxial compaction is obtained from the vertical strain. The pre-requisite for the estimation is the knowledge of the stress evolution in the formation ([5]; [19]; [13]).

Fjær *et al* [5] developed a model for uniaxial compaction using Hooke's law. They gave the model in terms of depletion in reservoir pressure. Linear poroelastic theory in a homogeneous reservoir formed the basis of the study. The rock properties used for the study were isotropic, but most sedimentary rocks have large-scale anisotropy. The elastic modulus of anisotropic rocks varies from one direction to the other. This intrinsic or induced anisotropy, when not included in the analysis, can yield errors. The mathematical expressions for the changes in effective stress obtained are the following:

$$E\varepsilon_h = \Delta\sigma_h - \nu(\Delta\sigma_H + \Delta\sigma_v) \tag{6}$$

$$E\varepsilon_H = \Delta\sigma_H - \nu(\Delta\sigma_h + \Delta\sigma_v) \tag{7}$$

$$E\varepsilon_v = \Delta\sigma_v - \nu(\Delta\sigma_H + \Delta\sigma_h) \tag{8}$$

Where E = average elastic modulus, ε_h = strain in the minimum stress direction, ε_H = strain in the intermediate stress direction, ε_v = strain in the maximum stress direction, $\Delta\sigma_h$ = stress change in the minimum effective stress direction, $\Delta\sigma_H$ = stress change in the intermediate effective stress direction, $\Delta\sigma_v$ = stress change in the maximum effective stress direction, and ν = Poisson's ratio.

From eq. (6), eq. (7) and eq. (8), rocks with anisotropic elastic constants may not be solvable. It is important to develop models that are robust enough to incorporate anisotropy in elastic moduli. The result for the vertical compaction is the following model for strain [5], obtainable from eq. (8):

$$\epsilon_v = -\frac{\Delta h}{h} \tag{9}$$

Where h = reservoir thickness and Δh = vertical compaction of the rock.

Upon the assumption of no lateral compactions, [5] gave an expression for reservoir compaction as the following:

$$\frac{\Delta h}{h} = \left(\frac{1 - \nu - 2\nu^2}{1 - \nu} \right) \frac{\alpha \Delta P_p}{E} \tag{10}$$

Where ΔP_p = pore pressure depletion and α = Biot's coefficient, taken as unity in this study. The limitation of using uniaxial compaction in geomechanics is that when the theory deviates from reservoir condition, the results are not representative of *in situ* mechanical behavior. Teufel *et al.* [19] analyzed compaction and subsidence in the Ekofisk reservoir and showed the importance of stress-path analysis. Their study showed that for measurements during pore pressure depletion, the increase in effective horizontal stress was lower than that obtained from the laboratory. Hettema *et al.* [20] did an extensive study on the stress path coefficient for stress changes during pore pressure depletion. Rotational symmetry in the horizontal plane is the assumption used in obtaining the parameters for analyzing uniaxial compaction [5]. This will not yield a good result when we analyze polyaxial stresses, with different horizontal stresses. In an experiment designed to deform samples of rocks, constrained by uniaxial stresses up to 30kN in magnitude, [21] observed widespread small-scale fractures in the more porous rocks. These fractures are indicative of the movement of *in situ* stresses in three dimensions and not just in one direction. The presence of faults and fractures, at large scale, result from stress differentials among the *in-situ* stresses. It is, therefore, better to consider compactions in 3D. Rock compaction is stress-path dependent, ([22], [5], [13]), thus we may expect variations in results when *in situ* stresses are polyaxial. Moreover, we can use these stress-path parameters to obtain vertical compaction from the polyaxial stress system.

Expressions for the stress path parameters can be obtained using the [23] model, which relates the aspect ratio (ratio of thickness to length of the reservoir) with the coefficients. However, a more simplified set of expressions is the [24] model for flat reservoirs, which are given as follows:

$$\gamma_v = \frac{(1 - 2\mu)\alpha}{(1 - \mu)} \frac{\pi}{2} e \tag{11}$$

$$\gamma_h = \frac{(1 - 2\mu)\alpha}{(1 - \mu)} \left(1 - \frac{\pi}{4} e \right) \tag{12}$$

Where e = aspect ratio, α = Biot's coefficient, μ = Poisson's ratio. With eq. (11) and eq. (12), the stress path parameters are now with respect to the geometry of the reservoir, thus variations in reservoir dimensions can be observed. These stress paths are for total stresses in the formation. More useful to the current study is the effective stress path parameters, which can be written as follows [5]:

$$\gamma' = \gamma - \alpha \tag{13}$$

Where γ' = the effective stress path parameter in the direction considered, γ = total stress path parameter in the direction considered, and α = Biot's coefficient. With eq. (13), the expressions for the effective stress paths in the orthogonal directions can be presented, but the stress path parameter in the intermediate direction is a requirement. An important technique of obtaining intermediate property of a system is by the use of averaging/interpolation technique. The Lagrange averaging [25] of the stress path coefficients in the maximum and minimum stress directions can yield a result for that in the intermediate stress direction. We can do this since both the *in situ* stresses and their changes are orthogonal. Stress-path coefficients should be orthogonal, except where there are, for example, equal lateral stresses.

Recently, [26] used geomechanical simulation to study the subsidence and compaction behavior of the Fahlian reservoir of Iran. The available data fed into the simulator included geophysical, geological, reservoir engineering and geomechanical data. They used these data to calculate the magnitude and orientation of the *in situ* stresses, with about a 90% correlation between model and real data. The results showed that reservoir compaction and subsidence were insignificant in the field, at about 29 mm, mainly because of the gas injection scheme used in the formation. Large-scale injection into a formation can reduce the compaction and subsidence significantly because it serves to support the rock strength. Their study showed the importance of accurately developing 3D geomechanical models. The basis for the 3D geomechanical model generated was the building of a 1D model for wells in the field.

III. METHODOLOGY

From Hooke's law of elasticity, we obtained the various strains in the minimum, intermediate and maximum stress directions using a computer application. The stress evolutions in the formation were obtained in terms of the effective stress path parameters in the three orthogonal directions such that 3D responses were obtained. In order to obtain the effective stress-path parameter in the intermediate principal stress direction, we used the Lagrange averaging of results between those of the vertical and minimum horizontal stresses. We computed the vertical compaction from eq. (4), and showed the variation between the polyaxial compaction and a uniaxial one as obtained by [5].

Fig. 1 shows the physical model for the study, which is a rectangular geometry that comprises vertical and lateral stresses. There

was no assumption of zero lateral strains in this study, which is the convention used in the 1D analysis. This is a true representative of polyaxial stress systems.

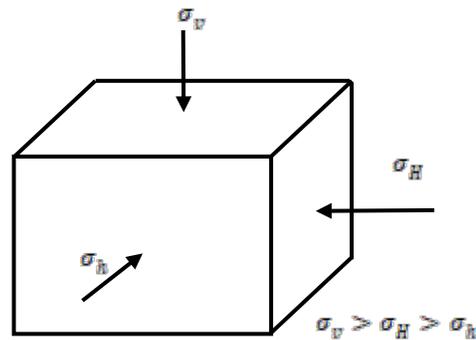


Fig. 1- physical model of stresses on the rock

In order to incorporate the possibility of modeling the effect of anisotropy, a new set of equations for the Hooke's law are posed as follows:

$$E_h \varepsilon_h = \Delta \sigma_h - \nu (\Delta \sigma_H + \Delta \sigma_v) \tag{14}$$

$$E_H \varepsilon_H = \Delta \sigma_H - \nu (\Delta \sigma_h + \Delta \sigma_v) \tag{15}$$

$$E_v \varepsilon_v = \Delta \sigma_v - \nu (\Delta \sigma_H + \Delta \sigma_h) \tag{16}$$

Where E_h = elastic modulus in the minimum horizontal stress direction, E_H = elastic modulus in the maximum horizontal stress direction, E_v = elastic modulus in the vertical stress direction, ε_h = strain in the minimum stress direction, ε_H = strain in the intermediate stress direction, ε_v = strain in the maximum stress direction, $\Delta \sigma_h$ = stress change in the minimum effective stress direction, $\Delta \sigma_H$ = stress change in the intermediate effective stress direction, $\Delta \sigma_v$ = stress change in the maximum effective stress direction, and ν = Poisson's ratio.

From eq. (13), the following expressions for the effective stress path parameters are posed:

$$\gamma'_v = \gamma_v - \alpha \tag{17}$$

$$\gamma'_h = \gamma_h - \alpha \tag{18}$$

$$\gamma'_H = \gamma_H - \alpha \tag{19}$$

Where the superscript are as defined in eq. (13) and the subscripts v, h, and H represent the vertical, minimum horizontal and maximum horizontal directions respectively. From eq. (3) and eq. (4), the values of the stress path parameter in the vertical stress direction and in the minimum horizontal stress direction relates to the *in situ* stresses linearly. Then, the application of the Lagrange averaging techniques [25], on the *in situ* stresses yields the following expression for the stress path parameter in the maximum horizontal stress direction:

$$\gamma_H = \gamma_h - (\gamma_h - \gamma_v) \left(\frac{\sigma_h - \sigma_H}{\sigma_h - \sigma_v} \right) \tag{20}$$

Where γ_h = stress path coefficients in the minimum horizontal stress direction, γ_H = stress path coefficient in the maximum horizontal stress direction, γ_v = stress path coefficient in the vertical stress direction, σ_h = minimum horizontal stress, σ_H = maximum horizontal stress and σ_v = vertical stress.

From eq. (14), eq. (15) and eq. (16), we have the matrix arrangement for the effective compactions in the rock as follows:

$$\begin{pmatrix} \varepsilon_h \\ \varepsilon_H \\ \varepsilon_v \end{pmatrix} = \begin{pmatrix} 1 & -\mu & -\mu \\ -\mu & 1 & -\mu \\ -\mu & -\mu & 1 \end{pmatrix} \begin{pmatrix} \gamma'_h \frac{\alpha \Delta p}{E_h} \\ \gamma'_H \frac{\alpha \Delta p}{E_H} \\ \gamma'_v \frac{\alpha \Delta p}{E_v} \end{pmatrix} \tag{21}$$

We can, therefore, extract expression for the vertical compaction, as follows:

$$\Delta h_v = \left(\frac{\gamma'_v}{E_v} - \mu \frac{\gamma'_h}{E_h} - \mu \frac{\gamma'_H}{E_H} \right) \alpha \Delta P_p h \tag{22}$$

Eq. (22) can model compaction for rocks with contrasting elastic moduli, but obtaining this information is very difficult in reservoir studies. In order to simplify the analysis, the elastic constant can be taken as uniform, except where such data are measurable.

In order to develop a workflow for obtaining polyaxial compaction in this study, MS excel computer capability was employed. This workflow requires reservoir input data, which are geomechanical and has an allowance for elastic constant anisotropy. Equation (11), (12), and (17)-(20) were combined to obtain the effective stress path parameters, while eq. (21) yielded the result for the vertical strain, from where the compaction was obtained. We also randomly generated a thousand data points in the interval 0.5 – 1 to satisfy the condition that $\gamma'_h < \gamma'_H < 1$. In addition, the results of the prediction from the Lagrange interpolation were in agreement with those from randomly generated stress path parameters, hence the results, in **Fig. 5** can serve as a quick read-up chart.

IV. RESULTS AND DISCUSSION

From eq. (22), we observe a smaller compaction in the reservoir than in a uniaxial model, eq. (10), which is obtainable assuming the stress path parameters are equal in the horizontal directions. With this development, reservoir subsidence for uniaxial compaction would probably yield poor results if polyaxial stress state were present. Reservoir compaction depends on the stress regime in a formation. Under a normal stress regime, the results of polyaxial compaction are significantly different from those of uniaxial compaction. The reason is that the stress-path coefficients change as the stress regimes change. The difference may be larger in a strike-slip regime or reverse stress regime. Using the data in **Table 1**, we obtained a compaction of 0.503 ft by applying the uniaxial model, [5], while the current model yielded a compaction of 0.4656 ft, which is about 7.9% smaller in value. In practical design, this can be economically catastrophic as poor reservoir management ensues.

Table 1: Properties for a disk-shaped reservoir compaction

	Parameter	Symbol	Value	Unit
1	Overburden stress gradient	σ_o	0.953	[Psi/ft]
2	Pore pressure gradient	P_p	0.45	[Psi/ft]
3	Maximum horizontal stress, gradient	σ_H	0.8	[Psi/ft]
4	Minimum horizontal stress, gradient	σ_h	0.7	[Psi/ft]
5	Reservoir depth,	Z	6560	[ft]
6	Reservoir thickness,	h	328	[ft]
7	Poisson`s ratio,	ν	0.25	[-]
8	Shear modulus,	G	2	[GPa]
9	Depletion,	ΔP	10	[MPa]
10	Reservoir Diameter	D	6560	[ft]

Compaction is linear with pressure depletion but inversely proportional to rock stiffness. Thus, soft reservoirs will show more compaction than corresponding stiff ones [5]. The thickness of the rock plays a similar effect on polyaxial compaction as in the uniaxial case. A rock with smaller thickness will compact less than one with larger thickness depending on the stiffness and compression of the sediments. Any reservoir system that tends to improve pore pressure will reduce compaction. For example, an energy supplement from an external aquifer or the introduction of injection wells.

The variance between the values of polyaxial and uniaxial compactions can affect the modeling of surface subsidence. This may also affect the integrity of the wellbore casings. Polyaxial compaction decrease with increasing Poisson`s ratio, muck like uniaxial compaction. Both types of compactions tend to approach zero as Poisson`s ratio approaches 0.5, at which point the rock behaves as a plastic and there exists little or no difference between them. **Fig. 2** shows the variation of both polyaxial and uniaxial compactions

with Poisson's ratio, while **Fig. 3** shows the variation of absolute difference in compactions with Poisson's ratio.

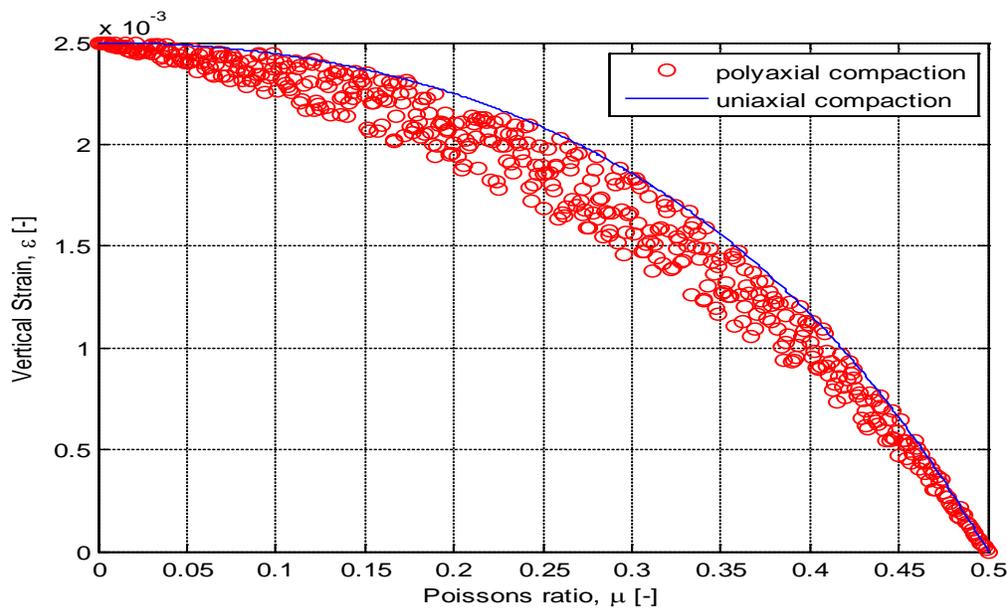


Fig.2- Variation of polyaxial and uniaxial compactions with Poisson's ratio.

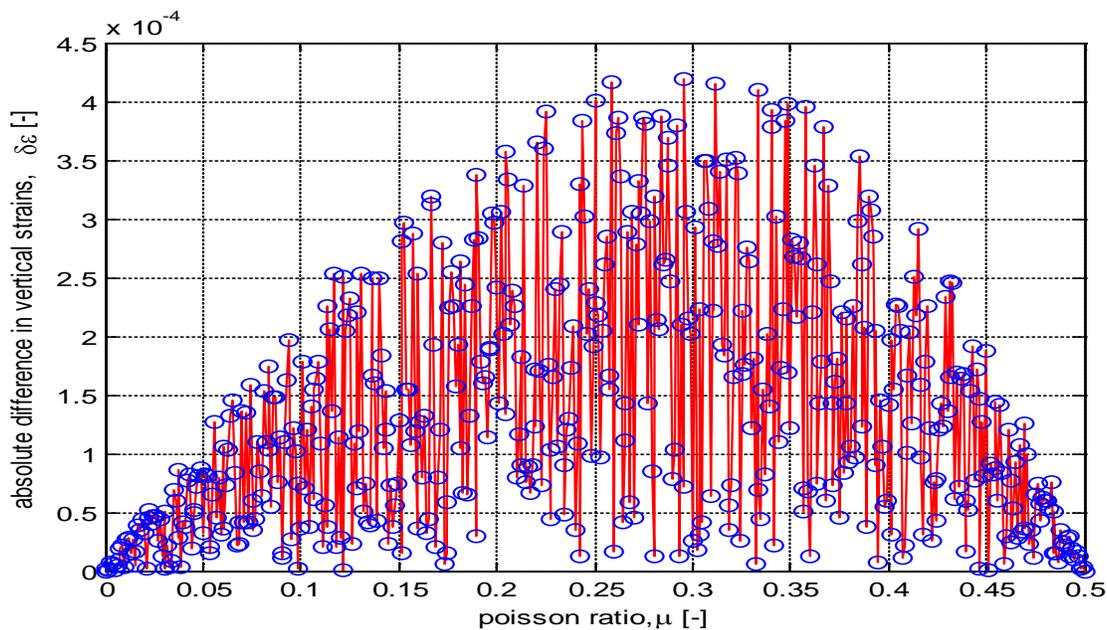


Fig.3- Variation of difference in compactions with Poisson's ratio.

The simulation was repeated several times and the maximum difference observed between the compactions occurs at Poisson's ratio equal to or greater than 0.25 in all cases, as the distribution was observed to be slightly non-symmetrical. This is within significant depth in the formation.

The reservoir thickness affects the results of rock compaction. Varying the thickness from 0-200m, the magnitude of the compactions changes significantly. As the aspect ratio of the rock increases, due to increasing reservoir thickness against reservoir length, both the uniaxial and polyaxial compactions increase up to a point and then starts to reduce in value with a trend reversal. During the trend reversal, the value of the polyaxial compaction becomes larger than that of the uniaxial compaction as shown in **fig. 4**. The compaction of the reservoir is transferred easier in the direction of the lower length scale. As the reservoir thickness gets larger with respect to the lateral scale, the compaction increases in that direction.

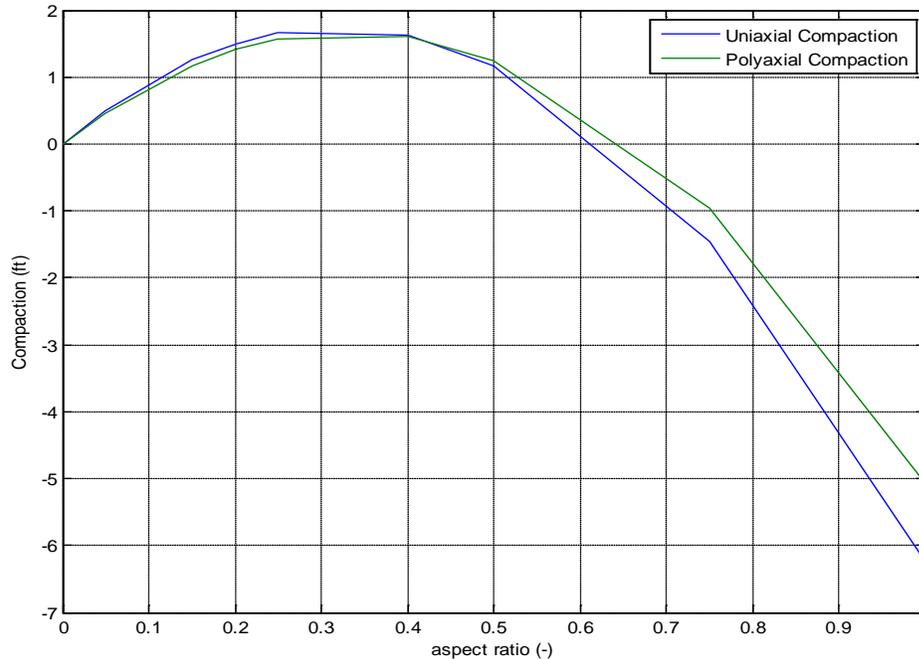


Fig.4- Plot of aspect ratio against compaction

Variation of compaction with elastic moduli contrast

Up till this point, the compactions has been with respect to an isotropic rock, with uniform elastic constant. Incorporating the effect of the elastic contrast with allowance for maximum, intermediate and minimum elastic constant, various results are obtained. When applied to the elastic contrast with the condition such that $6Gpa > 5Gpa > 4Gpa$, the following are obtained when the various constants are maximum, intermediate and minimum elastic constants. The uniaxial compaction has higher values than the polyaxial compaction when the elastic constant in the vertical direction is higher than that in the least horizontal stress direction, $E_v > E_h$, while the polyaxial compaction yields higher values when the elastic constants in the horizontal stress directions are higher than that in the vertical stress direction. When the elastic constant in the vertical direction is intermediate between those of the horizontal directions, the uniaxial computation result is higher than the polyaxial value. The various results are displayed in **table 2**.

Table 2: Effect of elastic constant anisotropy on compactions.

Condition	Uniaxial Compaction, ft	Polyaxial Compaction, ft
$E_v > E_h > E_H$	0.4198	0.3377
$E_v > E_H > E_h$	0.4198	0.3473
$E_H > E_v > E_h$	0.5037	0.4670
$E_H > E_h > E_v$	0.6297	0.6372
$E_h > E_H > E_v$	0.6297	0.6308
$E_h > E_v > E_H$	0.5037	0.4512

The elastic constant is proportional to the stress, which has been related to the pressure depletion. The lower the elastic constant in a particular direction, the higher the strain in that direction, which corresponds to higher compaction. This reflects the results obtained in **table 2** for higher values of polyaxial compaction compared to uniaxial compaction when the vertical elastic constant is lower than the lateral one. The deposition of different layers of sediments can result in different elastic constants obtained in a formation, [5]. Thus, it is very important to determine whether elastic constants vary in a formation or not before computation of compactions. This can significantly affect subsidence in a locality. From table 1, the largest difference between polyaxial compaction and uniaxial compaction occurs when the vertical elastic constant is greater than the horizontal components.

A-50,000-Simulation run for rock compactions was obtained using 50,000 trials in the Optquest application. **Fig 5** shows the sensitivity chart for the polyaxial compaction. In order to facilitate the simulation run, twelve (12) assumptions of the reservoir

geomechanical properties and a decision variable as Biot's constant were used to forecast six (6) parameters including uniaxial and polyaxial compactions, aspect ratio, and the three (3) effective stress path parameters. The results show that the pore pressure depletion (30.7%), reservoir thickness (25.7%), and the intermediate *in-situ* stress (18%) significantly influence the result of the polyaxial compaction. The Poisson's ratio (16.1%) also greatly influences the results of the compaction. Thus, if the maximum horizontal stress significantly differs from the minimum horizontal stress in the formation, the compaction can exceed uniaxial compaction. The most influential parameter of the compaction is the depletion of pore pressure, without which there can be no void in the rock to cause settlement. This result is consistent with the previous study by [5], which implies that pore pressure depletion controls compaction, subsidence, and fluid flow performance in a reservoir.

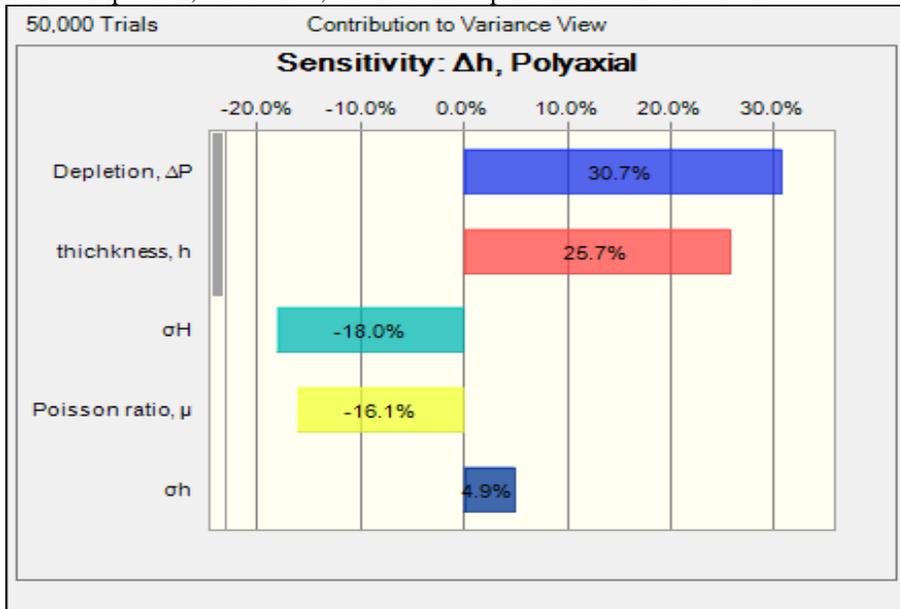


Fig 5: Sensitivity of polyaxial compaction to geomechanical properties for 50000 simulations

For the sensitivity chart of parameters affecting uniaxial compaction, **fig. 6** shows the result. The chart shows that, in order of decreasing magnitude, the pore pressure depletion (43.7%) is still the most significant parameter affecting compaction, followed by the reservoir thickness (36.6%) and Poisson's ratio (19.3%). From the results of **fig. 5** and **fig. 6**, pore pressure depletion and a considerable thickness must be present for compaction to occur.

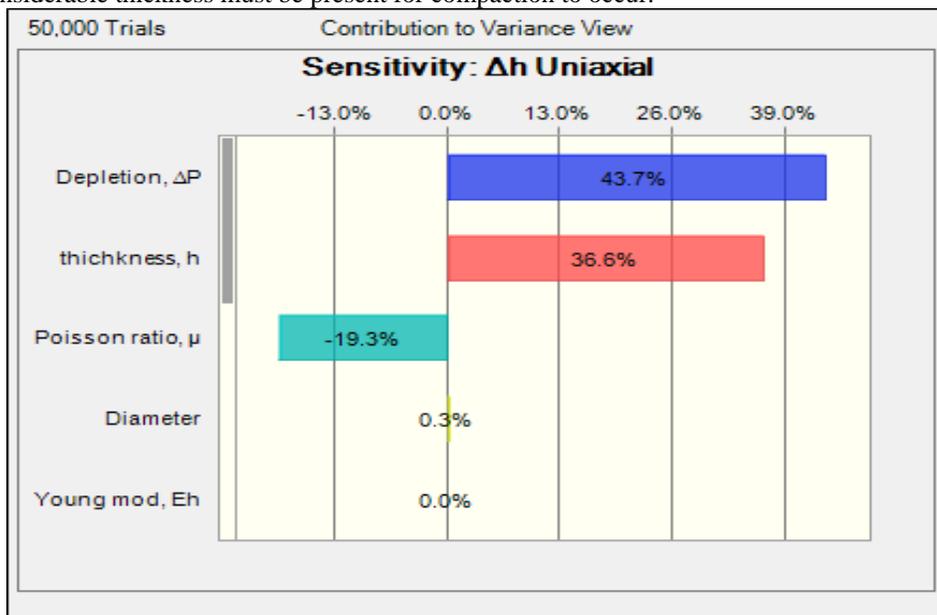


Fig 6: Sensitivity of uniaxial compaction to geomechanical properties under 50000 simulations

The effective stress path parameter in the vertical direction is highly sensitive to the reservoir thickness, depth and Poisson's ratio; while in the minimum horizontal stress direction, the stress path parameter is highly dependent on the Poisson's ratio as shown in the appendix (**fig. A**). The effective stress path parameter in the maximum horizontal stress direction is highly sensitive to the *in situ* stress

fields and Poisson's ratio. The magnitude of the intermediate stress is the major contributor. Previous studies ([5], [13]) show that the vertical and horizontal stress path coefficients depend on the geometry of depleting formation and on the elastic contrast between the rock and its surrounding.

We provide a monograph, **Fig.7**, serving as a chart for quick read-up of vertical compaction in the depleted reservoir considered at various values of the Poisson's ratio. The requirements for using the chart are the intermediate stress-path parameter and the Poisson's ratio.

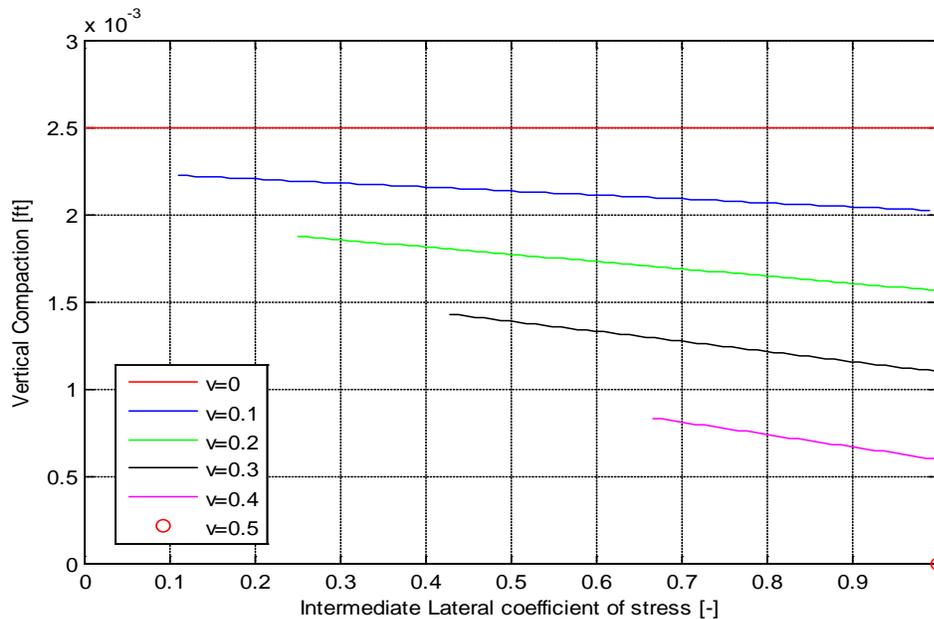


Fig.7- Monograph containing vertical strain, Poisson's ratio, and intermediate stress coefficient

Here comes the most crucial step for your research publication. Ensure the drafted journal is critically reviewed by your peers or any subject matter experts. Always try to get maximum review comments even if you are well confident about your paper.

V. CONCLUSION

In this study, we have examined reservoir compaction in terms of effective stress path parameters, and changes in polyaxial stresses, pore pressure depletion, and varying elastic moduli, which helps to incorporate the effect of anisotropy. From the results, we have the following points:

- In the vertical direction, polyaxial Compaction mainly yields lower values than in a corresponding uniaxial compaction, with the uniaxial compaction defining the envelope or upper bound of possible compactions.
- The difference between polyaxial and uniaxial compactions diminishes in the region of plastic behavior.
- The distribution of the Difference in polyaxial and uniaxial compactions with Poisson's ratio follows a near parabolic trend or a bell-shaped distribution.
- Polyaxial compaction has a magnifying effect in a formation when the elastic constant in the least horizontal stress direction is larger than in the vertical one.
- The largest variation between uniaxial compaction and polyaxial compaction occurs when the vertical elastic constant is the largest in the formation.
- The maximum horizontal principal stress plays a significant role in the development of polyaxial compaction in a reservoir.

We, therefore, recommend further studies in this area of geomechanics, especially using different stress regimes.

APPENDIX

SENSITIVITY CHART FOR ASPECT RATIO AND EFFECTIVE STRESS PATH PARAMETERS

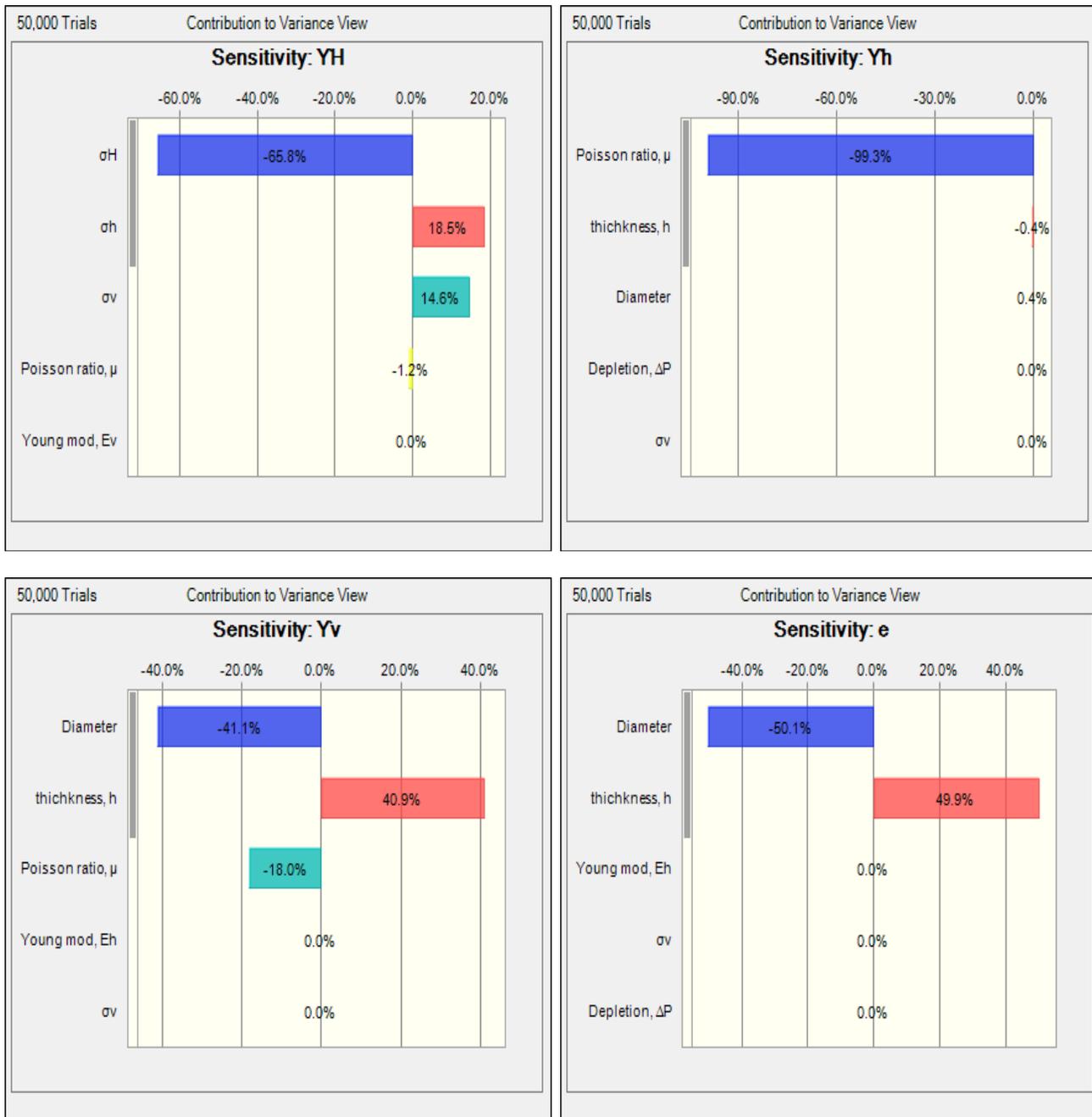


Fig AA: Sensitivity of aspect ratio (e), vertical stress path parameter (γ_v), and horizontal stress path parameters (γ_h and γ_H).

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'Tribal Ecumenism' in North East India: Ethnic Identity Formation of the Mizo

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Abstract- In the traditional Mizo context, tribalism in the form of centralized political and sociological force was almost absent, since life was mainly based within one single village. People were connected by their cultural practices, geographical proximity, their evolving *lingua franca* and their ethnic bond. During the rule of the British, especially after conversion to the Christian faith, people began to experience tribal consciousness as a sociological factor, including the sense of belonging to one community, one nation and one people, especially among the Lusei clans who were former citizens of Sailo chieftainship. However, in the absence of any political platform and common political agenda, a sense of tribal identity lacked a political harmony. On the eve of Indian independence, the Mizos began to be sensitized to the political stirrings characterized by political dreams and aspirations. After the signing of the Peace Accord between the Mizoram underground government and the Indian Union, tribalism became characterized by an economic turn and almost all aspects of tribal consciousness became economic in nature, and so it remains today.

Index Terms- Tribal, ethnic identity, Mizo, Christianity, tribal ecumenism, Mizo Insurgency.

I. INTRODUCTION

Historically, the lives of each tribal community in Northeast India were characterized by a unique worldviews, distinct cultures and incomparable values. With the coming of Christianity into the region, the tribal groups experienced unity within their sub-tribe first, and then the whole tribal group. In this regard, Frederick S. Downs opines that Christianity brought together the different ethnic identities under the banner of one tribal group, which he called "tribal ecumenism", a phenomenon that marked the beginning of intra-tribal ecumenism.¹ Christianity contributed towards the preservation and formation of new tribal identities by providing written language, pioneering education, introducing new administrative setup and endorsing new relevant ideology.² Christianity helped the people to unify

by making one of the dialects as the basis for the written language of the whole tribe.

Downs also opines that the ecclesial structures helped the tribals to formulate the inter-communal ecumenism:

At the base level those structures were centred on the village and tribe in the form of organized congregations and groupings of congregations called associations, presbyteries and the like. But these structures based on a single language group for the most part were constituent of larger structures that brought together for fellowship and deliberation members of several different tribes or communities. Thus the PCNEI brought together Khasis, Jaintias, Mizos, Kukis from Manipur, several small Naga tribes from North Cachar, and some plains people from Cachar.³

Christianity and the church helped the different tribal groups to develop a sense of common tribal identity with a standard higher than their traditional chieftainship. The new found identity proved to become the fundamental principle of modern political movements, even though it was not the conscious intention of the western missionaries or the Mizo church leaders.⁴ However, attributing the new ethnic identity formation of the Mizos to Christianity alone would mean oversimplifying the case altogether. As Downs' "tribal ecumenism" has also been challenged by O.L. Snaitang who observed denominationalism in the region as a new form of tribalism that divided the region politically, ethnically, socially and religiously.⁵ While the tribals experienced ecumenism within a particular umbrella, there was a tendency developed among such groups to secede from the Indian Union in different time period of their own history.

Therefore, the development of the ethnic identity formation of the Mizo should consider the role of Christianity in the milieu of the socio-economic changes and political development of the region.

Religious Conversion in Revival Movements in South Asia in Medieval and Modern Times edited by GA Oddie (Delhi: Manohar publications, 1991), 155- 174.

³ Frederick S. Downs, *History of Christianity in India. North East India in the Nineteenth and Twentieth Centuries* Volume V, Part 5 (Bangalore: Church History Association of India, 2003), 133.

⁴ Downs, *History of Christianity in India*, 209.

⁵ O.L. Snaitang, "Ecumenism and the Hills People's culture in Northeast India," *Journal of Tribal Studies* Vol. II, No. 1 (January –June 1998), 36-44.

¹ Frederick S. Downs, "Tribal Ecumenism in North East India: Further Reflections," *Journal of Tribal Studies* Vol. II, No 2 (July-December 1998), 29-52.

² Frederick S. Downs, "Christian Conversion Movements among the Hills Tribes of Northeast India in the Nineteenth and Twentieth Centuries," in *Religion in South Asia*.

II. GENESIS OF THE EVOLVING IDENTITY

Identified as belonging to a marginal community called *Mizo*, or *Zo*, used by scholars outside Mizoram, and also *Zomia*, a term coined by Willem van Schendel,⁶ they have always been known as runaways, fugitives, abandoned communities. They have traditionally evaded state-making schemes such as “slavery, conscription, taxes, corvee labours, epidemics and warfare”.⁷ Therefore, the identity of the Mizos cannot solely be defined by their written documents, or any other visible written documents, so a proper writing of their history would also require employment of their oral traditions.

The earliest oral tradition of the Mizo began with a struggle to attain freedom against the oppressive rule that seemed to have lorded over them. A well known Mizo fable known as *Chhinlung chhuak* describes the different tribes as originating from one common point. It suggests the presence of a big cave, with a gate well guarded by a gatekeeper somewhere in the east. Almost all the different Mizo clans came out in pairs from that cave. The story goes that there came a time when one clan called Ralte came out, but they were so noisy that the gatekeeper assumed that many people had already gone out and he finally closed the gate of that cave⁸. Almost all the different clans⁹ share a parallel pattern of this narrative with slight contradictions and variations. The familial bond shared between the different groups of Mizo people often continues to be traced along the line of the *Chhinglung* tradition. Another myth coming up among the community is that the Mizos are one of the lost tribes of Israel¹⁰ that had little impact on the worldviews of the whole Mizo society.

The religious practices were drawn along the lines of their ancestors by reciting a simple ritual, ‘*Pi biakin lo chhang ang che, pu biakin lo chhang ang che*’, meaning, ‘Let my plea be answered by whoever my ancestor worshipped’.¹¹ C. Liantluanga dated the origin of religious practices of the Mizos to around 1500.¹² Liangkhaia, considered as the first historian among the Mizos, observed that each clan followed a particular and distinct

pattern of religious rituals.¹³ The tribal religious beliefs regulated tribal identity and tribal consciousness was also based on their religious worldviews. *Sakhua*, a term used in the present day as equivalent to religion once referred to the family or clan god, which might be unique to that clan.¹⁴ In the same way, Saiaithanga also observed that religion was drawn along the lines of clan identity. One clan shared one religious ritual and that in turn shaped their ethnic identity.¹⁵ Changing of one’s clan called *saphun* required changing of one’s religious rituals accordingly.

III. HISTORY OF TRIBALISM OF THE MIZOS

When the Mizo settled in Len Tlang region of present day Myanmar around 1460 AD, they lived together according to their own clans with little sense of a kindred bond.¹⁶ The early Mizo history was a story of exile from the major tribes of the region, but it was also a story of intra-tribal wars. Almost all the clans had their own stories of intra as well as inter-clan rivalries. However, the formation of the Lusei clan under a particular ethnic umbrella must be attributed to the Sailo chieftainships, who were in reality the descendants of a non-Lusei tribe.¹⁷

Intra-tribal war was also fought time to time among the upcoming Sailo chiefs. In 1760, Lallula, a Sailo chief massacred the Thlanrawn (Pawi) clan in the village of Zopui out of revenge for the Pawi aggression. In around 1789, the strong Sailo chiefs’ migration was commenced from the south towards the north following the Hrangkhawl, Biate, Thado and other kindred tribes. The northward migration of the Sailo chiefs was due to the pressure from the Zahau, Hualngo and Fanai clans until they eventually occupied the northern part of the present Mizoram.¹⁸ Meanwhile the Sailo chieftainship routed most other Lusei clans by 1857. Among the Lusei tribes, major wars were also fought among themselves like that of the War of North and South (1856-1859) and the War of East and West (1877-1880) in which different Sailo chiefs fought a heavy war between themselves with heavy losses.

⁶ Willem Van Schendel, “Geographies of Knowing, Geographies of Ignorance: jumping Scale in Southeast Asia”, *Environment and Planning D: Society and Space* 20/6 (2002), 647-668.

⁷ David C. Scott, *The Art of Not Being Governed* (New Delhi: Orient Blackswan Private Limited, 2010), ix.

⁸ K. Zawla, *Mizo Pipute leh an Thlahtute Chanchin (Narratives of the Mizos and their Ancestors)* (Aizawl: Maranatha Printing Press, 1976), 12.

⁹ Liangkhaia considered the different tribes of Mizo as any tribes coming from the Chhinlung like Lusei, Ralte, Hmar, Pawi, Paite, Khiangte, Chawngthu, Chawhte, Ngente, Renthlei, Tlau, Pautu, Rawite, Zawngte, Vangchhia, Punte; See also Liangkhaia *Mizo History* 4th Edition (Aizawl: Mizo Academy of Letters, 1976).

¹⁰ Zaithanchhungi, *Israel-Mizo Identity* (Aizawl: S.T. Printing Press, 1992).

¹¹ V.L. Siana, *Mizo History* Second Edition (Aizawl: Lengchhawn Press, 2009), 10.

¹² C. Liantluanga, *Hmanlai Mizo Nun (Life of the Early Mizo)* (Aizawl: Mizoram Publication Board, 1999), 6.

¹³ Liangkhaia, *Mizo Chanchin* Fourth Edition (Aizawl: Mizo Academy of Letters, 1976), 24.

¹⁴ Zairema, “The Mizos and their Religion,” in *Towards a Tribal Theology: The Mizo Perspectives* edited by K. Thanzauva (Jorhat: The Mizo Theological Conference, 1989), 31-44.

¹⁵ Saiaithanga, *Mizo Sakhua* (Aizawl: R. Lalsawmliana, 1994) 2nd Edition, 16-17.

¹⁶ Each of the clan has their own particular villages or some kindred clan together in some villages: the Lusei Clan in Seipui and Khawkawk, the Kawlni clan in Suaipui and Saimhmun, the Chawngthu clan in Sanzawl and Bochung, the Hauhnan, Chuaungo and Chuauhang in Huanhnar valley, the Ngente, Parte and Punte in Chawnghawih and Siallam villages; K. Zawla, *Kan Pipute leh Thlahtute Chanchin*, op. cit, 12.

¹⁷ Joy L.K. Pachuau, *Being Mizo. Identity and Belonging in Northeast India* (Delhi: Oxford University Press, 2014), 115.

¹⁸ A.G. McCall, *Lushai Chrysalis* Reprint (Aizawl: Tribal Research Institute, 2003), 36.

IV. COMING OF THE WESTERN POWERS

On the eve of the coming of the western powers, the Sailo and Pawi (Lai) chiefs¹⁹ became dominant in the region. In spite of their rivalries, they also learnt from one another and there was also overlapping of culture between the two.²⁰ There was also another clan called Mara, but they had been often in the shadow of the Lai chieftainship and already shared a close familial bond.²¹ Most of the other sub-clans were either culturally assimilated or politically subdued by the Sailo chiefs to develop a macro identity. Joy L.K. Pachuau made the interesting remark that this identity constituted a “conscious transformation of a sense of belonging from a micro-locality to a macro-locality identified by a particular set of hills”.²²

The advent of the British power in the region provoked the tribals and invited recurring raids on the plain regions. As early as the 1840s, there were frequent raids on their neighbouring regions to compensate for the encroachment on their land, to show their supremacy and thirst for spoils. The British government retaliated by sending a military expedition as well as agents from time to time but these rarely delivered the expected results. Eventually, two successive expeditions were dispatched in 1888-1889 and 1889-1890. The second expedition usually known as the “Chin – Lushai Expedition of 1889-90” marked the most important stage of annexation of the Lushai hills. With the amalgamation of the Lakher region into the empire in 1931 the annexation of the region was completed.²³ The British rule witnessed the gradual loss of the different sub-ethnic identities in such a way that since that time the census has recorded the people as Lushai, Kuki, Pawi, Lakher and Hmar.²⁴ With such brands inscribed upon them, the different tribal groups pursued the requirements of such categories.²⁵

¹⁹ It is admitted that both sides proved themselves as equally strong with number of successes, however, it is most likely that the Lusei chiefs left Thantlang and Lentlang in the Chin Hills for the present Mizo hills due to the pressure from the Lai community; Vanlalchhuanawma, *Christianity and Subaltern Culture*, op. Cit, 32.

²⁰ Vanlalchhuanawma, *Christianity and Subaltern Culture: Revival Movement as a Response to Westernization in Mizoram* (Delhi: ISPCK, 2006), 32.

²¹ Hlychho, a Mara clan is known as Hlawhchhing in the Lai area, Chozah is known as Chinzah in the Lai region as well. Inter-marriage between the Lai and the Lusei clan like Sailo was also a recurring phenomenon in the history of the region. Sailo was known among the Maras as Shyhlo as well; See also V. Lalhawna, *Autonomy Movement in Mizoram* (Aizawl: V. Lalhawna, 2014), 10.

²² Pachuau, *Being Mizo*, 128.

²³ Animesh Ray, *Mizoram: Dynamics of Change* (Calcutta: Pearl Publishers, 1982), 34.

²⁴ SK. Chaube, *Hill Politics in Northeast India* Third Edition (New Delhi: Orient Blackswan, 2012), 170.

²⁵ When the Superintendent called and registered them for a census, they simply used their sub tribes identity like Zathang, Chinzah, Hlawhchhing, etc instead of Pawi or Lai, among the Maras almost half of the tribes preferred to use the term ‘Kalia’ for their common umbrella instead of ‘Mara’ when

With the appearance of Western Christian missions in the Hills since 1891, the Mizos embraced different Protestant sects, mainly the Presbyterian and the Baptist traditions that often stressed individualistic Christian faith through conversion, revival and charismatic experiences. Like anywhere in the world, education was an important tool of mission in the Mizo hills. Initially, the expansion of education far outshined the expansion of the Gospel. For instance, in the census of 1901, there were already 761 literates while there were only 45 native Christians.²⁶ The modern western education also created an elite group among them that grew up to be an influential counterpart to the traditional chieftainship. S.K. Chaube opines that the British administration and western education most benefitted the Lusei of the northern and central parts of the region who in turn sprung up as the most advanced group in different fields.²⁷ The introduction of western medicine, education and the Gospel was perceived to have liberated the people from the fear and bondage associated with their former religious worldviews. Christianity, being an egalitarian faith by tradition, changed their basic identity and put them under a unified umbrella of religious identity.²⁸ Lalsangkima Pachuau observed that the Pathian (God) of a distant heaven who vaguely figured in their primal religion came to occupy the central place in Christianity. The implication of this change in divine role and personhood was seen in the changed Mizo worldview and social relations.²⁹

V. RECONSIDERATION OF TRIBAL IDENTITY

As the British government vassalized the Mizo chieftainship, they ruled the region through the chiefs with gradual changes introduced by them. N.E. Perry, Superintendent of the Lushai hills (1926-28), affirmed the necessity of Mizo chieftainship for financial reasons and its indigenous set up. The chief was almost given free rein in the day-to-day administration on simple cases.³⁰ But the power of the chief was gradually restricted and constrained in grave cases like murder and rape³¹, issues of immigration, hereditary matters and confiscation of the property of villagers.

The concept of tribalism during the colonial period can briefly be summarized as a tension between the Sailo clan and

modern political developments were intruding into their lives for the first time.

²⁶ Lalhmuaka, *Zoram Zirna Lam Chhinchhiahna (The Records of Zoram Education)* (Aizawl: Tribal Research Institute, 1981), 3.

²⁷ Chaube, *Hill Politics in Northeast India*, 170-171.

²⁸ Zolawma, *Tribal Ecclesiology* (Delhi: Christian World Imprint, 2016), 33.

²⁹ Lalsangkima Pachuau, “Mizo “Sakhua” in Transition Change and Continuity from Primal Religion to Christianity” *Missiology: An International Review*, Vol. XXXIV, No I (January, 2006), 41- 57.

³⁰ N.E. Perry, *Monograph on Lushai Customs and Ceremonies* Reprint (Aizawl: Firma KLM Private Limited on behalf of Tribal Research Institute, 1976), 3.

³¹ Perry, *Monograph on Lushai Custom.*, 1.

the commoners, in some cases also as a reaction to the suppressive rule of the British Superintendent".³² There was also a grand shift in the self understanding among the different sub-clan groups as they began to come closer under the umbrella of one generic term called Mizo. B. Lalthangliana observed that among the Hmar sub-tribe, less than one third of the group continued to identify themselves as Hmar in the 1961 census. Less one fourth of the Lai who considered themselves as Lai in 1901 considered themselves as Lai in the 1961 census. Other clan groups like Lusei, Paite and Ralte considered themselves simply as "Mizo" by 1961, rejecting their own sub-ethnic identity.³³ The intra-tribal tension of the past almost disappeared in the face of more oppressive and stronger powers wielded by the colonial, national and religious authorities.

The main cause of tension between the chief and the commoners was the provocation of the rise of the elite class, mainly through conversion and education. It was the church that laid the foundation of education. More or less along the same lines, Animesh Ray has opined that the flow of modern cash and the exposure of the people to land beyond the hills through their participation in the different wars were responsible for the emergence of a new class in the society they eventually struggled for recognition of their status and privilege. Thus, they came into conflict with the ruling class.³⁴ The new intelligentsia were emancipated through salaried jobs, trade and commerce, but they wanted freedom from the chiefs and also the customary requirements.³⁵ With a settled and peaceful life free from frequent tribal warfare, the Mizo chiefs were no longer the leaders of the people; instead, they became the local representatives of the alien government.³⁶

Anthony McCall created the district chief's Durbar in 1941 in which chiefs of different circles were supposed to send representatives on the basis of election.³⁷ The Superintendent A. R. Macdonald made a plan to form a conference that was supposed to be represented by both the chiefs and the commoners with one representative each. The first election of each Circle was held on 16th January 1946, the occasion also witnessed the termination of the powers of disobedient chiefs and also the installation of new chiefs in their place. The representatives of Aizawl circle passed two controversial resolutions at that time. One of the important resolutions was that cases of expulsion of villagers by chiefs were serious and needed serious reconsideration. At the same meeting, the members of the committee asked a deceptively complex question to the Superintendent Macdonald, "Who is the owner of the land?" and

unexpectedly he replied, "The land belongs to the people."³⁸ The unanticipated answer from the Superintendent boosted the morale and determination of the commoners to champion their rights and dignity. The chief wanted to maintain the status quo and the commoners wanted maximum freedom from the chiefs and hence they were growing in opposition to each other.³⁹

The so-called Mizo Union, the first political party in the state, was formed in Mizoram in 1946⁴⁰ to voice the resentment of the masses against the chiefs.⁴¹ It was originally named by R. Vanlawma, the founding member and also the first General Secretary, as "Mizo Common Peoples Union." It was later renamed as "The Mizo Commoners Union" and finally the "The Mizo Union." The interest of many of the members was fuelled by the wish to undermine the status and privilege of the chiefs.⁴² The MU was formed with the objective of gaining the upper hand by the common people against the chiefs. However, the opposition to the chiefs was regarded by the British as opposition to the British rule.⁴³

When the first Assembly was called on 24th-26th September 1946, the most important resolution was to end the *Ramhual* taxation.⁴⁴ However, it was resolved that it should be done on a voluntary basis and no one could be compelled to comply. However, the then Superintendent of the Lushai Hills, MacDonald, insisted that the President and the General Secretary give their signature over a letter that nullified the said resolutions.⁴⁵ The tension between the Chiefs and the Mizo Union reappeared many times through the interference of the British Superintendent who supported the traditional chieftainship and who vassalized the chiefs as their faithful agents. Against all the odds, the position of the chiefs continued unchanged even after the end of the British rule in 1947, till the enactment of the Assam Lushai Hills District Act in 1954. The then Chief Minister of Assam put up the "*Acquisition of Chief's Rights Bill*"⁴⁶ that ended chieftainship.

With the spread of Christianity also appeared the new hierarchical set up of the church with the priests (ordained ministers) and the laity. In 1910, the Lushai Presbytery was held and the first ordination was done in 1913 in which Pastor

³⁸ Chaltuakhuma, *History of Mizoram* (Aizawl: Chaltuakhuma and Sons, 1987), 86.

³⁹ Ray, *Mizoram*, 39.

⁴⁰ R. Vanlawma, *Ka ram leh Kei. (Political History of Modern Mizoram)* Third Edition (Aizawl: M.C. Rinthanga, 1989), 130.

⁴¹ Ray, *Mizoram*, 40.

⁴² Vanlawma, *Ka Ram leh Kei ...*, 133.

⁴³ Ray, *Mizoram*, 40-41.

⁴⁴ Annual rice tax given by each family of the village to their own respective chiefs.

⁴⁵ Vanlawma, *Ka Ram leh Kei*, 149.

⁴⁶ Under this Act, the rights and privileges of all the existing 259 chiefs in the region covered by the Mizo District (excluding the Pawi-Lakher region) were acquired by the Government of Assam and handed over to the Mizo District Council on 1st April 1958. In the Pawi-Lakher region, the rights and interest of the 50 chiefs were handed over to the Pawi-Lakher Regional Council on 15th April 1956; Ray, *Mizoram ...*, 41.

³² Ngurbiaka, "Emergence of Mizo District Council and Pawi-Lakher Regional Council," in *A Modern History of Mizoram* edited by Sangkima (Guwahati: Spectrum Publications, 2004), 140-147.

³³ B. Lalthangliana, "Mizo Identity," *Seminar & Important Papers* (Aizawl: Tribal Research Institute Art & Culture Department, Government of Mizoram, 2008), 15 - 23.

³⁴ Ray, *Mizoram*, 39.

³⁵ Ibid, 66.

³⁶ Ibid, 40.

³⁷ McCall, *Lushai Chrysalis*, 246-252.

Chuahkhama was given his ordination. However, among the commoners, the so-called modern democratic ideals were also growing along the lines of Christian values and morals. The missionaries influenced the life of the tribals by implanting new concepts and new standard of living. The whole fabric of social, cultural and political spheres was moulded and shaped by missionaries.⁴⁷ However, since 1904, through different revival stirrings the Mizo church has been periodically revitalized. Many of these revival stirrings took the form of indigenous cultural phenomena.⁴⁸ According to Vanlalchhuanawma, revival was “a tribal social protest against absolute colonization of western theological system, denominationalism, and ecclesial symbols.”⁴⁹ Christianity, through revivals, helped the Mizo to develop their own ethnic identity along the line of their cultural elements.

VI. THE MNF INSURGENCY MOVEMENT

When the Mizo Hills was merged into mainline India, many Mizos from both the leaders and the masses considered that such a merger was both temporal and alterable. The different government officials who trespassed upon the Mizo moral standards sowed the seeds of hostility. To worsen the situation, when the people predicted the periodic famine, the Assam Government dismissed the impending danger as simply tribal superstition and did not heed their apprehension.⁵⁰ First as a relief project, the Mizo National Famine Front was started on 22nd October 1961.⁵¹ It soon gained the confidence of the people and later became the symbol of Mizo national identity⁵² and the revolutionary movement was defined with national terms. Tribalism during the insurgency movement can best be described as a tension between the Mizos and the *Vai*, mainline Indians (the term very often implies Hindus, and also worshippers of idols).

The relatively modern Mizo ethnic national consciousness was rooted in a belief that the distinctive Mizo culture, language

and religious beliefs⁵³ had been masterminded by God in His original plan. It is also opined that the perspective of the politicians Laldenga and Zoramthanga was rooted in the Christian theory of Liberation.⁵⁴ Recognising their common familial descent, the Mizo District and the Manipur Hills on 18th January 1965 adopted a number of resolutions, out of which they expressed their desire to come under one administration.⁵⁵ The insurgency movement was spearheaded by the Lusei and any other clans subdued by the Sailo before the British appearance into the region. However, the MNF was also given moral support by almost every other non-Lusei clan in the region, including the Maras and the Lai in southern Mizoram. The Kuki and other Mizo clans in Manipur formed a separate army unit called the Joshua battalion.⁵⁶

VII. BOMBING OF AIZAWL AND PERIOD OF INSURGENCY

On the fateful day of 1st March 1966, the Mizo National Front declared independence from the Indian Government. The memorandum submitted to the Indian Government highlighted a number of causes responsible for their desire to secede from the Indian Union, one of such was to avoid religious assimilation and “Hindu indoctrination”, claiming that Hindu encroachment was likely to culminate in suppression of Christianity which would be equal with assimilation of their interests and ethnic identity. They also assumed that the Indian government tried to “wipe out Christianity”. They blamed the non-tribal high ranking officials as being responsible for introducing sexual immorality in the region.⁵⁷ The MNF also brought up the issue of the Central Government conducting Public examinations on Sundays and official dignitaries occasionally visiting Mizoram on Sundays. At the same time, restrictions on free entry of missionaries into the district were seen as a challenge to the full liberty of Christianity.⁵⁸

The Indian Army retaliated by aerial bombardment of different towns and villages in the then Lushai Hills District in March 1966. When the Armies recaptured towns and villages, the countermeasures that they gave were along the lines of their identity as Mizos. At the same time, most of the ultimatums issued by the Mizo insurgents bore an anti-Indian, specifically

⁴⁷ Ibid, 65.

⁴⁸ Vanlalchhuanawma, *Christianity and Subaltern Culture*, 80.

⁴⁹ Vanlalchhuanawma, “Quo Vadis Theological education? A Critique of the Theological education from the Perspective of Revival,” in *Mizoram Journal of Theology* Vol. II No 1 (Jan-June 2011), 3-9.

⁵⁰ Sajal Nag, *Pied Piper in Northeast India: Bamboo Flows, Rat-Famine and the Politics of Philanthropy (1881-2007)* (New Delhi: Manohar, 2008), 21.

⁵¹ The impact of famine on the reputation of the Indian government was a decisive one as it was repeatedly compared with the British administration, which was considered benevolent and sympathizing with the plight of the people. They often mentioned that they were better off during the British rule as their distress were addressed automatically; Sajal Nag, “Bamboo, Rats and Famines: Famine Relief and Perceptions of British Paternalism in the Mizo Hills (India)”, *Environment and History* Issue 5 Vol 2 (June 1999), 245-52.

⁵² Chawngsailova, *Ethnic National Movement in the role of the MNF* (Aizawl: Mizoram Publication Board, 2007), 53.

⁵³ Zoramthanga, *Mizo Hnam Movement History (A History of Mizo Nationalism Movement)* (Aizawl: Zoramthanga, 2016), 5.

⁵⁴ K. Vanlalmawia, *Laldenga, Zoramthanga and the Concept of Freedom* Unpublished Thesis submitted to North Eastern Hills University, 1991): 63.

⁵⁵ Kawnpui Mizo Convention (16th- 18th January 1965); Cited by Zamawia, *Zofate Zinkawngah Zalenna mei a Mit Tur a ni lo (The Light of Freedom should not be extinguished in the Mizo struggle)* (Aizawl: Lengchhawn Press, 2007), 968.

⁵⁶ C. Zama, *Joshua Battalion* (Aizawl: JP Offsets, 2014).

⁵⁷ “MNF Declaration of Independence”; Cited by Zamawia, *Zofate Zinkawng*, 968.

⁵⁸ J.V. Hluna, “Mizo Problem Leading to Insurgency”, in Proceedings of North East India History Association, Sixth Session, 1985, p. 445.

anti-Hindu, sentiment.⁵⁹ The Indian armies resorted to all types of aggression and harassment like rape, killing, torture, burning of houses and sending many suspects to jails in Assam. Following the aerial bombing of the Mizos, the Khasi MLA from Meghalaya such as Hoover H. Hynniewta spoke out in the Assam Assembly the same year. Mr. Hynniewta raised a very controversial question, "Do you think the Mizos are Indian?" He was referring to the excessive violence and inhumane treatment inflicted upon these fellow Indian citizens.⁶⁰ It was the same question that has echoed in the ears of many Mizos till the present time.

It is no surprise that every Mizo looked upon the *vai* people with suspicion and fear.⁶¹ In such a juncture, the involvement of the church leaders in committee bodies such as the Aizawl Citizens' Committee and the Christian Peace Committee was significant. The first pamphlet of the Aizawl Citizens' Committee declared that murder is a serious crime unacceptable to God, and this was distributed to different pockets in the region. Relying on the Defence of India Act, they gave awareness to the people about the authority and jurisdiction of armies and civil-military relationship. It was the church who first responded to the cry and dread of the people.⁶² The Committee also closely kept an eye on the people imprisoned on cases of suspicion and they also intervened on their behalf, risking their own lives.⁶³

Meanwhile, besides engaging in violent and guerrilla warfare, the underground Mizo Government also tried to reform Mizo society by imposing 'Christian values'. Therefore, the sale of liquor (or 'Zu') was strictly prohibited. They also forbade intermarriage between Mizos and non-Mizos, especially with 'vai'. They also disapproved of the purchase of goods and other commodities from non-Mizo traders within the district as long as possible.⁶⁴ In a very simple sense, when Christian tradition was offended, it was often considered to be an offence to their Mizo tribal culture.

In 1969, the Indian army resorted to grouping villages in the name of Protected and Progressive Villages (PPV), aiming to starve the underground militia and stop the supply of food and any form of assistance to them.⁶⁵ These upheavals marked the beginning of deeper untold misery for the Mizos.

⁵⁹ N William Singh, "Quit Mizoram Notices," *Economic and Political Weekly* Vol. 49, Issue No 25 (21st June 2014), 23-34

⁶⁰ J.V. Hluna, *Zawlkhawpui Senmawi Chan Ni (A Day Aizawl turned into Blazing Fire)* (Aizawl: Zoram Ni Organizing Committee, 2008), 46-47.

⁶¹ Lalngurauva, *Mizoram Buai leh Kohhran (Insurgency and the Church)* (Aizawl: Lalngurauva, 2008), 18.

⁶² Ibid. 18.

⁶³ Ibid. 133.

⁶⁴ Tlangchhuaka, *Mizoram Politics* (in Mizo), A booklet issued by the MNF Headquarters (year and date not mentioned).

⁶⁵ C. Lalnunthara, "Grouping of Villages in Mizoram-Its Social and economic Impact" *Economic and Political Weekly* Vol. 6, Issue No 30 (25th July 1981).

VIII. EXILE TO BANGLADESH AND ARAKAN

Gradually, the MNF Government was compelled to take refuge in the hill ranges that lay within what was then East Pakistan (1969-1971), Arakan (1972-1974) and Rangamati, Bangladesh (1974-1986). In the words of Schendel "State boundaries cannot contain the story: territories bled into one another, insurgents were mobile across several national domains, and state agents were burdened by their spatial confinement within state borders."⁶⁶ In spite of such hardships, they could manage to survive and keep the flame of nationalism alive because of the assistance that they received from the Zo ethnic families like the Pang, Bawm, Miria and others who lent a helping hand to them. The bond that they shared was especially stimulated by their faith, since many of them were also Christians.

Their presence in Bangladesh among the people was reinforcement to the minority Christian population. And some of the best Mizo Christian hymns were composed while they were in exile in Bangladesh and those hymns were subsequently incorporated into the Mizo hymn books. An official agreement with the Association of Baptist, Dacca was signed that pertains to work among the tribals in the Chittagong Hill Tracts. It resolved that no European or Bengalis were allowed to visit those places, whereas the Mizo insurgents could freely roam. It was agreed that the missionary personnel would be from the MNF while the financial needs and the different assets would be given by the Association.⁶⁷ Reminiscent of the 'Makabian revolt', the whole organization and morale was therefore characterized by Christian values. For instance, Zoramthanga, one prominent leader who was to become the Chief Minister of Mizoram, mentioned that during 1972-74 in Arakan, it was religious revival that boosted the morale of the volunteers and which enflamed their nationalistic enthusiasm when they were extremely low in their nationalist spirit.⁶⁸

IX. REAPPEARANCE OF TRIBALISM: SUB CLAN IDENTITY

The sense of tribalism after the signing of the Peace Accord in 1986 was drawn along the lines of the government administrative boundaries, especially the Autonomous District Council. The sense of tribalism based on sub-tribal identity had been quietly evolving since the beginning of political consciousness in the Mizo Hills District. However, it attained an important political agenda only after the Peace Accord.

On the 23rd April 1953, when the Pawi-Lakher Regional Council was inaugurated at Lunglei by Ch. Saprawnga, the then Parliamentary Secretary of Assam which was later upgraded to

⁶⁶ Willem Van Schendel, "A War within a War: Mizo Rebels and the Bangladesh Liberation Struggle," *Modern Asian Studies* (10th October 2015), 1-43.

⁶⁷ Chawnglianthuama, *Zoram Buai Karah Harhna Ropui (Revival in the Midst of Revival)* (Aizawl: H. Lalchawimawia, 2011), 89.

⁶⁸ Zoramthanga, *Mizo Hnam Movement History (A History of Mizo Nationalism Movement)* (Aizawl: Zoramthanga, 2016), 114.

Autonomous District Council in 1986.⁶⁹ The Pawi (and also the Lakher) reluctance to come under the Lusei hegemony was considered as the main factor responsible for the secession.⁷⁰ On 2nd April 1972, the Pawi-Lakher Regional Council was divided into three autonomous regions such as the Pawi region, the Lakher region and the Chakma region.⁷¹ The creation of the third District Council amazed many Mizo leaders, including Ch. Saprawnga, who considered the Chakma as purely outsiders, comparable with the *vais*.⁷² The overall assessment of the role and contribution of the Autonomous District Council in Northeast India, according to Robert Tuolor was tragic and “it has only strengthened identity politics”⁷³ in which the Mizoram state would not be exempted.

The points of disagreement between the Mizoram government and the tribal political sentiment lay in the subject of giving autonomous councils or the case of upgrading of the District Council to a Sixth Schedule status. Mizoram also faced the challenge of demands for autonomy by various tribal groups like Paite and Bru. Those tribal groups enjoying separate autonomous councils comprising of Lai, Mara and Chakma still desire for higher autonomy by demanding direct funding, and, if possible, Union Territory status.⁷⁴ This is partly the resistance to the process of “Mizoisation” by smaller cognate tribes such as Paite, Hmar, Lai and Mara people in particular. Mizo identity is perceived to be Lusei-centric and acceptance of Mizo identity is equivalent to accepting Lusei language and culture.⁷⁵

Those tribal groups that received Autonomous District Councils maintained their unique tribal identities, and predominantly retained Christianity as their foundation. In the case of the Chakmas, Christianity is seen as religion of the Mizos and the District Council played a very significant role in checking the infiltration of Christian mission work into the region. Among the Lai, the District Council acted as the promoter of Lai culture and Lai identity.⁷⁶ Among the Hmar community, Lal Dena classified the community into two

groups:⁷⁷ those that are assimilated in the mainstream Mizo society and others that mainly dwell together in the north-west part of the state. Practically, this fluid ‘situational identity’ is found among all the other tribes of the Mizos, however, from time to time, these other tribes have opposed the Mizo nomenclature as a mean to political leverage or political pressure to fight for their own benefits. The exceptions to this ‘situational identity’ are found among the Chakmas and the Brus whose distinctiveness is accentuated by both ethnicity and religion.

X. CONCLUSION

There has been a grand shift in the identity formation of the Mizos, especially their self understanding from the past to the present. Today, the identity of the Mizos as Indian is something that has been comparatively accepted in the past hundred or fifty years. However, when it is put to the test through their lives and experiences in mainline India as Mizo or northeast people, oftentimes it failed and confused the people and they often began to coil themselves inside the protective wall of their minority community. The role and implication of Christianity, on the other hand, in the ethnic identity formation of the people is so well rooted that it remained almost unchallenged. The identity of the Mizos as Christians is something that simply worked for mutual enrichment and reinforcement as the Christian faith have almost been fully indigenized. Even cases where Christianity failed as a moral guardian, it has always been the ideological foundation of the Mizo society. The so called sub-tribal consciousness also often made its appearance among the people as a new form of tribalism as centre-periphery polarities when economic development seems to benefit only the mainline Mizo society. Above all, the ethnic identity of the Mizos is following the Christian faith as its ideological foundation in the different chapters of history.

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⁶⁹ Ngurbiaka, “Emergence of Mizo District Council,” op. cit, 140-147.

⁷⁰ Z. Hengmanga, *Ka Vahvaihpui Ram leh Hnam (My Toil with the Nation)* (Lawngtlai: Pawi District Council, 1988), 13.

⁷¹ HC. Thanhranga, “Working and Functioning of the Lakher Autonomous Regional Council in Mizoram”, in *A Modern History of Mizoram* edited by Sangkima (Guwahati: Spectrum Publications, 2004), 148-170.

⁷² Ch. Saprawnga, *Ka Zin Kawng (My Personal Journey)* 2nd Edition (Aizawl: Lalkungi, 2007), 177.

⁷³ Robert Tuolor, “Autonomous District Councils and Tribal Development in North East India: A Critical Analysis” *International Journal of Advancements in Research & Technology* Vol. 2, Issue 7 (July-2013), 408-418.

⁷⁴ Roluahpuia, “Political Turmoil in Mizoram,” *Economics and Political Weekly*, Vol. 50 Issue 31 (1st August 2015): 1-5.

⁷⁵ Ibid. 1-5.

⁷⁶ Pachuau, *Being Mizo*, 155.

⁷⁷ Lal Dena (2002): “Unresolved Issues of the Hmars,” *Indigenous World Journal of Indigenous People*, 303-305. Cited by Roluahpuia, “Political Turmoil in Mizoram,” 1-5.

The Effect Of Physical Characteristics Of Coastal City On The Air Quality

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Abstract- Coastal city is an area that is still strongly influenced by sea breeze. Characteristics of the sea breeze is blowing during the day from the sea to the land every day, it can be utilized to improve the air quality in urban areas. This study aims to assess the physical characteristics of the coastal city to assess the quality of air. This research was conducted in Makassar, in three locations of city regions which were selected as the observation units to be studied, each area have a radius of 100 m. To support this research, the measurements of wind speed and direction had been conducted in those three regions. Measurements of microclimate conditions at all measuring points were simultaneously carried out five times, since morning to evening in the fair-weather. The aspects of physical characteristics of the environment studied; including building mass, environmental density, building materials, land cover material, and landscapes. The analysis was carried out quantitatively using a formula by Edward Ng (2006) as the indicator and statistical analysis. Air quality was mapped using the ENV-Met V.3.1 software. The result of the analysis shows that the physical characteristics of coastal city had a significant effect on the utilization of local wind to improve air quality.

Index Terms- physical characteristics, coastal city, air quality

I. INTRODUCTION

The coastal area which is characterized by land and water is one of the climate controls that may affect the climate elements in that region. Large water capacity in the ocean prevents heating as fast as it does on the land. During the day, the air above the land is warmer than the air above the ocean. Different pressure causes the sea breeze blowing. At night, the air temperature changes the direction. There is no wind in the time of dusk and dawn, because at those time the land and sea are in the same temperature. Furthermore, at night the wind speed is weaker than during the day since the difference of air temperature between land and sea is smaller [1].

The result of Juhana's research show that sea breeze in Makassar city was still able to reach the land at a distance of 10-20 km from the sea, if there was no any significant obstacles along the surface that was passed [2]. The strategy of utilizing the potential

of local wind is an anticipatory step to improve the microclimate, especially to create a comfortable and pleasant environment.

The smooth flow of wind in urban environment highly depends on the conditions of the building characteristics and the existence of vegetation. The result suggests that the form of building mass arrangement, the ratio of height and the slenderness of the building is highly instrumental in determining the smooth flow of wind in the built environment [2].

Hong Kong is the first coastal city in the world that utilized the local wind potential of coastal areas by involving several experts, then formulating the Hong Kong Planning Standards and Guidelines (HKPSG). This standard introduces air flow issues in urban environments associated with the increased air ventilation. This HKPSG was made because of the case of Severe Acute Respiratory Syndrome (SARS) in 2003, which claimed many victims in Hong Kong. The SARS allegedly occurred since the air pollution was confined and piled up in the middle of the city, due to poor air ventilation in Hong Kong [3].

Makassar city is located in South Sulawesi Indonesia. Makassar is one of the big cities in Indonesia located in South Sulawesi which has similar problems as Hong Kong. Makassar is inhabited by more than 1.7 million people. There are many tall buildings that may prevent good air circulation. This study aims to analyze the physical characteristics and the air quality of the coastal city located in Makassar.

II. RELATED WORKS

The level of wind speed that blows into the city could affect the air quality in the region. In the case that occurred in Hong Kong, the use of macro-coastal winds could be calculated by calculating how much instrumental buildings and plants could direct the wind into the city. Ng's research, Edward et al (2006) in several areas of Hong Kong City, used the wind speed ratio (VR_w) as an indicator, using the following formula:

$$VR_w = \frac{v_p}{v_\infty}$$

Descriptions :

v_∞ = the wind speed at the boundary layer which is not affected by surface roughness

v_p = the wind speed at road level (2m height) as an impact of surface roughness

VR_w = the wind speed ratio indicated by the impact of the existence of a building or plant in a location.
The high VR_w value gives an indication of the low impact of buildings or plants on the wind speed.

III. RESEARCH METHOD

The air quality mentioned above means the ambient air quality. As in the air there are pollutant elements (pollutants, both This study used a quantitative method using the formula from Edward Ng to reveal the benefits of wind in urban areas [3]. Empirical data was collected through field observations by using direct recording and direct measurement techniques. The data of wind speed in urban areas was obtained through direct measurements which was conducted in those three observation locations.

Data of the physical characteristics of urban areas related to the building mass, environmental density, building materials, land cover material, and landscapes were collected using tools such as; GPS, angle-finder, meter gauge and camera. Data retrieval of physical characteristics of urban areas in those three research locations was conducted within a radius of 100 m. This study used the basic maps such as topography, earth appearance, aerial photographs from google map, ETM-7 of lansat imagery. Field observations were conducted by using recording techniques, in the form of shooting, recording, observing, and measuring.

The urban areas that were used as a case study in this research were urban areas around G. Bawakaraeng Street (St.) that was ± 1 km from the coastline, A.P. Pettrani St. that was ± 4 km from the coastline (in the downtown area), and Perintis Kemerdekaan St. that was ± 20 km from the coastline. Those areas were determined by the consideration of: 1) being in diverse of landscapes (near the coast, in the downtown, far from the coast), 2) belonging to the sea breeze range zone (maximum 50 km from the coast), 3) the dense urban environments.

The measurement time was determined based on the circulation of the sun and the rush hours; that were at 8:00 a.m., 10:00 a.m., 12:00 p.m., 2:00 p.m., and 4 p.m. The measurements were simultaneously conducted for all measuring points in the fair-weather.

To support the mapping of micro wind characteristics conditions, data collection of physical characteristics in the three urban areas were observed through field observations, aerial photography assistance from Google map of Makassar 2016, topographic maps, earth appearance, and the ETM-7 of lansat imagery. Field observations were conducted by using recording techniques, in the form of shooting, recording, observing, and measuring. The level of local wind speed that blew into the city area could be identified by calculating the magnitude of the effect of buildings and plants that could turn the wind by using the wind speed ratio formula from Edward Ng as an indicator.

The assessment of air quality was based on air pollution content. Ambient air quality was determined good when the concentration of pollutants was still below the standard value. The content of air pollution which was being the subject of study was Carbon Monoxide (CO).

primary and secondary which come from natural activities and most of human activities) which can affect normal air balance and cause disruption to human life, animals and plants, also the other objects, so that the ambient air quality drops to a certain level which causes the ambient air not fulfilling its function. It is considered as good ambient air quality if the concentration of pollutants is still below the standard value.

IV. RESULT AND DISCUSSION

A. Physical Characteristics of City Areas of Makassar

The physical characteristics of the three city areas observed were explained in 2 stages, namely 1) the condition of the physical characteristics of the city area, and 2) the parameter of physical characteristics of the city area. The description of physical characteristics in the three urban areas observed is explained as follows:

Physical Characteristics of Area adjacent to G. Bawakaraeng St.

Figure 1 showed the environmental conditions around G. Bawakaraeng St., in which there were offices complex, shoppings complex (shophouses), settlements, school buildings, sports fields (Karebosi); in the form of small buildings with only 1 floor to 2 floors, trade buildings lined up along the main road consisting of 1 to 3 floors . There were also high-rise buildings with 23 floors.



A. Aerial photography around the area of the observation location St. G. Bawakaraeng of Makassar city by google earth, 2017



Legend:

1. St. G. Bawakaraeng
2. Primary School Building
3. Office complex
4. Shopping complex (shophouses)
5. Kindergarten building
6. Office building, Bosowa tower

B. Aerial photography around the area of the observation location St. G. Bawakaraeng of Makassar city by google earth, 2016

Figure 1: Physical characteristics of areas adjacent to G. Bawakaraeng St.

The mass of each building in this region was diverse, some of the buildings were elongated (flat), wide (thick), and small in size. Land cover was dominated by hardening of asphalt and paving blocks, there were only a small part of it which was covered with grass. Trees were mostly on the west and south sides of the building mass.

Physical Characteristics of Area adjacent to A.P. Pettarani St.

Figure 2 showed the environmental conditions around St. A.P. Pettarani, in which there were offices complex, shops complex (shophouses), settlements; in the form of small buildings with only 1 floor to 2 floors, trade buildings lined up following the main road line consisting of 1 to 3 floors. In the location there are also high-rise buildings with 18 floors (Graha Pena building).

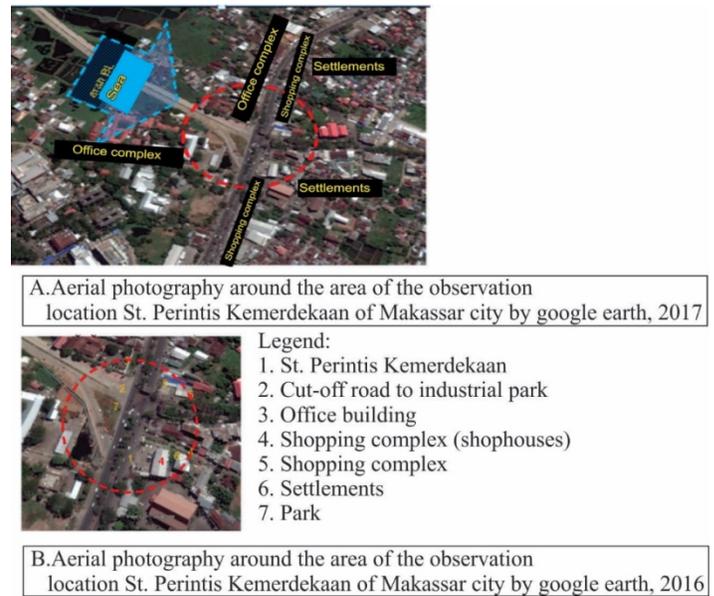
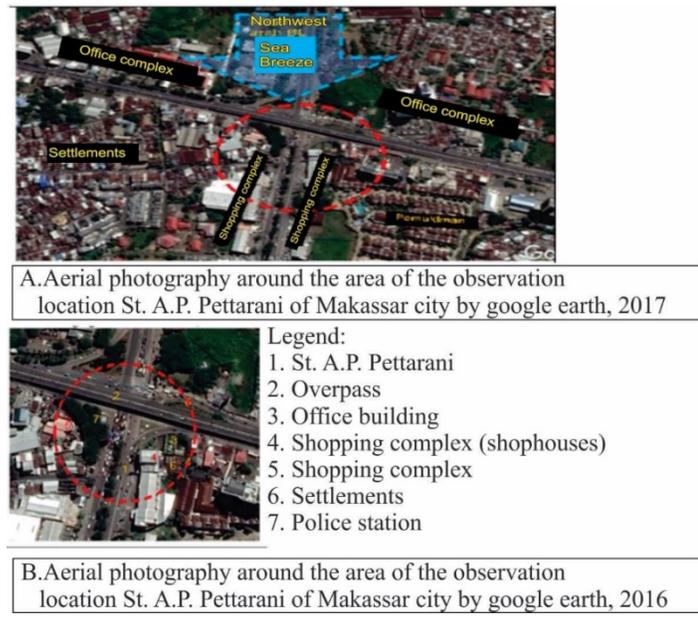


Figure 2: Physical characteristics of area adjacent to A.P. Pettarani St.

The mass of each building in this region was diverse, some were elongated (flat), wide (thick), and small in size. Land cover was dominated by hardening of concrete and paving blocks, only a small parts of it which was covered by grass. This area had eight main road lanes with concrete material. This area was crossed by 2-lanes of overpass. Trees were mostly on the west and south sides of the building mass.

Physical Characteristics of Area adjacent to Perintis Kemerdekaan St.

Figure 3 showed the environmental conditions around St. Perintis Kemerdekaan, in which there were offices complex, shops complex (shop houses), settlements; in the form of small buildings with floors 1 to 2, the buildings of trading area which consisted of 1 to 3 floors were lined up following the main road line. In this location, there were also four-lane roads that cut-off to the sea and were also a cut-off road from the industrial area.

Figure 3: Physical characteristics of area adjacent to Perintis Kemerdekaan St.

The mass of each building in this region was diverse, some were elongated (flat) and the majority of them were small. Land cover was dominated by hardening of concrete and paving blocks, a small part of it was covered by grass. Trees were mostly on the west, north and east sides of the building mass.

B. Parameters of the Physical Environmental Characteristics

The main parameters of physical characteristics of the city area were; building mass (aspect ratio, slenderness ratio, roof and wall cover, building orientation), environmental density (building coverage ratio (BCR), floor area ratio (FAR) and building volume), building material (heavy material, light material, albedo material value), land cover material (hard material, soft material, albedo value material of land, tree), as well as landscape (elevation, contour, and distance from the coast) The parameters of physical characteristics in the three urban areas observed were described as follows:

The Mass of Building

The building mass is explained through aspect ratio (AR), slenderness ratio (SA), roof cover (RC) and wall (RW), and building orientation (RO).

The comparison of the mass of buildings in the three urban areas (Figure 4) showed that the area of Perintis Kemerdekaan St. had the most flat building (3.04), followed by that in the Pettarani St. (2.92) and the widest building construction was in the area of G. Bawakaraeng St. (2.45). The environment that had the highest slenderness of buildings was the G. Bawakaraeng St. (0.92), followed by PP. Pettarani St. (0.78) and the shortest building construction was in Perintis Kemerdekaan St. (0.64). The area of G. Bawakaraeng St. had the highest ratio of roof area / building volume (2.40) and wall / building volume (2.50), but it was the smallest East-West oriented building (0.30). It was different from Perintis Kemerdekaan St. which had the smallest ratio of roof area / building volume (0.90) and wall / building volume (1.10), yet the building tended to be East-West oriented (1.20). The area

of PP. Pettarani St. had a ratio of roof area / building volume (2.31) and wall / building volume (2.48) and it was the highest East-West oriented building (2.01).

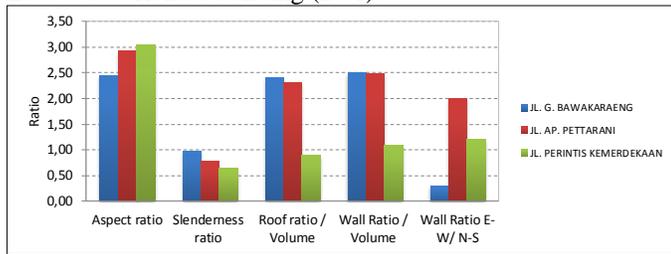


Figure 4: Characteristics of buildings mass in three urban areas

The Density of Urban Area

The density of urban area is explained through the basic building coverage ratio (BCR), floor area ratio (FAR), and building volume in the environment (VBE).

Comparison of densities in those three urban areas (Figure 5), showed that the area of G. Bawakaraeng St. was the densest urban environment compared to other regions, with the BCR average was around 0.85, FAR was 2.96, and the building volume was around 61,410.00 m³. Meanwhile, the lowest density area was Perintis Kemerdekaan St., with BCR average was around 0.57, FAR was 0.86, and building volume was around 40,597.80 m³, then followed by the A.P. Pettarani St., with BCR average was around 0.84, FAR was 2.67, and the average building volume was around 55,321.40 m³. The condition of the ratio indicates that the area of G. Bawakaraeng St. had large buildings with large- volume buildings, moreover it had the largest land cover compared to other regions.

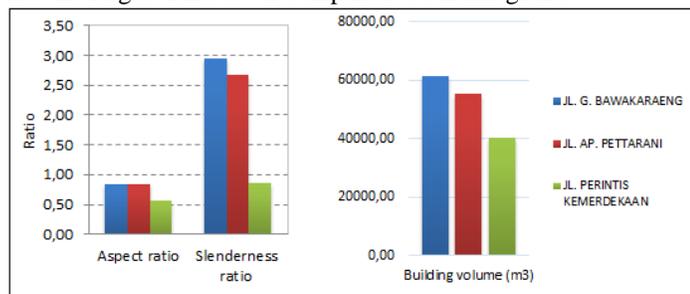


Figure 5 The comparison of densities in three urban areas

Building Materials

Building materials are explained through heavy material (HM), light material (LM), high-albedo material (HAM), and low-albedo material (LAM).

Comparison of building material characteristics in the three urban areas (Figure 6) showed that the use of lightweight materials was greater than heavy building materials and the use of materials with low-albedo value was greater than the high-albedo material. The ratio of the area of heavy building materials / volume of building area of G. Bawakaraeng St. was higher than other regions (1.30), slightly higher than A.P. Pettarani St. (1.20).

Meanwhile, the ratio of the area of heavy building materials / volume of building material was in the area of Perintis Kemerdekaan St. (1.15). The highest ratio of light building material / building volume was found in the Perintis Kemerdekaan St. (1.00) and the lowest was in the area of G. Bawakaraeng St. (0.75), then followed by A.P. Pettarani St. (0.90).

In Figure 6 it was known that the three urban areas used low-albedo material rather than the high-albedo material, in other words it was still dominated by the use of dark colored materials. The low-albedo material was mostly used in the area of A.P. Pettarani St. (2.80 m² / 1 m³) and the less used of low-albedo material was on Perintis Kemerdekaan St. (1.75 m² / 1 m³), followed by G. Bawakaraeng St. (2.10 m² / 1 m³).

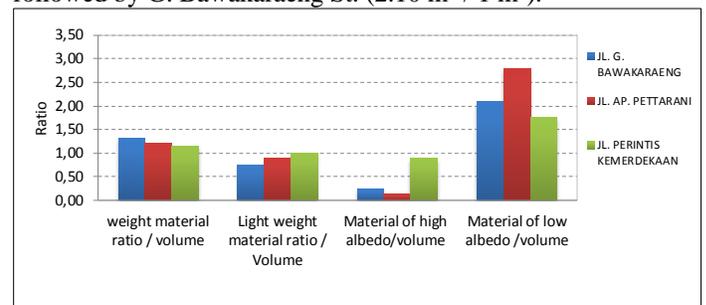


Figure 6 The characteristics comparison of building materials in three urban areas

Land cover material is explained through hard material (HM), land material with low albedo value (MLAV), and tree (T).

The comparison of the characteristics of land cover material in the three urban areas (Figure 7), showed that the use of hard land material was greater than soft land material. The highest ratio of use of hard land material was in the area of A.P. Pettarani St (2.89 m² per 1 m² of land area), and the lowest in the area of Perintis Kemerdekaan St. (1.98 m² per 1 m² of land area), followed by G. Bawakaraeng St. (2.20 m² per 1 m² of land area). Low albedo land material was still dominantly used in the three urban areas. Land cover material in those three regions was still dominated by dark colors. Land cover material with the lowest albedo value was widely used in the area of A.P. Pettarani St. (0.78 m² per 1 m² of land area), and the less use of land cover material with the lowest albedo value was in the area of Perintis Kemerdekaan St. (0.65 m² per 1 m² of land area), followed by G. Bawakaraeng St. (0.76 m² per 1 m² land area).

The area of A.P. Pettarani St. had the most trees compared to other regions (0.54 m³ per environmental area). G. Bawakaraeng St. had the fewest trees (only 0.20 m³ per area), followed by Perintis Kemerdekaan St. (0.43 m³ per environmental area).

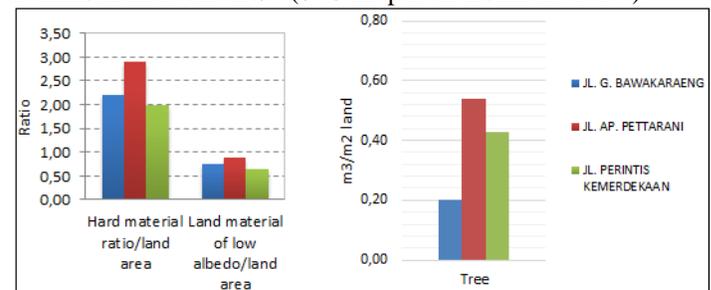


Figure 7. Land cover material in three urban areas

Landscape

The landscape was explained through elevation, contour, and distance from the coast (DC). The elevation was calculated from sea surface in meters (m). DC was calculated in kilometers (km). City area contours were calculated in the Slope Index (SI). Comparison of the characteristics of the landscape in the three urban areas (figure 8), it showed that the area of Perintis Kemerdekaan St. was located in the highest elevation that was around 18.00 m above the sea level, its location was at the farthest distance from the coast (11.7 km), and it was the most contoured land with a slope index of (0.10). Even though the G. Bawakaraeng St. was located in the closest distance from the coast which was around 2.65 km and was located at the altitude of 2.2 m above sea level, with the lowest land slope index that was around 0.01. The area of A.P. Pettarani St. had a height of about 2.70 m above sea level with a distance of 4.03 km from the coast. The land conditions tend to be flat with a slope index was about 0.02.

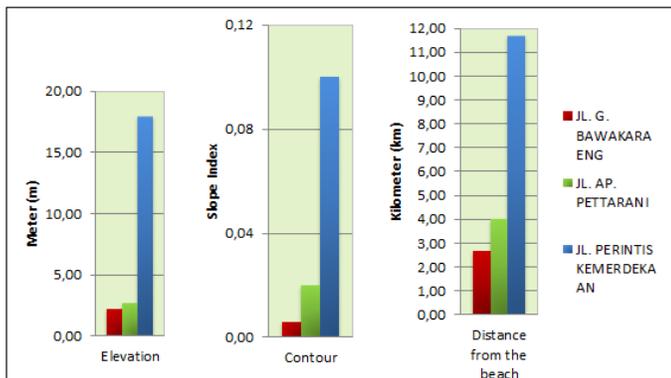


Figure 8: The comparison of landscapes in three urban areas

C. The Utilization of Local Wind

The utilization of local winds in the three urban areas is described as follows:

Wind utilization in G. Bawakaraeng St.

The measurement results of wind utilization in the area of G. Bawakaraeng St. tended to fluctuate. The highest wind speed generally occurred during the day prior to the evening. The average of wind speed was about 0.93 m/sec. The highest wind speed occurred at 2:00 p.m., which was around 1.77 m/sec and the lowest occurred at 10:00 a.m, which was around 0.45 m/sec. This area was only able to utilize local wind speeds of around 27.24% with a wind speed ratio of around 0.27.

Wind utilization in area adjacent to A.P. Pettarani St.

The measurement results of wind utilization in the area of A.P. Pettarani St. also tended to fluctuate. The highest wind speed generally occurred during the day. The average of wind speed was about 1.25 m/sec. The highest wind speed occurred at 12.00 a.m., which was around 1.80 m/sec and the lowest occurred at

10:00 a.m., which was around 0.50 m/sec. This area was only able to utilize local wind speeds of around 36.87% with a wind speed ratio of around 0.37. The wind speed in the city area is strongly influenced by the density of existing buildings, height and distance between buildings, landscapes (distance, contour and height of an area from wind sources), the building material used is based on its ability to reflect and continue wind flow, and land cover such as tree. Trees can direct and inhibit the flow of wind speed. trees and other types of vegetation reduce the ventilation that is responsible for the wind direction [4]. Comparison of results between two situations, with and without vegetation and water pond, indicate that surface temperatures are reduced in presence of trees and the comfort is improved [5].

Wind utilization in St. Perintis Kemerdekaan

The measurement results of wind utilization in the area of Perintis Kemerdekaan St. were quite high and tended to be prevalent. The highest wind speed occurred in the morning. The average of wind speed was about 1.50 m/sec. The lowest wind speed occurs at 10.00, which was around 1.82 m/sec. This area was able to utilize the local wind speeds of around 44.12% with a wind speed ratio of 0.44.

The measurement results of wind utilization in the three urban areas mentioned above shows that the area of St. Perintis Kemerdekaan had the best of wind flow. Although the utilization of local wind was still below 50% (figure 9).

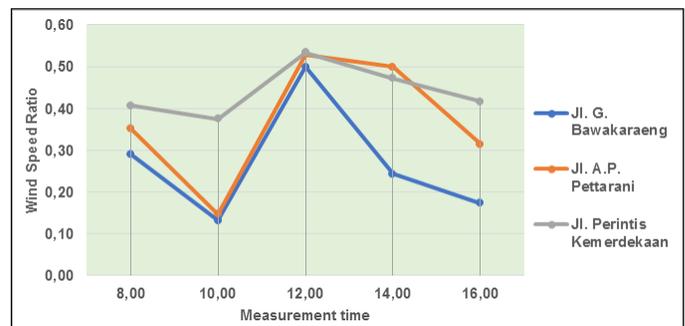


Figure 9. Wind speed of three urban areas in Makassar
Wind behavior patterns in the three urban areas were almost the same, although the locations were in different landscape. The area of St. Perintis Kemerdekaan was in the high-altitude area, A.P. Pettarani St. was in a crowded area, and St. G. Bawakaraeng was in the coastal area, hence it was a crowded area. This condition proves that the local climate could not be intervened. If the local wind speed conditions were high, then the high wind speeds could be utilized, nonetheless the amount of wind speed that could be utilized highly depended on the conditions and physical characteristics of the urban area.

I. CONCLUSION

The analysis results prove that the local winds could not be intervened. The high local wind speed contributed to the high wind speeds utilization, yet the amount of wind speed that could be utilized highly depended on the conditions and physical characteristics of the area.

The results of this study can be used as the basis of considerations for further research related to the synergy opportunities of local wind potential and the characteristics of the physical environment to obtain a comfortable and pleasant environment. The results of this study can be used as the basis of considerations for the coastal area planners and designers for the anticipation and consideration of the local wind potential of coastal areas.

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Computations of Geoid Undulation from Comparison of GNSS/Levelling with EGM 2008 for Geodetic Applications

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ABSTRACT

Consistency is an important characteristic in height systems which the mean sea level (msl) surface cannot guarantee. Only a geoid surface can provide height consistency. The quality of geoid undulation (N) will obviously affect the resulting orthometric height (H) determined from GNSS. The geoid undulation may be global, regional/national and local. Online software CSRS-PPP was used for post processing rinex data. $N^{EGM2008}$ was computed from AllTrans EGM2008 geoid calculator while h was used to compute N^{GPS} from the relationship $N = h - H$. H is the existing orthometric height. Twenty-four controls with FCT 260 P as base reference station were used for this study. The computed standard deviation of differences in $N^{GPS} - N^{EGM2008}$ (σ) is used as accuracy indicator and $\sigma = 0.419m$. The root mean square error (RMSE) is 0.934m. This indicates the quality and reliability of the geoid undulation from the EGM2008 model. Comparing the observed N^{GNSS} and $N^{EGM2008}$, the use of global models may not satisfy the accuracy level of orthometric height desired for local applications in the FCT, Abuja. GNSS (GPS) may be used along with local geoid model as a way to acquire acceptable orthometric height. The smaller the $N^{GPS} - N^{EGM2008}$ makes it better model. The range of 1.585m from ($N^{GPS} - N^{EGM2008}$) in this study is a strong indication that global models should be avoided as much as possible in local applications.

Keywords: Geoid undulation, Ellipsoidal height, Orthometric height, EGM2008, Accuracy

INTRODUCTION

Geospatial data are acquired by space or conventional techniques. The space techniques of GNSS produce ellipsoidal heights (h) based on mathematical best-fit ellipsoid model of the earth surface. GNSS is presently used for coordinate (N, E, H) determination of points of interest on the earth. The orthometric height (H) is determined from the relationship given by Abdulkahdum (2015) and Eteje *et al* (2018) as:

$$H = h - N \quad (1)$$

The N is termed geoid undulation that is the difference between ellipsoid and geoid surface used for the conversion of ellipsoidal height to orthometric height. The N is given by Heiskanen and Moritz (1967) and Eteje *et al* (2018) as:

$$N = h - H \quad (2)$$

Geoid undulation may be determined from global, regional and local geoid models. GNSS, by default is integrated with global

model e.g. EGM 2008. Global models are classified into satellite only (GRACE) and satellite combined with terrestrial gravity data e.g. EGM 2008. For practical geodetic data applications, there is the need for evaluation of global geoid by comparison with another model, the accuracy achievable before use in geospatial data acquisitions. Odera and Fukuda (2015) observed that global models are too generalized to be adopted for local geo-data measurements. In a place like Nigeria with no official national geoid model and unreliability of global geoid models, the need for local geoid development is very important for GPS user community.

Pavlis *et al.* (2008) confirmed that lack of gravity data contribution from Nigeria in the development of EGM 2008 geoid model implies that generated gravity was used and hence reliability of geoid undulations are very poor and hence lead to unreliable orthometric height. This can also be viewed from the worldwide EGM 2008 geoidal map where Nigeria falls within the gravity fill-in category as shown in Figure 1. To remedy the effect in local applications, local geoid is imperative. Local geoid model can be determined by gravimetric, astro-geodetic, geometric methods. This study adopted the geometric method due to the availability of controls in the F.C.T. with orthometric heights (H) whose coordinates (N, E, H) were collected from Survey and Mapping department of Federal Capital Development Authority (FCDA).

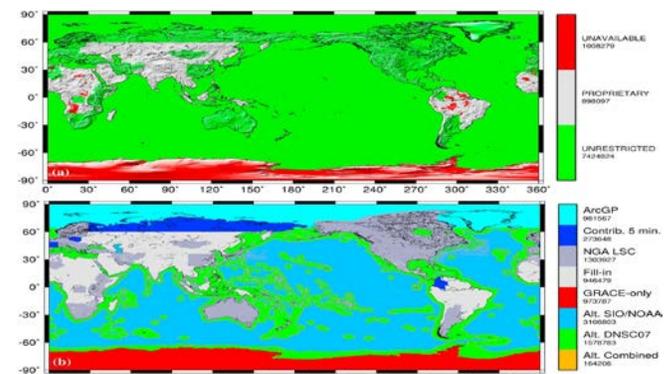


Figure 1. Geographic display of some of the characteristics of the 5 arc-minute area-mean gravity anomalies in the merged file used to develop the EGM2008 model.

Source: Nikolaos K. Pavlis, Simon A. Holmes, Steve C. Kenyon, and John K. Factor (2012)

GNSS is integrated with global model (EGM2008, EGM 96) by default. EGM2008 was developed by the US National Geospatial-Intelligence Agency according to Pavlis *et al.*(2008) with WGS84 as reference global ellipsoid to best –fit the earth surface for heights as vertical datum. The AllTrans 3.002 EGM geoid calculator was used to compute the geoid undulation for the observation points. Kotsakis *et al.* (2010) say the EGM2008 has a resolution of 9 km. The particular choice of EGM2008 was mainly due to its high resolution. Yi and Rummel (2014) opined that EGM2008 is the most comprehensive representation and the highest resolution of the Earth’s gravitational field currently available.

With GPS/Levelling technique and existing orthometric height (H) in F.C.T, the geoid undulation was determined from equation (2). This procedure is referred to as geometric geoid approach and is very practicable especially with widespread use and acceptability of GPS by surveyors for geodetic applications. This study therefore presents the determination of geoid undulation using the EGM global model and DGPS levelling over 24 controls points. The static DGPS provided better ellipsoidal heights and logically, better ellipsoidal heights would lead to better estimates of geoid undulation and hence orthometric heights. Figure 2 shows the geodetic surfaces of ellipsoid, geoid and geoid undulation.

The earth surface is the physical surface and the geoid is an equipotential surface of the gravity vector which best-fits, in a least squares sense, global mean sea level ignoring oceanographic effects. Since the mass of the earth is not uniform at all points due to subsurface materials, the gravity value varies and hence the shape of the geoid is irregular. The geoid is very appropriate for orthometric height realization. The use of geoid became highly relevant with the development of GNSS space techniques which makes geoid (global, regional/national and local) determination one of the goals of geodesy. The ellipsoid is the mathematically generated surface used to approximate the actual earth surface and is used as reference in space techniques. The heights referred to ellipsoid and geoid are termed ellipsoidal orthometric heights respectively. (See Fig. 2.)

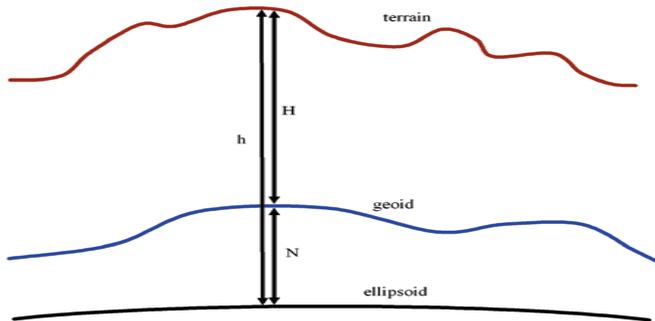


Figure 2: Terrain/earth surface, geoid and ellipsoid heights

Geology of the study area

FCT is said to be predominantly underlain by metamorphic and igneous rocks of Precambrian age within the basement complex (Kogbe,1989). Precambrian Basement Complex rocks underlie three areas of Nigeria including the North-central area where FCT is located. FCT also lies outside the two zones suspected of tectonic activities in the country. The implication of this is that geodetic infrastructures/controls are geo-dynamically stable. Figure 3 shows the geological map of Nigeria.

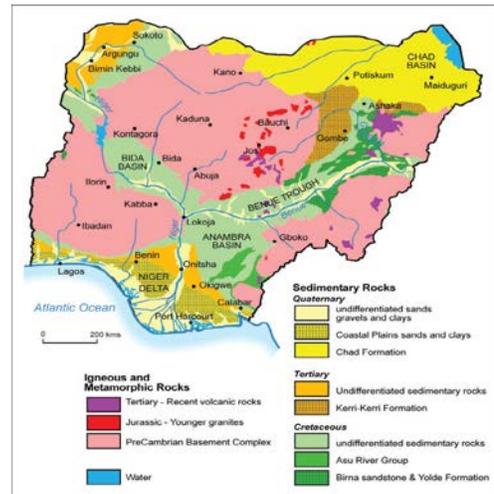


Figure 3: Generalized geological map of Nigeria (MacDonald *et al.*, 2005).

Study area

Federal Republic of Nigeria consists of 36 states and Federal Capital, the FCT, Abuja. Nigeria is located between 4° and 14° latitude and 2° and 15° longitude occupying an area of 923768 km² Two major rivers in the country are Niger and Benue that meets at Lokoja. The FCT lies between 8° 15’N to 9° 12’N latitude and 6° 27’E to 7° 23’E longitude. Figures 4a and 4b are maps of Nigeria and Federal Capital Territory Area Councils respectively

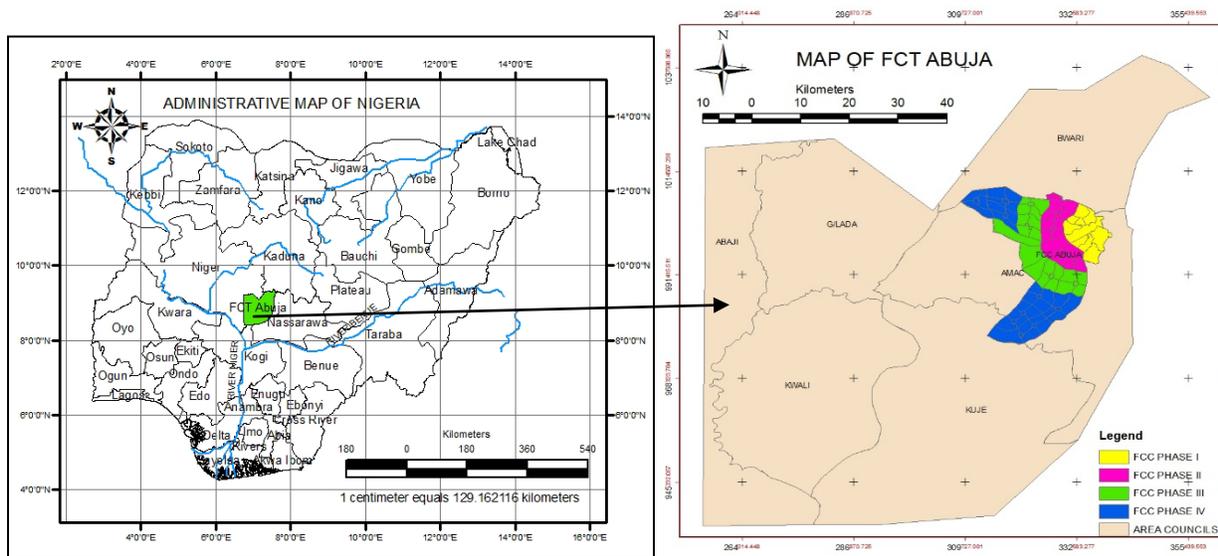


Fig. 4a: Nigeria map with thirty-six states and FCT. Fig. 4b: Map of FCT Area Councils

METHODS

The DGPS geodetic receivers were used and in relative mode on base reference station for a 2 hour duration of each rover observation positions. This provided primary data of latitudes, longitudes and ellipsoidal heights. The secondary data were collected from surveying and mapping department of F.C.D.A. which are the coordinate list, maps of Nigeria and Area councils of FCT. AllTrans EGM2008 geoid calculator was also used for geoid computation.

Data Sets

The datasets required for this study include: Orthometric height (H) shown in Table 1; Ellipsoidal height (h) from static DGPS measurements by relative technique; AllTrans3.002 EGM geoid

Table 1: List of coordinates with orthometric height.

CONTROL POINTS	COORDINATE REGISTER VALUE		
	EASTINGS (m)	NORTHING (m)	ORTHOMETRIC HEIGHTS, H (m)
FCC11S	331888.114	998442.043	485.447
FCT260P	255881.175	993666.807	201.944
FCT103P	340639.766	998375.578	532.558
FCT12P	333743.992	1008308.730	735.707
FCT19P	337452.408	996344.691	635.644
FCT2168S	310554.927	1009739.930	431.087
FCT24P	322719.776	1001884.850	453.804
FCT276P	351983.716	1025998.314	625.572
FCT4154S	329953.882	1003831.280	476.981
FCT4159S	326124.422	1003742.860	452.230
FCT66P	299148.035	998114.283	297.111
FCT9P	329821.512	1007612.091	497.253
FCT35P	322183.380	992926.363	427.171
FCT57P	303234.270	992916.402	323.844
FCT4028S	330164.634	1001388.240	449.592
FCT53P	308943.361	993406.773	351.943
FCT4652S	329441.767	997474.808	462.711
FCT162P	270791.291	934625.533	189.696

calculator for geoid undulation (N) computation and GPS computed geoid undulation from $N = h - H$

Orthometric Height (H)

This is the height required for survey, mapping, engineering/environmental applications as well as geo-scientific studies. These heights are referred to the geoid surface which is a surface that is at all places on the surface at right angles to the gravity vector direction. The list of controls obtained from Surveying and Mapping Department of FCDA, Abuja. The orthometric heights are referenced to Mean Sea Level (MSL) approximation of the geoid surface. Table 1 shows a list of coordinates with orthometric height.

FCT130P	330982.584	952889.869	695.608
FCT2327S	282526.612	973821.470	183.287
FCT2652S	271370.273	945385.429	138.952
FCT2656S	272644.591	941062.460	204.724
FCT83P	332954.205	987231.606	568.752
XP382	284074.729	983364.863	274.586

Source: FCDA (Surveying & Mapping Dept.)

RESULTS AND DISCUSSIONS

The results from this study are highlighted below:

Ellipsoidal Height (h)

The dual frequency GPS Hi-Target V30 Pro geodetic receiver model was used in static mode for 2 hours session during the field work on a primary control base (FCT260 P) reference station in relative technique mode. The base receiver was constantly logging data throughout the duration of collecting fieldwork. Online post-processing software CSRS-PPP (Canadian Spatial Reference Service Precise Point Positioning) was used to post-process GNSS RINEX data submitted through internet.

Table 1: Ellipsoidal heights (m)

CONTROL POINTS	EASTINGS (m)	NORTHIN GS (m)	CSRS-PPP HEIGHT ellipsoidal h (m)
FCC11S	331888.114	998442.043	509.410
FCT260P	255881.175	993666.807	224.753
FCT103P	340639.766	998375.578	556.851
FCT12P	333743.992	1008308.730	760.185
FCT19P	337452.408	996344.691	659.817
FCT2107S	308926.908	989748.256	342.063
FCT2168S	310554.927	1009739.930	455.290
FCT24P	322719.776	1001884.850	478.013
FCT276P	351983.716	1025998.314	649.851
FCT4154S	329953.882	1003831.280	501.247
FCT4159S	326124.422	1003742.860	476.442
FCT66P	299148.035	998114.283	321.126
FCT9P	329821.512	1007612.091	521.720
FCT35P	322183.380	992926.363	451.276
FCT57P	303234.270	992916.402	347.845
FCT4028S	330164.634	1001388.240	473.994
FCT53P	308943.361	993406.773	375.991
FCT4652S	329441.767	997474.808	486.992
FCT162P	270791.291	934625.533	215.073
FCT130P	330982.584	952889.869	719.411
FCT2327S	282526.612	973821.470	207.446
FCT2652S	271370.273	945385.429	163.774
FCT2656S	272644.591	941062.460	229.244
FCT83P	332954.205	987231.606	592.876
XP382	284074.729	983364.863	298.432

Geoid Undulation/height (N)

The geoid height (N), is required for the most notable and primary use of the transformation between Global Positioning System (GPS)-derived ellipsoidal heights and orthometric heights. After post-processing of the Rinex data from CSRS-PPP online software, the geoid undulation is computed from both global EGM 2008 global model and GPS observed ellipsoidal height.

i) From EGM2008.

The geoid undulation was computed from AllTrans 3.002 EGM 2008 geoid calculator. For the observed points, the calculator was used for global N and results are shown in Table 3.

Table 3: EGM 2008 geoid undulation.

CONTROL POINTS	EASTINGS (m)	NORTHIN GS (m)	$N^{EGM2008}$ m
FCC11S	331888.114	998442.043	23.1627
FCT260P	255881.175	993666.807	23.1113
FCT103P	340639.766	998375.578	23.0363
FCT12P	333743.992	1008308.730	23.2582
FCT19P	337452.408	996344.691	23.2566
FCT2168S	310554.927	1009739.930	23.3182
FCT24P	322719.776	1001884.850	23.2245
FCT276P	351983.716	1025998.314	23.1733
FCT4154S	329953.882	1003831.280	23.2209
FCT4159S	326124.422	1003742.860	23.2297
FCT66P	299148.035	998114.283	23.2793
FCT9P	329821.512	1007612.091	23.2566
FCT35P	322183.380	992926.363	23.2108
FCT57P	303234.270	992916.402	23.2789
FCT4028S	330164.634	1001388.24	23.1974
FCT53P	308943.361	993406.773	23.2256
FCT4652S	329441.767	997474.808	23.1635
FCT162P	270791.291	934625.533	23.5677
FCT130P	330982.584	952889.869	23.7235
FCT2327S	282526.612	973821.470	23.3336
FCT2652S	271370.273	945385.429	23.4997
FCT2656S	272644.591	941062.460	23.5846
FCT83P	332954.205	987231.606	23.2237
XP382	284074.729	983364.863	23.2752

From table 3 above, the EGM 2008 geoid undulation is noted to be nearly consistent which is desirable.

ii) From GNSS observations

The ellipsoidal height (h) from GNSS is combined with existing orthometric (H) from FCDA (Surveying and Mapping) to compute geoid undulation (N) from $N=h-H$ and results are shown in Table 4.

Table 4: Geoid Undulation Map from GNSS Observations

CONTROL POINTS	FCDA COORDINATE REGISTER VALUES			ELLIPSOIDAL HEIGHTS (h) m	$N^{GNSS}(m)=h-H$
	EASTINGS(m)	NORTHINGS(m)	ORTHOMETRIC HEIGHTS(H) m		
FCC11S	331888.114	998442.043	485.447	509.388	23.941
FCT260P	255881.175	993666.807	201.944	224.742	22.798
FCT103P	340639.766	998375.578	532.558	556.836	24.278
FCT12P	333743.992	1008308.730	735.707	760.187	24.480
FCT19P	337452.408	996344.691	635.644	659.817	24.173
FCT2168S	310554.927	1009739.930	431.087	455.285	23.198
FCT24P	322719.776	1001884.850	453.804	477.994	24.190
FCT276P	351983.716	1025998.314	625.572	649.851	24.279
FCT4154S	329953.882	1003831.280	476.981	501.259	24.278
FCT4159S	326124.422	1003742.860	452.230	476.535	24.305
FCT66P	299148.035	998114.283	297.111	321.124	24.013

FCT9P	329821.512	1007612.091	497.253	521.716	24.463
FCT35P	322183.380	992926.363	427.171	451.291	24.120
FCT57P	303234.270	992916.402	323.844	347.807	23.963
FCT4028S	330164.634	1001388.240	449.592	473.960	24.368
FCT53P	308943.361	993406.773	351.943	375.964	24.021
FCT4652S	329441.767	997474.808	462.711	487.131	24.420
FCT162P	270791.291	934625.533	189.696	215.133	24.437
FCT130P	330982.584	952889.869	695.608	719.396	23.788
FCT2327S	282526.612	973821.470	183.287	207.504	24.217
FCT2652S	271370.273	945385.429	138.952	163.724	24.772
FCT2656S	272644.591	941062.460	204.724	229.228	24.504
FCT83P	332954.205	987231.606	568.752	592.849	24.097
XP382	284074.729	983364.863	274.586	298.381	23.795

It can also be noted that the geoid undulation is also nearly consistent like the EGM determined geoid model. This is also desirable for orthometric height determination for local applications.

The geoid undulation differences ($N^{GNSS} - N^{EGM2008}$)
 From computations, the differences between both EGM and GNSS derived geoid undulations are shown in Table 5.

Table 5: $N^{GPS} - N^{EGM2008}$ Differences, Standard Deviation, RMSE

A	B	C	D=B-C	E	F	G
CONTROL POINTS	$N^{GNSS}(m)$	$N^{EGM2008} m$	$N^{GNSS}(m) - N^{EGM2008}$	D-0.836	E ²	D ²
FCC11S	23.951	23.163	0.778	-0.058	0.003364	0.605284
FCT260P	22.798	23.111	-0.313	-1.149	1.320201	0.097969
FCT103P	24.278	23.036	1.242	0.406	0.164836	1.542564
FCT12P	24.480	23.258	1.222	0.386	0.148996	1.493284
FCT19P	24.173	23.257	0.916	0.080	0.006400	0.839056
FCT2168S	23.198	23.318	-0.120	-0.956	0.913936	0.014400
FCT24P	24.190	23.225	0.965	0.129	0.016641	0.931223
FCT276P	24.279	23.173	1.106	0.270	0.072900	1.223236
FCT4154S	24.278	23.221	1.057	0.221	0.048841	1.117249
FCT4159S	24.305	23.230	1.075	0.239	0.057121	1.155625
FCT66P	24.013	23.279	0.734	-0.102	0.010404	0.538756
FCT9P	24.463	23.257	1.206	0.370	0.136900	1.454436
FCT35P	24.120	23.211	0.909	0.073	0.005329	0.826281
FCT57P	23.963	23.279	0.684	-0.152	0.023104	0.467856
FCT4028S	24.368	23.197	1.171	0.335	0.112225	1.371241
FCT53P	24.021	23.226	0.795	-0.041	0.001681	0.632025
FCT4652S	24.420	23.164	1.256	0.420	0.176400	1.577536
FCT162P	24.437	23.568	0.869	0.033	0.001089	0.755161
FCT130P	23.788	23.724	0.064	-0.772	0.595984	0.004096
FCT2327S	24.217	23.334	0.883	0.047	0.002209	0.779689
FCT2652S	24.772	23.500	1.272	0.436	0.190096	1.617984
FCT2656S	24.504	23.585	0.919	0.083	0.006889	0.844561
FCT83P	24.097	23.224	0.873	0.037	0.001369	0.762129
XP382	23.795	23.275	0.520	-0.316	0.099856	0.270400
		SUM	20.083		4.043871	20.922041
		MEAN	0.836			
		STD DEV (σ)			0.419	

In Table 5, the computation of standard deviation (σ) was done and the value is given as $\sigma = 0.419m$.

Specifications for Topographical Survey

This step becomes necessary to determine from the standard deviation of the differences compared against the specifications given by American Society of Photogrammetry and Remote Sensing (ASPRS 1993) as shown in Table 6, the limits to what is expected from the use of each model.

Table 6: ASPRS Topographic Elevation Accuracy Requirement for Well-Defined Points

Contour Interval (M)	Class I(M) High Accuracy/ Standard Deviation Accuracy	Class II(M) Lower Than Class 1 Accuracy Standard Deviation	Class III(M) Lower Than Class 11 Accuracy Standard Deviation
0.5	0.08	0.16	0.25
1.0	0.17	0.33	0.5
2.0	0.33	0.67	1.0
4.0	0.67	1.33	2.0
5.0	0.83	1.67	2.5

Source: American Society of Photogrammetry and Remote Sensing (ASPRS 1993)

From Table 6, it is seen that EGM2008 with $\sigma=0.419$, checked against the specification above, can be used to produce topographical plan of 4m contour interval for less accurate survey, feasibility studies and preparation of master plan or land use classification maps but inadequate for survey applications where a high accuracy is required.

ANALYSIS AND DISCUSSIONS

Steps used for comparing the two methods of geoid undulations from global and observations. Twenty-four controls were used for these observations and the geoidal undulations from the two are shown in Table 5. From the Table 5, the standard deviation (σ) of the geoid undulation differences computed is $\sigma = 0.419m$.

Table7: Statistics of $N^{GNSS} - N^{EGM 2008}$ (m)

	MINIMU M m	MAXIMUM m	MEAN m	STANDARD DEVIATION (σ) m
EGM2008	-0.313	1.272	0.836	0.419

The range of the differences in the Table 7 above (1.585 m) obtained from this study is a pointer to the fact that for local applications, the global model (EGM 08) is not be an adequate source of orthometric height determination. This has buttressed the fact for the need for development of local geoid by geometric method using GNSS. This difference has serious implications for topographical mapping, cadastral survey, engineering/environmental studies and others.

Discussion

The static GNSS provided better ellipsoidal heights. It is logical that better geoidal undulation would lead to better estimates of orthometric heights. The results from this study have confirmed the investigation of Uzodinma *et al.*(2014) in the evaluation of EGM2008 in UNEC (a value of 1.019m), Okiwelu *et al.* (2011) and others that reported about 1m accuracy in global model using spherical harmonics over Nigeria. This study has shown a RMSE of 0.934m. In Thailand, an accuracy of 1.012m was reported in the evaluation of EGM 2008

The following conclusions are made from this study:

- 1) The smaller the range of values (between lowest and highest $N^{GNSS}-N^{EGM 2008}$) the better the orthometric heights obtained, in this instance, the range of 1.585m is clearly an

REFERENCES

This is considered as the accuracy indicator of the global EGM2008 model. This accuracy is definitely inadequate in the FCT study area for geospatial data acquisition for orthometric height using GNSS method. Though the EGM 2008 geoid model shows nearly consistent geoid undulation values, the resulting standard deviation proved the unacceptable and inadequate behavior of the global model in local applications in the FCT study area which may be attributed to the lack of gravity contribution from Nigeria during the development of EGM 2008. In Central Mozambique, Merry (2009) reported a 3m difference between EGM orthometric height and the levelled height.

- indication that EGM2008 should not be adopted for orthometric height determination in the study area.
- 2) The standard deviation of $\sigma=0.419$ computed when checked against the APSR table (1993) shows that at the very best only topographical survey of 4m contour interval can be produced using EGM 2008 geoid model and this may not be accepted for surveying, mapping, engineering and environmental studies.
 - 3) The standard deviation value or root mean square error is a confirmation of absence of gravity values from Nigeria being part of input data in the development of EGM2008. Actually a generated gravity was used for Nigeria from the classification depicted on EGM global geoid map
 - 4) This study has also implied that use of GNSS with local geoid model is preferable to using EGM2008 global geoid for orthometric height determination.

RECOMMENDATIONS

- 1) Though Nigerian has no official geoid model, each state may be encouraged to develop a geometric geoid model for local applications instead of adopting a model that is inadequate for practical geo-data acquisitions.
- 2) Efficient utilization of GNSS in almost all applications requires development of an appropriate geoid model for transformation of ellipsoidal height to orthometric height.
- 3) Since GNSS (GPS) observations were used for determination of geoid undulation, polynomial models may use the values for the modelling of geoid for local applications.

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Synthesis, Characterization of Magnetite Nanoparticles and Their Role in Lead Adsorption

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Abstract- Industrialization has revolutionized the quality of life but also led to the increase in environmental pollution in the form of industrial waste. The effluents released from the industries include toxic compounds which get accumulated in soil and persist for years if not treated properly. These persisting, non-degradable compounds include the heavy metals which are mostly released into the soil from electronic industries in the form of E-waste. Electronic industries are the fast growing industries and the amount of the waste released from them is considerably high. Most of the electronic goods are made of heavy metals like Lead (Pb), Cadmium (Cd), Zinc (Zn), etc., of which Lead is an important metal found in most of the electronic goods which is highly toxic. The metal leaches into the soil if not processed properly and leads to contamination of soil thereby affecting the lives of flora and fauna on earth. To prevent this the present study focused on the use of nanotechnology in the removal of Lead from contaminated soils. Magnetite nanoparticles are used for Lead adsorption. The unique property of high affinity of magnetite nanoparticles towards cations enables a better adsorption of Lead by the nanoparticles. The current study focuses on the application of Magnetite nanoparticles in reducing Lead toxicity by adsorption technique. The nanoparticles exhibited a higher rate of metal removal upto 2500ppm. X ray diffraction study revealed the size of the magnetite nanoparticle to be 4.3nm. The structure of the nanoparticle was determined by Scanning electron Microscope and Transmission electron microscope.

Index Terms- Magnetite nanoparticles, metal adsorption, and adsorption isotherm.

I. INTRODUCTION

Soil is the basic source for life on earth. In recent years due to rapid industrialization soil is being polluted with various toxic compounds. The toxic compounds include different types of chemicals as well as heavy metals. These compounds leach into the soil because of improper treatment methods. Among the pollutants heavy metals pollution is the most challenging environmental problem globally [1]. It is a major threat for agriculture based countries like India where the contaminant free soil is of major importance. The presence of the heavy metals even in low concentrations could be harmful to the flora and fauna. Few of these compounds like Lead persist in soil for years without being degraded. So there is need for an efficient

treatment method for the heavy metals. The basic sources of these heavy metals are the electronic goods. The utility of the electronic goods has increased to a large extent in 21st century. At the same time the discard of these goods after their usage has also increased tremendously. The electronic goods are discarded in the landfills and remain in soil as electronic waste or e-waste for a long period due to improper treatment procedures. According to United Nations Environment Programme (UNEP) estimates the amount of E-waste produced globally is 50million tones annually and only 10% of it is recycled [2]. The E-waste from the developed nations is dumped into developing countries [3] as a part of free trade which is adding up to the difficulty in waste management. There are different methods available for E-waste management like mechanical separation, thermal treatment, hydrometallurgical treatment; electrochemical treatment [4]. But the employment of these methods requires more cost and expertise for their operation and also facilities for e-waste collection and treatment [5]. Because of inadequate facilities the e-waste is not being recycled properly and is getting accumulated in soil leading to environmental pollution. So there is a need for a new method which is cost effective and does not require much infrastructure. One of such methods is by adsorption mechanism using nano-based adsorbents. Nano-based adsorbents or Nanoparticles have small size and high surface area which enables greater adsorption of the cations onto them. Nano adsorbents such as Magnetite nanoparticles are generally used to remove Lead from soil. The magnetic property of the Magnetite nanoparticles enable easy separation of the adsorbent from the applied site as well as reusability [6]. So the present study focuses on the use of magnetite nanoparticles for Lead adsorption from soil samples containing high concentrations of Lead.

II. MATERIAL AND METHODS

1.1 Synthesis of magnetite nanoparticles: Magnetite nanoparticles were synthesized by co-precipitation method [7]. 19.46 g of anhydrous FeCl₃ was completely dissolved in 150 ml distilled water (aqueous solution A). Potassium iodide solution (aqueous solution B) was prepared by dissolving 6.584g of potassium iodide in 50.0 ml distilled water. Both the solutions were mixed together at room temperature (RT) and allowed to stand for 1h to reach equilibrium. Iodine precipitate formed

was filtered out and then washed with distilled water. To the filtrate the washing was added. To the filtrate 25% ammonia solution was added drop-wise with continuous stirring at 1100rpm on a magnetic stirrer till a black precipitate was observed. Then the beaker was left to settle, filtered and washed with distilled water. After washing the sample was dried at 90°C.

2.2 Characterization of magnetite nanoparticles:

2.2.1 UV-Vis spectra analysis: UV-Vis spectral analysis was done using UV-Vis absorption spectrophotometer (Systronsis 2100). Small aliquot of the sample was diluted in distilled water and measured at wave length between 200-600nm.

2.2.2 X-Ray Diffraction(XRD): The crystallographic structural information of the magnetite nanoparticles was analyzed by X-ray diffraction(XRD).The analysis of sample in diffraction patterns were recorded from 10^0 to 70^0 with a diffractometer (CuK α , 40 kV, 30 mA and $k = 1.54056 \text{ \AA}$) (Indian Institute of Chemical Technology, Hyderabad).

2.2.3 Scanning Electron Microscopy: The morphology of the synthesized Magnetite nanoparticles was assessed by Scanning Electron Microscope (ZEISS). The samples were placed on a round cover glass of 1.2 cm diameter each, deionized water was used to wash and dried in a desiccator at RT. The cover glass was then mounted on a SEM stub and coated with gold for SEM analysis.

2.2.4 Transmission electron microscopy: The samples were observed under TECNAI FE12 TEM instrument operating at 120 kV using SIS imaging software. The magnetite nanoparticles were dispersed in methanol and a drop of each sample was placed on formvar-coated copper grid and air dried.

2.2.5 Selected area diffraction: The crystal structure of the nanoparticles was determined by Selected area (electron) diffraction (SAD or SAED) which is determined inside a transmission electron microscope (TEM).

2.3 Preparation of Lead stock solution: Stock solution of Lead (Pb II) was prepared by dissolving 300mg of metal in 300ml sterile distilled water (3000ppm). From this different concentrations of the metal were made ranging from 5ppm to 2500ppm by dilution.

2.3.1 Preparation of nanosuspension: 1g of Magnetite (Fe₃O₄) nanoparticles (dried) was dissolved in 100ml distilled water to make Magnetite particle suspension. For uniform dispersion of the nanoparticles in distilled water ultrasonic disruption (25 KHz, Model: Enertech) was carried on [8].

2.3.2 Metal adsorption studies: 25ml of metal solution of different concentrations were taken in a conical flask and 5ml of magnetite nanoparticle suspension was added to each flask. The flasks were incubated at 37°C for 24h. After the incubation period the amount of metal present in each concentration was determined by Atomic Absorption Spectrophotometer. The amount of metal (mg) adsorbed onto 1g of magnetite

nanoparticles was determined by mass balance equation which is given as [9].

$$Q_e = \frac{C_o - C_e}{m} V$$

Where C_o is the initial metal ion concentration (mg L⁻¹), C_e is the final concentration of the metal.

V is the sample volume (L), and m is the mass of Fe₃O₄ nanoadsorbent (g).

2.3.3 Adsorption isotherm studies: The amount of adsorbate on the surface of an adsorbent with respect to pressure for gases or concentration for liquids at constant temperature is explained by adsorption isotherms. Langmuir and Freundlich models are the two adsorption isotherms used to determine the adsorption phenomenon of Lead ions onto the surface of 1g of magnetite nanoparticles.

Freundlich- Langmuir Isotherm: This adsorption isotherm model explains heterogeneous system [10] which is expressed as $X/m = KCe^{1/n}$

Where: x is the amount of adsorbate adsorbed

m=mass of adsorbate

Ce=equilibrium concentration of adsorbate

K= Freundlich constant

n=no. of layers of metal adsorbed on the surface layers of nanoparticles.

In general, 1/n is less than 1. Therefore, above equation can be written as

$$\text{Log}x/m = \text{log}K + 1/n \text{ log}C_e$$

The Freundlich coefficient can be determined from the plot of log x/m versus log C_e

III. RESULTS AND DISCUSSION

Characterization of magnetite nanoparticles:

The accumulation of electronic waste because of improper recycling techniques is posing a major threat to the environment. Electronic waste constitute heavy metals like lead, mercury, copper which are toxic to the environment if they leach directly into soil without proper recycling. Due to lack of appropriate technologies the increase in the volumes of the scrap is witnessed after informal recycling [11]. So there is a need to design a method by which the volumes of the toxic metals that are leached into the soil can be minimized without causing any harm to the environment. Though there are many methods employed in their treatment the use of nanosized particles as environmental remediants is drawing the attention of current researchers as they provide cost-effective solutions for most of the environmental pollutants [12]. Nanosized Iron particles (Magnetite) are widely employed in the removal of common environmental pollutants like organic contaminants [13, 14, 15] as well as heavy metals [16, 17]. The literature reveals that Magnetite nanoparticles synthesized by co-precipitation method are used for the treatment of water contaminated with metals like lead, copper, Zinc and Manganese [18]. The magnetite nanoparticles functionalized with carboxyl (succinic acid), amine (ethylenediamine) and thiol (2,3-dimercaptosuccinic acid) groups were used for the removal of toxic metal ions (Cr(III), Co(II), Ni(II), Cu(II), Cd(II), Pb(II))

and As(III) and bacterial pathogens (*Escherichia coli*) from water [19]. The unique property of magnetite nanoparticles which enables their use as adsorbent of Lead ions is the larger surface area and presence of hydroxy groups as reactive sites [20].

The validation of the synthesized magnetite nanoparticles was done by UV-Visible spectroscopic analysis. The absorption band was observed at 316.8nm (Fig1) which is according to the previously reported literature [13]. The absorbance band in the visible range between 330-450nm indicates the formation of particles of nanodiameter [21]. The crystal structure was verified using x-ray diffraction (XRD) and the size of the magnetite nanoparticles analyzed using Deby - Scherrer equation [22] and was found to be 4.3nm (Fig 2). The data obtained is very close to the JCPDS card no.89-0691 which will prove that the prepared nanoparticles was made of iron oxide [23]. The XRD pattern of Magnetite nanoparticles obtained by co-precipitation method shows the characteristic peaks at 35.2°(311), 43.1°(400), 53.4°(422), 57.1°(511) and 62.8°(440) were observed which indicate the crystalline nature and phase purity of the synthesized magnetite nanoparticles. The literature shows that the magnetite

nanoparticles of size less than 30nm exhibit a greater paramagnetic property which enables easy separation from the applied regions in presence of external magnetic field [24]. Magnetite nanoparticles synthesized by co-precipitation method using different reagents like $FeCl_3 \cdot 6H_2O$, $FeCl_2 \cdot 4H_2O$, propylene glycol and ammonium hydroxide had a mean particle size diameter of 8nm [25]. The small size of the nanoparticles determines their nanocrystalline nature [26]. The morphology of the magnetite nanoparticles was determined using SEM (Fig3). The figure shows the spherical magnetite nanoparticles synthesized by co-precipitation method. The magnetite nanoparticles agglomerated to a little extent because of their small size and more surface energy. The size is approximately >10nm indicating the synthesis of homogenous nanoparticles. TEM analysis confirmed the size of the magnetite nanoparticles to be below 10nm(Fig4.a). From the SAED pattern it can be inferred that as observed in XRD, SAED also shows characteristics patterns which explain the phase purity of the magnetite nanoparticles (Fig4.b).

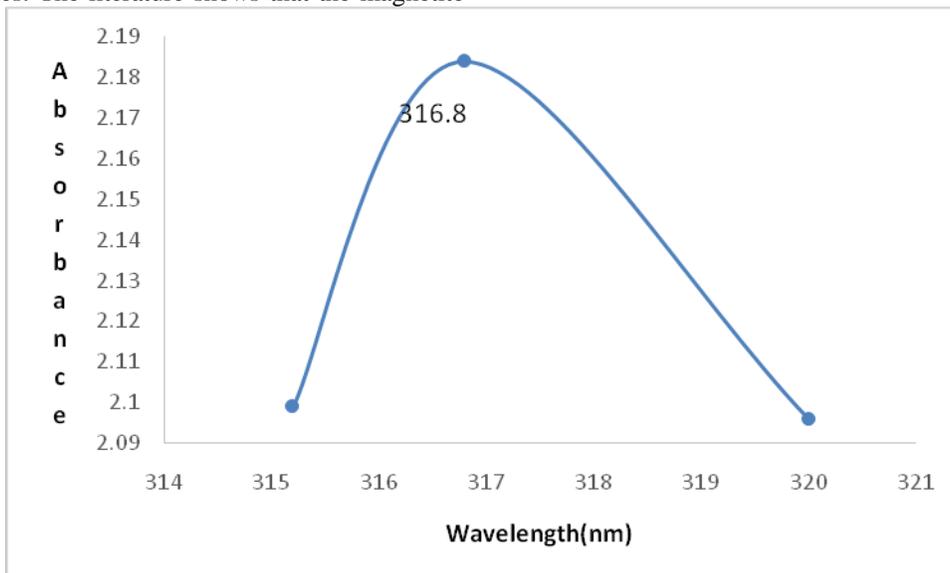


Fig.1: UV-VIS absorption spectra of magnetite nanoparticles

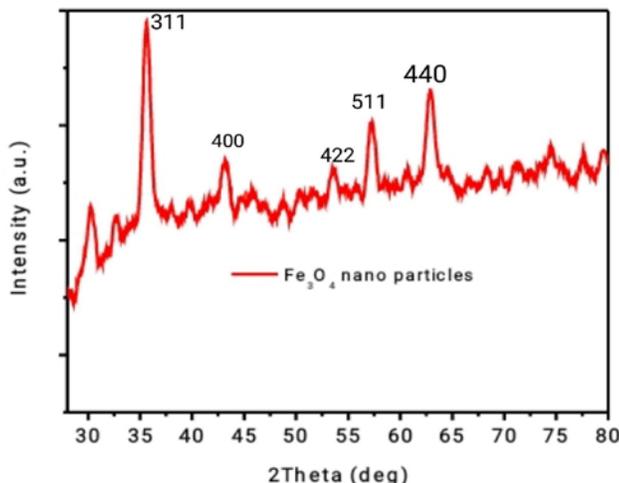


Fig .2: X-Ray diffraction patterns of magnetite nanoparticle

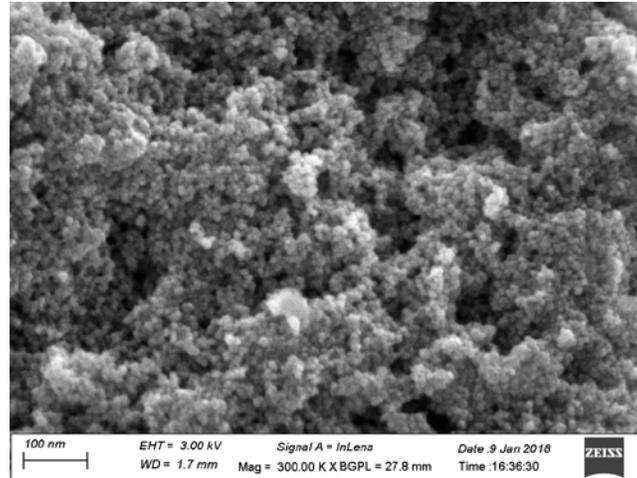


Fig 3: SEM image of magnetite nanoparticles

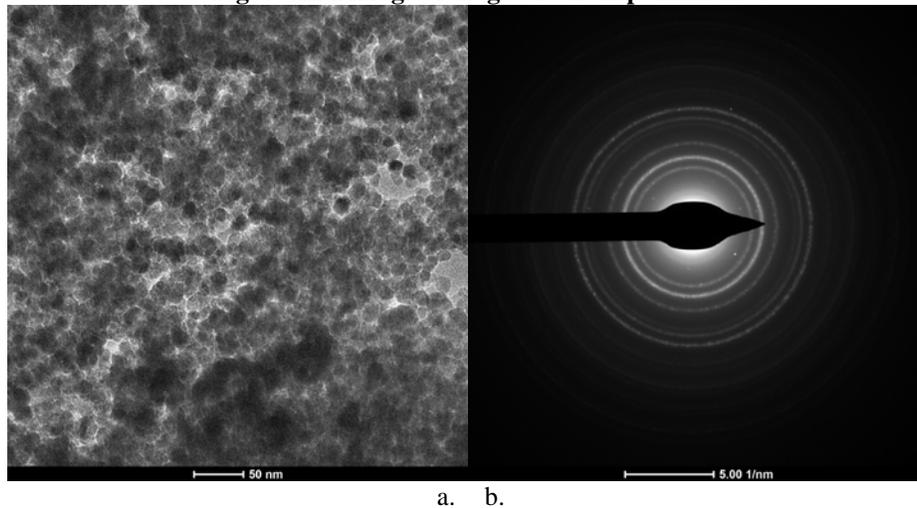


Fig 4. TEM image of Magnetite nanoparticles (a),SAED pattern of magnetite nanoparticles(b)

Adsorption isotherms: Freundlich- Languier adsorption isotherm model was used to determine the monolayer formation or the heterogeneity of the adsorbate onto the surface of the adsorbent. Different concentrations of Lead solution were taken ranging from 100ppm to 2500ppm. The experimental data obtained from adsorption of Lead ions onto the surface of magnetite nanoparticles are presented (Fig6). The correlation coefficient of the Languier -Freundlich isotherm was above 1 which indicated a deviation from the monolayer adsorption of the Lead ions onto the magnetite nanoparticles. The literature shows that if the $1/n$ values are less than unity it indicates the significant adsorption at low concentration and as the concentration increases the amount adsorbed becomes less significant [27]. The non-linearity may be because of the hydrophobic nature of Lead ions and presence of polar functional groups which compete with water molecules for adsorption sites [28].

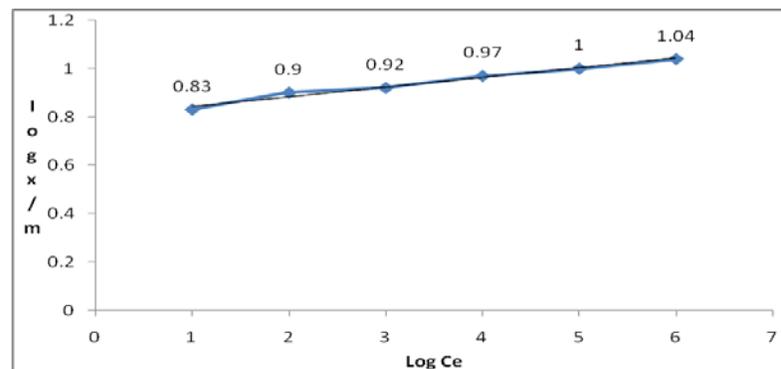


Fig 6: Languier–Freundlich adsorption isotherm of Lead adsorbed onto magnetite nanoparticles.

Metal adsorption by Magnetite nanoparticles: The amount of metal adsorbed by the magnetite nanoparticles was determined using Atomic absorption spectrophotometer (Fig 5). A range of metal concentrations were taken from 100ppm to 2500ppm. It was observed that as the concentration of metal increased the amount of metal (g) deposited on the surface of

magnetite nanoparticles also increased. The maximum amount adsorbed on 1g of magnetite nanoparticle at 2500ppm concentration of metal was 62.189g. According to earlier studies Magnetite nanoparticles. Previous studies reveal that Magnetite nanoparticles can adsorb maximum upto 2.072ppm of Lead ions [29]. From the study it was observed that the concentration of the metal adsorbed onto the surface of the nanoparticle increased with increase in the concentration of the metal ions, this may be due to the formation of multilayers on the surface of the adsorbent enabling higher intake of metal. The small size of the nanoparticles favours the diffusion of metal ions from a bulk solution onto the active sites of the adsorbent at a higher rate [30]. The amount of Lead removed by magnetite nanoparticles increases with the increase in the contact time between the metal and the adsorbent [31, 32, 33]. The uptake of Lead ions by magnetite nanoparticles is by physico-chemical interactions between the adsorbent and the adsorbate [27]. In aqueous solutions the hydrated ionic radius of Lead ions is low which enables highest adsorption capacity towards the protons on the adsorbent [34]. So there is greater adsorption of the metal observed onto the magnetite nanoparticles.

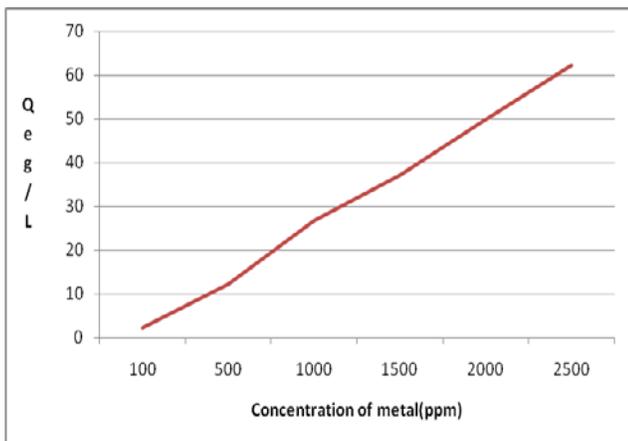


Fig 5: Concentration of metal(g) adsorbed on the surface of nanoparticles

IV. CONCLUSION

The current work concludes the use of magnetite nanoparticles synthesized by co-precipitation method with a size of 4.3nm as effective adsorbents of Lead ions (Pb II). The magnetite nanoparticles had maximum adsorption capacity upto 2500ppm which enable their use in highly contaminated Lead soils. The ease in the recovery and reuse of the magnetite nanoadsorbents from the applied sites reduces the economical burden.

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A Review Paper On: Identified Effective Methods Which Are Used In School-Based Teacher Professional Development in Sri Lanka

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Abstract

School Based Teacher Development (SBTD) is a new concepts in Sri Lankan education system, in 1980s and 1990s decades of 20th century, this School Based Teacher Development concept (SBTD) was introduced to the general education system in the country. However the importance of the School Based Teacher Development was emphasised by the government in 2006 under Program of School Improvement (PSI) project. Currently this School Based Teacher Development (SBTD) programs are being developed in the general education system in Sri Lanka. Under SBTD programs, several teacher professional development methods are used by school principals and the staff of the schools. This paper reviews some identified more effective methods which are applied in SBTD programs in Sri Lanka. In this review process relevant books, journals, research papers, websites, policy documents, and hand books were referred to collect information.

Key words: School Based Teacher Development, Program of School Improvement, in-house sessions, job-embedded teacher professional development methods

Introduction

Different methods are used in SBTD programs, some of which are traditional and one-shot, for example, workshops, seminars and conferences (Smith et al., 2003). Others are job-embedded teacher professional development methods (Smith & Gillespie, 2007) such as study circles, practitioner research and inquiry projects. Various types of activities are applied in the above methods, which are group works, peer learning, projects, team teaching, and observation of model schools. These activities help to increase the quality of teaching-learning processes in

schools, as “...the success of professional learning activities depend on teacher motivation, enthusiasm and commitment” (Yates, 2007, p. 215). In addition, Smith et al (2003) outlines some school-based continuing professional development activities, which are listed below:

- Induction (pairing with a master teacher or mentor when beginning to teach, offered by the school).
- Ongoing inquiry activities (practitioner research or study circles, organised by the school).
- Coaching (whether peer or mentor).

The Department of Education & Training (2005) provides some effective professional development activities: action research, study groups and case discussions. In addition, SBTD programs at outside locations are also a different activity of SBTD programs.

Methodology

The qualitative data (information) for this study were collected by reviewing relevant books, journals, websites, thesis, paper articles and hand-books. The collected information were analysed and finally this reviewed paper is presented. Especially the paper was focused to review national and international literature which are relevant to various types of effective methods of SBTD programs in Sri Lanka. The flowing sections of the paper describe some identified effective methods which are used in SBTD programs in Sri Lanka.

Action research

This is a strategy in the teaching and learning process, and it is a good tool for individual self-teacher professional development. Action research strategy allows teachers to formulate valid questions about their own practice and pursue objective answers to these questions in the same workplace (Department of Education & Training, 2005). One of the previously discussed programs was included this activity.

This is an action research-based case study which was conducted in a disadvantaged school in Sri Lanka. This research was conducted by the National Institute of Education (NIE). This project was conducted about two-and-a-half years and the research has five specific objectives: “to report an attempt to introduce school improvement in Sri Lanka; to assess the success or otherwise of this innovation; to evaluate the effectiveness of the strategies used in the process; to identify factors that hinder the improvement process; and to develop insights on the role of the

facilitator” (Wijesundera, 2002, p. 170). In this school improvement project, the Action Research method was used and the project procedure is explained in the diagram below.

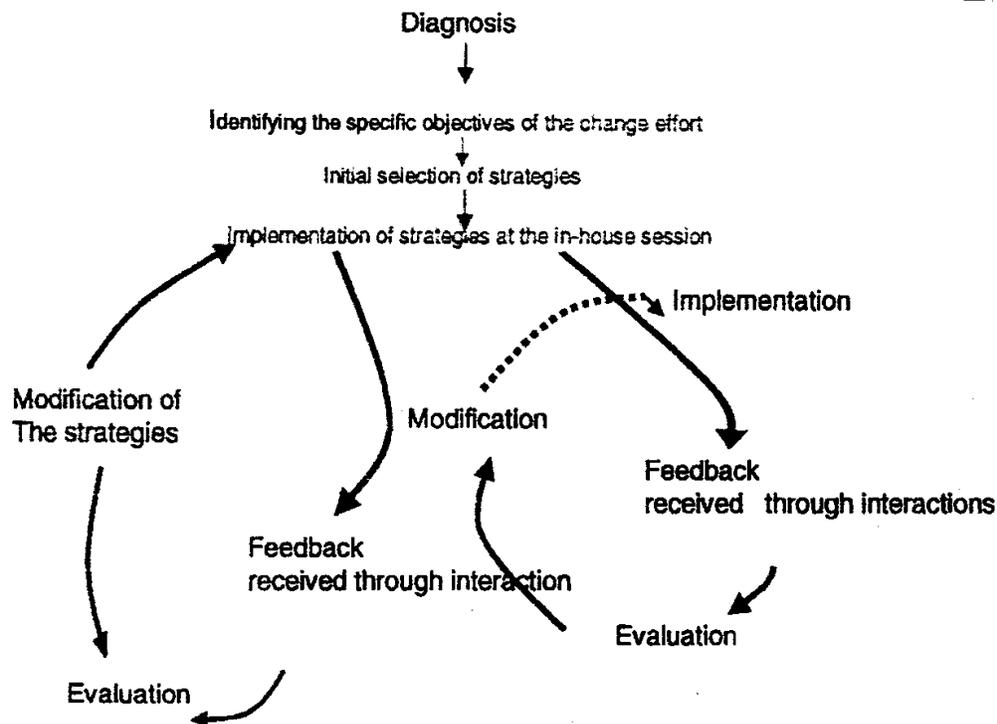


Figure 1: Diagram of action research based study

(Wijesundera, 2002)

This action research procedure has two aspects which are relevant to the SBTD concept. Firstly, it is school-based, and secondly it considers in-house sessions conducted for teacher professional development to make awareness of the project. The effectiveness of the strategies and processes used in the in-house session were explained as, “The most successful strategies used in the in-house sessions were the individual and school levels” (Wijesundera, 2002, p. 180). The next section articulates identified two methods which are applied in SBTD programs.

School-based teacher development programs at outside locations

SBTD programs are usually implemented in-house and sometimes may create boredom and dullness among teachers. Therefore some SBTD programs are also organised at outside

locations. Since teachers are adult learners, teacher professional development activities should be incorporated with some aspects of adult learning theories; while Butler (1992a, p. 3) describes that "...adult learners exist in situations separate from the learning context. They are motivated to learn by changing in their situations and learn best when new learning is applied in practical ways and/or are relevant to the changes in their situations".

Some important aspects of SBTD programs at outside locations are:

- Participation of all teachers of the school.
- Transport is reserved for participants.
- Accommodation and meals are provided.
- Various teacher professional development programs are organised and implemented according to specific subjects, grades and sections (e.g. Science, Art, Commerce, etc).
- Different types of physical and human resources are used, for example, popular lecturers are invited for the lectures.
- Various activities are organised for teachers' entertainment at evening and night time.
- At the end of the program, a special ceremony is organised and certificates are presented by the chief guest.
- In the SBTD programs, every teacher is assessed and this assessment will be evaluated for the next promotion of the teacher service.
- Programs are organised and implemented annually or two or three times a year and the locations are changed from time to time.

These programs are assumed as those that develop teachers' skills, knowledge, attitudes and values.

ICT for teacher professional development

This section describes the importance of Information Communication Technology (ICT) for teachers and students. The literature shows that ICT is a strong tool for teacher professional development (Anderson & Henderson, 2004; Brooks-Young, 2001). Nowadays, ICT is a part of the teachers' working life. Teachers are required to have at least a basic knowledge of ICT. "As pre-service teachers are prepared to teach in tomorrow's classrooms, they must learn to use computer technology in the ever-changing global marketplace and as a critical tool to strengthen educational reforms for improved student learning" (Seabrooks et al., 2000, p. 219). This

statement emphasises the importance of ICT education for teacher professionalism. However, prospective teachers do not have an opportunity to undertake ICT education in Sri Lanka. Mendes, Tuijnman et al (2003, p. 64) mentions that “there are 17 national colleges of education offering a diploma after three years of study but they offer little or no ICT training”.

“In this ‘Digital Age’, computer technology enables many people to work anytime, anywhere, freed from a workplace anchored in time and space” Computer Literacy of Sri Lanka, (MOE, 2004, p. 1). Thus, teachers in the 21st century should have a better computer knowledge, skills and attitudes. Using SBTD programs, teachers’ computer ability can be developed to a considerable extent in their workplace. Even though the availability of Sri Lankan ICT-related facilities such as electricity, telephone, internet, e-mail and hardware (computers, printers, scanners, etc.) are insufficient (MOE, 2004), the above mentioned ICT-related facilities could be provided using the power and authority of School-Based Management (SBM) to organise and implement SBTD programs to develop teachers’ ICT ability at school level. In addition, Davis (1997) states the importance of ICT for teachers and he highlights five foci for professional development. These are: skills with particular applications; integration into existing curricula; IT related changes in the curricula; changes in the teacher role; and understanding theories of education.

While Hartley (2007) believes that more adults are becoming interested in continuing education, both formally and informally. Thus continuing education (lifelong learning) can be enacted with SBTD programs, and CDs, software and internet facilities help with teacher professional development. By introducing ICT in SBTD programs, time could be saved, because teachers are allowed to use these materials according to their own timetable. The Sri Lankan government planned to make ICT a culture in Sri Lanka. This plan has goals; one of them is to make 50% of the Sri Lankan population ICT literate by 2010 (MOE, 2005). Thus the United State of America, Canada and Norway used a ‘Web-based, Case-based’ learning environment for professional educators. This is called ‘Case *NET*’ and has four aims (Bronack et al., 1999):

1. Both in-service and pre-service teacher educators use Case *NET* to develop and refine their abilities to understand professional problems using case studies.

2. The Case *NET* is used by educators to develop collaboration and their group problem solving.
3. The Instructional Technology model can be used as supporting material for student-centred learning.
4. The Case *NET* provides opportunities to participants to promote technical skills.

In SBSD programs, the abovementioned Case *NET* can be used in SBTD programs in Sri Lanka. Moreover, Doncaster Secondary College in Melbourne, Australia, used technology to make a ‘Global classroom’ in the school. At the beginning of this project a few Geography teachers had experiences in the use of new technology to make a ‘Global classroom project’. Finally, all the staff got formal training to use technology for their professional development. This professional training project included three phases over a period of six months. In the first phase, the project focused on giving knowledge and understanding of the application of Windows, Word, Excel and PowerPoint to teachers. In the second stage, organised group worked in particular key learning areas, and during the final phase, teachers were trained for curriculum software packages (Allen, 1998).

In 1998, the United Kingdom conducted a research that investigated teachers’ ICT development needs. According to the research finding, they categorised teachers’ ICT needs in three major areas (Williams. D. et al., 2000). Figure: 1 depicts the abovementioned teachers’ needs.

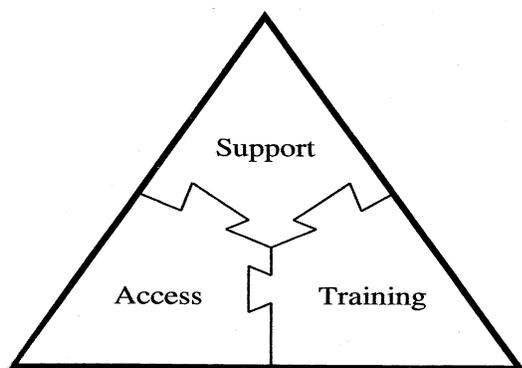


Figure 1: Teachers’ ICT needs

(Williams, D. et al 2000)

Williams, D. et al (2000) discuss three areas of teachers’ ICT needs. Access to ICT is the availability to use computers for teachers. Training means appropriate training to teachers to

develop skills, knowledge, and relevance to achieve educational goals, priorities and delivery. Support is explained as encouragement to education or training for teachers.

Conclusion

The paper articulated international and national literature which related to deferent methods in SBTD programs and this review paper presented a summary of the findings of this study. Further some important and effective methods are identified which are used in School-Based Teacher Professional Development in Sri Lanka. With respect to contributions to new knowledge, further this review paper summarised some suggestions for future study in the area of methods of SBTD programs in Sri Lanka.

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Starch and Karyotype Study of Taro (*Colocasia esculenta* L.) from West Sumatra, Indonesia

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Abstract- The shape, amount, and distribution of starch granules are specific to each plant. Different plants will have different shapes, quantities, and distribution of starch granules. Based on the shape, amount and distribution of starch, the types of starch producing plants can be classified. Taro (*Colocasia esculenta* L.) is a starch-producing plant that has the potential to be developed in the future. *Colocasia esculenta* L is distributed in a wide area in West Sumatra, Indonesia so that genetic variations and variations in anatomical structure are interesting to know. The method in this study is the observation of the shape and distribution of starch, as well as the observation of chromosomal karyotypes. This study aims to determine the shape, amount, and distribution of starch granules and karyotypes from *Colocasia esculenta* L. *Colocasia esculenta* L has the form of round starch granules, rectangles, semicircles, polygonal and triangles. The amount of starch is 6-35 percent and the pattern of spreading irregular starch with cortical cells is not entirely filled with starch. The basic chromosome number of *Colocasia esculenta* L is $n = 14$.

Keywords- *Colocasia esculenta* L, identification, shape, starch, tuber, karyotype

I. INTRODUCTION

Starch is a carbohydrate in the form of granules in plant organs, such as cereal seeds (corn, wheat, sorghum, and rice), tubers (potatoes and cassava) and cassava roots (Samsuri, 2008). The form of specific starch granules in each plant, there are oval ones with long and elongated. Different plants will have different forms of starch granules. The number and distribution of starch granules found in plant tissues are also different.

A group of starch source tubers, such as *Colocasia esculenta* L, have not been widely used in West Sumatra, Indonesia. Taro (*Colocasia esculenta* L) is a local food ingredient that has the potential to be developed in the future. Taro (*Colocasia esculenta* L) is a tropical tuber crop largely produced for its underground corms contain 70–80 % starch and the corms of *Colocasia antiquorum* contain anthocyanins such as cyanidin-3-glucoside, pelargonidin-3-glucoside and cyanidin-3-chemoside which were reported to have antioxidative and anti-inflammatory properties (Kaushal *et al.*, 2015). *Colocasia esculenta* L is distributed in a wide area so that genetic variations and variations in anatomical structure are interesting to know. This study aims to determine the form of starch granules and karyotypes from *Colocasia esculenta* L.

II. METHODS

Observation Form and Distribution of Starch

Colocasia esculenta L was obtained from several regions in West Sumatra, Indonesia. *Colocasia esculenta* L was sliced thin and observed under a microscope then photographed with an Olympus microscope camera.

Chromosomal Observation

a. The acclimatization

The root was *Colocasia esculenta* L soaked in colchicine solution 0.01%; 0.02%; and 0.03% for 6 hours and then transferred to a single pot for acclimatization.

b. Make of preparations

1) Pre-treatment

The meristematic root of *Colocasia esculenta* L is cut along ± 5 mm from the root tip and washed with clean water. The tip of the root of *Colocasia esculenta* L is inserted into the bottle containing aquadest for 2-3 hours at 5-8 ° C. This activity is carried out to separate and decompose chromosomal density, cytoplasmic purification and soften the tissue.

2) Fixation

Fixation is done by soaking the material into carnoy 2 solution (6 ethanol: 3 chloroform: 1 pure 96% glacial acetic acid) and stored in a refrigerator at 5°C for ± 3 hours. The finished material was fixed, then washed with 70%, 50%, and 30% alcohol for 5 minutes, then washed with distilled water 3 times.

3) Hydrolysis

Hydrolysis is done by soaking the material into 1 N HCL solution and stored in an oven with a temperature of 60° C for ± 5 minutes. When finished, the ingredients are washed with aquadest 3 times. Hydrolysis is done to get cells that spread in the observation of chromosomes. Hydrolysis can use acid or hydrolase enzymes, one of which is hydrochloric acid (HCl). Hydrochloric acid has the ability to dissolve the middle lamella very high. A concentration of 1 N is the optimum concentration. At lower concentrations, the power of the work decreases, so it must be soaked longer. At higher concentrations it can decipher the nucleus and chromosomes in it, so that the shape of the nucleus extends and the chromosome cannot be observed perfectly.

5) Staining

Staining is done by soaking the material into 2% aceto-orcein solution and storing it in a refrigerator at 5o C for ± 24 hours. Aseto-orcein is commonly used in chromosomal staining. Aceto-orcein colors the core so that the chromosomes can be seen clearly.

6) Squashing

Squashing done by taking a cross-section along the root tip meristematic ± 0.5 mm from the root tip and placed on glass preparations. Furthermore, spilled with 45% acetic acid solution and covered with a glass lid and then push it(*squash*)with your thumb or using a pencil knock gently tap, then preparations squashing results sealed using clear nail polish. According to Setyawan and Sutikno (2000), the purpose of *squashing* is to make the cells separate from each other, but not lose their original shape and spread evenly over glass objects. The quality of *squash* determines the quality of the preparation. *Squash* that is good produces preparations that only consist of a layer of cells, separated, not overlapping, and not fragmented. After the process *squash*, the edge of the cover glass is sealed with clear nail polish. This sealing aims to make preparations last longer and prevent dryness of preparations.

c. Observation Variable Chromosome

Observation of the number of chromosomes is done directly and indirectly. Direct observation was carried out by calculating the number of chromosomes seen during observation with a magnification of 40X, 100X, 1000X. Indirect observations are carried out by calculating the number of chromosomes contained in the results of the shooting (printed image).

III. RESULTS AND DISCUSSION

A. The shape and distribution of starch

The result of the incision of *Colocasia esculenta* L seen to contain starch which is spread in the cortex. The form of starch *Colocasia esculenta* L is round, rectangle (rectangle), half circle, polygonal and triangle. Research that has been carried out on the form of starch *Colocasia esculenta* L has different results from the results obtained by Susiana, et al., (2013) in the form of round and oval starch granules in five types of taro, namely white talas (*Xanthosoma sagittifolium*), black talas (*Xanthosoma violaceum*), beetle talas (*Colocasia esculenta* cv. 1), taram talas (*Colocasia esculenta* cv. 2) and yellow talas (*Colocasia esculenta* cv. 3). According to Elida (1994) the size and morphology of starch granules depending on the type of plant and its shape can be in the form of circles, ellipses, oval, polyhedral or polygonal, and irregular shapes irregular

Patterns of starch dispersion with cortical cells are not entirely filled with starch. The amount of starch in one cell ranged from 6-35 starch granules which in one cell contained single starch and compound starch. Starch in *Colocasia esculenta* L is starch sentries, the hilum is located in the middle of the granule, with the hilum surrounded by lamellae (Figure 1). Mulyani (2006) and Hidayat (1995) say that plants have 2 types of starch, namely starch centric and eccentric starch. Essau (1962) states that there are two starch grains in plants, namely single starch, and compound starch.

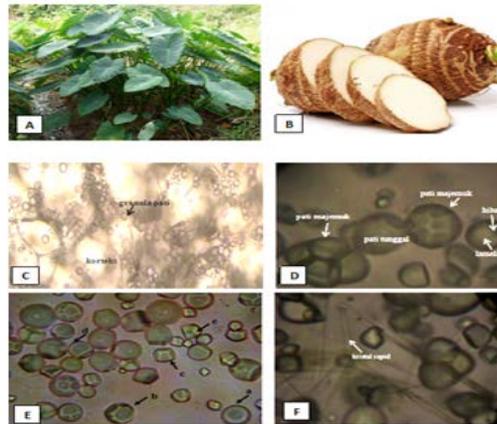


Figure 1. Starch form of *Colocasia esculenta* L.
a. Round, b. Polygonal, c. Rectangle, d. Half circle, e. Triangles

The type of starch in *Colocasia esculenta* L is a single starch or monoadelf and polyadelf. Monoadelf is a starch which has a hilum surrounded by lamella and compound starch. Polyadelf is a starch which has more than one hilum, each surrounded by a lamella and outside is not surrounded by lamella. Compound starch in *Colocasia esculenta* has 2 forms. According to Mulyani (2006) the starch which has a hilum surrounded by lamella is called single starch (*monoadelf*), starch which has more than one hilum, each surrounded by a lamella and outside surrounded by a lamella joint called half-compound starch (*diadelf*) and starch which has more than one hilum, each surrounded by a lamella, and outside is not surrounded by a joint lamella called compound starch (*polyadelf*). In *Colocasia esculenta* L there are also rapid crystals scattered in the cortex tissue. Mulyani (2006) and Hidayat (1995) say that crystals are one of ergastic substances. Various types of crystals in plants are sand crystals, rapid crystals, drush crystals, prism crystals, and stiloide crystals. Rapid is a long and slender crystal with both pointed ends. Cells containing rapid often are typically distributed in plants.

B. Karyotype

The result of analyzing the number of chromosomes of *Colocasia esculenta* L is $n = 14$. The number of chromosomes is used in taxonomy because of the number chromosomes are one of the most fixed markers because all individuals in one type generally have the same number of chromosomes even though there are some exceptions (Figure 2). The number of chromosomes is the data that is most often used in taxonomic research because the observations are easy to do. Cytology data can be used at various levels in the taxonomic hierarchy, especially at the level of type because it has a close relationship with reproductive factors (Stuessy, 1990 cit. Sujadmiko and Sutikno, 1990).

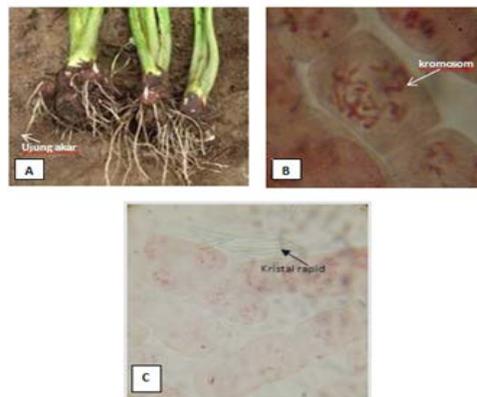


Figure 2. Chromosome of *Colocasia esculenta* L

Chromosome of *Colocasia esculenta* L diploids ($2n=2x=28$) and triploids ($2n=3x=42$) chromosomes in taro while diversity study using simple cytological techniques (Mace and Godwin, 2002). However, Dastidar (2009) reported existence of taro chromosome number $2n=14$, 28, and 42 and $2n=36$ and 48 in India and suggested as the genetic instability might be due to cultivation for long period of time in the region of center of diversity. Furthermore, Quero-Garcia et al., 2006 stated as taro is highly polymorphic, allogamous and protogynous species. This is in accordance with the results of research that has been conducted. Suryo (2003) states that the number of chromosomes of all individuals of a species is fixed from generation to generation. This consistency strengthens that chromosomes as one of the important taxonomic characters.

IV. CONCLUSION

Based on the research that has been done it can be concluded that *Colocasia esculenta* L has the form of round starch granules, rectangles, semicircles, polygonal and triangles. The amount of starch is 6-35/cell and the pattern of spreading irregular starch with cortical cells is not entirely filled with starch. The number of basic chromosomes of *Colocasia esculenta* L is $n = 14$

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The Role of Geoscientists in Nuclear Resources Exploration and Exploitation: A Key Tool for Sustainable Economic Development and National Security

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“The peaceful and appropriate usage of nuclear and radioactive substances plays a crucial role in sustaining economic development”

Abstract-

The aim of this study is to expand on the role and relevance of Geoscientists in improving economic development and national security through nuclear resources exploration, exploitation, supply, application, safety assessment and security. Geoscientists follow paths of exploration and discovery in quest to finding solutions to some of the society's most challenging problems which include sustainable energy supply, climate change, food insecurity, crime and high poverty level amongst others. When nuclear and radioactive materials are not properly explored and exploited they can have adverse effect and security implications on people, property and the environment. In the light of the above, the mission of nuclear related organizations including the World Institute for Nuclear Security (WINS), the International Atomic Energy Agency (IAEA), the Nigerian Nuclear Regulatory Authority (NNRA) amongst others and the role of the Geoscientists in the domestic and industrial applications of nuclear and other radioactive materials will be enumerated. Nuclear and other radioactive sources are used in key sectors of the world economy. The key sectors include Oil and Gas, Health, Manufacturing, Security, Agriculture, Mining, Construction, Education and Research, Water Resources. The petroleum sector is the largest importer and user of nuclear and radioactive sources in Nigeria. Most of these materials are imported from Europe, United State of America and South Africa. During Oil and Gas exploration activities, radioactive substances are used for Nuclear Well logging to determine the quantity and quality of petroleum in the reservoir rock which assist in crucial business decision making. In Oil wells, nuclear gauges are used both onshore and offshore for quantification and quality control of water in Oil and Gas phases. The benefits of the extensive exploration and usage of nuclear and radioactive resources and the role these resources play in improving sustainable economic development and National security cannot be overemphasized, hence the need to unravel its relevance.

Key Words: Geoscientists, Nuclear Resources, Radioactive sources, Climate Change, Sustainable Development

I. INTRODUCTION

Nuclear energy is produced from fission, which splits the large atoms of heavy elements like uranium and Thorium into smaller atoms releasing enormous amount of energy. The discovery of the neutron in 1932 by Chadwick James is a very great force that triggered Man's quest to utilize the large conserved energy in the nucleus of atom (Jonah, 2011). Through the analysis of materials and products derived from the nucleus-induced reactions, nuclear fission was later discovered. This discovery opened the prospect of obtaining limitless energy from the nucleus of several radioactive elements and thus the quest for technology to exploit this new source of energy began in earnest. Exploration and exploitation as well as application of nuclear energy resources in Nigeria will be discussed to include the historical development of nuclear science and technology in the country and the status of progress made by stakeholders and several organizations with regards to the introduction of nuclear option in Nigerian's energy mix.

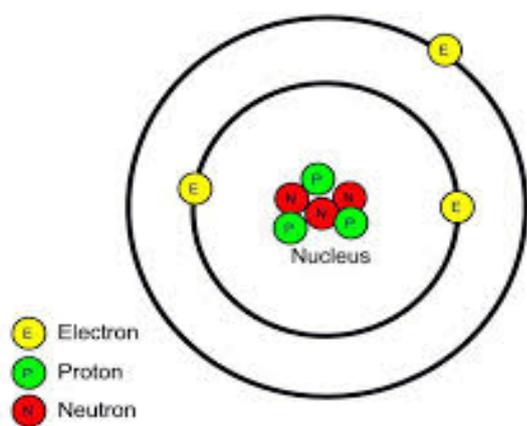


Figure 1: Neutron with enormous energy (source -www.girlscientistmagazine.blogspot.com)

Because of the dreadful impact of the French nuclear test on Sahara Desert region in the 1960's, Nigeria became aware of the threat in nuclear radiation. This led to the setting up of the Federal Radiation Panel in 1961 and the Federal Radiation Protection Service in 1964. Prior to this, Radium needles and X-ray machines have been used in medical application across the country by some hospitals. Also, the University College Hospital in Ibadan had used Cesium sources for cancer treatment (Jonah, 2011). The Nigeria Atomic Energy Commission (NAEC) was created by Act 46 of 1976 by the Federal government of Nigeria as the national focal agency charged with the responsibility for the promotion of the peaceful development of atomic energy and for all matters relating to the peaceful use of atomic energy. The Federal Government in 1978, following the enactment of NAEC act in 1976, established two University based research and training centers; Center for Energy Research and Training (CERT) at the Ahmadu Bello University, Zaria and Center for Energy Research and Development at the Obafemi Awolowo University, then University of Ife, Ile- Ife. These research centers were given the mandates to conduct research, train and develop man power in nuclear technology, engineering and sciences. In 1988, the Nuclear Technology Center (SHESTCO) at Sheda Complex in Abuja was established as the third training and research center in nuclear technology. NAEC in 2010 also created two more centers; these are Center for Nuclear Energy Studies and Center for Nuclear Energy Training and Research located at the University of Port-Harcourt and University of Maiduguri Respectively. The country's proposal is to specifically develop nuclear science and technology for application in Medicine and Human Health, Oil and Gas, Manufacturing, Defense and Security screening, Agriculture, Mining, Construction, Education and Research, Water Resources, Energy sector among others.

For proper security and safety to be ensured in the use of nuclear resources and other radioactive materials, the Nigerian Nuclear Regulatory Authority (NNRA) was established in 1995 by the Nuclear Safety and Radiation Protection Act 19 but was inaugurated in 2001. Since its inception, the NNRA has emplaced an effective regulatory framework within the context of the Act to fulfill its primary regulatory function. The NNRA also regulates the use of radioactive substances in the upstream, midstream and downstream sectors in the oil and gas which is the mainstay of the Nigerian economy. On 27 July 2008, Nigeria's President Umaru Yar'Adua urged the country to embrace and exploit the enormous energy in nuclear resources in order to meet its growing energy needs.

II. THE CONTRIBUTIONS OF NUCLEAR AND RADIOACTIVE RESOURCES TO SUSTAINABLE ECONOMIC DEVELOPMENT AND NATIONAL SECURITY

With constantly growing energy demands, it's imperative we explore nuclear as a dependable energy source. Nuclear energy should be the preferred option, as it is not intermittent and clean. Nuclear power plants require small areas of land to site, but produce much energy. The enormous benefits attached to nuclear and radioactive resources are numerous as individuals, organizations and governments have gained from it either directly or indirectly.

Hydrocarbon exploration and production



Figure 2: Geoscientists using radiation sources in hydrocarbon exploration (source - www.geoservices.co.id/drilling-services)

Over the last two decades, nuclear logging has grown to become one of the most important peaceful applications of the principles of nuclear geology in the oil industry. The oil and gas industry are heavily dependent upon the use of radiation from nuclear and radioactive substances to conduct business. Of the many reasons for drilling and logging wells, hydrocarbons offer one of the most lucrative motivations. A well log is an account of the geological factors present in the hole. It analyzes test wells to determine the potential for economically viable oil deposits. Well logs feature information on the feasibility of extracting oil and gas. Geoscientists as hydrocarbon explorers wish to gain information on the quality and characteristics of the test wells.

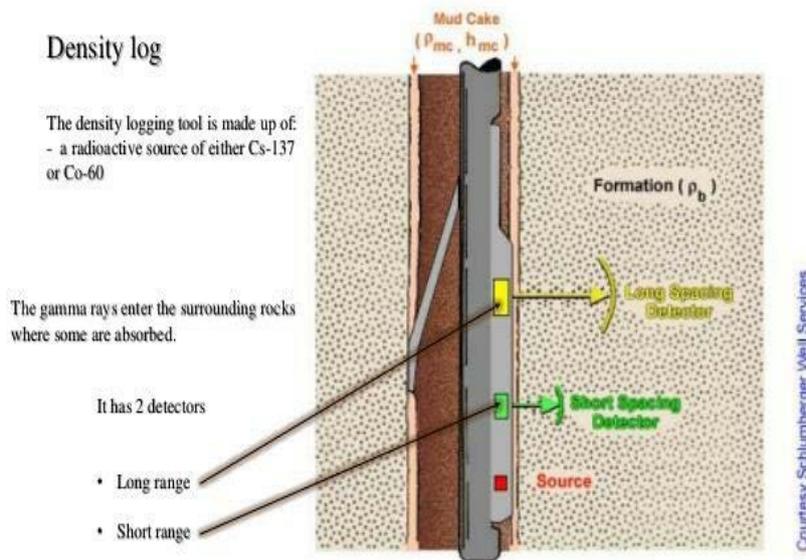


Figure 3: Shell deep sea oil rig (source - www.synergen.com)

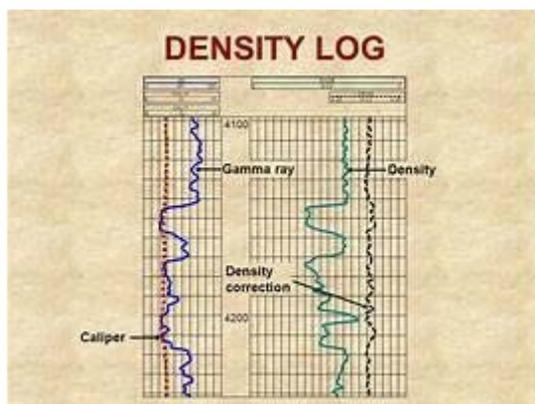
Well Logging provides the best techniques of borehole investigation, classification and understanding as accurate analysis of the borehole determines the success of the operation. Nuclear well logging techniques are of different types with almost the same principle governing all of them. Neutron probes when lowered into the test wells constitute one technique. Neutron generators inject fast bursts of neutrons into the surrounding earth and the amount of hydrocarbons present can be determined by measuring

the resulting slow neutrons detected at a known distance from the source (Kerr et al., 2011). Gamma ray backscattering techniques can also be employed in a similar manner. Geoscientist carryout different types of well logging using radiations from nuclear and radioactive sources to ascertain the quality and quantity of hydrocarbon that is present in a proposed field. These logs include Density logging Spectral Log, Gamma ray log, Nuclear Magnetic Resonance (NMR), Compton Scattering and so on.

Density Logging approach pays attention to rock bulk density. Density logging analyses both the minerals in the rock and the trapped hydrocarbon in the pores. Density logging mainly refers to gamma radiation logging and the way gamma waves reflect rock density.



a) (Source – Soran University, Department of petroleum engineering www.slideplayer.com)



b) (Source - https://www.slideplayer.com)

Figure 4: a) Density radiation logging b) results obtained

In Compton scattering, a radioactive source shoots medium-energy gamma rays into a rock and the particles in the wave crash into the rock's electrons. The gamma radiation transfers its energy into the electrons as each successive round occurs. This causes the gamma to slow down. The level of density determines how much power the gamma loses. The source reads the rate of gamma energy loss and determines the mineral or element type based on this atomic density rate of energy transfer (Worthington et al., 2011). This will then be interpreted to give useful information on the characteristics and potentials of the reservoir.

Gamma ray logging uses gamma radiation as implied by their name to give read-outs on the minerals in the hole. Each type of rock substance handles gamma differently this is because each rock type emits different gamma radiation signature. Rocks like dolomite and limestone produce fewer gamma waves than other sedimentary rocks like shale. This occurs because radioactive potassium occurs at a higher rate in these minerals and thus, it implies that they handle radioactivity better than shale (Killeen, 1982). Geologists study the information of the reactions to gain knowledge of the interior rock and reservoir composition.

NMR logging is mostly used in the measurement of the porosity quality of the well to determine the porosity and permeability potentials of the reservoir rock. NMR uses a neutron source to record the presence of hydrogen in a borehole. Hydrogen atoms in boreholes often appear as hydrocarbons (Coates et al., 1999). The levels of measured hydrogen help predict the presence of these elements. NMR logging uses the same type of technique as gamma ray logging.

Efficient refinery operation is also a very important part of the oil industry. Whereas it is difficult to install and maintain diagnostic probes inside the distillation towers (due to the extreme environment), gamma probes can be easily installed on the exterior of the towers and then be moved up and down the tanks to easily record the composition of ingredients at various vertical levels. Any malfunctions within the tanks can be readily detected.

Agriculture:

“Using nuclear science and technology to feed the world”

In the agricultural sector, nuclear application relies on the use of isotopes and radiation techniques to combat pests and diseases, increase crop production, protect land and water resources, improve soil and water balance, ensure food safety, security and authenticity and increase livestock production (FAO and IAEA, 2016).

FOOD SAFETY AND SECURITY: it is pivotal that food as a valuable commodity should be preserved once grown and protected against contamination until consumed by an increasingly hungry world. Infestation and damage tragically prevent at least one-fourth of the annual food production in the world from reaching the mouths of its citizens. The percentage of harvested seafood that never reaches the consumers is even higher—sometimes well over 50%. This is particularly the case in countries with warm and humid climates, characteristic of many of the developing nations including Nigeria (FAO, 2017).



Figure 5: Improving crop productivity, safety and security through nuclear techniques (courtesy of FAO/IAEA)

Food preservation methods have evolved historically from the earliest days of sun drying to salting, smoking, canning, heating, freezing and the addition of chemicals such as methyl bromide. Fortunately, food irradiation is now positioned to provide a substantially superior method. Food irradiation involves subjecting the food to carefully controlled amounts of ionizing radiation, such as beta particles or gamma rays, to break the DNA bonds of targeted pathogens. This is especially effective in destroying the reproductive cycle of bacteria and pathogens. It is important to note that the goal of food irradiation is not to eliminate biological contamination, but rather to reduce it to as low as 0.001 percent of its original value (Alan E.W, 2002). One of the prime advantages of food irradiation is that it sterilizes food without altering its form or taste.

The older methods of food processing, which rely on temperature extremes (heating or freezing), extreme drying, salting or chemical treating, often change the nature and taste of the food that is treated (Alan, 1994, 1995 and 2003).

Rice is the major source of food for over 50% of the global population and is especially important in African and Asian diet. More than 430 mutant varieties of rice have been developed, of which half were developed from gamma radiation. Because of radiation, Thailand has become the largest exporter of aromatic rice in the world. During the decade from 1989 to 1998, Thailand produced \$19.9 billion of milled rice (FAO). Wheat is the staple grain for many countries, including the United States. In Italy, the Durham wheat Creso's mutant was developed through radiation. By 1984, this mutant reached 53.3% of the Italian market—such that over 50% of the pizza consumed today in Italy is the direct result of harnessed radiation. Barley is a prime ingredient in making malt. Mutant varieties such as Diamant's and Golden Promise are two radiation products that have made a major impact to the European brewing and malting industry. This industry provided Scotland with a revenue of approximately \$417 million over the last quarter century. Both the United Kingdom and Ireland likewise make wide use of Golden Promise for their beers and whiskey (Alan, 2001).

Animal health and productivity:

Livestock productivity and trans-boundary animal diseases prevention have been improved through the impact of nuclear science and technology (IAEA). Farm animals, essential for providing commodities such as milk, meat, wool, and leather, have likewise benefited from the application of radiation techniques. In many parts of the world, most of the livestock are the primary fed with native grass and rice straws which often lacks sufficient protein, energy, and minerals needed for a balanced diet.



Figure 6: Healthy livestock as a result of nuclear science

Employing tracer radioisotopes to determine the key nutritional deficiencies has been used quite effectively in many Asian countries (Alan, 2003). Radioisotopes have also been used to develop vaccinations that are effective for certain animal diseases.

Nuclear medicine:

The use of radiation in the medical and health sector can be classified broadly into 3 segments – Diagnostic and interventional practices, Nuclear medicine and Radiotherapy. The earliest use of radiation in the medical field was to employ portable x-rays sources in World War I, where such devices helped field surgeons save many lives. Radiation techniques have since then made their most significant contribution to enhance health care in the diagnosis of ailment in the field of medicine. There are countless examples in every corner of the globe where an early and exact diagnosis of an ailment could have prevented tragic results. Dental x-rays, chest x-rays, mammograms, and a plethora of other tests are in routine use today in the medical/dental professions).



Figure 7: Nuclear medicine; useful in diagnosis and treatment of diseases (www.mayo.edu/mayo-clinic-school-of-health...)

Nuclear medicine is primarily used for imaging of cancers, cardiovascular organs and brain and spine scans. Radionuclide substances are usually combined with pharmaceuticals in Nuclear Medicine. Two of the most common approaches used in modern nuclear medicine diagnosis are single photon emission computed tomography (SPECT) and positron emission tomography (PET). SPECT is widely used for routine clinical work because it is relatively inexpensive and utilizes radioisotopes available from nuclear reactors. A SPECT scan integrates two technologies to view the human body: computed tomography (CT) and a radioactive material (tracer). The tracer is what allows the doctors to see how blood flows through tissues and organs (MBSMC, 2008). PET is a technique that measures physiological function by looking at blood flow, metabolism, and radiolabeled drugs. The PET system offers quantitative analyses, thus, allowing relative changes over time to be monitored as a disease process evolves or in a response to specific stimuli (USNLM, 2002). PET systems tend to be more expensive than SPECT systems, partly because of the sophistication of the counting system and partly because the radioisotopes that emit positrons typically have a very short half-life (minutes).

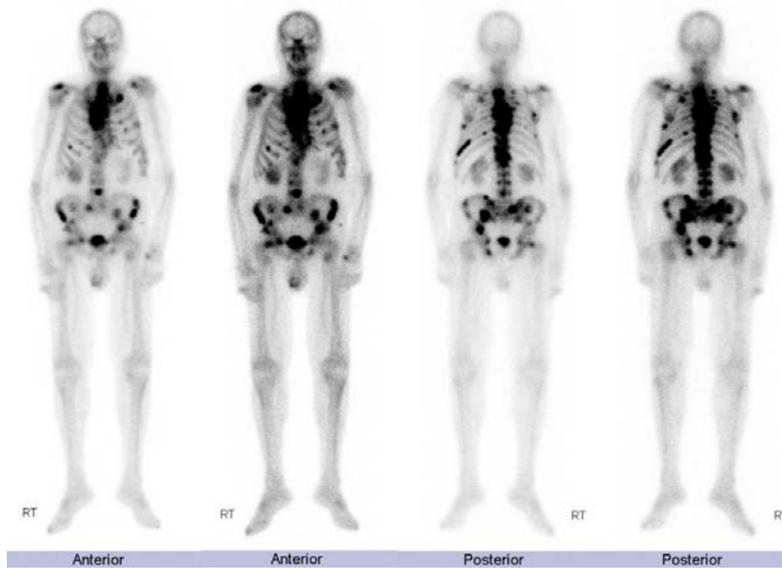


Figure 8: Nuclear medicine and technology used for diagnosis and treatment of bone metastasis

Radiotherapy is another widespread use of radiation. Radiotherapy simply means the use of radiation for treatment and cure of ailments. This has been more effective in the treatment of cancer and cardiovascular abnormalities. Most of the current procedures utilizing radiation to kill cancer in humans are based on delivering the radiation to the patient externally.

III. NATIONAL SECURITY

Nuclear and radioactive materials emit ionizing radiations from radio detectors which have played a key role in National security. Radiation from radioactive sources have been used in an increasing role for public safety, including seaport and airport screening, smoke detectors, crime solving, deterrence of terrorism at points of entry, archeology dating, precious gem embellishments, etc. Computerized tomography machines are used to scan and check luggage at airports and also to scan the contents of cargo ships in

seaports. The use of Am-241 in smoke detectors has undoubtedly saved thousands of lives and associated property damage due to the avoidance of fire. The list of applications of radiation to enhance our modern life style literally goes on and on (Alan, 2003).

IV. CONCLUSION

We are optimistic that the world's desire to increase the current global hydrocarbon output of 92.6 million barrels per day can be achieved if radioactive sources are used in the geological and geophysical exploration and examination of new oil fields as this will provide qualitative and quantitative information than any other exploration technique. The cost of production and maintenance of refinery facilities can also be reduced if radiotracers are used in measurements of flow rates of petroleum products in pipelines and Non-Destructive Testing (NDT) services during pipeline infrastructure development and maintenance. In many nations of the world, the use of nuclear and radiation technology in agriculture, water resources, mining, construction, pest control, healthcare delivery system, material analysis amongst other sector has contributed immensely to their economic growth and development. Other countries that are yet to exploit the enormous potentials in nuclear and radioactive resources should join the train to enjoy the trend of sustainable development attached to it.

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20. <http://www.geoservices.co.id/drilling-services>
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A Critical Analysis of William Shakespeare's: *Romeo and Juliet*

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Abstract- This study is conducted to explore the artistic values of William Shakespeare's most well-known play: *Romeo and Juliet* and for indicating all the possible sides of the play including characters, setting, plot summary, historical background, themes and other literary figures' perspectives about the play critically. *Romeo and Juliet* has been praised as one of the interesting plays of William Shakespeare not only in English Literature, but worldwide. All the elements of a play has been used scholarly by William Shakespeare. As Connolly (2000) mentioned that "Shakespeare wrote *Romeo and Juliet* early in his career, between 1594-1595, around the same time as the comedies *Love's Labour's Lost* and *A Midsummer Night's Dream*. Scholars often group these plays together because they explore the themes of love, courtship, and marriage."

On the other hand, Morris (1985) stated that "Now Shakespeare wrote a new kind of tragedy. It was not about one 'hero' but about two young lovers, the heroine quite as important as the hero; their troubles led to their deaths, and this did not disrupt, but healed, a disordered society. It was fashionable to write 'revenge' plays, but as the critic Professor Levin has pointed out, *Romeo and Juliet* is an 'anti-revenge' play."

The love and hate both go similarly in the play of *Romeo and Juliet*. It means that in the same time, it gives the feelings of sadness and happiness to the audience and readers of it.

Index Terms- *Romeo and Juliet*, historical background, characters, plot summary, theme

I. INTRODUCTION

Literature is the art of expressing emotions and feelings as the way they are. Literary figures usually express these through some of the genres in the field (literature) as mainly; *fiction, non-fiction* and *play*. These genres include various types of its subtypes as well. Plays *were/are/will be* being performed on the stages in theatres for the audience to convey the main message (that is called theme in literature) about the way of life being drawn by playwright or it is directly related to the writer's emotions regarding to a particular individual and social effect hidden behind the theme of a play.

Shakespeare's artistic works, poetry and plays, have been known as the famous ones of him with having highest artistic qualities in the field of literature and among others: *Romeo and Juliet* is known as William Shakespeare's famous play worldwide. Connolly (2000) declared about the first performance of it as "the first performance of *Romeo and Juliet*

took place in the autumn/winter of 1594, when the playhouses reopened for the first time after a sustained outbreak of the plague had forced the authorities to close all the playhouses in London in January 1593.” He further described that during that time, over 10,000 people in London alone died from the disease, and Shakespeare emphasizes the relevance of the plague for his audience by using it in *Romeo and Juliet* to prevent Friar Laurence’s message from reaching *Romeo* in Mantua.

So it has been indicated that Shakespeare always tried to convey the social real life events not only in his poetry, but in his plays too.

G. Lipson & S. Lipson (2007) expressed that “of the 37 plays written by William Shakespeare, *Romeo and Juliet* is the play that appeals most strongly to young people. Although it was written in the language of another century, the conflicts in this play are timeless. Both the consuming urgency of *Romeo and Juliet’s* love and the ill-fated couple’s defiance of their parents evoke a strong sense of identification from today’s teenager.” It makes that clearer that *Romeo and Juliet* is not only a play that people enjoyed in the earlier times, but its joyfulness is still remaining for today, because of the story inside the play can be still applied on the loves of many other couples at this time.

This comedy is structured in tragic manner that makes readers and audience cry that shows the artistic talent of William Shakespeare for connecting all the events in the play as a chain of suspense till the end of it.

II. SOME GENERAL FACTS ABOUT THE ART OF SHAKESPEARE IN *ROMEO AND JULIET*

William Shakespeare’s literary works are not only having the quality to be read and praised in English literature, but in other literature of the world too. Particularly, the

effects of the story in the play of *Romeo and Juliet* is not only the one related to previous centuries, but it can be felt still today. He is not only counted as a greatest playwright, but as a great poet used higher poetic and artistic qualities in his poetry. But in this piece of literary criticism, it has been tried to focus only on what is in *Romeo and Juliet* and how was it written by William Shakespeare?

As it is clear that play is an interesting genre in the field of literature, because it gives audience practical feelings of happiness and sadness in a real-like performance on the stage in theatres. It is not only the thing that whenever someone watch it practically in the theatre and enjoy it, but whenever readers read that on a piece of paper, it can also give them the feeling of pleasure or it will be enjoyable for the readers too. If one studies Shakespearean plays, it can be seen that he expressed social real life matters of his time interestingly. Within that, his higher qualities can be indicated in his plays obviously. For example, whenever a person wants to watch Shakespearean comedies, so they have the power to make you laugh, and on the other hand, whenever one watches his tragedies, so they have the power to make you cry, or if it is in an exaggeration, at least, they can make you sad deeply. Within that, as it is obvious that Shakespeare not only wrote comedies and tragedies (Tragic-comedies in his later life), but his histories can give you historical facts about the historical backgrounds of the Kings of the time. But as it will be impossible to criticize all the three types of Shakespearean plays, so it has been tried to only focus on *Romeo and Juliet* in this critical article.

Sometimes, critics have stated different ideas about Shakespearean plays. So far that I have studied British literature, at that time, Ben Jonson (1572-1637) was

held in a higher position as a playwright. Ben Johnson himself expresses his perspective about William Shakespeare that Shakespeare is a talented, but undisciplined writer.

Within that, critics of the recent centuries expressed their point of views about Shakespeare and stated that he had more natural ability than professional modifications. So in this critical article, it has been tried to only focus on the selected play in in-depth details with expressing self-understanding, including the point of views of other scholars and literary figures.

When someone criticize a play, so it is good for the critic to practically judge the play, because of that play is a live performance that should be performed in theatre and is a live experience. In this case, it will be a bit complicated for the critic in the same time to criticize a play and to watch it. Means that during this condition, you will realize both to enjoy the play and to criticize it. So during criticizing the play, a critic should take notes of the play, characterization, connection of scenes, suspense... and to critically watch it. For this reason, criticizing a play is a bit difficult task in the field of criticism.

As a critic, one should indicate both the high artistic qualities of the playwright and the weak points of that. So in this case, a critic should be the one who fully understands the elements through which a play can be criticized. If not, so some of the parts might be ignored and cannot be judged well. For this reason, it has been tried to indicate positive and negative aspects of the play in this critical article.

III. *Romeo and Juliet* and its plot Synopsis:

Love and hate both go similarly from the start to the end of the play. So it is noticeable that the play is much

about hate as love. Criticizing it practically, it is needed to bring the brief overview of the plot for the better understanding of the readers:

3.1 A brief Plot Overview of the play: Romeo and Juliet:

Many years ago in Verona, Italy, there lived two families who hated one another. The Montagues and Capulets had been carrying on a feud for as long as they could remember. Morris (1985) mentioned about the beginning of the play that "Capulet intends to marry his only daughter *Juliet* to the Prince's kinsman, Paris. But she and *Romeo*, a young Montague, fall in love at first sight, and persuade Friar Lawrence to marry them immediately. As he returns from his wedding *Romeo* is challenged by the quarrelsome Tybalt, a Capulet, but refuses to fight his new kinsman. *Romeo's* friend Mercutio fights instead, and is slain. *Romeo* avenges Mercutio by killing Tybalt, and is banished by the Prince."

Actually, *Juliet* loves *Romeo* and praises his love in songs sometimes, but Capulet does not want to do so. So the beginning of hate and jealousy starts from this moment. As further stated by Morris (1985) that "Capulet proceeds with his plan to marry *Juliet* to Paris. Friar Lawrence tries to prevent this by supplying *Juliet* with a drug which will make her appear dead for forty-two hours; meanwhile he will send for *Romeo* to rescue her. The messenger is delayed; *Romeo* learns only that *Juliet* is dead, and determines to die with her. The mourning Paris tries to prevent *Romeo* breaking into *Juliet's* tomb, and is slain. *Romeo* poisons himself, and the waking *Juliet*, finding him dead, stabs herself with his dagger. The Montague and Capulet parents are reconciled, but to no purpose, for all the younger generation are dead."

After the death of their lovely *Romeo* and *Juliet*, it is meaningless for the Montague and Capulet to be in grief, because of that they cannot compensate this disaster with sorrow and they were the only reason prevented *Romeo* and *Juliet* to marry for having a lovely life ahead.

3.1.1 Acts in *Romeo and Juliet*:

Act 1: Hacht (2005) mentions about act 1 as, "Capulet servants, Sampson and Gregory, and Montague servants, Abraham and Balthasar, start a street fight that is joined by Benvolio, a Montague relative, and Tybalt a Capulet relative. Escalus, the Prince of Verona, learns about the fight and angrily decrees a death penalty for anyone caught in further feuding. Benvolio finds *Romeo* and learns that *Romeo* is forlorn because the girl he loves, Rosaline, will not return his affection because she has chosen to remain chaste. Benvolio advises *Romeo* to move on with his life and look at other girls. *Romeo*, however, is quite sure that he cannot forget Rosaline."

So the story of feuding started, and everyone tries to revenge from one another. It means that from this point, it is impossible for the members of both families to live in peace, but instead, they are in the attempt of revenge.

Act 2: "In a very short scene 1, Benvolio and Mercutio try to find *Romeo*, who has climbed a wall to hide in the Capulet orchard. His friends give up when *Romeo* will not respond to their calls." (Hacht, 2005).

Before dawn the next morning, *Romeo* spaces alongside the Capulet orchard. He avoids his friends, who ridicule his lovesickness. He climbs the wall to get a look at *Juliet* once again. When he does it, he hears *Juliet's* soft singing voice that praises his love in the

song in her lips. He recalls this pleasant feelings of love between him and *Juliet*, but regret to belonging feuding families.

Till the end of the senses in Act 2, *Romeo* tries to see *Juliet* many times, and finally, they met one another in Friar Laurence's cell for the third time.

Act 3: "In scene 1, later that day, Benvolio and Mercutio encounter Tybalt and are already sparring with words when *Romeo* arrives. Tybalt attempts to provoke *Romeo* into a fight, but *Romeo* will not fight because, although unknown to the others, he and Tybalt are now relatives by marriage. Instead, Mercutio challenges Tybalt and is killed by a deceitful stab from Tybalt when *Romeo* tries to separate them." (Hacht, 2005).

When the nurse informs *Juliet* of the latest street fight, *Juliet* mourns for Tybalt, even though he had a reputation for provoking his enemies. *Juliet* sends the nurse with a ring for *Romeo*, who has retreated to Friar Laurence's cell.

Because of his daughter's grief, Capulet sets the wedding for Thursday. During wedding, *Juliet* tries her best to keep *Romeo* in her room, but *Romeo* should go far from that because of facing to be arrested.

Capulet is not in the suspect of the daughter's secret marriage, and tells her to be prepared for a wedding with Paris.

Act 4: "Scene 1 is back at Friar Laurence's, where he tells *Juliet* to take a potion that will cause her to appear dead until *Romeo* can come to rescue her and take her away with him to Mantua." (Hacht, 2005)

Juliet sends the nurse away and pretends to pray to ready her spirit for marriage and then she swallows the herb and swoons in her bed. When the nurse comes to call *Juliet* to be ready for her wedding, and Paris also hopes his darling to be awaken for the wedding

ceremony, but in this condition, the nurse finds *Juliet* as she is died.

On Wednesday morning, the Capulets send the nurse to call *Juliet*, but the nurse finds *Juliet* lifeless.

Act 5: "Scene 1 takes place in Mantua as *Romeo's* servant Balthasar arrives, bringing the news of *Juliet's* death. *Romeo* decides to risk his own life by returning immediately to Verona. He buys poison from an apothecary with the intent of dying beside *Juliet*." (Hacht, 2005).

So *Romeo* comes in hurry from Mantua to Verona to kill himself beside *Juliet's* corpse. When *Romeo* arrives, Paris accuses *Romeo* of killing Tybalt and, indirectly, expresses that this is the main root of *Juliet's* death from the deep sorrow. *Romeo* looks at *Juliet* and her pink lips and rosy cheeks with embrace, kisses her and swallows the poison and collapses.

Juliet awakens in this time and finds her only lover, *Romeo* lifeless, because of poisoning. *Juliet* kisses his lips behind the hope of finding a drop of poison to cause her die too because of she is unable to tolerate *Romeo's* deep sorrow. She unsheathes his dagger and plunges it into her chest. Both of their family members arrive at this time and looking to see the tragic moment of their lovely couples lost their lives because of them. So for the honor of the couple, Montague grasps Capulet's hand and promises to stop being enemy of each other. But it is the time that they lost many things, particularly the two lovers.

Finally, the story comes to an end with:

*"A glooming peace this morning with it brings
The sun for sorrow will not show his head
Go hence, to have more talk of these sad things;
Some shall be pardoned, and some punished;
For never was a story of more woe*

Than this of Juliet and her Romeo."

(G. Lipson & S. Lipson, 2007)

3.1.2 Characters of the play:

3.1.2.1 Montague family and friends:

Romeo Montague: A young man

Lord Montague: Romeo's father and the enemy of Lord Capulet

Lady Montague: Romeo's mother

Mercutio: Romeo's friend and Prince Escalus's cousin

Benvolio: A cousin and friend to Romeo

Balthasar: Romeo's servant

Abraham: Lord Montague's servant

Friar Lawrence: A Franciscan priest

Friar John: An associate of Friar Lawrence

3.1.2.2 Capulet family and friends:

Juliet Capulet: A 13-year-old girl

Lord Capulet: Juliet's father and the enemy of Lord Montague

Lady Capulet: Juliet's mother

Nurse: Juliet's nanny

Sampson and Gregory: Servants to Lord Capulet

Tybalt: Juliet's cousin

Paris: A young man who wants to marry Juliet; Prince Escalus's cousin

Prince Escalus: Prince and ruler of Verona

Characters convey the main theme of the playwright in a play. In this play, Shakespeare tried to play all the characters greatly. The roles of characters can play an important role for attracting audience's attention to the play while watching it and the attention and suspense of the readers who read the play as a printed version. In

this case, all the characters are given the dialogues and roles very appropriately by the author. Shakespeare composed the roles of *Romeo* and *Juliet* with suspense that attracts audience's/readers' attention in every event passing on. In the same time that they love their families and parents, but they hate the ones who want them to be separated from one another or to live without love. This expresses the power of love and particularly, true love, between *Romeo* and *Juliet*. So in this case, love, can be similarly transferred by the lovers till the end of the play, and each lover wants to die for the other and these are the greatest roles given by Shakespeare to the characters, particularly, main characters *Romeo* and *Juliet*. On the other hand, their families transfer hate till the moment the lovers die for each other. And then they regret about their manner in the past but time cannot be returned back and one cannot see and touch any moment passed. Within that, as mentioned earlier that social real life events have been greatly mirrored in Shakespearean plays. So this play is one of the best example as a mirror of social real life status of love. In this case, the conflict of lover is versus society and that individual versus society. Lovers tried to break social and family borders for reaching their true love for each other, but social and family obstacles prevented them to reach to their dreams for becoming one soul in two bodies. Another vital point to be indicated in this play is the importance of time. The events of the PLOT of the play have been composed with a great suspense in connecting events from start to end as a chain. Next point is that plot is one of the vital element of the play that there should be a logical and chronological order between the events appearing after one another in a play. When a playwright wants to make the play joyful,

he/she should connect each scene of the play with great suspense that attracts the audience's attention during direct performance of the play in the theatre. In this play, the plot and the connection of events has been composed by playwright in a great manner. We know that plot should consist five parts; at the beginning of the play, writer introduces characters and starts the play, it is called (Exposition of the Plot). The second part is rising action. In this part, playwright gives actions to the characters introduced in the first part of the play. The third part is climax. In this, conflicts may also be occurred sometimes, and it is the highest point of the play and the point of greatest suspense. It means that audience and readers reached to the half of the play, and there might be a turning point in the climax that can change the play and the statues of the main character or theme of the play. The fourth part is falling action. In this part, playwright tries to go to the conclusion of the play. So in this case, actions go to the conclusion. The fifth and the last part of the plot is resolution. It ends the play where the conflicts or problems of the play can be resolved.

Based on these points, Shakespeare connected the story of the play into five acts. Each act gives the elements of each part that we have in plot. It means that all the parts of the plot have been kept in mind and composed scholarly in the play of *Romeo* and *Juliet*. So this indicates the highest artistic talent of Shakespeare that he exposed in this play.

Finally, this play can give you the feelings of love and hate similarly. But the suspense between the scenes of all the events in five acts have the power to bring you till the end of the play which is the most important factor to be kept in mind while criticizing a play. Briefly, the

overall structure of Shakespeare's play *Romeo and Juliet* has been really highly and scholarly organized.

3. 2 Themes of the play:

3.2.1 Love and Hate:

Theme is the central idea of a play that states the main message of the playwright to the audience or readers. As *Romeo and Juliet* is considered as one of the world's greatest love stories, but there is a big amount of hate as well in it. It means that it is the art of William Shakespeare who mixed up the happiness and sadness equally till the end of the plot or the events chained after one another. So for this reason, love and hate go similarly till the end of the play.

3.2.2 Social Barriers:

Romeo and Juliet face many obstacles toward reaching one another's true love, and till the last breath, they tried their best for reaching to the destination. It means that sometimes, traditional and family barriers can stand toward you and if you are not confident on the love and the goals you created for yourself, it will be always possible for your love to be lost. Actually, the play of *Romeo and Juliet* is an indicator of how individual can stand for his/her legal rights to achieve that in their life.

3.2.3 The Problem of Time:

Time is always going on. If you are unable to manage it, you will lose many opportunities in your life. In this case, it expresses the significance of time as well that most of the time, people think as time is not valuable, but in a minute or ever a few seconds, someone will lost his/her life or save that. In this play, one can regret when thinks about *Romeo*, to wait for a few seconds to see *Juliet* and live together.

3.2.4. Historical Context of the Play:

William Shakespeare was living during the Renaissance literary movement in England, and this play is said to be written in that time of literature flowering.

Bloom (2010) stated about the historical place of the play in Elizabethan era, "The story of *Romeo and Juliet* was well known in Elizabethan England, and by the time of Shakespeare's play it had appeared in several collections and in various forms."

This story draws us a clear historical lesson in our mind about the social barrier in that time toward human freedom and struggles of youths for love and passion.

3.3 Critical Overview:

Some critics say about Shakespeare and his plays that Shakespeare composed his plays greatly, but they call him an unprofessional playwright, but talented when compared with his other playwrights of his time, Ben Johnson. As literary effects can not only be felt in one time, one century and one region, but its roots can be reached to the next generations and to the regions far away. This is the reason that many of the literary works have been influenced by others. Shakespeare's *Romeo and Juliet* also looks like to be influenced by the earlier literary works.

As Morris (1985) criticized that "Shakespeare did not invent the plots of his plays. He found a likely theme in a chronicle, a poem or a book of tales or biographies, and recreated it to suit his own purposes. There are several earlier versions of the story of *Romeo and Juliet* in French and Italian; and it occurs in an English collection of prose stories which William Painter translated from the Italian in 1567, which Shakespeare may have read."

Morris (1985) further explains, "Not only are many details of the plot the same, but Shakespeare's

language and images often echo Brooke's. Another source is possible; Brooke tells us that he had already, in 1562, seen 'the same argument lately set forth on stage', and it is possible that Shakespeare had seen or heard of the same play, and borrowed from it parts of his *Romeo and Juliet* (for instance, the balcony scene) which do not occur in Brooke's poem."

Holding (1992) explained the historical relationship of this play with other literary works and stated, "Versions of this popular folklore tale exist in many languages but it is clear that Shakespeare closely followed an English translation (1562) by Arthur Brooke, *Romeus and Juliet*. It is possible that Shakespeare was at least aware of another English version by William Painter, 'Rhomeo and Julietta', included in the second volume of his popular collection of prose translations, *Palace of Pleasure*."

Furthermore, Bloom (2010) stated that In *Romeo and Juliet*, a broiling Verona summer provides a volatile backdrop for *Romeo and Juliet's* passion and their families' rancor. Although male aggression fuels the play, *Juliet* blossoms as a sturdy, intelligent woman whose devotion to her love and her ideals makes her heroic.

Concisely, it is mentionable that the play of *Romeo and Juliet* has been organized scholarly and all the elements that a well-organized play should contain can be found in this play. But based on the influences that the earlier literary works may have on the ones later on, some points and shared parts can be seen in *Romeo and Juliet* in relation with other writers.

IV. Conclusion

In conclusion, all of William Shakespeare's literary works can be recognized as high artistic ones, because

of his natural talent and of the literary movement; Renaissance in Europe, particularly in England. *Romeo and Juliet* is a really interesting play ever written by him. The overall structure of the play, and characterizations are really the facts that gave the play a higher position. Events in the plot have been organized scholarly and there is a higher quality of suspense between connecting the events he woven from the beginning till the end of the play. Within that, the historical background of the play is another aspect that gave the play a higher place in the field of literature. Finally, *Romeo and Juliet* of William Shakespeare can cry and laugh someone in the same time. It is because of the scholarly art that William Shakespeare used in this play.

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The Effect Of Learning Model Logan Avenue Problem Solving Heuristic To The Student's Learning Activity

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Abstract- This research aims to know how the effect of learning model logan avenue problem solving heuristic to the student's learning activity of the social programme X.I at SMAN 1 Bukit Tinggi, West Sumatera. The methodology of the research which is used in this research is experimental research. The population of this research amounts 151 students. The sample used in this research is cluster random sampling. So that the sample of social programme XI class is 30 students. The technique of data analysis is observation data analysis, pretest and hypothesis test. Based on the research done, it consists of significant effect of using learning model logan avenue problem solving heuristic to the student's learning activity of social programme X.I at SMAN 1 Bukit Tinggi, West Sumatera.

Keywords : Model logan avenue problem solving heuristic, learning activity

I. INTRODUCTION

Learning is one try from education with the applying which is done purposely with the goal which has been determined before with the controlled doing process (Amin, 2018). Therefore, the components of the learning process includes : learning goal, learning material, teaching method, and evaluation applying (Umar, Bala and Ladu, 2016). The four things must be focussed on by the teacher in selection of teaching method and learning model which will be used in learning process. That's why, the teachers must make well-managed plan in learning process, one of them determine which learning model will be applied (Perdue, Milkman, and Marcis n.d, 2016)

Well-managed learning is proved because of the reaching in target of learning goals. One of them has mutual relationship among the teacher and students, it means that the interaction between the stimulus applied by teacher to make good respond from students (Marinov and Fraszczyk, 2014). Based on the fact, a teacher must try how a students is able to be active in learning process which is applied. Widespreading the potency of the students through learning activity is very important to be applied by the teacher, because the learning activity of students determine one of success of learning which is applied. (Belabes, Belouafi, and Daoudi, 2015). The activity of students in learning process is the physical and non-physical activity in teaching-learning process which is applied optimally which has a goal to create active and condusive classroom atmosphere (Widodo n.d, 2018).

Unfortunately, we can see the fact that in education at now has many problematical ones found in learning process. One of them is the applying of learning process does not suit with the curriculum. Many teacher applied speech-method, in order to make the students do not have the chance to be able to be active directly and active in learning process because the students only get become information acceptor. Besides that, the using the model and the strategy of learning which are applied by the teachers do not suit with

the real wish of the students. The factor being is not suiting in using the method and the learning model (Intan and Gunawan, 2012). The model of learning is one of learning planning which shows the certain learning cyclus, in that cyclus, it seems that the teacher's and student's activity systematically to support the learning to give the learning experience for the students in reaching the aims of learning (Harrison, 2014).

Teacher must apply the accurate learning model which suit with the students' characteristics. The selection of learning model which is applied by the teacher must increase the students' activity, so the well-managed, accurate learning model will produce effective learning. To increase the students' activity, a teacher must have variatif learning, in order to make the students involve directly in learning process applied. There is a must for teacher to choose accurate learning model to make the students' activity. One of the learning model which is able to be applied to create the students, activity atmosphere is the learning model Logan Avenue Problem Solving Heuristic. The indicators which are visual activity, spoken, listening, moving, and writing (Bilgin, 2015). The learning model of Logan Avenue Problem Solving Heuristic is not only listening but also finding the solution to problem solving which have the question words : what's the problem? Is the alternative way? Is it valueable ? What's the solution? And how the students do better? (Gujjar and Malik, 2007). With this model, the students will become active and motived to do a thinking activity (Abrahamson and kapur, 2017).

The research about the learning model Logan Avenue Problem Solving Heuristic has ever done by some researchers. The research which is done by (Arifah, 2017) said that learning model Logan Avenue Problem Solving Heuristic affects significantly the thinking ability critically of students (Anggrianto, Churiyah, and Arief, 2016).

The learning process of SMAN 1 Bukit Tinggi uses the speech-method and the asking-answering method with Power Point media, the teachers serve the learning material's directly and the students accept the materials. From the interview done by the teachers at SMAN 1 Bukit Tinggi, shows that the level of the student's activity in economy subject is still less with the percentage 25% or 30% of the students are categorized active, it means that 75% or 91 students are still less active in economy subject, so the researcher need to see the student's activity as applying the learning model LAPSH.

Based on the setting above, the researcher is interesting in doing the research entitled "The Effect of Learning Model Logan Avenue Problem Solving Heuristic to The Student's Activity in Economy Subject at SMAN 1 Bukit Tinggi, West Sumatera. Learning is one try from education with the applying which is done purposely with the goal which has been determined before with the controlled doing process (Amin, 2018). Therefore, the components of the learning process includes : learning goal, learning material, teaching method, and evaluation applying (Umar, Bala and Ladu, 2016). The four things must be focussed on by the teacher in selection of teaching method and learning model which will be used in learning process. That's why, the teachers must make well-managed plan in learning process, one of them determine which learning model will be applied (Perdue, Milkman, and Marcis n.d, 2016)

Well-managed learning is proved because of the reaching in target of learning goals. One of them has mutual relationship among the teacher and studends, it means that the interaction between the stimulus applied by teacher to make good respond from students (Marinov and Fraszczyk, 2014). Based on the fact, a teacher must try how a studends is able to be active in learning process which is applied. Widespreading the potency of the studends through learning activity is very important to be applied by the teacher, because the learning activity of students determine one of success of learning which is applied. (Belabes, Belouafi, and Daoudi, 2015). The activity of students in learning process is the physical and non-physical activity in teaching-learning process which is applied optimally which has a goal to create active and condusive classroom atmosphere (Widodo n.d, 2018).

Unfortunately, we can see the fact that in education at now has many problematical ones found in learning process. One of them is the applying of learning process does not suit with the curriculum. Many teacher applied speech-method, in order to make the students do not have the chance to be able to be active directly and active in learning process because the students only get become

information acceptor. Besides that, the using the model and the strategy of learning which are applied by the teachers do not suit with the real wish of the students. The factor being is not suiting in using the method and the learning model (Intan and Gunawan, 2012). The model of learning is one of learning planning which shows the certain learning cyclus, in that cyclus, it seems that the teacher's and student's activity systematically to support the learning to give the learning experience for the students in reaching the aims of learning (Harrison, 2014).

Teacher must apply the accurate learning model which suit with the students' characteristics. The selection of learning model which is applied by the teacher must increase the students' activity, so the well-managed, accurate learning model will produce effective learning. To increase the students' activity, a teacher must have variatif learning, in order to make the students involve directly in learning process applied. There is a must for teacher to choose accurate learning model to make the students' activity. One of the learning model which is able to be applied to create the students, activity atmosphere is the learning model Logan Avenue Problem Solving Heuristic. The indicators which are visual activity, spoken, listening, moving, and writing (Bilgin, 2015). The learning model of Logan Avenue Problem Solving Heuristic is not only listening but also finding the solution to problem solving which have the question words : what's the problem? Is the alternative way? Is it valueable ? What's the solution? And how the students do better? (Gujjar and Malik, 2007). With this model, the students will become active and motived to do a thinking activity (Abrahamson and kapur, 2017).

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Based on the setting above, the researcher is interesting in doing the research entitled "The Effect of Learning Model Logan Avenue Problem Solving Heuristic to The Student's Activity in Economy Subject at SMAN 1 Bukit Tinggi, West Sumatera.

II. METHODS

This research is such an experimental research. The research variable consists of free variable and unfree variable. Free variable (X) in this research is the learning model Logan Avenue Problem Solving Heuristic. Meanwhile, unfree variable (y) in this research is the Student's Activity. The place of this research is done in SMAN 1 Bukit Tinggi, West Sumatera Province. The population is all classes X of Sosial Programme at SMAN 1 Bukit Tinggi, West Sumatera amount 151 students. The sample is Cluster Random Sampling, namely X IPS₂ amount 30 students. This research is done for four meetings. The technique of data input is used in this research uses observation technique. The technique of data analysis which is used in this research is Data Analysis Observation by using the pattern from the book (Sugiyono, 2012 : 139) then it will be scored with the scale which is used is Gutman Scale, and than the score will be marked in the form of the percentage based on book (Arikunto, 2013 : 266). Further, the percentage of the score from the research result will be categorized as the student's activity (Arikunto, 2010). Next it uses the analysis data technique pretest, and hypothesis test.

III. RESULT AND DISCUSSION

This research is done at SMAN 1 Bukit Tinggi, West Sumatera. The observation is done to see the student’s activity in mastering the materials especially in economy subject. The observation is helped by an observer namely peer-friend who has a duty to observe and value the student’s activity in every learning process at the first experiment class and the second experiment class. The observation consists of the indicators namely visual, spoken, listening, writing and moving activity.

The Result of Experiment Class Observation, the first experiment class

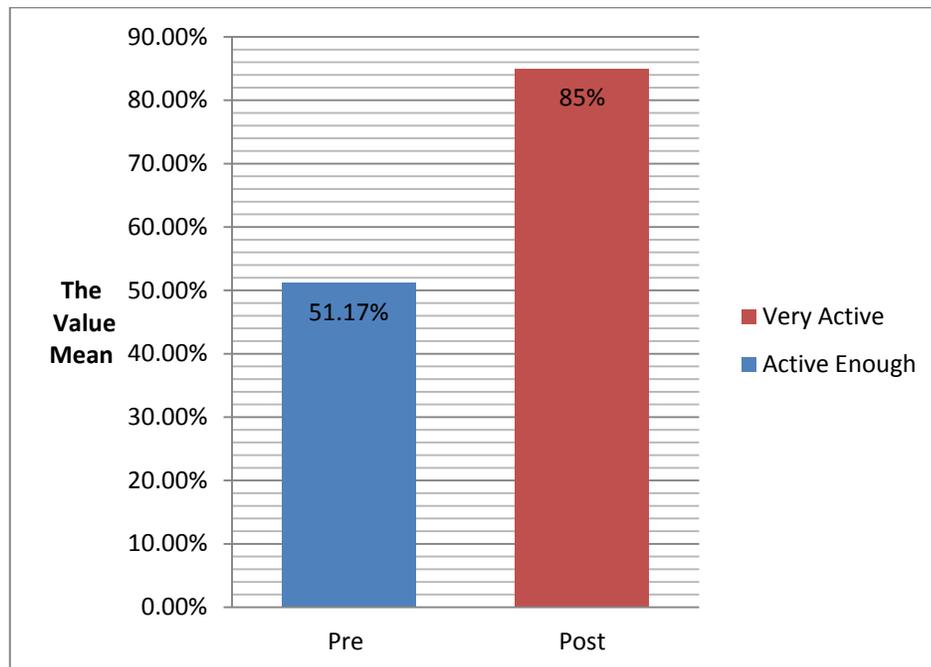
Table 1. The distribution of the student’s activity of the first experiment class

Data	The indicators of the student’s activity					Mean
	Visual	Spoken	Listening	Moving	Writing	
Pre	30	14.17	63.33	66.67	81.67	51.17%
Post	96.67	38.33	92.22	97.78	100	85%

Source : Primer Data 2018

Based on the table 1 above, it concludes that the mean of the student’s activity pre and post of student’s test at the first experiment class is different. For the score of pre, the indicator score shows the visual 30, spoken 14.17, listening 63.33, moving 66.67, and writing 81.67 with the mean 51.17%, it means that the student’s activity in the category : active enough.

Meanwhile the score of post got in the indicator score visual 96.67, spoke 38.33, listening 92.22, moving 97.78, and writing 100 with the mean 85% in the category : very active. This shows that the mean of post in the first experiment class is better. Further informasi, check the diagram below :



The picture 1. The diagram tree of the difference of pre and post of the Student’s activity.

Based on the first diagram above, it concludes that the student’s activity in the pretest with the mean 51,17% categorized as active enough and the student’s activity at the post test increases till 85% categorized as very active.

Table 2. The category of the students' activity applied pre-test.

No	Presentation	Category	Amount	
			The Students	%
1	81 - 100	Very active	0	0
2	61 - 80	Active	4	13.3
3	41 - 60	Active enough	18	60
4	21 - 40	less active	8	26.7
5	0 - 20	Very less active	0	0
Amount			30	100

Source : Primer data 2018

Table 2 shows us that 4 students (13.3%) are active, 18 students are active enough (60%), and 8 students (26.7%) are less active. Based on data, most of the X₁ class students before being applied the model learning Logan Avenue Problem Solving Heuristic are active enough.

Table 3. The category of the students after being given Post Test

No	Presentation	Category	Amount	
			The Students	%
1	81 - 100	Very active	18	60
2	61 - 80	Active	11	36.7
3	41 - 60	Active enough	1	0.3
4	21 - 40	Less active	0	0
5	0 - 20	Very less active	0	0
Amount			30	100

Source : Primer data 2018

Based on the table 3, it concludes that 18 students (60%) are very active, 11 students (36.7%) are active, and 1 students (0.3%) is active enough. Based on the data most of the X₁ class after being applied the using of the model learning Logan Avenue Problem Solving Heuristic are very active.

Table 4. Mean of the percentage of observation result in the first Experimental Class

Meeting	Percentage (%)	Interprestige Criteria
1	89	Very well
2	89	Very well
3	100	Very well
4	100	Very well
Mean	93	Very well

Source : Primer data 2018

Based on the table 4 above, it can conclude that the observation result for the learning activity done by the researcher in the first experiment class by applying the learning model LAPSH for four times meeting. The percentage of the observation result at the first meeting is 89%, then at the second one is 89%, the third one is 100% and the fourth one is 100%.

Before doing hypothesis test, the data tested must have the normal qualification and homogen qualification. Based on the result of normality and homogeneity of the test, the data with $dk = n-1$ and the significant level 5% for the test observation in normality test in pre at the first experiment is $X_{.1}$ with using the formula chi kuadrat, it is gotten that $X_{hitung} \leq X_{tabel}$ or $1.96 \leq 11.070$. It means that X_{hitung} is smaller than X_{tabel} , so the data is distributed in normal and the normality test at the observation data in post at the first experiment class by using the formula chi kuadrat is is gotten that $X_{hitung} \leq X_{tabel}$ or $4.516 \leq 11.070$. It means that X_{hitung} is smaller than X_{tabel} , so the data is distributed in normal.

Based on the analysis of multiple regression similarity is got that the value of the similarity is $Y = a + b_1X_1 - b_2X_2 = 2.245 + 0.49X_1 - 0.48X_2$. From this data, means that the activity score (Y) is affected by the variable of the learning model LAPSH at the Economy subject amounts 0.49.

The result of data analysis shows that the effect the learning model LAPSH to the students' activity is from the test result t (persial) with $t_{hitung} > t_{tabel}$, namely $5.777 > 2.045$ so that the hypothesis is of H_a ia accepted, it means H_0 is rejected, so there is the effect which is significant of the model learning LAPSH for the students' activity at the Economy subject is SMAN 1 Bukit Tinggi, West Sumatera.

IV. FINDINGS

This research entitled "The Effect of Learning Model LAPSH to the students' activity at the Economy subject in SMAN 1 Bukit Tinggi, West Sumatera. This research aims to know is there difference in the effect of learning model LAPSH to the students' activity at the Economy subject in SMAN 1 Bukit Tinggi, West Sumatera.

The technique of data input in this research is observation. The observation is used to identify the students' activity is learning process. It is in the first experiment class by using the observation sheet with the activity indicators : visual, spoken, listening, moving and writing.

As in research of identification, it uses the observation consisting of 14 statement which aims to collect the data about the students activity for the learning process done in the first experiment class by using the learning model LAPSH namely X IPS2 class. At the observation sheet, the statement is completed with the choice "Real" or "unreal" in each.

The learning process is done for each in 4 times meeting with the detail : the first meeting of pre observation, the second one till the fourth one are continued by applying the post observation in the first experiment class by applying the learning model LAPSH. The competency standard uses in this research is understanding money and banking, the indicators are describing the definition of bank, identifying the function of sentral bank, public bank, syariah bank, peoples' credit bank, identifying the function of public bank, and the sentral bank, identifying the product of bank, identifying 5 C and identifying the advantages and disadvantages of credit for the customer.

Observation result which is related to the teacher's activity at the learning process in the first experiment class using the model LAPSH based on the steps of APSH. The indicator in the observation are first, the teacher introduces new concept the topic "Money and Bank" through the question developing to the students' knowledge, second the teacher divides the students into group consisting 4-5 students, third the teacher asks each group finishes the problems given as metacognitive questions namely the questions supporting the students to understand the topic "Money and Bank", fourth the teacher asks the delegator from every group to present the result of discussion, the fifth the teacher asks other group to respond, the sixth the teacher gives review to chack again for the students' answer about the strength and the teacher gives a test as exercise to identify whether the students have understood the

materials all or not yet, the eighth the teacher gives the verification to identify the students categorized as having reached the level of passing grade and not yet, and the ninth the teacher has enrichment activity, remedial activity given to the not yet reached students, meanwhile the activity for those have reached the passing grade.

We see that at the first experiment class as 89% at the first meeting and the second , 100% at the third meeting and the fourth meaning 94.5%.

Before doing hypothesis test, the data tested must be qualified normal qualification and homogen qualification. Based on the result of normality test for observation data and homogeneity data, with $dk = n-1$ and the level of significancy 5% for normality test Pre data observation at the first experiment class namely X.1 by using the formula chi kuadrat, it is taken the result $X_{hitung} \leq X_{tabel}$ or $1.96 \leq 11.070$. It means X_{hitung} is smaller than X_{tabel} , so the data is distributed as normal and normality test of post data observation at the first experiment class by using the formula chi kuadrat, it is taken the result of $X_{hitung} \leq X_{tabel}$ or $4.516 \leq 11.070$. It means X_{hitung} is smaller than X_{tabel} , so the data is distributed as normal, meanwhile normality test of pre data observation at the second experiment class namely X.2 by using the formula chi kuadrat, it is taken $X_{hitung} \leq X_{tabel}$ or $5.933 \leq 11.070$ it means X_{hitung} is smaller than X_{tabel} , so it is distributed as normal and the normality test of post data observation at the second experiment class by using the formula chi kuadrat it is taken $X_{hitung} \leq X_{tabel}$ or $4.95 \leq 11.070$. it means X_{hitung} is smaller than X_{tabel} , so the data is distributed as normal it concludes that pre and post data observation for the first and the second experiment class are distributed as normal. Next being tested homogeneity test of pre and post data by using barlett test at the classes, it is taken $X_{hitung} \leq X_{tabel}$ or $6.003 \leq 7.815$, so this sample is stated as homogen so the analysis of hypothesis test can be continued.

Based on the similirity analysis of multiple regrestion is taken that the value is : $Y = a+b_1X_1- b_2X_2 = 2.245 + 0.49 X_1 - 0.48X_2$. From this, it is said that the activity value (Y) is effected by the variable of learning model LAPSH at the Economy subject amounts 0.49.

The result of data analysis is stated that the effect of learning model LAPSH to the student's activity can be showed from the test result $t(\text{persial})$ with $t_{hitung} > t_{tabel}$ namely $5.777 > 2.045$ so the hypothesis H_a is accepted and H_0 is rejected, so there is the effect which is significant of learning model LAPSH to the students' activity at the Economy subject in SMAN 1 Bukit Tinggi, West Sumatera.

As the research time, it gets some problems in applying the learning model LAPSH by the researcher at the first experiment class such as the time for discussing to finish the students' problem in understanding the aims of the statement in working-team sheet which the researcher gives, furthermore, the problem faced as checking again the answers, not more students who ask to other group who is representing and there are also the students who do not follow the discussion si that the researcher has get difficulty in conditioning the grups.

V. CLONCLUSION

Analyze and understand all the provided review comments thoroughly. Now make the required amendments in your paper. If you are Based on the research done and from the data analysis that there is the effect of learning model LAPSH to the students' activity at the Economy subject in SMAN 1 Bukit Tinggi, West Sumatera Province. The learning model LAPSH can be one of the learning models which can be used by the teachers to increase the students' activity.

As the research time done, there are some problems faced by the researcher in applying the learning model LAPSH to the first experiment class namely as the discussion time to finish the students' problems to understand. The aims of the statement in the work-team sheet which the researcher gives, then the problem is as rechecking the answers, not more students ask the other group presenting and there are also the students who do not follow the discussion , so that the researcher gets difficulty in conditioning the class.

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A Review of Multiple Approaches for Binomial Theorem

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Abstract: The Binomial Theorem has since long been of paramount importance in mathematics in varied forms. It was known to the ancients and in the hands of Leibniz, Newton, Euler, Galois, and others, it became an essential tool in both algebra and analysis. In this paper we have collected the Multiple Proofs of Binomial Theorem.

Keywords:

Binomial distribution; Independent and identically distributed random variables; Principle of induction, Uniqueness Theorem, Fundamental theorem of calculus, Mean value theorem. Laplace transforms etc.

Introduction:

Binomial Theorem is a crucial result of mathematics which provides augmentation of positive integer powers of sums of two expressions.

Statement is as follows:

Binomial theorem, for all $n \geq 1$ and $a, b \in \mathbb{R}$

$$(a + b)^n = \sum_{k=0}^n \binom{n}{k} a^k b^{n-k} \quad \dots 1$$

The Binomial Theorem has played a crucial role in the development of mathematics, algebraic or analytic, pure or applied [1]. It was very important in the development of the calculus, in a variety of ways and has certainly been much important in the development of number theory. It plays a dominant role in function field arithmetic [1]. In fact, it almost appears as function field arithmetic (and a large chunk of arithmetic in general) but a commentary on this amazing result. In turn, function field arithmetic has recently returned the favour by shedding new light on the Binomial Theorem. It is our purpose here to recall the history of the Binomial Theorem [1].

History of the Binomial Theorem:

As per known information, trace of Binomial Theorem started in 4th century B.C., in which Euclid found formulae for $(a + b)^2$. Later, 3rd century B.C., Pingala Indian mathematician presented a formula which is currently known as ‘Pascals triangle’ which gives binomial coefficients in a triangle [1]. After that, in 10th century A.D., Halayudha Indian mathematician and Persian mathematician al-Karaji derived similar results as did by the 13th century Chinese mathematician Yang Hui. It is notable that al-Karaji appears to have used mathematical induction in his studies. Indeed, binomial coefficients, appearing in Pascal’s triangle, seem to have been widely known in antiquity [1].

Multiple Theorem’s for Proof of Binomial Theorem:

1. Binomial Theorem using the uniqueness theorem for the initial value problems in linear ordinary differential equations.

Theorem 1: For a positive integer n and real s , the following holds [2].

$$(1 + s)^n = 1 + \sum_{k=1}^n \frac{n!}{k!(n-k)!} s^k \quad 1.1$$

Proof: Observe that if (1.1) holds for all $s > -1$ then taking limit as $s \rightarrow -1 +$ on both sides of (1.1), we get the result for $s = -1$ as well. Also, if (1.1) holds for all $s > -1$ then it holds for all $s < -1$ since if that is the case then we can write:

$$(1 + s)^n = s^n \left(1 + \frac{1}{s}\right)^n = s^n \sum_{k=0}^n \frac{n!}{k!(n-k)!} \frac{1}{s^k} = \sum_{k=0}^n \frac{n!}{k!(n-k)!} s^{n-k} = \sum_{k=0}^n \frac{n!}{k!(n-k)!} s^k \quad 1.2$$

Thus, it is sufficient to prove (1.1) for $s > -1$. So, consider the initial value problem.

$$x'(s) - \frac{n}{(1+s)}x(s) = 0, \quad x(0) = 0, \quad s > -1 \quad 1.3$$

Which has zero function as its unique solution for $s > -1$.

Let $\phi(s) = (1 + s)^n - 1 - \sum_{k=1}^n \frac{n!}{k!(n-k)!} s^k$ for $s > -1$, differentiating it with respect to s , and multiplying throughout by $(1 + s)$, we get:

$$\begin{aligned} (1 + s)\phi'(s) &= n(1 + s)^n - (1 + s) \sum_{k=1}^n \frac{n!}{k!(n-k)!} k s^{k-1} \\ &= n(1 + s)^n - \sum_{k=1}^n \frac{n!}{(k-1)!(n-k)!} (s^{k-1} + s^k) \\ &= n(1 + s)^n - n - \sum_{k=2}^n \frac{n!}{(k-1)!(n-k)!} s^{k-1} - \sum_{k=1}^n \frac{n!}{(k-1)!(n-k)!} s^k \\ &= n(1 + s)^n - n - \sum_{k=1}^{n-1} \frac{n!}{(k)!(n-k-1)!} s^k - \sum_{k=1}^n \frac{n!}{(k-1)!(n-k)!} s^k \\ &= n(1 + s)^n - n - \sum_{k=1}^{n-1} \frac{n!}{(k-1)!(n-k-1)!} \left(\frac{1}{k} + \frac{1}{n-k}\right) s^k - n s^n \\ &= n[(1 + s)^n - 1 - \sum_{k=1}^{n-1} \frac{n!}{(k)!(n-k)!} s^k - s^n] \\ &= n[(1 + s)^n - 1 - \sum_{k=1}^n \frac{n!}{(k)!(n-k)!} s^k] \\ &= n\phi(s) \end{aligned} \quad 1.4$$

Which together with the observation that $\phi(0) = 0$ shows that $\phi(s)$ satisfies equation 1.2, by uniqueness of the solution, we have $\phi(s) = 0$, as desired [2].

2. An Alternate Proof of the Binomial Theorem using the Laplace transforms.

Theorem 2: Let n be any nonnegative integer and a, b two real numbers. Then from equation (1). [4]

$$(a + b)^n = \sum_{k=0}^n \binom{n}{k} a^k b^{n-k}$$

where 0^0 is interpreted as unity whenever $x = 0$ or $y = 0$.

Proof. For $x = 0$ or $y = 0$, (1) clearly holds. Let $t > 0$ be any positive real number, then the Laplace transform of $(1 + t)^n$ for $s > 0$ is given by

$$\begin{aligned} L[(1 + t)^n]s &= \int_0^\infty e^{-st} (1 + t)^n dt \\ &= \frac{1}{s} + \frac{n}{s} L[(1 + t)^{n-1}]s \\ &= \frac{1}{s} + \frac{n}{s^2} + \frac{n(n-1)}{s^2} L[(1 + t)^{n-2}]s \\ &\vdots \end{aligned}$$

$$L[(1 + t)^n]s = \sum_{k=0}^n \frac{n!}{(n-k)!} \frac{1}{s^{k+1}} \tag{2.1}$$

Taking the inverse Laplace transform, we obtain

$$\begin{aligned} [(1 + t)^n] &= L^{-1} \left\{ \sum_{k=0}^n \frac{n!}{(n-k)!} \frac{1}{s^{k+1}} \right\} (t) \\ &= \left\{ \sum_{k=0}^n \frac{n!}{(n-k)!} L^{-1} \left(\frac{1}{s^{k+1}} \right) \right\} (t) \end{aligned}$$

$$[(1 + t)^n] = \left\{ \sum_{k=0}^n \frac{n!}{k!(n-k)!} t^k \right\} \tag{2.2}$$

Similarly,

$$[(1 - t)^n] = \left\{ \sum_{k=0}^n \frac{n!}{k!(n-k)!} (-t)^k \right\} \tag{2.3}$$

From the above equation it is clear that (2.2) holds for all real t. The proof is now complete on substituting t = a/b in (2.2).

3. A Simple and Probabilistic Proof of the Binomial Theorem

Theorem 3: Let n be a positive integer and a, b two nonzero real numbers. Then from eqⁿ(1) [3]

$$(a + b)^n = \sum_{k=0}^n \binom{n}{k} a^k b^{n-k}$$

Proof: By a straight forward induction argument, for all n ≥ 1, there exist positive integers C(n, 0), ..., C(n, n) such that for all a, b ∈ R,

$$(a + b)^n = \sum_{k=0}^n C(n, k) a^k b^{n-k} \tag{3.1}$$

Hence to establish (1) (i.e., to establish the general case described in equation 3, we need to show

$$C(n, k) = \binom{n}{k}, \quad k = 0 \dots \dots n, \tag{3.2}$$

To this end, let 0 < a < 1 and let S_n = ∑_{i=0}ⁿ X_i, where X₁, ..., X_n are independent and identically distributed random variables with P(X₁ = 1) = a = 1 - P(X₁ = 0).

The sum S_n has the binomial (n, a) distribution which by an elementary probability and counting argument (which does not make use of the binomial theorem) is given by:

$$P(X_n = k) = \binom{n}{k} a^k (1 - a)^{n-k}, \quad k = 0 \dots \dots n$$

Thus,

$$1 = \sum_{k=0}^n P(X_n = k) = \sum_{k=0}^n \binom{n}{k} a^k (1 - a)^{n-k} \tag{3.3}$$

Thereby establishing the theorem in the special case 0 < a < 1 and b = 1 - a described in (1).

Next, by equation 3.1:

$$1 = (a + 1 - a)^n = \sum_{k=0}^n C(n, k) a^k (1 - a)^{n-k} \tag{3.4}$$

then from equations 3.4 and 3.3,

$$\sum_{k=0}^n [C(n, k) - \binom{n}{k}] a^k (1 - a)^{n-k} = 0$$

And consequently

$$\sum_{k=0}^n [C(n, k) - \binom{n}{k}] \left(\frac{a}{1-a} \right)^k = 0 \tag{3.5}$$

Since $0 < a < 1$ is arbitrary

$$\sum_{k=0}^n [C(n, k) - \binom{n}{k}] (X)^k = 0, \quad 0 < X < \infty \tag{3.6}$$

The assertion equation 3.1 now follows immediately since the left-hand side of equation 3.5 is the zero polynomial and so all of its coefficients are zero. [3]

4. An Alternate Proof of the Binomial Theorem

While going through the proof of the binomial theorem using the Laplace transform in [1], this Proof arise

Theorem 4: Let n be a positive integer and a, b two nonzero real numbers. Then from equation 1 . [5]

$$(a + b)^n = \sum_{k=0}^n \binom{n}{k} a^k b^{n-k}$$

Proof: Let $s = -1$ be any nonzero real number. For each k , using the quotient rule for derivatives, we have $\frac{d}{ds} \left(\frac{s^k}{(1+s)^n} \right) = \frac{ks^{k-1} - (n-k)s^k}{(1+s)^{n+1}}$, which on multiplying throughout by $\frac{n!}{k!(n-k)!}$ and summing over $k = 0$ to n gives:

$$\begin{aligned} \frac{d}{ds} \sum_{k=0}^n \frac{n!}{k!(n-k)!} \left(\frac{s^k}{(1+s)^n} \right) &= \sum_{k=0}^n \frac{n!}{k!(n-k)!} \left\{ \frac{ks^{k-1} - (n-k)s^k}{(1+s)^{n+1}} \right\} \tag{4.1} \\ &= \sum_{k=0}^n \frac{kn!}{k!(n-k)!} \frac{s^{k-1}}{(1+s)^{n+1}} - \sum_{k=0}^n \frac{(n-k)n!}{k!(n-k)!} \frac{s^k}{(1+s)^{n+1}} \\ &= \sum_{k=0}^n \frac{n!}{(k-1)!(n-k)!} \frac{s^{k-1}}{(1+s)^{n+1}} - \sum_{k=0}^{n-1} \frac{n!}{k!(n-k-1)!} \frac{s^k}{(1+s)^{n+1}} \\ &= \sum_{k=0}^n \frac{n!}{(k-1)!(n-k)!} \frac{s^{k-1}}{(1+s)^{n+1}} - \sum_{k=0}^n \frac{n!}{(k-1)!(n-k)!} \frac{s^{k-1}}{(1+s)^{n+1}} \\ &= 0 \end{aligned}$$

So, by an application of either the fundamental theorem of calculus or the mean value theorem, we have $\sum_{k=0}^n \frac{n!}{k!(n-k)!} \left(\frac{s^k}{(1+s)^n} \right) = c$, for some fixed real number c , which on taking the limit as $s \rightarrow 0$ gives $c = 1$. Therefore,

$$\sum_{k=0}^n \frac{n!}{k!(n-k)!} \left(\frac{s^k}{(1+s)^n} \right) = 1 \quad \text{or} \quad \sum_{k=0}^n \frac{n!}{k!(n-k)!} s^k = (1+s)^n \tag{4.2}$$

Taking the limit as $s \rightarrow -1$ in the preceding equation gives:

$$\sum_{k=0}^n \frac{n!}{k!(n-k)!} (-1)^k = (1-1)^n = 0$$

Thus, we have:

$$\sum_{k=0}^n \frac{n!}{k!(n-k)!} s^k = (1+s)^n \tag{4.3}$$

for all non zero real s . To complete the proof, we put $s = a/b$ in equation 4.3

Conclusion:

We have seen the multiple techniques of proving Binomial Theorem like

1. Uniqueness theorem of initial values problem of Linear Differential Equation.
2. Laplace Transformation.
3. Simple probability and binomial distribution.
4. Properties of Laplace Transformation.

These proofs open the way for applications of analytic techniques and useful for proving further identities by differentiation or integration or by some other mathematical techniques.

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Subsidiary Legislation in Malaysian Administrative Law: Definition, Advantages & Grounds to Challenge it

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Abstract- This article discusses on the definition of subsidiary legislation in Malaysian administrative law, its advantages and how to challenge it. Subsidiary legislation is part of Malaysian legal sources that supplements the legislative function of Malaysian legal system. Although the Parliament and State Assembly are the main bodies that have been vested with the legislative power in Malaysia, other non-elected members are also conferred to exercise the same function to assist the Parliament and the State Assembly in their law making roles. The abundance of subsidiary legislation in the legal systems serve a great deal of benefits and advantages especially to ease the burden of the legislative bodies especially in dealing with the details of the law and also to gain expert views on certain issues. However the power mandated in the hands of these authorised bodies comprising of non-elected civil servants could also result in illegality and abuse of power, thus, this article attempts to outline grounds on which the subsidiary legislation can be challenged. This article is a descriptive and comparative analysis research which involves library-based method. This method is based on the analysis of various literature materials from books, articles, journals, Acts of Parliament, as well as reference to decided cases from Malaysian courts and commonwealth countries. It is the finding of this article that the court has the power of judicial review over the subsidiary legislation if the subsidiary legislation is *ultra vires* its conferring Act (parent Act), substantively or procedurally and the parent Act or the subsidiary legislation itself is unconstitutional. The court will look into the provisions of the parent Act and also the subsidiary legislation to determine its constitutionality and if it is within the scope of the parent act and the Federal Constitution. It is recommended that the power to enact subsidiary legislation conferred to the delegated body shall not be abused to overstep legal and constitutional boundaries and the Parliament shall not over-delegate its power to subsidiary legislation since it may be seen as abdication or 'giving up' its actual constitutional role i.e. to make law.

Index Terms- Administrative Law; Advantages; Challenge; Subsidiary Legislation.

I. INTRODUCTION

The system of delegated, subordinate or subsidiary legislation has come into fashion in all democratic countries. Of the total legislative output in a country, only a small portion is made directly by the legislature, and by far the larger portion of it emanates from administrative authorities. These authorities frame such legislation under powers conferred on them by the legislature. While framing a statute, the legislature usually confines itself to enunciating the general principles and policies relating to the subject-matter in question, and delegates to some agency the power to legislate further and fill in the details. This technique is made use of very extensively so much so that there is no statute enacted by the legislature which does not delegate some power of legislation to an administrative agency.

In no democratic countries does the legislature monopolize the whole of the legislative power; it shares it with the administrative agencies to a substantial extent. The delegated legislation produced by these agencies is so voluminous that the statute book will not only be incomplete but even be misleading if not read along with the relevant subsidiary legislation which seeks to amplify it. The term delegated legislation is used to denote; (1) The subsidiary legislation itself made by the administration in pursuance of the power delegated to it by the legislature, and; (2) The exercise of the power by the agency.

I. RESEARCH METHODOLOGY

This article is based on the descriptive and comparative analysis research which involves library-based method. The method chosen is one of the well-known approaches to get the literature material such as books, articles and journals including the Acts of Parliament and any other legal materials. These texts are scrutinized to develop the concept and scope of analysis. Reference is also made by referring the cases decided by Malaysian and commonwealth countries.

II. SUBSIDIARY LEGISLATION: DEFINITION AND ADVANTAGES

According to section 3 of the Interpretation Act 1948 and 1967, subsidiary legislation is defined as meaning:

'any proclamation, rule, regulation, order, notification, bye-law, or other instrument made under any Act, Enactment, Ordinance or other lawful authority and having legislative effect'.

Based on the definition given by section 3, it means that an order and notification, etc can be regarded as subsidiary legislation only if it has legislative effect. In addition, According to Mohd Izzat (2018), the legal criteria of the subsidiary legislations are; (1) it is issued out by the authority appointed by the legislative power, (2) the delegation of power shall be made through the parent act (enabling act), and, (3) has legislative effect. It means that not every order, notification, etc is subsidiary legislation: it is so only if it has legislative effect; if it is not legislative in nature, it is not subsidiary legislation; it may then be regarded as administrative in nature (MP Jain, 1997).

In another perspective, the above mentioned provision impliedly indicates the clear status of subsidiary legislation in Malaysian administrative law. In other word, this type of legislation is recognized as one of the sources of law in our legal system (Sharifah Suhanah, 2012). As referred to Justice Hashim Yeop Sani in the case *S Kulasingam v Commissioner of Land, Federal Territory* [1982] 1 MLJ 204:

"There is nothing to prevent Parliament from delegating power to legislate on minor and administrative matters and for this very reason, we have in addition to statutes, innumerable subordinate or subsidiary legislation having the force of law. Without these subordinate or subsidiary legislation, the Government machinery will not be able to function effectively".

The implementation of subsidiary legislation is important as it may smoothen the administration by the executive power. The valuable time of the legislative power; namely Parliament can be saved by delegating its power to the executive authority. For instant, Parliament may focus only on the principles of law in general pertaining to a particular issue, while the delegated authority can look into the matter in specific manner. By this, the law has restores the matter into the specialist person due to the lack of expertise and different background of the Parliamentary

members. Other than that, the particular matters may be easily administered because of the flexibility of the subsidiary legislation. It can be released in nearest time without going through the complicated Parliamentary process. In addition, the flexibility and the speediness of the subsidiary legislation are very beneficial in handling emergency situations and accommodating the changing needs of the society which require immediate attention from the government and the executive. For example, there may be an emergency or crisis wherein the Minister has to act quickly as in an economic crisis where the Minister of Finance has to act promptly by making new regulations to alleviate or control the situation. Once the regulations become outdated, the Minister can rescind them easily.

One of the most common standard formula that is used to confer executive law making power is 'as necessary and convenient' to give effect to the enabling legislation. Whether the court would in any particular instance adopt a broad or narrow construction of this will depend primarily on statutory context and intendment. As a generalized statement, and no more than that, the more detailed the enabling legislation, the less room there will be for the courts to maneuver. Nevertheless, this factor alone is hardly conclusive. Some legislation may adopt only what is "necessary" to give effect to the enabling Act, or for carrying out or giving effect to the Act. The principles noted above would be equally relevant in this instance (Wu Min Aun, 1975). Another standard formulation commonly utilized in subsidiary legislation is "without limiting the generality of the foregoing provisions". This does not carry with it, and rightly so, an automatic position that the more specific provisions that follow it are of little significance in determining the scope of the executive law making conferred (Wan Azlan, 2006). Thus, in *Leon Fink Holdings Pty Ltd v Australian Film Commission* (1979) 24 ALR 513, Aickin J explained:

"At first sight [the words "without limiting the generality of the foregoing"] would appear to indicate a parliamentary intention that general words which precede the expression should be construed as if the more particular words which follow were not there. That however is too wide a proposition for in every case, it must depend upon the whole of the context."

III. GROUNDS TO CHALLENGE SUBSIDIARY LEGISLATION

In control mechanism of subsidiary legislation, an important place is occupied by judicial control (Puttick & Keith, 1988). This is where the courts may exercise control over subsidiary legislation based on its judicial review jurisdiction. First and foremost, a question may arise as to whether the parent statute which delegates the power of subsidiary legislation is itself constitutional or not. If the statute is unconstitutional then it is *non est*, and, therefore, it cannot be the source of any delegated legislation which will then automatically fall to the ground. For this purpose, reference has to be made to judicial review under the Constitutional Law. Reference may, however, be made in this

connection to *Johnson Tan Han Seng v Public Prosecutor* [1977] 2 MLJ 66.

Here, the validity of the Essential (Security Cases) Regulations 1975 was challenged on the ground that the Emergency (Essential Powers) Ordinance 1969 had lapsed and ceased to be law by effluxion of time and changed circumstances and, therefore, these regulations made thereunder also become void. The Federal Court rejected the argument ruling that it was for the executive and not for the courts to decide whether a proclamation of emergency under article 150(1) should or should not be terminated.

Then, the courts also exercise control over subsidiary legislation in the ground that the parent statute may be constitutional, but the subsidiary legislation made thereunder may be unconstitutional. The court will strike down delegated legislation (Michael Zander, 1994), as it strikes down any statute, if it comes in conflict, or does not conform, with a constitutional provision. Here again, reference has to be made to Constitutional Law to assess whether the regulation in question infringes a constitutional provision (MP Jain, 1997). The frame of reference to adjudge the validity of the regulation or subsidiary legislation is the Constitution.

Reference may be made in this regard to *Osman v Public Prosecutor* [1968] 2 MLJ 137. Certain emergency regulations made under the Emergency (Essential Powers) Act 1964 were challenged as unconstitutional on the ground that these were of a discriminatory nature and thus infringed article 8. The argument was, however, rejected by the Pricy Council on the ground that emergency regulations could not be held to be unconstitutional because of article 150(6).

In *Public Prosecutor v Khong Teng Khen* [1976] 2 MLJ 166, the Federal Court, by majority, upheld the validity of the Emergency (Security Cases) Regulations 1975. The regulations were challenged as being inconsistent with article 8. The court held that: (i) the regulations were not inconsistent with article 8; (ii) even if inconsistent, the regulations were saved by article 150(6) on the authority of the plaintiff.

On 15 May 1969, the Yang di-Pertuan Agong proclaimed as emergency under article 150(1) of the Constitution. On the same day, he promulgated the Emergency (Essential Powers) Ordinance 1969 purporting to give power to him to make regulations for certain purposes. Thereafter, although the proclamation of emergency continued to subsist, and it exists even today, Parliament sat on 20 February 1971 and has been sitting since then, and even general elections have been held to the Dewan Rakyat. Nevertheless, the Yang di-Pertuan Agong continued to issue regulations under the ordinance of 1969 even after 1971, although under article 150(2), his power to issue an ordinance came to an end with the sitting of Parliament, for the Yang di-Pertuan Agong could promulgate ordinances during an emergency 'until both Houses of Parliament are sitting'. Accordingly, the Yang di-Pertuan Agong issued the Essential (Security Cases) Regulations 1975. The question in *Teh Cheng Poh v Public Prosecutor, Malaysia* [1979] 1 MLJ 50 was

whether these regulations of 1975 were constitutionally valid and could the Yang di-Pertuan Agong issue the same when he no longer had power to issue an ordinance? The Federal Court's response to this question was that while the ordinance-making power had come to an end, the Emergency Ordinance when made was valid and it continued to subsist and, therefore, the power conferred by it to frame regulations would also subsist.

From this point of view, the regulations were treated as subsidiary legislation under the Ordinance. On appeal, the Privy Council declared the regulations to be *ultra vires* the Constitution and hence void on the ground that once Parliament had sat after the Proclamation, the Yang di-Pertuan Agong was no longer left with any power to make 'essential regulations' having the force of law.

The Privy Council argued that the power to promulgate ordinances under article 150(2) was expressed to be exercisable only until both Houses of Parliament were sitting. It lapsed as soon as Parliament sat and this power would not revive even during the periods when Parliament was not sitting. The Security Regulations, which purported to alter in respect of security cases the mode of trial laid down by the Criminal Procedure Code, were made four years after Parliament's first sitting after the Emergency Proclamation.

Plainly, if the same provisions had been made through an ordinance, the ordinance would have been invalid since the ordinance-making power lapsed in 1971 as soon as Parliament had sat. The regulation in question was made under the Ordinance of 1969 which conferred power of the Yang di-Pertuan Agong. The subject-matter of 'Essential Regulations' having the force of law which by this Ordinance, the Yang di-Pertuan Agong purported to empower himself to make was 'no less broad' than the 'subject-matter of the 'Ordinance' having the force of law that he was empowered to make under article 150(2) of the Constitution'.

The maker of the law, the Yang di-Pertuan Agong, 'is the same' for both ordinances and for essential regulations; the subject-matter of the law-making power 'is the same for both'. The only difference 'is in the label attached to them'. But, emphasized the Privy Council, 'in applying constitutional law, the court must look behind the label to the substance'. The Privy Council thus equated the regulations to the Ordinance, and, as the Yang di-Pertuan Agong could no longer make the Ordinance after Parliament had sat according to article 150(2), he could not make the regulations.

This equation between the ordinance and the regulations was made possible because of the breadth of the regulation-making power which was coterminous with the ordinance-making power and also because in both the power was conferred on the Yang di-Pertuan Agong. The Privy Council pointed out that the power of the Yang di-Pertuan Agong to make ordinances given to him by the Constitution had come to an end as soon as Parliament first sat after the proclamation of the emergency. He could not prolong it, of his own volition, 'by purporting to empower him to go on making written laws, whatever description he may apply to

them. That would be tantamount to the Cabinet's lifting itself up by its own boot straps'.

Consequently, Parliament enacted the Emergency (Essential Powers) Act 1979, replacing the Ordinance. Section 2 of the Act is a *verbatim* reproduction of section 2 of the Ordinance. All the subsidiary legislation made under the Ordinance was validated and adopted under the said Act. The essential regulations are now made under the Act and so constitute subsidiary legislation. The Federal Court has upheld the validity of this Act. Commenting on the validation of the regulations, the Federal Court observed in *Teh Cheng Poh v Public Prosecutor* [1979] 2 MLJ 238:

"the regulations having been ruled to be ultra vires, it is open to Parliament to validate them and, further, to validate them with retrospective effect".

The regulations have thus been revalidated with effect from the date when they purported to come into force in the first instance. The Act in question has been made under article 150(5). Further, the Act confers a very broad power on His Majesty to make regulations generally. Thus, the *status quo ante* has been restored in all respects. The only difference now is that whereas formerly the powers of the executive were derived from an ordinance, they are now derived from an Act of Parliament.

In *Razali bin Ahmad v Public Prosecutor* [1981] 2 MLJ 81, it was submitted before the Federal Court that despite section 9(1) of the Emergency (Essential Powers) Act 1979, the Essential Security Cases Regulations 1979 were still not validated. Parliament failed in its efforts to revive these regulations because the expression 'every subsidiary legislation' used in section 9(1) of the Act must have the same meanings as defined in section 3 of the Interpretation Act. The appellant thus argued that when section 9(1) of the Emergency (Essential Powers) Act 1979 enacts that 'Every subsidiary legislation whatsoever made or purporting to have been made under the Emergency (Essential Powers) Ordinance 1969, on or after 20 February 1971, shall be valid and have effect as if the said subsidiary legislation has been made under the appropriate provision of the act, only those having the force of law could be validated.

As the Essential Security Cases Regulations were not made by lawful authority, they did not have the force of law by virtue of the Privy Council's ruling in *Teh Cheng Poh* [1979] 2 MLJ 238, and so they would not fall within the expression 'every subsidiary legislation' in section 9(1) of the Act, and therefore were not validated. Negating the contention, Salleh Abbas FJ, delivering the judgment of the court, observed that if the expression 'every subsidiary legislation' in section 9(1) were to have the meaning as assigned to the expression 'subsidiary legislation' in the Interpretation Act, then it would mean that the Act was validating something which was already validly done and could not validate what was not validly done. This was absurd and such exercise in futility could not be attributed to Parliament.

Therefore, the expression 'every subsidiary legislation' in section 9(1) of the Act was not intended to include a 'general species',

but was limited to a particular kind. This expression is amply qualified by the words 'whatsoever made of purporting to have been made under the Emergency (Essential Powers) Ordinance 1969 on or after 20 February 1971'. This qualifying phrase clearly shows that Parliament did not intend to import the definition of 'subsidiary legislation' in the Interpretation Act into the section. The qualifying phrase refers to all regulations made or purported to have been made under the Emergency (Essential Powers) Ordinance 1969, being regulations which were struck down by the Privy Council in *Teh Cheng Poh* [1979] 2 MLJ 238. These regulations must necessarily include the Essential Security Cases Regulations which were therefore validated by section 9(1) of the Act.

In the case of *Hajjah Halimatussaadiah bte Haji Kamaruddin v Public Services Commission, Malaysia* [1994] 3 MLJ 61. a departmental circular laid down dress code for civil servants. Women officers were prohibited from wearing *purdah* so as to cover their face while on duty. A woman officer was dismissed for not obeying the circular. She challenged the circular under Article 11 (1) of the Constitution which guarantees freedom of religion, but the Supreme Court rejected the argument saying that the circular did not affect her constitutional right to practice her religion.

Last but not least, the courts exercise control over subsidiary legislation on the ground that subsidiary legislation can be challenged before the courts if it is *ultra vires* the parent Act, i.e., it goes beyond the powers conferred by the parent Act on the concerned authority making delegated legislation. The chances of success in such challenge depend essentially on the terms of the parent Act, as interpreted by court (Anthony Wilfred, 2007). Delegated legislation should not travel beyond the purview of the parent Act; if it does, it is *ultra vires* and cannot be given any effect. Such a challenge can be sustained either when delegated legislation goes beyond the scope of the authority conferred by the parent statute, which is known as substantive *ultra vires*, or when the prescribed procedure is not complied with while making delegated legislation, and this known as procedural *ultra vires*.

a) Substantive *ultra vires*

Substantive *ultra vires* refers to the scope, extent and range of power conferred by the statute to make subsidiary legislation. It is based on the principle that, the Parliament owns the legislative power and any other subordinate agency has no power to legislate any law. Any other subordinate agency may only have the power to legislate if the legislative power is conferred thereon by Parliament making law. However, the limit of the power must not be crossed, if power is conferred to legislate only with respect to certain topics or certain purposes or in certain circumstances. The validation of the delegated legislation if the subordinate agency legislate any within the bounds of the power delegated. In the case of *McEldowney v Forde* [1969] 2 ALL ER 1039, Lord Diplock pointed out the validity of subordinate legislation is challenged:

- i. To determine the meaning of the words used in the parent Act itself to describe the subordinate legislation which the delegate is authorized to make.
- ii. To determine the meaning of the subordinate legislation itself
- iii. To decide whether the subordinate legislation complies with that description.

In *Wong Pot Heng v Kerajaan Malaysia*, Eusuff Chin J has phrased the doctrine of *ultra vires* as:

“There is also no doubt whatsoever that the courts have jurisdiction to declare invalid a delegated legislation if in making it, the person or body to whom the power is delegated to make the rules or regulations, acted outside the legislative powers conferred on him or it by the Act of Parliament under which the rules or regulations were purported to have been made.”

The efficacy of judicial review of delegated legislation on substantive grounds depends upon how broad the statutory formula conferring power of delegated legislation on the administration is. The efficacy of the doctrine of *ultra vires* is very much eroded if the power is delegated by the statute in very broad and general terms. The broader the powers delegated, lesser chance of control for the court.

In Malaysia, section 25 of the Interpretation Act provides that subsidiary legislation shall be deemed to be made under ‘all powers thereunto enabling, whether or not it purports to be made under in exercise of any particular power or powers (Wu Min Aun, 1975). A broad dimension to the validity of legislation has been given by this provision’. However, section 28 of the aforementioned Act, lays down the principle, when a statute is repealed either wholly or partly, subsidiary legislation made under the repealed law remains in force under the new law so far as the former is consistent with the latter until such time it is revoked or replaced by subsidiary legislation made under the repealing law. This provision covers the gap between the repealing of a law and making subsidiary legislation under the new law which may take some time. In the case of *Re Lee Kian Soo* [1953] MLJ 195, paragraph 8(1)(b) of the Architect Ordinance 1941 empowered the Board of Architects, after due inquiry, to strike an architect’s name off the register if he was ‘guilty of any act or conduct’ which in the Board’s opinion was ‘infamous in any professional respect’. Bye-law 13 of the Architects Bye-Law 1941 laid down what was misconduct on the part of an architect. The bye-law then went on to say that every misconduct would be ‘deemed to be conduct which is infamous in a professional respect under section 8’. This part of the bye-law was declared bad in the instant case on the ground that it was inconsistent with section 8. In that particular section, the legislature said in clear terms that whether professional misconduct was to be stigmatized as ‘infamous’ or not was for the Board to decide after inquiry, by applying the quasi judicial function. The board must form its opinion based on the facts of each particular case. But, what bye-law 13 purported to do was to settle by legislation the question of what was ‘infamous’ regardless of the facts of each case and thus prevent the Board

sitting in its disciplinary capacity from forming an opinion of its own. The bye-law deprived the Board of the power to form its opinion in its disciplinary capacity, whether the person’s conduct was ‘infamous’ or not and, therefore, bye-law 13 was held to be in conflict with section 8.

b) Procedural *ultra vires*

Subsidiary legislation may be challenged on the ground of procedural *ultra vires*. The parent statute may lay down certain procedures for the subordinate legislator to follow while making subsidiary legislation. If the subsidiary legislator fails to follow those procedures, it may result in making the subsidiary legislation *ultra vires*. However, the court will determine whether the procedural requirement is mandatory or directory. When mandatory procedural norm is not complied with, the subsidiary legislation will be found as *ultra vires*, but it is not *ultra vires* if the procedure is only directory. In *Wong Keng Sam v Pritam Singh Brar* [1968] 2 MLJ 158, Wee Chong Jin CJ stated that the disobedience of a directory procedural rule only results in an irregularity not affecting the validity of the subsidiary legislation made.

Generally, in the case of *Banwarilal Agarwalla v State of Bihar* [1961] AIR 849, the courts tend to treat a procedural norm requiring consultation with a specific body as mandatory. When, a statute says that the rule-making authority shall refer the draft rules to a statutory body and seek its advice as to the expediency or suitability of the proposed rules before finalizing them, the rules made without observing the procedure are *ultra vires*. In the same category falls the procedure seeking to provide an opportunity to the effected persons to file objections against any proposed measure. A requirement for pre-publication of draft rules is regarded as mandatory and the prescribed mode of pre-publication has to be adopted substantially by the rule-making authority concerned.

IV. CONCLUSION

Delegated or subsidiary legislation is an inevitable feature of modern government. If the Parliament attempted to enact all laws by itself, the legislative machine would break down, unless there was a radical alteration in the procedure for considering the Bills. The granting of legislative power to a department which is administering a public service may obviate the need for amending Bills. Section 3 of the Interpretation Act 1948 and 1967, subsidiary legislation is defined as meaning ‘any proclamation, rule, regulation, order, notification, bye-law, or other instrument made under any Act, Enactment, Ordinance or other lawful authority and having legislative effect’.

There are two grounds where the subsidiary legislation may be challenged before the court. First and foremost, a question may arise as to whether the parent statute which delegates the power of subsidiary legislation is itself constitutional or not. If the statute is unconstitutional then it is *non est*, and, therefore, it cannot be the source of any delegated legislation which will then

automatically fall to the ground. For this purpose, reference has to be made to judicial review under the Constitutional Law. Last but not least, the courts exercise control over subsidiary legislation on the ground that subsidiary legislation can be challenged before the courts if it is *ultra vires* the parent Act.

Substantive *ultra vires* refers to the scope, extent and range of power conferred by the statute to make subsidiary legislation. It is based on the principle that, the Parliament owns the legislative power and any other subordinate agency has no power to legislate any law. However, if the subsidiary legislator fails to follow the procedures in legislation making process, it may result in making the subsidiary legislation *ultra vires*.

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Effects of social cultural factors on male partners' level of participation in maternal and child well-being programmes. A case of Kiambu County, Kenya

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ABSTRACT

Responsibility for uptake of maternal and child wellbeing (MCW) services are a responsibility of both parents however men often play a passive role. Such programmes are doomed to fail in societies where men control family resources and are the family decision makers. This has resulted to high maternal and infant mortality and morbidity rates especially in Sub-Saharan Africa. In Kiambu County low male partner participation in the MCW programmes was identified as a challenge to successful implementation of the programmes. This study sought to determine effects of cultural factors on this low participation. An analytical cross-sectional study was carried out in Kiambu County to establish existing relationships between the variables. Data were collected from one hundred and two male partners. Descriptive as well as analytical statistics were used to establish possible relationships between the variables. The findings from the study revealed socio- cultural factors as significant determinants of the male partners' level of participation in the programmes in the County. The study recommend promotion of male friendly and culture sensitive programmes which may increase acceptability by the male partners leading to their improved participation. This would result to increased consumption of the services by the mothers and the infants.

Index Terms- Male-partner, level of participation, Socio-Cultural factors, Maternal and wellbeing programmes

INTRODUCTION

International development platforms and commitments like the Cairo convection of 1994 expressed the need for male partner participation in maternal and child wellbeing programmes [34]. Since these conferences, there has been a formal recognition that more equitable relations between male and female partner are important in achieving international, national or even regional goals on maternal and child wellbeing [32]. Many factors may be implied for male partner's low level of participation in maternal and child wellbeing programmes some of which are barriers existing at societal level referred to as socio-cultural factors [37]. Male involvement in these programmes during pregnancy and post-partum periods has shown greater benefits in maternal and infant outcomes [35,36]. In most patriarchal societies men's main responsibility is perceived as that of providing for the family and in so doing they influence consumption of health services. In most of these societies' men's control over family finances, family mobility and health care decisions impact on the female partner's behaviour in relation to consumption of the services [8, 4]. Men in such societies are expected to be the source of information and decision making a factor that make them feel over ruled by the females who bring home health care information either from the health facilities [9, 7, 30, 13]. Earlier studies have shown that involvement of male-partners in antenatal VCT was associated with increased uptake of the services by their female partners and the infants as well as improved sharing of information between the couple [3, 6, 20, 2]. Male partners' 'infidelity in marriage discouraged them from attending VCT with their female partners in fear of receiving HIV positive results in their presence which would undermine their dominion in the family [1,23]. In most of these patriarchal societies men are not expected to give much information to their female partners a factor that discouraged couple sharing [5,18,10,17,19]. In most of these cultures men and women do not fully express themselves emotionally to each other and this is a barrier to dual participation in maternal programmes and reduced chances of support from the male-partner [28,32, 14]. The area of maternal and child well-being is also perceived as a woman's domain and therefore it is shameful for men to be found at health facilities with women [5,2,33,36]. Such men are deemed weak and that they are controlled by their female partners a factor that discouraged them from participating in the programmes [11,24,31]. The need to seek male-partners' consent for HIV testing and fear of violence in case they tested HIV positive barred female partners from involving the male-partners in the couple CVT

determine if there existed a significant relationship between male partner level of participation in the programmes and the community's cultural values. The researcher picked mothers systematically as they reported to level four and five health facilities to consume the MCW services in the County and their consent was sought. Consenting mothers were requested to introduce their male partners to the study. The male partners' consent was also sought. Consenting male partners formed the study respondents from who the primary data were collected. Secondary data were collected from earlier studies and it informed the background to the study. The study involved collection of quantitative as well as qualitative data. The collected data were analysed with aid of SPSS. Data was subjected to descriptive statistical as well as inferential analysis. The findings from the analysis were presented in frequencies, percentages, histograms and tables.

Figure 1. Map of the study area within the inset map of Kenya

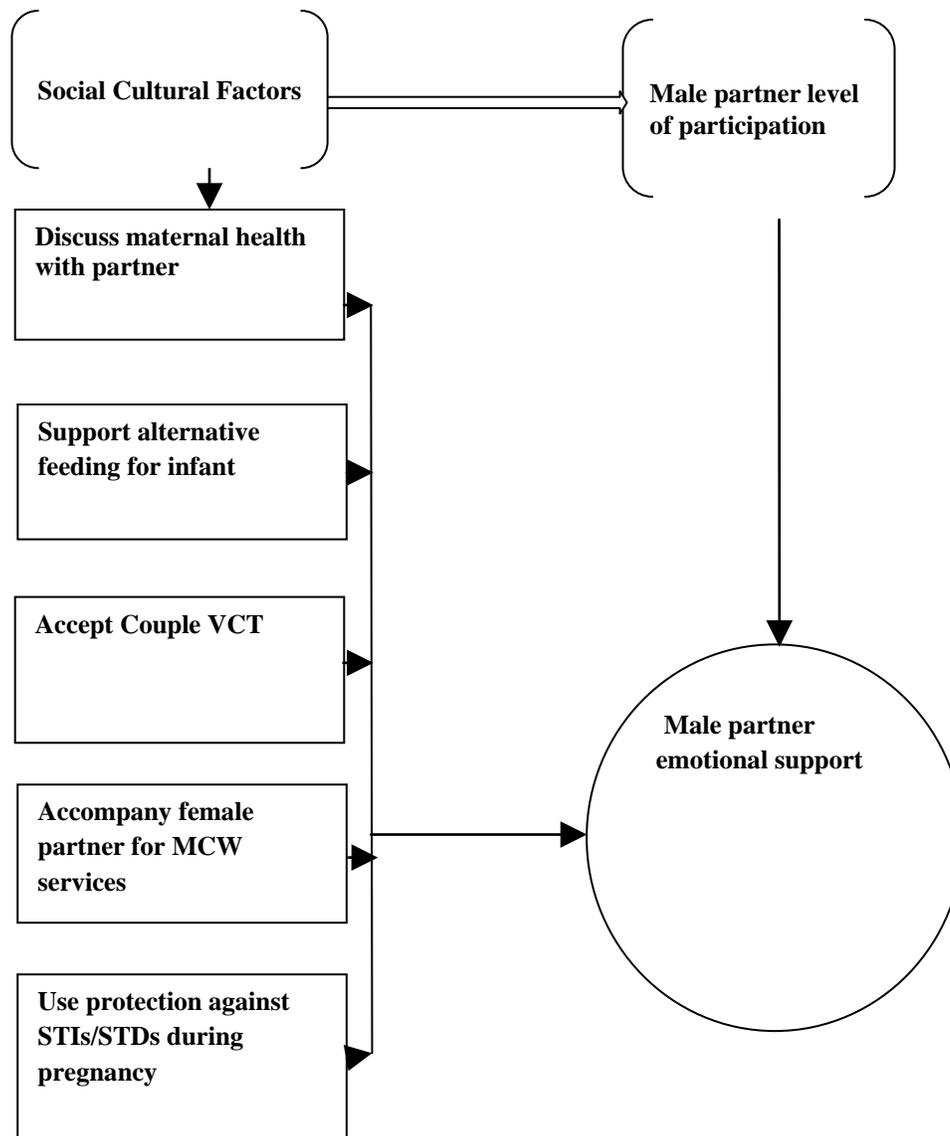


Figure 2. The Conceptual framework

STUDY FINDINGS

The study findings revealed that cultural factors were significant determinants of male-partner's level of participation in maternal and child well-being programmes in Kiambu County, Kenya. Chi-square test was used to test for independence of the outcome variable (male partner level of participation in maternal and infant well-being programmes in the County) and the predictor variables (the community based cultural values). The key predictor variables included effects of male partners' cultural values and beliefs based on their perception towards male partners who participated in various programmes. The Chi-square test revealed a value of 137.106, at df-1 and p value of 0.000 meaning the community's perception had a significant negative effect on level of participation. Male partners who perceived it as a taboo to discuss reproductive health issues with their pregnant partner recorded a significant low level of participation as revealed by a Chi-square value of 40.914 at df-1 and a p value of 0.000. The effects of male partner perception towards couple VCT was found to have a significant negative effect as revealed by a Chi-square value of 46.396 at df-1 and a p value of 0.000. The study also sought to establish effects of male partners' perception that male partners should use preventive measures to prevent secondary sexual infections during pregnancy which was found to be significant at a Chi-square value of 7.122 at df-1 and a p value of 0.008. The study further established that male perception that maternal clinics are designed for women and children only had a significant negative effect at a Chi-square value of 14.547 at df-1 and a p value of 0.000. Logistic regression test for the relationship between dependent and independent variables revealed that, $y = (\alpha) 0.700 +$ effects of cultural factors (-0.229) . Based on the study findings therefore, cultural factors are significant determinants of male-partners' level of participation in maternal and child well-being programmes in Kiambu County. The Cox and Snell R square and Nagelkerke R square of 0.607 and 0.819 (Table. 1) revealed that the model of goodness of fit is satisfactory and that social cultural factors explained 81.9% (Nagelkerke R²-Table 1) of the variation in male partners' levels of participation in the programmes while Cox and Snell R square show that the cultural factors explain 60.7% of the variations in the level of participation.

Table 1. Goodness of fit model for cultural factors

odds Summary	
-2 Log likelihood	59.325
Cox & Snell R Square	0.607
Nagelkerke R Square	0.819

The Exp (B) column (the Odds Ratio) (Table. 2) show that male-partners who felt that discussing reproductive health issues with pregnant partner was a taboo were 10.166 times less likely to register a high level of participation in the programmes compared to those who never perceived it a taboo. Male-partners who perceived the MCW programmes as designed and meant for women and children only were 6.050 times less likely to register a high level of participation compared to those who believed male-partner could participate. Further, the Exp (B) column (the Odds Ratio) shows that male-partners who believed that MCW programmes' information should be communicated to the family through the family heads (male-partners) were 1.937 times less likely to register high level of participation compared to those who thought the information could be channeled through the female or the male-partners. The study findings revealed a significant negative relationship between the community's cultural values and beliefs. This was explained by the fact that a community' values and beliefs shape peoples' perceptions and influence their behaviour.

Table 2. Logistic regression analysis for effects of cultural factors on male-partners' level of participation

	B	S.E.	Wald	df	Sig.	Exp(B)	1/Exp(B)
Tested without approval(1)	0.159	0.078	4.155	1	0.042	1.172	
Accompany partner(1)	1.079	0.461	5.478	1	0.019	2.942	
Men are bewitched(1)	1.752	0.45	15.158	1	0.000	5.766	
Taboo to discuss(1)	-2.319	0.912	6.466	1	0.011	0.098	10.166
Couple testing(1)	1.312	0.53	6.128	1	0.013	3.714	
Use of condoms(1)	0.29	0.097	8.938	1	0.003	1.336	
MCW for women children (1)	-1.8	0.645	7.788	1	0.005	0.165	6.050
Unfaithfulness(1)	-1.501	0.974	2.375	1	0.123	0.223	4.486

Infected women be divorced(1)	-0.135	0.704	0.037	1	0.848	0.874	1.145
Information through men(1)	-0.661	0.803	0.678	1	0.41	0.516	1.937
Constant	-1.937	1.87	1.073	1	0.3	0.144	6.938

DISCUSSION OF THE FINDINGS

Male partners' behaviour in relation to reproductive health are outcomes of factors existing at the societal level and which guide gender relations and division of labour. The study realised that the most pertinent was the societal perception that the field of maternal and child health was a woman's domain and male partners needed to give women a chance to pursue issues that are socially theirs. Majority of the respondents did not agree that women can be tested for HIV without their male-partners' consent. The study found that respondents who had the perception that women cannot be tested for HIV without their male-partners' consent were less likely to register a high level of participation as compared to those who did not. Majority of the respondents did not agree that male partners should accompany their female partners to the health facilities for MCW programmes. These respondents registered a low level of participation in the programmes. There was ridicule to men who physically accompanied their female partner to the health facility because they were perceived to be weak. This perception discouraged other male partners. For example a respondent from Ruiru sub-County in the Kiambu County commented: *"It is our way of life inherited from our ancestors. There are duties for women and men. If my friend sees me take my wife to the clinic they will say 'huyu amekaliwa' (this one is henpecked). If they did not believe in the culture, they wouldn't burst me, but right now if I also see a man take his wife to clinic when pregnant I will tell him 'bwana umekaliwa na bibi nyumbani'.* Another respondent from Gatundu sub-County reported; *you know according to our way of life, men are taken as kings, so if you're seen carrying a baby, you are seen to be 'voiceless'. Also, if you are so much concerned with women, they'll see you to be voiceless (Mister, your wife controls you at home)".*

Culture coupled with peer pressure played a major role in determining male partners' level of participation in maternal and child wellbeing programmes due to negative perceptions towards some MCW programmes. For example, the study found that majority of the male partners was not in support of some MCW programmes such as condom use during pregnancy and alternative feeding for infants. Majority of the respondents believed that it is a taboo to discuss reproductive health issues with the female partner during pregnancy as this would cause misfortune. Respondents who had the perception that discussing MCW issues with their pregnant female partner was a taboo registered a lower level of participation. Despite the challenges brought about by the prevailing cultural beliefs in Kiambu community majority of the respondents agreed that there are more benefits if male partners became more responsive in matters concerning their own reproductive health and that of their female partner. Among these benefits are increased understanding of pregnancy and related issues, enhanced levels of preparedness from the time the female partner is pregnant until she delivers and after delivery during breastfeeding. The study revealed that male partners are very willing to support the health of their female partner and that of their children. Some men are even willing to denounce customs and practices that challenge the women's health and that of their children. The study further noted that perception of male partners as intruders into the women's reproductive domain led to their failure in participating in couple VCT a challenge in dealing with couple discordance in HIV sero-status.

The study found out that most obstacles to involving male partner in maternal and child wellbeing programmes revolve around socio-cultural factors such as men's fear of losing control of their position as family heads. The study found that deep-rooted cultural norms about gender roles and power hierarchy are major obstacles to male participation in the maternal and child wellbeing programmes. Women's efforts to overcome these challenges have remained a huge challenge over decades because power of decision making lies with the male partner as the family head. Male partners were not supportive of programmes where the female partner made decisions regarding maternal and child health without their male-partners' consent. For example, men did not like invitations to the health facility by their female partner because this meant they are the ones making decisions and controlling the male partner. The findings revealed that for most respondents, physical participation in maternal and child wellbeing programmes implied weakness. They also fear that accompanying their female partner to the maternal and child wellbeing facility would increase their vulnerability and expose any reproductive health secrets, exposures that could reduce their social status. The study also found that women did not have the authority to request their husbands to test for HIV which made it difficult to involve male partner in VCT through their female partner. Most respondents explained that HIV testing is an important part of preparing for fatherhoods however receiving a positive HIV result in the presence of their female partner discouraged male partners from attending VCT with their female partners. This would mean they lose their confidentiality as well as their status as family head. These findings revealed a strong correlation between male partner's perception towards the programmes as influenced by cultural beliefs and their effect on level of participation.

SUMMARY OF THE FINDINGS

The study concludes that Kiambu community's established cultural norms that define the expected male and female behaviour in relation to reproduction were significant determinants of male-partner's level participation in maternal and child well-being programmes. Respondents who were more conservative of the community's cultural norms registered a lower level of participation in the programmes compared to those who were liberal. This study concludes that the relationship between cultural factors and male-partners' level of participation in maternal and child well-being programmes is significant and negative.

RECOMMENDATIONS OF THE STUDY

The study points out that it is important for the County government of Kiambu to incorporate the community's cultural values during policy formulation as well as implementation. This may help break the cultural barriers to male-partner participation with an aim of limiting them. In this regard, overturning the attitude that maternal and child well-being programmes is a woman's responsibility could improve male-partner's participation. The County government should determine male-partners' priority goals, routes of action, as well as culturally appropriate strategies that can create positive impact. Priorities in reproductive healthcare provision should be locally identified in accordance to the male-partners' most pressing needs. There is need to carefully consider the community's acceptability of any intended health promotion interventions before their implementation to increase acceptability. Suitable community specific channels such as peer educators and men leaders may be trained and supported to work with professional healthcare providers in different phases of the programmes.

There is need to carefully consider effectiveness and acceptability of any intended health promotion interventions by the intended consumers before implementation to increase their effectiveness. There is need for healthcare system amendments and context-specific adaptations of public policy on maternal and child well-being services to break down barriers and facilitate participation. Well targeted and focused male participation programmes may have positive influence on their level of participation and promote reproductive well-being. There is need to carry out research on participatory approach that integrates male issues in on-going as well as future maternal and child well-being programmes. Relevant authorities should support this fact finding about MCW programmes related short-comings and existing cultural conditions that relate to male participation as a first step in operational research. This research should support the testing of different participatory approaches to promotion of the acceptable ones by specific communities. It should also assess the impact of specific programmes such as male or female-specific clinics, offering of VCT services for men at antenatal clinics, options for both couple and individual counseling and testing, among others.

There is need to implement such findings in favour of male-partner participation in the programmes throughout their life cycle.

The study recommends adoption of culture-sensitive strategies that address maternal and child well-being needs of the community in which they are applied. This is may increase acceptability of the programmes by male gender leading to their increased participation. For example, healthcare providers and policy makers need to understand how men relate to women in the field of reproduction and as well as factors upon which men make decisions in reproductive issues. This mean that the County government and the National government should establish the best culture specific action plans that can be adapted in men dominant societies to promote their involvement in maternal and child well-being programmes.

APPENDIX

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Tertiary Level Business and Management Education in Bangladesh: Current Status, Existing Specializations, Prospective Areas, and Future Route to Excellence

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Abstract- The aim of this study is to understand the present disciplines and areas of Business and Management education in Bangladesh as well as future prospective areas. This study basically uses secondary data from different sources and some primary data have been used which were collected through face to face and over phone interviews with the scholars of business and management. Both qualitative and quantitative data have been used in the study. This study finds that business and management education in Bangladesh is now very much specialized and this process of specialization is still in motion. Each and every year new branch of business and management are being introduced because of the fast-changing demand of the competitive business arena. This study has also explored the comparative analysis among these disciplines of business and management education. A list of potential disciplines has been prepared on the basis of discussion with some prominent management scholars of home and abroad.

Index Terms- Tertiary Level; Business; Management; Education; Specialization; Bangladesh

1. INTRODUCTION

A business refers to an organization aims at profit making that performs economic activities like production, trade, marketing, financing (Kiyosaki, 2018). Management is a universal branch of study that is applicable in any kind of organization. Business as an organization uses management to achieve its goals and objectives (Shinde, 2018). Management covers different areas like accounting, financial management, marketing management, human resource management, supply chain management, and so on for ensuring the utilization of human resources, financial, physical, and information resources of an organization (Bose, 2012). Thus business and management are interrelated to each other. Further, to ensure the effective and efficient utilization of the resources of the organizations, skilled managers are needed. Business and management education is regarded as the key to developing skilled managers for filling the increasing demand of labor market both in public and private sector. Business and management education has become an integral part of the education system in Bangladesh in every level like secondary, higher secondary, and higher education though still today, no direct business and/or management related course has not been introduced in the primary and junior school level of education. Nowadays, business and management related education disciplines like Management, Accounting & Information Systems, Finance, Marketing, Banking & Insurance, Management Information Systems, Human Resource Management, Tourism & Hospitality Management, Organization Strategy & Leadership, Supply Chain Management, and International Business etc. (DU, 2018) have become very popular. Scholars noted that the development of Bangladesh Economy and its direct linkage with the growth of industry and businesses have increased the demand for business graduates in the country. Normally, the general category Public Universities including National University and Bangladesh Open University, Science & Technology Universities, Private Universities and some other educational institutions are providing tertiary level business education degrees in Bangladesh (Islam, 2011).

Business and Management education in the higher education level of Bangladesh has a long history. It is basically connected with the establishment of the University of Dhaka in 1921 (Rahman, 2015). In 1921, a department named Department of Commerce started its journey under the Faculty of Art at the University of Dhaka ((Islam, 2018). The department was offering B.Com and M.Com degrees to the students (Baquer, 2016). In 1966, the Institute of Business Administration (IBA), University of Dhaka, was established in order to provide professional education in business and management that was initially offering MBA degree (Rahman, 2015).

With the passage of time, the demand for business graduates was increasing rapidly and because of that reason the University of Dhaka established the Faculty of Commerce comprised of two departments: Management and Accounting (Islam, 2018). In 1993, the

Institute of Business Administration (IBA), University of Dhaka, launched BBA Program. In 1994, two more departments were added under the Faculty of Commerce and then in 1995, the Faculty of Commerce was renamed as the Faculty of Business Studies (FBS) (Baquer, 2016). From academic session 1994-95, the B.Com (Hons.) and M.Com degrees were converted into BBA and MBA with the aim of making those degrees more pragmatic to maintain international standard of business education (DU, 2018). Meanwhile, the business education started its journey at the University of Chittagong and the University of Rajshahi in 1970s and 1980s respectively (CU, 2018; RU, 2018).

Now, there are a good number of Business Schools both in public and private universities in Bangladesh offering BBA and MBA degree. Moreover, some of the business schools are also offering MPhil, PhD and DBA degrees along with BBA and MBA degrees. However, this study focuses on the disciplines and areas of BBA and MBA levels only.

2. LITERATURE REVIEW

Researches on education are very much available in the recent world. Even, a good number of qualitative and quantitative studies have been conducted on the education system of Bangladesh, ensuring quality education (Richards, 2008), problems and prospects of education, structure of education, private higher education (Alam, Haque and Siddique, 2006).

A study titled '*Future of business education in Bangladesh*' specifies that the business and management education is at its increasing pace and its future is highly prosperous in the country due to the growing economy, private sector development, and international integration (Rahman, 2012). Study on the issues and concern of management education in India shows that Indian Institutes of Management (IIMs) are creating a good number of managers for meeting the demand of the global and local market. That study also refers that the business schools of India offer a wide range of majors of management education (Shukla, 2013). Rao and Raju (2015) studied management education in India from historical perspective and found that it has a long history and they mentioned management as the backbone of any organization that helps the organizations in achieving their goals. This is the reason for which employers are interested to hire employees having specialized managerial skills in the field of HRM, Finance, Accounting, Marketing, MIS and so on. Moreover, they identified some of the areas of improvement for developing the management education in India to make it competitive with the global marketplace whereas, Mone, Engwall and Zamagni (2002) discussed the historical evolution of management education in the world perspective.

Another article titled- '*The status of management education in India*' written by (Ravi, Rao and Prasad, 2015) remarked that the success of the business depends on the nature of management it has and students can achieve strategic and tactical managerial skills through management education. This is how the management education in India is playing vital role in developing human capital and meeting the increased demand of the businesses as well as other organizations. World Bank (2013) in their report on the education system of Bangladesh mentioned the access, equity, quality, policy and others. That study actually showed a positive correlation between education system and economic development of our country. Previously some other research have also been conducted on the education systems of Bangladesh focusing on its problems, prospects, approach, development, policy from time to time (World Bank, 2008; NUFFIC, 2012).

Focusing on medical education in Bangladesh, Reza (2013) discussed the problems and prospects of medical education in Bangladesh. Islam (2011) studied the brief history, problems and prospects of the tertiary or higher education in Bangladesh that covers both of the public as well as private sector of higher education in Bangladesh. Rahman (2015) conducted study on the history and development of business education in Bangladesh and mentioned how business education flourishes during British, Indian, Pakistani and most importantly after the independence of the country. He basically discussed the history of business education by focusing influence of the University of Dhaka in developing today's business education.

Most of the previous studies regarding the education system of Bangladesh focused on the overall education system, problems and prospects, quality enhancement, accessibility rate. Some of the researches are related to the higher education in Bangladesh though a good number of studies have been found in the context of business and management education in India and other countries of this subcontinent. If we consider in the context of Bangladesh, we found insignificant number of studies in this area. However, there some studies focusing on history and evolution of business education in Bangladesh. This study is hopefully going to fill up the gap of discussion on graduation to post graduation level's business and management education in Bangladesh and its existing, prospective, major areas.

3. STUDY METHODOLOGY

This study uses qualitative research approach and also some quantitative facts have been used. Most of the data have been collected from the secondary sources like journals, newspapers, websites of University Grants Commission (UGC) of Bangladesh, website of the University of Dhaka, and websites of other public and private universities of Bangladesh. However, some primary data have been collected through face to face and over phone interview from different prominent scholars of business and management in Bangladesh. The data collected from the secondary sources have been showed after proper interpretation and classification using researchers own knowledge and skills.

4. FINDINGS OF THE STUDY

This study found several business and management education related issues in the context of Bangladesh. The names of existing Business schools of Bangladesh are: Institute of Business Administration (IBA), Faculty of Business Studies (FBS), Faculty of Business Administration (FBA), School of Business, Faculty of Management, Management & Business Administration School, Faculty of Business & Economics, and Department of Business Administration (DBA). Whatever the title is, important fact is that most of the business schools are providing major/specialization/concentration in almost similar subjects or areas of studies (**Table 4.2**). The following findings and discussions have been made based on the current study.

4.1. Available areas of study in Business and Management Education in the public universities in Bangladesh.

The following table has been prepared on the basis of information available on websites of public universities of Bangladesh as well as UGC Annual Report 2016. This list shows the titles of the major areas and number of university(s) in which the particular major is available.

Table 4.1 Areas of Business and Management Education in Bangladesh Available in Public Universities

SL	Specializations (BBA & MBA)	Number of Public University
01	Management	17
02	Accounting/Accounting Information System (AIS)	17
03	Finance	15
04	Marketing	15
05	Human Resource Management (HRM)	10
06	Management Information System (MIS)	3
07	Banking/ Banking & Insurance	3
08	Tourism & Hospitality Management (THM)	3
09	International Business	1
10	Organization Strategy & Leadership	1
11	Port & Shipping Management	1
12	Maritime Business	1
13	Business Administration (General)/ Major Not Found on Website	10

4.2 Majors/specializations of Business and Management Education Available in Private Universities.

Since the major areas are not expressed properly on the websites of most of the private universities, the tabular analysis like the previous one has not been prepared. Besides this, only mentioning the major areas has been found convenient and meaningful.

- Management
- Accounting and Information Systems (AIS)
- Finance
- Marketing
- Banking & Insurance
- Management & Information Systems (MIS)
- International Business
- Tourism & Hospitality Management
- Human Resource Management (HRM)
- Bank Management
- Engineering Management
- Supply Chain Management
- Operations Management
- Agribusiness
- Real-Estate Business
- Entrepreneurship Development
- Garments Management
- Apparel Manufacturing Management (AMM)
- Product & Fashion Merchandizing (PFM)

The above major areas are available in different private universities in Bangladesh. This list shows that the private universities offer a wider range of specializations in business and management education in Bangladesh than the public universities. Some private universities are providing specialization serving the specific demand of the labor market and it is a very positive side for business education. This development of specialization indicates that the demand for business graduates are being increased and diversified knowledge and skills are necessary to operate the business.

4.3 Prospective areas of Business and Management Education in Bangladesh

The businesses of the modern time are facing new challenges and opportunities. To use those opportunities and face the challenges, businesses need dynamic and capable human talent. In this regard, talented human resources having diversified business and management skills have to alternative. This is why the industries of Bangladesh have created human resources demand with different specialization for business and management graduates. The professionals and academicians of the country also noted that the demand of the business organizations is becoming more specific day by day. They have suggested the business schools to create some new areas of business and management education of the country to address the requirements of the labor market in near future. However, this list may not be perfect one but still it will definitely show a future route to excellence.

- Compliance Management
- Business Analytics
- Training and Development
- Sustainable Development Management
- Public Policy & Management
- Total Quality Management (TQM)
- Project Management
- Management Science
- Event Management
- Talent Management
- Security & Risk Management
- Innovative Management
- Library Management
- Capital Market Management
- Fashion Design Management

However, some other areas of business and management education might be effective in the perspective of Bangladesh. Business schools conducting R&D project to open new specializations to meet the increasing demand of both inland and foreign job market.

4.4 Number of Students in Different Business Schools (Public University)

Both the public and private universities of Bangladesh have their business schools. However, the following table only shows the number of students studying in business schools of different public universities of the country. It will make a partial overview of the situation of business education in the country.

Table 4.4 Number of Students in Different Business Schools (Public University)

SL	Name of the University/Institute	Number of Students in 2016
01	University of Dhaka (FBS)	6575
02	University of Dhaka (IBA)	1239
03	University of Rajshahi (FBS)	4499
04	University of Chittagong	3976
05	Jahangirnagar University (FBS)	1456
06	Jahangirnagar University (IBA)	348
07	Islamic University, Kushtia	1957
08	Shahjalal University of Science & Technology (SUST)	529
09	Khulna University	483
10	Hajee Mohammad Danesh Science & Technology University	1009
11	Mawlana Bhashani Science & Technology University	405
12	Patuakhali Science & Technology University	517
13	Jagannath University	4487
14	Noakhali Science & Technology University	410
15	Jatiya Kabi Kazi Nazrul Islam University	1088
16	Comilla University	1518
17	Jessore Science & Technology University	40
18	Begum Rokeya University, Rangpur	1672
19	Pabna Science & Technology University	307
20	Bangladesh University of Professionals	1845
21	Bangabandhu Sheikh MujiburRahman Science and Technology	819
22	University of Barisal	1434
23	Rangamati Science and Technology University	135
24	Bangabandhu Sheikh Mujibur Rahman Maritime University	47
25	National University	650608
26	Bangladesh Open University	5194
TOTAL		692597

Source: UGC Annual Report 2016

4.5 Current Status of Business Students Comparing to Other Branches of Study

According to UGC, Bangladesh (2016), the university students enrolled in different higher educational program has been classified into 12 broad categories as mentioned in the following table. This table has been prepared on the basis of data obtained from the UGC Annual Report 2016. Data were found in a semi-structured and scattered manner which have been classified and analyzed using frequency and percentage to make better sense.

Table 4.5 Category-wise Distribution of Higher Education Students in Bangladesh

SL	Branches	Private Universities		Public Universities		Colleges Under NU, BOU & IAU		Total	
		Freq.	%	Freq.	%	Freq.	%	Freq.	%
01	Business Studies	112553	33%	35161	13%	655802	25%	803516	25%
02	Arts & Humanities	35399	10%	42472	16%	891217	34%	969088	30%
03	Social Science	12580*	4%	37928	14%	745025	28%	795533	25%
04	Education	1614	0%	3036	1%	14789	1%	19439	1%
05	Law	25855	8%	5337	2%	15569	1%	46761	1%
06	Pharmacy	10343	3%	2284	1%	0	0%	12627	0%
07	Science	23533	7%	40057	15%	213422	8%	277012	9%
08	Biological Sciences	0	0%	17472	7%	0	0%	17472	1%
09	Medical	0	0%	3409	1%	0	0%	3409	0%
10	Agriculture	2621	1%	21567	8%	9739	0%	33927	1%
11	Engineering & Technical	109979	33%	42235	16%	2928	0%	155142	5%
12	Others	2680	1%	13126	5%	85113	3%	100919	3%
TOTAL		337157	100%	264084	100%	2633604	100%	3234845	100%

Source: UGC Annual Report 2016

*NU – National University, BOU- Bangladesh Open University& IAU- Islamic Arabic University. Social Science student of private university segment is the summation of Social Science and Economics Students.

The statements we found by analyzing the above table (Table 4.5) that, total number of students enrolled in higher education in Bangladesh is 3234845 out of which 803516 students are enrolled in different areas of business and management education which covers 25% of the total. Maximum number of students study in different areas of arts & humanities (969088) that cover s 30% of the total. Arts & science and humanities jointly cover 55% (30% + 25%) of the total students. In public universities, the percentage of business students is relatively lower than that of private universities. Unlike the public universities, private universities primarily focus on business (33%) and engineering and technical education (33%). Colleges affiliated with National University (NU), Bangladesh Open University (BOU) and Islamic Arabic University (IAU) mostly focuses on arts and humanities, social sciences and business education. Public universities provide only 13% of their total attention on business education whereas private universities provide 33% of their total attention on it.

4.6 Other Institutes Providing Professional Business, Management and Accountancy Education in Bangladesh

- a. Bangladesh Institute of Management (BIM)
- b. Bangladesh Institute of Bank Management (BIBM)
- c. Institute of Chartered Accountants of Bangladesh (ICAB)
- d. Institute of Cost & Management Accountants of Bangladesh (ICMAB)
- e. Bangladesh Institute of Capital Market (BICM)

5 CONCLUSIONS

This study primarily focuses on identifying the fields of specializations in which the Bangladeshi public and private universities are offering BBA and MBA degrees for ensuring the supply of human resources in different sectors and subsectors of the economy. Some of the prospective areas have also been identified based on the demand of national and international job market by consulting with some management scholars of the country. This study also clearly explains the current status of the business and management education in Bangladesh. Apart from this, the study has also covered some other related issues like history of business and management education in Bangladesh. The study finds that the private universities are providing a wide range of specializations some of which are not found in the public universities. However, Faculty of Business Studies of the University of Dhaka, the oldest business school of the country, has the maximum number of major areas in business and management education and it is playing the role as pioneer in initiating new specialization/ major areas and diversified professional programs for engaging managers in professional educations. This study also finds that almost all of the General and Science & Technology category public universities are offering BBA and MBA degrees in business & management. On the other hand, almost all of the private universities have their programs in business and management. The number of business schools in the country is also increasing year after year. This research recommends some issues those might help the business schools to meet the expectations of the job market.

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Gender and Their Role in Conflict Management: The Nigerian Perspective

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Abstract- Conflict and conflict circumstance are by nature impossible to avoid in as such humans interact with different identify and race. This make peace process to be a complex state of affairs because of the win attitude of human existence. The state of resolute and peace building are vital for society and humans to strive, which springs development and society of today desert the role of women in conflict management due to customs, traditions, culture and gender. Data were basically collected from existing literature to demonstrate the role women play in conflict management. The paper concluded women should be involved in conflict management for the society to attain a holistic conflict management and peace building. The paper recommends that women should be giving more training to education which will deepen their understanding in conflict and in peace.

Index Terms- Gender, Nigeria, Peace and Conflict Management

I. INTRODUCTION

Peace is absent of war, disturbance or conflict. This create conducive environment for human interaction to flourish which ensure development either humanly or economically and this in return guarantee sustainable development. In situation where this is absent conflict occurs, nothing seem to grow. Conflict resolution and peace building are however, highly gendered activities (Beth Speake,2013).

Literature have argued that men are mostly from time memorial involved in peace buliding and process neglecting the presence of women. However, the peace process don not concern those involved in war or armed conflicts, women also contribute important skills, perspectives and insights into conflict resolution and peace building activities. Therefore, their direct participation in decision making is necessary because mothers by personality and God given gift which make them closer to their children, one could say they have natural gift which strategically places them above men in peace process.

Stricklaw and Duwury (2003) have also identified that those who do take into account issues of gender, have generally failed to address the structural inequalities and power relations which are the basis for gender discrimination. Most of the arguments put forward in support of women involvement in conflict management come from a variety of disciplines, with different political opinions and recommended methods. Some see women as important in bringing about sustainable peace, others employed techniques that confine them to their roles as mothers

and caregivers, and thus denying access to a more formal and wider agenda of peace building and conflict resolution. (Puechguirbal, 2010:177).

It has been over a decade since the passage of the United Nations Security Council Resolution (UNSCR) 1325, which is a land mark document restating the importance of women involvement and participation at all levels of peace building and conflict management (NjidekaEbisi, 2016:). Informal contributions of women have been shown to be insufficient to resolving conflict and building sustainable peace (Pratt and Richtar-Devroe, 2011:490). However, formal building and conflict resolution initiatives have continued to ignore or marginalize issues of gender, and women's involvement in formal peace missions and talks (Diaz, 2010:1). With the new phase of globalization, women have been able to organize themselves in many unofficial ways. This they do through participation in non-profit organizations, support groups and grass roots, activities in their communities. Even in their official working places, they extend this support attitude of bringing peace when there is conflict. Women are often portrayed as victims of conflict; and, of course in large part they are: targeted for rape, become widows and suffer most from decay of social sectors. The roles of women in this modern age have changed after generations of silence. Women's stories of their struggles for social change, justice, and for peace are beginning to be told (Ferris, 2004).

However, the assumptions of this paper is about the women's inappropriate roles in the society, particularly in relation to decision-making and conventional assumptions about their areas of expertise, have been used to exclude them from informal or formal and all other peace processes. In some peace talks, for example, some male delegates questioned the presence of women, seeing their wish to be involved as interference in the process. Nevertheless, it is happy to note that the United Nations as well as other regional bodies are increasingly recognizing the position of women's leadership in the prevention and resolution of conflict and crises. For instance, the Beijing Declaration and Platform for Action acknowledged the crucial role of women during times of armed conflict and the collapse of communities and called for the establishment of an active and visible policy of mainstreaming a gender perspective when addressing armed and other conflict (Alilu, 2012:4). The paper will be discussing the role of women in conflict management and why women are always considered less effective in peace process with specific references to Nigeria. This paper is focused on the role of women

in conflict management. In this discourse, we begin by developing an appropriate conceptual and analytical framework.

II. RESEARCH METHODOLOGY

This paper is a qualitative study which is based on secondary data. The study was carried out through the review of other existing literature on role of women in conflict management in Nigeria and across the world. Existing and applicable literature on the role of women in conflict management were reviewed, which led to insight exciting study.

III. CONCEPTUAL AND CONJECTURAL DECONSTRUCTION

Gender is defined in contrast to sex, as the social roles and interactions between men and women rather than their biological differences. (Eschborn 2001:6). It draws attention to the social roles and interactions between women and men, rather than their biological differences. Gender relations are social relations, which include the ways in which the social categories of male and female interact in every sphere of social activity, such as those which determine access to resources, power and participation in cultural and religious activities. Gender also denotes the social meanings of male and female, and what different societies regards as normal and appropriate behaviour, attitudes for women and men, although the details vary from society to society, and change over time. Gender relations always include a strong element of inequality between men and women and are strongly influenced by ideology (NjidekaEbisi, 2016:2).

On the other hand, what is biologically determined gender differences is still vaguely defined and subject of debate (Jill,1998:81). Some contend that women tend to be less-predisposed to aggressive and violent behaviour because of certain biological characteristics. These include that women have lower testosterone levels than men, and the ways women's brain is structured and developed and other biological characteristics constitute academic debates, that are responsible why most women behave the way they do in challenging and competitive ways than most men. Therefore, they posit and argue that science cannot explain all forms of different behavioural patterns and roles in society (Jill,1998:81).

For Stean and Jill (1998), It is not sufficient to focus on women alone. The ways in which men are socialised to become part of a male gender are also important. Egotistical, aggressive and dominant behaviours are common features of cultural definitions of masculinity, as is men's dominance over women at a general level (Byrne and Bridget,1996:33). Therefore, male and female roles and relations between men and women are subject to constant change because they are shaped by society. Yet, in all societies the gender relations between women and men tend to be clearly to the disadvantage of women. For example different rights and decision making powers; ability to make choices; which are determined by the existing cultural norms and values relating to masculinity and femininity (NjidekaEbisi, 2016). Therefore, gender denotes what differentiate men from women which include biological, social, and cultural attributes.

Conflict is opposition between two parties resulting from struggles over values, ideas for power and resources (Sanchez, 2011). To be in conflict connotes being in disagreement or contradictory or in opposition (Moris 2000). Conflict resolution and peace building are essential conditions for sustainable development initiatives; the cultural explicit and systematic consideration of a gender perspective in peace building and conflict resolution have either been ignored or marginalized by agencies in their efforts and strategic approaches towards crisis prevention and management. Conflict resolution and peace building are however, highly gendered activities (Beth Speake,2013).

Lederach (2000:71) sees conflict as composed of three elements: people, process and problems. Any of these and combination may cause conflict and will always be present in the development and outcome of a dispute. Conflict management involves efforts and the interventions to minimize, limit, contain, control or regulate conflict. It is a process of minimizing and controlling the negative effects of conflict through working with the disputing parties. Some authors use conflict prevention synonymously with conflict management. It seeks to reduce the negative and destructive capacity of conflict based on the realization that conflict is inevitable and that not all conflicts are resolved always. Irresolvable conflicts are controlled and managed (Obasi and Nnamani,2015:2, Ijeoma et al., nd).

Gender roles are not the same. Nature in some instances has assigned roles to men and women. While women are mothers, bringing forth new life to the world, men are the voice of the family. They care and protect mothers and the life they bring to the world. While women are traditionally the heart of the home, procurators and care-takers of the house, men control the economy and support the family (Obioma, 2001:19). Nature on the other hand has given each gender gifts according to the roles of each sex. Men cannot bear the pains of pregnancy, women have the gift. Women are strongest on this, men are weaker. It is on the basis of the different roles of sexes that tradition assigns functions to each.

Stricklaw and Duwury (2003) have also identified that those who do take into account issues of gender, have generally failed to address the structural inequalities and power relations which are the basis for gender discrimination. Most of the arguments put forward in support of women involvement in conflict management come from a variety of disciplines, with different political opinions and recommended methods. Some see women as important in bringing about sustainable peace, others employed techniques that confine them to their roles as mothers and caregivers, and thus denying access to a more formal and wider agenda of peace building and conflict resolution. (Puechguirbal, 2010:177).

Issues involving gender arise in what is sometimes called "personal life" (Minas, 1993). In collaboration with Minas (1993) Gender role depend on her personalized role in the society and people she relate with and how they perceived her. In personal relations, this can make a difference since human choice of spouse depends on gender and the quality that will upgrade us as men which are always gender related because her quality determine the choice. However this gender is not confirmed confined to men only, women also have same feeling where they now look at such qualities in choice of a female partner which

happening in the western world of today. With this recent trend we now take gender with us into the workplace and the rest of public life.

Gender affects our perspectives on others as well as the way others perceive us; even when our relationships with them cannot be seen as "personal". Very early in our lives, we learn whether we are girls or boys and accordingly, what we are expected to do or not to do. Gender expectations for children (e.g., what types of clothing are appropriate for which gender) are somehow simple, compared to what is expected of adult men and women. Societal expectations for adults can be very limiting with restrictions, for example a particular kind of behaviour can attract a more severe sanction or penalty for one gender than for the other. Also a certain posture or sitting position may pass as normal for a man but may attract unwelcome sexual attention if taken by women. Career paths in the work place are laid out according to gender; it is much easier for one gender than the other to join particular careers and to remain and progress in them. In all, it is difficult to find any segment or area of human life where gender fails to make a difference. It systematically favours men over women, it continuously maintain and encourage structures that ensure men receive better treatment and have more available options than women. These structures are well found in both private and public life. Gender is a social acquisition that creates many differences between men and women. (Minas, 1993:2).

In fact more than a decade ago, on 31 October 2000 the United Nations took the first step in identifying the important position women hold in preventing and resolving Conflict with the passage of a resolution which stressed the importance of women's equal participation and full involvement in all efforts of the maintenance and promotion of peace and security. It also emphasized the need to increase their role in decision making with regard to conflict prevention and resolution. The impact of this resolution was further solidified by the establishment of national action plans by 24 nations, confirming government support at the national level for the inclusion of women in conflict resolutions (Alilu, 2012:5).

Women therefore have a role in ensuring a peaceful and healthy society. They can do this by inculcating sound moral instruction into the younger generation. Naturally, children tend to endere more to their mothers than fathers. This provides a good channel for mothers to impact positive virtues of peace to their children and ward right from childhood because a peaceful society begins with a peaceful home. Many of the conflict enveloping the globe emanate from the family to community and like a spark of fire spreads across a state and its environs. Often times, issues such as poverty, struggle for scarce resources, lack of infrastructures and violations of human rights are indentified as the root causes of conflict in the society. In this regard, successful strategies for empowering women should be put in place. Informal activities such as peace marches and protests, intergroup dialogue, the promotion of inter-cultural tolerance should be encouraged to be spearheaded by our women.

IV. THE NIGERIAN WOMAN

The Nigerian woman is bold and industrious. She is a mother and leader in the family and community. Before the advent of colonial rule and the amalgamation of Nigeria in 1914, many women have made history in the political and socio-economic levels of their environment at a time not known. According to Nnamani&Okpara (2010: p. 95 in Obasi& Nnamani,2015:4), the gallantry efforts of Queen Amina of Zaria, Moremi of Yorubaland, Queen Kambasa of Ijawland and Queen Owari of Ilesha were recorded in history. In Igboland, many priestesses intervened to avert family and communal conflicts. The advent and influence of colonialism eroded the traditional autonomy of Nigerian women. It affected and reduced their peace efforts in the early days to their charging. It was against this background that the Aba women riot of 1929 took place. It was staged against the British high-handedness, policies against women and taxations.Nnamani&Okpara (2010: p. 95 in Obasi& Nnamani,2015:4)affirmed that the Egbasu women group from Yoruba nationality staged another protest in 1941 and 1947 against injustice melted against women and the exploitations by the colonial administration. The Nigerian women have come of age since independence. They are now more organized than ever. They fight against abuse of women, trafficking of girls, marginalization, exploitation and disempowerment. In the mid 1970s, the women of Umueleke staged a protest against sexual child abuse and for some days left their homes for their men who did not do so much to punish the culprit. The women took refuge at the St. Patrick's Catholic Church, Umuezeala, Ehime Mbanu, Imo State. Their action attracted attention and the men were forced to act immediately.We cannot forget how women such as Fummilayo RansomeKuti and Margaret Ekpo stared a revolution that brought about changes in our country. Women on their part , should be mindful of the power that lies inside of them and use it positively amidst numerous challenges to positively change the world.

V. MANAGEMENT OF CONFLICT BY WOMEN

Over the years, women have been relegated to the background in the area of conflict management. It is about high time the women contributions to peacemaking must be acknowledged. Abdukarim (2002) said 'it is about time that the people of Nigeria are indeed of the whole world appreciated the tremendous potentiality that is inherent in this (so called) weaker sex. "Many ways, they are much stronger".

Peace women (2004) asserted. That "women and men have different access to resources, power and decision making before, during and after conflicts. The experience of women and men in situations of tension, war and past conflict reconstruction is significantly different". In many organizations it seems many women do not have free access to resources, power and decision making as regards to conflict as much as their male counterparts. This situation has jeopardized the management of conflict in the organizations.

Women by their nature are good nurturers, social problem solvers and excellent negotiators. The Gender schema theory confirms these attributes of women. The theory was propounded by Sandra Bem in 1981. This theory combines the social learning

and cognitive learning theories. Gender Schema theory implies children learn about what it means to be male and female from the culture in which they live. It concerns the development of an internal Schema, or mental framework which organizes and directs the behaviour of an individual (Brannon 2002).

In the Nigerian society, girls are made to believe that they must be obedient, do not say while resolving, remain quiet and last to speak. In work place conflict management, the qualities of women are more likely to be utilized in the conflict management because of work ethics but despite these men still dominate the process.

There are other certain attributes that a problem solver or conflict manager must possess and one of them is tact. Diaz (2008) said that "tact is being mindful of the other person and the context while taking into account one's own account". Tact is very important for keeping or creating harmonious relationship. Women are more tactful than men. Even in the families, they utilize this attribute, by keeping the family coordinated and organized. Those women in the organization can also utilize this potential if they are given the opportunity to manage conflict in the organization.

Diaz (2008) also went on to bring forth another factor that can help in conflict management and he said "Words were originally magic and to this day words have retained much of their ancient magical power. By words one person can make another blissfully happy or drive him to despair". Women use more soft and low tone in situation of chaos unlike the men. Magic language is good for negotiated solutions and it may generate the changes required for conflict management. Women who are more sensitive than men, and more emotionally attached to people. They are the ones that often use this magic language.....words. All these go to buttress the point that more women must be employed in conflict resolution in organizations because of these their attributes (Ijeoma et al., nd).

Foundation coalition (2011) came up with modes for conflict management. Five modes were listed and analyzed. Conflict management decreases the odds of non productive escalation. It involves acquiring skills related to conflict resolution, self awareness about conflict modes, conflict communication skills and establishing a structure for management of conflict in the organization.

women are naturally perceived as weak and cannot make quick decision which constitute a big obstacle in conflict resolution process. But women are intelligent, not lazy, energetic and not weak. However, ethnic, religious group, or other community have not look beyond this, women are only recognized in modern organization which is also peculiar to Nigeria but traditionally there is a big constraint in their role in peace process. It seems evident that there is lack of political commitment on the part of governments and decision making bodies (at both national and international level) to promoting changes in favour of gender balance and mainstreaming into decision making bodies such as peace building committees and etc. d. There is also lack of comprehensive, systematic national strategy for implementing all the measure connected with a peace building agenda. In many countries, political authorities lack the capacity and/or are unaware the need to address peace building projects and platforms, and mobilize resources for such gender awareness training. They are also unable to influence policy at

community level. e. One of the major obstacles to the peace building process and especially role of peace makers, is the failure not only to acknowledge and accept the respective interests and priorities of all the parties concerned and their willingness to also cooperate and negotiate which ultimately hinder negotiations. f. Patriarchal cultural pattern that rely on certain traditional beliefs, assumptions and expectations with regards to men's and women's role in dialogue and peace building may become a major obstacle in affirming new gender roles and approaches to sustainable development as conflict free environment.

VI. CHALLENGES WOMEN IN CONFLICT RESOLUTION AND PEACE BUILDING

According to Iruloh and Uche (2017) argued that the following are challenges women face in playing their role in conflict management and this include the following:

1. Women themselves are not ready to champion their own course
2. Lack of cooperation from men for fear of women leadership
3. Negative societal perception of the role of women
4. Lack of awareness of benefits of gender equality
5. Lack of awareness of gender issues
6. Implementation of already existing policies to back women

VII. CONCLUSION AND RECOMMENDATIONS

Society can only progress if there is no stereotype, the wide range of obstacles, both obvious and hidden that undermine women's ability to use their powers and capacity to bring about change in peace building processes. The discrepancy of influence, control and power between women and men in all aspect of their societal life particularly in decision making process and representations is still a global problem, where certain position are meant for the men alone. In Nigeria there is lack of gender Awareness among those responsible for Gender Mainstreaming in Government Bodies and Public Administrations. Therefore, creating awareness on gender equality and women empowerment for development is one to get more women into conflict resolution and peace building. Time has come for everybody to be aware of gender equality and participation in conflict resolution and peace building. However mothers should teach their children skills of anger management from home because this can lead to a peaceful state and globe peace which is among the only way the world can be safe, peaceful and enjoyable.

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Multi Use Conversion System and Visual Based Encyclopedia

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Abstract- Information technology is a field of science that explores data, facts and various information as widely as possible in the form of numbers, text, images, analog and digital signals with a computer as a tool. Various data sources are grouped, modified, transformed and processed into other forms to be used as new data, new facts, new information needed by users, all of which can be referred to as information.

Processing that involves a variety of ways and techniques by using various software and hardware that are appropriate is expected to be obtained to give satisfaction to users of information which can then be used as data in other forms by users.

In addition, as the daily reality faced by many people is the transformation and conversion of one form of data into another form, both commensurate and in other forms, is often needed. For example, often someone needs certain information both words in a particular language, pictures and descriptions of an object and the like. So that these needs should be easily available, but because the tools or software that can provide the required information is not available. So it is necessary to have a program or model that has the ability to assist users in solving various problems in terms of transforming data into other forms such as a multipurpose conversion system.

The benefits of this program can later help students to explore various information in the form of illustrated dictionaries (encyclopedias) and as a tool to assist students in completing the tasks given by the teacher.

Index Terms- Multi use Conversion System; Encyclopedia

I. INTRODUCTION

Information technology is a field of science that explores data, facts and various information as widely as possible in the form of numbers, text, images, analog and digital signals. Furthermore, various data sources are grouped, modified, transformed and processed into other forms to be used as new data, new facts, new information needed by users, all of which can be referred to as information.

Processing that involves a variety of ways and techniques by using various software and hardware that are appropriate is expected to be obtained to give satisfaction to users of

information which can then be used as data in other forms by users.

To be able to explore various data and information broadly and optimally, it is certainly not easy, because it requires high skills, tenacity, skills and creativity so that a variety of data and information that is still rough can be realized into new data and information more broadly, flexibly, representative and effective and detailed and clear. Therefore, in order to realize this, the role of information technology that is supported by appropriate software and hardware will provide maximum, accurate, relevant and correct results.

In addition, as the daily reality faced by many people is the transformation and conversion of one form of data into another form, both commensurate and in other forms, is often needed.

Another thing that often happens is the fact that someone forgets how to calculate and certain units, so that when needed it will make it difficult for someone to open a book, search the internet and so on which is not always available.

Therefore it is necessary to have a software that is able to serve and solve various other needs in an integrated manner so that the software will be able to answer all user needs, both in terms of the appearance of digital dictionaries and encyclopedias.

The variety of information to be studied, in addition to the conversion of words in local languages, foreign languages, illustrated dictionaries (encyclopedias), number conversions, calculators, and various conversions needed along with the needs of prospective users of the program to various information, the writer formulates how to make a system program multipurpose conversions that can serve various information needs.

Making a multi-use conversion system program as an application of information technology that is expected to be used by various parties such as students or students.

This multipurpose conversion system program is expected to help students or other users in making various conversions. In addition, the program which is equipped with this encyclopedia feature will contribute a lot to students to browse various information needed, especially when the internet network has problems or is offline.

The target of this study is to build application programs that will be able to contribute to the development of information technology for students and / or general users in terms of various conversions. As well as the availability of encyclopedias that will be able to provide a variety of information visually.

II. LITERATURE REVIEW

The system according to Webster (1968: 378) in Winardi (2010: 125) is:

“System is assemblage of object arranged after some distinct method, usually logical or scientific; whole scheme of created things regarded as forming one complete while, universe, organization, classification, set of doctrines or principles, the body of functional unity.”

While Winardi (2010: 125) revealed the general understanding of the system as follows:

The system is a set of elements between which there are relationships. Often in the literature additional words can be found, which elements are aimed at achieving certain general goals.

Similar understanding is also conveyed by Moses (2004: 12), that the system is a combination of components organized and related to one another. The system has unique behavior and each component has a contribution and influence on the system.

The system comes from Latin (Systēma) and Greek language (sustēma) is a unit consisting of components or elements that are linked together to facilitate the flow of information, material or energy. This term is often used to describe a set of interacting entities, where a mathematical model can often be made.

The system is also a unit of interconnected parts that are in an area and have driving items, a common example such as a country. The state is a collection of several elements of other entities such as provinces that are interconnected so as to form a country in which the role is the driving force of the people in the country.

The word "system" is widely used in everyday conversation, in discussion forums and scientific documents. This word is used for many things, and in many fields too, so that its meaning becomes diverse. In the most general sense, a system is a collection of objects that have a relationship between them.

Based on some understanding of the system above, it can be concluded that:

The system is a collection of various objects or elements that are interrelated that support the full system that can be in the form of activities, thoughts, teachings, formulas and provisions that are interrelated to achieve a particular goal

III. METHODOLOGY

System design model that describes the complete stages from the start of Analysis and Definition of Requirements, System and software design, implementation and unit testing, integration and

testing system, operation and maintenance. The respective stages can be explained as follows:

- Analysis and Definitions Requirements, namely services, limits and objectives are determined in consultation with the user system. These requirements are then defined in detail and function as system specifications.
- System Design and Software, namely the system design process dividing requirements in a software system. This activity determines the overall system architecture.
- Unit implementation and testing, namely software design that is realized as a series of programs or program units. Unit testing involves verifying each unit whether it meets its specifications.
- System Integration and Testing, that is, the individual program or program unit is integrated and tested as a complete system to ensure that the system requirements are met and after fulfilling then the program is sent to the customer to be tested by the customer whether in accordance with the wishes determined by the customer
- Operation and Maintenance, which is the longest phase of the life cycle, because the system is installed, used and continues to be used by users who in this case are extension agents to find a correction factor that needs improvement.

IV. RESULTS

1. Program Results

The multi-purpose conversion system program that has been designed according to the previous proposal is given the file name SISKON. Where the intended conversions are grouped into language conversion (foreign languages and regional languages), encyclopedias (Scientists / Inventors, Figures / Heroes, Flora and Fauna) and number and unit conversions.



Fig. 1. User's menu



Fig. 2. Indonesian Heroes



Fig. 5. Encyclopedia of Heroes

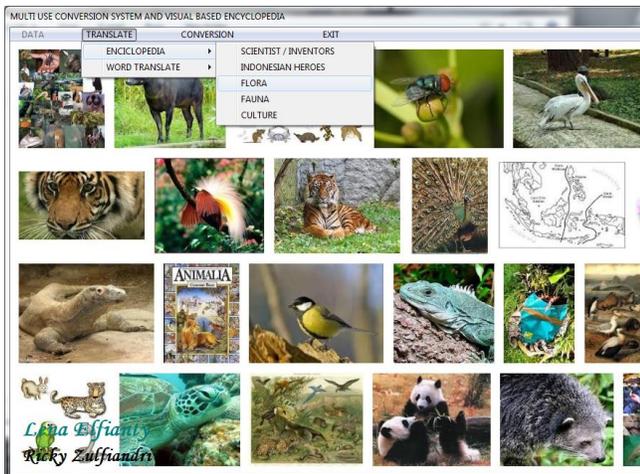


Fig. 3. Fauna

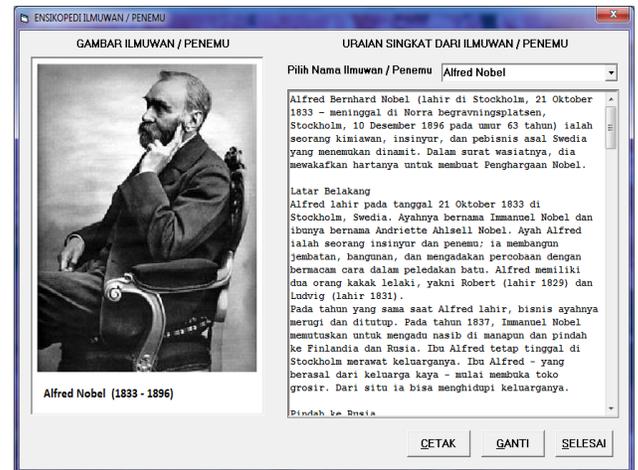


Fig. 6. Encyclopedia of Scientist/Inventors

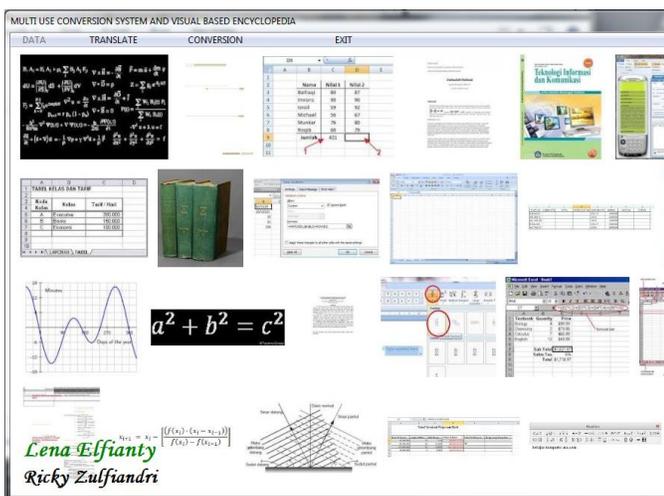


Fig. 4. Conversion

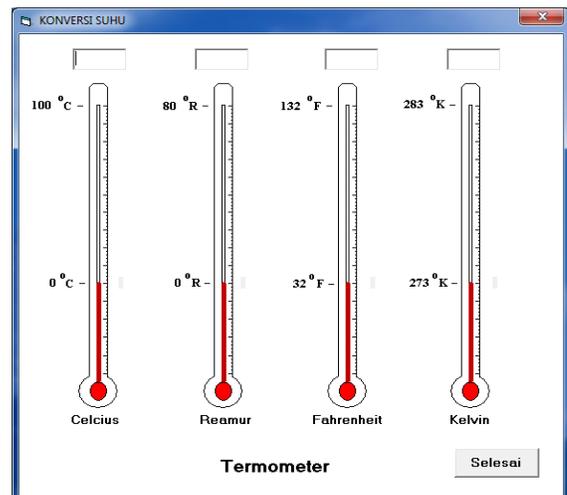


Fig. 7. Converting with any termometers

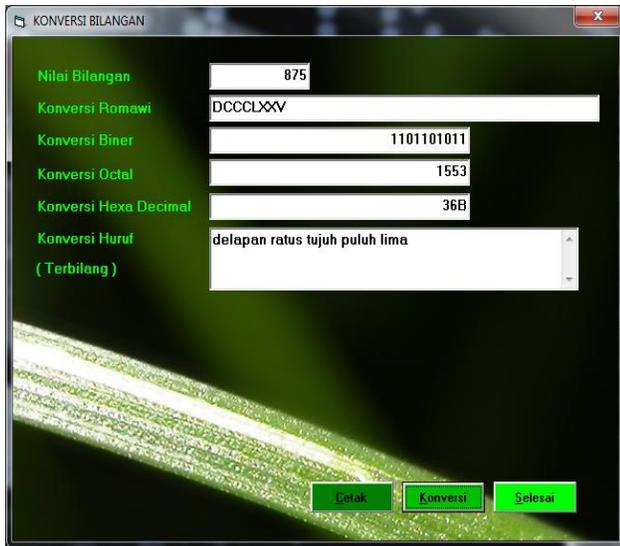


Fig. 8. Number Converting in any bases



Fig. 9. Word translating in any regional language

V. CONCLUSION

1. That the form of data processing does not merely have to change numbers into other numbers, but can also be changed and transformed into text and image forms that provide more information.
2. That conversions and encyclopedias are needed for many users because in certain conditions a person is susceptible to forgetfulness
3. That the scope of the field of information technology is very broad depending on how to utilize and interpret the information technology intended.

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Antimicrobial Activity of Orange Extract on Selective Oral Biofilm Bacteria

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Abstract- This study was planned to identifying the Microorganisms are present in oral cavity as normal microflora. However the fact that they become harmful due to some oral infections made us to investigate the inhibitory effect of orange juice extract on them. Total 20 samples were collected. Samples were taken from patients suffering from throat infection. On the basis of morphological variations 6 strains were selected and were tested for their sensitivity against orange juice extract. Some strains are resistant but 3 strains were sensitive against orange juice extract. Aqueous layer of juice extract proved to be more effective in their antibacterial activity on studied strains as compared to methanolic ones. Minimum inhibitory concentration (MIC) values of these extracts were also determined. Moreover, these fruit extracts also tested for their antibacterial activity against clinical isolates and proved to have significant inhibitory effect on growth of these isolated bacteria, providing an alternative to treat various infections caused by these antibiotic resistant strains. Hence this study also enhances the nutrition value of orange juice because orange juice provides the resistance against some kind of oral bacteria.

Index Terms- orange, nutrition value, oral bacteria

I. INTRODUCTION

Microorganisms have important effect on human health to environment and to our economy. Some of them have beneficial effects without which we could not exist but others have harmful effects. Our battle overcome their harmful effects our understanding and ingenuity to the limit. Saprophytic decomposers play an important role in breaking down dead organic matter in ecosystem but on the other hand these microorganisms also responsible for food spoilage and subsequent illness so microorganisms can be beneficial or harmful depending upon what we want from them. (Kroes *et al.*, 1999).

Disease and decay are results from physical damage or being eaten by insects it is microorganism that bring about these changes; these are not the inherent properties of organic objects. Many microorganisms are capable of invading in our body and

causing human disease and some of them cause diseases in farm animals. (Beighton *et al.*, 2010)

New compounds from plants which have some kind of vegetables and fruits lead synthetic antimicrobial compounds which have ability to prevent the resistance of pathogenic bacteria to antibiotics. It is necessary to evaluate the potential of folk medicine on scientific basis if we want to use folk medicine for the treatment of common infectious diseases. (Fabricant and Farnworth, 2001).

The presence of a resident microflora is not essential for life, but is an important component if the host is to have a normal existence. Information on the beneficial role of the resident microbial flora has come from early studies comparing the physiology of germ-free and conventional laboratory animals, and from humans in whom the normal flora has been disrupted by long-term administration of antibiotics. Most studies have focused on the gut microflora but, in general, such findings are also relevant to the mouth (Lamont *et al.*, 2000).

One of the most popular fruits around the world is oranges. It is their juice that is most associated with good health having a reputation for being an integral part of healthy breakfast, while they are as a snack or as a recipe ingredient for many Americans. Oranges are round citrus fruits with textured skins and their color just like pulpy flesh. They usually two to three inches in diameter. Oranges are classified into two general categories sweet and bitter with former being type most commonly consumed. Valencia Navel and Jaffa oranges as well as the blood oranges are popular varieties of the sweet oranges (*Citrus sinensis*), smaller size hybrid species are more aromatic in flavor and has red hues running throughout its flesh. Bitter oranges serve as flavoring for liqueurs such as Grand Marnier and Cointreau or used to make jam or marmalade also. (Guarnieri *et al.*, 20017). Against pimples, wrinkles, acne, blackheads and blemishes are good antioxidants. In glowing of skin oranges along with other products are helpful. Oatmeal and honey mix with the paste of orange juice and apply on the face and leave it for 20 minutes then wash it Orange peel powder and milk also used to make skin beautiful. Gentleness of skin increased when orange juice rubs on face since they have

adequate amount of vitamin C. For blemishes and prevention of acne eating of oranges is also good.(Abeyasinghe *et al.*, 2010). The aims of this study was to identify and characterize the microorganism mostly present in oral cavity, to test the antibiotic resistance profile of isolated clinical strains, to find out the antibacterial activity of orange juice against oral bacteria either the orange juice have any ability to resist the bacteria present in oral cavity.

II. MATERIAL AND METHODS

Bacterial sample collection:

Total 20 samples were collected from patients including both male and female of Mayo hospital Lahore. Samples were collected from mouth specifically tongue and buccal region of patients having throat infections with the help of sterilized swab. The swabs were immediately dipped in 1ml of 0.85% saline solution. Within 2-3 hours of sample collection, 100µl of each sample was spread on nutrient agar plates (Prepared by 7g nutrient agar in 250ml distilled water).100µl of each sample was pour with the help of micropipette and spread on nutrient agar plates (Each plate containing 15µl nutrient agar) with sterilized glass spreader and the plates were incubated at 37° C for 24 hours. After 24 hours of incubation, morphologically different bacterial colonies were selected and purified on agar plates after several hours of streaking and restreaking.

Table 1. Nutrient-Agar

Sr. No	Component	gL ⁻¹
1	Nutrient broth	13
2	Agar	15

pH adjusted to 7.0

Morphological Characterization of Isolates

Following Gerhardt *et al.* (1994), purified colonies were grown on nutrient agar and characterized them on the basis of size, shape, margins, elevation, colour, texture etc.

Gram staining (Gerhardt *et al.*, 1994)

Bacteria react differently to a specific staining process because they different from one another physically and chemically. Staining depends on the fact that bacteria differ chemically from their surroundings and thus can be stained to contrast with their environment. The Gram stain is extensively used for this purpose. The procedure involve is taking a clean glass slide and adding a drop of water on it. With the help of sterilized inoculating loop added a small amount of bacterial sample on clean slide and making a thin smear. Smear was heat fixed by passing the slide 2-3 times over the flame. The smear was stained with the basic dye crystal violet for 1-2 minutes. This is referred as primary staining. The smear was then treated with iodine solution for 1 minute, iodine solution act as mordant (enhance the interaction between dye and bacterial cell). The smear then wash with the decolorizer the crystal violet-iodine complex was retained by gram positive bacteria while gram negative bacteria appeared colorless as they lose their crystal-

violet iodine complex. The smear was counterstained with safranin for about 30 seconds. Safranin did not change the deep purple color of gram-positive bacteria, while colorless gram negative bacteria were stained pink with it. Thus, gram negative bacteria appeared pinkish to red in color while gram positive bacteria appeared dark purple under the microscope with an oil immersion lens.

Solution for Gram's staining

Solution I

Table 2. Crystal violet solution

S. No	Components	Quantity
1	Crystal violet	10g
2	Ammonium oxalate	4g
3	Ethanol 20%	500ml

Solution II

Table 3. Iodine Solution

S. No	Components	Quantity
1	Iodine	1.25g
2	Potassium iodide	2.5g
3	Ethanol	156.2g

Solution III

Table 4 Safranin solution

S. No	Components	Quantity
1	Safranin	4g
2	Ethanol 95%	500ml

Acid-Fast staining (Benson, 2002)

It is the differential staining techniques which was first developed by Ziehl and later on modified by Neelsen. So this method is also called **Ziehl-Neelsen staining** techniques. Neelsen in 1883 used Ziehl'scarbol-fuchsin and heat then decolorized with an acid alcohol, and counter stained with methylene blue. Thus Ziehl-Neelsen staining techniques were developed. The main aim of this staining is to differentiate bacteria into acid fast group and non-acid fast groups. This method is used for those microorganisms which are not staining by simple or Gram staining method, particularly the member of genus *Mycobacterium*, are resistant and can only be visualized by acid-fast staining.

Table 5 Ingredient for acid fast staining

Application of	Reagent	Cell colour	
		Acid fast	Non-acid fast
Primary dye	Carbolfuchsin	Red	Red
Decolorizer	Acid alcohol	Red	Colorless
Counter stain	Methylene blue	Red	Blue

Procedure involve is that Prepare bacterial smear on clean and grease free slide, using sterile technique. Allow smear to air dry and then heat fix. Cover the smear with carbolfuchsin stain and placed over boiling water or steam for 5 minutes. Allow the heated stain to remain on the slide for 5 minutes .Afterward the slide was cooled and rinsed with decolorizing agent such as acid alcohol for about 5 minutes. well with clean water. Few drops of malachite green on the smear stain for 1–2 minutes using the longer time when the smear is thin. Wash off the stain with clean water. Wipe the back of the slide clean, and place it in a draining rack for the smear to air-dry. Examine the smear microscopically, using the 100 X oil immersion objective.

Solution for Acid-Fast Staining

Table 6 Ziehl-NeelsenCarbol-Fuchsin Solution

S. No	Components	Quantity
1	Basic Fuchsin	2.5g
2	Distilled water	250ml
3	100% alcohol	25ml
4	Phenol crystals, melted	12.5ml

Table 7. 2.1% Acid Alcohol

S. No	Components	L ⁻¹
1	Hydrochloric Acid	10ml
2	70% Alcohol	990ml

Table 8 Methylene Blue Working Solution

S.No	Components	Quantity
1	Methylene blue stock	5ml
2	Distilled water	45ml

Motility test (Benson, 2002)

The motility of bacteria was tested by inoculating tubes containing semi solid agar medium. The bacterial culture was

stabbed into medium tubes with inoculating needle and the tubes were incubated at 37⁰ C for 24 hours. The growth of non-motile bacteria was confined to the stab line while the growth of motile bacteria was not restricted to the stab line of inoculation.

Table 9 Semi solid medium for motility (Benson)

S. No	Components	gL ⁻¹
1	Tryptone	10
2	Yeast extract	5
3	Sodium	5
4	Agar	10

Fruit Material

Oranges (Citrus sinences) was used for the preparation of fruit extract.

**Preparation of fruit extract
Methanolic extracts**

Oranges were washed with distilled water and then their weight was determined by using weight balance. Then their juice was taken. After this fresh juice was filtered by using Whatman Filter Paper (1), then again their weight was determined. Methanolic extract was prepared by mixing equal amount of orange juice and methanol 1:1. After mixing this, mixture was poured into a separating funnel. After vigorously shaking, three layers were separated. Collected three layers separately into three different clean beakers. The first layer called as aqueous layer which contains only polar compounds. Second layer called as central layer which contains both polar and non-polar compounds. Third layer called as Non polar layer. All three layers were subjected to dry in sunlight or to air dry for the collection of extract powder.

After getting powder, aqueous layer was used for making stock solution. Stock solution was made by adding 1g of extract powder into 5ml of distilled water. From this stock solution, 4 dilutions 100%, 50%, 25%, 12.5% were made by adding 0.5ml, 0.25ml, 0.125ml and 0.0625ml of juice into 5ml of distilled water respectively.

ANTIMICROBIAL ACTIVITY OF FRUIT EXTRACTS

Antimicrobial activity of fruit extract was determined by agar well diffusion method. To check bacterial susceptibility on different dilutions (100%, 50%, 25%, and 12.5%) of methanol fruit extracts were made. 10µl of bacterial culture was spread on labeled nutrient agar plate with the help of sterilized glass spreader. Well were made by using sterilized borer. Each well labeled for different dilutions was filled with 50µl fruit extract. Then plates were incubated at 37°C for 24 hours. After incubation the zones of inhibition were measured by measuring three values and taking mean value.

MINIMUM INHIBITORY CONCENTRATION

MIC is defined as the lowest concentration of fruit extract which inhibit the growth of microorganism. MIC of extracts was determined by broth dilution method. The methanolic extract of orange was diluted to the concentration

ranging from 6mg to 46mg ml⁻¹ in 3ml nutrient broth. 150µl of overnight bacterial suspension with turbidity of 0.5 was inoculated into the test tubes. The tubes were incubated for 24 hours at 37°C. After incubation O.D was determined at 590nm. MIC was recorded as the lowest concentration which showed no visible growth.

III. STATISTICAL ANALYSIS

Results obtained in these experiments were analyzed statistically following. Means and standard errors of the means were calculated. The difference between the means of minimum inhibitory concentrations were collected using 't' test.

Table 10: Analysis of colony morphology of oral microbial isolates

Strains	Form	Color	Texture	Margins	Elevation	Optical character	Surface
A1	Circular	Yellow	Buttery	Entire	Raised	Yellow	Shiny
A2	Circular	Light yellow	Buttery	Entire	Raised	Light yellow	Smooth
A3	Circular	Light yellow	Moist	Entire	Raised	White	Smooth
A4	Circular	white	Moist	Undulate	Raised	Light yellow	Wrinkled
A5	Circular	transparent	Moist	Entire	Raised	Transparent	Shiny
A6	Circular	transparent	Dry	Entire	Raised	Transparent	Smooth

MORPHOLOGICAL CHARACTERIZATION OF ISOLATES

Gram staining

In gram staining, 2 strains appeared dark purple under the microscope with an oil immersion lens indicating that they were gram positive (Figure 4.1) while the remaining 4 strains appeared pinkish to red in color showing that they were gram negative (Table-4.3).

Acid Fast Staining

IV. RESULTS

ISOLATION OF BACTERIAL STRAINS

Out of 20 samples taken from patients suffering from throat infections 6 bacterial strains were isolated and then purified on nutrient agar. Through Morphological characterization of 6 strains isolated from throat 6 clearly different strains were selected out of which 1 strain was yellow, 2 were light yellow, 1 was white, 2 were transparent. Three strains showed smooth surface, 1 had wrinkled and 2 had shiny surface. Among the 2 strains, 1 exhibits the circular shape, entire margin and raised elevation. Moreover out of six strains 3 were moist, 2 were buttery and 1 was dry in their texture.

All 6 selected strains showed blue color under 40x light microscope indicating negative results and thus confirming absence of Mycobacterium among tested isolates (Table-4.3).

Motility test

In motility test, growth of 3 strains [A1, A2 and A4] was not confined to the stab line of inoculation showing that these strains were motile, while the rest of 3 strains were found to be non-motile (Table-4.2).

Table 11: Morphological characterization

S. No	Strains	Gram staining	Acid staining	fast	Motility
1	A1	-	Blue		Non motile
2	A2	-	Blue		Non motile
3	A3	-	Blue		-
4	A4	-	Blue		Motile
5	A5	+	Blue		-

ANTIBACTERIAL ACTIVITY OF PLANT EXTRACTS

Antibacterial activity of fruit extract was determined against all the 6 strains. Among four dilutions that were made, 100% dilution of all extract was found to be most effective. In case of orange juice extract the diameter of zone of inhibition 1.5-6.25mm. When we take 500µl juice extract in wells maximum zone of inhibition is shown by *Klebsilla* spp that is 6.25±0.5mm and smallest zone of inhibition is shown by *Lactobacillus* spp. which is 3±0.816mm *Salmonella* spp shows in between zone of inhibition which was 4.25±0.5mm. When we

take the amount of juice extract is 250µl then maximum zone of inhibition was shown by *Klebsilla* spp which is 5.5±1.290mm and smallest zone of inhibition is shown by *Lactobacillus* spp which is 2.25±0.957mm and salmonella shows zone of inhibition 3.25±0.957mm which is intermediate zone of inhibition between first two bacterial species. When we use the amount of juice extract is 125µl in wells then again maximum zone of inhibition is shown by *Klebsilla* spp. Diameter of zone of inhibition is 3.5±0.577mm and *Salmonella* spp. was shown the intermediate zone of inhibition whose diameter is 3±0.186mm. When we use

the 62.5µl concentration of juice extract in wells then smallest zone of inhibition is shown by *Lactobacillus* 1.25±0.5mm and *Salmonella spp* shows the diameter of zone of inhibition is

1.25±0.5mm and *klebsilla spp* shows the diameter of zone of inhibition is 3±0.816.

Table 12: Effects of methanolic extract of fruits on bacterial isolates

Fruit extract used	Strain	Zone of inhibition in mm(ZI)± S.D			
		12.5%	25%	50%	100%
Orange	<i>Klebsiella spp.</i>	3±0.816	3.5±0.577	5.5±1.290	6.25±0.5
	<i>Salmonella spp</i>	2.25±0.5	3±0.816	3.25±0.957	4.25±0.5
	<i>Lactobacillus spp.</i>	1.25±0.5	1.75±0.5	2.25±0.957	3±0.816

aq: aqueous; meth: methanolic

ZI: Zone of inhibition; SD: Standard Deviation

MINIMUM INHIBITORY CONCENTRATION (MIC)

MIC of fruit extract showing antibacterial activity were determined and broth dilution method was used to determine the MIC of fruit extract (Table-4.7). Result indicated that MIC values of aques layer of orange juice extract were in the range of 15-25mg ml⁻¹ for different selected strain. The MIC value against *Klebsilla spp* was 20mg ml⁻¹,15mg ml⁻¹ for *Lactobacillus*and 25mg ml⁻¹ for *salmonella spp*.

Table 13: Minimum Inhibitory concentration (MIC) of fruit extract

Fruit Extract	Strains	MIC Mg ml ⁻¹
Orange	A1 <i>Klebsiella spp.</i>	20
	A4 <i>Salmonella spp</i>	25
	A5 <i>Lactobacillus spp.</i>	15

V. DISCUSSION

Bacterial species were identified by using standard laboratory criteria (Colony morphology, Texture, Color, Catalase production, Hemolysis pattern etc.) as well as through biochemical testing. Isolates showed resemblance in morphology and biochemical characteristics but they also exhibited some diversity. They showed circular/irregular margin (Table-4.2). The selected strains also showed different hemolytic patterns on blood agar. All strains were good in growth on chocolate agar (Table-4.4). The bacterial ability to exhibit morphological variation may be an adaptation to thrive in a wide range of environmental conditions Jiang (2007), On the basis of biochemical testing, the strain isolated from clinical sample belong to the genus *Klebsiella*, and *Salmonella* (Table- 4.6). Similar results were reported by Keskin (2010), who found that gram negative bacteria belonging to the family Klebsiella,

Enterobacter were the most common cause of oral infections. However gram positive bacteria such as *staphylococcus spp* and *Lactobacillus spp* also play their role in causing these infections. According to Noack (2001), the microorganism causing oral infections vary from time to time. These infections may be monomicrobial or polymicrobial.

Fruits extracts were effective in decreasing the capacity of biofilm formation showed by studied strains susceptibility of oral bacteria against fruit extract (Table- 4.6). According to study by Percival (2010) fewer fractions of terpineol and other terpene citrus oil appeared to have greater inhibitory effect on food-borne bacteria than other citrus oils or derivatives. As compare to gram negative bacteria gram positive bacteria were more sensitive to essential oils in general.

The purpose of this study was to identify bacteria present in oral cavity of those people who suffering from some kind of oral infections and monitoring the inhibitory effect of fruit extract against them. Oral infections causing clinical isolates usually cause serious infection and are very tough to eradicate mainly because of the development of high resistance against commonly used antibiotics. Hence, there is an immediate need to find out an alternative to treat these microbial infections. Fruit extract prove to have remarkable antibacterial activity against antibiotic resistant bacteria. In this study, three clinical isolates i.e. *Klebsiella spp*, *Salmonella spp*and *Lactobacillus* were found to have potential oral infection capacity. Alcoholic extract of orange juice was tested for their antibacterial properties against these isolates. This fruit extract proved to have significant antibacterial activity and thus provided a way use them as an alternative to treat different infection caused by antibiotic resistant, biofilm forming clinical isolates

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Evaluation of Factors Affecting Sustainability of Upland Rice Value Chain Development for Food Security in Kakamega County, Kenya.

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Abstract- Upland rice value chain development for food security study was done in Kakamega county to contribute to knowledge on sustainability of new innovative technologies thus achieve food security and overall development as intended. Solutions and suggestions regarding what promoters of new technologies such as upland rice value chain should do to ensure that even after promotion period the value chain continues to be implemented by value chain actors and that the benefits are maintained and well distributed among the direct actors (input suppliers, producers, transporters and traders). The data was analyzed by descriptive statistics and chi-square. The study established that demographic factors such as gender of household head, age of household head, and educational level of household head, methods of food acquisition and unreliability of socially inclusive credit affected sustainability more than other factors analyzed. Dependency on free inputs, donors withdrawal before development of upland value chain and Value chain growth plan not well understood by VCAs least affected sustainability of the new technology upland rice. This implies that some little intervention on these factors will shed light on the value chain development thus its sustainability. Government and donors alike have focused heavily on production to improve food security in Kenya while ignoring the wider value chain development and factors affecting sustainability, adoption and upgrading of new innovative technologies such as upland rice which could save the 7 billion spent on rice imports and humiliating hunger and poverty in the country. Implementing recommendations made in this study will reduce vulnerability to disasters such as food insecurity. Sustainable upland rice value chain will increase cash incomes and create assets which families can fall back to when disasters occur hence the concept of pro poor growth in value chains can be achieved.

Index Terms- credit products, demographic, donor support, growth plans, value chain organizations factors.

I. INTRODUCTION

A handful of the rapidly growing literature on upland rice value chain and food security focuses on routine production and little marketing and that is the information relied on by implementers of the value chains to steer food security campaigns. Small scale Farmers take up the inadequate information, make little increase in production and income while in the value chain is being promoted but when promoting programmes wide up, farmers are not able to maintain even the little benefits and therefore fall back into grave food insecurity. KALRO scientists researched on adaptability of upland rice technology at Alupe Busia County, and then trials were done in Kakamega and other counties, after realizing that the production was okay the rest of the value chain nodes were not considered how they were to be sustained for food security attainment. Rice yield in upland systems in Africa is about 1 ton ha⁻¹ (Africa Rice Center, 2008 Kijima et al. 2006). According to Africa Rice Center (2008), NERICA responds better to inputs than the traditional varieties hence producing enhanced yield. Preliminary evaluations from WARDA showed that NERICA has surpassed the local landraces in yield with a potential to revolutionize the rice industry. Reutlinger and Selowsky argue that food insecurity is caused by poverty. Entailments approach by Sen (1986), postulates that food security depends on production of own food, ability to buy food and accessibility to food on market in terms of transport facilities and prices. Seavoy (1989) pointed out that most households suffer from food insecurity due to lack of transformation from subsistence to commercial farming. Value links, a manual on the methodology of value chain promotion reprint of first revised edition, January 2008 describes procedures of promoting value chains from deciding whether to promote up to monitoring without guidance on how the sustainability will be done. The finding of this study will guide and fill the gaps that exist on sustainability of the upland rice value chain for benefits of farmers to finally realize food security and sustained benefits of commercialized value chain. The study is based on the theory that; Upland rice Value chain development is for business purpose where farmers invest to produce rice, process it, feed their households and market surplus product to larger community thus achieving food security. Value chain theory by Michael Porter describes a value chain as processes by which businesses receive raw materials, add value to create a finished product and then sell the finished product to customers. The findings of this study on the demand for rice among the 172 HH sampled in Kakamega county were that 55 HH (32%) of HH take at least 0.5 kg of rice per day, 103 HH (60%) take at least 1kg of rice, 10 HH (6%) take at least 2kg of rice per day and 4 HH (2%) take none.

II. RESEARCH METHODOLOGY

Study site

The study was conducted in Kakamega (Kakamega central (Lurambi and Navakholo) of Kakamega County, Kenya which was purposively chosen for being pioneers in implementation of upland rice value chain. Kakamega County is one of the 4 counties in the former western province. It comprises of 13 sub counties namely; Kakamega central, Navakholo, Kakamega east, Kakamega south, Mumias west, Mumias East ,Butere, Kakamega north, Matungu, Lugari, Matete, Likuyani and Kwisero figure 1 below. The County is food Deficit despite funding of various value chains which makes it difficult to meet the needs of its growing population through formal and informal imports of maize as well as rice and wheat. The poverty rate of the two study sites Kakamega central and Navakholo is at 53% which means more than a half of the population in the two sites lives below poverty line. Information provided by this study on how to develop and sustain benefits of upland rice value chain was important for attainment of food security and poverty alleviation.

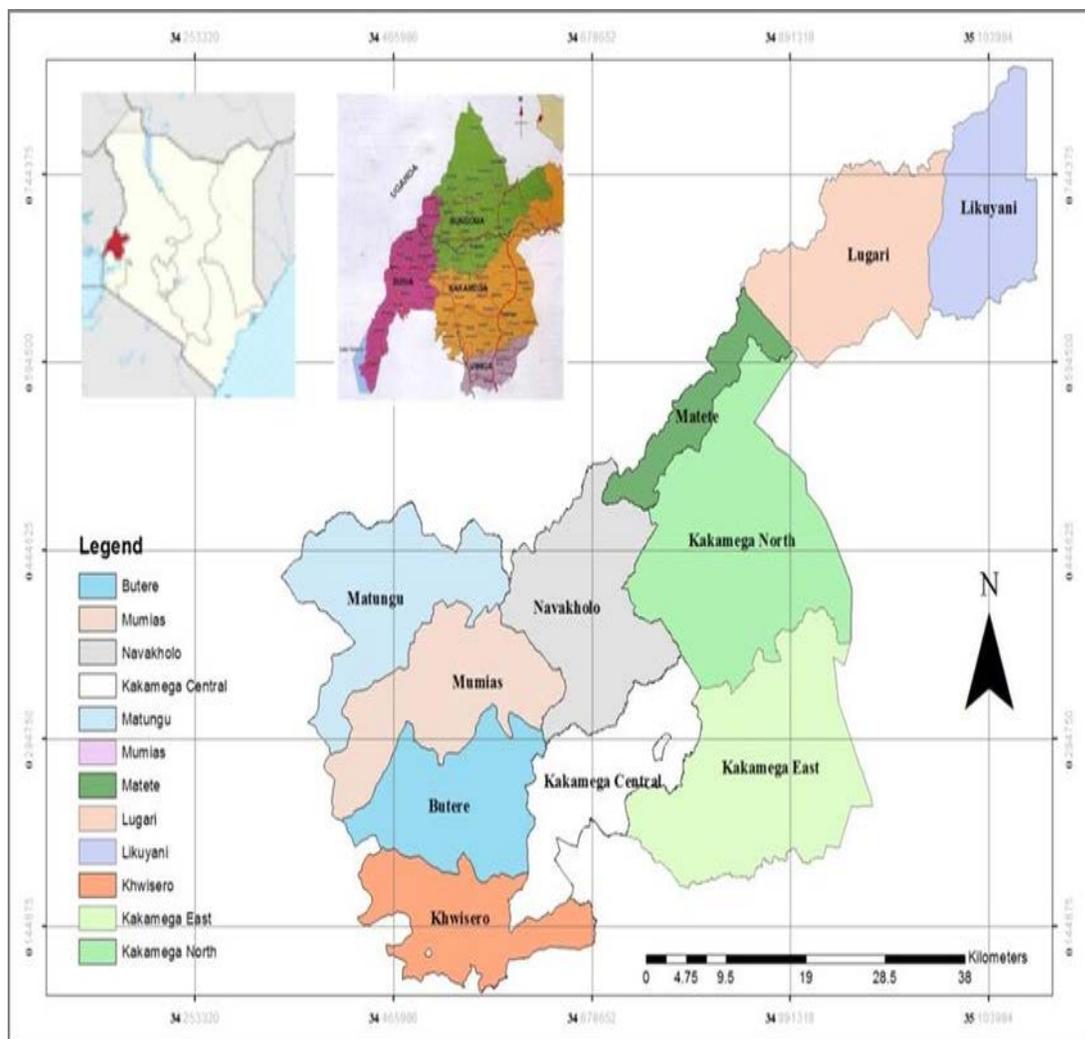


Figure 1: Map of Kakamega County showing study site Kakamega central
Source: The Kenya County map (2010)

Descriptive research design was used to describe the variables as they exist. The relationship between upland rice value chain development and its effects on food security were analyzed as they existed to fill the knowledge gap that was necessary for use by development partners and researchers. To solve the problem on food security and show the way to anti-poverty programmes that have

been concentrating on production and wide up without putting in place sustainability of the value chain measures, a study was conducted in Kakamega (Lurambi and Navakholo) of Kakamega County, Kenya which was purposively chosen for being pioneers implementation the value chain and being one of poorest counties where half of the population lives below poverty line despite implementing many value chains. In 2014, Kakamega County was ranked the poorest county in Kenya with a poverty incidence of 49.2 percent (more than 809,500 of its people live below poverty line) according to ministry of planning on socio economic atlas of Kenya. After understanding the challenges of the county on value chains through the few literature available, this study was done to find solutions to the problem. A population sample of 172 out of the 573 HH that were implementing upland rice value chain was taken. According to Luvisia, (2002), a sample of 10-30% of total population is appropriate in social studies. The study population comprised of individual household under shiba rice SACCO, 10 community groups with an average membership of 20 making a total of 200 beneficiaries /members, key informants were purposively selected from opinion leaders, GOK departments, NGOs involved in implementation of the VC Kakamega central (Lurambi and Navakholo divisions) as shown in table 2. Evaluation research design was used in this survey to get factual information necessary for decision making. The variables, upland rice value chain sustainability and effect on food security were described and analyzed as they exist as per table 1. The purpose of this design in the study was to establish factors affecting upland rice value chain sustainability for food security in Kakamega.

Table 1: Specific objective and indicators

SPECIFIC OBJECTIVES	MEASURABLE VARIABLES/INDICATORS
To determine the factors affecting sustainability of upland rice value chain for food security.	Social demographic factors, inputs, donor support, growth plans, credit products, factors value chain organizations.

Table 2: Sample and sampling technique

Study population	Total number of HH/FGs growing rice	Sample Determination method	Sample size(n)
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The	Kakamega central(Lurambi)HH	382	30% of total Population	random sampling	115 HH
	Navakholo Nambacha) HH	191	30% of total Population	random sampling	57HH
	Kakamega central(Lurambi) FGs	7		Purposive sampling	7 FGs
	Navakholo Nambacha)FGs	3		purposive sampling	3FGs
	2 Sub County Agriculture Officers			purposive sampling	2
	1Assistant county commissioner Lurambi			purposive sampling	1
	1 Equity bank representative			purposive sampling	1
	1 SHIBA Rice director			purposive sampling	1
	Chief Lurambi			purposive sampling	1
	1 Lake basin authority staff			purposive sampling	1
	1 KALRO staff			purposive sampling	1
	1 ward officer Lurambi			purposive sampling	1

collected data was analyzed based on the specific objective of the study; specific objective was to determine the factors affecting sustainability of upland rice value chain development for food security. The Variables were: demographic factors, Dependency, beyond donor funding challenges, value chain growth path not well understood, lack of socially inclusive credit and mistrust in value chain organizations.

III. RESULTS AND DISCUSSION

The study sought to determine the factors affecting sustainability of upland rice value chain development for food security in Kakamega County as follows:

Table 3:Gender distribution of household head in Kakamega County

GENDER	FREQUENCY	%
Male	120	69.8
Female	52	30.2
Total	172	100

Source: Field data, 2017

The chi-square test ($X^2_{1, 0.01}=26.8$) shows the variation in the distribution is highly significant ($P<0.01$) among the household head, the majority of the households were headed by males as per analysis in the table above.

Most households in the region were male headed. According to the VCAs in this study, upland rice value chain products are some of the assets owned by women in male headed households just because it is a new technology and men have not yet realized the value of it due to low volumes being realized due to lack of value chain coordination and sustainability. The land resource allocated to the women by men for rice production is therefore small ranging from 0.025 to one acre which in return affects the volumes produced. It was observed during the field study that men are majority in value chain organized trainings whereas women are majority in provision of labour. Thus gender inequality in knowledge acquisition leading to unsustainable value chain. Gender inequalities at household level affect the technical know-how particularly for women who are majority in provision of labour. .

Table 4:Age household head in Kakamega County

Age bracket	Number	Percentage %
19-35	33	19
36-52	104	61
53-69	26	15
Over 70	9	5
Total	172	100

Source: Field data, 2017

The Chi square ($X^2_{3, 0.01} = 122.47$) shows there is a highly significant ($P < 0.01$) variation among age group distribution for household head.

The finding shows that this region has most household heads aged between 36-52 years with the youngest and the oldest being 19 and 78 years respectively. These results imply that more than a half of middle age adults in the county are actively involved in food security activities and therefore with proper sustainability of the value chain food security can be achieved.

Educational level of household head

The data on education of household was essential to establish how value chain business sustainability was being affected by the level of education especially in terms of documentation of farm records and profits.

Table 5: Education of household head in Kakamega County

Education level	Frequency	Percentage
Primary	120	70
secondary	38	22
Tertiary level	14	8
Total	172	100

Source: Field data, 2017

The Chi-square test ($X^2_{2, 0.01} = 107.7$) shows there was a high significant ($P < 0.01$) variation household head level of education as shown in above. Education level of the household head is important when it comes to analysis of the value chain profitability, record keeping and overall assessment of the value chain at farm level by individual farmers.

Household food acquisition in Kakamega County, Kenya.

Kakamega County is food insecure due to unsustainable value chain development and thus the study analyzed food acquisition methods in the county.

Table 6: Household food acquisition in Kakamega County, Kenya.

How food is acquired	frequency	percentage
On farm	37	22
purchase	133	77
Assisted	2	1
Total	172	100

Source: Field data, 2017

The chi-square test ($X^2_{2, 0.01} = 181.65$) shows there is a highly significant ($P < 0.01$) variation among household food acquisition methods. Most households at 77% purchase food, 22% have sufficient food throughout the year and 1% are assisted. Most of

household income in the county goes to food purchase and therefore the households are not able to accumulate enough assets for wealth making.

Food self-sufficiency will make the value chain sustainable since the income accrued from the surplus rice will be used to invest continuously on the chain development.

Number of meals taken by household

The respondents in the sample were asked to state the number of meals taken per day /HH to establish whether the HH were food secure.

Table 7: Number of meals taken by household per day in Kakamega County

Number of meals	Frequency	percentage
Three	57	33.1
Two	104	60.5
One	11	6.4
Total	172	100

Source: Field data, 2017

The chi-square test ($X^2_{2,0.01} = 75.43$) shows there is a highly significant ($P < 0.01$) variation among household number of meals taken per day. Majority of households at 60.5 take two meals per day as shown in the table 7.

The study established that even the food consumed is purchased from the market due to limited food self-sufficiency at household level. Dependency on food from market is at 77%. This simply means that the purchases consume household savings as a result of high costs of food leading to a decline in the household asset base. Inadequate food and low asset base status at household level. That affects families both economically and nutritionally and this study has come on board to provide the necessary information required for development of viable value chains such as upland rice for food self-sufficiency and sustainable development.

House hold demand for rice per day

The household respondents were asked to state the amount of rice consumed in the household per day and the average price of rice in the market. Each household stated on average the amount of rice eaten either as breakfast, lunch or supper and the price at which they buy it per kg. The data collected was used to project the county demand for rice.

Table 8: Household demand for rice per day in Kakamega County, Kenya.

Quantity In Kgs	No of household demanding rice per day	Total rice Volume in Kgs consumed by household	No of HH in Kakamega county	County projection	Price per kg	Value of rice in KES
0.5kg	55(32%)	27.5kgs	37689	5672194.5 kgs	100	567,219,450
1kg	103(60%)	103 kgs				
2kg	10(6%)	20 kgs				
none	4(2%)					
Total	172(100)	150.5	37689	5672194.5	100	567,219,450

Source: field data, 2017

In terms of quantity demanded and consumed per household ; 32% take at least 0.5 kg of rice per day, 60% take at least 1kg of rice, 6% take at least 2kg of rice per day and 2% take none. According to this study, the projected consumption per day of rice per day in the county is 5672194.5 kgs valued at 567,219,450 KES. This implies that a lot of money is spent on purchasing food especially rice and that could be saved through adoption and sustainability of the new technology of rain fed rice production.

Table 8: Other Sustainability factors affecting upland rice value chain development in Kakamega County Kenya.

Factor affecting sustainability	Number of micro actors ranking it as a major factor	Percentage as ranked by micro actors
Dependency on free inputs	15	8.7%
Donors withdraw before proper value chain development	24	13.9%
Value chain growth plan not well understood by VCAs	27	15.6%
Unreliable socially inclusive credit	60	34.8%
Mistrust at value chain organizations	46	26.7%
Total	172	100%

Source: Field data, 2017

Among the reasons given unreliability of socially inclusive credit affects the value chain sustainability more than other factors at 34.8 %. Mistrust at VCOs affected sustainability at 26.7%. It was observed that there was need for building trust in value chain organizations for upland rice value chain to be sustainable. The trust could be built through conflict resolution mechanisms and coordination of actors. Unless some coordination mechanism of the value chain actors is already in place sustainability of the value chain will not be easily achieved. The value chain growth plan should be well understood by actors. Donors should incorporate sustainability mechanisms in the design of the value promotion plan. Actors should invest on value chain development and avoid dependency on free inputs.

IV. CONCLUSION

Kakamega County is food insecure. Dependency on free inputs, Donors withdraw before development of upland value chain and Value chain growth plan not well understood by VCAs least affected sustainability of the new technology upland rice. This implies that some little intervention on these factors will shed light to the value chain development. Social demographic factors that constraint the value chain sustainability significantly were; gender of household head, age of household head, education of household head, Household food acquisition and number of meals taken by household per day. Similarly, unreliability of socially inclusive credit and Mistrust at value chain organizations affected upland rice sustainability more. The implication is that the above factors that hinder sustainability must be addressed as per the finding of this study for the value chain to be sustainable.

V. RECOMMENDATIONS

The study recommends that for the value chain development to be sustainable and food security achieved, Support activities and interventions of the upland rice chain development should actually be taken up and maintained by value chain actors even after the support programmes wide up or cease to fund .Both direct and indirect actors of upland rice value chain should build synergy to identify and engage a reliable credit service provider for interventions on socially inclusive credit provision for sustainability of the value chain.

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Determination of Statistically Significant Variables Affecting Inflation in The Kenyan Economy

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Abstract: The main purpose of this research was to establish the statistically significant factors that determine the rate of inflation in Kenya for duration of 30 years from 1987 up to and including 2017. The research considered data in the areas that included money supply, Central bank rates, currency exchange rates, salaries of employed Kenyans, basket prices of foodstuffs, the price of petroleum products, rates of corruption in the country and Political stability as a dummy variable. The research employed time series analysis that used Ordinary Least Squares estimation covering the mentioned period and regressing the factors affecting inflation to reveal the statistical effect of each of the factors on the inflation rate. It also involved testing significance of parameters and picking the statistically significant factors to create an econometric model. The research revealed that average inflation rate is at 11.908% with a standard deviation of 8.0923 as at 2017. The highest inflation rate was at 45.97% and the minimum at 1.5543%. Food prices have been ranging from 77.8 units to 169.9 units with a mean of 110.14 units and a standard deviation of 23.78. Oil prices have ranged between 69.6 units and 188.1 units with a mean of 102.29 units and a standard deviation of 26.23. The central bank rates range between 8.00% and 36.24% with a mean of 16.68% and a standard deviation of 6.78. The lowest monetary growth is at 0.78% and the maximum at 48.8995% with a mean of 16.73% and a standard deviation of 9.56. According to the respondents, their perception on corruption ranges between 0.03 and 0.33 with a mean of 0.2144 and a standard deviation of 0.063. The regression coefficient showed that there is a negative relationship between food prices and inflation level, oil prices are statistically significant and have a negative relationship with the level of inflation. Central Bank Rates, Monetary Growth and Wage Rate Coefficient have a positive relationship with inflation level while GDP rate and corruption perception index have negative relationship with inflation. Exchange rates are statistically significant and have a positive relationship with inflation level. In addition, presence of political instability increases inflation level by 5.572%. This research output will be useful to policy makers, the Kenyan government, businesspersons, academicians and any other interested people.

KEYWORDS: Seigniorage, Nominal Output, CPI

INTRODUCTION

Inflation rate is “an annual increase in the price of a basket of goods and services that are purchased by consumers in an economy” according to World Bank (2007), Inflation rate, therefore, measures the changes over time of the consumer prices or the GDP deflator which takes into account prices of goods and services produced in the country. This percentage cost of living is calculated using the consumer price index in Kenya. The highest inflation rate ever recorded in Kenya was in 1993 at 46%. This high inflation rate was attributed to excessive money supply, low aggregate demand, and depreciation of the Kenyan shilling with a low investor confidence due to tumult surrounding transition to plural politics. The devaluation of the Kenya shilling was seen as one of the causes of inflationary pressures, coupled with excessive money supply in 1992 and decontrol of prices and poor weather conditions in 1993. A prolonged drought further made the government divert large amounts of funds to famine relief imports to attain food security. The year 2002 registered the lowest inflation rate of 2% in the decade of the 2000’s. According to Economic Survey (2003), this was due to implementation of monetary policy, stability of the Kenyan currency, low prices of foodstuffs and stable petroleum prices. There are three main methods of measuring inflation: The GDP deflator, The Consumer Price Index (CPI), and, The Wholesale price index (WPI).

The choice of the method to measure inflation is influenced by information available. Kenya adopted the use of CPI in 1961, and it has continued to be accepted as the most practical measure. According to Mburu (2002), the CPI method has weaknesses such as not taking into account the change in the quality of goods and new products entering the market as well as the failure to capture the fact that relative prices change at different rates. Inflation imposes a real cost on society thereby distorting the incentives to save and invest. High inflation rates, a sign of economic imbalances, could reduce economic growth and lead to a reduction of the implementation of sustainable development goals. This research will study the statistically significant determinants of inflation and therefore make it easier to control it.

LITERATURE REVIEW

Monetarism

Friedman (1982) explained this theory. It focused on the demand for money during hyperinflation and explained that expectations of future inflation rates depended on past inflation rates. It explained that inflation is as a result of an increase in money supply in the economy. He concludes that inflation occurs if money supply in the economy exceeds the economic growth. The monetarist theory explained demand-pull inflation as being caused by excess demand, which in turn, businesses respond by raising prices of commodities to increase profits. This is explained by increases in money supply, depreciation of currency exchange rates and reducing tax rates. Any monetary policy sought to stabilize the exchange rates and prices, raise the level of employment, stable economic growth and interest rate smoothing.

Structural Perception of Inflation

According to Ndebbio (1993), Inflation is brought about by structural rigidities in the economy as a natural consequence, these rigidities results mainly from imbalances in public finance, where, the government is unable to raise enough revenue to match with the increased expenditures.

Cost Push View

This explained that the pressure on wages and monopoly pricing cause inflation. It argues that with strong trade unions, nominal wages go up once the price levels go up. The altering of wages should match up the price index so as to check inflation levels; however, the commodity shortages and crop failures coupled with high oil prices also cause inflation. Cost-push inflation is brought about by factors that make costs to go up. These costs are hence passed on to the consumers through higher prices. This is also referred to as wage-push inflation because wages are the largest part of the total production cost. (Zahoo & Shama, 2010). An interaction of forces cause inflation, with a number of factors such as exchange rates, money supply, wages, food price, oil prices, political instability and corruption perception leading to a rise in the general price level. However, it is important to note that, research on inflation in many aspects has been done but to determine the statistically significant factors in the Kenyan economy that affect the inflationary process in Kenya are rarely done. This research, therefore, will fill this gap.

METHODOLOGY

Data Type and Source

This research made use of secondary time series data extracted from the Kenya National Bureau of Statistics and CBK for a period of 30 years. This is due to the fact that no other empirical analysis has been done in the past and because of the consistency of the variables.

Specification of the Model.

This study adopted a model used to analyze inflation in Tanzania in 2001 by Laryea and Sumalia where it was observed that in the short run, output and monetary factors influence inflation while in the long run, exchange rates, output, and monetary factors do affect inflation. Then the model is given as:

$$Y_t = f(M_t, N_t, E_t, P_{t-1}, M_t, P_t^f)$$

Where;

Y_t is the inflation rate.

M_t is money supply/monetary growth.

N_t is Food price.

E_t is nominal exchange rate.

P_{t-1} oil price.

P_t^f – GDP rate.

In order to determine inflation in Kenya, the following variables were added to the model:

Central Bank Rates – R_t

Wages – W_t

Political instability – I_t

Corruption Perception – C_t

Error term - ε_t

Therefore, the model will take the following functional form:

$$Y_t = f(M_t, N_t, E_t, P_{t-1}, M_t, P_t^f, B_t, W_t, I_t, C_t, \varepsilon_t)$$

The model is then given as:

$$Y_t = B_0 + B_1M_t + B_2N_t + B_3E_t + B_4P_{t-1} + B_5P_t^f + B_6R_t + B_7W_t + B_8I_t + B_9C_t + \varepsilon_t$$

Political instability is a dummy variable, which takes zero (0) if true and 1 if not true and corruption perception as an index.

RESULTS AND DISCUSSION

From the pre-estimation tests, it was concluded that inflation, monetary growth, wage rates and exchange rates are not stationary in trend. Most of the variable show very weak correlation with the other variables except for Food price and Oil price, which show

positive correlation of 0.705. Exchange rates and CBR also show moderate correlation of 0.671. From the Breusch-Pagan tests, the p value > 0.05 and therefore we conclude that all the variables had a constant variance. The Durbin Watson test statistic is 1.304. This indicates that there is positive autocorrelation between the variables. The test for normality showed that food prices, CBR rates, corruption index, wage rate, political instability, are not normally distributed.

Endogeneity test

The following is the R output for the Wu-Hausman test for Endogeneity.

```
> summary(fm, vcov. = sandwich, df = Inf, diagnostics = TRUE)
Call:
ivreg(formula = inflation ~ Food + Oil + cbr2 + monetary + wage +
corruption + political + exchange + gdp | Food + Oil + cbr +
monetary + corruption + wage + gdp + exchange + political)

Residuals:
    Min       1Q   Median       3Q      Max
-16.1473  -3.9561  -0.2845   3.2444  25.4615

Coefficients:
            Estimate Std. Error z value Pr(>|z|)
(Intercept)  6.676977   15.543747   0.430   0.668
Food        -0.042135    0.054367  -0.775   0.438
Oil         -0.039471    0.055838  -0.707   0.480
cbr2         0.004743    0.005321   0.891   0.373
monetary     0.158568    0.138271   1.147   0.251
wage         0.005459    0.004489   1.216   0.224
corruption  -15.558543   33.674299  -0.462   0.644
political    -5.645087    4.606239  -1.226   0.220
exchange     0.051025    0.125449   0.407   0.684
gdp         -0.378866    0.267321  -1.417   0.156

Diagnostic tests:
      df1 df2 statistic p-value
weak instruments  1  38  585.239 <2e-16 ***
wu-Hausman      1  37   2.194  0.147
Sargan          0 NA      NA      NA
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 7.94 on Inf degrees of freedom
Multiple R-Squared:  0.2216, Adjusted R-squared:  0.03723
Wald test: 23.09 on 9 DF, p-value: 0.005998
```

Figure 4.18: Endogeneity test

From the R output, under the diagnostic tests, the p-value of weak instruments is < 2e-16. This p-value is far much less than 0.05, level of significance, and therefore we conclude that there is very weak correlation between the instrumental variables and the endogenous variables. We can also conclude that instrumental variables are sufficiently strong. Looking at the Wu-Hausman test, the p-value is 0.147, which is greater than 0.05 and therefore we conclude that the instrumental variables are consistent.

Overall Regression

The following is the R output of overall regression

```
> model
Call:
lm(formula = inflation ~ Food + Oil + cbr + monetary + corruption +
wage + gdp + exchange + political)

Coefficients:
            Food            oil            cbr            monetary            corruption            wage
 6.114694 -0.046921 -0.038159  0.216272  0.163350 -16.560055  0.005302
            gdp            exchange            political
-0.367564  0.044115 -5.572382
```

Figure 4.19: Overall Regression

From the output, the regression equation will be

$$\text{Inflation} = 6.115 - 0.0469 \text{ Food} - 0.0382 \text{ Oil} + 0.216 \text{ CBR} + 0.163 \text{ Monetary} - 16.56 \text{ Corruption} + 0.0053 \text{ Wage} - 0.368 \text{ GDP} + 0.0441 \text{ Exchange} - 5.572 \text{ Political.}$$

From this model, we can make the following inferences:

- When all the factors are held constant, the rate of inflation will be constant at 6.115.
- Any unit change in food price reduces inflation by 0.0469.
- Any unit change in oil price reduces inflation by 0.0382.
- A unit change in the central bank rates increases inflation by 0.216
- A unit increase in the monetary growth increases inflation by 0.163.
- A unit increase in the corruption perception will reduce inflation by 16.56.
- A unit increase in the wage rate causes an increase of 0.0053 in inflation.
- A unit increase in the GDP rate will cause a decrease of 0.368 in inflation.
- Any unit increase in currency exchange rate cause inflation to increase by 0.0441.
- When there is political stability, the rate of inflation is reduced by 5.572.

Regression Plots

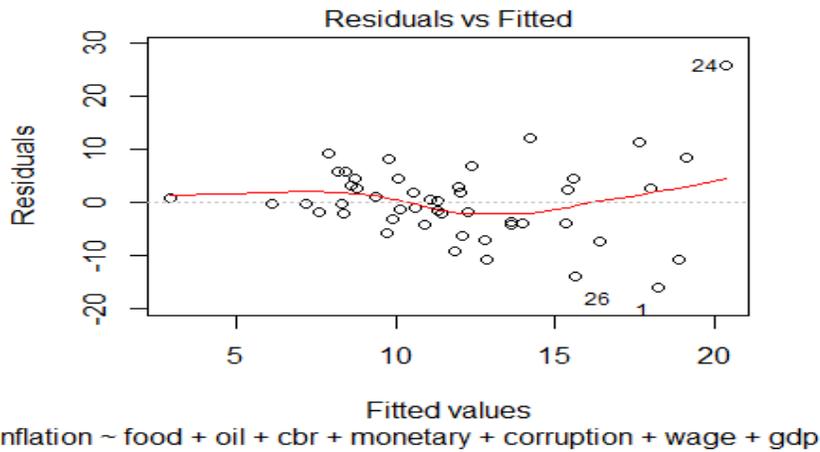
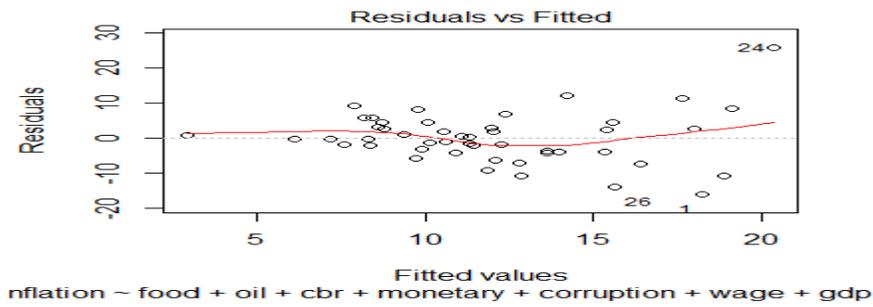


Figure 4.20: Residuals vs. Fitted values plot.

The plot of residuals vs. fitted values indicated an almost linear relationship between the predictor and outcome variables of the regression model. This proves the assumption of using a linear model.

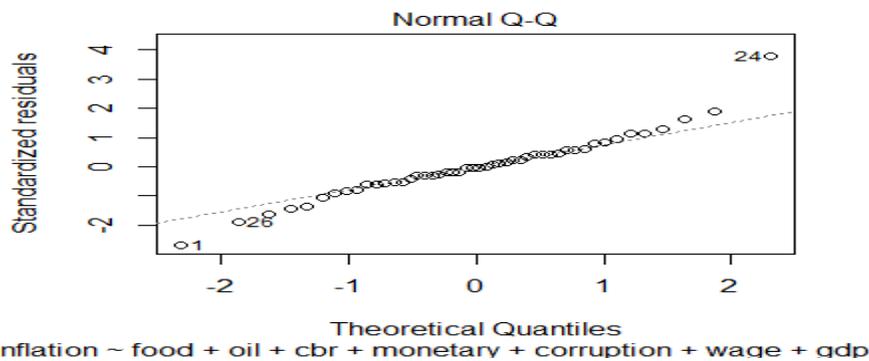


Figure 4.21: Normal Q-Q plot

Most of the plotted points in the Normal Q-Q plot are in a straight line except for points 1, 24 and 26, which are outliers. This shows that the residuals of this model are normally distributed.

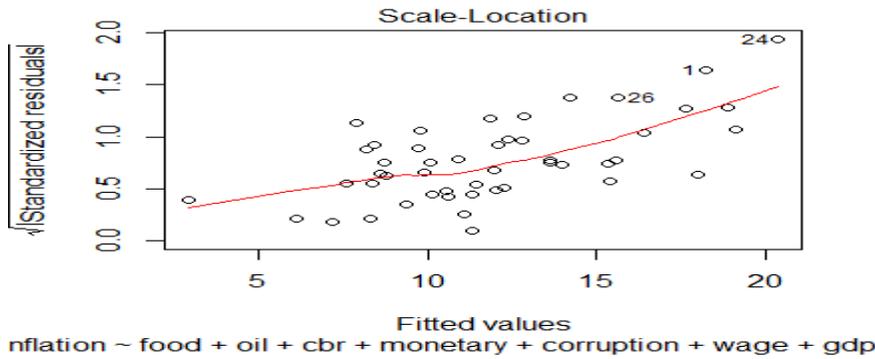


Figure 4.22: Scale-Location plot.

From this plot, the residuals are spread equally along the ranges of predictors. This indicates the presence of homoscedasticity.

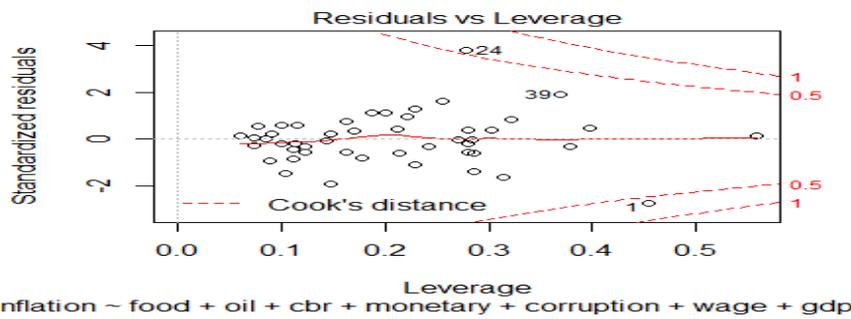


Figure 4.22: Residuals vs. Leverage plot

From the Residuals vs. Leverage regression plot above, points 1 and 24 have a higher Cook's distance greater than 0.5 but less than 1. Most of the points are close to Cook's distance of 0. From this plot, we conclude that only two data points of 1 and 24 are the influential to the regression results.

1.1 Testing Significance of Parameters

To test the significance of parameters, we use the following hypothesis,

$$H_0: \beta_j = 0 \text{ vs. } H_a: \beta_j \neq 0$$

```
Call:
lm(formula = inflation ~ Food + oil + cbr + monetary + corruption +
    wage + gdp + exchange + political)

Residuals:
    Min       1Q   Median       3Q      Max
-15.9946  -3.9925  -0.2666   3.3138  25.6237

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  6.114694   23.100152   0.265    0.793
Food        -0.046921    0.077449  -0.606    0.548
oil         -0.038159    0.086630  -0.440    0.662
cbr         0.216272    0.259287   0.834    0.409
monetary     0.163350    0.128485   1.271    0.211
corruption  -16.560055   27.055695  -0.612    0.544
wage         0.005302    0.008323   0.637    0.528
gdp         -0.367564    0.316888  -1.160    0.253
exchange     0.044115    0.095757   0.461    0.648
political    -5.572382    4.902191  -1.137    0.263

Residual standard error: 7.986 on 38 degrees of freedom
Multiple R-squared:  0.2126,    Adjusted R-squared:  0.02609
F-statistic: 1.14 on 9 and 38 DF,  p-value: 0.36
```

Figure 4.24: Testing Significance

From the results above, we look at the p-values of each coefficient. At 5% level of significance, i.e. $\alpha = 0.05$, I compared the p-value with $\alpha = 0.05$ value. All the p-values in the figure above are greater than $\alpha = 0.05$. Therefore, we fail to reject the null hypothesis at 0.05 level of significance and conclude that the coefficients of all explanatory variables are insignificant at 0.05 level of significance. The coefficient of determination, R^2 , is 0.2126. This indicates that this model has 21.26% effect on the total variation of inflation. From this, we can conclude that all the factors explained used in this model have 21.26% effect on the total rate of inflation. The figure below shows the confidence intervals of each the coefficients of explanatory variables.

```
> confint(fit)
                2.5 %      97.5 %
(Intercept)    -40.64911825  52.87850710
Data$`Food Price`  -0.20370907  0.10986742
Data$`Oil Price`  -0.21353217  0.13721389
Data$`CBR`        -0.30862655  0.74117042
Data$`Monetary Growth` -0.09675313  0.42345386
Data$`Corruption Index` -71.33144606  38.21133632
Data$`Wage Rate`  -0.01154732  0.02215113
Data$`GDP Rate`  -1.00907016  0.27394178
Data$`Exchange Rate` -0.14973422  0.23796425
Data$`Political Instability`1 -15.49634932  4.35158568
```

Figure 4.25: Confidence Intervals.

Confidence intervals show the range that the coefficients of the explanatory variables lie. From these results of confidence intervals, we note all the intervals range from negative value to a positive value. This implies that zero is part of the interval and therefore, this proves failing to reject the null hypothesis and concluding that the coefficients of explanatory variables are insignificant.

Prediction Using the Model

I used the inflation of data to test my model as shown below.

$$\text{Inflation} = 6.115 - 0.0469 (94.66) - 0.0382(110.85) + 0.216 (16.4) + 0.163 (25.76022) - 16.56 (0.28) + 0.0053 (2990) - 0.368 (5.028794) + 0.0441 (96.36) - 5.572 (0).$$

Inflation level at 2017 is 11.91477 according to my model. The actual inflation level is 8.042507. There is a difference of 3.872263 and this margin is attributed to other random factors affecting inflation that are not accounted for by the model. Therefore, this model can predict inflation with a margin for error.

SUMMARY, CONCLUSION AND RECOMMENDATIONS

The study aimed at determining the statistical significant determinants of inflation in Kenya for a period of 30 years while the specific objective was to develop a regression model that can be used to determine inflation rate in Kenya at any time and to draw lessons for future and further suggest policy recommendations. From this study, findings indicate that average inflation rate is at 11.908% for year 2017 after putting the factors in the regression model developed. Food prices have been ranging from 77.8 units to 169.9 units with a mean of 110.14 units and a standard deviation of 23.78. Oil prices have ranged between 69.6 units and 188.1 units with a mean of 102.29 units and a standard deviation of 26.23. The central bank rates range between 8.00% and 36.24% with a mean of 16.68% and a standard deviation of 6.78. The lowest monetary growth is at 0.78% and the maximum at 48.8995% with a mean of 16.73% and a standard deviation of 9.56. According to the respondents, their perception on corruption ranges between 0.03 and 0.33 with a mean of 0.2144 and a standard deviation of 0.063. Wage rates range between 2250 and 3134 with a mean of 2740.42 and a standard deviation of 177.73. The gross domestic product rate ranges in between -4.655% and 22.17% having a mean of 4.46% and a standard deviation of 4.127. The currency exchange rates have a minimum at 56.17 and a maximum at 147.41 with a mean of 97.3 and a standard deviation of 21.028.

The regression coefficient showed that there is a negative relationship between food prices and inflation level, oil prices are statistically significant and have a negative relationship with the level of inflation. Central Bank Rates, Monetary Growth and Wage Rate Coefficient have a positive relationship with inflation level while GDP rate and corruption perception index have negative relationship with inflation. Exchange rates are statistically significant and have a positive relationship with inflation level. In addition, presence of political instability increases inflation level by 5.572%.

Conclusions and Policy Recommendations

From the results of my study, Central Bank Rates, Monetary growth, Wage rate coefficient and exchange rates are the main variables that policy makes should aim at in controlling inflation in Kenya. The four variables have positive relationship with inflation and therefore an increase in them causes a corresponding increase in Inflation level. Oil price and Exchange rates are the only statistically significant factors that affect inflation in the study period. Interest policy is effective in reducing money supply which in-turn reduces monetary growth thereby reducing inflation rate. GDP rate has a negative effect on inflation and therefore increasing the GDP rate reduces inflation rate. This implies that policy makes should embrace fiscal policies that spur GDP growth in order to contain an increase in inflation.

Recommendations for further research

This study used time series data and applied Ordinary Least Squares estimation to estimate a regression model for inflation in Kenya. A similar study may be conducted using panel data or any other data type and compare the results. Another study may also be done comparing inflation in different regions of Kenya or yet another may utilize data from black market and compare the findings.

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Efficacy of Selected Botanicals against Cowpea Weevils (*Callosobruchus maculatus* F.) on Stored Cowpea (*Vigna unguiculata* (L) Walp).

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Abstract

The experiment was conducted at the Federal College of Forestry, Jos Biology laboratory to determine the efficacy of selected botanicals against cowpea weevils (*Callosobruchus maculatus* F.) on stored cowpea (*Vigna unguiculata* (L) Walp). The experiment consist of eight treatment laid in complete randomized design (CRD); control, actellic dust 5g, citrus peel powder 5g, citrus peel powder 10g, paw-paw leaf powder 5g, paw-paw leaf powder 10g, annona seed powder 5g, anonna seed powder 10g. Each treatment replicated three times. Data collected include adult mortality, number of eggs, larval development, percentage grain damage, percentage weight loss and percentage germination. The data collected were subjected to analysis of variance (AVONA) at 5% probability level. Mean separations was carried out using student Duncan Multiple Range Test (DMRT) where significance was declared. The result indicated that, there were significantly differences between plant products treatments and the synthetic treatment over the control throughout the period of the experiment (1 to 8 weeks). However, among the various treatment of the plant products used, 5g pawpaw leaf powder/100g and 5g annona seed powder/100g of cowpea grains proved to be most effective in grain damage and also 5g pawpaw leaf powder and 10g citrus peel powder proved to be most effective on adult emergence and adult mortality of *C. maculatus* at 8 weeks of

the storage. However, 5g actellic dust was the most effective in controlling grain damage while 5g pawpaw leaf powder and 5g annona seed powder proved to be most effective in controlling grain damage among the natural botanicals, adult mortality and number of eggs laid by *C. maculatus* on the stored grains. Finally, the result of the study showed that, plant products tested at different concentrations displayed some potentials as food poison, repellants, antifidant and contact poison. The result clearly indicated the potential values of using plants extracts as complimentary to chemicals pesticides in controlling *C. maculatus* on cowpea grains.

KEYWORDS: Cowpea, Botanicals, Stored Weevils, *Callosobruchus maculatus*, *Vigna unguiculata*.

Introduction

Cowpea (*Vigna unguiculata L. Walp*) is an important grain (food) legume of significant economic importance worldwide. It is the most important indigenous legume in the dry savannah of the tropics covering 12.5million hectares with annual production of about 3.million tons (FAO, 2005). Nigeria is one of the world's largest producer of cowpea with an average production of 2.92million tons followed by Niger with 1.10million tons (FAO, 2012). With about 22-26% protein, cowpea constitutes a major source of protein for resource poor rural and urban people (Singh et al., 2002). The crop can be used at all stages of growth for several purposes.

The primary insect causing losses to stored cowpeas in West Africa is the cowpea weevil, (*Callosobruchus maculates*). Infestation begins in the field at low level. The infestation which start in the field causes damage that ranges from rendering cowpea unsuitable for consumption to reduced viability and as population build up, great loses can be recorded (Ibrahim and Garba, 2011). The seeds lose 30% of their weight (Udo, 2011). After the crop is placed in storage, the insect population continues to grow until the cowpea is completely damaged (Joana and Daniel, 2010). Once infestation of pest (*C. maculatus*) is established in stored cowpea, farmers generally resort to application of synthetic insecticide otherwise loss of the entire stored product is inevitable (Mohammad et al., 2013). Unfortunately, most farmers in the tropics are resource-poor and cannot afford the use of synthetic pesticides (Emmanuel, 2013). Synthetic insecticides are costly, toxic to humans, low biodegradability and consequently when used excessively may be harmful to the environment (Sharah and Ali 2008). Increasing cost of synthetic

insecticide and dwindling farmers' income in face of ever decreasing value of national currencies have made these insecticides too expensive for the ordinary farmers. All these have called for an alternative to these synthetic products (Mohammad et al., 2013). There are considerable literatures that indicates that the use of some plant extracts are promising alternative control measures to synthetic chemicals (Schmutterer, 1990).

Results show that insecticides are the most effective control measures against pests and majority of the farmers rely heavily on the use of synthetic insecticides in the management of their cowpea pests. Hence the need for an alternative control measure that exclude or minimise the use of synthetic insecticides in the management of cowpea pests. It is an established fact that peasant farmers all over the world use plant materials for storage of their excess harvest as protactants against pest infestation (Mohammad et al., 2013). The past three decades have witnessed reawakening in research efforts to ascertain the effectiveness of these plant products. Available literature shows over 66 plants from 30 families have been subjected to laboratory test for their effects on different store and field (Mohammad et al., 2013). The broad objective of this study therefore is to investigate the Efficacy of selected botanicals against cowpea weevils (*Callosobruchus maculatus F.*) on stored cowpea (*Vigna unguiculata (L) Walp*).

MATERIALS AND METHODS

Table 1: Botanicals and its common and scientific name

S/N	Botanicals	Common Names	Scientific Names	Plant Part Used
1	Anona seed powder	Chup-chup	<i>Anona muricata</i>	Fruit Seed
2	Pawpaw leaf powder	pawpaw	<i>Carica papaya</i>	Leaf
3.	Citrus peel powder	Sweet orange	<i>Citrus sinensis</i>	Fruit Bark

Source: Dick Gross, 2003

Types of Materials

Translucent Bama bottles measuring 16cm and 8cm in diameter were acquired and used as experimental containers. 100g of cowpea grain (variety TAR 48) was measured and transferred separately into each of the translucent Bama containers with each contain 5g of actellic dust, 5g and 10g of citrus peel powder, 5g and 10g paw-paw leaf powder, and also 5g and 10g annona seed powder. Ten pairs of *C. maculatus* were introduced in each of the containers including the treated and non-treated control treatments. The experimental containers together with the treated grains and insects were covered with a piece of white cloth and tightened with firm rubber band. The whole setup were kept in the laboratory and maintained at ambient temperature and relative humidity.

Sources and Rearing of the Experimental Insects

Initial culture of cowpea weevil *C. maculatus* was obtain from infested cowpea grains from Laranto Market, Jos and maintained at ambient temperature and relative humidity as stated above. The insect were allowed to massively reproduce in the laboratory. Fresh and uninfected cowpea grains (variety TAR 48) were purchased from Plateau Agricultural development pogramme (PADP) cleaned and disinfected, new insect culture were set up by transferring cowpea grains that was purchased from PADP and transferred into earthen pot. 500 unsex adult *C. maculatus* were released into the earthen pot containing 500g of clean, fresh and uninfected cowpea grains. The pot was covered with a small piece of white cloth and secure firmly with rubber band. This will be incubated at ambient temperature and relative humidity of 28.20°C to 32.20°C and 55% to 75%, respectively with alternative light-dark cycle of 12hrs for about 2 weeks. After 2 weeks, the original adult (*C. maculatus*) were removed from the earthen pot by sieving and discarding while the newly emerged experimental insects were kept in separate containers until when needed.

Collection and Preparation of Plant Materials

Collection: Citrus peel, paw-paw leaf, annona seed and actellic dust were collected in the Plant Nursery of Federal College of Forestry, Jos.

Preparation: Citrus peel, paw-paw leaf, annona seed were dried under room temperature of about 28°C-32°C and grind with mortar and pestle. After grinding it was passed through a mesh size of about 600um

to obtain fine powder of the product as described by Asawalan and Arukwe (2004). The fine powder of each of the plant was kept separately in a container until when needed.

Experimental Design

Completely randomized designed (CRD) was used in the experiment. There were eight treatments in the experiment namely: control, actellic dust 5g, citrus peel powder 5g, citrus peel powder 10g, paw-paw leaf powder 5g, paw-paw leaf powder 10g, annona seed powder 5g, annona seed powder 10g. Each treatment will be replicated three times

Data Collection

Data to be collected includes; adult mortality, number of eggs, larval development, percentage grain damage, percentage weight loss and percentage germination.

Adult Mortality: Data on adult mortality was obtained by counting the number of dead weevil in the translucent plastic cup after application of treatment. The data was recorded on weekly basis for a period of about 8 weeks as recommended by (Aswallam and Arukwe, 2004; Jembere *et al.*, 1995).

Number of Eggs: Data on number eggs was obtained by counting the number of eggs laid on the stored cowpea grains using magnifying hand lens as recommended by (Jembere *et al.*, 1995).

Larval Count: Data on larval count was obtained by counting the number of larvae that emerged in each translucent container after application of treatment using a hair of camel brush as recommended by Jembere *et al.*, (1995).

Percentage Grain Damage: Percentage grain damage was assessed by randomly selecting 10 cowpea seeds from each translucent container and count the number of holes of attack embryo from each translucent plastic cup. The percentage damage can be calculated using this formula recommended by Adedire and Ajayi (1996).

$$\text{Percentage Grain Damage} = \frac{G1}{G2} \times 100$$

Where, G1 = Number of grain with hole or attacked embryo

G2 = Total number of the randomly selected cowpea grains

Percentage Weight Loss: Data on percentage weight loss can be obtain using this formula recommended by Yusuf and Ahmed, 2005) as show below.

$$\text{Percentage weight loss} = \frac{P - Q}{P} \times 100$$

Where: P= Initial weight of the grain

Q = Final weight of the grain

Percentage Germination: The effect of treatment, storage duration and their interaction on seed viability, will be calculate by selecting (10) seeds from each container. The ten (10) was place separately in clean petri dish contain moist filter paper. Thereafter, the Petri dish together with the seeds were covered and daily germination count was recorded and computed appropriately. Final percentage germination calculated using the formula recommended by Haines (1991).

$$\text{Viability index (\%)} = \frac{N G}{T G} \times 100$$

Where: NG = Number of seed that germinate

TG= Total number of test seeds.

Data Analysis: The data collected was subjected to analysis of variance (AVONA) to determine the Efficacy of Some Selected Botanicals Against Cowpea Weevils (*Callosobruchus maculatus F.*) on Stored Cowpea (*Vigna unguiculata (L) Walp*), at 5% probability level. Mean separations was carried out using student Duncan Multiple Range Test (DMRT) where significance was declared.

RESULTS AND DISCUSSIONS

Table 2 shows the adult mortality from 1 – 8 weeks of storage. When efficacy of plant products were compared and evaluated at 1 week after application of treatment, the result indicates that there was no significant difference between the treatments although high adult mortality of (3.33^a) was recorded in 10g Anona seed powder and 10g pawpaw leaf powder respectively, followed by 10g citrus peel powder (2.66a), then 5g Actellic dust (2.00a), 5g Anona seed powder and 5g Pawpaw leaf powder has an adult mortality of 1.66a respectively, while the lowest adult mortality (0.00^a) was recorded in the control. At 2weeks after treatment, significant difference was observed. The lowest adult mortality was obtained in 5g citrus peel powder (2.66a) followed by 5g annona seed powder (3.33ab), 5g actellic dust and 5g annona seed powder (3.66a), 10g citrus peel powder (4.00ab), 10g annona seed powder and 10g pawpaw leaf powder (5.66a) . Significant difference was declared of adult mortality at 3weeks after treatment. The highest recorded for 10g Pawpaw leaf powder (8.33^{ab}), 7.33ab for 5g Actellic dust, 6.33b for 5g Pawpaw leaf powder, 6.00 for 5g Anona seed powder, 10g Anona seed powder and 5g citrus peel powder respectively. 10g citrus peel powder has 4.33a and the least was the control with 3.66.

Adult mortality was found to be significant at 4 weeks of treatment even though all the treatments shows mean mortality of 10.00 with the exception of 5g Anona seed powder (9.00) and the control. At 5 weeks of treatment, same adult mortality (10.00) was recorded in all the plant products and the synthetic treatments also showing marked significance. At 6weeks, 5g pawpaw of powder was significantly less effective than the remaining treatments the highest adult mortality was recorded on 10g annona seed powder (27.33b) while 5g pawpaw leaf powder found to be less effective with the lowest number of adult mortality (10.00c) recorded from the treatment. The result showed that all plant materials tested had varying insecticidal activities at 7 weeks after application of treatment, 5g actellic dust (15.66ab), 10g citrus peel powder (15.00d), followed by 5g citrus peel (17.00c), 5g pawpaw leaf powder (18.00d), 10g pawpaw leaf powder (27.00c) 5g annona seed powder (30.66d) and 10g annona seed powder (42.00c). At 8 weeks after application of treatment, the number of adult mortality ranged from (59.33e) in 5g annona seed powder, (59.33d) in 10g annona seed powder to (23.00b) in 5g actellic dust significantly higher mortality were recorded in 5g annona seed powder, 10g annona seed powder, 10g pawpaw leaf powder, 10g citrus peel powder, 5g pawpaw leaf powder, and 5g actellic dust.

Table 2: Effect of plant products and synthetic treatment on Adult mortality

ADULT MORTALITY								
Treatment	1 st wk	2 nd wk	3 rd wk	4 th wk	5 th Wk	6 th Wk	7 th Wk	8 th Wk
Control	0.00 ^a	0.66 ^a	3.66 ^b	9.00 ^c	10.00 ^c	11.00 ^c	15.33 ^d	19.00 ^e
5g Actellic dust	2.00 ^a	3.66 ^a	7.33 ^{ab}	10.00 ^{ab}	10.00 ^{ab}	10.33 ^{ab}	15.66 ^{ab}	23.00 ^b
5g Anona seed powder	1.66 ^a	3.33 ^{ab}	6.00 ^{ab}	9.00 ^{b^c}	10.00 ^{b^c}	13.66 ^c	30.55 ^d	59.33 ^e
10g Anona seed powder	3.33 ^a	4.33 ^a	6.00 ^{ab}	10.00 ^a	10.00 ^a	27.33 ^b	42.00 ^c	59.33 ^d
5g citrus peel powder	1.33 ^a	2.66 ^a	6.00 ^a	10.00 ^b	10.00 ^b	11.66 ^b	17.00 ^c	34.66 ^d
10g citrus peel powder	2.66 ^a	4.00 ^{ab}	4.33 ^a	10.00 ^c	10.00 ^c	11.00 ^c	15.00 ^d	32.33 ^e
5g Pawpaw leaf powder	1.66 ^a	3.66 ^a	6.33 ^b	10.00 ^c	10.00 ^c	10.00 ^c	18.00 ^d	28.66 ^e

10g Pawpaw leaf powder	3.33 ^a	5.66 ^a	8.33 ^{ab}	10.00 ^{ab}	10.00 ^{ab}	15.33 ^b	27.00 ^c	39.00 ^d
LS	NS	x	x	x	X	x	x	x

Means within a column followed by the same letters are not significantly difference (P = 0.05%) using Duncan Multiple Range Test.

x = Level of significant at 0.05% level of probability

LS = level of significant

NS = Not significant

Summary of the study showed that the application of 5g and 10g annona seed powder/100g cowpea grain was found to be more effective than all other plant products. This result was in conformity with the findings of Rajapakse *et al.*, (1998), which showed that there was significant reduction in adult mortality of *C. maculatus* when treated with annona seed powder. Similarly, Moussa, (2001) indicated that the flora of savannah consist of plant species that possesses insecticidal properties and plant product treatment acted either as stomach or contact poison or both because they were all found to be effective in suppressing the growth of the bruchids. Annona seed powder proved to be most effective in controlling of *C. maculatus* because it provided good protection to cowpea grain against damage and loss on the grain weight (Seneinyak *et al.*, 1998). Malungu *et al.*, (2007) also reported that the use of plant powders has been reported to produce higher death of insects because of physical barrier with the tendency of blocking the spiracles of the insects, thus impairing respiration leading to death of the insects. Although, annona seed powder have not been used frequently by our farmers in controlling *C. maculatus*, the high mortality rate exhibited under the current investigation indicates the possibility of success in control of storage insects (Bamaiyi *et al.*, 2007).

Effect of plant product and synthetic treatment on Larva development

Table 3 shows the number of eggs laid from 1-8 weeks of storage. The data shows that all the tested different concentrations (5g and 10g) of various plants product were significantly better than the control treatment throughout the period of observations (1 to 8 week after treatment). However, when efficacy of plants product were compared and evaluated at 1 week after application of treatment, high number of eggs (10.00c) was recorded in 5g citrus peel powder while the lowest number of eggs (0.66a) 5g pawpaw leaf powder (1.00a) 10g, pawpaw leaf powder (1.66a) 5g annona seed powder (2.66a), 10g citrus peel powder (7.33a), and 5g citrus peel powder (10.00a) respectively. Similarly when plant products and synthetic treatment were compared and evaluated at 2 weeks after treatment application, the lowest number of eggs was obtained I 10g annona seed powder (5.00b), followed by 5g pawpaw leaf powder (8.66a) 10g pawpaw of leaf powder (9.33b), followed by 10g citrus peel powder (16.00a) and 5g citrus peel powder (21.66a). the statistical analysis obtained at 3 weeks after application of treatment, showed that, lowest number of eggs were obtained in 5g actellic dust (6.33bc) followed by 5g annona seed powder (8.33b), 10g annona seed powder (9.66b), followed by 10g pawpaw leaf powder (10.33b), 5g

pawpaw leaf powder (13.00bc) followed by 5g citrus peel powder (28.33a) and 10g citrus peel powder (34.66a)).

Statistical analysis of data obtained at 4 week, showed that number of eggs ranged from (53.33a) in 10g citrus peel powder to (9.00c) 5g actellic dust. Treatment with significantly higher number of eggs were 10g citrus peel powder (53.33a) and citrus peel powder (38.33a) and treatment with lowest number of eggs were 10g pawpaw leaf powder (12.00b), 5g annona seed powder (12.33c), 10g annona seed powder (13.33b) 5g pawpaw leaf powder (17.66cb), and 5g actellic dust (9.00c). At 5 weeks after application of treatments, highest number of eggs (69.00a) was recorded in 5g citrus peel powder and the lowest number of eggs of (13.33a) was obtained in 5g actellic dust. The order of increase in number of eggs were as follows 5g actellic dust (13.33a) 10g annona seed powder (15.33cd), 10g pawpaw leaf powder (17.33b), 5g pawpaw leaf powder (22.66b), 5g citrus peel powder (69.00a) respectively.

Table 3: Effect of plant product and synthetic treatment on Larva development

Treatment	NUMBER OF EGGS LAID AFTER							
	1 st wk	2 nd wk	3 rd wk	4 th wk	5 th Wk	6 th Wk	7 th Wk	8 th Wk
Control	6.33 ^a	28.00 ^a	31.33 ^a	47.33 ^a	123.66 ^a	275.66 ^a	606.66 ^b	821.00 ^b
5g Actellic dust	1.00 ^a	3.33 ^b	6.33 ^{bc}	9.00 ^c	13.33 ^d	13.33 ^d	17.00 ^e	17.00 ^e
5g Anona seed powder	2.66 ^a	5.00 ^{ab}	8.33 ^b	12.33 ^c	15.33 ^{cd}	16.00 ^{cd}	18.33 ^d	18.33 ^d
10g Anona seed powder	0.66 ^a	2.00 ^b	9.66 ^b	13.33 ^b	15.00 ^b	16.00 ^b	16.00 ^b	16.00 ^b
5g citrus peel powder	10.00 ^a	21.66 ^a	28.33 ^a	38.33 ^b	69.00 ^a	129.66 ^a	251.33 ^a	528.00 ^b
10g citrus peel powder	7.33 ^a	16.00 ^a	34.66 ^a	53.33 ^a	57.00 ^a	153.66 ^{ab}	257.66 ^{ab}	389.00 ^b
5g Pawpaw leaf powder	1.00 ^a	8.66 ^b	13.00 ^{bc}	17.66 ^{cb}	22.66 ^b	23.33 ^b	24.00 ^b	24.33 ^b

10g Pawpaw leaf powder	1.66 ^a	9.33 ^b	10.33 ^b	12.00 ^b	17.33 ^b	18.66 ^b	18.66 ^b	18.66 ^b
Ls	NS	x	x	x	x	x	x	x

Means within a column followed by the same letters are not significantly difference (P = 0.05%) using Duncan Multiple Range Test.

x = Level of significant at 0.05% level of probability

LS = level of significant

NS = Not significant

At weeks after application of treatments, 10g citrus peel powder was significantly less effective than the remaining plant products treatments. The highest number of eggs of (153.66ab) was recorded on 10g citrus peel powder, while 5g actellic dust was found to be significantly effective with the lowest number of eggs of (13.33d) recorded from the treatment.

The result showed that all plant materials had varying degree of insecticidal activities at 7 weeks after application of treatments, 10g citrus peel powder was found to be less significantly effective than the remaining plant products treatments, with the highest number of eggs (257.66ab) was recorded while 10g annona seed powder was found to be significantly effective with the lowest number of eggs (16.00b) recorded from the treatment. At 8 weeks after application of treatment, the number of eggs ranged from (528.00b) in 5g citrus peel powder to (16.00b) annona seed powder. Significantly higher mortality were recorded in 5g citrus peel powder, 10g citrus peel powder, 10g pawpaw leaf powder, 5g annona seed powder, and 5g actellic dust.

The findings of the experiment showed that the number of eggs of *C. maculatus* was significantly high in the control treatment as compared to cowpea grain treated with plant products and synthetic treatments, indicating that insect's reproduction and development were impaired in all botanicals pesticides. The result agrees with the findings (Bekele *et al.*, 1997) who reported that the toxic properties of plants products compiled within the growth and development of eggs decreased the number of progeny that emerged in treated cowpea grains. The result also revealed that the use of annona seed powder 5g and 10g and also pawpaw leaf powder 10g/100g at concentration level provided significantly high protection in the number of eggs of *C. maculatus* (Rajapakse *et al.*, 1998). Also according to Mushobozy *et al.*, (2007) powder annona seed significantly affected survival and egg laying capacity of *C. maculatus*.

Effect of plant products and synthetic treatment on % Grain damage

Table 4 show the percentage damage from 5 to 8 weeks of storage. The data shows that the tested concentrations (5g & 10g) of various plant products were significantly better than the control treatment throughout the period of observation (5 to 8 weeks after treatment). However, when efficacy of plant products were compared and evaluated at 5 weeks after application of treatment, high percentage grain damage (%) of (13.66ab) was recorded in 10g citrus peel powder while the lowest percentage grain damage of (0.00a) 5g actellic dust was recorded for the treatment. The order of the increase in

percentage grain damage was 5g actellic dust (0.00a) 5g annona seed powder (0.00a) 10g annona seed powder (0.00a) 5g pawpaw leaf powder (1.33ab), 10g pawpaw leaf powder (1.66a), followed by 5g (1.33ab), 10g pawpaw leaf powder (1.66a), followed by 5g citrus peel powder (13.00b) and 10g citrus peel powder (13.66ab) respectively.

At 6 weeks after application of treatment, 10g of citrus peel powder was significantly less effective than the remaining plant products. The highest percentage (%) grain damage of (36.00b) has recorded on citrus peel powder, while 5g annona seed powder found to be significantly effective wit the lowest percentage grain damage of (1.33a). The result showed that all plant material tested had varying degree of insecticidal activities at 7 weeks after application of treatment, 5g actellic dust (10.33b) 5g, annona seed powder (11.33b), 10g annona seed powder (3.33a), 5g citrus peel powder (4.66d) 10g citrus peel powder (68.66b), 5g pawpaw leaf powder (7.66c) and 10g pawpaw leaf powder (10.33bc).

Table 4: Effect of plant products and synthetic treatment on % Grain damage

GRAIN DAMAGE AFTER				
Treatment	5 th Wk	6 th Wk	7 th Wk	8 th WK
Control	9.0a ^b	32.66 ^a	80.00 ^c	117.00 ^c
5g Actellic dust	0.00 ^a	2.33 ^a	10.33 ^b	10.33 ^b
5g Anona seed powder	0.00 ^a	1.33 ^a	11.33 ^b	11.66 ^b
5g citrus peel powder	13.00 ^a	27.00 ^c	43.66 ^d	77.33 ^e
10g citrus peel powder	13.66 ^{ab}	36.00 ^b	68.66 ^b	86.66 ^b
5g Pawpaw leaf powder	1.33 ^{ab}	4.66 ^{b^c}	7.66 ^c	10.00 ^d
10g Pawpaw leaf powder	1.66 ^a	7.00 ^b	10.33 ^{b^c}	12.66 ^c
LS	X	x	x	x

Means within a column followed by the same letters are not significantly difference ($P = 0.05\%$) using Duncan Multiple Range Test.

x = Level of significant at 0.05% level of probability

LS = level of significant

At 8 weeks after application of treatment, the percentage grain damage, ranged from (86.66b) in 10g citrus peel powder to 5g actellic dust (10.33b). Significantly higher percentage grain damage were recorded in 10g citrus peel powder, 5g citrus peel powder while significantly lower percentage grain damage were recorded in 10g pawpaw leaf powder, 5g annona seed powder, 10g annona seed powder, 10g pawpaw leaf powder, 5g actellic dust and 5g pawpaw leaf powder.

The level of damage recorded was significantly higher in the untreated cowpea grains than in those treated with plant products and the synthetic treatment. This agrees with the findings of Comes (1973) who reported that the potential for exploiting insecticides from plant source is quite high in Nigeria. In addition quality and quantity of cowpea grains treated with plant products were not adversely affected by cowpea bruchids during the period of the experiment. This agrees with the result obtained by Operake and Dike, (2005) who reported that cooking quality and test of cowpea grains were negative due to the damage caused on the grain by the insects pest. The result is also in conformity with the findings of Lale (1995) who reported tendency of possession of insecticidal properties by some plants. However, according to Mushobozy *et al.*, (2007), the percentage damaged of seeds differed significantly amongst the treatment. Also seeds treated with 5g pawpaw leaf powder and 5g actellic dust gave significantly lowest percentage damaged for the whole period of the experiment. Among the natural botanicals 5g and 100g citrus peel powder had the highest seed damage, almost similar to the control treatment throughout the period of the experiment.

Effect of plant products and synthetic treatment on Percentage Weight loss

Table 5 shows the percentage weight loss from (1-8weeks) of storage. The data shows that all the tested different concentrations (5g and 10g) of various plant products were significantly better than the control treatment throughout the period of observations (1 to 8) weeks after treatment. However, when efficacy of plant products were compared and evaluated after 8 weeks high percentage weight loss was recorded at 5g citrus peel gave highest % weight loss of (18.73b) while the lowest percentage weight loss of (0.30d) was recorded in 5g actellic dust. The order of increase in percentage weight loss was 5g actellic dust (0.33b), 10g of annona seed powder (10g) annona seed powder (1.06d), followed by 5g pawpaw leaf powder 5g annona seed powder (10.6d) 10g annona seed powder (1.06d), followed by 5g pawpaw leaf powder 5g annona seed powder (5.40cd) 10g citrus peel powder, and 5g pawpaw seed

powder (5.56cd) 10g citrus peel powder (14.33bc) 5g citrus peel powder (18.73b) respectively. The result showed that the seed viability of treated and control grains were all significantly influenced by the duration of storage and concentration of the plant products treatment and synthetic treatment.

The result is in conformity with the findings of crop production Compedium, (2004) who reported that cowpea bruchid is an internal feeder, thus the different life stage developed successfully inside the grain can cause decrease in grain weight accordingly. Also the result indicated that the insects activities lead to depletion of food stock and reduction of grains to powder. This confirmed the findings of Agboola, (1996) who reported that weight losses in grains were proportional to the level of damage, loss in grain weight depends on the damage in the grain as seen in 5g citrus peel powder with (18.73^b) and the least weight loss recorded in 5g actellic dust (0.30^d) and 10g pawpaw leaf powder. The loss of weight of cowpea grains infested with *C. maculatus* could be a good index for assessing damage and waste during storage.

Table 5: Effect of plant products and synthetic treatment on Percentage Weight loss

Treatment	% weight loss after 8 weeks
Control	29.57 ^a
5g Actellic dust	0.30 ^d
5g Anona seed powder	5.40 ^{cd}
10g Anona seed powder	1.06 ^d
5g citrus peel powder	18.73 ^b
10g citrus peel powder	14.33 ^{bc}
5g Pawpaw leaf powder	5.63 ^{cd}
10g Pawpaw leaf powder	1.06 ^d
LS	x

Means within a column followed by the same letters are not significantly difference ($P = 0.05\%$) using

Duncan Multiple Range Test.

x = Level of significant at 0.05% level of probability

LS = level of significant

Germination Test

Table 6 shows the number of seeds that germinated from 1-4 days. The data shows that all the tested different concentrations (5g and 10g) of varying plant product were significantly better than the control treatment throughout the observations (1 to 4 days after treatment). Therefore, when efficacy of plant product were compared and evaluated at day one (1) after application of treatment, high number of germination of (3.33a) in 5g annona seed powder was recorded while the lowest number of germination of (0.00a) was recorded in 5g actellic dust, 10g annona seed powder, 5g citrus peel powder, 10g citrus peel powder, and 10g pawpaw leaf powder and the least germination in 5g pawpaw leaf powder (0.33a) treatment.

Table 9: Germination Test

Treatment	Days after germination			
	Day 1	Day 2	Day 3	Day 4
Control	0.00 ^a	1.00 ^a	1.00 ^a	1.00 ^a
5g Actellic dust	0.00 ^a	5.00 ^b	7.00 ^c	10.00 ^d
5g Anona seed powder	3.33 ^a	4.33 ^b	6.33 ^c	8.00 ^c
10g Anona seed powder	0.00 ^a	5.33 ^b	6.33 ^b	9.00 ^c
5g citrus peel powder	0.00 ^a	0.00 ^a	2.00 ^b	2.00 ^b
10g citrus peel powder	0.00 ^a	2.00 ^b	2.33 ^b	2.33 ^b
5g Pawpaw leaf powder	0.33 ^a	5.00 ^b	7.00 ^{bc}	8.00 ^c

10g Pawpaw leaf powder	0.00 ^a	5.33 ^b	6.66 ^b	8.66 ^c
LS	NS	x	x	x

Means within a column followed by the same letters are not significantly difference (P = 0.05%) using Duncan Multiple Range Test.

x = Level of significant at 0.05% level of probability

LS = level of significant

NS = Not significant

The order of increase in the number of germination was 5g annona seed powder, 5g pawpaw leaf powder (0.33a) and 5g actellic dust, 10g annona seed powder, 5g citrus peel powder, 10g citrus peel powder and 10g pawpaw leaf powder product and synthetic treatment were compared and evaluated days after treatment application, the lowest number of germination was obtained in 5g citrus peel powder (0.00a) , followed by 10g citrus peel powder (2.00b), 5g annona seed powder, 5g actellic dust (5.00b)= 5g pawpaw leaf powder (5.00b), and 10g annona seed powder (5.33b) = 10g pawpaw leaf powder (5.33b). The statistical data obtained at 3 days after application of treatment, showed that, lowest number of germination were obtained in 5g citrul peel powder (2.00b) followed by 10g citrus peel powder (2.33b), 5g annona seed powder (6.33c), 10g annona seed powder (6.33b), 5g pawpaw leaf powder (7.0bc) and 5g actellic dust (7.00c). At 4 days showed that 5g actellic dust gave the highest percentage germination (10.00a) followed by 10g annona seed powder (9.00c), followed by 5g annona seed powder (8.00c) = 5g while the lowest percentage germination were 10g citrus peel powder and 5g citrus peel powder (2.33b) and (2.00b) respectively. The result showed that seed viability of treated and control grains were all significantly influenced by the duration of storage and the concentration of the plant products treatment. The result agrees with the findings of Bamaiyi *et al.*, (2009) who reported that the effectiveness of the plant powders was observed to be directly proportional to their concentration. Equally, the study confirms with the result of Emmanuel *et al.*, (2006) who showed that a large difference can be observed between germination percentage of the control and the treated and infested seed of cowpea grains.

According to Beyond Control, (2009) even slight bruchids feeding damage the embryo impairs germination feeding in the cotyledon will not affect germination but the vigour of the young plant can be reduced.

Conclusion

The result indicated that, there was significantly differences between plant products treatments and the synthetic treatment over the control throughout the period of the experiment (1 to 8 weeks). However, among the various treatment of the plant products used, 5g pawpaw leaf powder/100g and 5g annona seed powder/100g of cowpea grains proved to be most effective in grain damage and also 5g pawpaw

leaf powder and 10g citrus peel powder proved to be most effective on adult emergence and adult mortality of *C. maculatus* at 8 weeks of the storage. However, 5g actellic dust was the most effective in controlling grain damage while 5g pawpaw leaf powder and 5g annona seed powder proved to be most effective in controlling grain damage among the natural botanicals, adult mortality and number of eggs laid by *C. maculatus* on the stored grains. Finally, the result of the study showed that, plant products tested at different concentrations displayed some potentials as food poison, repellants, antifidant and contact poison. The result clearly indicated the potential values of using plants extracts as complimentary to chemicals pesticides in controlling *C. maculatus* on cowpea grains.

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Diversity of Fish Parasites from fresh water fishes of Masooli Reservoir of Parbhani District

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Abstract: This study aimed to investigate the incidence and abundance of the parasites of fresh water fishes. A total 209 specimen of Cultivable and Catfishes were sampled from Masooli Reservoir of Parbhani District during the period of Oct 2011 to Sep 2012. Recorded parasites were analysed and identified as *Senga* from Cestodes, *Argulus* from Branchiura and *Lamproglena* from Copepodes separately. The total incidence and abundance was observed higher 12.6% and 0.23 in Catfishes as compared to the cultivable fishes 11.82% and 0.18

In conclusion, it was found that *Mystus seenghala* from Catfishes and Catla-catla from Cultivable fishes shows heavy infection with large number of parasites. The parasites were collected from different parts of the body. Their abundance and clinical lesions could eventually reduce performance and productivity of the species.

Key words: Fish parasites, incidence, Abundance, Cultivable and Catfishes, Masooli Reservoir

Introduction:-

Biodiversity is the short form of biological diversity. It is considered as an umbrella term referring to organisms found within the living world, i.e. the number, variety, and variability of living organisms.

Fishes are aquatic creatures, perfectly adapted for life in water. Among the organisms, fishes are the best known species of aquatic organisms and they are the only food source harvested from natural populations. Furthermore, fishes exist at or near the top of the food chain and can serve as an indicator of a balanced aquatic ecosystem (Gorman and Karr, 1978). Fishes are the keystone species which determine the distribution and abundance of other organisms in the ecosystem they represent and are good indicators of the water quality and the health of the ecosystem. Nearly 20 per cent of the world's freshwater fish fauna is already extinct or is on the verge of extinction due to parasitic impact (Moyle & Leidy, 1992)

Today the fish diversity and associated habitats management is a great challenge and the ability to evaluate the effects of habitat change and other impacts on the fish population required extensive surveying of the fish population before and after the change occur (Lester *et al.*, 1996; Dudgeon *et al.*, 2006).

Parasites and diseases reduce fish production by affecting the normal physiology of fish (Kabata, 1985) and which, if left uncurtailed, can result in mass mortalities of fish, or in some cases infection of man and other invertebrates that consume them (Fagbenro et al., 1993). Therefore, in the present investigation species diversity, occurrence of different parasites was studied from Masooli reservoir.

Materials and Methods:-

During present investigation period catfishes (*Clarius batrachus*, *Wallago attu* and *Mystus seenghala*) and Cultivable fishes (*Catla-catla* and *Labeo-rohita*) were collected from Masooli reservoir of Parbhani district with the help of local fisher man. The specimens were preserved in 4 % formalin and brought to the laboratory for the further study. Two Crustacean parasites that are *Lamproglena* and *Argulus* have found on gill filament and skin surface respectively. Both parasites were carefully removed with the help of needle and soft brush under a low power binocular microscope. Both parasites were preserved in 5% formalin. Identification and Classification of Crustacean parasites were done with the help of "Parasitic Copepod and Branchiura of Fishes" by Yamagutti (1963).

For helminth parasites fishes were dissected and intestine was removed from each fish and placed in petri dish with saline solution. The intestine was cut open to reveal the cestodes. Cestodes were removed from the intestine; washed in distilled water flattened between cover glass and slides, fixed in 4 % formalin until 24 hours, for specific identification. Then, were stained with Harris hematoxylin, destained in 1% acid alcohol, dehydrated through a series of ascending alcohol of 30%, 50%, 70%, 90%, and absolute alcohol, cleaned in xylene before mounting in D P X; and drawing were made with the aid of Camera lucida and measurement were recorded in millimeter unless otherwise mentioned. Identification was carried out by using Systema Helminthum Vol. II (Yamaguti - 1956).

This data was obtained throughout the study period of one year (2011-2012). This was processed and analysed to know the incidence and abundance of parasites.

Incidence and Abundance of Helminth and Crustacean parasites were determined by using following formulae.

$$\text{Incidence \%} = \frac{\text{Infected Host} \times 100}{\text{Total Host examined}}$$

$$\text{Abundance} = \frac{\text{No. of Parasites}}{\text{No. of Host examined}}$$

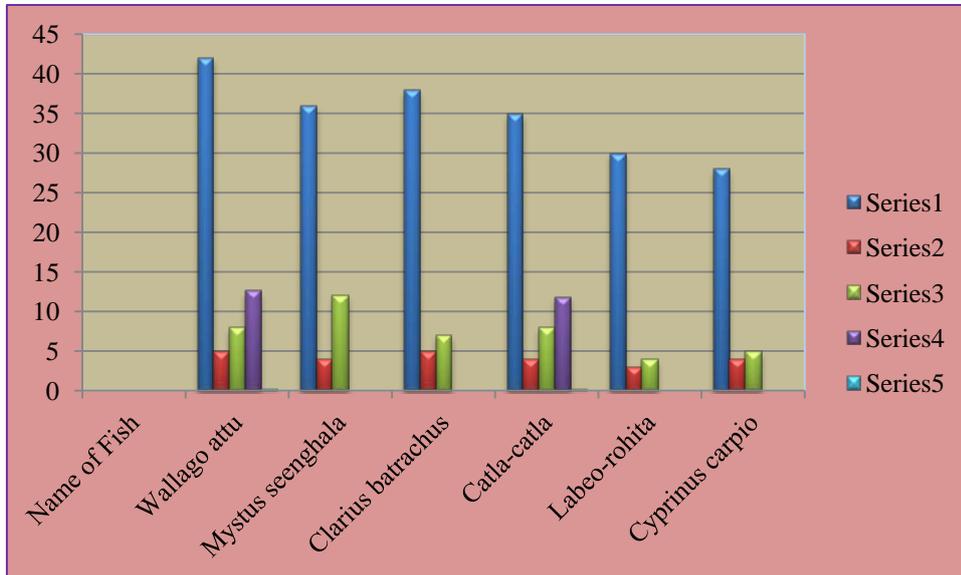
Table No.1:- Showing incidence and abundance and number of parasites collected from fresh water fishes

Sr. No	Name Of Fish	Number of fishes	Number of parasites	Incidence	Abundance
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		Examined	Infected	collected		
1	Wallago attu	42	05	08	12.6%	0.23
2	Mystus seenghala	36	04	12		
3	Clarius batrachus	38	05	07		
Total		116	14	27	11.82%	0.18
1	Catla-catla	35	04	08		
2	Labeo-rohita	30	03	04		
3	Cyprinus carpio	28	04	05		
Total		93	11	17		

Table no. 2 showing different parasites collected from fresh water fishes

Helminths	Name of Host	Name of Parasite
	<i>Clarius batrachus, Wallago attu, Catla-catla, Cyprinus carpio</i>	<i>Argulus</i>
Crustaceans	<i>Clarius batrachus, Wallago attu, Mystus seenghala, Labeo-rohita</i>	<i>Senga, Argulus, Lamproglena</i>
	<i>Clarius batrachus, Wallago attu, Mystus seenghala, Catla-catla</i>	<i>Argulus, Lamproglena</i>



Graph -1 shows Intensity and Abundance of Cultivable and Catfishes.

Series1—Number of examined; fishes Series2—Number of Infected fishes;

Series3—Number of Parasites; Collected Series4—Incidence%; Series5—Abundance

Result and Discussion:-

During the present study total 209 fresh water fishes were collected from the Masooli Reservoir with the help of fisherman. From these 116 fishes are Catfishes and remaining 93 fishes are Cultivable fishes. The study was carried out during Oct 2011 to Sep 2012. Out of 116, total number of 14 catfishes is found to be infected with the different parasites (Table no.1). Among three species of catfishes, *Mystus seenghala* shows more number of parasites (12), followed by *Wallago attu* (08) and less number of parasites found in *Clarius batrachus* (07). At the same time Cultivable fishes were also examined which shows 11.82% incidence and abundance of infection found to be 0.18, which is slightly less than Catfishes in which the incidence is 12.6% and abundance of infection is found 0.23.

Apart from these, the identification of the parasites and their occurrence from host to host, species to species and season to season was also recorded separately. The identification of *Argulus* and *Lamproglena* was done by following "Parasitic Copepod and Branchiura of Fishes" by Yamagutti (1963) and helminth (*Senga*) was identified with the help of Systema Helminthum Vol. II (Yamaguti - 1956).

Catfishes show large number of parasite (27) i.e each catfish is found affected with helminths as well as crustacean parasites. But among three species of cultivable fishes only *Cyprinus carpio* doesn't shows occurrence of *Lamproglena* and *Senga* parasites.

Argulus, *Lamproglena* and *Senga* parasites were collected from the different parts of the body of infected catfishes and cultivable fishes with. The *Argulus* and *Lamproglena* were collected from gill region and *Senga* parasite was collected from intestine. Oniye et al (2004) in Zaria, Nigeria, isolated five species of helminth parasites comprising of three cestode species, one nematode species, and one acanthocephalan species. Although both ectoparasites and endoparasites are common in fishes but it was found that the internal (endo) parasites are able to cause much greater damage to their hosts than external (ecto) parasites and the damage caused by helminth parasite to their host is generally related to the intensity of the infection and the depth of penetration of the parasite within the host tissue. These findings are in agreement with Tonguthi (1997) and (Dezfuli et al. 2003)

Parasitic crustaceans found in the class copepod and Branchiura are invariably ectoparasites on fish and have a direct life cycle. Parasitic stages are usually blood feeders on gills, fins and skin on the host and large number can have serious pathogenic effects (Lester and Hayward 2006). Copepods occupy a special place in the world of parasitism because of their extraordinary ability to adapt to very diverse aquatic hosts ranging from simple shape, such as sponges to more complex forms, such as vertebrates.

The host fishes were examined carefully and parasites were collected by observing different clinical signs i.e *Argulus* fish lice attached to the skin, gill chamber, and mouth. Localized inflammation occurs at the contact site because of mechanical damage from hooks and spines on the style and appendages, causing irritation from digestive enzymes. In heavy infestations, the fish lice may be seen all over the skin and fins of the fish and in the water column fish without visible lice (non-specific signs) of infestation (Hoffman, 1999). The signs include spot or pinpoint hemorrhages, anemia, fin and scale loss, increased mucus production, lethargy, erratic swimming, reduced feeding, hanging at the surface (avoiding swimming into the water column) and poor body condition. Fish may "flash" or rub against surfaces in an attempt to relieve irritation or to remove the parasites. In some cases, there may be no obvious signs of disease other than presence of the parasite (Stoskopf, 1993).

In Iran, *Argulus spp.* were reported from different hosts between 1984 and 2010 (Azadikhah et al 2009; Behrouzfar et al 2009; Jaameei et al 2009; Mehdizadeh, 2009; Mokhayer 2006; Mokhayer and Ebrahimzadeh Mousavi 2009; Mosafer et al 2009).

Recently in 2009 Everts, L and Arent-Oldwageort (Department of Zoology University of Johannesburg, South Africa) published a list of 28 species of *Argulus* in Malaysia (Applied Biology, 2009) with their host name and location; of these 09 species from India.

The most common lesions observed regarding helminth parasites were intestinal inflammation around the worm attachment surface and necrosis (cell death). Heavily infected fishes are often dark, emaciated, and lethargic. Necropsy may reveal liver enlargement and anemia. No obvious external signs can be seen

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Water Absorption and Compressive Strength of Self-Compacting Concrete Incorporating Fly Ash and Quarry Dust

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Abstract:

Self-compacting concrete or also known as self-consolidating concrete (SCC), an innovation in concrete technology is being regarded as one of the most promising developments in the construction industry due to numerous advantages that it has over conventional concrete. The cement and sand consumption in concrete production can be reduced by using a combination of industrial waste materials like fly ash and quarry dust and at the same time lead to energy and cost reduction. In this project, work is done on experimental study on fresh and hardened properties of SCC such as slump flow test, J-ring test, water absorption test, and compressive strength test of M35 grade of SCC. Five mixes with different percentages of quarry dust (0%, 10%, 20%, 30%, and 40%) as partial replacement for sand and a constant 10% of fly ash as partial replacement for cement is considered. The test results for water absorption and compressive strength were carried out after 7 days and 28 days of curing. The results obtained showed that the optimum dosage of quarry dust was 30% and that incorporating QDFA in SCC as green, sustainable and eco-friendly materials in SCC resulted in high workability, enhanced the strength and durability properties in term of water absorption.

Keywords: Fly Ash, QDFA, Quarry Dust, Superplasticizer, Self-Compacting Concrete, Water Absorption

1.0 Introduction

Highly fluid nature, easy handling and less noise are among the key advantage of self-compacting concrete. SCC significantly reduces the placement time of concrete in the large section due to easy handling technique. Self-compacting concrete (SCC) may reduce the noise on the worksite caused due to the vibrator use for concrete compacting purpose [1]. In the modern construction demand for concrete material has increased. The utilization of waste construction product has made possible to improve the compressive strength and workability of the concrete. Engineer's has made an effort to reuse the construction materials to unburden the environmental pollution always find new materials in the area of construction. The real problem exist the excessive waste or construction materials which should has to be reuse. Unlike other waste by products quarry dust is the waste material found from the crushing process of the stones and available abundantly from rock quarries at low cost[2]. Quarry dust may cause negative impact on environment [3]. Quarry dust has partially replaced with fine aggregate in concrete and significant improvement has witnessed [4], [5].

In the conjunction another most commonly waste material recommended and supplied in the construction is fly ash. Fly ash or pulverized fuel ash is a residue from the combustion of pulverized coal collected by mechanical separators, from the fuel gases of

thermal plants. Fly ash consists mostly of silicon dioxide, aluminum oxide and iron oxide and is hence a suitable source of aluminum and silicon for geo polymers [3][4]. The use of fly ash reduces the demand for cement, fine fillers and sand, which are required in high quantities in SCC. Fly Ash has been shown to be an effective addition for SCC providing increased cohesion and reduced sensitivity to changes in water content [1]. The durability of concrete subjected to aggressive environments depends largely on transport properties. Moisture migration into concrete is the main cause of concrete degradation worldwide.

One of the primary water transport mechanisms in concrete is absorption. Water absorption affects the durability of concrete due to the influence of pore system and moisture migration through structure [6]. Strength performance of concrete is always the key concern and to achieve sufficient compaction and vibration by skilled workers are required to enhance the durability performance of concrete. SCC has been used worldwide for placement in congested reinforcement concrete structures where casting conditions are difficult and where pump ability properties are required especially in high-rise building. Therefore, the development of SCC enhances the concrete lifespan compared to conventional vibrated concrete [7], [8].

The objective of this study is to determine workability (filling ability and passing ability) of self-compacting concrete incorporating quarry dust and fly ash using the slump flow test and the j-ring test. Moreover to determine the water absorption and compressive strength performance of self-compacting concrete incorporating quarry dust at different percentages and fly ash at a fixed percentage.

2.0 Review

Ahmad,[1] conducted experimental study to replace sand with quarry dust with the proportion of 10, 20, 30 and 40% and super plasticizer was added 0.9%. Study found that workability and compressive strength has increased by 30% replacement of sand with quarry dust and further addition leads to the decrease the compressive strength and workability. Johnsirani, [9] has performed an experimental investigation on self-compacting concrete (SCC) with fine aggregate (sand) replacement of Quarry Dust (QD) (0%, 25%, 50%, 75%, 100%) and addition of mineral admixtures like Fly Ash (FA) and Silica Fume (SF) & chemical admixtures like super plasticizers (SP). The results of the hardened properties of SCC such as compressive strength and split tension strength shows that the higher strength has been obtained for SCC_25% mix of about 34.62 Mpa and 2.36 Mpa respectively, while fine aggregate replacement of quarry dust increases with the gradual decreases in the strength values after replacement of 25% of quarry dust. Completely removal or 100% replacement of sand with quarry dust is not recommended due to drastically reduce the compressive strength and split tensile strength of SCC. Vanjare, [10] added 5, 10, and 15% glass powder in the self-compacting concrete the findings indicated that the addition of glass powder in SCC mixes reduces the self-compatibility characteristics like filling ability, passing ability and segregation resistance. Bradu, [6] studied the water absorption of self-compacting concrete (SCC) addition of fly ash in the mixture.

Findings indicated that water absorption value of SCC is affected by with addition of fly ash, the cement type and w/c ratio. Significant improvement in the properties of SCC has seen by the addition of fly ash. Past studies [1], [2], [6], [8]–[12] concluded that water absorption has strong relation with the voids present in the concrete and voids carries fluid in the result absorption in the concrete increase. Fly ash incorporated with SCC resulted higher water absorption values compare to other materials. Moreover, cement plays an important role in the water absorption process. Study has concluded that self-compacting concrete compressive strength increase by reduction of water absorption value.

3.0 Methodology

3.1 Material Preparation

The material used in this study were Ordinary Portland Cement, water, sand, gravel, quarry dust, fly ash and super plasticizer. The fly ash was a class F fly ash and was obtained from Jimah Power Plant, Tanjong Sepat, and Selangor, Malaysia. Quarry dust was obtained from Negeri Roadstone, Nilai, Negeri Sembilan, Malaysia. Sand and quarry dust with maximum passing size 5 mm sieve, coarse

aggregates from crush granite gravel with maximum size 10 mm sieve were used. The cube size 150 x 150 x 150 mm is used to test the compressive strength.

3.2 Mix design proportion

Different mixture designation of Control Mix (CM), SP, QDFA10, QDFA20, QDFA30, and QDFA40 with different percentages consist of 0%, 10%, 20%, 30% and 40% of quarry dust (QD) to replace sand as partial fine aggregate replacement with constant 10% of fly ash (FA) of total cement mass as supplementary cementitious material. The mighty 21HA superplasticizer of 1.0% of cement mass was added as water reducer in SCC as admixture. The proportion of partial fine aggregate replacement and supplementary cementitious material were designed based on volume replacement.

4.0 Results and Analysis

4.1 Workability Test Result

Self- Compacting Concrete is characterized by filling ability, passing ability and resistance to segregation. European federation of national trade associations representing producers and applicators of specialist building products (EFNARC) and ASTM recommended values for slump and J Ring test quoted from Ahmad, [1] is given in Table 1.

Table 1: Recommended Value [1]

	Property	Range
1.	Slump Flow Diameter	500-700 mm
2.	J-Ring	0-10 mm

The findings of slump flow diameter and J-Ring passing ability has shown in Figure 1 and 2. The slump flow diameter of the SCC mixes with different designation QDFA10, QDFA20, and QDFA30 and QDFA40 in SCC increased with the increase of quarry dust from 10% to 30% as fine aggregate replacement and constant 10% fly ash as cement replacement. The resulted outcome of slump flow diameter is 560 mm, 610 mm and 680 mm and 650 mm respectively. The slump flow diameter for QDFA10, QDFA20, and QDFA30 and QDFA40 in SCC are more than 500 mm and it can be considered as a proper slump required for a concrete to qualify for self-consolidating concrete. The workability of SCC increased with the increase percentages of quarry dust due to it physical properties and classified as less water absorbent material than sand. Additionally, the usage of superplasticizer in SCC increases the workability exponentially even though the water cement ratio for control and SCC with double blended QDFA are the same. The increases of slump flow diameter with the increase of quarry dust percentages and additional of superplasticizer improve the workability of SCC than conventional vibrated concrete. It indicates the optimum slump flow diameter for this research study is QDFA30 in SCC.

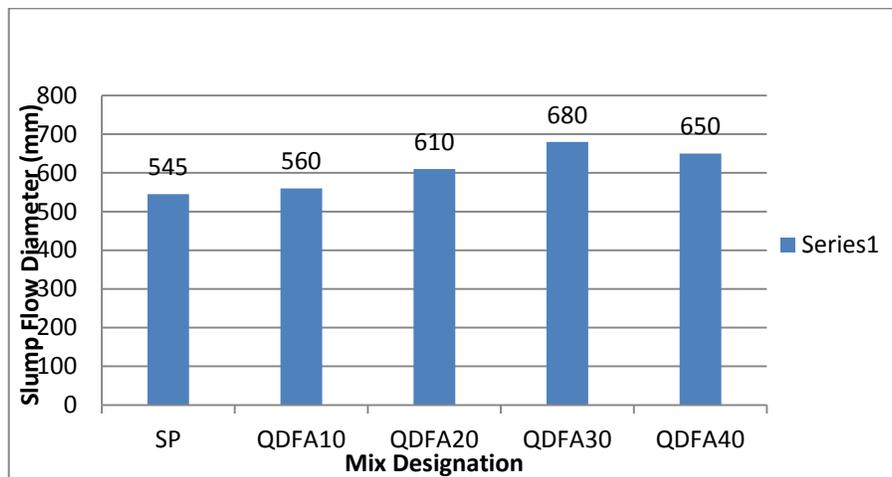


Figure 1: Slump Flow Diameter for all SCC mix designation

Figure 2 indicated J-Ring test values which lie between the ranges of recommended value 0-10mm. Workability by measuring the passing ability through openings. The passing ability increase when more Quarry dust is added at a constant amount of fly ash.

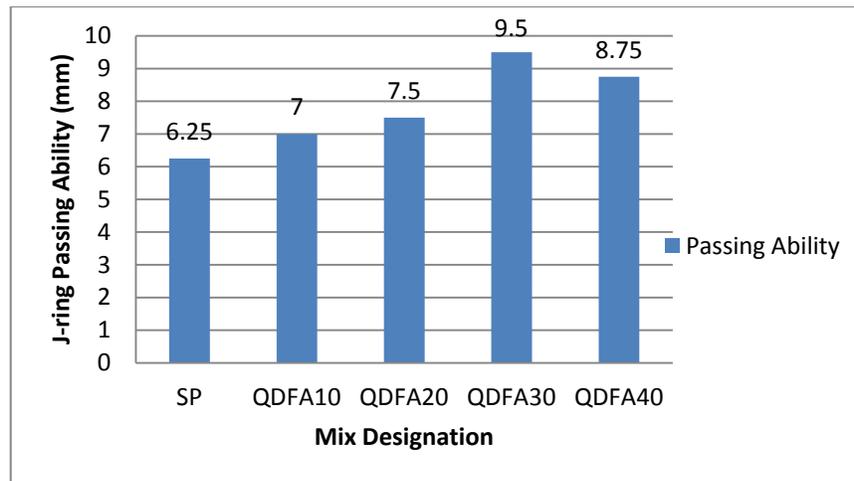


Figure 2: J-ring Test for Passing Ability for all SCC mix designation

4.3 Compressive Strength Test

Table 2 and Figure 3 indicated the findings of compressive strength of SCC mixed with quarry dust and fly ash. Compressive test were conducted in 7 and 28 days curing period. The obtained result shows higher compressive strength in 28 days curing period compare to 7-days curing. . The average compressive strength of concrete cubes for 10% quarry dust is 24.37 MPa at 7 days, which then increased to 34.82 MPa at 28 days. For 20%, the compressive strength develops from 25.32 MPa at 7 days to 35.67 MPa at 28 days. For 30% quarry dust increased from 29.19MPa at 7 days to 38.77 MPa at 28 days. For 40% quarry dust increased from 28.32 MPa at 7 days to 36.24 MPa at 28 days. As for SP, the first recorded strength is 27.03 MPa at 7 days and 36.15MPa at 28 days. The compressive strength result for QDFA10 and QDFA20 are lower than control concrete and the SCC with only superplasticizer while QDFA40 is lower than the SCC with only superplasticizer. However, the compressive strength result for QDFA30 is higher both the control concrete and SCC with only superplasticizer and it indicates the QDFA30 in SCC as the optimum result in this research study. QDFA30 has the highest compressive strength amongst all the other design mixes, with an increase of 7.24% than control mix and 6.54% of the mix with only superplasticizer. In order to increase the workability of concrete, higher water to cement ratio is needed thus decreasing the strength of concrete.

However, by incorporating the Quarry dust and fly ash and the use of superplasticizer, higher compressive strength was achieved with the constant water cement ratio for all mixes.

Table 2: Compressive strength results of control mix and all SCC mix designation

Mixture Designation	Curing (Days)	Compressive strength in MPa
Control Mix	7 days	27.03
SP		27.96
QDFA10		24.37
QDFA20		25.32

QDFA30	28 days	29.19
QDFA40		28.32
Control Mix		36.15
SP		36.39
QDFA10		34.82
QDFA20		35.67
QDFA30		38.77
QDFA40		36.24

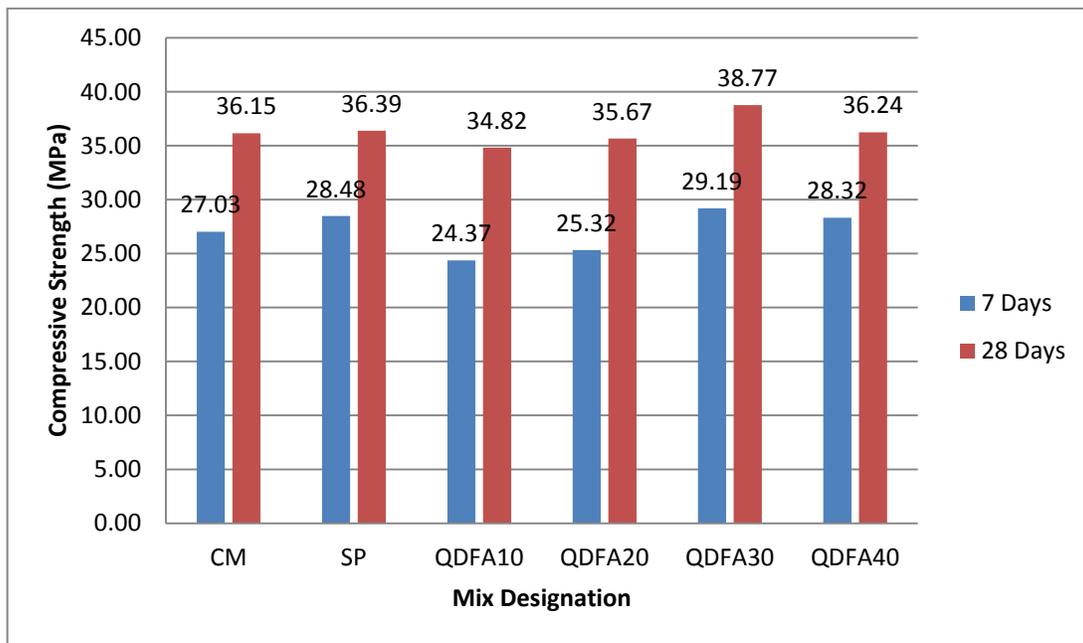


Figure 3: Compressive strength test for control and all SCC mixture designation

4.3 Water Absorption Test

The water absorption test was performed using BS 1881: Part 122: 1983. This Part of this British Standard specifies a method for the determination of water absorption of concrete specimens cored from a structure or precast component. The 50 mm Ø x 100 mm height cylinder was used for casting. The cylinder was immersed in water for 7 days and 28 days curing period. The specimen were dried in oven for 3 days and immersed in water at 30 minutes interval for 4 hours. The results for 7 days and 28 days test for water absorption of control and all SCC mixes with different mix designations are shown in the table 3. The water absorption of SCC containing fly ash and quarry dust in grade 35 concrete according to immersion time of 7 days and 28 days curing were classified as having average water absorption. The water absorption of concrete after 7 days curing at initial 30 minutes water immersion were not all below 3% except for QDFA30 which is slightly above 3% and for after 28 days curing it can be seen that most of the mix designation are below 3% and so this concrete can be classified as having low water absorption.

The fly ash added to the SCC mix served as a filler and helped to fill up the capillary pore structures that reduced water absorption in the SCC mix. Thus, reducing the size of the pores and the transport of water in the concrete mix. Water absorption of QDFA30 was

lower than the control mixes for both 7 days and 28 days curing. Therefore, it shows that durability of QDFA30 was improved and made better compared to the control mix concrete.

Figure 4 indicated that water absorption for initial 30 minutes are not all below 3% after 7 days curing but for the bar chart of the results in Figure 10 most of the mix designations are all below 3% after 28 days curing therefore all concrete mixes can be classified as having good water absorption since 3% is the limiting value specified for initial surface water absorption. Based on the two graphs it can be seen that water absorption at 7 days curing is higher than water absorption at 28 days curing. Thus, water absorption of concrete reduces with the age of concrete.

From the results of water absorption stated below we can see that the SCC mix with mix designation QDFA30 had the least percentage of water absorption than the other mixes. Therefore, the optimum percentage of quarry dust in SCC with respect to water absorption is 30%.

Table 3: Water absorption of control mix and all SCC mix designation for 7 and 28 days curing

Mixture Designation	Curing (Days)	Water Absorption (%)							
		Duration of immersion (Hours)							
		0.5	1	1.5	2	2.5	3	3.5	4
Control Mix	7 days	3.24	4.26	4.92	5.33	5.57	6.15	6.28	6.48
SP		3.96	4.59	4.75	5.40	5.74	5.98	6.20	6.41
QDFA10		3.82	4.57	4.86	5.67	5.76	5.84	6.09	6.31
QDFA20		3.64	4.55	5.36	5.57	5.77	5.93	6.01	6.19
QDFA30		3.06	4.02	4.61	5.17	5.58	5.78	5.91	6.07
QDFA40		3.19	4.14	4.85	5.33	5.73	5.96	6.08	6.26
Control Mix	28 days	1.78	2.52	3.15	3.71	4.34	5.04	6.44	6.87
SP		2.39	3.14	3.58	3.78	4.28	4.69	5.10	5.50
QDFA10		2.77	3.19	3.94	4.29	4.78	5.11	5.72	6.35
QDFA20		3.01	3.62	4.17	4.57	5.07	5.58	6.03	6.47
QDFA30		1.78	2.47	2.94	3.31	3.83	4.26	4.80	5.31
QDFA40		3.10	4.13	4.85	5.38	6.02	6.72	7.30	7.92

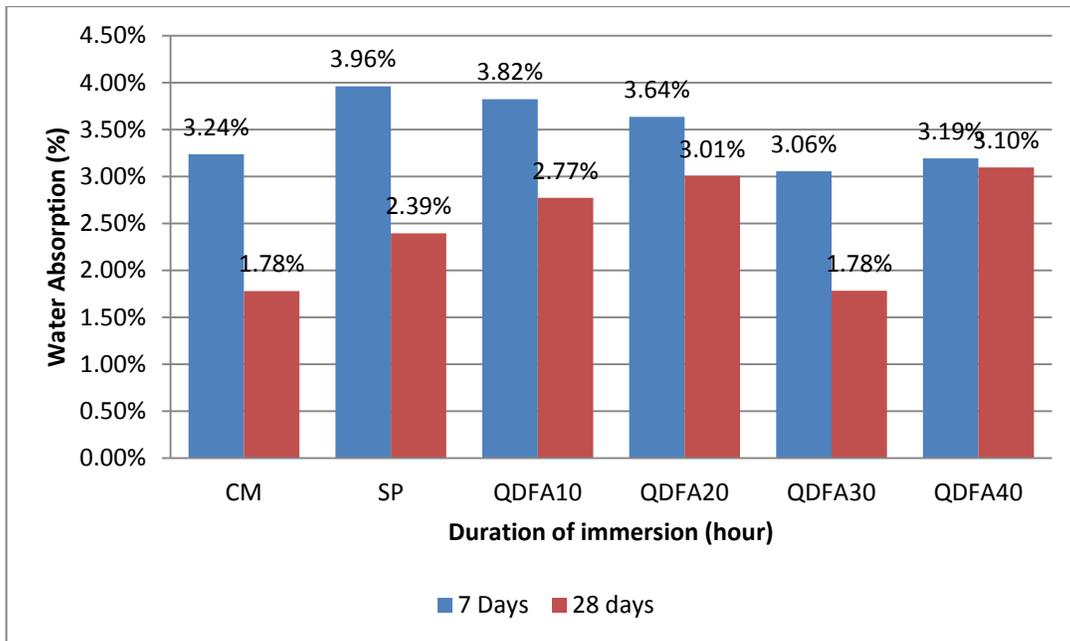


Figure 4: Water absorption of control mix and all SCC mix designation at initial 0.5 hour water immersion

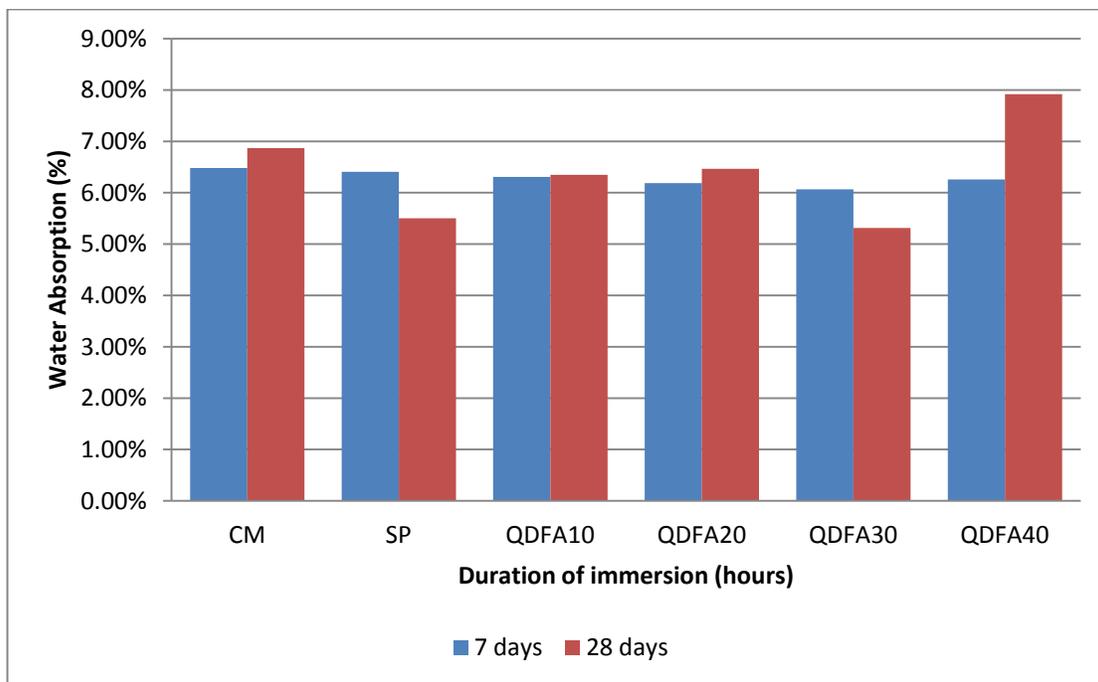


Figure 5: Water absorption of control mix and all SCC mix designation at final 4 hour water immersion

5.0 Conclusion and Recommendations

The following conclusions are outlined based on experimental result

SCC workability in terms of slump flow value and j-ring value increases by the reduction or sand with replacement of quarry dust from 0% - 30%. Further replacement of quarry dust with sand above 30% resulted reduce workability. This indicates that the optimum amount for the replacement of sand by quarry dust in SCC is 30% and at this percentage the workability of SCC was greatly improved. From the water absorption test, it was observed that the percentage of water absorption was least at 30% replacement of sand with

quarry dust and 10% replacement of cement with fly ash. The water absorption value of self-compacting concrete containing quarry dust and fly ash was generally lower compared to the one containing no quarry dust and fly ash. From the compressive strength test, increase in percentage of partial replacement of fine aggregate with quarry dust at 0%-30%, resulted in the increase in compressive strength. Further, with increase in percentage partial replacement of fine aggregate with QD at 40% decreased the strength gradually. The best compressive strength was achieved at 30% replaced of quarry dust with sand and 10% replacement of cement with fly ash. Study concluded that the partial replacement of quarry dust with sand more than 30% caused reduction of compressive strength and water absorption. Hence, the optimum amount of quarry dust for this research is 30%.

More research needs to be done to make effective use of waste materials like quarry dust and fly ash to improve the workability, durability and compressive strength of self-compacting concrete. This will lead to less waste materials released to the environment and as this same time produce a cheaper SCC mix with good durability and strength properties. Some other recommendations for future research are as follows: Additional test can be conducted on SCC mix incorporated with quarry dust and fly ash such as split tensile test, flexural test and other durability test such as acid resistance test and sulphate attack test. A different water cement ratio and a different grade of SCC can be designed other type of superplasticizers can be used for future research. The percentage of fly ash can be increased to see the effects on the concrete properties. The curing duration can be increased to 60 days to see if there will be future strength increase.

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Factors influencing dietary practices among pregnant women in Adeoyo Maternity Hospital, Yemetu, Ibadan, Oyo State

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Abstract

The menace of maternal morbidity and mortality has remained a major maternal and child health problem in developing countries and prominent among the risk factors is inadequate dietary practice in pregnancy. The study assessed factors influencing dietary practices among pregnant women in Adeoyo Maternity Hospital Yemetu, Ibadan, Oyo State.

The study adopted a descriptive research survey. The populations were 626 pregnant women attending Adeoyo Maternity Hospital, Ibadan Oyo State. Sample size was determined using solvin's formula and simple random technique through was used to select 244 pregnant women. A researcher-designed questionnaire was used to obtain data on factors influencing dietary practice among pregnant women. Data was processed using statistical package for social science version 21. Three research questions were answered using descriptive statistics of percentage while three hypotheses were tested using chi square at 0.05 level of significance.

Majority 75% of the pregnant women had moderate knowledge level concerning dietary practice during pregnancy, 58.2% agreed that cultural belief influence dietary practice while 50.8% agreed that religious belief influence dietary practice. There is no significant relationship between participants knowledge regarding dietary intake and dietary practice ($p= 0.200$). There is no significant relationship between participants level of education and dietary practice ($p= 0.077$). There is significant relationship between monthly income and dietary practice ($p= 0.001$).

Pregnant women have moderate knowledge level about dietary practice and monthly income significantly influence dietary practice. Nurses should educate pregnant women about cost effective dietary practice

Keywords: Dietary knowledge, Dietary practice, Factors, Nutrition, Pregnant women.

I. INTRODUCTION

Pregnancy is a period of great physiological changes that demand healthy dietary lifestyle among pregnant women because the growing fetus draws a lot of energy and nutrients from the mother to improve physical, physiological and psychological progression. The increased metabolic, physiologic and nutritional demand during pregnancy has given maternal dietary practice much attention over the years. The extra demand of pregnant women's body system has resulted in the need for an improved dietary practice to meet the nutritional needs of the pregnant woman and the developing fetus [1],[2].

According to [3] the menace of maternal morbidity and mortality has remained a major health problem in developing countries. Prominent among the risk factors for maternal morbidity and mortality inadequate nutrition and dietary practice in pregnancy.

Inadequate dietary practice among pregnant women has been identified as one of the causes of maternal death during pregnancy. Inadequate dietary practice among pregnant women has been attributed to factors such as educational level, income level, knowledge regarding dietary practice during pregnancy, cultural belief and ethnicity as well as religious belief [4].

According to [5] inadequate dietary practice among pregnant women has been associated with negative maternal outcomes low birth weight and poor mental development of the fetus. Globally, the estimated prevalence of anemia in pregnancy has been 50% with higher prevalence of 75% in the developing countries and 15% in developed countries. This has been attributed to inadequate dietary practice among pregnant women. Several studies have associated inadequate dietary practice among pregnant women with maternal complication such as anemia and immunosuppression as well as fetal complications such as low birth weight, decreased physical, physiological and cognitive ability in children [6].

Anemia in pregnancy, low birth weight, decreased physical, physiological and cognitive ability in children has been persistent as a result of inadequate dietary practice among pregnant women. This may be attributed to factors influencing dietary practice such as level of education, cultural belief, religious belief, level of income and knowledge regarding dietary practice [7]. Researcher through clinical experience has observed more cases of anemia among pregnant women attending Adeoyo Maternity Hospital. This may be attributed to factors influencing dietary practice among pregnant women. Hence, the need for a study to assess factors influencing dietary practice among pregnant women attending Adeoyo Maternity Hospital Yemetu, Ibadan, Oyo State, Nigeria.

II. MATERIALS AND METHODS

2.1 Study Design

The study adopted a descriptive research design to assess factors influencing dietary practice among pregnant women attending Adeoyo Maternity Hospital, Yemetu, Ibadan, Oyo State, Nigeria between January and March, 2018.

2.2 Study setting

The study was carried out at Adeoyo Maternity Hospital, Yemetu, Ibadan, Oyo State, Nigeria. Adeoyo Maternity Hospital is located in Ibadan North Local Government of Oyo State and was founded in 1928. There are 189 nurses working in the hospital and it provides maternal and child healthcare services to people in Ibadan and its surrounding. It is made up of antenatal clinic, labor ward, antenatal ward, gynecological ward, lying in ward, children's ward, immunization clinic, post-caesarian section ward, gynecological clinic and family planning clinic.

2.3 Sample size and Sampling Technique

The study population was 626 pregnant women attending antenatal clinic per month obtained from the register in Adeoyo Maternity Hospital, Yemetu, Ibadan. Sample size was determined using solvin's formula $n = N/1+N(e)^2$ where n is required sample size, N is the total population and e is the error of tolerance (5%). The formula indicated a minimum sample of 244. Simple random sampling technique was adopted to select 244 pregnant women for the study using the ballot method and the pregnant women were selected on

daily basis as they attend ante natal clinic for four weeks. Adeoyo Maternity Hospital runs her antenatal clinic for three days in a week. The clinic register and list of names of participants were compared to ensure that no participants was selected twice.

2.4 Instrumentation

A researcher-designed questionnaire consisting of 47 items structured around factors influencing dietary practices among pregnant women was utilized for the collection of data for the study. It consisted of five sections which include Socio-demographic characteristics made up of 8 questions, Obstetric characteristics made up of 12 questions, knowledge of pregnant women regarding dietary practice made up of 11 questions and factors influencing dietary practices among pregnant women made up of 6 questions. Knowledge score of participants below 50% was categorized as inadequate knowledge level, knowledge score of participants between 50%-70% was categorized as moderate knowledge level and knowledge score of participants above 70% was categorized as adequate knowledge level.

2.5 Procedure for data collection

A letter of introduction and permission for data collection was obtained from Babcock University Health Research and Ethical Committee (BUHREC) and submitted to Oyo State Hospital Management Board. Participants were recruited and informed about the purpose, course and potential benefits of the study. Consent was obtained from the participants after which they were asked to complete the researcher-designed questionnaire. The questionnaire was translated to Yoruba because majority of the participants were Yoruba who could not read and understand English language. Data was collected for four weeks on clinic days. The collection of data was done in three days per week with 27- 30 participants captured per day. 244 questionnaires were distributed to participants in total and same retrieved adequately completed.

2.6 Method of data analysis

Data was analyzed using Statistical Package for Social Sciences version 21. Three research questions were answered using descriptive statistics of percentage and three hypothesis were tested using Chi-square at 0.05 level of significance.

2.7 Ethical consideration

Ethical clearance was obtained from Babcock University Health Research Ethics Committee and permission was obtained from Oyo State Hospital Management Board. Written informed consent was obtained from the participants and the purpose of the study was explained to the participants. Information obtained from participants was kept confidential. Participant's freedom to withdraw from the study at any point in time in spite of the consent was also respected.

III. RESULTS AND DISCUSSION

3.1 Result Presentation

Table 1: Demographic characteristics of participants (n=244)

Variables	Variable Levels	N	Percentage %
Age(years)	≤20	6	2.50
	21-30	117	48.0

	31-40	118	48.3
	41-50	3	1.2
Total		244	100
Marital Status	Married	241	98.8
	Cohabiting	3	1.2
Total		244	100
Religion	Christianity	140	57.4
	Islam	104	42.6
Total		244	100
Ethnicity	Yoruba	233	95.4
	Hausa	2	0.8
	Igbo	7	3.0
	Others	2	0.8
Total		244	100
Monthly Income	Less than N5,000	2	0.8
	N5,000 to N9,000	20	8.2
	N10,000 to N14,000	52	21
	N15,000 to N19,000	43	18
	N20,000 and Above	119	52
Total		244	100
Level of Education	No formal education	5	2.0
	Primary education	22	9.0
	Secondary education	122	50.0
	Tertiary education	95	39
Total		244	100
Occupation	Unemployed	16	6.6
	Student	8	3.3
	Trader	121	49.6
	Artisans	99	40.5
Total		100	100
Spouse Occupation	Unemployed	3	1.2
	Self employed	149	61.1
	Salary earner	92	37.7
Total		244	100

Table 1 shows majority of the participants were aged 31-40years (48.3%). Majority of the participants were married (98.8%). Majority of the participants were Christians (57.4%). Majority of the participants were Yoruba (95.4%). Majority of the participants earned monthly income of N20,000 and above (52%). Majority of the participants had secondary school certificate (50%). Majority of the participants were traders (49.6%). Majority of the participants spouse were self-employed (61.1%)

Table 2: Obstetric variables of participants (n=244)

Variables	Variable Levels	Frequency	Percentage %
Number of Live births	1-4	215	87.7
	5-8	30	12.3
Number of still births	None	218	89.3
	One	22	9.1
	Two	4	1.6

Numbers of induced abortion	None	189	77.5
	1-2	49	20.0
	3-5	6	2.5
Complication experienced in previous pregnancies	Yes	63	28.4
	No	181	71.6

Table 2 shows majority of the participants have had between 1-4 live births (87.7%). Majority of the participants have had no still birth previously (89.3%). Majority of the participants have had no induced abortion previously (77.5%). Majority of the participants have not experienced pregnancy complications previously (71.6%).

Table 3: Knowledge category regarding diet in pregnancy n= 244

Category	Inadequate (below 50%) Frequency (%)	Moderate (50% - 70%) Frequency (%)	Adequate (Above 70%) Frequency (%)
Participants	37(15%)	183(75%)	24(10%)

Table 3 reveals that majority of participants 183(75%) had moderate knowledge about dietary practice in pregnancy.

Table 4: Factors influencing dietary practices among the participants n = 244

Variables	Variable levels	Frequency	Percentage%
Cultural beliefs	Yes	142	58.2
	No	102	41.8
Ignorance	Yes	84	34.4
	No	160	65.6
Religious belief	Yes	124	50.8
	No	120	49.2
literacy	Yes	184	75.4
	No	60	24.6
Socio-economic status	Yes	224	91.8
	No	20	8.2

Table 4 shows that majority 142(58.2%) of the participants agreed that cultural beliefs influence dietary practice. Majority 160(65.6%) of the participants agreed that ignorance influence dietary practice. Majority 124(50.8%) of the participants agreed that religious belief influence dietary practice. Majority 184(75.4%) of the participants agreed that literacy influence dietary practice. Majority 224(91.8%) of the participants agreed that socio-economic status influence dietary practice.

Table 5: Inferential statistics regarding knowledge and dietary practices among participants

Participants knowledge regarding	Practice of Dietary Intake		Total	Df	χ^2	p-value
	Inadequate practice	Adequate practice				

dietary Intake	F(%)	F(%)				
Inadequate knowledge	9(3.7)	19(7.8)	28(11.5)	1	1.644	.200
Adequate knowledge	97(39.7)	119(48.8)	216(88.5)			
Total	106(43.4)	138(56.6)	244(100.0)			

Table 5 shows that there is no significant relationship between participants knowledge regarding dietary intake and dietary practice (p=0.200).

Table 6: Inferential statistics regarding level of education and dietary practice among participants

Participants level of education	Dietary practice		Total	Df	χ^2	p-value
	Inadequate practice N(%)	Adequate practice N(%)				
No Formal Education	5(2.0)	0	5(2.1)	3	7.032	.077
Primary Education	10(4.1)	12(4.9)	22(9.0)			
Secondary Education	53(21.7)	69(28.3)	122(50.0)			
Tertiary Education	38(15.6)	57(23.4)	95(38.9)			
Total	106(43.4)	138(56.6)	244(100.)			

Table 6 shows that there is no significant relationship between participants level of education and dietary practice (p=0.077).

Table 7: Inferential statistics regarding monthly income and dietary practice among participants

Participants monthly income (naira)	Practice of Dietary Intake		Total	Df	χ^2	p-value
	Inadequate practice N(%)	Adequate practice N(%)				
Less than N5,000	2(.8)	0	2(.8)	3	26.485	.000
N5,000 to N9,000	15(6.4)	5(2.1)	20(8.5)			
N10,000 to N14,000	21(8.9)	31(13.1)	52(22.0)			
N15,000 to N19,000	28(11.9)	15(6.4)	43(18.2)			
N20,000 and Above	37(15.7)	82(34.7)	119(50.4)			
Total	103(43.6)	133(56.4)	236(100.0)			

Table 7 shows that there is significant relationship between participants monthly income and dietary practice (p=0.000).

3.2. Discussion of findings

More pregnant women between 31-40years visit Adeoyo Maternity Hospital for antenatal care because of dominance of pregnant women with this age group. This disagrees with the previous descriptive study conducted by [8] in which majority of participants were between 21-30years. More married pregnant women visit Adeoyo Maternity Hospital for antenatal care because of the support of the spouse. This agrees with previous descriptive study finding by [9] in which majority of the participants were married. More Christians visit Adeoyo Maternity Hospital for antenatal care which is due to Christian dominance in the area. This agrees with previous descriptive study finding by [9] in which majority of participants were Christian.

More Yoruba pregnant women visit Adeoyo Maternity Hospital for antenatal care which is due to Yoruba tribe dominance in the area. This agrees with previous descriptive study finding by [10] which had more Yoruba participants. More moderate and high income earners visit Adeoyo Maternity Hospital for antenatal care because of the economic status in the area which agrees with previous study finding by [10] which had more participants earning more than #20,000. More pregnant women with secondary school certificate visit Adeoyo Maternity Hospital for antenatal care which is due to availability of time for people with secondary school certificate to attend antenatal. This disagrees with a descriptive study finding by [10] which had more participants with tertiary school certificate. More traders visit Adeoyo Maternity Hospital for antenatal care because of the availability of time for trader to attend antenatal clinic. This disagree with previous descriptive study by [10] in which majority of participants were artisans.

Majority of the pregnant woman visiting Adeoyo Maternity Hospital have had between 1-4 previous live births, nil previous still birth, nil previous induced abortion or pregnancy complications. This is due to their accessibility to health education on pregnancy and healthy dietary practices during pregnancy which is delivered by Nurses during antenatal clinic visits.

Pregnant women possess moderate knowledge regarding dietary practice because of their access to antenatal clinic health educations and information on healthy lifestyle and practices including dietary practice during pregnancy. This finding disagrees with previous descriptive study by [11] in which majority of participants had adequate knowledge. The cultural beliefs and religious belief of pregnant women influence their dietary practice because some culture and religion consider some certain nutritious and beneficial diet for pregnant women a taboo which make them abstain from it. This agrees with previous descriptive study finding by [12] in which majority of participants agreed that cultural and religious belief influence dietary practice during pregnancy

A descriptive study by [13] among 401 pregnant women to describe the relationship between participants knowledge regarding dietary intake and dietary practice support the findings of this study which pointed out that dietary intake knowledge is unable to result in adequate dietary practice among pregnant women. It may be due to lack of interest in making a change in one's diet, perceived or encountered barriers that may prevent people from eating healthier diets such as the lack of money (cost), lack of time or poor appetite.

Participant's educational level did not influence their dietary practice because education does not automatically translate into good practice due to perceived or encountered barriers that may prevent participants from adequate dietary practice. This finding support previous descriptive study by [14] in which high literacy level of participants did not translate to good dietary practice. Participants' monthly income influenced their dietary practice because of the availability of resources to purchase nutritious diets by pregnant women will determine its intake. This finding agrees with a previous cross sectional study by [9] which reported a significant relationship between participants' monthly income and dietary practices.

IV. CONCLUSION

Based on the findings of the study, knowledge regarding dietary intake during pregnancy among participants is moderate, cultural and religious belief influence dietary practice during pregnancy. Knowledge regarding dietary intake and level of education is not significantly related with dietary practice during pregnancy while monthly income is significantly related with dietary practice during pregnancy.

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Student Team Achievement Divisions Technique to Improve Students' Behaviour Engagement

(A Study of Classroom Action Research at Islamic Senior High School of Al Azhar 9 Yogyakarta in Academic Year 2015/2016)

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ABSTRACT

Student Team Achievement Divisions (STAD) is a strategy used in teaching process by which students work collectively in small groups on a structured activity and it is presumably able to improve their behaviour engagement and learning outcome. Collaborative learning and engagement (specifically behaviour engagement) are something considered important in learning, especially in language learning as they can promote the effectiveness of learning by fostering students' active participation in the learning process. The data of this study were collected by using questionnaire, observation, interview and diary which used successively. The data analysis revealed that (1) STAD can improve students' behaviour engagement (2) There are several difficulties found when applying STAD to enhance students' behaviour engagement. Taking sample of twenty one students divided into five small groups, the research was conducted by using classroom action research design. The results indicates that students in a class with caring atmosphere and supportive interaction managed by the teacher; who played active roles as prompter, participant, and/or tutor as well as addressed the students autonomy via group work activity, are engaged behaviourally to the instructional. In conclusion, the student team achievement divisions technique is appropriate to be applied to enhance students' behaviour engagement on the english class successfully.

Keywords: Student Team Achievement Divisions, Students' behaviour engagement.

INTRODUCTION

The importance of student engagement in the classroom can be seen by the teachers. So far, some observations showed that (in many language classes) many students are fed-up, apathetic, and detached. These are the indicators of disengagement in the academic and social aspects of school atmosphere. Teachers are constantly working to connect their students to the school atmosphere and to the learning activity because they know that engagement is crucial to the learning goal. It may help teachers to know that students' engagement occurs on multiple levels. Every level of engagement can increase the teachers' chances to get their students' attention. Thus; for many researchers, educators, and policymakers; Students' engagement is a topic seen as main dimension in addressing problems such as students' lack of achievement, high level of tedium in classroom, estrangement, and high dropout rates (Fredricks, Blumenfeld, & Paris, 2004). As they progress from elementary to middle school, students are become more disengaged with some estimates that 25–40%

of youths are showing signs of disengagement—detached, apathetic, and unmotivated (Friesen, 2008; Dunleavy & Milton, 2009; Yazzie-Mintz, 2007).

Many factors play significant roles in the teaching and learning process in the classroom including teaching material, teaching media, teaching strategy, teachers and also students as the last destination of learning process. The students also have to have the will and drive to learn and feel that the studies are relevant to them. They have to feel supported by their parents and teachers and feel safe to study in their place of learning. In short, they have to be engaged to learn. However, some of teachers still focus their teaching activity on delivering a curriculum to fulfil their target in teaching and learning process. They feel comfortable if they can teach all materials from curriculum in time.

Talking about students' engagement, it is also an important element existing in classroom practice since, through which, students can develop their knowledge acquisition and cognitive development in order to support their skill. Students with a great level of engagement will

acquire meaningful and long-life learning (Barkley et.al, 2014). Kuh et.al (2008) also stated that engagement is the extent to which students are engaged in learning activities . thus, it can be said that engagement is correlated to expected leaning outcomes such as studnets' high grades, satisfaction, and perseverance. Moreover, student engagement is commonly considered as the core system that enables motivational processes contributing to learning and development (Skinner & Furrer, 2009, pp. 493-525).

Students' engagement is a dimension in academic achievement rooted in late 20th century research suggesting students who are fully engaged to the educational activities can get better achievement than those who are not. The concept of engagement—as linked to the learning process designed by teachers and expected from students—is deeply-rooted in the belief that learning process designed from the interest or that is relevant to the student leads to the greater achievement (Schlechty, 2004). From the brief explanation above, we can notice that students' engagement plays a significance role in the learning process. The higher the students' engagement is the easier the students and teacher to conduct the successful teaching and learning activity. Some studies estimated that by high school as many as 40 –60 percents of youth are disengaged (Marks 2000). As we notice that students' engagement is an important thing to increase student achievement, that is why, it is recommended to increase students' engagement in the classroom.

Engagement is not merely participation as it requires feelings, tacting, and activity (Harper and Quaye, 2009). Furthermore, (Taylor & Parson, 2011, pp.8) states that respectful relationship and interaction are also instrumental elements should be exist to positively engage the students in learning activities Those elemets influence each other—acting without feeling engaged is vacuous; feeling engaged without acting is disintegration. In other versions, behavioral engagement involve observable levels of actions, involvement, perseverance and Studnets' academic participation, according to rules and on/off-task behaviour (Finn & Voelkl, 1993). Klem and Connell (2004) measure student engagement sampling from two point of view— teachers and students. Teacher measurement is emphasized on student behaviour and performance; and seek engagement as a potent predictor of academic success. Duffy et al. (2005) find that active participations (in learning process) raise the level of engagement. The level itself can be measured through several indicator; interaction, effort, and perseverance.

Focuses should be given more on students' behavioral engagement. As stated in Regional Educational Laboratory/REL (2011), students' behavioral engagement is indicated by three main behaviors; (1) students' attendance to the classroom, (2) Students' participation during the teaching and learning activity, and (3) students' positive behavior towards teachers' performance in the classroom. If the teacher can make those three behaviors present to the classroom, he has successfully made the students engaged to the classroom activity behaviorally. Student engagement dimensions have been proven positively correlated to achievement and likelihood of not dropping out of school (Fredricks, Blumenfeld, and Paris 2004).

One of the way to realize such intention described is by implementing collaborative learning in the classroom

register. Sansivero (2016) said that through such way, students can have many beneficial elements such as “increased openness, conscientiousness, agreeableness, trust and stability in learning”.

Responding to the issues above, in the context of this study, Student Team Achievement Divisions (STAD)—a form of was implemented at Class XI MIA 2 Islamic Senior High School of Al Azhar 9 Yogyakarta to overcome some problems happened in the classroom. This method is generally used in a large class which will be divided into teams, and fosters individual, small group, and class accountability. In STAD, the teams/ small goup formed usually consist of five/seven students, actively engaged and motivated by learning material, in which they communicate and learn from each other. As what said by Bales (1950) in Kuo & Yu (2011) that when students work in group, their maturity and performance will be more likely developed, especially when they make decisions. In addition, by which, “students voices” which, all this time, has long been lost in the dominance of teacher can be elevated (Bennet, Maton & Kervin, 2008).

In accordance to the reason and its benefit of STAD as teaching strategy, it leads the researcher to conduct a research entitled “Student Team Achievement Divisions Technique to Improve Students' Behaviour Engagement” (A Study of Classroom Action Research at Islamic Senior High School of Al Azhar 9 Yogyakarta in Academic Year 2015/2016). The reasons why the students have such kinds of problems are that: (1) they feel tired because they study start from 06.30 until 16.00 everyday which really makes them out of energy; (2) They do not feel enthusiastic because they are taught in the same atmosphere every day; (3) And the teacher is not creative enough to give new technique in teaching and learning process.

STAD Technique may offer the best solution to increased students' behavioral engagement. According to (Slavin, 1994), in Student Team Achievement Divisions (STAD) Technique, students are assigned to learning teams that are mixed in based on several considerations; performance level, gender, and ethnicity. In the first stage, teachers will present the learning material, and then students cooperatively work in their groups. In the final stage, all students take individual quizzes regarding the material, in this time they are not allowed to help each other.

Based on th elucidation before, there are some specifications to concern with in this study: (1) to find out whether and to what extent STAD can improve students' behavior engagement in English Language Classroom. (2) to investigate the difficulties in implementing this strategy to enhance students' behaviour engagement. With STAD, the researcher believes that the students' behaviour engagement to the classroom can be improved. With applying STAD, the teacher will not only serve a new technique in teaching but also serve a different atmosphere to the classroom so that the students' will have curiosity and enthusiastic to follow the classroom activity. With this assumption, the researcher believes that STAD can be a good problem solving for the students' engagement to the classroom activity.

METHOD

Related to this study, we used Classroom Action Research since it deals with fact finding in practical problem solving in a social circumstance with an intention to improve the quality of action within it, involving the cooperation and collaboration of researchers (Burns, 1999: 30). The place of the research is Islamic Senior High School of Al Azhar 9 Yogyakarta. It is located on Jalan Ringroad Utara No.171, Sinduadi, Mlati, Kabupaten Sleman, Daerah Istimewa Yogyakarta. There were 3 classes in the tenth grade, 3 classes in the eleventh grade, and 3 classes in the twelfth grade.

The subject of this research was the students of tenth year of Science 2 Senior High School at Yogyakarta. There were 3 classes of the tenth year, but the chosen class was X MIA 2 that consists of 21 students. The researcher chose them as the representation of students who have problems with behaviour engagement on learning English subject. This class consisted of different level of competency in mastery of English language. For doing this research in this class, I planned to see the improvement of students' behaviour on learning English subject. The second subject of this research was the researcher. The researcher was a practitioner who implements the action. In this research, the researcher helped by the collaborator who was the English teacher in that class. the role of the collaborator in this research were participating in designing the plans, observing and making notes what happened in the classroom when the treatments were implemented to the students or while the treatment was applied, and giving suggestions for the better treatment.

The researcher did the research in a series of steps of a classroom action research namely: planning, acting, observing, and reflecting. In doing the steps, we took considerations and ideas from both the collaborator and students during all the activities. Before explaining the schedule of research procedure, the researcher planned the schedule of the whole research activity in Table 1.

Table 1. Schedule of Research Procedure

Activities	Day/Date	Place
A. Pre-Research	Thursday, 17 th of December 2015	Head master's office
1. Asking for permission to the head master of Islamic Senior High School of Al Azhar 9 Yogyakarta		
2. Interviewing the English teacher (collaborator).	Friday, 8 th of January 2016	Teacher's room
3. Observation 1	Monday, 11 th of January 2016	Classroom
4. Observation 2	Monday, 18 th of January 2016	Classroom
5. Distribution questionnaire	Wednesday, 20 th of January 2016	Classroom
1. Interviewing the students	Wednesday, 20 th of January 2016	Classroom
B. Implementation		
Cycle 1	Monday, 25 th of January 2016	
1. Meeting 1		
2. Meeting 2	Monday, 1 st of February 2016	Classroom
3. Meeting 3		

4. Meeting 4	Monday, 8 th of February 2016	
Cycle 2	Monday, 15 th of February 2016	
1. Meeting 1		
2. Meeting 2		
3. Meeting 3		
4. Meeting 4	Monday, 22 nd of February 2016	
Cycle 3	Monday, 7 th of March 2016	
1. Meeting 1	Monday, 14 th of March 2016	
2. Meeting 2	Monday, 21 st of March 2016	
	Monday, 28 th of March 2016	
	Monday, 4 th of April 2016	

The techniques in collecting the data were using; (1) Observation, a mainstay of action research (Burns, 1999: 80); (2) Interview as it direct attempt to obtain reliable and valid measures in the form of verbal responses coming from respondents (Wallace, 1998: 149); (3) Questionnaire, according to Brown (2001: 6) questionnaires were any written instruments that present respondents with a series of questions or statements to which they were to react either by writing out their answers or selecting from among existing answers. As stated in Dornyei (2003: 9), questionnaires can yield three types of data about the respondents: factual, behavioural, and attitudinal. In this research, the researcher used attitudinal type of questionnaire. Attitudinal questions were used to find out what people think. (4) Diary The research diary was one of the most important research methods and it was very commonly used by teachers when they are doing the research. The researcher's diary contains information about the researcher, what the researcher does, and the process of research.

The stages in action research can be done in several stages such cycle of planning, action, observation and reflection. Based on Kemmis and McTaggart (Burns, 1999: 32) the first stage is developed a plan of critically informed action to improve what is already happening. The next stage is action to implement the plan. After doing action, observation is done to observe the effect of the critically confirmed action in the context of its occurrence. The fourth stages in the classroom action research is reflection, a phase reflecting effects used as the basis of further planning, subsequent critically confirmed action and so on, through a succession of stages.

In analysing the quantitative data, the researcher used Descriptive Statistic to analyze the mean score. Meanwhile, to analyze the qualitative data, the researchers used interactive model of data analysis, Miles and Huberman Said that there are several steps included in this model: (1) data reduction (2) conclusion drawing and verification. Descriptive statistic was technique which was used to describe the basic feature of the data and present quantitative description including mean, media and percentage of questionnaire.

RESULTS AND DISCUSSION

Table 2. Situation before the Research

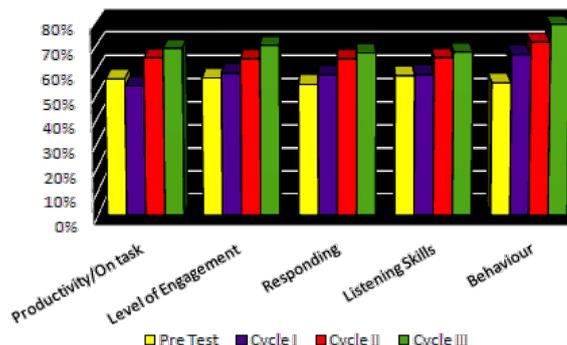
Problem indicators	Situation before the Research	%
Productivity/ On- task	1. They were lack of confident to come forward and express their ideas. 2. The students did not want to do the task from the teacher. They did not interest in doing it.	56.70%
Level of Engagement	1. Students did not give full attention in teaching and learning process. 2. Students asked to go home early.	57.14%
Responding	1. Students became quiet when the teacher asked them, "Is there any difficulty?" or "Is there any question?" or "is that clear?" 2. Students only focus on joking, chatting with friends and some of them even sleeping. So, when the teacher asks them about the material being explained "is that clear?" they are just ignorant.	54.46%
Listening Skills	1. Students were lack of concentration to the teacher's explanation. 2. Students just keep quiet and say "I don't know miss" when the teacher asked them about the material which was explained.	58.04%
Behaviour	1. Students chatted with classmate when teacher explained the lesson. 2. Students disturbed their friends while learning activities. 3. Students were indicated sleepy while learning process.	55.06%
Other Findings	Students: 1. Students needed to have readiness and a good preparation toward subject materials that would be given by the teacher in order to have background knowledge so there would be active interactions among them. 2. Students needed a team to share their ideas, build their confidence and improve their understanding toward learning material. 3. Students rarely practiced related to the teaching material given by teacher. Actually, they needed to practice what have been taught in order to enrich their understanding. Teacher: 1. The teaching method using attractive activities is needed. Students felt did not focus on the materials, kept chatting with their friends and some of them felt bored because they were just sitting and listening to the teachers' explanation and finally did the task on LKS they had. 2. The teacher had to make a solution that was she had to manage interesting teaching activities which could make the students felt comfort and engaged in the teaching activities. She had to make attractive and interesting atmosphere in teaching English subject.	

and learning made the students' behaviour engagement improve. It can be seen from the percentage of quantitative data, the result of questionnaire percentage was increased as displayed at Table 3 and figure 1:

Table 3. the Percentage of Quantitative Data

No	Indicators	Before The action	Cycle 1	Cycle 2	Cycle 3
1	Productivity/ On- task	56.70%	60.42%	65.33%	69.35%
2	Level of Engagement	57.14%	59.08%	65.03%	70.54%
3	Responding	54.46%	58.33%	65.03%	67.41%
4	Listening Skills	58.04%	58.48%	65.48%	67.86%
5	Behaviour	55.06%	59.38%	64.43%	70.09%
TOTAL		56.28%	59.14%	65.06%	69.05%

Figure 1. Percentage of Qualitative Data on Questionnaire



The total percentage of questionnaire before the action was 56.28%, meanwhile in the cycle 1 was 59.14%, in the cycle 2 was 65.06%, and in the cycle 3 was 69.05%. The improvement of the students' behaviour engagement can be showed in table 4.4:

Table 4. the improvement of the students' behaviour engagement

Activity	Percentage	Improvement
Pretest	56.28%	
Cycle I	59.14%	2.86
Cycle II	65.06%	5.92
Cycle III	69.05%	3.99

Based on the table 4.3, it can be concluded that from pre research to cycle 1 there is improvement for about 2.86; from cycle 1 to cycle 2 there is improvement for about 5.92; from cycle 2 to cycle 3 there is improvement for about 3.99. Therefore, it was indicated that the students had significant improvement at the end of the research. Their

Analyzing the data, we found several findings. The finding showed that using STAD in the process of teaching

percentage of questionnaire increased from cycle 1 to cycle 3.

Analyzing the data, we found some occurrence of obstacles in implementing STAD to improve students' behaviour engagement which include: (1) Difficulties in avoiding conflict among individual which effects to students' behaviour engagement in doing any activity during the implementation , (2) Some students are resistant from doing any group work activity and let others do it. (3) difficulties in ensuring students to consider more on individual pre class preparation. Such condition will potentially limits the students on both individual learning and team development.

Michaelsen and Sweet (2008:13-25) teacher should ensure that students have Pre class Preparation, Lack of preparation will promote limits on both individual learning and team development. As a result, for the sake of effectiveness, learning by groups clearly needs students who are held liable for class preparation. The finding is affirmed by the work of Johnson, Johnson and Smith (1991) that, learning in small groups helps peers to work together in maximizing their own learning as well as the others—their teammates.

However, despite all the constraints. The results of this research were satisfying in term of improvement of students' behaviour engagement. Slavin (1994) in Nikou et.al (2014) said that Cooperative learning (in this context is STAD) is an important teaching technique as it promotes interpersonal interaction and co-operation among the students as well as eliminate negative trend of individual competition. On many occasions, students can explain problem-solving tactics to another student better than a teacher can, although teacher often cannot see this perspective. In accordance with, cooperative learning is considered as a mean being important to improve student time on task, quality, and social interaction skills. Humes (2015, pp7) stated “when students work in cooperative groups, they engage in more task-related interactions than peers who are working either in whole class settings or in untrained cooperative groups”.

Compared to individual learning, cooperative learning (one of which is STAD) have been proven able to lead learners to higher levels of thinking of sharing ideas and looking for solutions as, by which, they can see learning in a broader point of view (Humes, 2015, pp.8)—apprehend learning process openly so they will get broader perspective of ideas through interaction, group work, and discussion. The basic principle motivated this strategy is that learners cooperatively learn and be held liable regarding their teammates and their achievements. It is considered as a good model since it can also raise students' motivation in learning through sharing and exchanging. Kittur (2016) stated that the STAD, as a teaching technique in cooperative learning, has motivated and encouraged the students to learn better.

Furthermore, the result of this study shows that STAD also helps students to actively and enjoyably follow all learning activities on language learning. Specifically, STAD helps students to have positive productivity/on task, level of engagement, responding, listening skills, and behaviour as well as maximize the learners autonomy.

CONCLUSION

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Based on the research findings and discussion elucidated before, on the topic of STAD to improve the students' behaviour engagement, some conclusions can be drawn.

1. The implementation of STAD in an English Language Classroom is proven able to promotes students' behavioral engagement in the extent that it provides them with the opportunity to work in peer-collaboration to discuss and do the task mandated by their teachers as well as individual task to improve their own learning.
2. In implementing STAD, specifically for the subjects of this study, some constraints were found such as the difficulties in avoiding conflict among individual during the work group due to the difference characters, resistance from several students to work in groups, and the difficulties to ensure the students to consider more on the pre-class preparation.

Accordingly, based on the research result and conclusion, we would like to propose some suggestions for English teachers, the students, school principals and other researchers.

The English teachers should use innovative and more effective student-centered strategy. Such strategy should promote meaning learning of difficult English concepts. The teachers could develop or adapt appropriate package for use with the students. A common problem with many students in the senior high school is their laziness towards learning especially in doing assignment. This study revealed that one effective measure teachers could use to nip this attitude of students in the bud is to adapt the use of concept tests at the beginning of every lesson. With the score been part of the continuous assessment. This could make them prepare adequately before coming to class. Another experience for English teacher is the student lack of attention and passive participation during teaching and learning.

The study also revealed that one major remedy for such student's behavior is the use of a posttest after every lesson. Students are being mindful of the fact that there would be a test after the lesson become motivated to put down salient points and actively carried out instructions given by the teachers. During lessons, they are prompted to seek help from peers and teacher when in difficulty, and encouraged to ask and response to questions during lessons. Therefore, it is highly recommended that teachers use posttest after every lessons to promote attentiveness and active participation of students during lessons.

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A Study of Land Surface Temperature Variation in Selected Urban Cities in Sri Lanka

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Abstract - Land Surface Temperature (LST) is one of the prominent methods to conduct climate studies and commonly used to analyze the impact of land surface changes all over the world. Due to many anthropogenic activities, natural environment transformed into urbanized areas rapidly. As a result, certain climatic components including land surface temperature has been modified dramatically. Therefore, this study was conducted to estimate Land Surface Temperature (LST) in highest population growth cities in Sri Lanka. The main objective of this research was to examine the relationship of rapid urban population growth with Land Surface Temperature using Geographical Information System (GIS) and Remote Sensing (RS) techniques. The study was conducted in five cities in Sri Lanka and those cities were selected by the population growth rate. Population data were collected from two census and statistic survey conducted in 2001 and 2011. The study has estimated Land Surface Temperature using Landsat TM, Landsat 8 data and spatial and temporal variations were also taken in to the consideration. Finally the study has revealed that the maximum LST values of the selected cities varied from 29 °C to 37 °C. When considering about spatial pattern of LST in 2005 and 2016 the highest mean LST were shown in Hambantota in 2005 and 2016. In 2005 mean LST has varied from 25 °C to 27 °C and in 2016 it was from 25 °C to 29 °C. LST has been increased with the population growth rate and land surface changes. However, some external factors such as meteorological, physical and environmental factors have influenced on the changes in LST in certain urban cities.

Index terms – LST, Population Growth, Land use, GIS

I. INTRODUCTION

Land Surface Temperature (LST) is one of the key parameters in the physics of land surface processes from local through global scales (Liang Li Z. et al, 2013). According to the NASA Earth Observatory, USA, Land Surface Temperature is how hot the “surface” of the Earth would feel to the touch in a particular location and from the satellite point of view, the object it sees when it looks through the atmosphere to the ground.

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Urban spatial areas have expanded rapidly during the last five decades and also rates of urban population growth are higher than the other areas (Xu H., 2007). The land-use and land cover changes occur rapidly and these have direct effect on the land surface temperature variation. Therefore, land surface temperature and population growth has a positive co-relationship with the earth surface. Many anthropogenic activities have directly affected the environmental transformation, and has created numerous major environmental problems. As a result of rapid growth of population, land surface modify dramatically and become impervious and reduce vegetation cover in any given urban area, Due to that the surface temperature of the earth gets modified accordingly.

To be more clear, land surface temperature is not the same as the air temperature that is included in the daily weather report, it is the warmth representation of earth’s landscape and strongly related to land surface emissivity (<http://www.cssteap.org>, 01.09.2016). Satellite base Land Surface Temperature is one of the best methods to identify the changes in environmental conditions for many research fields. Such widely used fields included, but not limited to evapotranspiration, climate change, vegetation changes, hydrological cycle and other environmental studies.

Furthermore, studying of land surface temperature variations with urbanization is very important for sustainable, environmental friendly future planning. It will also directly address the issue of how to reduce negative human impact on the environment. In Sri Lanka, many areas have been undergoing rapid urbanization, unhealthy land-use practices and land cover changes. Current urbanized areas can be identified as the densely populated areas in Sri Lanka. Therefore, more human impact and environment changes occurs frequently. Hence, identifying the spatial and temporal variation of land surface temperatures in cities which has the highest population growth is significantly important.

II. LITERATURE REVIEW

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Satellite base Land Surface Temperature is one of the best factors to identify the environmental conditions and a key parameter for decision making. Remote Sensing is one of the main spatial data acquisition method and that process involves in collection of data, processing of data, analysis of the data or using the data for decision making process. Land Surface Temperature calculation mainly uses thermal remote sensing and thermal bands of the satellite images. Thermal remote sensing is clearly different from remote sensing and uses the optical and microwave region of the electromagnetic spectrum. Thermal Infrared lies between 8 – 14 μm wavelengths of the electromagnetic spectrum. Thermal remote sensing measures emitted radiation for temperature estimation and these measurements give the radiant temperature of a body, which depends on two factors kinetic temperature and emissivity (Prakash A., 2000). Thermal remote sensing is very useful to identify the surface temperature of the earth surface and there are so many applications based on the land surface temperature. Such as, climate change, water management, land-use and land cover changes, fire monitoring, volcanology etc. Different satellite systems provide thermal data for analysis and AATSR, AVHRR, MODIS, and Landsat are some of them.

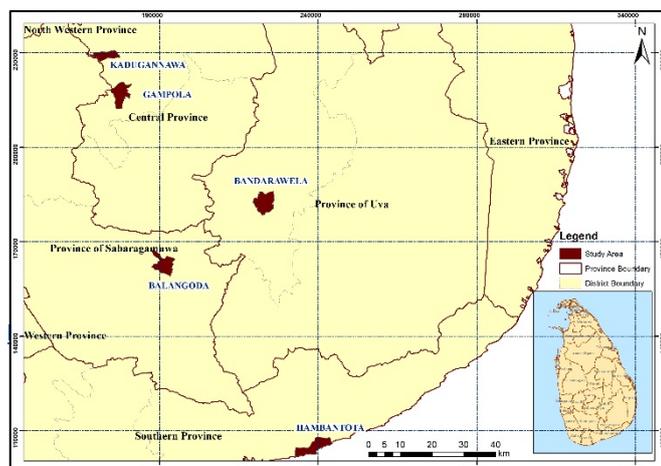
Land Surface Temperature estimation based research are common conducting in these days. Many research have documented the impact of urbanization and vegetation cover changes on climate and several of them focused mainly on Urban Heat Island (UHI) effects in the central core of urban areas. Some studies have mainly focused only on LST for green space planning in urban areas (Wardana I.K., 2015). However, very limited number of studies have been done to analyze the relationship between urban population growth and LST. Population shift to the urbanized and urbanizing areas resulted in residential expansion and created impervious, constructed surfaces, which predominantly influences the changes of land surface temperature. Land surface temperature estimation is essential for urban planning to mitigate the local climate changes and to create sustainable development within the region.

III. OBJECTIVES

The main purpose of this research was to examine the effect of rapid urban population growth on land surface temperature. GIS and RS techniques being used for that purpose.

Specific objectives

- Identify Land Surface Temperature for the highest population growth cities in Sri Lanka



- Compare spatial and temporal variation of Land Surface Temperature in selected urban cities

IV. STUDY AREA

The study area consists of five cities in Sri Lanka and those areas were selected by the rapid population growth rate according to the census 2011. According to this concept, selected cities are Kadugannawa, Gampola (Cities in the Central province), Bandarawela (Uva Province), Balangoda (Sabaragamuwa Province), and Hambantota (Southern Province). The absolute and relative locations are shown in figure 01.

Figure 01: Location Map of Five Selected Urban Cities in Sri Lanka
Source: Urban Development Authority, 2016

V. METHODOLOGY

Remote sensing data and census data were used in this study. Satellite data were obtained for two different years 2005 and 2016. March 17, March 26, 2005 and March 24, March 31, 2016 were selected due to satellite data availability. Landsat TM and Landsat 8 data were analyzed to estimate Land Surface Temperature and land use and land cover map. Red, NIR and Thermal band were used for this analysis. Cloud cover of the obtained images were less than 10% and all remote sensing data were obtained from <http://earthexplorer.usgs.gov/> website of United States Geological Survey (USGS). Surface temperature were extracted using Arc GIS 10.1 software.

2001 and 2011 census data were obtained from Department of Census and Statistics, Sri Lanka. All population data were analyzed using MS Excel 2013.

• Methods

Research methodology can be discussed in to several parts using the objectives. The methodologies can be explained as bellow.

Identify the highest population growth cities

Population growth rate was calculated to identify the highest population growth cities in Sri Lanka. Population Growth Rate means increasing of number of individual population in a given period. In this calculation population census 2001 and 2011 data were used to calculate population growth rate and the formula identified as bellow;

(Eq

01:)

$$PR = \frac{(V_{Present} - V_{Past})}{V_{Past}} \times 100$$

Where:

PR = Percent Rate

$V_{Present}$ = Present or Future Value

V_{Past} = Past or Present Value

The annual percentage growth rate is simply the percent growth divided by N, the number of years (<http://pages.uoregon.edu> , 01.10.2016).

Calculate Land Surface Temperature

Several formulas were used to estimate Land Surface Temperature for urban areas and Landsat Thermal and Visible bands were used. Image preprocessing was done to minimize satellite errors, and Radiometric and atmospheric errors were corrected using Radiance Scaling Factors Provided in Landsat Metadata File. To estimate land surface temperature, used red, near infrared and thermal bands of Landsat images. Normalized Vegetation Index (NDVI) is also a necessary factor to estimate land surface temperature and red and near infrared bands of Landsat images were used to create NDVI for year 2005 and 2016. The following formulas were adopted to calculate land surface temperature.

Formula used for calculate land surface temperature:

(Eq 02:)

$$LST = (BT / 1 + W * (BT/P) * \ln(e))$$

Where:

BT = At satellite temperature

W = Wave length of emitted radiance (11.5 um)

P = $h * c / s$ ($1.438 * 10^{-2} \text{mk}$)

h = Planck's constant ($6.626 * 10^{-34} \text{J}\cdot\text{s}$)

e = Velocity of light ($2.998 * 10^8 \text{ m/s}$)

(Oluseyi I.O. *et al*, 2009)

To calculate this formula, several formulas have been conducted such as brightness temperature and calculate normalize vegetation index (NDVI). In Landsat thermal band data can be converted from spectral radiance to brightness temperature, and the thermal constants are indicated in metadata file. The formula can be shown as bellow;

(Eq 03:)

$$T = \frac{K_2}{\ln\left(\frac{K_1}{L_\lambda} + 1\right)}$$

Where:

T = At satellite brightness temperature (K)

L_λ = TOA spectral radiance (Watts/($\text{m}^2 * \text{srad} * \mu\text{m}$))

K_1 = Band-specific thermal conversion constant from the metadata ($K1_CONSTANT_BAND_x$, where x is the thermal band number)

K_2 = Band-specific thermal conversion constant from the metadata ($K2_CONSTANT_BAND_x$, where x is the thermal band number)

Above equations directly taken from the http://landsat.usgs.gov/Landsat8_Using_Product.php.

Otherwise NDVI was calculate to deriving Land Surface Temperature and that formula can be mention as bellow;

(Eq 04):

$$NDVI = \frac{NIR - RED}{NIR + Red}$$

The NDVI is used for calculate the velocity of light. Those formulas can be indicated as bellow;

(Eq 05):

$$\text{Proportion of Vegetation (PV)} = \frac{(NDVI - NDVI_{\min})}{(NDVI_{\max} - NDVI_{\min})} * 2$$

(Eq 06):

$$e = 0.004 PV + 0.986$$

Those formulas were identified to deriving Land Surface Emissivity (LSE) in this study.

Finally, those methods were compared to identify the relationship between the rapid population growth and the land surface temperature. Mean temperature of cities were extracted using zonal statistic method in ArcGIS 10.1. Those values compared with population density of selected cities in Sri Lanka using correlation statistics methods. Also identified mean temperature for each land-use and land cover types and compared their relationship to identify the variation of Land Surface Temperature.

VI. RESULTS AND DISCUSSION

Rapid urban expansion and rapid population growth in urban areas can be identified in Sri Lanka. Thus, Land Surface Temperature estimation is very important in those areas. Table 01 shows the descriptive statistics of Land Surface Temperature for selected ten cities and Figure 02 show a graphical representation of the Land Surface Temperature during period of March, 2005 and March, 2016.

Selected city areas for this study have shown highest population growth rate than the other cities in Sri Lanka and also these cities shown approximately more than 70% built-up/ homestead lands. Therefore, rapid population growth as well as surface changes in those areas can be concluded as the main reason for increasing maximum LST values in selected city areas. According to the table 01, maximum LST values of the selected cities varied from 29 °C to 37 °C.

When considering about spatial pattern of LST in 2005 and 2016 the highest mean LST were shown in Hambantota in 2005 and 2016. In 2005 mean LST has varied from 25 °C to 27 °C and in 2016 it was from 25 °C to 29 °C.

When considering the temporal pattern, the temperature has increased in 2016. According to the extracted mean temperature difference (Table 02) in 2005 and 2016, LST has been increased in five cities (Figure 03); Hambantota (2.491°C), Bandarawela (0.746°C), Gampola (0.291°C),

City	Mean Temperature (2005)	Mean Temperature (2016)	Difference
Hambantota	27.290	29.781	2.491
Bandarawela	25.313	26.059	0.746
Gampola	26.942	27.233	0.291
Kadugannawa	26.081	26.273	0.186
Balangoda	25.986	25.988	0.002

Kadugannawa (0.186 °C) and Balangoda (0.002 °C). In those cities Maximum LST has shown as Hambantota (37.169°C), Bandarawela (33.173°C), Gampola (34.652°C), Kadugannawa (32.27 °C) and Balangoda (29.699 °C) (Figure 02). The Highest temperature values has been identified in built-up areas within the selected cities. The mean

City	Population Growth Rate	March 2005			March 2016		
		Minimum Temperature	Maximum Temperature	Mean Temperature	Minimum Temperature	Maximum Temperature	Mean Temperature
Kaduwela	94.148	24.00	29.466	26.081	24.158	32.27	26.273
Bandarawela	25.678	23.719	32.669	25.313	23.374	33.172	26.059
Hambantota	10.869	24.00	33.054	27.29	24.057	37.169	29.781
Gampola	5.596	23.888	32.521	26.942	24.16	34.652	27.233
Balangoda	3.688	23.881	31.811	25.986	23.563	29.699	25.988

temperature values of different land use types also subjected the consideration (Table 03). In figure 04 shown correlation between the LST and NDVI of selected five cities. According to the figure 04, High crowded areas can be identified in these cities. The LST value gradually increased with density of built-up areas.

Table 01: Descriptive Statistics of LST for Selected Cities in 2005 and 2016

Further, data analysis shows that during the year 2016 Land Surface Temperature has been increased than 2005 in all selected cities. Also, Maximum LST values have increased in above mentioned cities.

Comparing the trend of LST in two different study periods, cities which had higher LST in 2016 clearly indicate high population growth rate and more built-up/homestead areas than year 2005. As mentioned earlier, it is interesting to notice that some cities shown a small variation of its LST in 2016. Therefore, based on the data, a conclusion was made that weather patterns, environmental and geographical factors and additional issues may have influence on the expected results, other than the rapid population growth and land surface changes.

In analyzing of different factors that may be a reason for decreasing the LST in some cities, major focus was on the factors that can effect the surface temperature variation were taken to consideration. Even though, the study considered land use changes in the area as the major factor, as an

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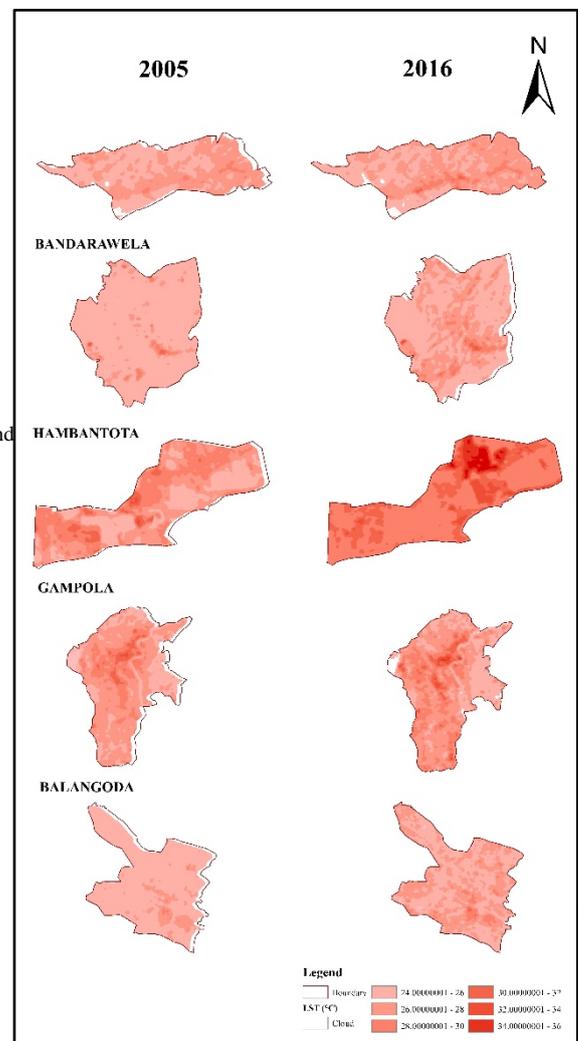
example satellite images in Hambantota area shows higher LST values in 2016 than 2005, while both areas have more build up areas in 2016 than 2005. According to figure 04, can conclude that land use pattern changes of those areas were affected by the increase of LST value in 2016.

Weather pattern such as rainfall data for particular study period were taken into the consideration as a major reason for reducing Land Surface Temperature. As the rain droplets can absorb temperature/heat in the atmosphere, collectively LST can be reduced. The study period of March was selected due to it being considered as one of the least rainfall occurrence month in Sri Lanka, but certain variations in rainfall pattern can be expected.

Table 02: Mean Temperature Difference in 2005 and 2016 for Selected Cities

Source: Landsat image, 17/26 March 2005 and 24/31 March 2016 from <http://earthexplorer.usgs.gov/>

Daily rainfall data for year 2005 and Year 2016 are shown in Table 04. Rainfall data were received from the Meteorological Department, Sri Lanka and if the selected city



City	Rainfall (mm) – 17/26 March 2005	Rainfall (mm) – 24/31 March 2016
Kadugannawa	4.2	27
Gampola	0	14

hasn't a rainfall collecting station, data from the nearest station were taken. As expected March 2005 indicate as a dry season for the most of the country, and none of the selected cities had not received any precipitation. However, only two cities Kadugannawa and Gampola had received some precipitation during March 2016. Hence, rapid population growth and land surfaces changers occurred due to the rapid urbanization in Kadugannawa and Gampola, precipitation initiated the changes of expected Land Surface Temperature.

Figure 02: Graphical Representation of Land Surface Temperature Distribution in Five Cities
Source: Landsat image, 17/26 March 2005 and 24/31 March 2016 from <http://earthexplorer.usgs.gov>

Hambantota area had not received any precipitation during March 2005 and March 2016. Therefore, the LST has been increased than the other cities.

Table 03: Mean Temperature for Different Land use Types in 2016

Land-use	Mean temperature (°C)
Homestead/Built-up	29.69
Coconut	26.82
Rubber	26.23
Tea	26.79
Water Bodies	26.46

Source: Landsat image, 24/31 March 2016 from <http://earthexplorer.usgs.gov/>

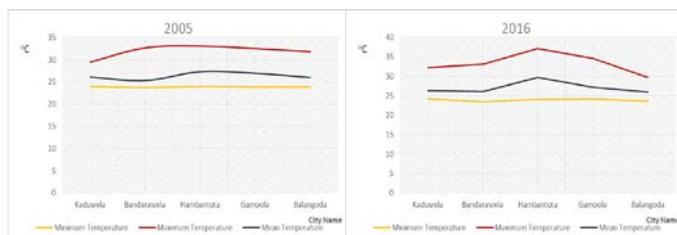


Figure 03: Mean LST for Selected Cities in 2005 and 2016
Source: Landsat image, 17/26 March 2005 and 24/31 March 2016 from <http://earthexplorer.usgs.gov/>

In contrast the city of Kadugannawa has shown relatively different situation than other cities. In March 2005, Kadugannawa shown 26.081 °C mean temperature value and in 2016 it shown as 26.273 °C, but it can be identified as the highest urban population growth city in Sri Lanka. Therefore, precipitation has made any significant changes on LST in the area and the elevation can be considered. In geographical /location consideration of Kadugannawa, we

see that it is situated on a higher elevation area than the other cities. Therefore, changes in local wind patterns and air temperature influence on the lower differences of LST in 2016 than March 2005. Bandarawela shown as the second highest population growth rate city in Sri Lanka but it has also gotten the same impact due to the physical changes of the environment.

Table 04: Daily Rainfall data for LST estimated dates in two different study period

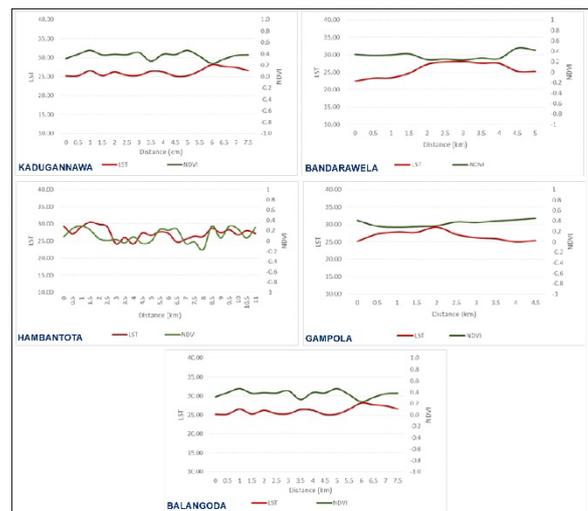
Source: Department of Meteorological, March 2005 & March 2016.

According to the above results, can conclude that LST has been increased with the population growth rate and land surface changes. However, some external factors such as meteorological, physical and environmental factors have influenced on the changes in LST in certain urban cities.

VII. CONCLUSIONS

This study has attempted to identify the relationship of LST variations in rapid population growth cities in Sri Lanka. Therefore, five cities which has highest population growth according to the census 2001 to 2011 were taken into the consideration. Spatial and temporal variation in those cities were also considered. Using satellite based methods, LST data for each city were estimated for March 2005 and March 2016. Results of the study in conclusion show that, LST has increased in all five cities and the highest value can be identified in Hambantota area. The highest LST mean differences have shown in Hambantota. Clearly some external factors had influence on the LST. Land use/land cover changes, rainfall, humidity, elevation and surrounding water bodies were identified as major external factors that influenced the changes in temperature variation in an area.

Figure 04: LST & NDVI for Selected Cities (using east to west Profile)



Source: Landsat image, 17/26 March 2005 and 24/31 March 2016 from <http://earthexplorer.usgs.gov/>

Finally, the study has revealed that the rapid population growth and urban expansion directly affected the increase LST. However, some physical, meteorological or

environmental factors play critical role on fluctuation of LST in certain areas.

VIII. FUTURE SCOPES

With rapid population growth all around the world. Population shift to urbanized areas will be continued. As a result natural land surface areas (natural vegetation, streams and etc.) will be convert in to more built-up areas. Therefore, best management practices should utilize for suitable urban planning to mitigate temperature increase in the cities.

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Twitter Sentiment Analysis Using Support Vector Machine and K-NN Classifiers

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Abstract— At the present time, social media has become an important popular communication medium among all online suffers. Twitter is one of the most popular social networking services where thoughts and opinions about various aspects and activities can be shared by the millions of users. Social media websites are rich sources of data for opinion mining. Such data can be applied for sentiment analysis. Sentiment analysis is the study of human behavior by extracting user opinion and emotion from plain text. Among machine learning techniques, Support Vector Machine (S.V.M) classifier and K-Nearest Neighbour (K-N.N) classifier is used in this system. The system provides the analytical results of education, business, crime and health for Educational Authorities, Economists, Government Organization's needs and Health. And then, the system predicts the conditions of selected ASEAN countries (Malaysia, Singapore, Vietnam and Myanmar) according to the tweets. In this system, accuracy, precision, recall and f1-score is also compared by using these two classifiers.

Index Terms—K-NN, Opinion Mining, Sentiment Analysis, SVM, Twitter.

1) INTRODUCTION

Nowadays, social media gives the very large effect to the digital improvement in terms of global communications. The emergence of social media has provided a place for web users to share their thoughts and express their opinions on different topics in an event. Micro blogging has become a very popular communication tool among Internet users. Millions of messages are appearing daily in popular web sites that provide services for micro blogging such as Facebook, twitter, Tumblr and so on. Twitter is an online social networking medium, popular since 2006, where registered users share or post messages under 140 characters known as tweets.

Sentiment Analysis or opinion mining is the computational study of the opinions, attitudes and emotions of the entity. The entity may describe and individual, event or topic. The topic is likely to be a review. The system is developed to analyze Educational Rate, Business Rate, Health Rate and Crime Rate occurred in Malaysia, Singapore, Vietnam and our country, Myanmar according to the tweets. As a first step, the system crawls the real time data as the input from Twitter. As a second step, sentiment analysis is implemented by using the crawled data. The system needs to build classifier model (Support Vector Machine and K-Nearest Neighbour) to implement sentiment analysis. Finally, the system outputs the percentage score of these sectors and displays according to their scores by using visualization techniques. The performance of classification is also analyzed using accuracy, precision, recall

and f1-score.

2) RELATED WORD

AaratiPatil and SrinivasaNarasimhaKini [1] proposed Evolution of Social Media from the era of Information Retrieval. Some insightful information that data scientists and social users are showing interest in sentiment analysis of social media data is got. Different approaches have been implemented to automatically detect sentiment on texts [2]. An active research on Sentiment analysis on selective micro blogging sites has explored in [3].

Barbosa and Feng [4] presented robust sentiment detection on Twitter from biased and noisy data. The subjectivity of social media messages based on traditional features with the inclusion of some social media site specific clues such as retweets, hash tags, links, uppercase words, emoticons, and exclamation and question marks has been classified. Further, Agarwal, Xie, Vovsha, Rambow and Passoeau introduced a Part-Of-Speech (P.O.S) specific prior polarity features and a tree kernel to obviate the need for tedious feature engineering.

Agarwal et al. [5] approached the task of mining sentiment from twitter, as a 3-way task of classifying sentiment into positive, negative and neutral classes. They experimented with three types of models: unigram model, a feature based model and a tree kernel based model. For the tree kernel based model they designed a new tree representation for tweets. The feature based model that uses 100 features and the unigram model uses over 10,000 polarity of words with their parts-of-speech tags are most important for the classification task. The tree kernel based model outperformed the other two.

3) SYSTEM DESIGN OVERVIEW

The system design is mainly composed of two parts such as Training and Testing. In training phase, the system trains the input raw dataset of tweets with classifier model. In testing phase, the system crawls the real tweets of Education, Business, Crime and Health data and then classifies the positive, negative or neutral class based on Classifier Model. In the system design, there are four main components. They are preprocessing, feature selection, feature extraction and classification. The overall system design is illustrated in Fig. 1.

Firstly, tweets about Education, Business, Crime and Health are extracted from Twitter. The language is English using Twitter Streaming API. The system needs to perform preprocessing step. The preprocessing step performs transformation, negation handling, tokenization, filtering and normalization. And then, features are selected by comparing with Knowledge Base. After that, meaning features are extracted from Term Frequency-Inverse Document Frequency (T.F-I.D.F). And then, features are selected as the input features of classification. At last, the system builds Classifier Model

(Support Vector Machine and K-Nearest Neighbour) in order to perform the training process.

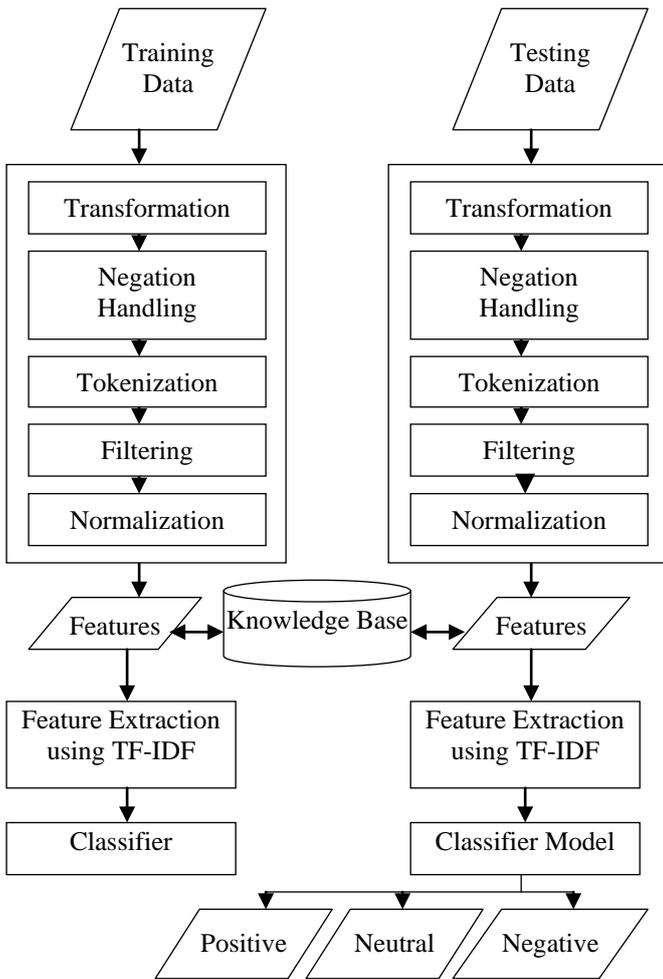


Fig. 1. The System Design

In Testing phase, the real data about Education, Business, Crime and Health is crawled from Twitter as the input of the system. And then, Preprocessing, Feature Selection and Feature Extraction are also performed like Training phase. The output features are executed in order to classify the positive or negative or neutral of class based on Classifier Model. And then, the system displays according to their scores by using visualization techniques. The system also compared the performance of these two classifiers in accuracy, precision, recall and f1-score.

1) Preprocessing

Data preprocessing is an important step in the data mining process. The phrase "garbage in, garbage out" is particularly applicable to data mining and machine learning projects. If there is much irrelevant and redundant information or noisy and unreliable data, then knowledge discovery during the training phase is more difficult. Data preprocessing is the most important phase of a machine learning project, especially in computational biology [6]. Sample tweet about education is shown in Fig. 1.

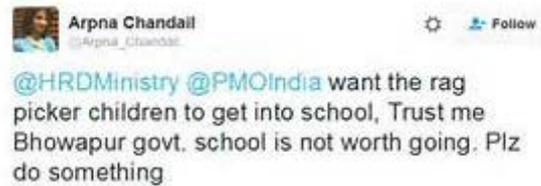


Fig. 2. Sample Tweets about Education

a) Transformation

The following steps are performed in Transformation step. In general, a clean tweet should not contain URLs, hashtags (i.e. #studying) or mentions (i.e. @Irene).

Firstly, the tweets extracted from twitter are converted from upper case to lower case, replaced URLs with generic word URL, replaced @username with generic word AT_USER, replaced #hashtag with the exact same word without the hash, removed punctuations at the start and end of the tweets and replaced multiple whitespaces with a single whitespace. The resultant tweets from Transformation step are shown in Table 1.

Table 1. Tweets after Performing Transformation Step

Step	Tweet
Transformation	AT_USER AT_USER want the rag picker children to get into school trust me bhowapur govt school is not worth going plz do something

b) Negation Handling

Negations are those words which affect the sentiment orientation of other words in a sentence. Examples of negation words include not, no, never, cannot, should not, would not, etc.

Negation handling is an automatic way of determining the scope of negation and inverting the polarities of opinionated words that are actually affected by a negation [7]. The resultant tweets after performing negation handling step are shown in Table 2.

Table 2. Tweets after Performing Negation Handling Step

Step	Tweet
Negation Handling	AT_USER AT_USER want the rag picker children to get into school trust me bhowapur govt school is not not_worth not_going not_plz not_do not_something

c) Tokenization

Tokenization is the act of breaking up a sequence of strings into pieces such as words, keywords, phrases, symbols and other elements called tokens [8].

The system tokenizes the uniformed sentence from Negation Handling Step which got into smaller components (unigram) as shown in Table 3. These resultants words become the input for the next preprocessing.

Table 3. Features after Performing Tokenization Step

Step	Features
Tokenization	want, the, rag, picker, children, to, get, into, school, trust, me, bhowapur, govt, school, is, not, not_worth, not_going, not_plz, not_do, not_something

d) Filtering

Stop words are words which are filtered out before or after processing of natural language data (text). A stop word is a

commonly used word (such as "the", "a", "an", "in") that a search engine has been programmed to ignore, both when indexing entries for searching and when retrieving them as the result of a search query [9]. The resultant features from Filtering step are shown in Table 4.

Table 4. Features about Performing Filtering Step

Step	Features
Filtering	want, rag, picker, children, get, school, trust, bhowapur, govt, school, not, not_worth, not_going, not_plz, not_do, not_something

e) Normalization

In the Normalization step, lemmatization is performed. Lemmatization in linguistics is the process of grouping together the inflected forms of a word so they can be analyzed as a single item, identified by the word's lemma, or dictionary form [10].

After normalization step is performed, the root words are got as shown Table 5 and they are used for feature extraction step.

Table 5. Features about Performing Normalization Step

Step	Features
Normalization	hrdministry, pmindia, want, rag, picker, children, get, school, trust, bhowapur, govt, school, not, not_worth, not_go, not_plz, not_do, not_something

2) Feature Selection

After preprocessing step, features are selected by comparing with Knowledge Base to improve accuracy. Several words related to hundreds education, business, crime features are collected and added to the Knowledge Base. Finally, the system selects features from Knowledge Base. In this way, the system can get the essential features for the system as shown in Table 6 and performs the best accuracy.

Table 6. Features about Performing Feature Selection Step

Step	Features
Feature Selection	Want, school, trust, not, not_worth, not_go

3) Feature Extraction

The system trains Support Vector Machine and K-NN classifier based on T.F-I.D.F (Term Frequency-Inverse Document Frequency) weighted word frequency. TF is how frequently a word occurs in a document. IDF decreases the weight for commonly used words and increases the weight for words that are not used very much in a collection of documents.

This can be combined with term frequency to calculate a term's tf-idf, the frequency of a term adjusted for how rarely it is used. When the feature extraction is performed using T.F-I.D.F, the system selects features as the input features of classification.

4) Classification

Text classification models are used to categorize text into organized groups. Text is analyzed by a model and then the appropriate tags are applied based on the content. Machine learning models that can automatically apply tags for classification are known as classifiers.

Classifiers can't just work automatically; they need to be trained to be able to make specific predictions for texts. Once enough texts have been trained, the classifier can learn from those associations and begin to make predictions with new texts.

There are two main approaches to sentiment classification: lexicon-based and machine-learning. A lexicon-based approach tokenizes data into individual words which are checked with a sentiment lexicon containing a polarity value for individual words. The sum of the polarities is passed to an algorithm that determines the overall polarity of the sentence. A machine-learning approach utilizes a labeled training set to adapt a classifier to the data domain of the training set. The trained classifier can then predict the result of the problem and the success rate of the prediction depends on how well the problem is contained within the same domain.

There are three types of machine learning algorithms: supervised learning, unsupervised learning and reinforcement learning. Among them, this system uses supervised learning approach. This algorithm consists of the target or outcome variable which is to be predicted from a given set of predictors. Using these set of variables, a function that map inputs to desired outputs is generated. The training process continues until the model achieves a desired level of accuracy on the training data. Examples of Supervised Learning are decision tree, K-Nearest Neighbour (K-N.N), Support Vector Machine (S.V.M), Naïve Bayes (N.B), Maximum Entropy(MaxEnt) and so on. In this system, S.V.M and K-N.N classifier are used.

a) Support Vector Machine (One-Versus-One)

SVMs are often employed for binary sentiment detection because they are binary classifiers. In order to perform multi-class classification, the problem needs to be transformed into a set of binary classification problems. There are two approaches to do this: One vs. Rest Approach (O.V.R) and One vs. One Approach (O.V.O).

In the system, OVO strategy is used. In the O.V.O strategy, one trains $K(K-1)/2$ binary classifiers for a K-way multi-class problem; each receives the samples of a pair of classes from the original training set, and must learn to distinguish these two classes. At prediction time, a voting scheme is applied: all $K(K-1)/2$ classifiers are applied to an unseen sample and the class that got the highest number of "+1" predictions gets predicted by the combined classifier. Like O.V.R, O.V.O suffers from ambiguities in that some regions of its input space may receive the same number of votes [11].

b) K-Nearest Neighbour (K-N.N)

K-NN algorithm is one of the simplest classification algorithms and it is one of the most used learning algorithms. K-NN is a non-parametric, lazy learning algorithm. Its goal is to use a database in which the data points are separated into several classes to predict the classification of a new sample point [12].

In the case of classification, the output is class membership (the most prevalent cluster may be returned), the object is classified by a majority vote of its neighbours, with the object being assigned to the class most common among its k nearest neighbours. This rule simply retains the entire training set during learning and assigns to each query a class represented by the majority label of its k-nearest neighbours in the training sets.

The Nearest Neighbour rule (N.N) is the simplest form of K-NN when $K=1$. Given an unknown sample and a training set, all the distances between the unknown sample and all the samples in the training set can be computed. The distance with the smallest value corresponds to the sample in the training set closest to the unknown sample.

Therefore, the unknown sample may be classified based on the classification of the nearest neighbor. The K-N.N is an easy

algorithm to understand and implement, and a powerful tool that there is at our disposal for sentiment analysis.

4) PERFORMANCE ANALYSIS

The system calculates the performance of the system. It performs accuracy, precision, recall and f1-score of the two classifiers.

Accuracy is not only the metric for evaluating the effectiveness of a classifier. The system calculates the accuracy of S.V.M and K-N.N Classifiers. It is calculated by number of correctly selected positive, negative and neutral words divided by total number of words resent in the corpus.

Precision measures the exactness of a classifier. Recall measures the completeness, or sensitivity of a classifier.

The system calculates them by using sklearn libraries based on Support Vector Machine and K-Nearest Neighbor Classifier. F1-score is the harmonic average of the precision and recall, where an F1 score reaches its best value at 1 (perfect precision and recall) and worst at 0.

5) EXPERIMENTAL RESULTS

The crawled training dataset consists of 3484 tweets about education, 5455 tweets about business, 2460 tweets about crime and 8078 tweets about health. These crawled data are preprocessed in transformation, negation handling, tokenization, filtering and normalization.

After that they system selects meaning features by comparing with knowledge base. And then, the system performs feature extraction step. The output features are the input features of Support Vector Machine and K-Nearest Neighbour classifiers.

For testing data, tweets about education, business, crime and health are extracted from a particular Twitter account after getting prior permission.

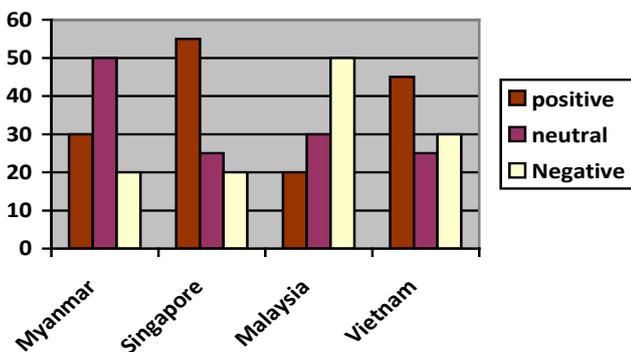


Fig. 2. Graphical Analysis about Education

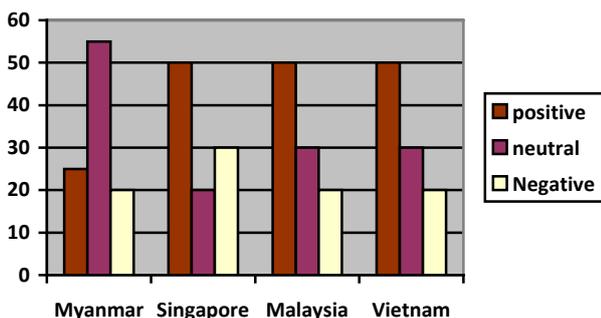


Fig. 4. Graphical Analysis about Business

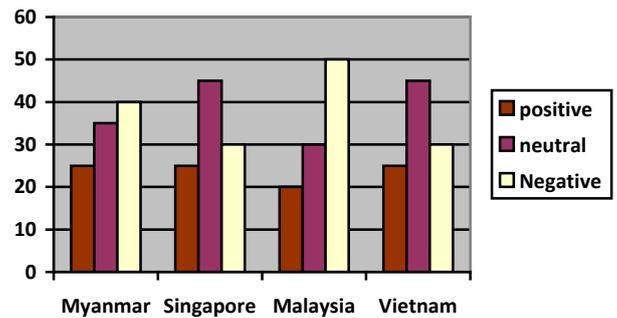


Fig. 5. Graphical Analysis about Crime

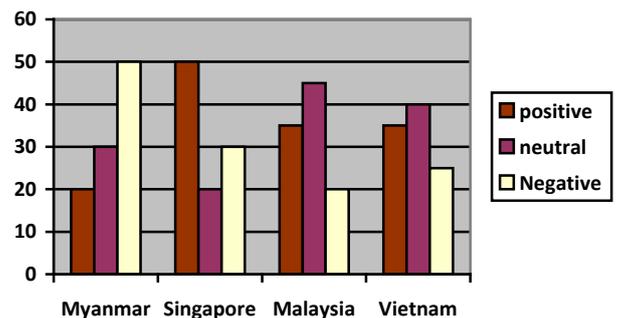


Fig. 6. Graphical Analysis about Health

6) PERFORMANCE COMPARISON

The system is aimed to perform the accuracy, precision, recall and f1-score of Support Vector Machine and K-Nearest Neighbour Classifier on the same training dataset.

Table 7. Performance Comparison about Education

Training Data 2788 Testing Data 696	Support Vector Machine	K-NN
Accuracy	0.7446197991391679	0.6958393113342898
Precision	0.7130609476214108	0.7780602580671679
Recall	0.7080479012071043	0.6339499441631286
F1-Score	0.7080479012071043	0.6339499441631286

Table 8. Performance Comparison about Business

Training Data 4364 Testing Data 1091	Support Vector Machine	K-NN
Accuracy	0.7241063244729606	0.7057745187901008
Precision	0.6727147115713413	0.7585090117040704
Recall	0.6740008345575266	0.5960035137416786
F1-Score	0.7239724741913184	0.6819787503355964

Table 9. Performance Comparison about Crime

Training Data 1968 Testing Data 492	Support Vector Machine	K-NN
Accuracy	0.7215447154471545	0.5873983739837398
Precision	0.694264733332539	0.6301859690017584
Recall	0.6764180216193556	0.5892023932506887
F1-Score	0.7175716931918386	0.5992940183025018

Table 10. Performance Comparison about Health

Training Data 6463 Testing Data 1615	Support Vector Machine	K-NN
Accuracy	0.709389492039024	0.5920848023027024
Precision	0.5842024027422439	0.4703402840230202
Recall	0.5700240203207324	0.4028508204830833
F1-Score	0.6409402930294028	0.5084348028302832

7) CONCLUSION

Support Vector Machine and K-Nearest Neighbour classifiers are performed on twitter to classify about Education, Business, Crime and Health. The system is intended to measure the impact of ASEAN citizens' social media usage behavior. The main purpose of the system is to understand how to perform social media sentiment analytics on big data environment by applying machine learning approach of Artificial Intelligence (A.I). The system is developed for analyzing Business Rate, Crime Rate, Educational Rate and Health Rate occurred in Malaysia, Singapore, Vietnam and our country, Myanmar. The rate of change of these sectors can be compared by looking at these conditions. The system can be expected to contribute a lot of advantages for the Ministry of Education, Commerce, Home Affairs and Health in each country's government.

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Green Computing Based Remote Information System

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Abstract-The implementation of green computing-based information systems in the school environment is still low. This is marked by the use of paper that is still liked by the school. For this reason, it is necessary to design information systems based on green computing to archive letters that have been created or received by schools. The letter that has been archived will make it easier for schools to search, avoid losing files when moving from one person to another. Those who have authority in archiving will certainly be easy to monitor.

The information system design in the management of school records aims to educate teachers and workers in the school environment for the concept of green computing on paperless.

Keywords: green computing, green computing on paperless, archives of school letters.

I. Introduction

The need for increased use of technology is accompanied by our difficulties in adjusting the school information system users. In the school environment begins with the use of school laboratories for learning media, the use of various tools and information systems to support the work of teachers in providing education to students. Also other electronic devices that are not small in number.

In the teacher's work environment, there is a lot of paper usage both in the reception of the results of the learning reports and assignments to students. Good file recording is very necessary in order to provide convenience in correcting and monitoring activities.

According to data from the Central Bureau of Statistics concerning the Export of Paper and Goods from Paper According to the Main Destination Country, 2002-2015 obtained the following table of 1:

Nama Negara	Berat Bersih (Ribu ton)													
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Jepang	340,2	382,5	395,9	366,6	368,0	307,7	329,1	449,6	447,5	487,2	515,0	461,0	410,2	420,3
Hongkong	253,8	172,2	168,4	160,6	157,3	135,9	106,4	114,4	80,6	86,5	87,5	57,3	37,3	30,4
Taiwan	227,7	201,8	185,9	152,3	167,5	121,6	142,8	130,8	117,1	140,9	155,7	134,2	129,1	137,0
Tiongkok1)	457,9	382,4	320,9	285,4	302,9	258,3	253,7	237,7	193,8	237,9	170,2	117,5	128,3	213,8
Singapura	154,1	139,0	144,3	155,2	190,7	182,1	196,7	179,1	132,5	180,1	182,1	171,3	136,8	109,5
Malaysia	296,5	282,7	312,1	327,3	374,8	379,8	338,0	378,5	343,0	384,4	398,7	364,1	340,9	336,4
Vietnam	75,6	76,9	108,3	107,9	147,7	185,9	186,4	247,0	258,9	287,9	307,0	356,1	343,3	331,5

Iran	70,7	64,6	73,3	131,6	127,5	164,4	171,9	98,7	101,3	114,3	87,4	96,4	84,6	64,7
Australia	186,0	167,7	217,6	181,3	194,3	203,9	179,9	147,4	168,0	141,7	125,8	107,2	101,2	124,8
Amerika Serikat	140,8	127,2	127,0	128,1	266,2	323,9	275,2	285,3	267,1	249,0	270,1	284,8	451,8	283,6
Lainnya	1.208,2	1.069,1	1.057,2	1.190,3	1.495,8	1.855,3	1.905,3	2.018,3	2.452,8	1.991,0	1.930,2	2.148,0	2.204,1	2.257,3
Jumlah	3.411,5	3.066,1	3.110,9	3.186,6	3.792,7	4.118,8	4.085,4	4.286,8	4.562,6	4.300,9	4.229,7	4.297,9	4.367,6	4.309,3

Nama Negara	Nilai FOB (Juta US\$)													
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Jepang	289,4	314,4	343,2	319,7	321,5	281,8	347,8	403,4	447,5	574,4	623,4	477,3	395,9	397,5
Hongkong	140,3	101,6	106,1	106,0	112,6	103,5	94,0	83,6	80,6	77,4	73,7	48,8	32,8	28,6
Taiwan	101,8	96,5	94,0	76,9	99,1	78,2	102,9	72,4	117,1	115,1	125,0	100,8	104,2	113,2
Tionggok1)	206,1	197,6	200,3	174,0	201,3	195,0	195,7	157,5	193,8	196,5	143,1	102,5	115,3	161,0
Singapura	91,6	87,6	92,6	99,7	128,6	127,9	155,0	116,1	132,5	143,3	129,3	118,9	106,0	89,5
Malaysia	160,8	160,8	195,2	209,3	258,0	287,5	301,9	271,1	343,0	347,4	338,9	299,9	279,7	257,6
Vietnam	35,4	40,0	64,6	68,1	99,0	135,5	158,0	181,1	258,9	247,6	236,8	256,7	233,2	210,1
Iran	36,1	33,6	41,1	82,6	89,2	128,2	154,0	75,9	101,3	101,7	74,6	77,0	66,5	49,3
Australia	139,9	138,9	181,7	150,4	170,4	183,5	192,5	138,0	168,0	161,9	146,5	119,2	114,8	133,6
Amerika Serikat	120,6	111,7	118,1	121,6	230,2	296,8	285,5	270,3	267,1	263,0	277,9	291,6	428,2	304,7
Lainnya	775,5	724,6	792,0	916,5	1.149,3	1.556,9	1.809,6	1.635,6	2.132,0	1.986,2	1.802,9	1.909,5	1.903,3	1.860,4
Jumlah	2.097,5	2.007,3	2.228,9	2.324,8	2.859,2	3.374,8	3.796,9	3.405,0	4.241,8	4.214,5	3.972,1	3.802,2	3.779,9	3.605,5

From the table it is understood that the demand for paper and goods from paper is still high. From the data from 2002 to 2015, the average use of paper and goods from paper is 3,927.6 thousand tons per year with a value of 3,265 million dollars.

So the activities of green computing from an early age to students are very important. The use of the right information system plays an important role in the green computing movement.

This research is

II. Research Elaborations

1. History of Green Computing.

- According to Malviya, Pushtikant, in the Journal of "A Study about Green Computing", page 790, it was explained that the beginning of "Green Computing" was when computer users who increasingly needed the speed and accuracy of data in using a computer, wanted to cut costs, by minimal effort (cost), but the results can be maximum. The Data Center is faced with the problem of large energy consumption and tends to be wasteful. To minimize the use of enormous energy, the concept of "Green Computing" was raised. Green Computing is used to save energy costs and reduce the cost of energy consumption and minimize waste resulting from the "Computing" process.
2. Green Computing on Paperless Method. Can be implemented with Document Management System, Electronic Business Process and Electronic Invoicing. According to Harry Carley, in a quote in the Journal of "Going Green: The Paperless Classroom", p. 10 [2], it is said that in paperless classes it must be completely paperless, there is no use of paper, ink, and staff, in activities teaching in class, students in learning activities and doing assignments and tests are using computer networks.
 3. Green Computing on Paperless Education. Use electronic files to archive mail data. In the opinion of Dr. Ravindra D. Sarode and Mr. Ashish S. Raul, as in the journal "Cloud Computing towards Green Libraries", p. 1, explained that at present, in accordance with the effects of the need for locations that are appropriate for storing document material, "Cloud Computing" appears and functions as a library to store data in large capacity but safe and affordable

Research methodology

1. Literature study. This section will study internet articles / publications and reference books.
2. Analysis method. This section is carried out by analyzing and reviewing the development of green computing in the scope of the school.

III. Result

The results of previous studies on green computing in information systems are shown in the following table:
Several studies related to Green Design Computing, among others are:

1. According to Gaurav Jindal and Manisha Gupta, in the journal "Green Computing" Future of Computers ", page 17, 2012, it was explained that the concept of Green Computing is the future for the world of computers, especially IT, because as IT functions in the lives of human beings, then more and more computers and components are used. But based on his research, the required costs are quite large and large, so Green Computing is absolutely necessary. The combination of new database management needs to be used which will have a positive impact, namely: reducing energy consumption, saving energy, using materials that are eco-friendly, reducing waste, and reducing waste materials.
2. According to Carley in her journal, "Going Green: Paperless Classroom" pages 10-13, 2014, it was explained that later in academic activities lectures would reduce or even eliminate the use of papers, even later a few years later, it could be, the next generation , will ask, what is paper? by using applications and various programs for teaching, the use of paper will be minimized, so that for the good of the environment will be very significant, where the need for paper including raw materials will decrease, and vice versa, the use of data bases on computers must be more efficient and able to store as much as possible data capacity.
3. According to Laura - Diana Radu, in her journal "Green Cloud Computing: A Literature Survey", in 2017, page 2, it was explained that the use of Cloud, as an important component in data storage would be increasingly massive, so that the capacity and capacity needed to be reproduced and upgraded The cloud is quickly accessed and storage capacity, making it possible for users to store data on a large scale and quickly displayed on a computer screen when accessed. With the increasing use of cloud, it will reduce waste (e-waste) that is not useful.

Discussion

1. Information System Design seen in the following picture:

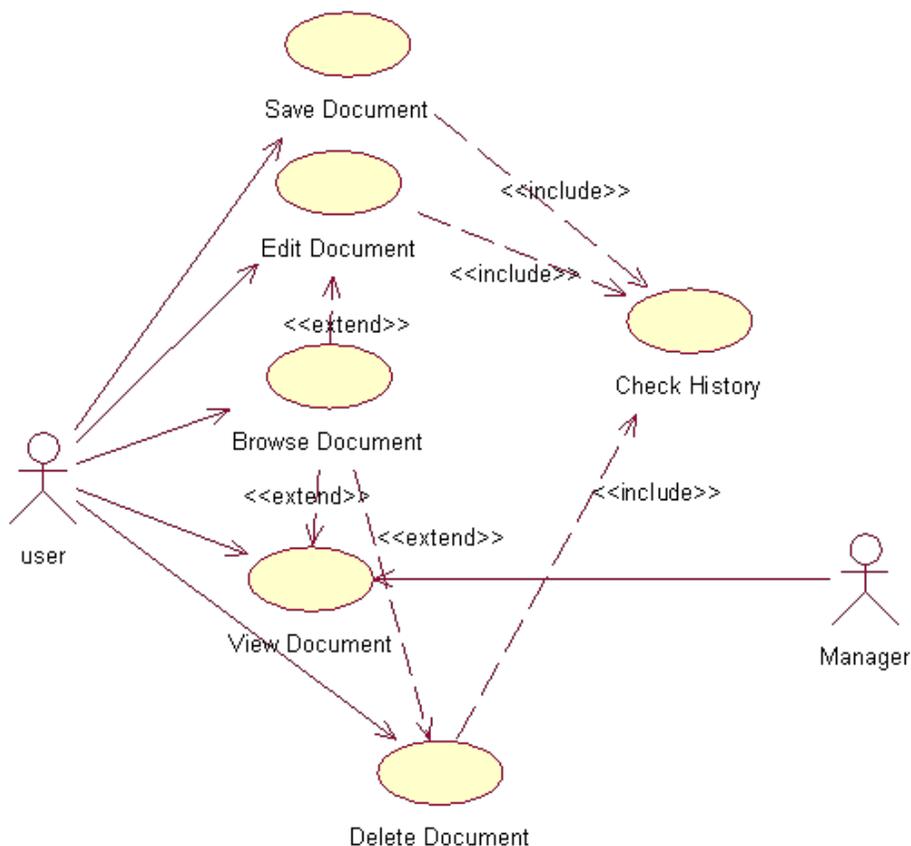


Figure 1 Use Case Diagram

Use Case Diagram here is used to describe object oriented design in the school information system. The school that is described as a user can do activities as clearly shown in the picture above. This diagram is very important to describe organizing and modeling behavior in a system.

2. Sequence Diagrams are used to describe sequences over time in object-oriented information systems. And this diagram is dynamic. The following is a picture of Design Sequence Diagram for school archive management:

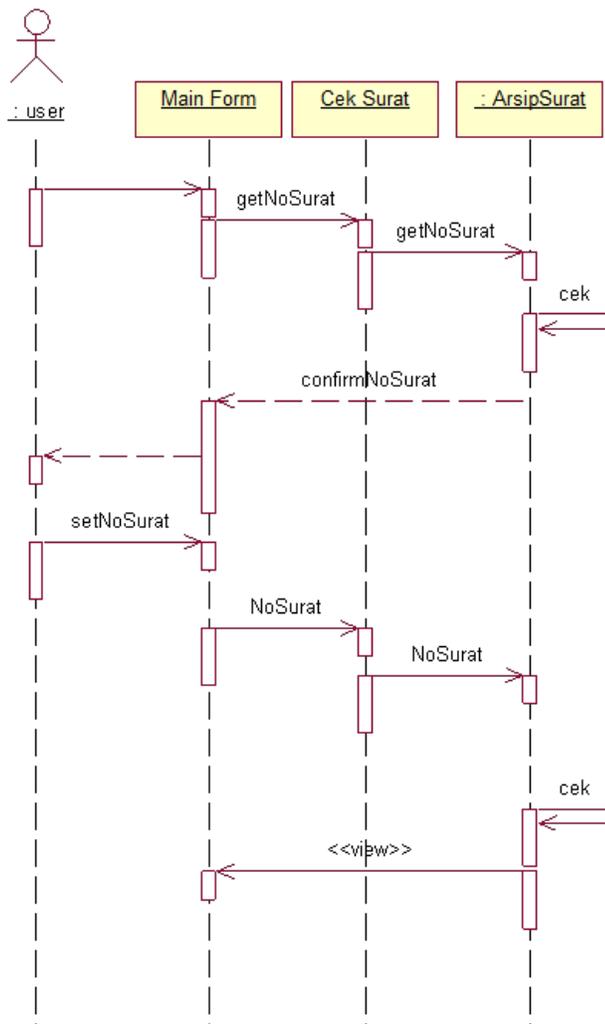


Figure 2 Sequence Diagram

In the picture above clearly sending messages from time to time in 1 use case diagram.

3. Design class diagrams are used to describe the set of classes, interfaces, collaboration and relationships in the information system created. The following is a class diagram design on the concept of green computing school:

Psychological Implications of HIV and Aids on Child-Headed Households in SEME Sub-County, Kisumu County- Kenya

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Abstract- HIV and AIDS, is decimating African society, most specific Sub-Saharan Africa, dismantling family systems and resulting into millions of orphans and child headed households. Having lost parents and close relatives, child-headed households experience extreme difficulties in accessing basic survival needs. The objectives of the study were to: - determine the psychosocial implications of HIV and AIDS on child-headed households in Seme Sub-County, Evaluate the implications of HIV and AIDS on school attendance and performance among child headed households in Seme Sub-County, Kisumu County and establish the effectiveness of the existing interventions to address the effects of HIV and AIDS on child headed households in Seme Sub-County, Kisumu County.

The study was anchored on Family Systems theory by Bowen and Ecological systems theory by Bronfenbrenner. The target population was child-headed households and Community Based Organizations in Seme Sub County; the sample size for the study was 100 respondents out of which there were 80 orphans selected through simple random sampling from 160 child-headed households and 20 personnel selected from 40 CBOs working with orphans in the area of study. A pilot study was conducted in North Seme location and the research tools achieved a reliability coefficient score of 0.7. Face and content validity was ascertained by experts in the Faculty of Arts and Social Sciences and the author respectively. The data was collected using face-to-face semi-structured interviews and through questionnaires. The data were analyzed using thematic content analysis and themes extracted and presented. In the study it was established that child-headed households experience various psychological and psychosocial challenges. It is recommended that psychosocial services should be made accessible to help mitigate the effects of HIV and AIDS on the children.

Index Terms- Psychological Implications, HIV and AIDS, Child-headed Households.

I. INTRODUCTION

Human Immunodeficiency Virus and Acquired Immune Deficiency Syndrome (HIV and AIDS), according to Coles (2014), are currently decimating the African society, especially

in Sub-Saharan Africa. It is tearing apart the extended family system, eliminating skilled workers and creating millions of orphans.

According to UNAIDS (2008) the high incidence of HIV infection means that the impact of HIV and AIDS morbidity and mortality will be felt for decades. According to Population Reports (2012), nine out of every ten children orphaned by AIDS are in Sub-Saharan Africa.

In Africa, family members traditionally cared for orphaned and vulnerable children; historically, members of the same family were under a (moral) obligation to care for one another and children were certain of being cared for either by their own parents or by a family member. In the recent past, however, care of children whose parents have died has become an insurmountable burden for many families, pushing them beyond their ability to cope. (Tsegaye, 2007).

The Extended family networks, once the social security for African children have quite simply become overwhelmed by the increasing number of children in need of alternative care. Since the availability of alternative care arrangements ensured by the government is limited, these developments initially led to a rise in the number of families headed by aunts or grandparents.

However, from the early 1990s an unprecedented rise in the phenomenon of child-headed households has been witnessed. (Nyambetha, *et al* 2007). In this study, a child-headed household was referred to as a household where a member who does not exceed the teen years fully or partially finances, controls, plans and implements the immediate management of the activities that affects the occupants of the household.

II. STATEMENT OF THE PROBLEM

HIV and AIDS leads to social and economic hardships of children and adolescents whose right to basic needs are constantly violated. The resultant psychosocial burden on the orphans may seem less important, less urgent and less compelling, however, to the affected individuals, it is urgent and their psychosocial concerns are real; and require urgent attention. Young people whose parents have died experience enormous emotional and psychological demands which often go unnoticed and neglected. Changes in behavior among children and adolescents may be dismissed as temporary presentation that will

pass rather than an indicator of psychological trauma with possible long-term implications. Some of the commonest effects include; anxiety, stress, low self-esteem, frustrations and other behavioral changes. In Seme Sub County, how the orphans sustain their disrupted life after the loss of their parents is no longer an extended family affair. Their situation is made worse by the fact that AIDS-related deaths in the communities have increased at an alarming rate. The multiplication of child-headed households within the area of study was an indicator of the magnitude of the problem.

Psychosocial implications of HIV and AIDS on child-headed households

Death of a parent is considered a crisis for any child (Dane, 2007). However, reports from different studies indicate that grieving process may be particularly difficult for children orphaned by AIDS due to material and psychological stress that often accompany the parents' illness and death (Wild, 2001). Parental loss in childhood is quite traumatizing and is considered a major cause of depression in young adults.

In a study in Rwanda, clinical depression was common among youth (aged 13-24) who headed households. The heads of households who reported higher levels of depressive symptoms, social isolation, and/or lack of adult support were also more likely to report that children under 5 in the home were showing more signs of socio emotional disruption" (Boris *et al.*, 2006,).

In another study in Uganda, depression was found to be higher among orphans than matched non-orphans. Depression among orphans was found to be associated with smaller household sizes, which suggests the potentially buffering function of a larger support system (Atwine *et al.*, 2008).

In a related study in Namibia, there were significant levels of suicidal ideation among child-headed households (Ruiz-Casares, 2010). Nevertheless, like adults, children are grieved by the loss of their parents. However, unlike adults' children often do not feel the full impact of the loss simply because they may not immediately understand the finality of death. This prevents them from going through the grieving process, which is necessary to recover from the loss. Children therefore are at risk of growing up with unresolved negative emotions that are often expressed with anger and depression.

However multiple studies in sub-Saharan Africa have demonstrated that HIV and AIDS orphan- hood is associated with emotional distress – particularly with regard to symptoms of anxiety, depression, and post-traumatic stress (Atwine, Cantor-Graae, & Bajunirwe, 2010; Bhargava, 2009; Cluver & Gardner, 2014; Nyamukapa *et al.*, 2008).

Stigma and discrimination on child-headed households

The negative attitude and judgment projected towards persons with AIDS, their partners and children and rejection by their extended family, friends and the society may lead the affected individuals to withdraw from social support networks because of the ramification of disclosure (Herek and Glunt 2011). The stigma attached to HIV and AIDS exacerbates the trauma already experienced and hampers the bereavement process due to the secrecy of AIDS deaths. The bereaved in most cases lack the necessary emotional support because they would not want to disclose to other people the pain and sorrow for fear

that other people will learn the cause of their relative's death. Even though awareness of HIV and AIDS is now high in most of Sub Saharan Africa nevertheless many children whose parents have died of the virus still face stigma and discrimination (Ayieko, 2007).

Emotional effects of HIV & AIDS on child headed families

In a study of child-headed households in the Free State province of South Africa it was found that some children experienced a feeling of vulnerability, the absence of a feeling of security (Leatham, 2006). They feared for their safety, worrying about being physically attacked or mobbed. The children compensated by being careful to be home before dark, avoiding drug and alcohol use and having fewer friends.

Children receive a lot of social, physical and psychological security from parents, but a lack of this assurance makes a child feel handicapped, uncertain of his own abilities, fearful and therefore on the defensive.

When failing to provide emotional security to the children, parents cause unhappiness, lack of loyalty and tension (Wanda 2007). Children from child-headed households are likely to miss this kind of security.

They develop defense mechanisms to protect themselves such as aggressive behavior when they play with other children. The remote awareness that they have to stand up for themselves makes them aggressive in order to control the situations around them. This way they become bullies. As Crosson-Tower highlights the residual effects of family maltreatment leads to having difficulty trusting others, having low self -esteem, anger, impaired objects relation, impaired parenting abilities, lowered intelligence, impaired development, verbal inaccessibility, inability to play, difficulty with relationships, abuse of alcohol and drugs and perception of powerlessness (Crosson, 2010).

Although past victims demonstrate an ability to survive despite incredible odds, they lack a true sense of trust in themselves. Not only have they lacked encouragement and stimulation to develop a positive self- image but they have modeled themselves as parents who thought little of themselves also (Crosson, 2010). Children are in several cases forced to go without some basic provisions, something that compromises their dignity. For example, some female children do not wear inner linen or use sanitary towels because of the opportunity costs involved. They are forced to choose between buying food and other basic provisions and their personal needs. Such difficult situations can make children grow up with feelings of bitterness and may be at times overwhelmed when faced with other challenges.

Effects on school attendance and performance

Children belonging to child-headed households may be compelled to leave school, as a consequence of poverty or in order to comply with the responsibilities of household heads (Meintjes *et al.*, 2009). When a parent becomes ill, the education of a child is disrupted. Children may be unable to go to school because there is no money to pay for books and fees or because they experience rejection or discrimination. Some must leave school to help care for younger children or to earn an income to help support the household (Government of Kenya, 2004).

Children that are deprived schooling are generally hampered in their ability to achieve their full potential, and would not contribute effectively to the society because of lack of knowledge and skills. A good school education can give children a higher self-esteem, better job prospects and economic independence. As well as lifting children, out of poverty, such an education can also give children a better understanding of HIV and AIDS, decreasing the risk that they will become infected (Bennel, 2012; Subbarao & Raney, 2011).

The abolition of school fees in Kenya is a step in the right direction that will help keep children in school (Sara, Fatuma & Wawire, 2009). However, other associated costs such as the school uniform, activity fund and miscellaneous expenses that keep children out of school need to be addressed if children are to remain in school. For example, in 2003, when the Government of Kenya eliminated user fees, it brought over 1.5 million children (a third of which were girls) to school.

A study on child headed households in Uganda (Gilborn *et al.*, 2010) shows that 26 percent of children reported a decline in school attendance and 25 percent reported a decline in school performance when parents became ill. It was observed from this study that parental illness detracts from school attendance because children stay home to care for sick parents; they have increased household responsibilities and need to care for younger children. The greatest challenge that these children are likely to experience is the lack of parental involvement in their education.

Children who are orphans may also not get much attention from teachers who are aware that there is no parent to follow up on the academic performance of the child. The children may also be ridiculed by others during play and may be intimidated when others laugh at them for not having parents. A better picture was provided by data gathered from all countries in South of Sahara in a study sponsored by UNICEF (2010).

Absenteeism from school

Majority of the orphans 78.5% reported being absent from school with 63.5% indicating being absent very often. 19.5% opined that they were absent sometimes, while 13% were rarely absent. Only 3.75% reported never being absent from school. Majority of pupils reporting absenteeism indicated that they will eventually drop out of school to seek a source of income so as to take care for their younger siblings.

Pradhan & Sundar's (2010) study in India also investigated the reasons for dropping out of school: the study indicated no variations in reasons for dropping out, either among children 6–14 or those 15–18. However, the study showed increased responsibilities for children in HIV-affected households is a major reason for leaving school.

According to Meintjes *et al.* (2009) the rate of non-attendance amongst children heading households in South Africa is high. The primary factor leading to children discontinuing their schooling is the lack of funds for school fees, books and other school essentials. Children heading a household may have trouble in focusing on their own education while bearing the responsibility for a household. However, a study by Wandah & Munya (2011) contradicts the findings of the majority of researches and suggests that the attendance rate of children living in child-only households was not found to be significantly lower.

Effectiveness of the existing measures against the effects of HIV and AIDS on child-headed households

Households led by children employ a number of measures in order to cope with their emotional and psychological burdens. In Kenya, the extended family network is seen and upheld as the traditional social security system and its members are responsible for the protection of the vulnerable and for providing care to the old, the poor and the sick. This family setting was in the past times responsible for the transmission of traditional values and education. In the 21st Century, as in other African countries the extended family unit has disintegrated due to factors such as migration to cities in search of paying jobs. There has been an increase in population resulting in insufficient land resource to sustain the traditional large extended families making it necessary for families to migrate in search of land and pasture for their livestock and livelihoods. (Foster *et al.*, 1997)

Labor migration and urbanization have led to a reduction in frequencies of contact with relatives and encouraged social and economic dependency and possessions are no longer owned communally (Ayieko 2007).

Education about social values that was obtained through traditional mechanism is no longer possible; the younger generation has to depend on the interaction with peers in schools. Despite the external and internal pressures exerted on the extended family network, this unit remains the pre-dominant caring unit for sick relatives and orphans throughout Africa and specifically Kenya (Foster *et al.* 1997).

The extended family responsibility towards members of the family was without a limit even where a family did not have sufficient resources. This was the basis of the assertion that traditionally, “there is no such thing as orphan” in Africa. Even during the current crisis precipitated by HIV and AIDS, it is expected that orphans be under the supervision of an extended family member even when they are not adopted and living under the same roof.

This way of coping and adaptation to change presented by AIDS illustrates the strength, resilience and adaptability of the extended family. The phenomenon of child headed households appearing in communities affected by AIDS is an indication of the saturation of the traditional extended family networks for orphans coping mechanism. This development should be seen as a coping mechanism meant to address the orphan crisis within the communities and not an abandonment of their responsibility to care for orphans within the family (Ansell & Young 2004).

The orphans need emotional support and assurance; they need counseling and education on the new role as house heads. They need support and encouragement to go on with school. The burden of household chores coupled with schoolwork is stressful; youth orphans need direct interventions not only to sustain them in school but also to minimize negative psychological impacts that such a role may have on the young person.

In reaction to their parent's deaths 50 percent felt very sad and helpless, while another 22 percent were too young to express themselves. The study reported that adolescents losing a parent are more likely to experience a special case of identity loss (Sengendo & Nambia 2010).

Most felt pessimistic about the future, while one fifth of the participants expressed the strongest hope if they get good jobs in

future, others hoped they could complete their education or attend vocational education.

Perceived Social support

When a household begins to feel the effect of HIV and AIDS, families provide the most immediate source of support; psychological, economic and social (Foster & Jiwli 2001). Families are the best hope for orphans, but they require support from outside sources for both immediate survival needs and the longer term. It is therefore important to assist building the capacity of families to improve their economic standing, provide psychosocial support to the affected orphans and strengthen young people's life skills. The capacity of families to protect the rights of orphans and vulnerable in their care depends largely on their economic strength.

Possible interventions should aim to enhance the economic resilience of the household, such initiatives as conditional cash transfer, insurance, direct subsidies and material assistance can help alleviate the urgent needs of the most vulnerable house hold (Landgren, 2005).

Long term interventions should include studying closely what was left behind by their departed parents and assist orphans to increase family production in terms of land, livestock and provision of professional advice on how to access micro –credit to start small business, for those who can't continue with school or college. Vocational education should be made available as well for those orphaned youths who have been made to drop out of school.

Providing Psychosocial Support

Interventions to orphans due to HIV and AIDS tend to focus on education and material needs and ignore the psychosocial needs. These needs are in most cases misunderstood and are difficult to assess. HIV and AIDS undermines and destroys the fundamental human attachments to normal family life and youth development as observed by Foster & Jiwli (2001).

Youth affected by HIV and AIDS suffer fear and anxiety during parental illness then grief and trauma with the death of the parent. These problems are further compounded by traditional taboos surrounding discussion of AIDS and death. Children and youths orphaned by AIDS cannot cope without support; they need plenty of opportunity to express their feelings without fear of stigma, discrimination or exclusion. (Foster & Jiwli, 2001; REPSSI, 2013).

Programs addressing the psychosocial needs of the orphans should be incorporated into other programs /activities. Peer support, individual counseling, and group approaches are needed. The school counseling and social welfare programs, faith-based organizations, community volunteer groups, all should be sensitized and equipped to offer psychosocial support to children orphaned by AIDS. Teachers, health care workers and other stake- holders interested with the welfare of the children should be trained to identify signs of distress and take appropriate actions (REPSSI 2003).

Providing the orphaned children with life and survival skills

In the absence of parental guidance and support, young people who have taken parental responsibility do so without

much skill and preparations. Young people require training to enable them cope with the demands of their new responsibilities, they need new and strengthened skills in areas including household management, caring for young siblings, budgeting and accessing other important services.

Vocation and apprenticeship are key to enhancing their ability to generate income. Further the orphans must be equipped with social and inter personal skills necessary to make informed decisions, communicate effectively and develop coping and self-management mechanisms that will enable them to protect themselves from HIV infections and other risks. These young people should be encouraged to participate actively in planning and implementing all programs that involve their welfare as explained by Williamson (2002), that by involving young people in the fight against HIV &AIDS their confidence and self -esteem is improved as they feel responsible as partners.

Community support

When families cannot adequately meet the basic needs of the orphans and the vulnerable in their care, the larger community becomes the safety net in providing essential support. Local leaders, including traditional and religious leaders, administrators, women groups, prominent citizens, journalist, teachers and others need to be sensitized to the impact of HIV and AIDS and to the circumstance of orphans within their community. This sensitization program should encourage leaders and their communities to take action in support of the affected house -holds and monitor the most vulnerable.

Their role should be to ensure such orphans are under supervision of adults, that they are enrolled in school, have their basic needs met and can access most of the essential services. Of particular importance is alerting leaders to the risks the children are exposed to, for forced marriages for girls. Leaders should create a culture in which abuse of any kind is unacceptable and violations are dealt with effectively, this heightened awareness can provide attention to the young people made vulnerable by AIDS and stimulates locally driven action in response to identified needs as observed by William (2002).

Supporting Cooperative activities

The rural poor communities provide examples of utilizing locally available resources to help children and house- holds made vulnerable by HIV and AIDS. Community groups can provide direct help to the orphans. They are better placed to assist AIDS affected families in monitoring and visiting the affected house- holds and the provision of volunteer programs that provide much needed psychosocial support, communal gardens, community childcare services, community schools, pooling of funds to provide material assistances, youth clubs and recreational programs. (UNAIDS, 2003)

The Kenyan community is known for its innovative ways of dealing with issues that threaten its cohesive nature. Specifically, the Luo of Nyanza are known for addressing community issues by forming community –based organizations or groupings to address issues such as funerals, school fees problems, hospital bills and any other threatening issue to the families, this can be seen through the common fundraisers- commonly referred to as *harambees*. On recognizing the increasing vulnerability of orphans in the communities; groups

are responding by ingenuity; such attempts are meant to provide support for the orphans within their locale. (Williamson, 2002)

Most community initiatives grow out of the concerns of a few motivated individuals who work together to support the orphans. These initiatives spring from a sense of obligation to care for those in need.

Theoretical Framework

The study was guided by family systems and ecological systems theory.

Family Systems Theory

The study was guided by Family Systems theory by Bowen (1954), which posits that people do not exist in a vacuum, but in families and communities. Every family member is connected to each other through a system of overlapping and intertwining relationships that can only be deciphered when all members work as one. This also applies to children affected or infected by AIDS. This theory sees different levels and groups of people as interactive systems where the functioning of the whole is dependent on the interaction between all parts. Family Systems Theory assisted the researcher in this study, to understand the educational and psychosocial factors that affect learners orphaned by AIDS. Whole systems can interact with other systems around them, for instance family may interact with schools, communities, education department and other government departments among other systems.

AIDS orphans are not treated like any other orphans; they are discriminated against by their peers and are absent from school because some of them need to take care of their terminally ill parents. These factors affect other levels of the system such as community; whereby community members discriminate those who are affected or infected by AIDS; and school level whereby learners orphaned by AIDS are being discriminated by their classmates.

If most of the learners are having difficulties to perform well in school due to the factors mentioned above, the entire education system will be affected. There may possibly be an imbalance in the whole system because of the disturbances between each of the levels, and so it may be detrimental to view the challenge as being caused by the learners' home factors, which in this study are their parents' illnesses and deaths related to AIDS.

Ecological Systems theory

Another theory that was relevant to this study is ecological systems theory propounded by Bronfenbrenner (1986) whose assumptions are based on the interdependence between different Organisms and their environments.

The relationships between organisms and their environments are seen holistically. In a family or household such as child headed households, every individual is essential to another in order to sustain the cycles between birth and death. Therefore, the links between organisms or people within their entire systems depend largely on one another. The theory sees different levels and groups of people as interactive systems where the functioning of the whole is dependent on the interactions between all the parts.

Orphans as in this study, are part of a system that can be affected by different aspects such as members of the extended family, siblings, teachers, neighbours, peers, the curriculum and the school administration. Interdependence here is highly dependent on the activities of each member.

Therefore, it becomes vital to understand how children's development is shaped by their social contexts (Bray *et al.*, 2010). Bronfenbrenner (1986) explains fully how different levels within a system in the social context interact in child development.

Research Design.

This study was a descriptive survey as it set out to describe and interpret a situation (Etemesi 2013).

This design helped the researcher to obtain information concerning the status of the orphans at that point in time. Emphasis on qualitative methods allowed the researcher to probe.

Target Population

Primary school pupils living in child-headed households, and Community Based Organizations formed the unit of analysis. An age range of 9-18 years was selected because they were considered to be mature enough for an interview and they also met the standard definition of a child according to Kenyan Law. Community Based Organizations were picked because they are considered the authority in the community and have personal information on orphaned children in the community. In order to participate in the study, the participants were required to have met the following criteria; aged 9-18 years, heading a household, living in Seme Sub- County, orphaned as a result of a HIV and AIDS-related illness, orphaned for a minimum of 6 months and able to understand and converse in English or Dholuo. At the time of the study, there were approximately 2347 primary schools with a pupil population of 36,000. There are 74 Community Based Organizations working in Seme Sub-County.

Sampling Procedures and Sampling Techniques

A criterion-based purposive sampling strategy was used to select participants for this study. It is a form of non-probability sampling in which decisions concerning the individuals to be included in the sample were taken by the researcher, based upon a variety of criteria, which may include specialist knowledge of the research issue, or capacity and willingness to participate in the research. When using a purposive sampling technique, researchers rely on their experience, ingenuity and, or previous research findings to obtain a research sample deliberately in such a way that the sample may be regarded as representative of the relevant population (Welman *et al.*, 2010). Purposive sampling technique helped the researcher to select orphaned children who met the research criteria. The researcher then used simple random sampling to select a sample from the pool of orphaned children.

The sample size for the study was 100 respondents out of which there were 80 orphans selected through simple random sampling from 160 child-headed households and 20 personnel from CBOs working with the selected orphans.

Data Collection Instruments

The unstructured interviews also allowed the researcher to probe extensively for sensitive issues. In this regard, unstructured interviews enabled the researcher to obtain in-depth data from the perspectives of the child-household heads. The interview schedule was administered to 80 child household heads and 20 community-based organizations personnel.

III. RESULTS

Demographic information of children heading households

Sixty-two (62.%) of the 80 household heads analysed were male and the rest (37.5%) were female, a ratio of almost 2:1. This was indicative that the number of orphan male-headed households are almost double when compared with orphan female headed households in Seme Sub County. Those aged below 10 years comprised 6.25% while those aged 10 to 14 years were the majority at 58.75%. Those above 15 years constituted 35% of the respondents

Demographic information of the CBOs personnel

Male respondents working in the community-based organizations totaled 65% of the respondents with the remaining 35% being female respondents. The ages of the respondents ranged between 19 and 55 years, with those aged below 21 years being only 3.5% of the study respondents. These were mostly field and outreach officers. Those aged between 22 and 29 years were the majority in the study at 35% and generally comprised research officers. Workers aged 30 to 39 years constituted 25% and mostly worked as program officers, while those between 40 and 49 years old comprised 15% and were at management levels. There were only 1.25% respondents aged above 50 years.

This indicates that young people who are still energetic and can conduct effective outreach programs and the research necessary to help the orphans manage most CBOs in the Sub County. How effective their approaches can only be understood from the psychosocial sequels experienced by the orphans in the community. The elderly are very few in the CBO sector and may be involved in advisory services in the community but their expertise and experience is still essential in the management of CBOs.

Psychosocial effects due to HIV and AIDS

Table 4.1: Psychological reactions of orphans (Source: field data)

Reaction	Percentage
Anxiety	36.25
Depression	23.25
Suicidal ideation	20
Panic Attacks	15
Others	5.5

As noted in Table 4.1. Anxiety accounts for (36.25%) of the psychological sequel experienced by the orphans. The symptomology of anxiety presented itself in various forms, with

45% of the orphans reporting being restless often and 35% noting being restless sometimes. Only 25% reported not being restless.

Forty five percent reported never having panic attacks, with only 15% percent noting them. Fifty percent sometimes feel that something bad is going to happen to them, while forty percent had the feeling often. Being scared with a reason sometimes was noted by forty percent of the orphans, with fifteen percent being afraid often. However, forty-five percent were not scared without reason.

Low energy levels were highlighted by (35%) of the orphans and was the most frequently reported depressive symptom resulting from excessive stress noted. Other symptoms of depression presented themselves in the form of suicidal thoughts and self-blame at 20% respectively.

The effects of HIV and AIDS on school attendance and performance

According to this study, the orphans reporting to have attended school constituted about 90 %, (72) of the respondents. However, only 61.25% (49) reported being currently enrolled in formal schooling. Those currently enrolled in school were those above the age of ten years. The performance of the children in school was noted as being generally poor (66.25%). Some of factors cited by the orphans include losing interest in their studies, becoming depressed, and even dropping out of school because of taunts by peers.

The findings highlighted that in some cases teachers actively discriminate and even mistreat affected children in the classroom by neglecting or abusing them hence leading to poor self-concept and low concentration in academics. The dropout rate was higher more among girls interviewed. The factors that may have led to the high dropout rates among the girls include household chores and indifference to girl’s education in the community.

Across Africa, the girl child is viewed as property to be married off at early ages and hence most communities don’t pay much attention to their education. Other contributing factors that may lead to early dropouts is the need to seek employment to sustain the child-headed households that may not be receiving support from the extended family members. The children also reported that ostracism and humiliation by their peers were other reasons for dropping out.

These results were similar to studies in China that compared attendance for children orphaned by AIDS. Enrollment rates were high overall, and no differences were seen among children living in HIV and AIDS affected households and unaffected children. Children orphaned by AIDS had lower attendance but the difference was not significant (Jainhua *et al.*, 2006). In another study conducted in Lao PDR, involving 115 children aged 6–18 years, of which 69% were HIV affected and 31% were not: 95% had ever been to school, and 83% were currently attending.

These results concur with those of low prevalence Africa Nations, in which enrollment rates are low. A cross-sectional study interviewing 1013 children in Benin found 77% of orphans and vulnerable children aged 6–18 years old were enrolled compared to 82% of non-orphans (GECA, 2005).

Absenteeism from school

The child household heads reported that the reasons for absenteeism were seeking part time employment to sustain the family and ostracism by other pupils and teachers. The absenteeism rate among the child household heads was 63.5%.

The effectiveness of existing interventions to address the effects of HIV and AIDS on child headed households

Support by siblings

Some of the orphans had siblings who were married (26.5%) and reported that they received some kind of support (11.25%) from them. The kind of support offered to the orphans by their married siblings as indicated in the Figure 6 denotes that food (80%) was the main support. Clothing (8.75%), upkeep money (8%) and schooling support (7.5%) were also reported by the orphans. To a minor extent the elder siblings contributed to medical and accommodation support at 3.75%. Financial upkeep and medical support is noted as being minimal at 8% and 3.75% respectively. These findings illustrate that the extended familial system once prevalent in the Luo community and many similar communities in Africa is slowly being eroded by modernization. The support reported by the orphans in Seme Sub County is a reflection of what is more prevalent in town and city life with the socio-economic hardships encountered in these settings. However, in a rural setting like the study geographical area, the support is supposed to be much higher than represented by the findings, as many relatives are assumed to reside in the rural setting. The support towards the orphans' accommodation and related matters including education that is currently highly subsidized by the government of Kenya for both primary and day secondary education should be much higher.

Support from CBOs

Majority (60%) of the community, based organizations C.B.O reported legal and advocacy services as their forte. 35% and 25% respectively reported education and food provision as the service they engaged in. medical services accounted for 20% of the service provision, while 15% respectively engaged in shelter, clothing and other services. However, it was noted that there were organizations that engaged in cross cutting service provision such as medical and nutrition services or legal aid together with education. The reasons for the selective support provision by the Community based organizations was reported as limited donor funding to the CBOs. They opined that the donors were keener to support the big Non-governmental organizations in Seme Sub County as compared to the CBOs that are mostly family and communal outfits.

IV. CONCLUSION AND RECOMMENDATIONS.

Children heading households experience increased levels of psychological and emotional distress. Furthermore, the factors that are inherently part of the reasons that children are affected by HIV and AIDS appear to cause psychological stress in orphans and vulnerable children may also be the result of conditions other than HIV and AIDS. Physical and verbal abuse, level of psychological distress of the guardians, and health status of the guardians are all significant predictors of psychological

distress in orphans and vulnerable children, these predictors may also be caused by phenomena other than HIV and AIDS and thus apply to other children as well.

In African communities, the extended families take in orphans who lose both parents. Children affected by HIV and AIDS in Seme Sub County are at serious risk of exploitation, including labor and sexual abuse. Isolated from emotional connections with the family, some have been forced to live on the market places and beaches either begging or engaging in petty crime as a means to survive. While most of these children, especially the girls were born free of HIV, they are highly vulnerable to HIV infection while in the markets or beaches. The work by the community-based organizations in the Sub- County, focus on legal and advocacy services with limited focus on education and food provision. Medical services account for 20% of the CBO service provision with the Ministry of health playing a major role in health care provision of these orphans. Their shelter, clothing and other services are mainly sourced from their hard earned labor with very little CBO contribution.

The researcher recommends that there should be accessible psychosocial services to help mitigate the effects of HIV and AIDS on child household heads. These should include counseling and mentoring of children and/or caretakers, self-help groups, and various types of community mobilization. In some cases, psychosocial interventions may be designed specifically for children and youth. Self-help groups such as weekly clubs and after-school programs where children can discuss their concerns with individuals similar to themselves can also be implemented. An important area needing attention is focusing on material and financial issues.

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Challenges of Social Housing Implementation and Consumer Satisfaction in River State, Nigeria

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Abstract- As greater percentage of the world's population become urban dwellers, the issue of housing shortages are bound to continue. Housing constitutes essential human need, whose availability or otherwise affects man's socio-economic well being. Little wonder then that most government tends to make housing one of the cardinal policies of governance. The present study examines Social Housing programme in Rivers State with a view to identifying the challenges hindering its effective implementation. Data for this study came from both primary and secondary sources. The target population for this study comprises of randomly selected 266 household heads who currently occupy social housing dwelling units in the three (3) senatorial districts of Rivers state at the time of the study. The results of this study showed that the distribution of social housing is not equitable in space to meet the needs of those who they are targeted at. In the mist of the forgoing, housing made for the less privileged ends up in the hands of the political elites exacerbating the housing challenge in the State. Though the socio-economic characteristics of social housing beneficiaries varied in the study area, there is statistically no significant difference between satisfaction derivable from social housing and occupants' age and gender. The study calls for urgent need to match words with action by ensuring that social housing is made available and affordable to the low income group. To achieve this requires that policymakers will have to define housing affordability in a way that allows families to obtain quality housing comfortably without compromising other essential house hold needs.

Index Terms- Social housing; housing need; affordability; housing policy; rental value; urbanization.

I. INTRODUCTION

Cities all over the world are centers of innovation and plays essential role in the socio-economic transformation of the nation where they are found. The world is currently going through accelerated urbanization as more than half of its population live in cities. United Nation (2016), reports that by 2030, 6 out of 10 people will be urban dwellers. As people move into cities in search of better life, the population of urban areas swells, precipitating housing challenges. A UN report has it that in 2014, 30 per cent of the urban population lived in slum-like conditions while globally; more than 880 million people were living in slums (UN 2016). Housing is one of the basic needs of

man and ranks second after food. In spite of the importance of housing to the overall survival of man, most citizens are unable to meet their housing needs. This matter is made worse by the very high level of income inequality between and among various strata of people in the society. Housing provision itself is capital intensive little wonder that most low income groups are unable to meet their housing needs. This problem is exacerbated by High rental values occasioned by disequilibrium between demand and supply of housing in most cities. High rental value on houses creates burden that reduces family's resources to spend on child enrichment items and activities and limits the neighborhoods where low-income families can afford to live, thus affecting parents ability to send their kids to highly ranked schools and exacerbates educational gaps that start early in life (Veronica, 2017).

In a bid to reduce the problems of housing shortage, government and corporate organizations usually provide some sought of subsidy through the process of social housing. Social housing is the provision of housing to citizens to enhance their wellbeing and achieve financial success while reducing costs to society in the long term. Social housing thus is a response by Government and corporate entities to address the housing needs of low income earners' using diverse instruments. It involves the provision of housing below market price using different forms of subsidy mechanisms. Social housing is predicated in the belief that meeting household basic need for shelter, can help promote positive life outcomes for low- and moderate-income families (Painter, nd).

Rivers state is one of the states that make up Nigeria. It is home for oil and gas operations that accounts for large quota of the Gross Domestic Product (GDP) of the country. The State, witnesses' high influx of both firm and people leading to shortages in housing supply and high rental value place on available stock. In a bid to provide housing for its populace, the Rivers state Government and most corporate bodies operating in the state, over the years, embarked on the provision of housing estates in the form of social housing to meet the housing needs of its citizens and workers. How well has the various social housing schemes faired in the Rivers State? What are some of perceived challenges facing its smooth implementation and what is the level satisfaction of occupants of social housing in the study area. The present study is an assessment of the challenges of social housing provision and satisfaction level of beneficiaries of social housing Rivers state, Nigeria.

II. STUDY AREA

Rivers State is located in the Niger Delta region, of Nigeria (fig.1). It lies within latitudes 4°20' and 5°50'N and longitudes 6°20' and 7°35'East. It is bounded on the south by the Atlantic Ocean, to the north by Imo and Abia states, to the east by Akwa-Ibom State and to the West by Bayelsa State. The state was created on May 27th 1967, out of the former Eastern Region of Nigeria. Rivers State is a predominantly low-lying pluvial (wet climate) state in southern Nigeria, located in the eastern part of the Niger Delta. Its topography ranges from flat plains, with a

network of rivers and tributaries. Rainfall is generally seasonal, variable, as well as heavy. Generally, rain occurs on the average every month of the year, but with varying duration. The state is characterized by high rainfall which decreases from south to north. Total annual rainfall decreases from about 4,700 mm (185 in) on the coast, to about 1,700 mm (67 in) in the extreme north. The land surface of Rivers State can be divided into three zones: freshwater swamps, mangrove swamps, and coastal sand ridges. The freshwater zone extends northwards from the mangrove swamps. This land surface is generally less than 20m above sea level.

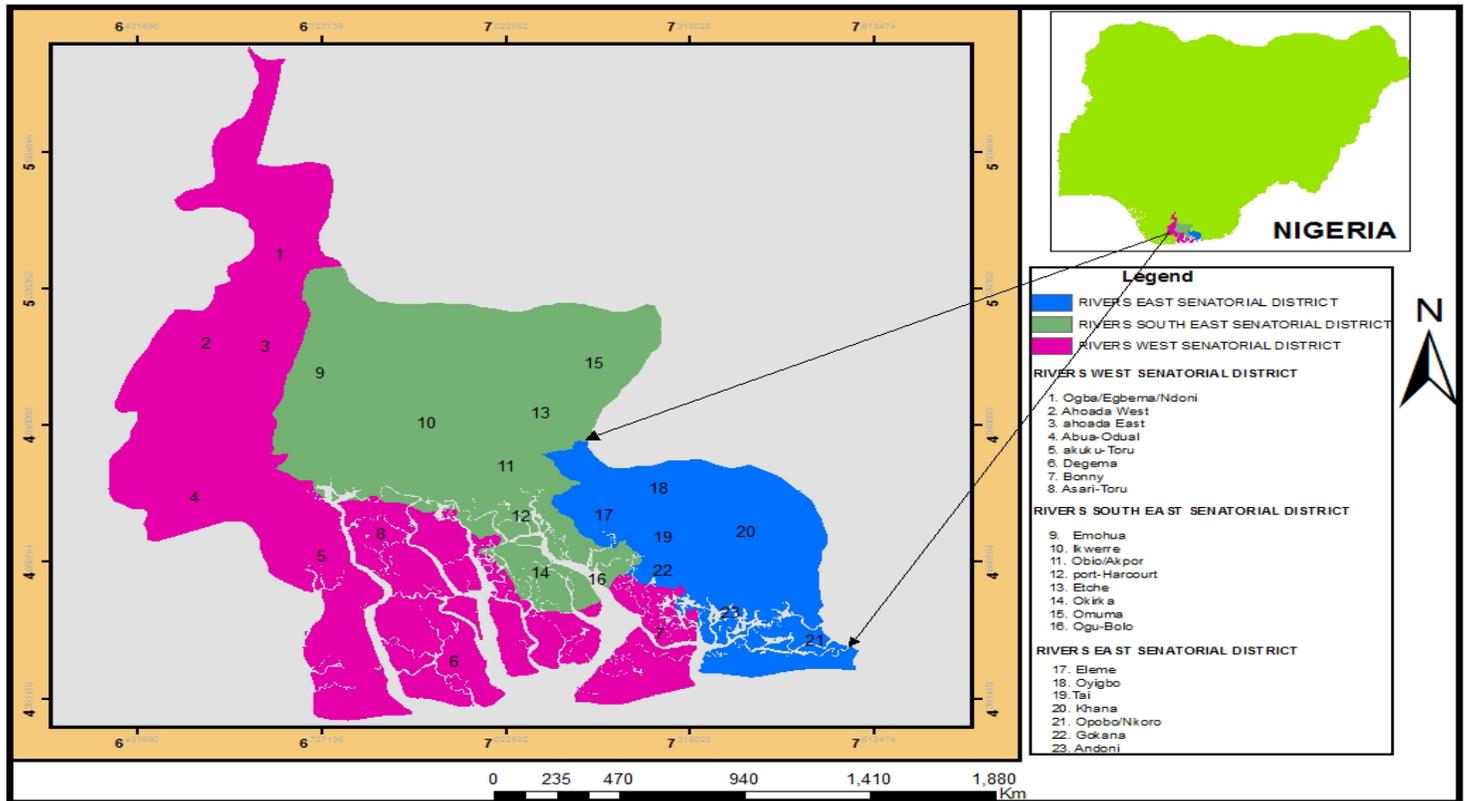


Figure 1: Rivers State and the Three Senatorial Districts of study

Source: National Research and Development Agency (NARSDA), 2017

Over the period from 1991 to 2006, the total population of Rivers State has increased by close to 3 million people. The last official census showed that 5,198,716 people were living in the state, of whom 2,673,026 were men and 2,525,690 were women. Population increase in the area may be due to the changes that have taken place in the socio-economic and political life of the state which in turn creates disequilibrium in the demand and supply of housing. The state is famous for its vast reserves of crude oil and natural gas. It was perhaps the richest and most important section of the African zone of the British Empire. Rivers State has two major oil refineries, two major seaports, airports, and various industrial estates spread across the land. More than 60% of the country's output of crude oil is produced

in the state. Other natural resources found within its boundaries are silica sand, glass sand and clay (The Tide, 2012).

III. CONCEPTUAL FRAMEWORK AND LITERATURE REVIEW

[1] 3.1 The Concept of Social Housing

Social Housing (SH) describes housing provided at subsidized rental costs regardless of ownership. Social housing is housing provided at low rents on a secure basis to those who are most in need or struggling with their housing costs. It refers to rental housing which may be owned and managed by the state, by non-profit organizations, or by a combination of the two, usually with the aim of providing affordable housing. Social housing can also be seen as a potential remedy to housing

inequality. (Wikipedia, 2018). One essential characteristics of social housing is that is provided base on needs rather than demand and price, and this concept of need is politically or administratively defined and interpreted. It exists because governments have decided that some housing, at least, should not be allocated by market forces.

One way of achieving social housing is through the provision of financial assistance to enable people to secure accommodation in the private market. This approach would be to assist demand (rather than supply) so that effective demand increases to a level at which it is sufficient to encourage housing supply that equates demand. Such usually may take the form of housing allowances. Another form of social housing takes the form of owner- occupier. In this case substantial subsidies are paid to owner-occupiers, in form of tax privileges and in selling public rental housing at large discounts to purchasing sitting tenants (Kemeny, 1995).

3.2 The Concept of Affordability

The main challenge faced by housing proponents and policy makers, is the issue of affordability of housing. Affordability may be understood as the ability of household to meet mortgage requirements without compromising households' basic needs. Meeting the housing needs especially for the low income earners may depend on the affordability of the existing housing stock. Painter (nd) argues that when the costs of available housing options in an area are high relative to household income, households may need to make tradeoffs. For him, affordability also determines the location choices of households within the urban setting. Such that in an effort to curb high costs, households may choose housing that is far from employment centers and would require long commutes or share housing with other households, which could lead to overcrowding or alternatively, households might reduce spending in other areas, such as transportation, health care, food, and education, to offset high housing expenditures.

The issue of affordability is important in the whole process of housing analysis. For example, affordable housing can help improve residents' health, access to education, and employment prospects while high housing cost burdens are associated with negative life outcomes such as declines in mental health, reduced parental enrichment spending and cognitive achievement for low- and moderate-income children, and reduced educational attainment among children (Painter, nd). The determinants of housing affordability include household income and price of housing. Housing cost is a function of the cost of construction. The pricing policy is dependent on the cost of production, interests on loans, and expected profit. Housing is supplied to the housing market at this price. For housing to be affordable, it must be available. Availability of housing is what makes housing interesting and attractive, and then liveability becomes accepted. The availability of affordable housing is proximity to mass transit and linked to job distribution, has become severely imbalanced in this period of rapid urbanization and growing density convergence (Pollard, 2010).

Affordable housing challenges in cities range from the homeless who are forced to live on the street, to the relative deprivation of vital workers like police officers, fire-fighters, teachers, nurses who are unable to find affordable

accommodation near their places of work. These workers are forced to live in suburbia commuting up to two hours each way to work. Lack of affordable housing can make low-cost labour scarcer exacerbating the problems housing quality and instability, which can have detrimental effects on children's mental and physical health (Pollard, 2010).

3.3 Housing and National housing policy

Housing is both a product and a process. As a "process" it involves the combination of enormous human and material resources to produce housing (Agbola, 1998). Housing is thus a fundamental unique "product" which usually results from a unique process, which has economic, geographical and sociological significance. The economic significance is probably linked to the proportion of the total economic wealth of a nation – often held in form of housing and the percentage of individual income, usually expended on housing-related consumption (Ogueffi & Adesanmi, 2004). The "new" National Housing policy from 1991-2000 has its main objective to ensuring that social housing-income earners in the country (Nigeria) have right to use acceptable shelters at are reasonably priced by the year 2000. This, of course, was not achieved.

However, the policy attempted to allocate roles for the three tiers of government to actualize its goals (Waziri and Roosli, 2013). By 2005, a new policy on housing emerged. It was acknowledged that although the government had the responsibility to house its citizens, it would step back from direct construction; while laying emphasis on private sector partnership in realizing its goals of "ensuring that all Nigerians own or have access to decent, safe and sanitary housing accommodation at affordable cost with secure tenure (Ministry of Housing 2005 not listed). It was also acknowledged that a holistic approach had to be the basis of the housing strategy and hence the co-location of housing and urban development. Although the policy has taken off, it has set for itself the target of 40,000 housing units across the country with 1000 in State and 2000 in Lagos and Abuja.

A critical review of the National Housing policy of Nigeria indicates that the policy is riddled with lots of challenges. Direct construction of housing for low-income groups by government did not meet its targets, calling to question, the efficiency and effectiveness of these policies hence the need to allow private housing provision to follow market forces (Alabi, 2005). According to Ademiluyi (2010), the implementation of the National policy on housing was riddled with politically interferences due to insincerity in the approach of the policy makers.

The needs of the stakeholders were not taken into account during the initiation and implementation of the scheme. Again, rather than allocate the houses to the targeted low-income population, a good number of the houses constructed were distribution in favour of the high income earners (Muoghalu, 1986). High construction cost of houses was also a problem. It was for this reason that Aluko (2002) described housing in Nigeria as an 'expensive commodity'. For him the beneficiaries of social housing in Nigeria are not the intended low income groups but the very high income earners and calls for strong political will needed for effective implementation of social housing scheme in the country.

IV. METHODS AND MATERIALS

The research design adopted is the “Passive Observational” research design (Cook and Campbell, 1979) since there was no experimental manipulation of the variables studied. Data for this study came from both Primary and secondary sources. The primary sources of data were collected through direct communication with government bureaucrats, workers, and consultants; personal observation and administration of questionnaires to 266 selected heads of households. Secondary data were also collected Government archives; Textbooks; Journals articles. The target population for this study comprises of all household heads who occupy social housing dwelling units in the three (3) senatorial districts of Rivers state at the time of this study (Table 1).

Adopting the stratified sampling technique, all the Local Government Areas (LGA) in Rivers state were divided into three senatorial districts (Rivers- east, Rivers south-east, and Rivers west). Two LGAs were randomly selected from each district making a total of six LGAs studied. Total census of the housing units in the selected LGAs was found to be 932 units. This represents 87% of the total (1071) housing units in the State. Further investigation reveals that of the 932 housing units in the sampled area, only 793 units representing 85% have been completed and are actually occupied by residents. To determine the sample size, the Taro Yamane formula was applied at a precision of 5%. Mathematically, the Taro Yamane formula is given as:

$$n = N / [1 + N (e)^2]$$

Where:

n = Sample size

1 = Constant

N = Population Size

e = Sampling error (5%) = $e^2 = 0.0025$

A total of 266 heads of household representing 34% of the study sample frame served as the sample size for the study. Systematic sampling technique was used to select the head of households using a sampling interval of every 4th item. Simple univariate statistics such as percentages were used in data analysis. To determine if there is any significant difference between age and income status occupants of social housing and

level of housing satisfaction, the chi-square (χ^2) statistics was used.

[2] Mathematically, χ^2 is given by:

$$\chi^2 = \sum_i \sum_j \frac{(O_{ij} - E_{ij})^2}{E_{ij}}$$

[3]

[4] Where O = Observed values

[5] E = Expected values

Table 1: Sampling Details

Senatorial Districts	Constituent LGAs	Selected LGAs	No. of Completed Units	Types and No. of Occupied Housing Units in the Selected LGAs	No. of Occupied Dwelling Units in Selected LGAs	No. of Dwelling Units (Hence households)
Rivers West	Ogba/Egbema/Ndoni	Ogba/Egbema/Ndoni	96	72 Units of 1 bedroom bungalow	72	24
	Ahoada West			18 Units of 2 bedroom bungalow	18	6
	Ahoada East			18 Units of 2 bedroom bungalow	6	2
	Abua-Odual					
	Akuku-Toru	Ahoada West	45	6 Units of 3 bedroom bungalow	15	5
	Degema			15 Units of 1 bedroom bungalow	9	3
	Bonny			9 Units of 2 bedroom bungalow		
Asari-Toru						
Rivers South East	Emohua	Obio/Akpor	366	26 Units of 1 bedroom bungalow	26	9
	Ikwerre			52 Units of 2 bedroom bungalow	52	17
	Obio/Akpor			140 Units of 3 bedroom bungalow	140	47
	Port Harcourt			50	17	
	Etche					
	Okrika	Port Harcourt	363	140 Units of 3 bedroom bungalow	363	12
	Omuma			50 Units of 1 bedroom duplex		2
Ogu-Bolo		363 of 1 & 2 bedroom bungalow				

Rivers East	Eleme	Eleme	52	20 Units of 1 bedroom bungalow	20	7
	Oyigbo			10 Units of 2 bedroom bungalow	10	3
	Tai			6 Units of 3 bedroom bungalow	6	2
	Khana			6 Units of 1 bedroom bungalow	6	
	Opobo/Nkoro	Oyigbo	10	793 Units		
Gokana						
Andoni						
			932 Units			
				793 Units		266 Units

V. RESULTS AND DISCUSSIONS

5.1 Socio-economic characteristics of occupants of Social Housing in Rivers State

The socio-economic survey of this work reveals that occupants of social housing in Rivers State vary in terms of their socio-economic status across the study area. The gener distribution shows that there are more males (60.78%) of than female (39.2%) occupants of social housing in the study area (figure 2). In terms of age, the highest age category among respondents was 25 – 39 years, accounting for 41.8% of respondents and 36.7% closely followed by age category 40 – 54 years (Fig 3). The educational characteristic of the respondents showed that majority attained secondary school (44.9%), followed by those who attained Post-Secondary qualification (33.9%), ‘Post-Graduate (19.2%), and primary (2.0%) respectively as shown in figure 4

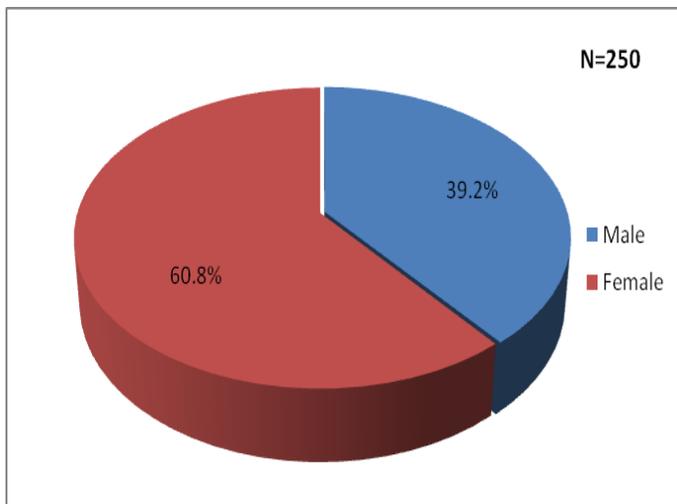


Fig.2: Sex of Respondents
 Source: Researcher’s Field Work, (2018)

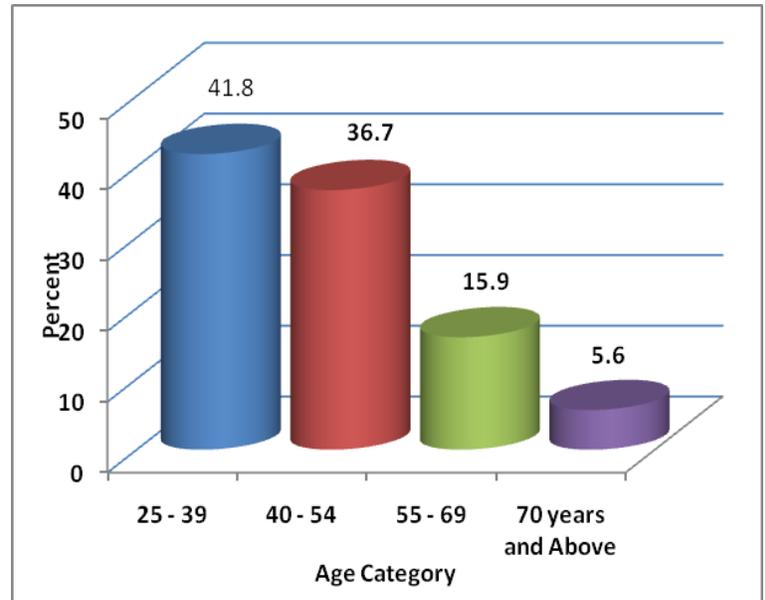


Fig. 3: Distribution of Age of Respondents

Source: Researcher’s Field Work,(2018)

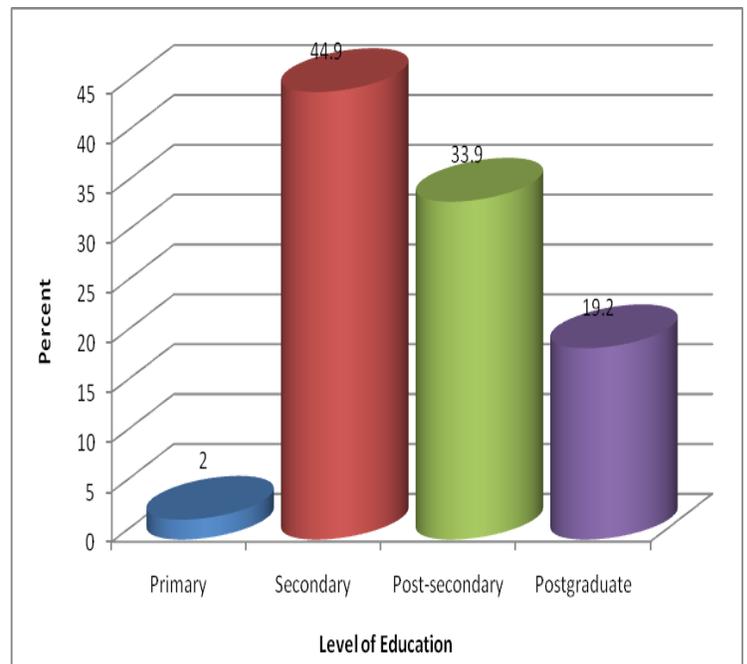


Fig. 4: Percentage Distribution of Educational Attainment of Respondents

Source: Researcher’s Field Work, (2018)

Figure 5, represents the distribution of the marital status of respondents. Married respondents accounted for 57.7% of the distribution, followed by single respondents- accounting for 34%, 3.7% for separated, 2.9% for widowed and 1.7% for the divorced. The employment characteristics of respondents shows that most occupants of social housing in the study area are in active employment (48.2%), while the proportion not in any form of employment are 35% (table 2). In terms of occupation, 29.6

percent of the respondents are Civil Servants. Others are 'Trading', 'Business', 'Students' and 'Artisans', accounting for 19.1percent,17.6 percent, 17.1 percent and 11.6 percent, respectively.(See Fig.6). Overall majority of the respondents fell into the Lower Medium Income group accounting for 36.4 percent (Table 3).

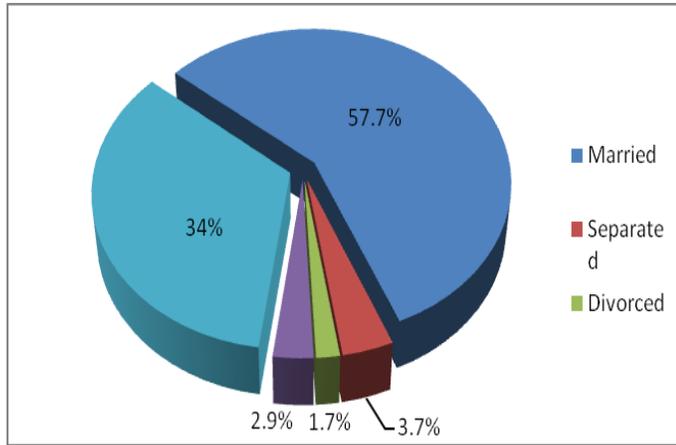


Fig. 5: Percentage Distribution of Marital Status of Respondents

Source: Researcher's Field Work, (2018)

Table 2: Employment Status of Respondents

Employment Status	N	%
Employed	95	48.2
Unemployed	69	35.0
Retired	23	11.7
Fulltime Housewife	10	5.1
Total	197	100

Source: Researcher's Field Work, (2018)

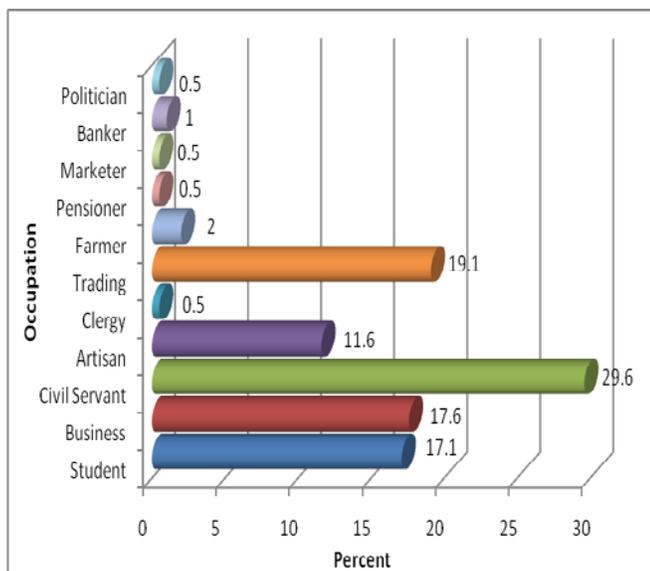


Fig.6: Percentage Distribution of Occupation of Respondents
Source: Author's Field Work, (2018)

Table 3: Income category of Respondents

Employment Status	N	%
No Income (N 0 – N 4,500)	37	15.5
Low Income (N 4,501 – N 18,000)	83	34.7
Lower Medium Income (N18,001 – N 72,000)	87	36.4
Upper Medium Income	29	12.1
High Income	3	1.3
Total	239	100

Source: Researcher's Field Work, (2018)

5.2 Perceived Challenges to Social Housing Provision in Rivers State

In a bid to examine the some of the challenges facing smooth running of social housing in the study area, our respondents were asked to list the challenges they perceive that hinders effective implantation of social housing. Their responses are as shown in table 4. As should be expected, funding constituted the greatest challenge of social implementation in the study area (45%). Other challenges listed by our respondents indicates that the implementation of social housing in the study area are not in with the national housing policy (15%), while 20% blamed lack of continuity in government. Also important is the fact that there is clear absence of public-private partnership arrangement (20%) in Social Housing provision in the study area. See table 4. Other perceived challenges are corruption/mismanagement by government officials (61.4%); dishonouring contractual agreement (14.4%); lack of proper planning (16.5%); over bureaucratization by government officials (2.5%) and lack of political interest in the scheme, (5.1%). See Table 5.

Table 4: Challenges to Social Housing Provision

Challenges	N	Per cent
Lack of fund	9	45
No proper planning	3	15
Lack of continuity in government	4	20
Lack of Public-Private Partnership	4	20
Total	20	100

Source: Researcher's Field Work, (2018)

Table 5: Household Respondents' Perceived Social Housing Implementation Challenges.

Views	N	%
Corruption/mismanagement by government officials	145	61.4
Lack of proper planning	39	16.5
Dishonouring contractual agreement	34	14.4

Over bureaucratization by government officials	6	2.5
Lack of political interest in the scheme	12	5.1
Total	236	100

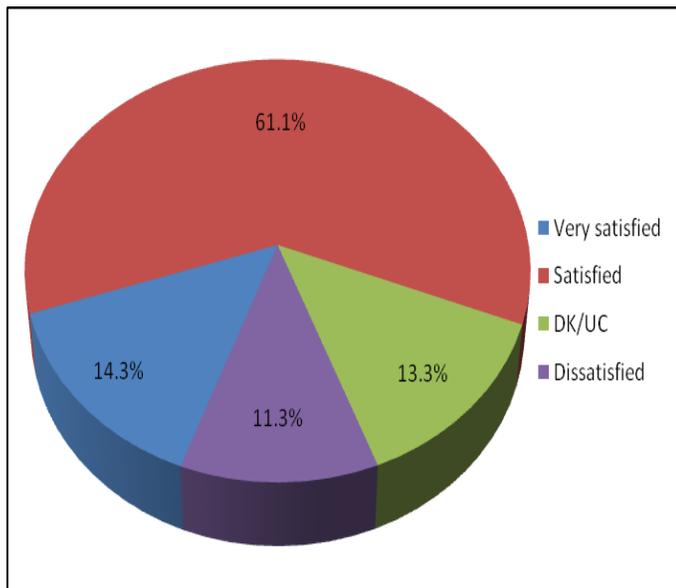
Source: Researcher’s Field Work,(2018)

5.3 Satisfaction Level of Social Housing Beneficiaries

Respondents were asked if they are satisfied or dissatisfied with social housing scheme using a 5-point Likert scale ranging from ‘very satisfied’ to ‘very dissatisfied’. Most of the respondents (75.4) were either very satisfied or satisfied with social housing scheme in the study area while 11.3 % said there are dissatisfied (See figure 7).

Source: Researcher’s Field Work, (2018)

In other to determine if there is any significance difference between satisfaction derivable from social housing and occupants’ age and gender, the chi-square statistics was used and the result is as shown in table 6. The chi-square (X^2) calculated value of 0.386 was obtained as against the critical value of 7.815. Implying that satisfaction to social housing does not differ with age of occupants at 0.05 alpha levels. The study also showed that satisfaction level does not vary with the gender of occupants of Social Housing in Rivers state. The calculated X^2 value of 1.223 was obtain and the critical table value of 3.841 at 0.05 significant level.



N= 236

Fig.7: Distribution of Satisfaction of Respondents

Table 9: Contingency Chi-Square Table

Null Hypothesis (Ho)	Calculated Chi-square Value	Degrees of Freedom	Tabulated value	Significance level (Alpha Value)	Decision Rule	Decision
There is no significant relationship between age of respondent and satisfaction with social housing	0.386	3	7.815	0.05	Reject Ho if calculated value is greater than tabulated value	Cannot reject Ho
There is no significant relationship between gender of respondent and satisfaction with social housing	1.223	1	3.841	0.05	Reject Ho if the calculated value is greater than the tabulated value	Cannot reject Ho

Source: Author’s computation (2018)

VI. CONCLUSION AND RECOMMENDATION

As greater percentage of the world's population become urban dwellers, the issue of housing shortages are bound to continue. The matter is made worse by the near absence of efficient housing programme in most developing nations of the world. Housing constitutes essential human need, whose availability or otherwise affects man's socio-economic well being. Little wonder then that most government tends to make housing one of the cardinal policies of governance. A Critical analysis of Social Housing programme in Rivers State indicates that social housing is riddled with lots of challenges that hinder its effective implementation. Overall, the outcome of social housing is not equitably distributed in space to meet the needs of those who they are targeted at.

In the mist of the forgoing, housing made for the less privileged ends in the hands of the political elites exacerbating the housing challenge in the State. More so, there seem not to be any significant difference between satisfaction level of social housing and occupants' age and gender in the study area. This may not be doubted given that in the mist of acute housing shortages in the area, people's behavior are no longer guided by basic principles but are constrained to limit their choice to that which is available. Also important in social housing delivery, is the ability of ensuring that social housing is made affordable to the low income group. To achieve this requires that policymakers will have to define housing affordability in a way that allows families to obtain quality housing and comfortably pay other nondiscretionary costs thereby reducing payment burden on families.

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Concurrent multiple oral malignant and potentially malignant lesions – The phenomenon of field cancerization

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Abstract- The incidence of oral cancer is increasing dramatically over the past years. According to National Cancer Registry Programme of Indian Council of Medical Research(ICMR), the mortality rate due to cancer has increased by approximately 6% between 2012 and 2014. The long term survival rates of oral cancer is less than 50%. Increased rate of morbidity and mortality is mainly due to the occurrence of multiple primary tumors and locally recurrent cancers. The concept of “field cancerization” by Slaughter *et al.* explains the mechanism by which second primary tumors develops. The presence of a ‘field’ with genetically altered cells appears to be a continuous risk factor for cancer. Detection and monitoring of these fields may have profound implications for cancer prevention. Here is a case report of “field cancerization” phenomenon.

Index Terms- Field cancerization, Multiple oral carcinomas, Oral cancer

I. INTRODUCTION

Worldwide incidence rate of oral cancer is escalating in such a rate that 1 in 8 men and 1 in 10 women can have this disease in their lifetime. It is estimated that a total of 18.1 million new cancer cases will be reporting in 2018[1]. In India, the rate of occurrence of oral cancer is high compared to western populations and oral cancer is the leading cause of cancer death in Indian male. This is due to high rate of tobacco usage in the sub-continent as part of custom and otherwise. The carcinomas associated with these habits shows comparatively good treatment response and prognosis than non-habit related cases. Also, habit associated lesion has got some particular pattern of occurrence – site of distribution, rate of locoregional progression, chance of distant metastasis etc. Multiple areas of cancers were observed in many patients with oral carcinomas, leading to the concept of ‘Field cancerization’. This is relevant in oral carcinogenesis, which is described in this article along with a case study.

II. CASE PRESENTATION

An 80- year- old female reported at Department of Oral medicine and Radiology, Government Dental College Kozhikode, complaining of progressive painless swelling of right cheek since 2 weeks. There was no bleeding or discharge from the mouth. She was not experiencing numbness or parasthesia.

She was a chronic user of tobacco in chewable form, stopped the habit 7 years back. No other co-morbidities were present.

On extra oral examination, there was a firm, non tender swelling on the right cheek of size 6×5 cm, without superficial ulceration or discharge. There was no localised rise of temperature. Multiple level Ib lymph nodes were present bilaterally, which were firm, mobile and non tender and none were more than 1cm.

Intra orally, a proliferative growth was present over right buccal mucosa, of size 4×3.5 cm. It was having raised borders, granular surface and superficial fissures. It was non-tender without bleeding or discharge.

A minimally proliferative growth with superficial fissures and multiple nodularities was present over left buccal mucosa, extending into left upper mucobuccal sulcus and left maxillary posterior alveolar mucosa.

Another growth was present in the edentulous ridge of right mandibular premolar-molar region of size 1×0.8 cm. Its surface was granular and consistency was firm. There was no tenderness or bleeding from the growth on palpation.

A white, non- scrapable lesion was present in the attached gingiva of maxillary anterior region in relation to 21 & 22 teeth.

A mixed red and white lesion was present in the mandibular anterior gingiva, extending into the mucobuccal sulcus, which was non- scrapable. Inflamed gingiva covered with slough was noticed in the region. There was generalised gingival inflammation and oral hygiene status was poor (Figure 1).

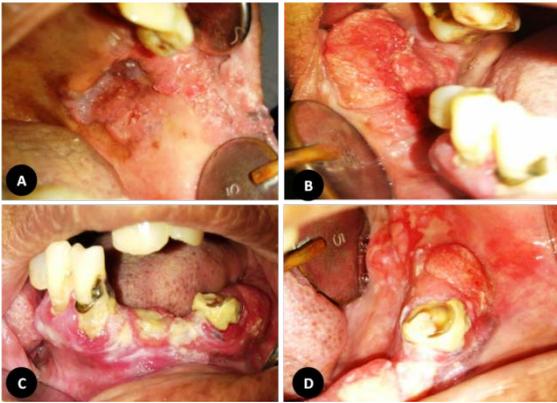


Figure 1: A) Lesion on left buccal mucosa B) Lesion on right buccal mucosa C) Lesion on mandibular anterior gingiva D) Lesion on mandibular posterior alveolar ridge

Radiographic investigation revealed no evidence of bone erosion in the alveolus. Blood parameters were also within normal limits.

Provisional diagnosis of carcinoma of bilateral buccal mucosa and right mandibular alveolar mucosa (T1N0M0), speckled leukoplakia of mandibular anterior region and homogeneous leukoplakia of maxillary anterior gingiva was made.

Histopathologic examination was done to diagnose the possible malignancy. Samples were collected separately from each site. The report came as squamous cell carcinoma moderately differentiated on right buccal mucosa, Severe epithelial dysplasia with indistinct basement membrane on left buccal mucosa and moderately differentiated squamous cell carcinoma on right mandibular alveolar mucosa.

III. DISCUSSION

In 1953, Slaughter *et al*[2] observed several peculiar findings regarding oral cancer like,

- The linear spread of oral cancer compared to deeper extension (lateral cancerization), which can be due to carcinogenic change of surrounding cells rather direct spread of pre-existing malignancy
- Independent foci of *in situ* cancer islands in surrounding area of large primary squamous cell carcinoma lesion
- Selective or Guided missile type carcinogenic activity in a pre-conditioned epithelium

He proposed the idea of 'field cancerization'. Although this concept was put forward to explain high local recurrence rate in oral cancer, it was also applicable in oropharynx, larynx, colon, breast, prostate, esophagus, skin, urinary bladder, vulva and cervix[3].

Various theories were formulated to explain this phenomenon. Slaughter's concept (classic theory) was that as a result of exposure to carcinogens, mucosa develops carcinomatous changes by independent mutations. Alternate theories came later (clonal theory) saying that altered cell leads to formation of expanding fields with premalignant potential and having same clonal origin[4].

A normal tissue will become dysplastic through 'multistep carcinogenesis', by the accumulation of genetic alterations both molecular and phenotypic progression of the neoplasm[4]. These altered epithelial cells form a 'patch' by clonal expansion, which later becomes a 'field' of epithelial cells with genetic alterations but without histologically evident changes. These fields contain genetic alterations that can be demonstrated by Tp53 immunostaining, where carcinomas may develop later.

Molecular studies provided sufficient evidence for establishing monoclonal origin for preneoplastic cells in a field, which was confirmed by presence of early markers of carcinogenesis. Thus 'field cancerization' was defined as "the presence of one or more areas consisting of epithelial cells that have genetic alterations. A field lesion (or shortly 'field') has a monoclonal origin, and does not show invasive growth and metastatic behaviour, the hallmark criteria of cancer." [3]. Widely accepted experimental animal model for field cancerization is 'hamster cheek pouch model', where carcinogenic agents were injected to cheek pouch of this animal and proliferative growth was developed in the site. Using this model, we could study regarding molecular markers, ploidy analysis, therapeutic response etc[5].

Detailing molecular concept of field cancerization is much complicated. Biomarkers like Cytokeratin -7,8,13,16,19, Cyclin D1, increased levels of isoenzyme glutathione S-transferase, vascular markers (vwf and cd31) and p53 (most promising marker) are noticed in the 'fields'. Allelic loss can predispose to carcinogenesis[5].

Clinical application of this concept comes in early detection of oral cancer in a patient who already had carcinoma of head and neck. There is 20% chance for development of a second primary tumor in these patients [5], which can be monitored by identifying molecular markers in peri-tumoral cancer field. This can significantly reduce tumor progression and can modify treatment options, resulting in good prognosis. Identification of tumor markers are usually done by polymerase chain reaction (PCR), *in situ* hybridization and immunohistochemistry. Commonly assessed markers are loss of heterozygosity, microsatellite alterations, mutations in p53 gene and chromosomal instability. Another important clinical application is in chemoprevention of the disease, which aims to ablate altered cell population and repair the genetic damages. Most common chemotherapeutic agents are 13-cis retinoic acid and cyclooxygenase-2 (COX-2) inhibitors[6].

The idea of field cancerization evolved so much in the past 50 years and is currently exploring its molecular aspects. The most common agent causing altered fields in normal oropharyngeal mucosa is tobacco. Appropriate chemopreventive measures have to be taken in such patients to avoid development of multiple tumors. Contributions from molecular and genetic studies may help us to form a management protocol in such cases, which in turn improve the survival rates.

CONFLICTS OF INTEREST

The authors disclose the absence of any conflicts of interest.

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A Study on Personality Traits Designated By Vedic and Formal Students

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Abstract- A comparative study was conducted to know and compare the different personality traits designated by the students of vedic and formal education system. A differential design is employed in this study. Major findings of the study depicts that, majority of the students of vedic educational system show high level of personality traits like extroversion, agreeableness, conscientiousness and openness to experience, while the students of formal educational system have shown low level of these personality traits. The results clearly depict that vedic system has succeed in molding the child personality in a desired way as the primary aim of any system of education is to be development of a wholesome personality. But today's modern formal system of education is producing only money making machines, ignoring the development of virtuous qualities and resulting in the development of negative personality traits.

Index Terms- Personality, Personality traits, Extroversion, Conscientiousness, Agreeableness, Openness to experience.

I. INTRODUCTION

Personality is the combination of characteristics or qualities that form an individual's distinctive character".

"Education is natural harmonious and progressive development of man's innate power" which plays a very important role in shaping of one's personality. India is a country that seen different phases era's of educational systems.

Era of Vedic Period:

It is said that education in India was started during vedic period. This system was centered to give importance for the formulation of character and personality of children, achieved through Gurukula System, a center which provides practical, natural and appropriate environment, lessons on right conduct and teaching based on life, character and ideals of great persons.

Era of Sangam:

In later periods, there were Parishads and Academics where the students of advanced learning gathered and enriched themselves through discussions and discourses convened at regular intervals known as Sangam. This was the period when many universities built like Nalanda and Taxila. Thus recorded to be great university which offered various subjects like Art, Architecture, Painting, Logic, Mathematics, Philosophy, Astronomy, Literature, Law and medicine.

Era Of British System:

After the arrival of East India Company in India, the education system of India started changing. The European attitude was adopted and more emphasis was given to use of textbooks and English language. Also the concept of examination and evaluation was introduced by the British.

This system which is followed throughout, puts emphasis only on the theoretical knowledge than practical, natural skills.

II. REVIEW OF LITERATURE:

Katyal.et.al(2011) in their study " A comparative study of job stress and type of personality of employees working in nationalized and non-nationalized banks" revealed that with respect to personality trait extroversion/introversion, majority of respondents were highly extroverts(48%), followed by moderate level of extroversion(30%) and only 22.00 percent of respondents were highly introvert.

Ijaz. M and Khan. A (2015) revealed in their study that employees with different personality traits like extroversion, openness to experience, conscientiousness, agreeableness will have high level of job satisfaction and employees with neuroticism personality trait will have negative impact on job satisfaction.

Dubey. A and Pandey. M (2016) revealed in their study that different personality traits like conscientiousness, agreeableness, extroversion, emotional stability, openness to experience has a positive impact in political skill.

III. SAMPLE SELECTION AND RESEARCH METHODOLOGY:

A systematic study has been conducted to study the personality traits designated by the students of Vedic and formal education and centers selected were " Maitreyee Gurukulam" - center of vedic education located in Vitla, D.K District and St. Aloysius PU College" a center of formal education located in Mangalore, D.K district.

Totally 46 students, about 23 each from both educational institutes who has completed minimum 6 years of education were considered a respondents.

The "Big Five Personality Traits Test" questionnaire was used for the study. The four personality traits considered are:

- Extroversion
- Agreeableness

- Conscientiousness
- Openness to experience

The total score of each personality traits were categorized into high and low levels, considering mean.

The standard of calculating each personality traits are as mentioned below:

IV. RESULT AND DISCUSSION:

Table 1: Personality traits designated by the respondents

Components	Category	Vedic system		Formal system	
		Frequency	Percentage	Frequency	Percentage
Extroversion	Low (0-19)	1	4.3	15	65.2
	High (20-40)	22	95.6	8	34.7
Agreeableness	Low (0-19)	-	-	13	56.5
	High (20-40)	23	100	10	43.5
Conscientiousness	Low (0-19)	-	-	9	39.1
	High (20-40)	23	100	14	60.8
Openness to experience	Low (0-19)	6	26.08	13	56.5
	High (20-40)	17	73.9	10	43.4

A. Extroversion:

The results in the table show that majority of the respondents of vedic educational system belonged to high level of extroversion(95.60%) as against the low level of extroversion(65.20%) among the respondents of formal educational system.

Qualities of being highly agreeable, fun loving, sociable, friendly and drive energy from social activities among the respondents of vedic educational system, may be the reason.

B. Agreeableness:

The results in the table show that with respect to the personality trait, agreeableness almost all the respondents of vedic educational system (100%) showed high level of agreeableness, where as in formal educational system about 56.50 percent of respondents showed low level of agreeableness.

Having the background of big family, involvement in agriculture, residential school background and their exposure towards collective living, sharing, caring among the respondents of vedic educational system might be continuously for the results. Absence of these in formal educational system might be the reasons for low level of agreeableness among the respondents.

C. Conscientiousness:

The data of the table shows that almost all the respondents from vedic educational system (100%) showed high level of conscientiousness,where as in formal educational system only about 60.80 percent of respondents showed high level of conscientiousness.

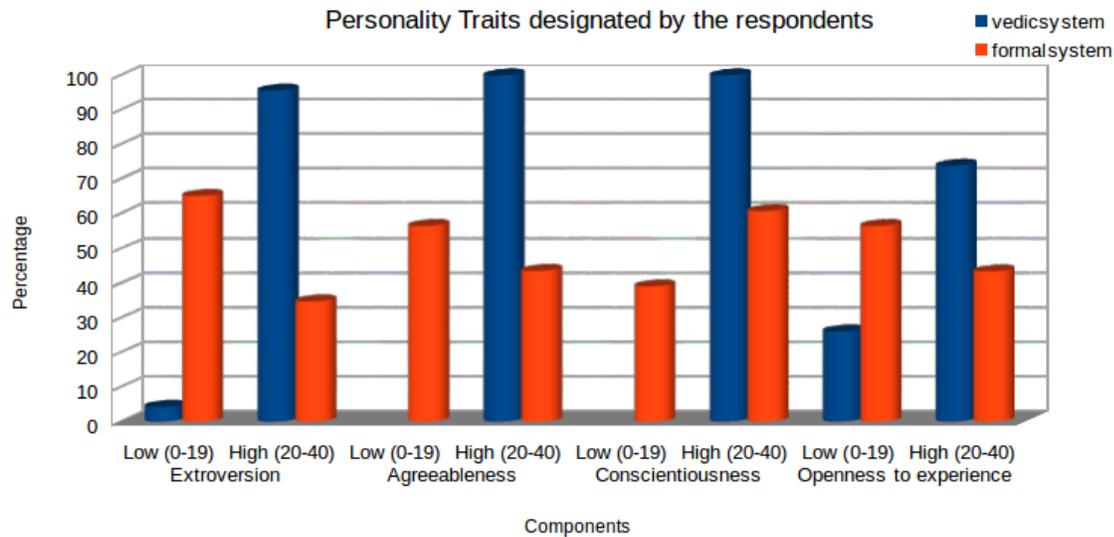
Practical and practice oriented system of education with the live experience of agricultural activities, tailoring, crafts, involvement in dance and music might be building the traits among the students of vedic educational system.

D. Openness to Experience

The study reveals that majority of the respondents from Vedic educational system (73.90%) showed high level of openness to experience, whereas majority of the respondents from formal educational system showed low level of openness to experience.

Students with built up self confidence,courage,high moral perspective observed due to their involvement in the extra and co-curricular activities like yoga, vedic chanting, agricultural activities, playing of instruments, tailoring etc. might be the reason for possessing high level of openness to experience among vedic educational system.

Figure 1: Graphical representation of personality traits designated by the respondents.



V. CONCLUSION:

An attempt is made to study the different personality traits designated by the students of Vedic and Formal educational system in the district of Dakshina Kannada, Karnataka.

Through the results it can be concluded that Vedic system is successful in imparting its major objective I.e to form a consistent personality and character of the students.

The formal system of education has failed in creating great personalities because the modern system has almost lost in developing the discipline, the cordial relation between student and teacher, the social, moral values which was inherited from generations.

VI. LIMITATION OF THE STUDY AND SCOPE FOR FURTHER RESEARCH

The research study was conducted in the cities Vitla and Mangalore, selected on the basis of location of vedic education institution. The study could not cover wider geographical area and the large sample because of the non availability of Vedic educational institutes, lack of awareness regarding the scope of

vedic education and its importance among the people also may be the reason for small sample.

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Community Involvement of Public Secondary School Teachers in Northern Aurora, Philippines

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Abstract: This study was conducted to find out the teachers' involvement in the community utilizing descriptive type of research using questionnaire as the main data gathering instrument, and was administered to 129 secondary school teachers, using purposive sampling from Northern Aurora, Philippines.

Based on the findings, most of the teachers were young, married, with units in MA/MS, BS degree, Teacher I, receiving a monthly salary between Php18 thousand to Php21K and few belong to cultural minority such as Igorot and Ilongot.

Teachers were involved in social activities, economic activities, cultural activities, political activities and religious activities.

The effects of teacher's involvement in the community were: they become productive and obtained positive interactions among the "multiplicity of personalities, cultures, beliefs and ideals" and "develop and teach students to learn through active participation in the community".

Family support, administrative support, and linkages and other agencies support were considered "not serious problems", while technical support was "fairly serious problem".

Present rank obtained high significant relationship with community involvements while civil status, highest educational attainment, and work experiences were highly significant to economic activities.

Strategies used in dealing problems which include: "Proper communication to the school heads and administrators is practiced, "Proximity of the community to other agencies" and "Contradicting ideas about the activities were given from other agencies" were described as "often".

Key Words: Community Involvement, Secondary School Teachers, Problems, and Solutions

I. INTRODUCTION

Education is the powerful tool in combating poverty as which the researchers often heard during their early childhood days. Education is acquired not only from a

formal school system but from the community as well. The community as a group is a big school by itself. The members of the group are the learners, teachers, parents, and the community at the same time.

Teachers play varied roles and functions in teaching –learning process. It is a moral obligation for the teachers to be involved in the community. As stated in Article III, Section 6 of the Code of Ethics for Professional Teachers;

"Every teacher is an intellectual leader in the community especially in the barangay, and shall welcome the opportunity to provide such leadership when needed, to extend counseling services, as appropriate, and to actively be involved in matters affecting the welfare of the people."

For the school community to get the sympathy and cooperation of the public, immersion, diversity, and a part of its time must be programmed to promote teacher – community relation.

Regardless of the size of the school, its program for public relation must always be addressed. Members of the school community must cooperate to carry out such sound programs that will in turn give satisfactory results for the benefit of all in the community, i.e, the pupils, the parents, the community people, and the school teachers and administrators alike.

The role of the teacher in a positive school-community relationship is extremely important since it is the teacher who is the backbone of the educational system (Nebor, 2011). The role of teacher in community relation states that teacher must also be prepared to make the most favorable impressions possible in even the most innocent of circumstances in order to maintain public support. The community perception of the teacher affects their perceptions of the school and subsequently students morale, school resources and support for their school in general.

Section 7 of Educational Act of 1982, "Community participation of every educational institution shall provide for establishment of appropriate bodies through which the member of the educational community may discern relevant issue and communicate information and suggestions for assistance and support of the school and for the promotion of their own interest".

It is widely recognized that if students are to maximize their potential from schooling they will need the full support of their teachers. It is anticipated that parents should play a role not only in the promotion of their own students' achievements but more broadly in school improvement and the community involvement.

In the province of Aurora, Philippines, Local Government Unit actively addressing the needs of the education sectors in their communities. Teachers are utilized in different endeavors and projects in the community where the school is located. One of the researchers is an official of the province, who was concerned with the state, status, needs and prospects of education in the province especially the welfare and development of the teachers. Much of the focal concerns of the researchers are on how to mobilize teachers in the development of the community where they served, hence, this study on the involvement of the teachers in the community is realized.

II. OBJECTIVES

This study sought to describe and evaluate the community involvement of the public secondary school teachers and its efficacy and effectiveness in Northern Aurora particularly Dinalungan, Casiguran and Dilasag (DICADI) districts.

To arrive at the desired objectives of the research work, the following questions are posited:

1. How may the socio-demographic profile of the public secondary school teachers in Northern Aurora, Philippines be described in terms of age, sex, civil status, highest educational attainment, present position/rank, work experience (in years), position/classification, salary, benefits, and ethnicity?

2. How may the community involvements of public secondary school teachers be described in terms of: social activities, economic activities, cultural activities, political activities, and religious activities?

3. How may these community involvements affect the teachers' efficiency and effectiveness in teaching?

4. How may the problems encountered by the teachers relative to community involvement be described in terms of family support, technical support, administrative support, and linkages with other agencies?

5. Is there a significant relationship between the socio-demographic profile and community involvement?

6. How may the teachers' strategies in addressing the problems on community involvement be described?

III. REVIEW OF RELATED LITERATURE

Teachers' Involvement in the Community

Teachers in the community are the best means of promoting community and local development which proceeds national development. Schools should be community directed and passionate to promote the welfare

of the community thru extension and outreach services. Schools with leaders who are committed to effecting local development thru projects and programs of extension can partner with industry, non-government organization and national agencies for resource generation to implement their specific plans for community with encouragement for further motivation to pursue extension and outreach work (Ozor, and Nsukka 2008).

Bilbao, P.P. et.al., (2012) claimed that school and its community, in collaboration with public and private institutions and organizations are indeed inseparable if they are to create an impact on the lives of the students and members of the community they are committed to serve. The school can enjoy linkages and networking activities with international, national, and local organizations in the community for mutual benefits and assistance needed.

The involvement of public Elementary School teachers in community development in Infanta District was studied by Francia (2003). She find-out that Elementary School Teachers in Infanta have very minimal participation in socio-economic and political activities in the various organizations they joined. Most of the various activities were filed of clean and green, beautification, campaign environmental conservation and other activities related to environment care. Most of the teachers' motivation for involvement includes their concern for the community service to others and a sense of responsibility and obligations as public servants.

Rygun, E. (2017) stated on her article about the parental involvement in our schools the five strategies to build better relationship:

1. Create an open and friendly school in which parents feel comfortable.
2. Establish an open-door policy and be available to hear concerns.
3. Be visible in the hallways
4. Ensure that parents feel valued.
5. Schedule regular special events at the school and involve students.

Crites (2008) studied parent and community involvement and the impact of that involvement on education, based upon the observations, interviews, and reflections. Findings from the study identified that effective research-based and best practices were implemented at the study school.

A parent and teacher perception on effective parental involvement was studied by Wright (2009). According to her, parental involvement is a key factor in the success of students.

Community Involvement and Teachers' Efficiency and Effectiveness

Meador (2017) postulated that true school reform will always begin with an increase in parental involvement in education. It has been proven time and time again that parents who invest time and place value on their child's education will have children who are more successful in school. Schools, parents, and the community should work together to promote the health, well-being, and learning of all students.

When schools actively involve parents and engage community resources they are able to respond more

effectively to the health-related needs of students (Judson, 2017).

Olsen and Fuller (2010) claimed that there are positive effects of parent involvement on children, families, and school when schools and parents continuously support and encourage the children's learning and development. The most accurate predictor of a student's achievement in school is not income or social status but the extent to which that student's family is able to create a home environment that encourages learning, express high (but not unrealistic) expectations for their children's achievement and future careers.

Rygun E. (2017) suggested that parental involvement in our schools must create an open and friendly school in which parents feel comfortable, establish an open-door policy and be available to hear concerns, be visible in the hallways, ensure that parents feel valued, and schedule regular special events at the school and involve students.

Francia (2003) find-out that teachers who are actively involved in community undertaking and projects discover their strengths and weaknesses and in turn improve their self-image.

Problems of Teachers in Dealing with Community Involvement

Dela Cruz (2005) stated that the problems of public Elementary School teachers in community projects in Zaragosa, Nueva Ecija, Philippines were time constraints, lack of interest among members of the community, inadequate funds and lack of cooperation among members of the community.

Francia (2003) identified the problems to community involvement were lack of cooperation among community people, lack of coordination among community agencies, lack of orientation related to peoples participation and time constraint.

Resueño (2010) study on the home-school partnership practices in the public secondary schools in Baler, Aurora, Philippines claimed that teachers encountered problems to the parents communicating and student's learning at home.

Solutions to the Problems Encountered by the Respondents in the Community Involvement

Judson (2017) recommended that schools, parents, and the community should work together to promote the health, well-being, and learning of all students. When schools actively involve parents and engage community resources they are able to respond more effectively to the health-related needs of students.

Crites (2008) research study recommended that to increase parent and community involvement, the schools need supportive administrators, who are willing to involve parents and community members in the decision-making process and who are willing to welcome parents and community members into the school.

IV. METHODOLOGY

The researcher utilized the descriptive method of research, composed of 129 teacher respondents chosen using purposive and simple random samplings from all public secondary schools in Northern Aurora, Philippines during the School Year 2016-2017. Questionnaire was the main tool used in gathering data with the aid of interview. Data were organized, classified, tabulated, analyzed and interpreted using the frequency distribution, percentage, weighted mean, and test of correlation.

V. RESULTS

Socio-demographic Profile of the Respondents

Table 1 Socio-demographic Profile (Age, Sex, Civil Status, Highest Educational Attainment and Present Position/Rank) of the Respondents (n=129)

SOCIO-DEMOGRAPHIC PROFILE	FREQUENCY	PERCENT
Age		
29 & below	20	15.50
30 – 39	68	52.71
40 – 49	25	19.37
45 – 49	16	12.40
50 – 59	14	10.85
60 and Above	2	01.55
Sex		
Male	35	27.13
Female	94	72.87
Civil Status		
Single	41	31.78
Married	84	65.12
Separated	2	01.55
Widow/er	2	01.55

Highest Educational Attainment		
Bachelor Degree	39	30.23
With Master's Units	66	51.16
Master's Degree	16	12.40
With Doctorate Units	8	06.20
Present Position/Rank		
School Head I	5	03.87
School Head II	3	02.32
School Head III	2	01.55
Teacher I	81	62.79
Teacher II	14	10.85
Teacher III	24	18.60
Work Experience (in Years)		
1-5	72	55.81
6-10	17	13.18
11-15	12	09.30
16 & above	28	21.71
Position/Classification		
Teacher	124	96.12
Master Teacher	2	01.55
Head Teacher	3	02.32
Salary		
Php18,000.00 - 21,000.00	89	68.99
21,001.00 - 23,000.00	29	22.48
23,001.00 - 25,000.00	7	05.42
25,001.00 - 27,000.00	1	00.77
27,001.00 & above	3	02.32
Benefits		
Social Security System (SSS)/Government Security Insurance System (GSIS)	96	74.42*
PhilHealth/Medicare	92	71.32*
Monthly Allowance from Local Government Units	11	08.53*
Ethnicity		
Member of Ethnic Group	9	06.98
None	120	93.02
TOTAL	129	100.00

Community Involvement of the Respondents

Table 2 Community Involvement of the Respondents

COMMUNITY INVOLVEMENT	WEIGHTED MEAN	VERBAL DESCRIPTION	RANK
SOCIAL ACTIVITIES			
1. Attends and accepts invitation of the community to host fiestas and other events (festivities)	3.70	Often	3.5
2. Initiates activities for the out-of-school youth	2.78	Sometimes	9
3. Holds meetings for the improvement of the welfare of the elders in the community.	2.32	Very Seldom	10
4. Attends birthdays and other activities when invited.	3.70	Often	3.5
5. Directly gets involve in the manifestations of the community outreach program.	3.37	Often	7
6. Disseminates information about the new program of the Education department about K12 program	3.95	Often	1
7. Lends the school facility to the community affairs and activities.	3.55	Often	6

8. Involves the school classroom and other facilities in times of disaster.	3.88	Often	2
9. Involves the school and its manpower in health activities like dental and health missions.	3.36	Sometimes	9
10. Leads community in other relevant activities necessary in improving status like holding TESDA activities.	2.96	Sometimes	8
Overall Weighted Mean	3.56	OFTEN	
ECONOMIC ACTIVITIES			
1. Creates and hold meetings for livelihood programs.	2.28	Very Seldom	10
2. Creates innovative projects that encourage community residents in improving their way of farming and other occupations.	2.40	Very Seldom	8
3. Invites people that will lead community residents in improving their lives by means of different livelihood projects.	2.36	Very Seldom	9
4. Directly initiates people in participating to income generating projects of the school.	2.64	Very Seldom	4
5. Creates development plan for the community.	2.54	Very Seldom	6.5
6. Encourages group of people to create livelihood projects.	2.54	Very Seldom	6.5
7. Involves the school facility and teachers in the community activities for technology adaptation in their farming and other occupations.	2.60	Sometimes	5
8. Does information dissemination that may help community residents in improving their lives.	2.81	Sometimes	1
9. Participates in the livelihood projects of the community.	2.72	Sometimes	3
10. Gives information and possible disadvantages/ effects of the economic projects created by the community.	2.76	Sometimes	2
Overall Weighted Mean	2.60	SOMETIMES	
CULTURAL ACTIVITIES			
1. Creates dance groups from the community residents	2.34	Very Seldom	5
2. Lends the school facilities /resources /manpower for the cultural events of the community	2.98	Sometimes	4
3. Organizes and participates in the community and cultural organizations.	3.06	Sometimes	3
4. Widely disseminates information's /news and other pertinent information about yearly cultural events that are practiced in the community.	3.11	Sometimes	2
5. Puts pictures /tarpaulin about the importance of Linggo ng Wika (Week of Language)	3.13	Sometimes	1
Overall Weighted Mean	2.93	SOMETIMES	
POLITICAL ACTIVITIES			
1. Allows the school facilities for the venues of meeting and political rally in the community.	2.11	Very Seldom	4
2. Seeks assistance from political entities for the school needs.	3.04	Sometimes	1
3. Accepts any other alternative political contributions	2.85	Sometimes	2
4. Attends political rally in the community and extends their contributory knowledge when seek.	1.78	Never At All	5
5. Does not allow themselves to be involved in politics.	2.29	Very Seldom	3
Overall Weighted Mean	2.44	VERY SELDOM	
RELIGIOUS ACTIVITIES			
1. Holds and uses the school for the mass and other religious activities.	3.50	Often	1

2. Organizes religious groups	2.74	Sometimes	4
3. Participates in the fluvial/other form of parade that honors saints and religious statues.	2.55	Sometimes	5
4. Participates in the preparation of church and other mass activities.	3.40	Often	2
5. Improves rapport with church people and community residents through series of meetings or holding a meeting.	3.02	Sometimes	3
Overall Weighted Mean	3.04	SOMETIMES	

Effects of the Community Involvement on the Efficiency and Effectiveness in Teaching the Respondents

Table 3 Effects of the Respondents' Community Involvement on their Efficiency and Effectiveness in Teaching the Respondents

EFFECTS ON THE EFFICIENCY AND EFFECTIVENESS	WEIGHTED MEAN	VERBAL DESCRIPTION	RANK
1 Helps the student's acquisition of knowledge regarding the real world.	3.74	Serious	3
2. Develops and teaches students to learn through active participation in thoroughly organized service that was conducted to meet the needs of the community.	3.77	Serious	2
3. Helps foster civic responsibility	3.53	Serious	6
4. Integrates and enhances the academic curriculum of the students, or education components of the community service program which the participants are enrolled.	3.58	Serious	4
5. Facilitates productive, positive interactions among the multiplicity of personalities, cultures, beliefs and ideals.	3.79	Serious	1
6. Promotes the welfare of the community thru extension and outreach services.	3.55	Serious	5
7. Time allotted to their student or school deprived their community involvement.	3.19	Fairly Serious	7
8. Lack of time in improving themselves for the betterment of their students.	2.80	Fairly Serious	9
9. Personal resources including financial matters were affected.	3.17	Fairly Serious	8
10. Constant absences in the school were reported to parents because of attendance in the community.	2.66	Fairly Serious	10
Overall Weighted Mean	3.38	FAIRLY SERIOUS	

Problems Encountered in the Community Involvement of the Respondents

Table 4 Problems Encountered in the Community Involvement of the Respondents

PROBLEMS ENCOUNTERED	WEIGHTED MEAN	VERBAL DESCRIPTION	RANK
FAMILY SUPPORT			
1. Family strongly opposes teacher's participation in the community activities.	2.26	Not Serious	3
2. Family does not intend to participate at all	2.20	Not Serious	5
3. Family problems prohibit them to give all the necessary involvement in the community.	2.22	Not Serious	4
4. Head of the family does not give financial support to let them participate in the activities	2.62	Not Serious	2
5. Quality time between family and community involvement was sacrificed and they were forced to choose between the two options and what will be their priority.	2.98	Not Serious	1
Overall Weighted Mean	2.46	NOT SERIOUS	
TECHNICAL SUPPORT			
1. Lack of resources or funds to be used in the community activity.	3.03	Fairly Serious	1

2. Problems in leasing and obtaining materials needed for the activities.	2.98	Fairly Serious	2.5
3. Lack of political motivation of community leaders to assist them in their community participation.	2.88	Fairly Serious	4
4. Lack of knowledge in using materials and equipment in activities.	2.62	Not Serious	5
5. Lack of electricity in the area wherein the activities are conducted.	2.98	Fairly Serious	2.5
Overall Weighted Mean	2.90	FAIRLY SERIOUS	
ADMINISTRATIVE SUPPORT			
1. Opposition from the school heads about the activities being participated.	2.29	Not serious	5
2. Lack of support from community officials about the projects.	2.33	Not Serious	3
3. Different recommendations on what to do in the projects.	2.43	Not Serious	2
4. Too much intimidation from government officials.	2.32	Not Serious	4
5. Lack of financial support from the community.	2.54	Not Serious	1
Overall Weighted Mean	2.38	NOT SERIOUS	
LINKAGES AND OTHER AGENCIES			
1. Red tape among other agencies.	2.20	Not Serious	5
2. Too much time are exerted for the signatures.	2.36	Not Serious	4
3. Delayed actions are experienced about the request.	2.55	Not Serious	1
4. Proximity of the community to other agencies.	2.43	Not Serious	2.5
5. Contradicting ideas about the activities from other agencies.	2.43	Not Serious	2.5
Overall Weighted Mean	2.39	NOT SERIOUS	

Relationship between the Socio-demographic Profile and Community Involvement of the Respondents

Table 5 Relationship between Socio-demographic Profile and Community Involvement of the Respondents

COMMUNITY INVOLVEMENT	CORRELATION VALUE (r)	ASYMPTOTIC SIGNIFICANCE (α)
SOCIAL ACTIVITIES		
Age	-0.045ns	0.612
Gender	-0.049ns	0.581
Civil Status	-0.205*	0.020
Highest Educational Attainment	-0.175*	0.047
Present Rank	-0.237**	0.007
Work Experience	-0.201*	0.022
Position/Classification	-0.063ns	0.482
Salary	-0.054ns	0.540
ECONOMIC PROJECTS		
Age	-0.047ns	0.403
Gender	-0.071	0.423
Civil Status	-0.295**	0.001
Highest Educational Attainment	-0.237**	0.007

Present Rank	-0.373**	0.000
Work Experience	-0.272**	0.002
Position/Classification	-0.059ns	0.510
Salary	-0.110ns	0.214
CULTURAL ORGANIZATION		
Age	-0.101 ns	0.255
Gender	-0.014ns	0.871
Civil Status	-0.244**	0.005
Highest Educational Attainment	-0.148ns	0.096
Present Rank	-0.212*	0.016
Work Experience	-0.223*	0.011
Position/ Classification	0.013ns	0.880
Salary	-0.019ns	0.834
POLITICAL ACTIVITIES		
Age	-0.084ns	0.345
Gender	-0.031ns	0.731
Civil Status	-0.106ns	0.230
Highest Educational Attainment	-0.211*	0.017
Present Rank	-0.301**	0.001
Work Experience	-0.042ns	0.638
Position Classification	-0.008ns	0.928
Salary	-0.06ns	0.502
RELIGIOUS ACTIVITIES		
Age	0.001ns	0.990
Gender	-0.137ns	0.123
Civil Status	-0.254**	0.004
Highest Educational Attainment	-0.094ns	0.290
Present Rank	-0.222*	0.011
Work Experience	-0.142ns	0.109
Position Classification	0.011ns	0.904
Salary	0.049ns	0.585

Legend: ** - highly significant; * - significant; ns – not significant

Strategies Used in Dealing with Problems on the Community Involvement of the Respondents

Table 6 Strategies Used in Dealing with Problems Encountered in the Community Involvement of the Respondents

Strategies	WEIGHTED MEAN	VERBAL DESCRIPTION	RANK
1. Strong manifestation of communication to the family members regarding their intention to participate in the community is practiced.	3.50	Sometimes	3
2. Personal money is used in the community development.	3.36	Sometimes	5
3. Proper communication to the school heads and administrators is practiced to allow them to participate in community activities	3.70	Often	1
4. Prioritized family but insists the involvement in the community if there will be.	3.56	Sometimes	2
5. Information dissemination regarding community activities to let others know the intention of the activity.	3.49	Sometimes	4
OVERALL WEIGHTED MEAN	3.52	Sometimes	

VI. DISCUSSION

Socio-demographic Profile of the Respondents

Table 1 shows that there were more one third (88 or 68.21%) of the respondents who were below 40 years old, 39 (30.22%) belonged to 40-59, and only 2 (1.55%) were senior citizens. This result implies that teacher respondents were young and in their productive stage.

Female teachers dominated the respondents with 94 or 72.97% while male are 35 or 27.13%. More than half of public secondary school teachers were married (84 or 65.12%). Half of them were with units in MA/MS (66 or 51.16%), 39 or 30.23% were with BS degree, 16 or 12.4% with MA/MS degree, and 8 or 6.20% with Doctoral Units. Eighty one or 62.79% were Teacher I, 72 or 55.81% worked for 1-5 years. Secondary Head Teacher II having the least frequency of 3.1%. Eighty nine or 60.8% were receiving a salary between Php18 thousand to Php21 thousand a month; only three (2.32%) were receiving Php27 thousand and above. Ninety-six or 74.42% of the overall respondents receiving SSS/GSIS, 92 (71.32%) were enjoying benefits from Phil/Medicare. Fifty and only 11 or 8.53% were receiving a monthly allowance from Local Government Unit. Respondents belonged to cultural minority such as Igorot and Ilongot while others were Kasiguranins, Ilokans and Tagalogs.

Community Involvement of the Respondents

With regards to social activities, "Dissemination of information about the new program of Education Department about K12" obtained a weighted mean of 3.95 described as "often", ranked as 1; followed by the involvement of school facilities in times of disaster (3.88), described as "often". The results imply that teachers were active in their social activities in the community.

"Does information dissemination that may help community residents in improving their lives" obtained a weighted mean of 2.81 described as "sometimes"; other items considered as "sometimes" in terms of economic projects.

Community/cultural organizations rendered that "Displaying of tarpaulin bearing the importance of Linggo ng Wika" obtained a weighted mean 3.13 (sometimes), "Very seldom" community activity is "Create dance group from community residents" with a weighted mean of 2.34.

"Seeks assistance from political entities for school needs" (WM = 3.04) and "Accepts any other alternative political contributions (WM = 2.85) described as "Sometimes". Respondents were "never at all" attend political rally and extends their contributory knowledge when sought. Based on the teachers' code of ethics, it is stated that teachers should not engage in any political affiliations and connections especially during the election.

"Holds and uses the school for the mass and other religious activities" with a weighed mean of 3.78 and "Participation in the preparation of church and other mass activities" with a weighted mean of 3.00. The overall weighted mean is 3.22 described as "sometimes". The results imply that the school is the venue of religious activities where teacher participated.

Effects of the Community Involvement on the Efficiency and Effectiveness on Teaching of the Respondents

Table 3 presents the effects of the involvement in the community on the efficiency and effectiveness in teaching the respondents. "They facilitate productive, positive interactions among the multiplicity of personalities, cultures, beliefs and ideals", ranked 1 with a weighted mean

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of 3.79 described as "serious." "Develops and teaches students to learn and develop through active participation in thoroughly organized service that was conducted to meet the needs of the community" with a weighted mean of 3.77 (serious).

Problems Encountered on the Community Involvement of the Respondents

Family support problems were all considered not serious, meaning to say that family is supportive to the teachers' involvement in community. Family members need a wider circle of friends that they may somehow count on in the future in many ways. With regards to technical support, "Problems in leasing and obtaining materials and equipment in activities," "lack of resources or funds to use in the community activities" and "lack of electricity in the area wherein the activities are conducted" were considered "fairly serious problem" with a weighted mean of 3.03 and 2.98, respectively. However, "lack of knowledge in using materials and equipment activities" described as not a serious problem has a weighted mean of 2.57.

All administrative supports problems of the respondents were considered "not serious" based on the overall weighted mean of 2.31. "Lack of financial support from the community" ranked the first problem with a mean of 2.54. Hence, municipalities in Northern Aurora are considered as third class municipalities, their Internal Revenue Allotment (IRA) is lower compare to other municipalities that's why teachers have problems regarding the financial support from the community regarding the teachers' involvement.

Linkages with other agencies were considered "not a serious problem" with over all weighted mean of 2.36.

Relationship between the Socio-demographic Profile and Community Involvement of the Respondents

Table 5 shows that present rank obtained a correlation of -0.391, which means that there is a highly significant relationship between present rank and social activities involvement. Results implied that the higher the position the lesser their participation in the community involvement.

Highly significant demographic profile and economic activities involvement in the community of the teachers were civil status ($r = -0.295^{**}$), highest educational attainment ($r = -0.237^{**}$), present rank ($r = -0.373^{**}$) and work experiences ($r = -0.272^{**}$). These results revealed that single, BS graduate, Teacher I, and still young in service often involved in economic projects in the community.

Civil status ($r = -0.270$) is considered significantly related to the cultural organization community involvement of the respondents. This result implies that single teachers often involved in the cultural organization community activities. This is attributed to the fact that they are still young in service that is why they enthusiastically participated in cultural community activities.

Highly significant relationship was observed on present rank and political activities involvement of the teachers with correlation value of -0.301. This result indicated that the lower the position rank the often involved

in political activities involvement. Highest educational attainment shows significant relationship ($r = -0.211$) with the political activities involvement. This means that once a teacher obtained higher degree his/her participation in the political activities is lesser.

Civil status was found highly significant ($r = -0.254$) with the church activities. This result implies that singles often participated in church activities as compared to married.

Strategies Used in Addressing Problems on the Community Involvement of the Respondents

“Proper communication to the school heads and administrators is practiced to allow them to participate in community activities ranked number 1 strategy used by the respondents with a weighted mean of 3.70 described as “often” (Table 6). “Prioritized family but insist the involvement in the community if there will be” and “strong manifestation of communication to the family members regarding their intention to participate in the community is practiced” ranked 2 and 3, described as “sometimes” with weighted mean of 3.56 and 3.50, respectively.

VII. CONCLUSIONS AND RECOMMENDATIONS

Most of the teachers were young, married, with units in MA/MS, BS degree, Teacher I, receiving a salary between Php18 thousand to Php21 thousand and few cultural minority such as Igorot and Ilongot.

Social activities involvement of the teachers were described as “often”, economic activities were described as “sometimes”, political activities were “very seldom”, cultural activities is considered as “sometimes” and religious activities were described as “sometimes.”

The effects of teacher’s involvement in the community involvement to their efficiency and effectiveness in teaching were described as “fairly serious.”

Family support problems were all considered “not serious”, Technical Support was considered as “fairly serious” problem. All administrative supports problems of the respondents were considered “not serious” based on the overall weighted mean of 2.31. Linkages with other agencies were considered “not a serious problem” with over all weighted mean of 2.36.

Present rank is highly significant relationship with social activities involvement, while civil status, highest educational attainment, and work experience were significant. Highly significant socio-demographic profile and economic projects were civil status, highest educational attainment, present rank and work experiences. Civil status was considered highly significant related to the cultural activities while present rank and work experience were significantly related. Highly significant relationship was observed on present rank and political activities while highest educational attainment shows significant relationship. Civil status was found highly significant ($r = -0.254$) with the religious activities of the respondents, however significant relationship was observed on present rank.

Strategies used in dealing problems include “Proper communication to the school heads and administrators is practiced to let them participate in community activities”, “Proximity of the community to other agencies” and “Contradicting ideas about the activities were from other agencies” were described as “often”.

Recommendations

Based on the conclusions presented the following recommendations are hereby given:

1. Public secondary school teachers must be encouraged to pursue their masteral and doctoral studies to acquire more knowledge, techniques and strategies in teaching and in involvement in the communities. In addition teachers to be hired should come from the area since they are already familiar with the community activities (localized hiring). Furthermore, encourage more male to enter in teaching profession.

2. Public secondary school teachers should include in their annual/yearly plan of activities the possible community programs in which all the stakeholders will be involved. Out of those listed activities, there is a need to rank and give priority to the always conducted activities. Encourage teachers to think other activities to be included in their community involvement plan so that teachers can arrange their schedules and allocate time for the purpose.

3. Again, it must be reiterated that public school teachers to have time so that they will practice their efficiency and effectiveness in dealing with other stakeholders of the school. School Head must prepare a plan considering all possible programs in the school and the community and other agencies.

4. School head must continuously motivate their linkages and partnerships by giving certificate of appreciation during moving up and graduation. Teachers are also advised to communicate from time to time to their immediate family members for a more smooth involvement in various events in the community.

5. Since secondary schools nowadays have their own Maintenance Of Operating Expenses (MOOE), public secondary school teachers may avoid getting from their own pocket while involving in community activities, hence, they must include it in their yearly budget. In this case they become more enthusiastic in doing their part in any development work.

6. It is recommended that a practice of professional delegation must always be taken into consideration. The school managers must not only develop the responsibility and leadership of the assignee but also considers the time to be spent so that allocation to some other important endeavours may make the school more responsive to the needs of their students.

8. The researcher further recommended the following involvement of public school teachers in community activities.

8.1. A correlation studies on the effects on the performance of the teachers in the community activities using the mixed research methods is highly recommended for further studies.

8.2. Impact on the teachers’ involvement in the community must be assessed, as a recommendation for further studies and evaluation.

8.3. Involvements in the community of the different colleges and universities are highly recommended for further studies.

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DEVELOPMENT OF SOY PLANTS (*Glycine max* L. Merril) ACCORDING TO THE TRAFFIC OF HARVESTERS WITH TWO TYPES OF WHEELERS

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Abstract- The use of machinery with unsuitable tires and in unsuitable climatic conditions, can affect the development of the plants and consequently the productivity. Soil compaction is one of the factors that most affect the crop, since it can decrease the ability of the roots to penetrate the soil profile in search of water and nutrients. The objective of the present work was to evaluate the development of soybean based on the traffic of harvesters with two types of wheelers. The work was carried out in the Marangatú neighborhood, Nueva Esperanza district, in the agricultural year 2017. The experimental design used was randomized complete blocks with trifactorial arrangement. The factors were load of the hopper with and without load, two types of rolled and two levels of humidity of the ground, with 8 treatments and two witnesses. The greater resistance to penetration was caused by conventional rolling, the height of the plant was influenced by the humidity level and the combination of load with rolling, where the highest height was observed with the track rolled and without load. The highest number of pods per plant was obtained with the combination of wheeled to caterpillar and moisture level 1. In relation to the number of grains per plant, significant differences were observed between the rolings, independently of the other factors where the caterpillar rounds obtained the greatest amount of grains. In the variables studied, the best results were obtained with the caterpillar rolling and less damage to the development of the plant and soil.

Keywords: soybean, wheeled, load, compaction, soil

I. INTRODUCTION

Food production has been in great demand in recent times for this reason is constantly seeking to find techniques to improve and where soil is an important factor, so it is necessary to conserve and implement a system of greater operational efficiency for production agricultural. One of them is the soybean which is a legume of the leguminous family (fabaceae) cultivated for its seeds of medium content in oil and high in protein; it is a crop that is sown in the months of October to January, from which oils and flours are obtained that are used in food products; Its introduction in Paraguay dates back to 1921, beginning its expansion only in 1960 (M.A.G, 2010).

The production of soy represents a very important fraction in the GDP of any country of the Mercosur, its importance not only derives from the production figures but also from the production chain; in Paraguay it represents 40% of agricultural production (Melgar, Vitti and De Melo, 2011); However, this production is affected to a large extent in the use of machinery with increasing size and size, more powerful tractors, seeders with high sowing capacity, harvesters covering more lines per pass and with hoppers each time greater; These machines, due to their high weight and bad use in inadequate conditions, can have negative consequences on the physical structure of the soil.

The agricultural soils have been suffering great disturbances, the compaction is indicated as the main cause of these changes by virtue of the traffic of agricultural machines in inadequate handling conditions; that can modify the physical structure of the soil, ranging from resistance to penetration, reduction of macroporosity, as a consequence there is less accumulation of water, which compromises its infiltration and the penetration of the roots in the soil profile (Richart *et al.*, 2005).

According to Da Veiga, Reichert and Reinert (2009), compaction is one of the main causes of the reduction of productivity in agricultural areas because it restricts the growth of the root system and reduces the infiltration of water and the gas exchange between

soil and soil. atmosphere. And De Moura, Bezerra, Rodrigues and Barreto (2008) mentions that when the soil is under inadequate humidity conditions, the traffic of machinery is one of the main causes of the compaction observed in many fields and that it results in a decrease in production with the use of machinery with unsuitable tires and in unsuitable conditions of soil moisture, can affect the development of subsequent crops and consequently their productivity, one of the factors that most affect the cultivation of soybeans is the compaction of the soil, since could decrease the ability of the roots to penetrate the soil profile in search of water and nutrients, which would lead to plants with less root development, lower height and therefore could affect the production capacity of grains.

Due to the great problem, it is necessary to search for solutions to optimize production and identify the effects that the incorrect use of agricultural machinery causes at the time of harvest, which is why this work had an impact on the development of the following crops. As objective to evaluate the development of soybean plants based on the traffic of combines with two types of wheeled.

II. MATERIAL AND METHODS

The experiment was installed in the agricultural field of the agricultural farm of the Paraná, located in the Marangatú district of Nueva Esperanza in the department of Canindeyú whose coordinates are 24 ° 28'10 "S; 54 ° 30'26 " O, The average annual rainfall ranges between 1,300 mm and 1,900 mm, and the average monthly temperature between 17 °C and 27 °C, although the average minimum annual temperatures reach 15 °C and the maximum annual averages reach 30 °C. In the sunny summer months, temperatures occasionally exceed 40°C, and in the winter months with little sun, important frosts can be registered in most of the territory, since temperatures can drop to -2°C (DINAC, 2016). The area of the experiment has a soil characteristic of the northern region of Canindeyú Paraguay department, which belongs to the Oxisol order, large Rhodic group and Kandiodiox subgroup - Rhodic Kandiodiox (López, 1995). For the installation of the plot, 10 sub samples from 0 to 0.20m of the surface were collected for the determination of the chemical characteristics and granulometry of the soil, the result of which are as follows: pH (CaCl₂) = 5,5; M.O = 25,5 g dm⁻³; P (Mehlich I) = 8,01 mg dm⁻³; K⁺ = 0,25 cmol dm⁻³; Ca⁺⁺ = 3,2 cmolc dm⁻³; Mg⁺⁺ = 0,34 cmolc dm⁻³; V = 32,76%, Sand = 35.5% granulometry; Silt = 10.4% and Clay = 54.1% respectively.

The plots installed were 3 blocks and 10 treatments totaling 30 experimental units with 6 meters long and 5 meters wide that started in a field with corn crops at harvest time where a rainfall was simulated, with the help of a uniport sprayer, with two 15 mm and 30 mm humidity levels. After 36 hours of moistening the plots, the harvesters were trafficked in each experimental unit, where harvesters with two types of wheeled were used: equipped with caterpillar wheels (Claas lexion 750) with a total weight of 22930 kg without load and with conventional double wheels (John Deere S680) with a weight of 23490 kg without load; both with two load levels: with load and without load of the hopper with grains.

The variety of planted soybean was Syngenta 9070 with a degree of maturity 7.0 of indeterminate growth habit, with light brown yarn and with white flowers with an average cycle of between 130-135 days approximately, and was carried out one week after the traffic of the harvesters in the corn plot, was carried out with the help of a seeder with furrower, with a fertilization NPK of formulation 4-30-10 of 300 kg ha⁻¹ and a distance of 0.45m between rows and 12 seeds per linear meter, it was cross-seeded traffic in such a way that the plants cover the trail of the harvesters.

The design of the experimental plot was randomized complete blocks with factorial arrangement of the treatments (T) with three repetitions. The factors studied were: types of wheels, conventional wheel (Cw) and wheel to caterpillar (Wtc); load level, hopper with load (Hwl) and hopper without load (Hw) in two conditions of humidity (Hm) of the ground 15 mm and 30 mm; they were combined in a factorial arrangement of 2x2x2, which results in 8 treatments and 2 additional controls.

The variables evaluated were: The resistance to penetration was determined through a digital penetrometer model Falker, in each experimental unit two points were made on the right side of the trail of the road before the symmetry in depths of 0 to 0.40 m. To determine the root volume was extracted 10 plants with their roots of each experimental unit in R6 state, for it was used a metal cylinder of 0.3 m in height and 0.2 m in diameter, with 8 mm in thickness adapted to be manipulated by the loader of a tractor and was measured by placing a sample of green radicular mass in a graduated cylinder with water, where the samples were submerged and the volume evicted was noted. For the determination of the diameter of the main root ten plants were extracted from the useful area, the roots were cleaned to later measure the diameter of each main root, with the use of a digital pachymeter. Regarding the length of the main root, the roots of the 10 extracted plants were used where it was measured from the base of the stem to the tip of the main root with the help of a tape measure. To determine the height of the plants, the aerial part of the root of the 10 extracted plants was separated, it was measured using a tape measure from the base of the stem until the last outbreak of the plant, according to the methodology of (Ozuna, 2013). For the number of pods per plant, the manual counting of the 10 plants extracted from each experimental unit in R6 state was carried out before full ripening, according to the methodology of Braccini, Mariucci, Suzukawa, Lima, and Piccinin, (2016). And finally grain numbers per pod was made to count the grains that were in the pods of 10 plants of each experimental unit in the R6 state before full maturation. The results were subjected to the analysis of variance, the variables that presented significant differences, their averages were submitted to the Tukey test, to process the data the statistical software AgroEstat was used.

III. RESULTS AND DISCUSSION

For the variable resistance to penetration, a highly significant effect was observed ($p < 0.05$), the studied factors showed an effect of high significance and an interaction between the factors A and B, which are moisture per hopper load, was observed factor A inside B1 (with load) statistically differ from each other, being A2 (humidity 30 mm) was of the highest resistance to penetration. Like A inside B2 (no load) that statistically differ from each other. However, the B factor within A2 are similar while B within A1 show statistical differences; in terms of the treatment that showed the greatest resistance to penetration, it was T7 where 30 mm humidity was combined with loading of the hopper and machinery with crawler track, followed by the T8 humidity 30 mm without load of the hopper and the same type of rolling is the conventional. However, the treatment that had the least resistance was the additional T1 (Control) with humidity of 15mm, in this experimental unit the traffic of the machinery was not carried out, reason for which a lower degree of soil compaction was obtained as observed in the (Table 1). Similar results were obtained by De Oliveira (2007) that comparing two types of rolling could verify that the roll of conventional type both wide and fine caused greater degree of soil compaction measured through the RP method, because this type of roll has lower capacity for weight distribution. It is also related to the experiment conducted by Castro (2001) where he found that the RP decreased in relation to the days that were expected to return to traffic with machinery because the more days they spend the lower is the moisture content of the soil, as that this experiment, since the PR values were lower for the experimental units with lower humidity level; so it could be determined that the less humidity the soil contained, the effects of the machinery on the physical properties of the soil also decreased. Unlike this work, where soil resistance to penetration is observed with the highest level of soil moisture, Unger and Kaspar (1994) verified that the same level of resistance to penetration the effects of this resistance are less pronounced in a soil with a higher moisture content.

Table 1. Comparison of average resistance to penetration (Kpa).
 Katueté Canindeyú, 2018

Comparison between the means of A (humidity) x B (hopper load)		
Factor A	B1 (with load)	B2 (without charge)
Hm 2	2548 a	2598 a
Hm 1	2143 b	2427 b
Treatments of penetration resistance stockings		(Kpa)
T7	Hm (A2) Hwl (B1) Cw (C1)	3314 a
T8	Hm (A2) Hw (B2), Cw (C1)	3218 b
T3	Hm (A1) Hw (B2) Cw (C1)	3105 c
T2	Hm (A1) Hwl (B1) Cw (C1)	2258 d
T4	Hm (A1) Hwl (B1) Wtc (C2)	2027 e
T10	Hm (A2) Hw (B2) Wtc (C2)	1979 e
T9	Hm (A2) Hw (B2) Wtc (C2)	1782 f
T5	Hm (A1) Hw (B2) Wtc (C2)	1749 f
T6	Hm (A2) Witness 2	1155 g
T1	Hm (A1) Witness 1	1130 g
CV:		3,10 %
DMS:		81,14

* Equal means by the same lowercase letter in the column and uppercase in the line are not deferred to each other, to 5% of probabilities, by the Tukey test

For the root volume, a highly significant effect between the treatments was also observed ($p < 0.05$), the humidity factor A, also showed highly significant differences between the two moisture levels, A1: 15 mm and A2: 30 mm; where the level of humidity that presented the highest root volume was A2, the humidity level A1 had lower root volume and a highly significant interaction between factors A (humidity) and B (load of the hopper) where with Factor A within factor B1 (with load) obtained greater root volume with the humidity level A2: 30 mm and with the loading the hopper; the data obtained by the Tukey test, treatment 7, showed greater root volume, with the lowest root volume being Treatment 4, as shown in Table 2. These factors could have favored the greater compaction of the soil causing the roots to grow in thickness, resulting in higher root volume, as well as the work done by Beulter and Centurion (2004), where they observed that the highest level of RP occurred changes in the distribution of the root system as an increase in the thickness of the root system, on the other hand Borges et al., (1988), Benghough and Mullins (1990) affirm that soybean roots develop better in points of lower resistance to penetration, reason for which, to a greater degree of compaction, morphological modifications in the root occur, such as reduction in root length and an increase in thickness due to mechanical impediment, these factors cause the obtainment of greater root volume.

Table 2. Comparison of means between root volume treatments in cm³. Katueté Canindeyú, 2018.

Comparison between the means of the factor A (Humidity)		
Factor A Humidity		Volume
Humidity 2		10,47 a
Humidity 1		9,19 b
Comparison between the means the interaction of B (charge) inside A2 (Humidity 2: 30 mm)		
Load		Volume
Load 1		11,63 a
Load 2		9,31 b
Root volume stockings		(cm3)
T7	Hm (A2) Hwl (B1) Cw (C1)	12,17 a
T6	Hm (A2) Testigo (2)	11,33 a
T9	Hm (A2) Hwl (B1) Wtc (C2)	11,10 a
T1	Hm (A1) Testigo (1)	10,93 a
T10	Hm (A2) Hw (B2) Wtc (C2)	9,80 b
T5	Hm (A1) Hw (B2) Wtc (C2)	9,53 b
T2	Hm (A1) Hwl (B1) Cw (C1)	9,53 b
T3	Hm (A1) Hwl (B2) Cw (C1)	9,44 b
T8	Hm (A2)	8,83 b
T4	Hm (A1) Hwl (B1) Wtc (C2)	8,27 d
CV:	10,70 %	
DMS:	1,30	

* Equal means by the same lowercase letter in the column do not differ from each other, at 5% probability, by the test Tukey

In the variable diameter of the main root according to the results of the ANOVA table, no significant differences were found between treatments, but Factor B (load) presented significant differences. In Table 3, the results of the significance of factor B are explained, where the largest diameter of soybean root was obtained with the B1 load (with loading of the hopper) unlike the no-load harvester with the smaller diameter, these results could be related to the RP (resistance to penetration), since the harvester with load caused higher RP which could have caused greater compaction, this condition causes greater increase in the diameter of the root as it prevents its growth in length, this The result coincides with another experiment where compaction contributed to the increase in soybean root diameter, as can be seen in the graph that the largest diameter was obtained with the harvester under load, which ensures that the loading condition caused a greater degree of soil compaction and consequently the increase of the diameter of the root. On the other hand Oliveira et al., (2012) found that the greater the degree of soil compaction, consequently there is an increase in the diameter of the roots of soybeans, which inhibits root development in compacted soils. Like this experiment, Beulter and Centurion (2004) also did not obtain significant differences regarding the increase of the diameter of soybean roots in relation to the levels of soil compaction.

Table 3. Comparison between the means of factor B for the variable Diameter of the main root. Katueté Canindeyú, 2018

Comparison of means B (load of the hopper)	
load 1: with load	10,68 a
load 2: without charge	9,87 b
CV:	8,89%

* Average, at 5% probability, by the Tukey test

For the length of the main root, the analysis of the variance, no significant differences were observed between the treatments performed ($p > 0.05$). The factors studied in the experiment: Humidity, hopper load, type of roll, did not show significant differences,

no interaction between the factors was observed, and coincides with the work done by Da Silva and Rosolem, (2002) on the development of the soybean in relation to the compaction did not find significant differences between the treatments regarding the root length of the soya plants. Similar results were also obtained by (Queiroz, Nogueira, & Coelho, 2000) where they also did not observe significant differences in the root length of soybean plants. On the other hand, Lipiec et al. (1993) proved that compacted soils cause morphological alterations in the roots of vegetables and one of them is the decrease in the length of the root and due to the resistance offered by the soil there is an increase in the diameter, therefore, it coincides with this experiment since differences in diameter were observed, but not with the length.

For the plant height variable, highly significant differences were observed between the treatments ($p < 0.05$), according to the analysis of variance. The factor A (humidity) was also highly significant for its two levels of 15 mm and 30 mm of humidity, as well as the additional treatments, and an interaction between the factors A by B that belongs to the hopper load, the interaction between the factors B x C (Load x wheel) was obtained better result of height of plants with the level of load B1 (empty) and the rolled C2 (caterpillar) in comparison with the rolled C1 (conventional) that contained the same level of load B1 (empty) as shown in table 4. In general lines it can be highlighted that the highest height of plants was obtained with the humidity of 15 mm, between the additional controls, better results were observed with Control 2 and in terms of the interaction Rolled by Load of hopper B1 (without load)) the height was greater with the combination of the no-load harvester and the caterpillar wheels, so it can be said that the soil was not subjected to a very severe compaction since the harvester was empty and with the wheel that distributed better the weight of the machine so the plant did not have many impediments to its proper development; while work done by Queiroz, Nogueira and Miranda, (2000) where they simulated a compaction in pots, the height of plants decreased with the increase in soil compaction, while increasing root growth; that coincides with the present work, since the highest height we obtained without load of the hopper and with the rolled to caterpillar, because this rolled offers better weight distribution and therefore compacts less the ground in comparison to the other rolled (conventional). However, the results differ with the work done by Beutler et al., (2006) where plant height was decreasing with the increase in the number of passes of the machinery, being that in this work the lowest height of soybean plants was obtained in the place where there was no traffic of machinery; they also differ with the work done in the corn crop by (Gonzales, Bobadilla, Rivas, and Osorio, 2017) where no significant differences were found in the height of corn plants according to the levels of soil compaction.

Table 4. Average of the plant height variable in centimeters.
 Katueté Canindeyú, 2018

Comparison between the means of A (Humidity)	
Humidity	Height
Humidity 1: 15 mm	118,04 a
Humidity 2: 30 mm	110,41 b
Comparison between the means of additional treatments	
Witnesses	Height
Witness 2: Hm 30mm	117,66 a
Witness 1: Hm 15mm	98,50 b
Comparison between the means of C (wheels) within B2 (without load)	
wheels	Height
wheel 2: to caterpillar	119,66 a
wheel 1: Conventional	108,41 b
CV: 5,47 %	

* Average, at 5% probability, by the Tukey test

For the variable number of pods per plant, significant differences were observed ($p < 0.05$), between the two levels of Factor C (wheel to caterpillar and conventional wheel); and an interaction between factors A (humidity) and B (hopper load); the use of the harvester equipped with caterpillar wheels was obtained more pods per plant, than with the use of conventional wheel. In contrast, in the significant interaction between the factors A x C (Humidity x Load) and as observed in table 5; the highest number of pods was obtained using the combine equipped with the caterpillar roll combined with the humidity level A2 (15mm). It can be said that this result is due to the fact that the harvester equipped with caterpillar wheels distributes the weight better and even with the moisture content there was no suitable environment for the compaction, reason why it is assumed that the plant had no physical impediments for its normal development, which stands out in the good production of pods that was observed in the experiment, however Queiroz et al., (2000) observed that as soil compaction increased the number of pods per plant decreased, which coincides with this work since the number of pods decreases with the use of the conventional wheel, since this rolling exerts more pressure on the ground. Similarly

Centurion et al., (2005) found significant differences, where the number of pods per plant was affected with the increase in soil compaction and as shown in this work, fewer pods were obtained with the use of rolled that causes greater soil compaction.

Table 5. Comparison of means of the variable number of pods for Factor C (wheels) and the interaction between humidity and wheels. Katueté Canindeyú, 2018.

Comparison between the means of C (wheels)	
wheels	Number of Pods
wheel 2: to caterpillar	59,66 a
wheel 1: conventional	50,75 b
Comparison between the means of C (wheels) inside A2 (humidity: 30mm)	
wheels	Number of Pods
wheel 2 inside A2	63, 66 a
wheel 1 inside A2	47,33 b

CV: 13,74 %

* Average, at 5% probability, by the Tukey test

In the variable number of grains per pod, no significant differences were observed ($p > 0.05$) between the treatments, but the C factor (wheels) presented significant differences ($p < 0.05$) between its two levels, which are: caterpillar and conventional wheel, however the other factors (humidity and load) did not present significant differences as observed in table 6, of comparison of means by the Tukey test; the greater amount of grains per plant was obtained with the use of the combine equipped with the wheel 2 (caterpillar), in comparison with the wheel 1 (conventional) that had smaller amount of grains, since the harvester with caterpillar wheels causes minor soil compaction which favored the production of grains, compared to the other harvester that was equipped with the conventional wheel that has a lower capacity to distribute the weight, which could have caused greater compaction and consequently lower grain production. This coincides with the work of Terminiello et al., (2004) where they state that the use of machinery with a high soil compaction index has a negative effect on the production of grains, as observed in this experiment that the amount of grains visibly decreased with the use of the conventional wheel, also relates to the work carried out by Cardoso et al., (2006) where no significant differences were found between the treatments as a function of soil compaction; According to the author, the availability of water in grain production may have interfered.

Table 6. Comparison between the means of the factor C. katueté, Canindeyú, 2018.

Comparison between the means of C (Wheels)	
Wheels	Amount of grains
Wheel 2 : to caterpillar	144,58 a
Wheel 1: Conventional	123, 58 b

CV: 14,85 %

* Average, at 5% probability, by the Tukey test

IV. CONCLUSION

The highest resistance to penetration was obtained with the conventional wheel, the humidity of 30mm and without load of the hopper; the root volume was greater when combined the humidity of 30mm with conventional wheel and with load of the hopper; the diameter of the main root increased with the load of the hopper, said variable was not affected by the other factors; the root length did not present significant differences between the treatments nor for any of the factors; plant height showed significant differences between treatments; it was greater with the humidity level of 30mm, without load of the hopper and with the wheel to caterpillar; As for the number of pods per plant, more was obtained with the track wheel and with the combination of this with the humidity of 15 mm, the load factor did not present significant differences and in number of grains per plant was greater with the use of machinery equipped with track wheels, the other factors did not show significant differences.

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An Empirical Analysis of Effect of Exchange Rate on Sesame Subsectors Output in Nigeria: 1980-2016.

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Abstract: This study made use of Vector error correction model to analyse effect of exchange rate on sesame output in Nigeria from 1980-2016. Secondary data consisting of annual times covering a period of 37 years (1980-2016) were obtained from World Bank development indicators data base, food and agriculture organization. United Nations conference trade and development (UNCTAD), Impulse response and Variance decomposition. The result of direction of growth showed that the coefficient of exchange rate (-0.005) was negative and significant at 5% level and this implies that exchange rate decelerated over the period. The result also showed that the direction of growth of sesame (0.000) was positive and significant at 1% level. This means that the direction of growth of sesame accelerated over the period under review. The result of coefficient of determinant (R^2) was 0.3726 indicating that 37.26% variation in sesame output was explained by exchange rate in the previous year, labour in the previous year, sesame output in the previous year, and public agriculture spending in the previous year. The study showed that a unit increase in public agriculture spending will decrease sesame output by 0.345% and 0.01% respectively. Further, the study showed that sesame output responded positively to itself, labour and public agriculture spending in both long and short run. The result also showed that sesame output responded negatively to exchange rate in both long and short run over the period under review. The result further showed that in the long run sesame output contributed to itself by 75.57 %, exchange rate contributed to sesame output by 0.26 %, labour contributed by 10.045 and public agriculture spending by 14.12 % over the period under review. The result also showed that in the short run sesame output contributed to itself by 78.26 %, exchange rate contributed to sesame output by 0.45 %, labour contributed by 8.68 % and public agriculture spending by 12.59 %.

Keywords: Exchange rate, sesame output, vector error correction model

INTRODUCTION

Agricultural sector in the early 1960s served as the major source of employment, income and foreign exchange earnings for Nigeria. As at 1961, Nigeria was the leading exporter of groundnut with a world's share of 42%. The country also had 27% of the world's palm oil export, 18% of cocoa and 1.4% of cotton as the major West African cotton exporter. Up to the early 1970s, agriculture accounted for well over 80 percent of Nigeria's Gross Domestic Product (GDP) and the major value of the country's exports (Oluigbo, 2012 and Nwalem et al, 2015). Unfortunately, the future, potentials and prospect of agricultural sector was lost immediately after the discovery of crude oil in the late 1960s and the huge financial gains benefitted from it made the government to shift its priority from agriculture to crude oil and relied on food importation as a means of feeding her citizens. The "glory" of agriculture however declined over the years hence Nigeria dominance in the export of groundnut was eclipsed by China, United States of America (USA) and Argentina as at 2008. Indonesia and Malaysia took over in palm oil; Cote d'voire and Ghana also become the

leading exporter of cocoa while Mali and Bukina Faso led cotton exports (Azih, 2011 and Nwalem et al, 2015). Based on the aforementioned importance of agriculture to the Nigeria economy, there is a need study the effect of exchange rate on sesame subsector output.

Sesame is one of the cultivated oil seed crops in the world. According to Onyibo (2005), since its introduction to Nigeria after the Second World War, it has been regarded as a crop of insignificant importance compared to groundnut and other cash crops. Sesame is widely grown in the Northern and Central part of the country initially as a minor crop until 1974, when it become one of the major cash earner in many northern states such as Benue, Gombe, Kogi, Jigawa, Kano, Nasarawa, Katsina, Plateau, and Yobe States as well as the Federal Capital Territory. The demand for sesame and its products is growing both at the National and International levels. Sesame seeds (approximately 50 percent oil and 25percent protein) are used in baking, candy making, in cooking and salad oil and margarine. The oil can also be used in manufacture of soaps, paints, perfumes, insecticides and pharmaceuticals. Sesame meal, left after the oil is pressed from the seed, is an excellent high protein (34-50percent) feed for poultry and livestock (Oplinger 2007 and Nwalem et al, 2015).

As a raw export commodity, sesame seed from Nigeria is enjoying a rising profile in the world market where overall global demand has risen to 3.3 million tons. Sesame, like other raw agricultural communities, has over 15percent margin in terms of value added products compared to other crops (RMRDC, 2004). Thus huge market potential exists for sesame. Owing to its previous status as a minor crop, there has been little research efforts on the crop (Nwalem et al,2015). Exchange rates' influences on trade have since been recognized by Economists, and as such agricultural producers have been more sensitive and interested in the role of exchange rates in commodity output and prices. The strong dollar is seen as a major culprit in low farm prices Kristinek (2001) .

According to Edward Schuh as quoted by Kristinek (2001) argued that the overvalued dollar caused the decline in agricultural exports due to their relative expense in other countries. The overvalued dollar led to depressed prices and lower farm profits, causing an undervaluation of farm resources and oversupply of output. Hence, the need to analyse the effect of exchange rate on sesame subsector output in Nigeria.

METHODOLOGY

Study area: Nigeria derives its name from river Niger, it got her independence in 1960 and it is located at western region of Africa. Nigeria has a land mass area of 923,768.00 sq kilometres and lies between latitude 40 and 140 North of the equator and longitudes 30 and 140 East of the Greenwich meridian. It is bounded on the West by the Republic of Benin on the North by the Republic of Niger and on the East by the Federal Republic of Cameroun. On the North-East border is lake Chad while also extends into the Republic of Niger and Chad and touches the Northernmost part of the Republic of Cameroun. On the South, the Nigerian coast-line is bathed by the Atlantic Ocean (Nwalem et al, 2018).

Agriculture was central to Nigeria's economic structure till the early 1990s. Her agricultural sector has become a vital area for the Nigerian economy. According to the 2009 estimates, the sector provides employment to more than 70% of the working population but contributes only 33.4% of the total national production. The country has not been able to satisfy internal demand and has to import a considerable amount of food products. Nigeria's economic structure is largely oil-based. The economy has stumbled for years due to political unrest, corruption and poor fiscal policies. However, since the restoration of democracy and introduction of economic reforms, the country's agricultural sector is growing at a fast pace.

Method of Data Collection

Following Nwalem et al (2018), Secondary data consisting of annual times covering a period of 38 years (1978-2016) will be obtained from World Bank development indicators data base, food and agriculture organization. United Nations conference trade and development (UNCTAD), Central Bank of Nigeria (CBN) and National Bureau of Statistics (NBS) .

Techniques of Data Analysis: Growth model was used to ascertain direction and growth rates. VECM (vector error correction model) was used to analyse effect of exchange rate on sesame output. Impulse response was used to examine response of sesame output to a unit shock in exchange rate and Variance decomposition was used to assess contribution of exchange rate to sesame output overtime.

Model Specification

VECM model for the effect of exchange rate on response of agricultural subsector output

In order to estimate the relationship between the variables if cointegration is found, the corresponding vector error correction equation will be estimated as

$$\ln AG_{t-i} = \beta_0 + \beta_1 \ln EX_{t-i} + \beta_2 \ln Lb_{t-i} + \beta_3 \ln PAG_{t-i} + ECT_{t-i} + \varepsilon_t$$

AG_{t-i} = Agricultural subsector (Rice, cassava, Cocoa, Groundnut, Sesame) output (tons)

EX_{t-i} = Exchange rate

Lb_{t-i} = labour (Number of person involved in the agriculture sector)

PAG_{t-i} = Public Agricultural spending (Naira)

ECT_{t-i} = Error correction Term

ε_t = error term

Apriori expectation, $\beta_1 < 0$, β_2 and $\beta_3 > 0$

RESULTS AND DISCUSSION

TREND OF SESAME OUTPUT

The trend of sesame is presented in table 1 and figure 5. The result showed that sesame output ranged between 2999 metric tons to 6256228 metric tons with a mean of 5340.270 metric tons. This could be due to the following reasons: the variety of sesame seed planted, the types of farm equipment used in sesame production, the time of planting and harvesting of sesame seeds, pest and diseases control measure taken, the level of foreign direct investment and gross domestic investment on sesame production and finally government programmes initiatives on sesame production could influence the output of sesame.

Specifically, from the graph in figure 5 below, there were fluctuations in sesame output between the period of 1992 to 2004. This implies that during these periods the output of sesame were not steady, it was changing on yearly basis with a slight difference. These fluctuations could be due to: lack of nutrient in the soil resulting over usage of a particular piece of land, inadequate application of fertilizer, planting of local variety of sesame could result in the fluctuations of output. The result also showed that sesame output were stagnant between the period of 1988 to 1991, 4000metric tons. This implies that during these periods, the output of sesame were neither decreasing nor increasing. It could be that during this period same pattern or method of sesame production was maintained by the farmers or that sesame sector were neglected during these periods.

The result further showed that sesame output witnessed a decline in output within the period of 1980 to 1985, from 3037 metric tons to 2999 metric tons, 2006 to 2010, from 5076 metric tons to 4603 metric tons and 2013 to 2014, from 11102 metric tons to 7769 metric tons respectively. This implies that during these periods sesame output did not contribute much to the nations GDP and this could have a negative impact on the Nigeria economy because the strength of any nation's economy is measured by her aggregate production, that is the GDP. The decline in sesame output could be due to pest and disease attack on the crops, environmental factors as well as poor funding of the sesame subsector.

The result also showed an increasing trend over the period under review. It increased along the periods as follows: between 1986 to 1988, from 3343 metric tons to 3977 metric tons, 2005 it was 5102 metric tons, 2011 to 2012, from 11967 metric tons to 19932 metric tons and 2015 to 2016, from 9209 to 10569 metric tons respectively. It could also be due to favourable weather conditions and good governmental programmes and projects on sesame production.

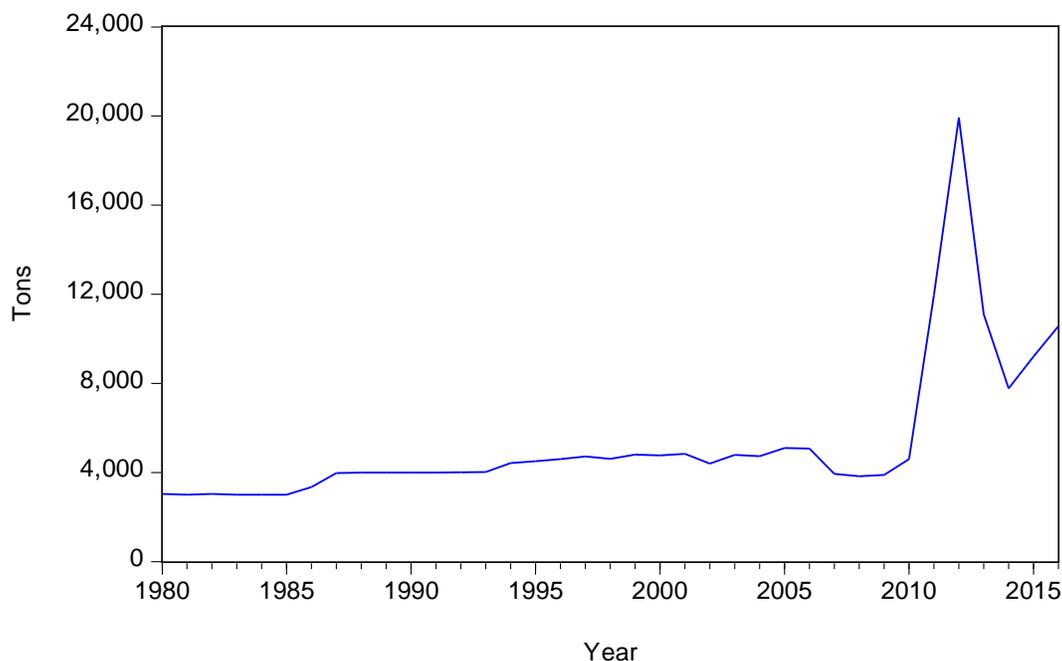


Figure 1: Trend of sesame output

Table 1: Summary Statistic

Variable	Sesame	ExchRate
Minimum	2999.000	0.500000
Maximum	19932.00	253.5000
Mean	5340.270	74.41622
Observations	37	37

Growth Rate and Direction of Growth

The result of the growth rate and direction of growth is presented in table 2 and 3. The result of direction of growth showed that the coefficient of exchange rate (-0.005) was negative and significant at 5% level and this implies that exchange rate decelerated over the period. The result also showed that the direction of growth of sesame (0.000) was positive and significant at 1% level. This implies that the direction of growth of sesame accelerated over the period under review. The acceleration in the growth of sesame could be due to the fact that the farmers adopted the use of improved variety of sesame seeds. It could also be proper funding of sesame project by the relevant stakeholders. Early planting of sesame seeds and conducive environmental conditions could also accelerate growth of sesame.

Further, the result showed the growth rate was positive for exchange rate 38.08% for instantaneous growth rate and 46.34% for compound growth rate. Conversely, the result also showed that the growth rate of sesame was negative for instantaneous and compound growth rate, that is, -0.03% and -0.02 respectively.

Table 2: Instantaneous and Compound Growth Rate

	Instantaneous %	Compound Growth %
Exchange rate	38.08	46.34
Sesame	-0.03	-0.02

Table 3: Direction of Growth

	Sesame	Exch Rate
Constant	8.098	-1.195
@Trend	-0.000	0.380
@Trend ²	0.000	-0.005
t-value	(2.004)**	(-10.64)***
R ²	0.616	0.973
F-value	29.942	667.974
Akaike criterion	0.271	0.693
Durbin-watson stat	0.748	0.798
Pro(f-statistic)	0.000	0.000
Decision	Accelerated	Decelerated

*** and** are significant at 1% and 5% level of significance respectively.

Stationarity Test (Unit Root Rest)

The result of the stationarity test is presented in table 4. The result indicates that all the variables were stationary at first difference, this means that they are cointegrated of order one (1(1))

Table 4: Augmented Dickey-Fuller Unit Root Test Result

Variables	Level		First difference		Decision
	t-statistic	Probability	t-statistic	Probability	
Sesame	1.01	0.9957	-4.71	0.0006	1(1)
Public Agric	-1.06	0.7162	-5.64	0.0001	1(1)
Exch Rate	-1.87	0.3407	-5.16	0.0002	1(1)
Labour	-0.00	0.9522	-9.75	0.0000	1(1)

***, ** and * indicate stationary at 1%, 5% and 10% level of significance respectively

Source:

Cointegration test between exchange rate and sesame output

The result of the cointegration test between exchange rate and sesame is presented in table 5. The result indicates that trace statistic (55.10) was greater than the critical value (42.91) implying that there is a long run relationship between exchange rate and sesame output with one cointegrating equation.

Table 5: unrestricted Cointegration Rank Test Result on Sesame output

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.595	55.107	42.915	0.002
At most 1	0.405	23.412	25.872	0.098
At most 2	0.138	5.233	12.517	0.563

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Source: Eview computation, 2018

Effect of exchange rate on sesame output

The result of the effects of exchange rate on sesame output is presented on table 6. The result showed one cointegrating equation. The result of the cointegrating equation showed that coefficient of determinant (R^2) was 0.3726 indicating that 37.26% variation in sesame output was explained by exchange rate in the previous year, labour in the previous year, sesame output in the previous year, and public agriculture spending in the previous year. Specifically, the coefficient of exchange rate (0.22) was positive but not statistically significant; therefore, the null hypothesis which states that exchange rate has no significant effect on sesame output in Nigeria is accepted. The result further showed that in the long run, public agriculture spending and labour were the only variable that significantly affected sesame output. Specifically, the coefficient of public agriculture spending (-0.345) was negative and significant at 1% level. This implies that a unit increase in public agriculture spending will decrease sesame output by 0.345%. The decrease in sesame output could be due to the bureaucratic process involved in the disbursement of public funds and distribution of agrochemicals to the prospective sesame farmers in Nigeria. This finding conforms to study of Usman (2010) and Ighodaro and Okiakhi (2010) who found that government total capital expenditure has negative effect on economic growth. However, it differs with Ekpo (1995), who found that capital expenditure on transport, communication, agriculture, health and education positively influence private investment

in Nigeria, which invariably enhanced the growth of the overall economy. Also, the coefficient of labour (-8.32) was negative and significant at 1% level. This implies that a unit increase in labour will decrease cocoa output by 8.32%. This could be due to rural urban migration by the active youths that forms the labour force, thereby leaving farming activities in the hands of aged men and women in the village

In the short run, exchange rate, public agriculture spending and labour was the only variable that significantly affected sesame output. Specifically, the coefficient of public agriculture spending (-0.01) was negative and significant at 10% level. This implies that in the short run, a unit increase in public agriculture spending will decrease the output sesame by 0.01%. This could be due to the fact that the short run period is always the period that is too small for planning and the use of public funds that entails rigorous bureaucratic procedures may not provide a satisfactory result. This finding is consistent with Chih-Hung Liu, et al. (2008) who found that total Government expenditure does cause the growth of GDP. However, it is inconsistent with Mwafaq (2011), who found that government expenditure at the aggregate level has positive impact on the growth of GDP. Also, the coefficient of labour (-3.51) was negative and significant at 1% level. This implies that a unit increase in labour will decrease cocoa output by 3.51%. This could be due to rural urban migration by the active youths that forms the labour force, thereby leaving farming activities in the hands of aged men and women in the village. It could also be that labour was used beyond its optimum level.

Table 6: Effect of Exchange Rate on Sesame Output

D(D(LNSSAME(-1)))	1.000000			
D(LNLABOUR(-1))	-8.32***			
	[-4.50]			
D(LNEXCRATE(-1))	0.22			
	[1.09]			
D(PUBCAGRIC(-1))	-0.34***			
	[-3.96]			
C	0.25			
Error Correction:	D(D(LNSESA ME),2)	D(LNLABOURD ,2)	D(LNEXCHRAD TE),2)	D(PUBLICAG RIC),2)
CointEq1	-0.73***	0.09***	0.31	1.61***
	[-3.73]	[2.92]	[2.07]	[2.86]
D(D(LNSSME(-1)),2)	0.21	-0.05	-0.05	-0.87**
	[1.09]	[-1.63]	[-0.35]	[-1.59]
D(LNLABOUR(-1),2)	-3.51***	-0.23	4.68***	6.60**
	[-2.88]	[-1.12]	[5.03]	[1.89]
D(LNEXRATE(-1),2)	-0.19	-0.02	-0.23**	0.24
	[-1.19]	[-0.71]	[-1.89]	[0.53]
D(PUBAGRIC(-1),2)	-0.10**	0.01**	0.01	-0.31**
	[-1.73]	[1.69]	[0.36]	[-1.87]
C	-0.00	0.00	0.00	0.02
	[-0.02]	[0.08]	[0.17]	[0.11]

R-squared	0.372	0.589	0.653	0.465
Adj. R-squared	0.256	0.513	0.589	0.366
Sum sq. resids	3.268	0.098	1.902	26.758
S.E. equation	0.347	0.060	0.265	0.995
F-statistic	3.207	7.748	10.172	4.699
Log likelihood	-8.672	49.178	0.255	-43.365
Akaike AIC	0.889	-2.616	0.348	2.991
Schwarz SC	1.161	-2.344	0.620	3.263
Mean dependent	-0.000	0.000	0.008	0.006
S.D. dependent	0.403	0.086	0.414	1.250
<hr/>				
Determinantresidcovariance(dofadj)	1.67E-05			
Determinant resid covariance	7.48E-06			
Log likelihood	7.459338			
Akaike information criterion	1.244889			
Schwarz criterion	2.514653			
<hr/>				

NB: values in bracket are t-statistics

Impulse response for the effects of exchange rate on sesame output

The result of the unit shock of exchange rate on sesame output over time is presented in figure 2. The graph showed that sesame output responded positively to itself, labour and public agriculture spending in both long and short run. This implies that sesame output, labour and public agriculture spending in the previous year will increase sesame output by 1% in both long and short run. The result further showed that sesame output responded negatively to exchange rate in both long and short run over the period under review. This implies that a unit increase in exchange rate in the previous year will decrease sesame output by 1% in both long and short run.

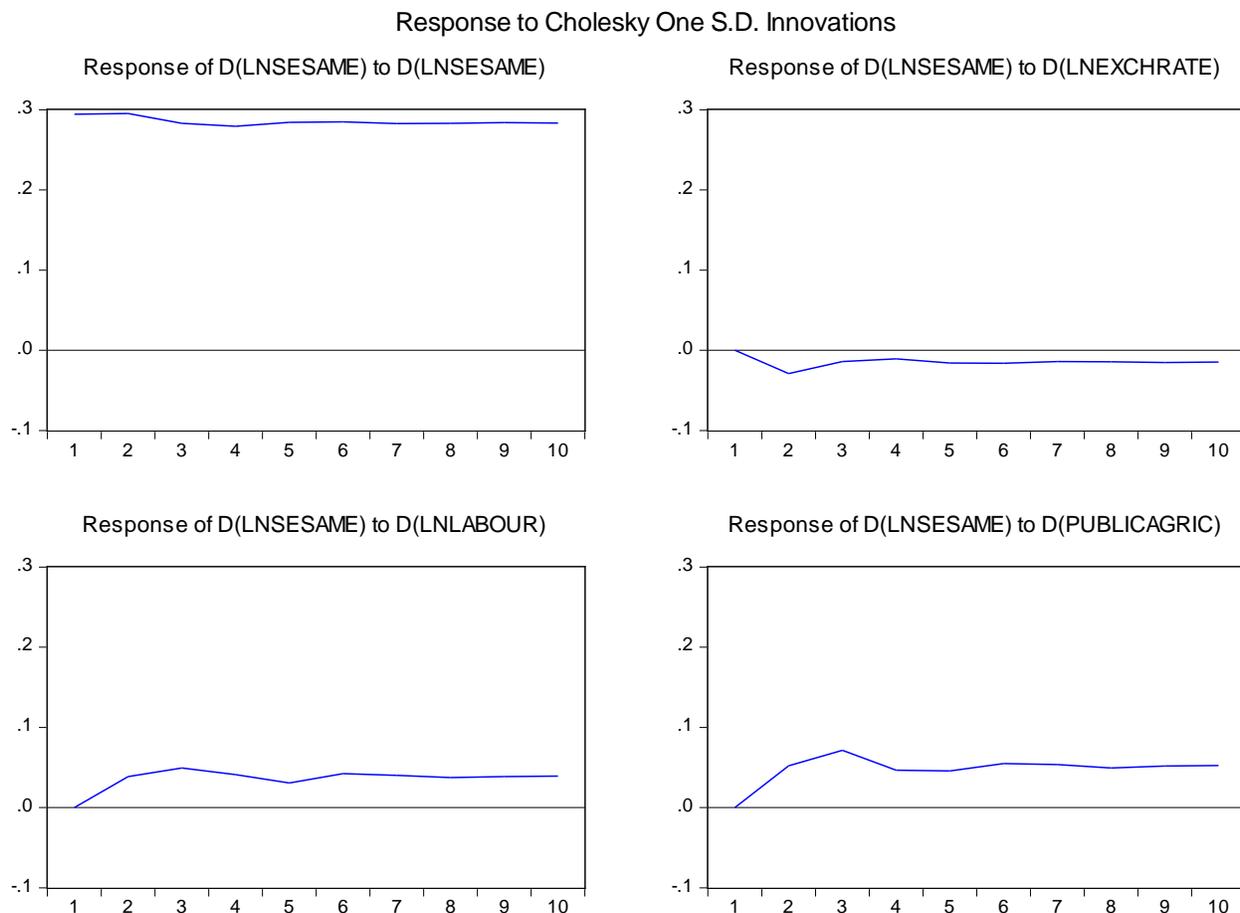


Figure 2: Response of sesame to exchange rate

Variance decomposition on effect of exchange rate on sesame output

The contribution of exchange rate to sesame output over time is presented in table 7. The result showed that in the short run (5years), Sesame output contributed to itself by 78.26 %, exchange rate contributed to sesame output by 0.45 %, labour contributed by 8.68 % and public agriculture spending by 12.59 %. The result further showed that in the long run (10years) , sesame output contributed to itself by 75.57 %, exchange rate contributed to sesame output by 0.26 %, labour contributed by 10.045 and public agriculture spending by 14.12 % over the period under review.

Table 7: Variance Decomposition on Sesame Output

Period	S.E.	D(D(LNSESAME))	D(LNEXCHRATE)	D(LNLABOUR)	D(PUBLICAGRIC)
1	0.34	100.00	0.00	0.00	0.00
2	0.45	85.49	0.55	5.96	7.97
3	0.51	75.01	0.54	9.56	14.87

4	0.56	76.14	0.50	9.67	13.68
5	0.61	78.26	0.45	8.68	12.59
6	0.67	76.57	0.39	9.46	13.56
7	0.71	75.36	0.35	10.02	14.25
8	0.75	75.82	0.32	9.90	13.95
9	0.79	76.02	0.29	9.83	13.84
10	0.83	75.57	0.26	10.04	14.12

CONCLUSION AND RECOMMENDATIONS

This study was carried out to analyse effect of exchange rate on sesame output in Nigeria using Vector error correction model. The result found that trend of sesame output undulated and accelerated and exchange rate was decelerated during the period under review. The result also showed that exchange rate has no significant effect on sesame output over the period of study. Furthermore, the result showed that sesame output responded negatively to exchange rate in both long and short run over the period under review. Finally, public expenditure on agriculture contributed mostly to sesame output in both long and short run. Since public expenditure contributed highest in sesame output in both long and short run, the government should disburse more funds and other agricultural inputs to sesame farmers to enhance their productivity.

It was therefore recommended that:

- I. Since exchange rate does not significantly affect sesame output, the central bank of Nigeria should come up with a sound monetary policy such as expansionary monetary that will lower the exchange rate, weaken the financial account and strengthen the current account. This will enable the farmers to purchase farming equipment and inputs to improve their farm output
- II. Targeted programmes aimed at reducing rural and urban migration should be set up, given that labour negatively affect sesame output in both long and short run

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Land Cover Changes of Tropical Forest Buffer zone

A case study of Kudawa Village, Sinharaja forest buffer zone; Sri Lanka

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Abstract-

This case study examined the specific land cover changes of the Kudawa village, which is located on the Sinharaja forest buffer zone of Sri Lanka (SL). Here considered land cover changes within 1986 – 2016. A buffer zone of a forest land undertaken the responsibility of protecting the fragile area and rainforest buffer zone protect most sensitive zones of the world and the local level that scenario also same. The main objectives of the study is to find out specific land cover changes of Kudawa village area and the specific objective is find out the reasons for that changes. The spatial analysis had been implemented to achieve the objectives and additionally used ground level verifications to verify the results of the spatial analysis. The relevant digital data manipulated from the Survey Department, Land Use and Policy planning Department (LUPPD) and the forest reserve boundary from UNESCO published spatial data. Main findings of this study are; have considerable land cover changes of the Kudawa village with economic, physical and demographic/social reasons. The synthesized conclusion is ongoing land cover changes impact to the biodiversity and the purpose of the buffer zone of the forest area.

Index Terms- Buffer zone, Kudawa, Land cover changes, Sinharaja

I. INTRODUCTION

Buffer zones play a part of biosphere reserves (Calandra, Mauro, Cutugno, & Martino, 2016). most of the anthropocentric activities concentrated within the buffer zone area. This peripheral area has some restrictions for resource use and development activities undertaken to enhance the conservation process area (Sayer, n.d.) Further, this area plays as a physical barrier against the human encroachment of the centrally protected area and it is extending the natural habitat area of the protected area to beyond its legal boundary. Usually has been accepted for human activities as agroforestry, agricultural tree plantation (FAO,2018). Most of rainforest buffer zones of the world faced to the pressure of settlements exist close to the boundaries of the protected area and illegal harvesting wood and other forest product (Sayer, n.d.). Usually Natural vegetation extent declined due to manmade land cover (Economic land cover) expansion (Silva & Sakalasooriya, 2018).

II. SINHARAJA FOREST AND THE STATE OF THE BUFFER ZONE

Sri Lanka (SL) there is a good biodiversity comparing the size of the land. Among that biodiversity, the wet zone forestland possesses a majority of the country's biodiversity. The Wet-zone of Sri Lanka along with the Western Ghats of India is nominated as one of the world's biodiversity hotspots (Weerakon, 2012). Sinharaja reserve, a world heritage, which is located southwest of Sri Lanka at 60 21-26' N and 800 21-34' E in the southern part of the wet zone (Conservation, Project, of, & Development, n.d.). The forest area has approx. 2000mm annual rainfall. It has encompassed with 8864 ha, More than 60% of the trees are endemic, and many of them are considered rare (UNESCO). Sinharaja is Sri Lanka's last remnant of virgin tropical rainforest (Lanka, 2003) and three districts administratively bordering, namely Galle, Mathara and Rathnapura plus a small area for Kalutara District, the altitude of the area spreads to 900-1200m (Forest Department. 2002).

Sinharaja buffer zone borders with a 3km width (Wijesooriya & Gunatilleke, 2003) but sometimes it takes as 1km width. However, buffer zones are part of biosphere reserves (Wijesooriya & Gunatilleke, 2003) When concerning the Sinharaja buffer zone, it has 27 villages around the forest. Additionally, a majority of villagers (about 48%) depends on tea cultivation and 37% depends on working as labors in the agriculture sector (Forest Department, n.d.).The buffer zone is a dynamic area with several human-induced activities as economic activities (Bandaratillake, 2003). Several management approaches have been taken in buffer zones (Forest Department,

n.d.). Land use changes in the buffer zone is a challenge for land management with people's thoughts and less awareness level of where they are living (Ogogo, Nchor, & Jacob, 2012).

III. THE RESEARCH AREA AND THE METHODOLOGY

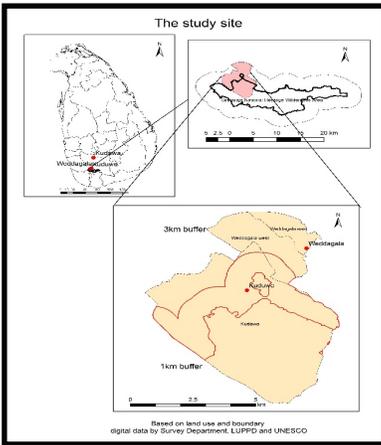


Figure 1- The Study Site

The Main objective of this study is to find out what are the contemporary land cover changes of Kudawa village area of Sinharaja buffer zone. To achieve this objective spatial analysis methods were applied with regard selected land cover data of 1986 and 2016. To verify the contrast changes of the cartographical study has auxiliary applied ground level verification through Focus Group Discussions. The original secondary data from the Survey Department, Land use and Policy Planning Department (LUPPD) of SL and the researcher applied Geographical Information System (GIS) tools to that data for elaborated main research purpose. Among all land covers special reference was given to Home gardens (HG), Forest land (FL) with their categories (explain in the discussion) Scrublands (SCL) Chena (CH), Tea (T) and Rubber (R). The Sinharaja reserve boundary digital data was based on UNESCO.

This case study is based on Sinharaja forest reserve buffer zone and the study area, “Kudawa” village was selected from that particular buffer area (Figure1). There are about 27 villages inside the buffer zone (Forest Department, n.d.) However, Kudawa is located near the reserve and is one the tourist entrances to the reserve. The buffer zone boundary is considered as the study area boundary and it has been demarcated with 3km distance from the reserve boundary. There is an argument for the buffer zone width (1km or 3km) hence; both were concerned in the study

The relevant administrative boundaries of Kudawa village are Kalawana DSD, Rathnapura District, and Sabaragamuwa province. It is encompassed with five GNDs but here only three GNDs were examined out of those five as Kudawa, Weddagala (West) Weddagala (East). The three GNDs, which were examined, have a population of 2835. (Department of Census & Statistics, 2012) and the highest population represented was Weddagala (west) GND. Kudawa GND has a land area inside the Sinharaja reserve.

IV. RESULTS AND DISCUSSION

The results of this case study concluded as subtopics and each topic has bulletins to express the results and discussion with applying the field experience and the cartographic analysis.

Land cover changes of the area

- There are contrast changes and land cover has temporarily changed (Map) with complex land covers found from 2016 map. When compare 2016, 1986 land covers have both expansions and contractions.

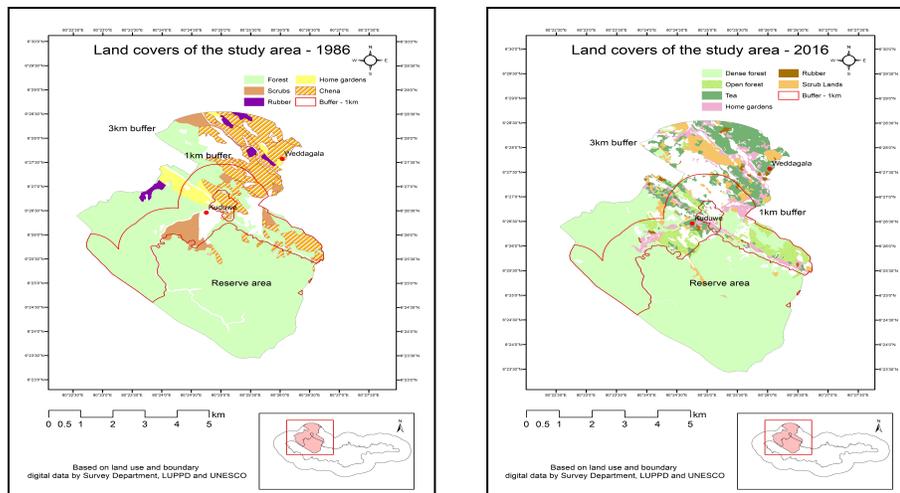


Figure 2 Land Cover changes of 1986 – 2016 of Kudawa village area
Source: Developed by the author based on digital data From SD, LUPPD, and UNESCO

- Some land covers existed both 1986 and 2016 (shaded on the table) but some were either 1986 or 2016
- When concern about expansions, it is prominent with agriculture-based land covers (here after economic land covers –EL). Tea lands, which were not there in 1986, are visible only in 2016 become a protuberant land cover with 100% increased. Additionally Home garden also have increased with reach 50% (48.22%) different between 1986-2016.

Table 1 Land cover changes between 1986-2016

Land cover	1986 (ha)	2016(ha)	Different (ha)	Different (%)
Tea	-	405.20	405.2	100
Rubber	54.51	27.10	-27.41	-50.28
Home Garden	114.09	220.34	106.25	48.22
Chena	647.22	-	647.22	0
Scrubs	163.91	206.66	42.75	20.68
Open forest	-	221.37	221.37	100
Forest	2875.6	-	2875.6	0
Dense forest	-	2600.47	2600.47	100

Source: Calculated by the author based on Figure 2 spatial data.

- Scrubs also visible both 1986 and 2016 with expansion scale. (Increased 20.68%)
- Open forest and dense forest exist only 2016 and that natural land cover represented by forest land cover in 1986
- Chena and forestlands not in 2016.
- On the other hand, some contractions of land cover as Rubber lands with dramatically decreased with 50.28%
- Scrublands are one of the results of land use changes and some scrublands are situated in the primary forest reserve. Scrublands have replaced previous Chena land use.
- “Chena” lands (Shifting agriculture) in the buffer zone and even were located in the reserve area. According to the ground level verification, Chena lands were there even in 1970 supplementary, this Chena started because of agriculture revolution in the 70s. Even today, a small-scale nonplantation agriculture could be seen where the previous shifting agriculture lands changed to other natural land cover types as Open forest and Scrubs.

Reasons for this land cover variation

Reasons to this land cover variation consisted of several types as **Economic, Physical and Demographic (Social)**

- Most of the people in the area engaged to agriculture sector with primary economic activities.
- The main reason for Tea lands expansion and Rubber declined is a market trend as the economic reason.
- Especially market value of agriculture crops pointed out as crucial factor same as here (Table 3). tea is the most popular land cover of the area having the best market value (Table 3) and is a useful extra source of income and a solution for the high cost of living
- This buffer zone behaves as a “Primary Economic zone” Small Tea patches common in most of the home gardens and some attempts found to encroach the restriction area of the forest.
- The ground level discussion releveled the main reason for “Removing Rubber” is cumbersome to collect rubber latex when the rainy season. This tropical rainforest area often with showering and many wet days for a year with usual high rainfall intensity¹. Otherwise, labor shortages have found with engaging more economic beneficiary agriculture (as Tea) and someone immigrated to a city area for join service sector.

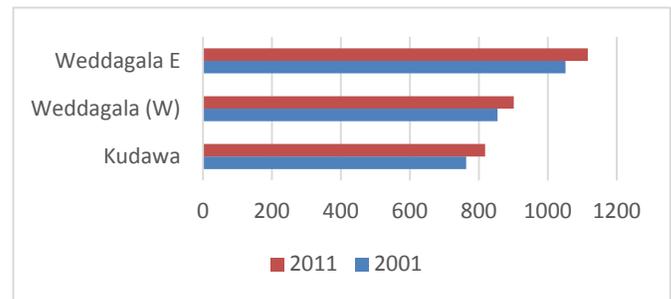
¹ Mean annual rainfall varies from less than 1000 mm on the southeast coast to over 4500 mm on the western slopes of the highlands (Sayer, n.d.) and Sinharaja located in this region

Table 2 Tea and Rubber price change

Year	Tea (kg/LKR)	Rubber (kg/LKR)
1980	33.41	21.42
2006	198.87	204.70
2014	459.01	362.83
2015	401.46	342.03

Sources-

Central Bank (1980) Annual Report, Colombo, Central Bank
Central Bank (2016) Economic and Social Statistics of Sri Lanka, Colombo,
Department of Statistics, Central Bank, Sri Lanka



Graph 1 Population of the study area (2001-2011)

Source :

<http://www.statistics.gov.lk/PopHouSat/CPH2011/Pages/Activities/Reports/Fina>

- Population changes (Graph 1) and simultaneously increase of home gardens and home garden based agriculture patterns. Furthermore, some home gardens expanded and slightly different from the forest boundary (Figure 2).

Other findings

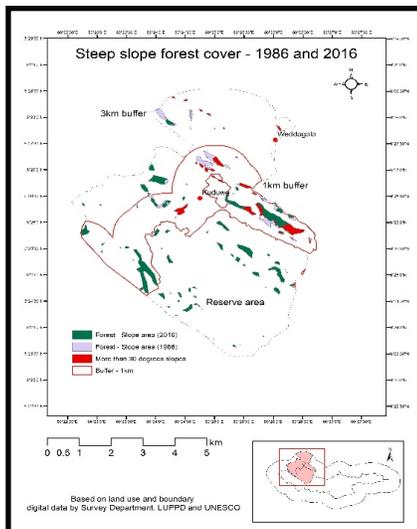


Figure 3 Steep slope forest cover -1986 and 2016

Source : Source: Developed by the author based on digital data
From SD, LUPPD, and UNESCO

- Soil erosion occurring in some land covers has been found and it is increasing with the high rainfall in the area. This erosion could affect the land with less soil nutrition and finally with degraded soil
- The area consists of plain land with low slope gradient. When examined it was found out how the extent of slopes have encompassed the forest cover (Figure 3). In 1986 it was 176.38 ha and in 2016 it was 152.09. There was a slight difference between the steep slope forest cover in 1986
- In 2016, 72.29 ha has been exposed without dense forest (may have another land cover) and it is 29.63% out of the total steep slope forest cover of the relevant year. (Steep slope extent – 250.67ha)

CONCLUSION

The buffer zone area of Kudawa in the Sinharaja forest had significant land cover changes during 1986 -2016. Moreover, most of the economic land expansions with prominence given to Tea. Global and local market decide what people grow or reject in ELs. Some of the previous non-suite land covers as Chena cultivation caused to primary natural land covers like secondary forest and scrubs, which are here. The result of that land cover changes and consequences of land preparation to establish that land cover is alarming to treat biodiversity. Monoculture effect is one of them. Otherwise, when will be applied an expansion or restructure the buffer zone should have to concern these residents social behaves and if not it will be started point of social conflict.

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The Use of Supportive Domestic Mechanisms Is a Distortion of Sugar Trade in the COMESA Region

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Abstract- The COMESA pact brought together twenty one countries with the aim of easing trade between them. This was aimed at creating more trade in terms of volume flows across the borders within the COMESA region through removal of tariff and non-trade barriers. However, trade volume statistics, with regard to sugar trade in this region indicates that member states do not benefit mutually. Sugar statistics in the region between member states indicate that industries that receive supportive domestic mechanisms had an edge over those that do not in the regional sugar market. It is upon such understanding that this paper interrogated the issue of supportive domestic mechanisms, and whether these are mercantilist approaches that distort sugar trade. The use of non-tariff barriers and other domestic supportive mechanisms are protectionist in nature. The researcher used questionnaires and interviews to collect primary data while secondary data was collected through sugar journals. Data was analysed by use of descriptive statistics such as tables, frequencies and percentages, and presented in form of graph, pie charts and tables. The results of the study indicate that member states that applied supportive domestic mechanisms in their sugar industries accrue more economic benefits from regional sugar trade than those that do not. The results indicate that Zimbabwe, and Sudan sugar exports have reduced while Egypt and Malawi exports into Kenyan sugar market have increased significantly since the implementation of the COMESA pact, the biggest loser being Kenya. It should be pointed out that non-tariff barriers were still in use in the region, seemingly only tariff barriers were done away with upon implementation of the COMESA pact. Therefore, to reduce distortions in sugar trade and realise further trade liberalization in the region, negotiations should now focus on removal of other supportive domestic mechanisms and use of non-tariff barriers that lead to sugar trade distortions in the COMESA region.

Index Terms- Tariff barriers, Non-tariff barriers, mercantilism, protection, economic benefits, negotiations

I. INTRODUCTION

The COMESA region is a vibrant economic area and membership to the Free Trade Area started in October 2000, to boost trade and investment (Republic of Kenya, 2009). Sugar is traded at zero-border tariff among eleven countries that are signatory to the COMESA FTA. Under FTA, countries trade in goods under the rule of origin without custom duties and import

quotas. Other countries that are not signatory to COMESA FTA, trade under preferential terms whereby custom duties were reduced for qualifying products. The level of preference offered a reduction of 80% of the Most Favoured Nation duties for Uganda and Eritrea while 10% for Ethiopia (Republic of Kenya, 2009). Under COMESA FTA, countries that produce their sugar cheaply would automatically enjoy the economic benefits that come with regional liberalization. This means that there are losers and winners whenever trade liberalization takes effect.

Sugar as a trade item receives extreme support in respective sugar producing countries. According to Anderson and Masters (2009), sugar is heavily supported in Africa. Mozambique, Sudan and Egypt support their sugar producers, while Egypt subsidizes sugar production. However, sugar farmers are taxed in Sudan, Egypt and Kenya. In Kenya, over taxation is the main constrain, as a wide range of taxes, levies, cesses and fees are charged in sugar production, imports and services distorts prices (Kwa, 2005). Supportive domestic mechanisms, according to Shaffaeddin, were meant to promote outward industrialization. In fact, it was a shift from the traditional import substitution to export oriented industrialization in the late 1980s. However, the use of supportive mechanisms by sugar exporting countries has been abused in the sense that it gives edge to certain industries over others.

Though the COMESA pact removed tariff barriers, progress on elimination of non-tariff barriers has been slow. There are trade restrictions in the region; for instance, Zambia uses import prohibitive international trade policies such as import permits against members (Ellis and Sigh, 2010). And as much as the COMESA pact was meant to promote trade within the region, sugar trade within the COMESA region is still minimal because of poor domestic and regional trade policies that have promoted trade with the US and EU sugar preferential markets (Kwa, 2005).

II. MATERIALS AND METHODS

The study was conducted in Kenya. Kenya sugar market is considered lucrative by other COMESA sugar producing countries because of high domestic prices. Though COMESA region consists of twenty one countries (World Bank, 2013), the study focused on six countries active in sugar exports in the regions. The Free Trade Area was achieved on 31 October 2000 when nine of the member States, namely [Djibouti](#), [Kenya](#), [Madagascar](#), [Malawi](#), [Mauritius](#), [Sudan](#), Egypt, [Zambia](#) and

Zimbabwe, eliminated their tariffs on COMESA originating products in accordance with the tariff reduction schedule adopted in 1992. Burundi and Rwanda joined the Free Trade Area on 01 January 2004 (Republic of Kenya, 2009). The six COMESA states include Malawi, Egypt, Sudan, Zambia, Zimbabwe and Swaziland. The sample was small since it consisted of administrative attaches of the six COMESA countries and COMESA Desk in Kenya to provide information. Therefore a small sample size of seven (7) was used. To manage limitation in research, the study relied heavily on secondary data from reputable firms such as KPMG to gather information on supportive domestic mechanism in use in the COMESA region.

To collect primary data, the researcher used structured questionnaires and interview schedules, which were trial tested in a pilot study. The questionnaires used had both open and closed questions intended to capture a detailed level of content. It was chosen due to its ability to reach distant respondents hence minimized researchers influence on the respondents. It also allowed time for respondents to give well thought answers and time to respond to the items. The interview was chosen due to its flexibility and adaptability. It provides the researcher with some measure of control over the research setting and one can modify questions and probe answers (Prewitt, 1975). With secondary data analysis, the researcher paid focus on sugar prices, import and export volumes, and domestic and international trade policies applied by COMESA sugar producing countries

Quantitative data was analyzed using descriptive statistics such as frequencies and percentages while qualitative data responses were grouped in themes and frequencies done. The researcher presented data findings in form of frequency tables, pie charts, bar graphs and narratives. There were factors that affected the accuracy of the results of the research study. One, the researcher was unable to gather information from some respondents who declined to participate or were unavailable for interviews. Two, the researcher did not carry out the study in individual COMESA states because of lack of funds. Some of the respondents could not understand technical terms on trade. To

overcome these shortcomings, data collected from other COMESA countries was provided by administrative attaches at embassies and the COMESA office in Kenya. In addition, the researcher utilized secondary materials from Kenya Sugar Board and COMESA office on trade policy and sugar trade in the COMESA bloc.

III. FINDINGS AND DISCUSSIONS

Tax exemptions, tax holidays and allowances

Most sugar producing countries in the COMESA region receive support in terms of tax exemptions, holidays or breaks and allowances. Therefore to find out trade policies that govern import of plant, farm inputs and other materials used in sugar production, the researcher asked economists at the COMESA desk (1) and administrative attaches (6) at embassies to identify tax exemptions, allowances, tax remissions, breaks and holidays enjoyed by sugar producers in COMESA partner states. Three questionnaires were not returned from embassies.

The researcher also analyzed documents on sugar trade policy of COMESA partner states. Findings indicate that Malawi producers enjoyed tax concessions while new firms enjoyed 100% investment allowance on plant, equipment and raw material. In Swaziland, new sugar producers enjoyed a five-year tax holiday, and then a 30% corporate tax at the end of the five years (Ndung'u, 2012). This means that there were no other taxes, charges or levies in respect of sugar manufactured in or imported in Malawi. In Zambia, sugar producers enjoyed a tax allowance of 50% on farm improvement and 100% for farm works or manufacturing while import of raw materials was duty free in Egypt (Ndung'u, 2012). This means that VAT did not apply on import of fertilizer and other sugar farming materials in most of these COMESA partner states or an allowance was applied. Figure 1 below is a summary of the findings.

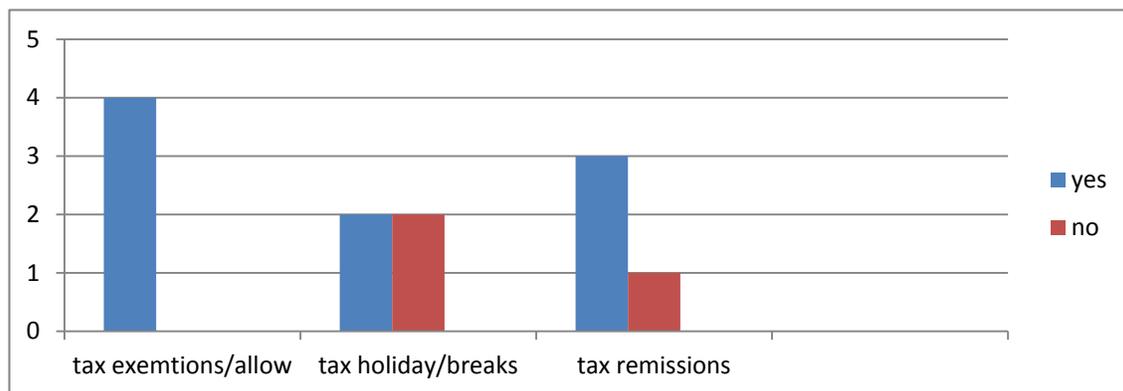


Figure 1: Exemptions and Allowances on Plant, Farm Inputs and Other Materials in COMESA Partner States.

Source: Field Data, 2012

Figure 1 indicates that 4(100%) agreed that tax exemptions or allowance were applied on import of plant and farm inputs used in sugar production. However, 2(50%) posited that tax breaks and holidays applied while 3(75%) argued that tax remissions were applied. Egypt subsidized farm inputs such as

fertilizer, raw materials, equipment and machinery. The state also compensated farmers for low producer prices (Ndugu, 2012).

This means that subsidies and incentives lowered cost of sugar production in COMESA partner states. It also means that tax allowances or exemptions enhanced both local and foreign investments in the sugar industries of COMESA partner states.

With adequate capital and foreign investment, these countries have the capacity to diversify and add value to their primary product, sugar.

Taxation Regimes in COMESA Partner State Sugar Industries

The findings indicate that the cost of sugar production in COMESA partner states was low because of a favorable taxation regime. Most sugar producers in the region were not subjected to sugar levies or other levies beside the VAT. Moreover, the VAT

rates in some of these COMESA partner states were lower. Malawi applied VAT at 16.5%, Swaziland at 14%, Sudan 15.5%, Egypt and Sudan at 10%. Study findings indicated that Swaziland applied a sale tax at 14%, however, it was not applied to goods that form part of a final product for resale. New investors enjoyed a five year tax holiday, then a 30% corporate tax rate at the end of the five years. Figure 2 is a summary of taxes COMESA partner states applied in their sugar industries.

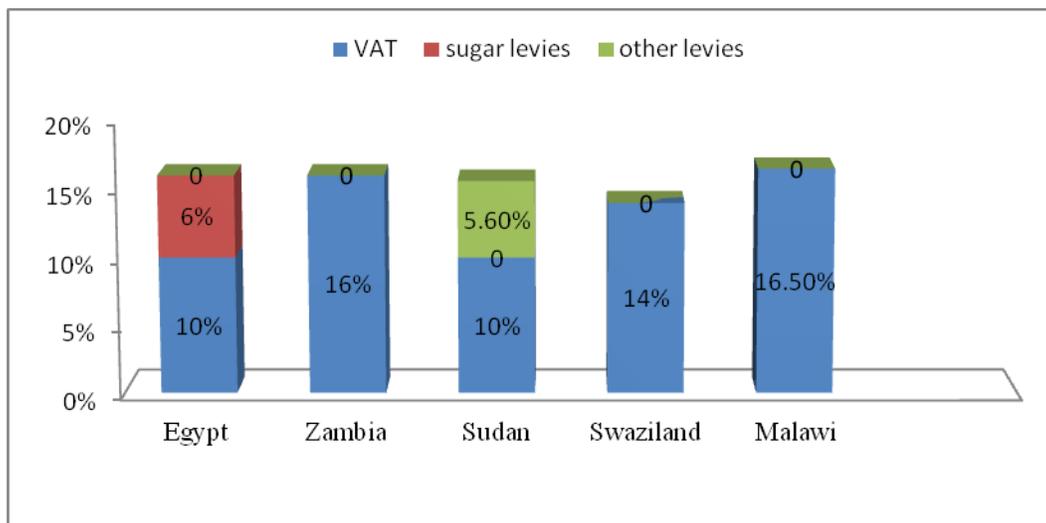


Figure 2: Taxation in Sugar Industries of COMESA Partner States

Source: Adopted from KSB Report, 2012

Figure 2 indicates Zambia, Swaziland and Malawi did not impose levies on their sugar producers while Egypt and Sudan did at 6% and 5.6% respectively. However, Sudan sugar producers were subjected to a range of taxes that were fixed under sugar levies such as state support tax (Ndung'u, 2012). Sugar producers in Sudan paid an excise tax at 17%, White Nile and state duty. In addition, there were other domestic fees such as Zakat, production, administration and transportation fees.

State Support of Infrastructure in Sugar Zones

The researcher asked administrative attaches and economists at the COMESA office to identify infrastructural areas that receive the support of the government. These infrastructural areas included power or energy, irrigation schemes and roads in sugar growing zones. State involvement in these areas is important because cost incurred indirectly add to sugar end prices. The following Table 1 is a summary of the findings.

Table 1: COMESA Partner States infrastructural Support in Sugar Zones

	Subsidized power N=4	%	Irrigation schemes N=4	%	Roads N=4	%
Yes	1	25	3	75	4	100
No	3	75	1	25	0	0
Total	4	100	4	100	4	100

Source: Field Data, 2012

Table 1 indicates that 3(75%) agreed to state support of irrigation, 4(100%) roads while 1(25%) posited that energy was subsidized in production of sugar. For instance, Egypt subsidized water for irrigation and power used in manufacturing. In Swaziland, electricity and water were subsidized to encourage investment and increase sugar production.

This means that sugar production in these countries was low because of a favorable taxation regime and support of government in infrastructural areas particularly roads and irrigation. These findings concur with Anderson and Masters (2009) observation that sugar as a trade item enjoyed a supportive government environment in Africa. Anderson and Masters (2009), main argument was that other COMESA countries enjoys supportive government policy but they fail to point out that natural factors such as soil type, amount of rain and temperature levels favour sugar production in these countries.

Import Sugar Policy in COMESA Partner States

Import sugar policies include use of taxes, other border charges and non tariff barriers such as licenses, registration, permits, rules of origin and weighbridges to manage trade. Respondents such as administrative attaches and an economist at

the COMESA were asked to identify sugar import policies that apply in COMESA partner state. The following Figure 3 is a summary of the findings.

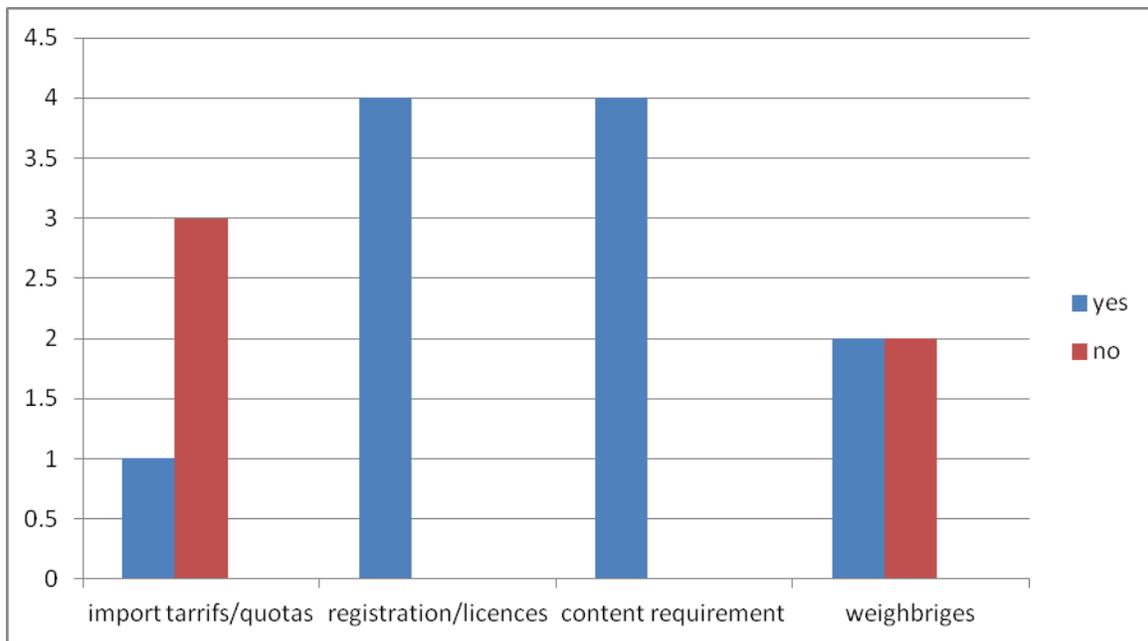


Figure 3: Import Sugar Policy in COMESA Partner States

Figure 3 indicates that 4(100%) agreed that import registration, licenses and content requirements were used. 1(25%) agreed that import tariffs and quotas were used while 2(50%) posited that roadblocks or weighbridges were applied. The findings indicate that COMESA partner state did not apply tariffs since they are signatory to the COMESA FTA which zero-rated the border tariffs for sugar trade within the region. However, these countries used licenses, registration and other non-tariff barriers in sugar importation.

Findings of the study indicate that, Zambia allowed importation of fortified sugar with vitamin A and imported sugar that has not been fortified may be seized. This means that the use of non-tariff barriers was still high in the COMESA region, which reduced flow of sugar trade. Furthermore, these import policies were complicated and cumbersome customs procedures.

Export Sugar Policy

The researcher asked administrative attaches and the COMESA office to identify export sugar trade policies. Table 2 below is a summary of the findings.

Table 2: Export Sugar Policy in COMESA Partner States

	Export subsidies N=4	%	Export taxes N=4	%	Export registration and licenses N=4	%
Yes	1	25	1	25	4	100
No	3	75	3	75	0	0
Total	4	100	4	100	4	100

Table 2 indicates that 3(75%) posited that sugar exporters did not receive export subsidies while 1(25%) indicated that taxes applied on sugar exports. 4(100%) of the respondents agreed that sugar exporters were required to register and obtain export licenses. This means that non-tariff barriers were used by COMESA partner states to manage export of sugar in the region. The use of non-tariff barriers in sugar export makes it difficult because excessive documentary requirements were required. For example, an exporter would seek clearance from twenty to thirty parties and complete over forty documents. This explained why the regions still experienced low sugar trade. Moreover, most of the sampled countries exported sugar to preferential markets in the EU and US (Vink and Hans, 2011). The findings in this section indicate that as much as regionalism promotes trade creation, the volume of sugar trade was still low in the COMESA region. The export levy was used by COMESA partner states to discourage sugar exports. Findings of the study revealed that Swaziland applied an export levy at 5.75% but Zambia, Malawi and Egypt did not apply export taxes (Ndungu, 12). However, export subsidies were not applied in the COMESA region.

Sugar Import and Exports in the COMESA Region

The supportive domestic mechanisms are important for a sugar industry that aimed at exporting sugar in the region. Sugar import and export volumes depict a picture whereby low cost producers, reap economic benefits from regional sugar trade. On October 31st 2000, eleven out of the nineteen COMESA member countries entered an agreement to zero-rate the border tariff for

sugar trade. Under the COMESA Free Trade Area agreement, domestic market duty-free (KSB, 2010).
sugar from the mentioned countries were to enter the Kenya

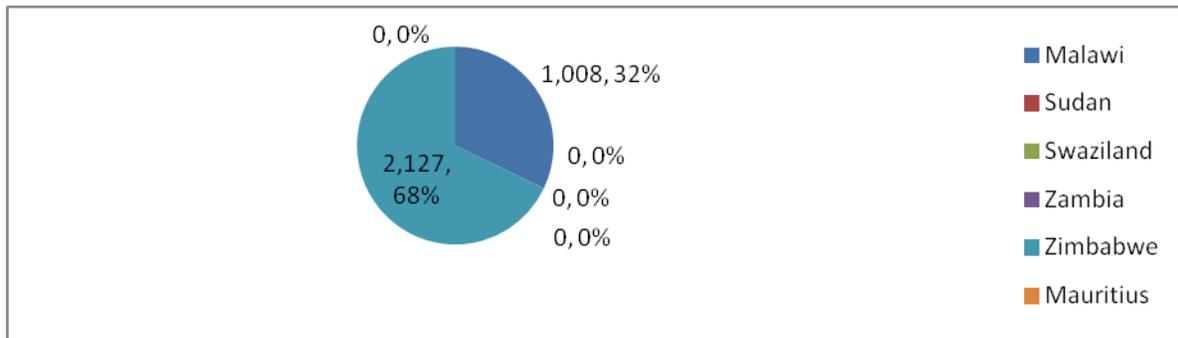


Figure 4: Pre-COMESA Sugar Imports in Metric Tonnes into Kenya, 2000

Source: Document analysis, Kenya Sugar Board, 2010

Figure 4 indicates that pre-COMESA FTA sugar imports into Kenya from the region were minimal since restrictive import policies were in force. As a result, Kenya imported only 3,135 MT in 2000 before the COMESA FTA pact. There were only

three suppliers: Sudan, Malawi and Zimbabwe in 2000. With the launch of the COMESA FTA, Kenya sugar imports rose to 120,881 MT from five COMESA countries in 2001.

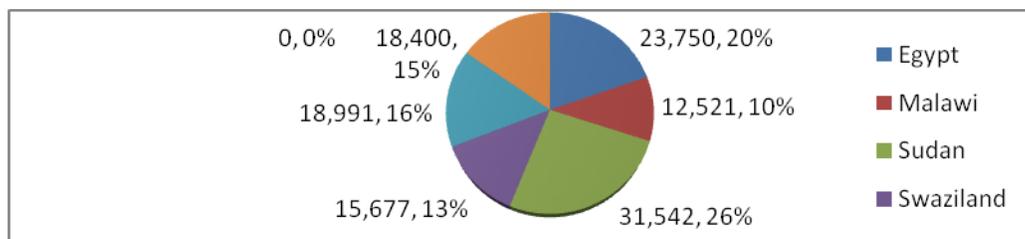


Figure 5: Post COMESA Sugar Imports in Metric Tonnes into Kenya, 2001

Source: Document analysis, Kenya Sugar Board, 2010

Figure 5 indicates that the market share for imported sugar from COMESA partner states increased in the domestic sugar market. The market share before the COMESA FTA was less than 10% but in figure 7, it increased to 48.5%. This finding concurs with Stern (2011) observations that removal or lowering of the border tariff and non-tariff barriers creates more trade. Under the COMESA safeguard, Kenya was allowed to impose a quantitative restriction on sugar imports. Kenya was allowed to import a quota of 200,000 metric tonnes annually from the COMESA region. 89,000MT was for domestic white sugar, while 111,000MT was for industrial refined sugar. Sugar importation beyond the specified amount attracted a 123% border tariff (100% tariff, 16% VAT and 7% SDL). The tariff is Ad Valorem.

Post COMESA Safeguards and Sugar Imports

The local sugar producer had lost market share to imported sugar in the domestic market. To forestall further economic decline, Kenya applied for an intervention by way of a Safeguard under Article 16 of the COMESA Treaty. The COMESA safeguard was awarded on premise that the local sugar industry becomes competitive after a four-year period. The COMESA safeguards introduced import quotas, high tariffs and licenses, which restricted sugar imports from the COMESA

region into Kenya sugar market. Thus, sugar exports from the COMESA partner states into Kenya were subjected to custom duties once a quota of about 200,000 metric tonnes was filled. The figures show that Malawi, Egypt and Swaziland increased their export volumes meaning the Safeguard did not weaken but enhanced. These findings concur with Shafaeddin’s (2005) observation that not all participating members could realize mutual economic benefits. The losers were Zambia and Zimbabwe, which exported 18,991MT, and 18,400MT respectively following the launch of COMESA Safeguard which saw their exports decline sharply with the application of the Safeguard. Likewise, exports from Sudan declined from a high of 31,542MT in 2001 to 9,000MT in 2002 to an annual average of 6,200MT between 2003 and 2005. Table 15 indicates changes in import volumes after the introduction of the mentioned tariffs and non-tariff barriers.

Table 3: COMESA Safeguard Sugar Imports in Metric Tonnes, 2004-2008

	2004	2005	2006	2007	2008
Egypt	39,286	38,870	59,507	108,960	51,084
Malawi	28,060	16,021	7,026	7,549	0

Sudan	6,484	6,107	2,322	0	3,950
Swaziland	31,399	58,902	43,090	19636	61,937
Zambia	0	0	0	484	0
Zimbabwe	3,580	40,056	2,344	7540	1,193
Mauritius	0	0	0	0	0
Total	108,809	123,957	130,705	144,169	123,164

Source: Document analysis, Kenya Sugar Board, 2010

Table 3 indicates that following the implementation of the COMESA Safeguard in February 2004, sugar import and export volumes reduced. However, decline in sugar imports was not same for all exporters in the COMESA region. The zero entities for Zambia and Mauritius were because these countries were unable to compete with other COMESA partner states in the Kenyan market. Moreover, they had other trade agreements such as ACP-EU to fulfill.

IV. CONCLUSIONS

Sugar producers in COMESA partner states enjoyed incentives and subsidies. The VAT in COMESA partner states applied only on sugar sales while state support was evident in areas of irrigation, roads and energy. The use of these policies was an indicator of government involvement in sugar industries of COMESA partner states. These policies range from tax exemptions or allowances to light taxation. The study findings indicated that the use of non-tariff barriers was still high in the region. Sugar importers and exporter were registered and licensed in all the countries sampled.

Sugar prices in Zambia, Malawi, Swaziland, Egypt and Sudan are low because of supportive trade policy environment. It was evident that state support for sugar producers in these countries had lowered production costs of sugar. Therefore, these countries were able to attract capital and skilled labour into their sugar industries. With adequate capital, their sugar industries were able to diversify and add value to their primary product, which further reduced cost of sugar production. Furthermore, management of these sugar industries is sound because of imported labour and participation of private agents. The study findings also indicate that non-tariff barriers were used in the COMESA region to limit sugar imports and exports. Sugar

exporters and importers were required to register and acquire licenses, which in one way or another restrict trade flow in the region.

The findings indicate that COMESA partner states sugar trade policies are favorable to their sugar producers. This is because COMESA partner state governments are heavily involved in sugar production. Therefore, COMESA member states should negotiate to reduce the use of non-tariff barriers and other supportive mechanisms that negate the very essence of free trade in the region. The rule of origin should be reinforced to reduce incidences whereby member states sourced sugar outside the bloc with aim of boosting their sugar trade fortunes in the region. This is possible through adoption of anti-dumping tax and countervailing duties by COMESA member states.

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Assessment of Environmental Problems in Nyala City- South Darfur-Sudan

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Abstract: This research aimed to detect the urban environmental problems and issues in Nyala city at southern Darfur State in the Sudan. So this research was directed to know the status of the pollution in the said city. This research was mainly directed on how to get rid of the various types of pollution and the different types of waste sources i.e. Agriculture and water, hospital wastes and other types of solid waste in the study area. Data was collected from both secondary and primary sources. The secondary sources consisted of various types of reports shown in the published literature, seminars, workshops, conferences and the worldwide webs (the internet). The primary sources included a survey questionnaire. The survey questionnaire is directed through strata sampling technique to the households of the forty two quarter of the study area. In this research both the descriptive and analytical methodology of statistic was adopted. By the descriptive approach of statistics, the central tendency as well as the scatter measurement were determined. Then chi-square analysis was carried. Then the outcomes of this research endeavor were reported as the main results. The main results included that the different wastes not to be thrown in the streets. This result supported by 90.8% of the respondents. 67,7% assumed that bricks industry also contributing to air pollution. 72,2% of the respondents said that the agricultural chemicals are the main reasons behind water pollution, and diseases which affect human and animal health and causes environmental deterioration. Moreover, 88,9% of the respondents believe that clean drinking water is not available in most parts of the city. However, respondents have different views on how to get rid of garbage and wastes. 31,3 said by using plastic bags, 22,3% throwing garbage on the streets, 11,4% transporting by cars, 1,5 % by burning which causes air pollution, and negatively influences the environment as well as human and animal health. Based on the above findings, the study concluded that, the increasing number of the population in Nyala city is the main reason for increasing pollution and pollutants which is reflected on human and animal health as well as on environmental balance. The paper recommended the redesigning and re-planning the city to accommodate the displaced people. Appropriate method to get rid of the garbage. Maintenance of the drainages and bridges. Establishing more schools and clinics and hospitals. Establishing safe sanitation system. Look for other sources for clean drinking water. Alleviation of awareness of the local communities in regard to the pollution and good handling and rationale used of agricultural chemicals.

Keyword: Waste, Sanitation, Garbage, Pollution

1. INTRODUCTION

The expansion and development of cities in the world are attributed to many factors. The most important one is known as pull-push-factor, which may result as a change in climatic factors (scarcity of rainfall, drought), frequent crop failure, war and conflicts, disputes over land and grazing. However, all these lead to rural-urban migration^[1].

Today, the fast growing and expansion of cities and Slums is of great concern. In Dar Fur, the rural areas became a push factor; while the urban centers became a pull factor due to ample security and accessibility to all services^[2].

In the last fifteen years, the greater Dar Fur witnessed a continual influx of migration from villages to the cities, which led to health and environmental problems as a result of high population. Obviously, this situation held huge responsibilities in the burden of the local authorities to treat the problems of environmental degradation which seems to be beyond their capabilities.

The Nyala city typically resembles the urban environment of developing countries, where the plastic bags, wastes and irons are scattered along the streets, and railroad tracks. Dispersed huge heaps of garbage with nasty smells on the sidewalk, where people excrete and urinate. Lines of women and children standing waiting their turn at the drinking water tap, and wells. The beggars at the intersection. All these phenomena are the common scenes found in cities of the developing world and are a direct consequence of poor urban environmental governance Bigio [3].

The war usually has great negative impacts on the community as well as the environment. Among these, the checks to the social demography which causes tremendous transformations in social composition and structure, social culture, norms and values of the communities in the villages as well as the cities [4]. Such changes are widely known in many cities in Sudan, particularly in war affected areas.

Nevertheless, it is observed that the relations between the host communities in the cities and displaced people are complex. When the displaced first arrive, they warmly welcomed due to the expression of solidarity and support till they get settled. But such good will often short-lived. This may be due the competition on the limited resources and services. Therefore, the displaced people will be treated with hostility by the host community [5][6].

It is well known that the Internally Displaced People (IDPs) settle in camps, where services can be provided to them by Humanitarian actors. Today, they are found not in camps or among host communities in rural areas, but in the towns and cities. This situation created many problems to the resident community, the local authority as well as the environment. Therefore, the long-term settlement of displaced populations in urban areas needs to be better anticipated, understood, and planned [7].

11. METHODOLOGY

Nyala is located in the middle of south Darfur state. It is the capital of south Darfur state-Sudan. It is about 900 kilometer south west Khartoum, with total population accounts to 492, 84 person (about %5.3 of total south Darfur population).

In this study, about 800 questionnaires were distributed randomly in Nyala city, where stratified sampling method was adopted. The questionnaire focused on the causes of environmental degradation and the consequences. The collected data were statistically analyzed. The results of data analysis were presented in tables and figure.

11.1. RESULTS AND DISCUSSION

The city hosted more than 600,000 of internal displaced families. They settled in unplanned area which lacks facilities such as sanitation, clean drinking water, drainage, health, education, electricity transportation services.

Pollutants

Table (1): Major sources of pollution in the study area-Nyala (2017)

S/No	Pollutant
1	Chemicals (pesticides and fertilizers)
2	Wastes
3	Stagnant water
4	Garbage: (households, restaurants etc.)
5	Lack of sanitation: excretion on open space led to the spread of many diseases
6	Drinking water
7	Vegetables.

From table (1), different sources of pollution and pollutants were identified, among these, the application of chemicals (pesticides and fertilizers) on farms, particularly which is considered a source of pollution. The chemicals seep down to the

ground and move to the wells, or washed by run – off of rainfall to the sources of drinking water like valleys and seasonal streams and pollute the water.

Waste from households, hospitals, markets are collected and dumped on open space, valleys and seasonal streams around the city (Plate 1). Thus, the mismanagement of the wastes cause many environmental and health problems to human and animals. Moreover, People often bathe, wash their clothes and swim in disgusting water.

However, due to the lack of drainage system, the accumulation of stagnant water, particularly during the rainy season is of great threat to the environmental health and quality.

Most of the population gets drinking water from polluted and contaminated sources like valleys, seasonal streams, and wells.

Furthermore, the residents consume vegetables produce near the city. Due to ignorance, farmers heavily spray the crops with chemicals (Pesticides) which are hazardous to environment, human and animal health.

In this study, 84% of the respondents confirmed that they did not get clean drinking water, while 16 % confirmed that they get clean drinking water.

The results of analysis of this study indicated that 77.9 % of respondents believe that the city lacks paved roads, sanitation, and drainage system.

The study revealed that the poor residents frequently visit hospitals due to poor hygiene. Similar case was reported from southern Ethiopia as a result of poor sanitation and health problems among the Poor people [8]. However, 35% of the respondents get medication in big hospitals in the neighborhood, while 64% of the respondents do not see this.

In general, the majority of the population (60%) agreed on new setup, oriented plans to improve the study area based on scientific ground, in such a way that to address the current environmental problems.



Plate (1): Accumulation of Wastes and Garbage -Nyal City (2017)



Plate (2): Waste burning causes Air pollution - Nyala City (2017)



Plate (3): waste thrown in the vicinity of the camp of displaced people- Nyala City (2017)

Burning of waste materials in open space near the residential area cause air pollution which harms the human (eye irritation and respiratory disease) and the animals (Plate 2). People in camps do not care about the danger of the waste materials where are thrown near to their homes (Plate 3).

IV. CONCLUSION AND RECOMMENDATIONS

Conclusion:

Due to the breakout of war in Dar fur, Nyala city hosted thousands of internal displaced people. This influx has exerted high pressure on already available limited resources and services like drinking water, education, health, sanitation, electricity, transportation etc. The study revealed that poverty became one of the phenomena which is reflected by increasing number of idle people as well as crimes. Furthermore, the human activities such as misuse of chemicals in agriculture, bricks manufacturing, mishandling of garbage and waste, all collectively have negatively influenced on human and animal health and upset quality.

Recommendations:

The paper recommended the redesigning and re-planning Nyala city to accommodate the displaced people. Appropriate method to get rid of the garbage and waste to be sought out. Maintenance of the drainages and bridges. Establishing more schools, clinics and hospitals. Establishing safe sanitation system. Look for other sources for clean drinking water. Alleviation of awareness of the local communities in regard to the pollution and good handling of agricultural chemicals.

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Socio-Economic Factors Affecting Response to Floods By Humanitarian Organizations In Lower Kano Plain Of Nyando Sub-County, Kenya

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ABSTRACT

Floods are one of the extreme disaster events which result in widespread social disruption, trauma, and extensive property damage, loss of life and social economic loss. Several humanitarian organizations including KRCS, USAID, CARE, Handicap International, JICA and OXFAM have always come in handy to help the victims through various interventions. The purpose of the study was to investigate socio-economic factors affecting response to floods by humanitarian organizations in Lower Kano Plain of Nyando Sub-County, Kenya. The sample sizes for the study were, chief, and 8 CBO chairpersons and 388 household heads. Combination of simple and stratified random sampling technique was used to select respondents, while purposive sampling techniques was used to select area chief and 8 CBO chairpersons. The data collection instrument was questionnaires, interview schedules, focused group discussion, observation checklist. Secondary data obtained through printed, published and unpublished documents, and disaster management reports. The data collected was both quantitative and qualitative. The study found that floods in the region were also attached to some economic benefits such as fishing that was taking place during floods and so residents in flood prone areas could not move away from the flood prone areas. There were also inadequate availability of resources such as money to relocate to safer lands and this could be attributed to low economic status of the majority of the respondents. Most of the respondents could not relocate to safer grounds during floods because whatever was given by Humanitarian Organizations was so small that it could not sustain their needs during floods. On challenges facing the humanitarian organizations during flooding, the study found that poor communication between the managers and the field workers and between the managers themselves could hamper good operations by the organizations. The study also found that relief supplies into the organizations warehouses was fair since there were many challenges encountered during transportation of the relief supplies like poor donor supply due to lack of communication and planning and poor road networks. Poor roads were the major cause of delays of relief supplies into the organizations warehouses due to fewer efforts by the Government to construct and repair the roads infrastructure in the region. The government, through various ministries concerned with community development and disaster management, should design sustainable mitigation measures such as economically empowering the communities to minimize the impact of floods and the associated risks not only in Lower Kano Plain area but also in other flood prone areas. It emerged from the study that social factors discussed herein had an influence on vulnerability to flood risk. There is need for the government to prepare and mitigate the consequence of floods by assisting the most vulnerales like orphan, women's, the aged and widows to build flood proof/resistant house or houses rising above the ground. The study found out that quite a number of challenges are faced by relief aid workers during relief aid distribution in Kenya. Therefore, this study recommends that employee-manager relationship should be enhanced to enable the organization to achieve the long term goals. This would be achieved by managers adopting organizational culture that is open to communication and democratic style of leadership. Bottom up decision making culture should be encouraged by the management. The study found out

that there was poor communication between employees and top level management. Therefore, the study recommends that managers need to involve workers in decision making and empower them through trainings.

Keyword: House-holders livelihoods, Humanitarian Organizations, Challenges, Socio-Economic, resilience

I. INTRODUCTION

Regular floods are part of people's lives in various regions of the world, recurring with varying magnitudes and frequencies to which people have adapted for centuries. Usually a flood is an overflow of water that submerges land, low-lying villages and towns or an unusual condition affected by inflow of the tide. Flooding may occur as an overflow of water from water bodies, such as a river or lake, or sea or large natural water basins, or it may occur due to an accumulation of rainwater on saturated ground in an aerial flood (McEntire et al., 2010). Floods are experienced in the lower course of the Nyando River covering approximately 50% of the Nyando district. (Mungai et al., 2004:43). Over 5,000 people are affected every year by floods in Lower Kano Plains. This generally happens during the long and short rains, especially after spells of intense and heavy rain-falls in the catchments of the rivers. The average annual damage is about US\$ 850,000 with annual relief and rehabilitation measures costing US\$ 600,000 in the Kano Plains (Eitel & Ochola, 2006:1). Major floods documented in the area occurred in 1937, 1947, 1951, 1957-1958, 1961, 1964, 1985, 1988, 1997-1998, 2002 and 2003 (Ongwenyi et al., 1993:118-119; Eitel & Ochola, 2006:1).

Thousands of flood-affected families in Kenya have been curtailed by lack of a national disaster management body, poor coordination, poor rural infrastructure and other challenges. Many Kenyans had been displaced by floods, according to a recent Kenya Red Cross Society (KRCS) report. The floods, caused by heavy rains in mid-March and early April, have affected areas in Kano plains in Nyando region. Disaster response in Kenya is often inadequate and characterized by a failure to act on early warnings. Further, what the government is doing now in the name

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of disaster response is neither effective nor adequate. I am yet to see a special kitty set to help the disabled, pregnant women, children and the sick. The bulk of what they are doing is only focused on distribution of food (Adato, and Meinzen-Dik, 2002).

Leading international non-governmental agencies work through volunteers to fight flood in Kenya including KRCS, USAID, CARE, Handicap International, JICA and Oxfam the different humanitarian organizations have been involved in humanitarian activities pre, during and post flooding on several occasions in the area. Their strong role in development works side by side with the recovery from a disaster and prevention and preparedness for any future disasters (Ariyabandu, 2003:26).

The challenges humanitarian organizations during floods are among them communication flow, employees competence, flow of relief supplies and staff motivation. Effective communication is critical to drive material along the relief aid network within and among the field/aid workers. Research shows that two way communications with both internal and external parties is critical for successful output (Krause, 1999) during a disaster, communication is as important as food and water.

Poor infrastructure, for example, roads have been impassable "Poor infrastructure, and the complete absence of roads in some settlements makes rescue and relief efforts difficult, costly and risky for aid workers. According to KRCS, projects to empower vulnerable communities in rural areas, who are often worst-hit by disasters, can help to build resilience. The potential benefit of resilience projects is enormous and helps a

lot to empower communities in areas synonymous with floods (UNEP, 2009).

The ability to have real time information on victims, volunteers, logistics, and financial information allows the Kenya Red Cross to respond in an efficiently coordinated manner (Rudduck, 2002). This is because the state of the internal information and communication systems within an NGO is an integral component of how successfully the organization is able to respond to complex humanitarian emergencies that include food and non food aid response. Although NGOs voice the desire and willingness to cooperate, the pressure of competition is enormous, presenting challenges to joint inter and intra communication and information (Horey and Fallesen, 2003).

Also competencies, or individual characteristics, were recognized as significant predictors of employee performance and success, a few employee competencies that have been proven time and again as mandatory for effective performance. Not-for-profit organizations tend to center around new competencies such as governance effectiveness, boardroom contribution, and service to community (Chait, Ryan and Taylor, 2004; cited in Thach et al., 2007). Following the initial emergency phase there are always delays in the arrival of assistance from abroad. Immediate needs must be met primarily with locally available resources from the affected area this pose another major challenge. Logistics determines an aids workers timeliness and accuracy of distribution. This also affects the aid workers morale in their work (Van Wassenhove , 2006).The main objective of a humanitarian assistance management system is to strengthen national capacity so that supplies are effectively managed from the moment donors offer assistance and through their arrival and distribution in the affected area The agencies most involved in this field, in addition to the health sector, include civil

i. Statement of the Problem

The global scenario in relation to disasters is becoming bleaker (Ariyabandu, 2003). Further, recent studies of the United Nations on global warming and climate change have predicted that global warming could bring about drastic climate changes, resulting in droughts,

protection agencies, customs agencies, Red Cross societies, and other NGOs capable of mobilizing national and international assistance.

Humanitarian relief supplies that arrive following a major disaster, whether natural or complex in origin, cause serious logistical and administration problems for national and international authorities. Humanitarian supply chains generally suffer due to poor planning which leads to increased costs or the inability to deliver goods, and poor collaboration, un-road worthy vehicles and bad roads and political influence (JICA, 2007).

Coordination is often difficult because of the many groups involved (military, government, NGO's), and often inadequate infrastructure. In many humanitarian aid organizations, transportation is the second largest expense after personnel. The uncertainty in vehicle demand can originate from internally or externally-based sources. The factors that are externally based are analogous to firm operating conditions and can be modeled as such (Bose, 2008).

Consolidated the areas of needs that motivate employees, these are; hygiene, achievements, recognition, responsibility and growth or advancement. People are motivated and able to continually work harder and more efficiently and that employee should be paid on basis of the amount and quality of work performed. Ouchi (1981), employee who are involved and committed to an organization will be motivated to increase productivity. The managers provide rewards such as long term employment, promotion from within and participatory management. Motivation for employees has been found to be a tricky business and managers often fail to understand the concepts, principals, and myths, about motivation so as to put into practice (World Disasters Report, 2014).

floods, cyclones and volcanic eruptions in many places that had no or little experience of such phenomena earlier – by which millions of people might be affected (Ariyabandu, 2003:26). Nelson (2012) also noted that floods have a negative impact in a community that live

in flood prone areas. In Kenya, it is emerging as the most prevalent climatic disasters, with the prevalence rates standing at (27%) and affecting (5%) of the population (GoK, 2007). Floods related fatalities constitute a whopping (60%) of disaster victims in Kenya according to the United Nations Environment Programme (UNEP, 2009). Among the areas that experience floods every year are Budalang'i, Kano Plains, Rachuonyo, Migori, Tana River District and Coast Province. Besides the evident loss of homesteads and the displacement of people and animals, floods also have other effects such as loss of crops, diseases outbreaks such as malaria, cholera and dysentery (Gadain et al., 2006). These results into further loss of lives, decreased live hoods, decreased food security

ii. Purpose of the study

The purpose of this study was to investigate socio-economic factors affecting response to floods by humanitarian organizations in Lower Kano Plain of Nyando Sub-County, Kenya

Objective of the study

The objective of the study was to investigate socio-economic factors affecting response to floods by humanitarian organizations in Lower Kano Plain of Nyando Sub-County, Kenya

LITERATURE REVIEW

It is a fundamental tenet of emergency management that there is no disaster without people (Cutter, 1996). Natural disasters hit populations regardless of their social status or economic conditions; the consequences of these natural disasters, however, do affect people differently according to their social and economic environment (Doherty, 2004). According to this principle it is the existence of a community which turns a mere event into something which is threatening in human terms and which therefore brings about a reaction.

According to Otiende (2009), it is equally true, but much less widely accepted as an axiom that both preparedness for and response to hazards are greatly facilitated by an understanding of the community on whose behalf preparation and response are undertaken. Sadly, in some of our emergency service organizations there is no more than a rudimentary understanding of the nature and dynamics of communities and the relevance of a comprehension of community characteristics to disaster management (Benthall, 2008).

and increased poverty. The incidence of poverty in Nyando basin is high, ranging from an average of (68%). Although the government, NGOs and other humanitarian organizations have put alot of effort to effectively manage this menace and limit its disastrous effects to the people living in flood prone areas, floods have continure to raise havoc and in many instances, loss of properties and life have been reported. This therefore raises the question of whether these bodies concerned are experience challenges when responding to this disaster. It is for this reason that this study sought to investigate socio-economic factors affecting response to floods by humanitarian organizations in Lower Kano Plain of Nyando Sub-County, Kenya

The cultures which have developed in these organizations tend to be hands-on and crisis-focused in their stances; in general, they have paid little attention to careful examinations of the communities which they protect. Messages warning of impending hazards are mechanistically constructed, paying little heed to the principles of communication, and as a result they are frequently misunderstood or ignored (Cutter, 1996).

Furthermore, there is little consideration of the nature of vulnerability and the identification of the most disaster-vulnerable groups within the community - at least in advance of hazards actually occurring - with the result that emergency managers are unable optimally to target assistance to those for whom hazards will be most dangerous.

Fortunately, there are ways in which these deficiencies can be addressed. The tools and insights of the social sciences should have utility to disaster managers as they seek to improve their understanding of and communication with their communities in the context of hazard preparedness and response. In particular, consideration of demographic structure and the principles of risk communication seem likely to pay dividends (UNISDR, 2004).

Disaster risk management framework acknowledges the steps of traditional practice of disaster management (preparedness, response, recovery, mitigation), but also argues on giving attention to more "proactive strategies, which can contribute to saving lives and protecting property and resources before they are lost" (UNISDR 2004). Emphasis is on risk reduction, which is defined as "the conceptual framework of elements considered with the possibilities to minimize vulnerabilities and disaster risks throughout a society,

to avoid (by prevention), or to limit (by mitigation and preparedness) the adverse impacts of hazards, within the broad context of sustainable development” (UNISDR 2004).

Empirical evidence demonstrates that “societies which suffer a fragile physical environment, weak economies and inadequate social and institutional structures are disproportionately likely to make a disaster out of a natural hazard” (Ozerdem, 2006: 399). Communities with, for instance, high levels of poverty and crime, loose family ties, limited business opportunities, deserted areas, or weak infrastructures, will be more affected by natural disasters because any of these factors reduces people’s capacities to respond to an emergency situation (Klinenberg, 2000:91). Loose family ties, for example, probably affect individuals’ willingness to look for and assist relatives while high crime rates might result in citizens focusing on protecting their assets instead of helping others. In addition, victims as well as emergency responders will not have easy access to provisions due to extreme poverty and lack of stores in the economically depleted areas. The presence of just one of these factors could have a detrimental effect on the emergency response in the wake of a natural disaster (Lagadec, 2004: p. 168). Conversely, strong community links, resilient infrastructures, high population density, satisfying economic conditions, or significant commercial activity all have the potential to increase the community’s response and reduce the victims’ vulnerability to disaster consequences; thereby lowering the workload of official emergency responders and enhancing their capacities. However, the affected population’s socio-economic conditions do not only influence the workload of official emergency responders, they also partly define the particular environment in which search and rescue activities will take place. Socio-economic conditions indeed shape

i. Theoretical review

The theory of structuration is a social theory of the creation and reproduction of social systems that is based in the analysis of both *structure* and *agents*, without giving primacy to either. Further, in structuration theory, neither micro- nor macro-focused analyses alone are sufficient. The theory was proposed by sociologist Anthony Giddens, most significantly in *The Constitution of Society*, which examines phenomenology, hermeneutics, and social practices at the inseparable intersection of structures and agents. Its proponents have adopted and expanded this balanced

the behavior of the victims themselves, which in turn can affect the emergency response (Boin et al., 2005:59). Victims might have to survive on their own in a hostile environment in which the rule of law does not prevail anymore resulting in chaotic conditions and anarchical behaviors.

It is also worth mentioning that the socio-economic structure of affected populations can also influence political actors and, by extension, disaster management decision-makers. There might be more or less political pressure to act quickly, mobilize extensive resources, and attract media attention according to the socio-economic composition of the victims. In the field of crisis management, as in any other area of governmental activity, political will is a major factor in the process of resources allocation, both during the prevention/preparation phases and the emergency response (McConnell, 2003). The study also found early warning system and awareness building could reduce the suffering of the victims. However, Islam (2006) examined the impact of global warming on floods, vulnerability of floods, and effectiveness of warning. Roy *et al.* (2009) examined the impact of disaster (*Aila*) on livelihood of disaster-affected people. They found people in disaster-exposed areas suffer from food security, pure drinking water, proper sanitation and so forth.

To assess the impact of the social and economic environment on the emergency response, two aspects need to be explored: the affected populations’ attributes in terms of socio-economic indicators because this will influence victims’ capacities to rely on their own means to overcome the consequences of the disaster; and the victims’ socio-economic position within the wider community because this position might influence the local or regional political actors’ emergency response.

position. Though the theory has received much criticism, it remains a pillar of contemporary Sociological theory (Cutter, 2003).

Giddens observed that in social analysis, the term *structure* referred generally to "rules and resources" and more specifically to "the structuring properties allowing the 'binding' of time-space in social systems" (Bourdieu, 1977, p.83). These properties make it possible for similar social practices to exist across time and space and that lend them "systemic" form.

Agents—groups or individuals draw upon these structures to perform social actions through embedded memory, called *memory traces*. Memory traces are thus the vehicle through which social actions are carried out.

Structure is also, however, the result of these social practices. Thus, Giddens conceives of the duality of structure as being the essential excursiveness of social life, as constituted in social practices: structure is both medium and outcome of reproduction of practices. Structure enters simultaneously into the constitution of the agent and social practices, and 'exists' in the generating moments of this constitution (Chambe, 1992). Thus, structuration theory attempts to understand human social behavior by resolving the competing views of structure-agency and macro-micro perspectives. This is achieved by studying the processes that take place at the interface between the actor and the structure. Structuration theory takes the position that social action cannot be fully explained by the structure or agency theories alone. Instead, it recognizes that actors operate within the context of rules produced by social structures, and only by acting in a compliant manner are these structures reinforced. As a result, social structures have no inherent stability outside human action because they are socially constructed. Alternatively, through the exercise of reflexivity, agents modify social structures by acting outside the constraints the structures place on them (Giddens, 1993).

Giddens's framework of structure differs from that in the classic theory. He proposes three kinds of structure in a social system. The first is signification, where meaning is coded in the practice of language and discourse. The second is legitimation, consisting of the normative perspectives embedded as societal norms and values. Giddens's final structural element is domination, concerned with how power is applied, particularly in the control of resources.

Social systems have patterns of social relation that change over time; the changing nature of space and time determines the interaction of social relations and therefore structure (Bourdieu, 1977, p.83). Hitherto,

social structures or models were either taken to be beyond the realm of human control the positivistic approach or posit that action creates them—the interpretivist approach. The duality of structure emphasizes that they are different sides to the same central question of how social order is created.

II. METHODOLOGY

Study Area

The study was conducted in the lower Kano Plains. The area was selected due to it being rated as a flood disaster red zone (Ongwenyi, Denga, Abwao & Kitheka, 1993). Generally, Lower Kano Plains experience annual floods resulting into property damage and temporary evacuation of residents annually (JICA, 2007).

Kano Plain lies between longitudes 0°50'S and 0°10'S and between latitudes 33°05'E and 34° 25'E (National Environmental Management Authority, 2004). The economy of Kano Plains consists of agriculture, fisheries and a wide range of informal sector activities. In terms of cultivation, about 50,000 hectares of the Kano Plains are arable and can be cultivated. All the rice in the Kano Plains is produced through irrigated cultivation. Most of the water for irrigation comes from River Nyando, whose annual floods also displace a huge number of people (Miller, 2009).

Research Design and sampling

Research design is the set of methods and procedures used in collecting and analyzing measures of the variables specified in the research problem research. These includes (descriptive, correlational, semi-experimental, experimental, review, meta-analytic) and sub-type (e.g., descriptive-longitudinal case study), research problem, hypotheses, independent and dependent variables, experimental design (Nwandinigwe, 2005).

Sampling Strategies

Sample size determination is the act of choosing the number of observations or replicates to include in a statistical sample. the sample size used in a study is determined based on the expense of data collection, and the need to have sufficient statistical power. Using a confidence level determines how accurate a result will turn out with lower chances of error (Cohen, 2012). Sample sizes are judged based on the quality of the

resulting estimates. Alternatively, sample size may be assessed based on the power of a hypothesis test (Kasomo, 2007).

Therefore, to obtain suitable sample size for households to be interviewed, Slovin's equation as cited in the formula below was used.

$$n = \frac{N}{1 + N(\alpha^2)}$$

Where n = sample size

N = Sample frame

α = margin of error

The sample frame (N) shows the list of the population of the groups selected for the study. According to Slovin, if a sample is taken from a population, the

formula must take into account confidence levels and margin of error (Orodho, 2003).

The area has 12 Community based Organizations which are registered by the department of social services with active operations in Humanitarian activities (Njogu, 2002). As such, the study included 1 assistant county commissioner, 8 Chiefs, 19 assistant chiefs, 12,994 household heads (response), KRCS County Coordinator, Head of special Programmes for Kisumu County and 12 CBO Chairpersons.

Based on the study population estimates and using Slovin's Equation, the sample frame was computed and is presented in the table 1

Table 1: Sample frame

Category of respondents	Target Population	Sample size	Percentage
KRCS Director of Operations	1	1	100%
District Officer	1	1	100%
Chiefs	8	8	100%
CBO Chairpersons	12	12	100%
Households	12,994	388	1.58%
Total	13,036	437	3.35%

Source: Researcher (2017)

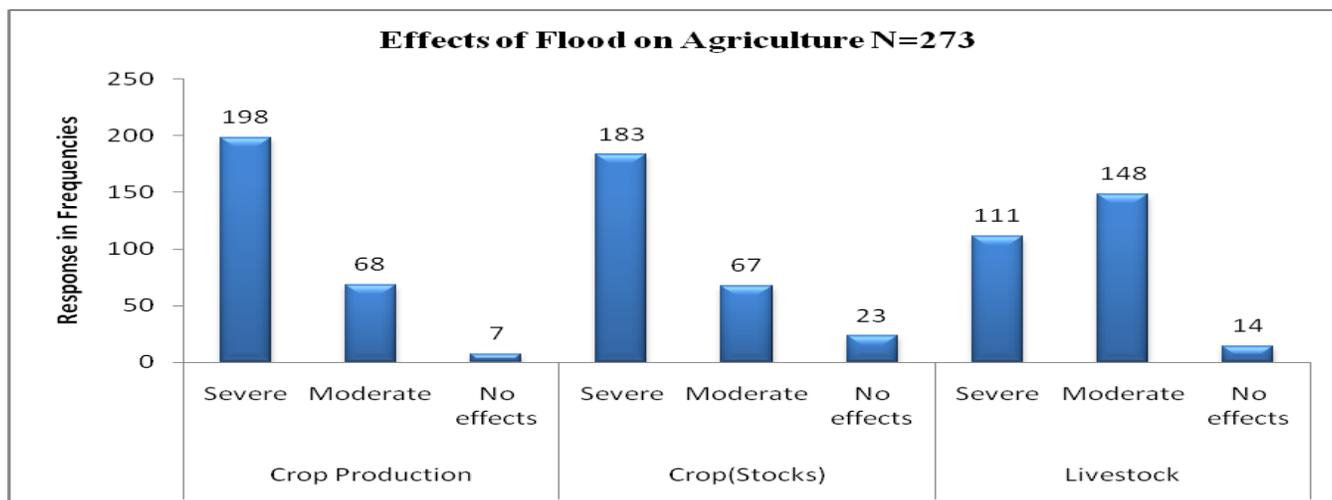
The primary Data collection methods include; questionnaires The Interview guide, Focused Group, Observation. While Internet Search, document

analysis are Secondary sources. The quantitative data was analyzed using SPSS and MS EXCEL Software Packages (Saunders, et ,al. 2007)

III. FINDINGS

Effects of flood on Different Sectors in lower Kano plains

The study sought to find out the effect of flood on different areas. This was imperative in order to find out the level of severity of the effect. Figure 1 shows the response.



Source, Field Data, 2017

Figure 1 Effects of Floods on Agriculture

The study found that in all areas, severity of flood was high, with over 60% of the households indicating that the effects of flood in crop production, crop (stocks), health, water access, sanitation, infrastructure and housing was very severe. Figure 5.1 shows the response. This percentages clearly depict how the flood effects were always felt in various socio-economic sectors in Lower Kano plain. According to the findings ,(72.5%) indicated that the effects of floods on crop production was severe. When the effect of floods are severe on crop production and this being one of the major economic activities of the people of lower Kano then there is a high probability of food shortages.

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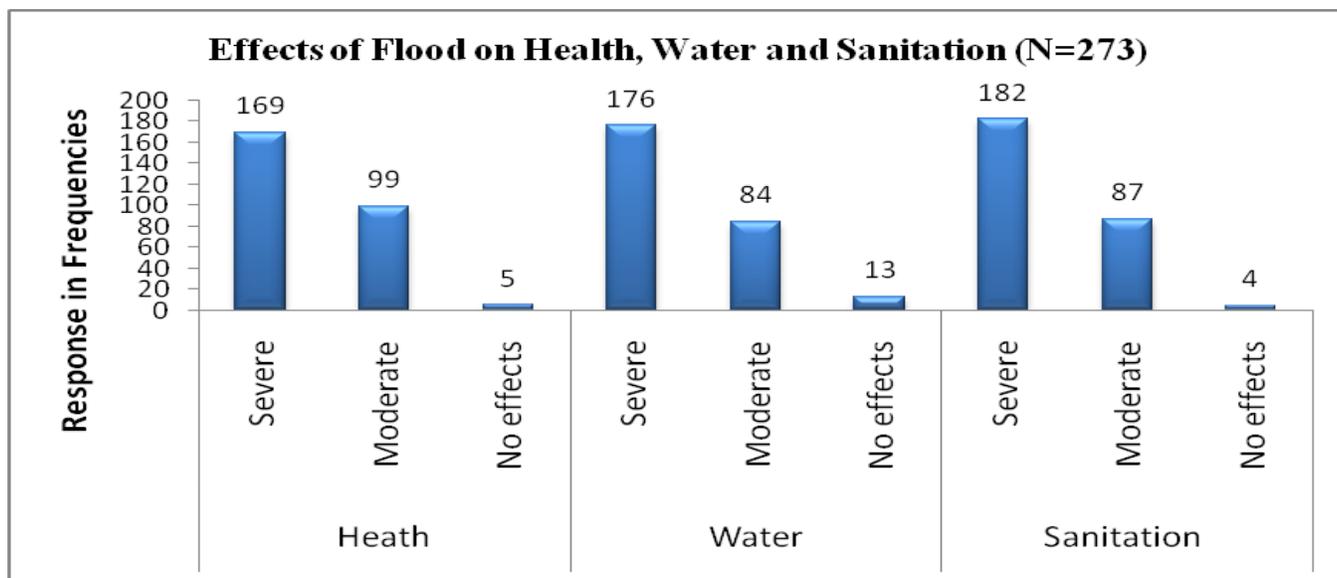
“As soon as it starts raining, we know the danger is eminent, it causes as awful feeling. I one time lost a lot my wares in the flood and was unable to report to work for three weeks. I had nothing to feed my family on” he further attested the houses submerged to flood water while houses collapsed and all valuable washed away” (Interview, Field data, 2017)

These findings support those of Njogu, (2002) who also found that floods destroy standing crops.

Effects of Floods on Health, Water and Sanitation

About (67%) indicated that the effect of floods on crop stocks were severe. Combined flood effect severity in crop production and crop stocks reduces the peoples purchase power and thus affecting their livelihood. As regards to effect of floods on livestock, the majority at (54.2%) indicated that it was moderate. In the case of livestock, the effect of floods were moderate since animals could be evacuated to other regions thus reducing the effects. A participant reported loss all his wares during flood and not being able to worth for three weeks

Prolonged flooding often limits people’s ability to earn money and replant quickly after floodwaters recede because either the cropping season is over or agricultural support is not available (Bose, 2008). Vulnerable people should be given various financial and material options, so that they can choose what works best for them. The decision to provide food, cash, a combination of both or something else should be based on an objective problem analysis and clear aims and not on what resources are available, what the agency has the capacity to distribute or the donor’s preferences.



Source, Field Data, 2017

Figure 2 Effects of Floods on Health, Water and Sanitation

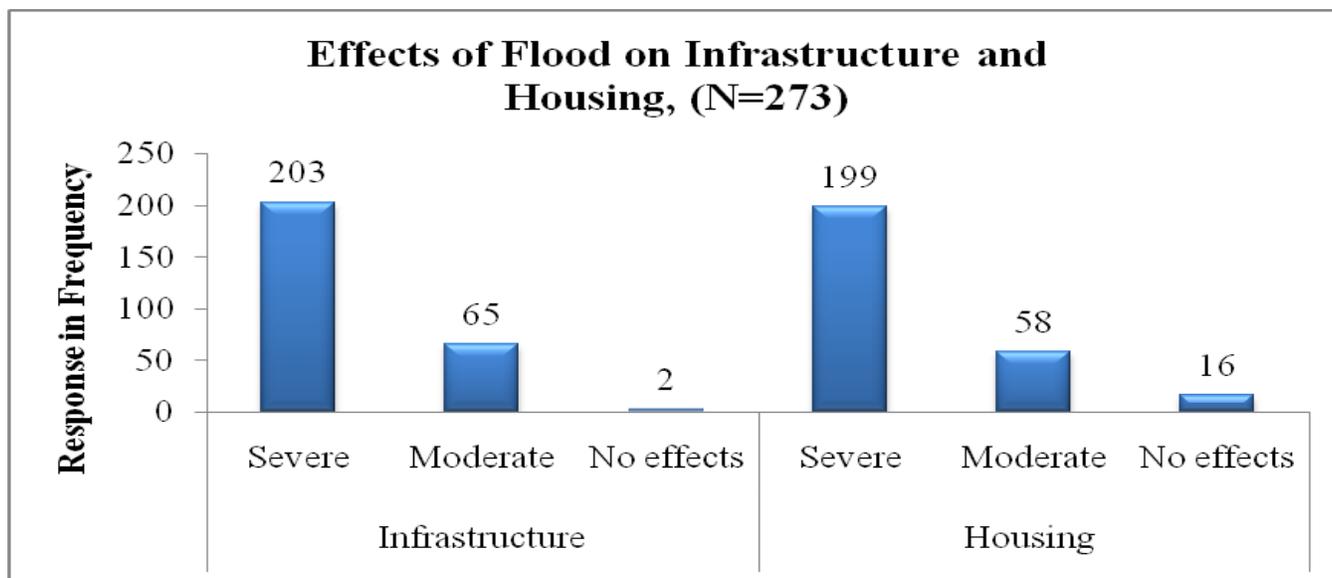
This study also revealed that about (62%) indicated that flood effect on health was severe. The flood water provided environment for breeding of mosquitoes hence rising cases of malaria. Effects of floods on water access and sanitation were severe and recorded (64.4%) and (66.6%) respectively. Contamination of water in an event of flooding through mixing with soil and poisonous waste also placed this population at a risk of contracting various diseases. The contaminated water affected both the people and the animals hence impacting on agriculture.

During the floods seasons, people were exposed to diseases such as cholera, bilharzia, and typhoid. Thus McCluskey (2001) also points that the potential for disease outbreaks is always present after a disaster. Good understanding of water and sanitation conditions, disease surveillance, and speedy response to warning and above all, preparedness of health agencies are the preconditions to reduce the spread of diseases and preserve the quality of the environment during and after flooding. McCluskey (2001) further showed that the risks of disease are greatest where there is overcrowding and where standards of water and

sanitation have declined. This often happens in situations of massive population displacement away from the flooded area and prolonged stay in flood shelters without adequate water supply. People themselves, national authorities and relief agencies in many flood-prone areas have had to develop mechanisms and technologies in order to sustain populations living in flooded environments. Initiatives to improve water supply or water systems should incorporate long-term sustainability.

“They can increase to epidemic levels even in a moderate flood, particularly in rapidly expanding urban areas with their often poor environmental conditions. Waterborne diseases are preventable through provision of clean water and sanitation (Interview respondents.” (Field Data, 2017)

Effects of Flood on Infrastructure and housing



Source, Field Data, 2017

Figure 3 Effects of Floods on Infrastructure and housing

With the destruction of infrastructure and housing the respondents indicated that the effects of floods were severe at (74%) and (73%) respectively. In cases of infrastructure such as roads, the accessibility to the markets become a problem hence some agricultural produce barely reach the market in time. These findings were also justified by the KRCS director, during the interview session, where he also reiterated that;

During the Large sediments could be deposited on roads thus making them impassable. In addition to that, even foot paths were covered by flooding water hence hindering mobility. As

regards to houses, many structures were brought down by the force of the flooding water. In some cases, houses were submerged in water or totally destroyed thus rendering people houseless (Field Data, 2017)

The findings show that flood affects to a great extent the infrastructure and housing of the area. Mercer and Kelman (2008) also found that during extreme weather events transport infrastructure can be directly or indirectly damaged, posing a threat to human safety, and causing significant disruption and associated economic and social impacts. Flooding, especially as a result of intense precipitation, is the predominant cause of weather-related disruption to the transport sector.

Effects of floods on Fishing Industry

Respondents were probed on effects of floods on fishing industry. Therefore, residents were asked to indicate whether they agreed or disagreed with the statements. Table 2 show the response.

Table 2 Effects of floods on Fishing Industry

Statement	Agree		Don't know		Disagree	
	F	%	F	%	F	%
Flood affects water quality for fish growth and reproduction	169	61.9	56	20.5	48	17.6
Flood interfere with accessibility to fishing grounds	171	62.6	88	32.2	14	5.1
Flood interferes with fish market	148	54.2	101	37.0	24	8.8

The study found that flood affects water quality for fish growth and reproduction as shown by 61.9% of the respondents. Only 17.6% of the respondents disagreed with the statement as 20.5% remained neutral. It was also found that flood interfere with accessibility to fishing grounds as agreed by 62.6% of the respondents. More than half of the respondents at 54.2% agreed with the statement that flood interferes with fish market, in terms of destruction of transport facilities. From these findings, it can be deduced that flood affects fishing industry through interfering with water quality, accessibility to fishing grounds or beaches and fish markets. Horsfall and Spiff (1998) equally collaborated the seriousness of erosion problems in the Niger Delta fisheries when they reported that in the Niger Delta, river banks, stream bank and river bed

erosion is a major problem that hinder effective fishing.

Effects of Floods on Productive Assets

Floods have far reaching implications on the livelihood of households and which is suddenly lost and felt for many years to come. In this study, respondents were asked to indicate their experiences on productive assets during floods. Out of 384 sampled households, 383 (99.7%) indicated that their house belongings were damaged while 1(0.3%) did not. Furthermore, 374 (97.4%) reported depreciation of house value with a paltry 10 (2.6%) did not report this effect. About 381 (99.2%) of the households whose houses were impacted by floods also reported loss and distress to the pets while 3 (0.8%) did not.

Table 3 Effects of Floods on Productive Assets

	Frequency	Percentages
Household belongings	383	99.7%
Depreciation of house value	274	97.4%
Loss and distress to the pets	381	99.2%

The results in this tally are in agreement with Tobin and Montz (1997) who demonstrated that the value of houses decreases immediately after flooding, but recovers 2-3 years and (Yeo 2003) who noted that investment in a flooded area would have a knock-effect on housing if substantial migration occurs. Findings of a study by RPA (2005) in England and Wells show that damage to and loss of memorability and irreplaceable items was ranked as a major impact by respondents. Although ranked below the effort of getting a house back to normal, having to leave home, and anxiety

about future flooding, the loss and damage of memorabilia was ranked above health impacts. From FGD findings, it emerged that some households were forced to relocate to alternative areas while some households send their children to stay with relatives. Relationships within the family were also tested by living in temporary accommodation. This, in a way disrupted their pattern of life and social networks. Some moved temporarily to higher grounds and return to their usual resident's liter.

5.6 Effects of Floods on Transportation

Nyando basin has two major trunk roads in addition to some primary networks. The primary networks are made from marram. The study sought to find the effects of floods on the transport networks.

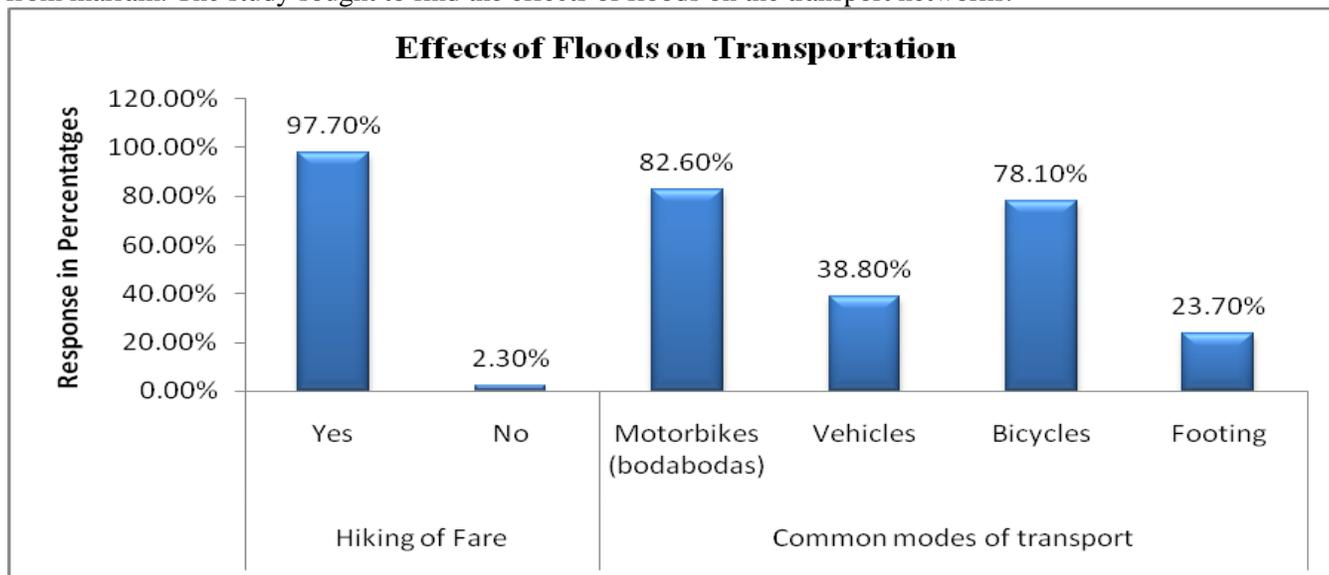


Figure 4 Effects of Floods on Transportation

Findings indicated that 375(97.7%) of the respondents reported hiking of fare during the flooding season while 9 (2.3%) of the respondents did not. The study observed that the most common mode of transport in Kano is the motor bike and the bicycle commonly known as “*bodaboda*” used in seasonal/marram roads and “*matatu*” Which are used for long distance travels, as shown by 82.6% and 78.1% respectively. Nyando basins have seasonal roads known as all-weather roads. Transport is usually affected during flooding periods hampering services provision because roads became in accessible while others get damaged.

The floods also damage irrigation infrastructure such as intake structures, canals and drains. Roads were completely cut off resulting in the isolation of communities for long periods and disruption of transport, communication and business activities. The effects experienced include shortage of food and other basic supplies in the study area. Relief operations coordinated by the government and other relief and humanitarian agencies during flood disaster were also affected due to destruction of transport infrastructure. From the FGD it also emerged that;

“The fares normally sky rockets therefore hindering movements of people from one place to another. The damage to infrastructure not only exacerbates impacts of flood disasters, but also creates problems in the evacuation of the affected

population. Because of the interrelationship between the infrastructures and other sectors of the economy, disruption of infrastructure also disrupts socio economic activities leading to loss of livelihood as well as scares resources to coping with reconstruction”. (Field data, 2017)

When the disruption of infrastructure and roads takes too long, it may result in the material impoverishment of the neighborhood, social impoverishment and migration of people. This adversely impacted investment and development activities in the area and in certain cases crippled the frail economy of the region. Consequently, it can be concluded that the resistance, resilience and susceptibility of the infrastructure determine the degree of household’s vulnerability as well as that of the community that they are situated. The study also establishes that most of the roads had either partly or completely damaged, making them at many times impressive.

This chapter has analyzed the findings from questionnaire survey of households, interview and FGD in three locations flooded within the period of 2010-2014. Overall, (77.1%) of the households had been affected adversely by floods out of the sample. It is also clear from the above analyses that floods have adverse effect on socio-economic status of livelihood of households in lower Nyando basin. The floods deposits that tangible impact of floods was more severe

than intangible effects. The education sector suffered massive losses. Learning was disrupted due to submerged schools and damaged infrastructure. Household suffered emotionally due to loss of memorabilia. Insecurity was reported in three locations. Houses, most of which were made of poles or mud were destroyed in one way or the other forcing families to relocate to other alternative areas. Regarding water and sanitation was found to be the main source of water.

The study concludes that, both government and households recognize the seriousness of flooding problem and recognize the need to mitigate its impact. However there is little coordination between government and household mitigation activities As a result even longtime residents who have long experience with flooding continue to suffer heavy personal and property losses.

5.7 Socio-Economic Factors Affecting the Operations of the Humanitarian Organizations

The residents of lower Kano plain views regarding the socio-economic factors affecting the operations of the humanitarian organizations during the flooding were also sought and measured on a five point LIKERT scale where strongly agree (SA) = 5, agree (A) = 4, neutral (N) = 3, disagree (D) = 2 and strongly disagree (SD) = 1. Further, the researcher computed the frequencies and percentages as well as the mean regarding each statement. The results of the findings on were as presented in Table 4

Table 4 Socio-economic Effects on operation of Humanitarian organizations

Statement	SA F(%)	A F(%)	N F(%)	D F(%)	SD F(%)
There are always more fish during floods and so we cannot move away from this place	174(63.0%)	64(23.4%)	21(7.7%)	6(2.2%)	8(2.9%)
I do not have enough money to relocate and set up a new in higher areas away from flood	182(66.0%)	65(23.8%)	17(6.2%)	6(2.2%)	3(1.1%)
This area is valuable and good for us even if floods come because the soils become fertile after floods	161(59.0%)	71(26.0%)	9(3.3%)	28(10.3%)	4(1.5%)
Floods bring about more food and water thus making this area ideal for us.	113(41.4%)	51(18.7%)	39(14.3%)	31(11.4%)	39(14.3%)
We do not have any formal employment and so must rely on fishing and farming for our needs hence we cannot relocate	178(65.2%)	69(25.3%)	13(4.8%)	7(2.6%)	6(2.2%)
I do not have enough income and so whatever is given by Humanitarian Organizations is so small that it cannot sustain my needs during floods	196 (71.8%)	51(18.7%)	12(4.4%)	5(1.8%)	9(3.3%)

(Source: Field data, 2017)

Key: F=Frequency, SA = 5, Agree= (A) =Neutral= (N), Disagree= (D), Strongly Disagree = (SD)

The study found from Table 5.4 based on the response of the household members that floods in the region were also attached to some economic benefits. For instance, majority of the respondents at 174(63.7%) indicated that there were always more fish during floods and so they could not move away from the flood prone areas. This perception could therefore hamper successful and effective of humanitarian operations such as evacuation. This support the observation made by Oluseyi and Oloukoi (2013) who also found that in predominantly Christian communities, the water spirits are still revered and is believed to be involved in day-to-day activities of the communities. In some communities, they hold the belief that the water spirit is responsible for a good fish catch and if the spirits are annoyed the fishes may not enter the nets and will result in poor catch for fishermen.

Further, when probe on why they could not move to a higher place, majority of the respondents (household heads) at 182(66.7%) indicated inadequate availability of resources such as money to relocated to more safer lands and this could be attributed to low economic status of the majority of the respondents, hence impeding the implementation of some of the operations by the humanitarian organizations. Lagadec (2004) also documented that victims as well as emergency responders will not have easy access to provisions due to extreme poverty and lack of stores in the economically depleted areas. The presence of just one of these factors could have a detrimental effect on the emergency response in the wake of a natural disaster (Lagadec, 2004:168).

Over half of the respondents (household heads) at 161(59.0%) indicated that reluctance to relocate to safer areas was due to agricultural reasons. For instance, this portion of respondents indicated that the

“No single organisation can handle the disaster response effectively without the help of other organisations, although each organisation can have their own programmes and do what they like. However, there should be coordination and cooperation among the actors (humanitarian organizations) during the flood management as this will help in avoiding duplication of activities and enhance effective response the disaster management. This can be done through setting up committees that represents the organizations to allow sharing of information on

area was valuable and good for them even if floods come because the soils become fertile after floods. Similarly, 113(41.4%) confirmed that floods brought about more food and water thus making the flood prone areas be ideal for their living. The study also found that most of the respondents could not relocate to safer grounds during floods because whatever was given by Humanitarian Organizations was so small that it could not sustain their needs during floods, as indicated by 196(71.8%) of the respondents. Further, 65.2% of the respondents indicated that they did not have any formal employment and so must relied on fishing and farming for their needs hence they could not relocate to safer areas.

From these findings, it could be deduced that some of the major reasons for reluctance to relocate to safer grounds during flooding was due to economic reasons and inadequate of resources to start a new life in new areas during flooding. This supports the study by Stivers (2007) who reveal that the governmental failure to act and step outside the rules whenever necessary during the flooding seasons or any natural calamity might have been generated by the socio-economic characteristics of affected populations.

Other challenges that emerged during the interview with the officials of humanitarian organizations were duplication of roles among the organizations. All the respondents were of the view that they came together in order to avoid duplication and make judicious use of the available resources. Generally, all the respondents echoed the same view and this is captured in a statement made by interviewee in response to a question about challenges they face in addressing flooding in the area. One of the officials working with the Kenya Red Cross Society offered that;

operations so that others will not do the same things.” (Field data, 2017).

This view shows a strong indication that duplication and resource management were key factors that influenced effective management and addressing of flood by humanitarian organizations in lower Kano plains. Another challenge that was mentioned by officials of the humanitarian organizations during the interview was lack of inclusive measures to manage floods in lower Kano plains in the interview. One of the officials had this to say;

Inclusive structural measures like embankments can provide protection against

many types of flooding. Flood control alone, however, often does not provide a robust, long-term solution for addressing flood risk. Such efforts at flood control in flood prone area have produced limited solutions, sometimes even exacerbating flooding problems, when applied in isolation from overall policy in the floodplains. However, such structures may offer solutions to critical aspects of the flooding problem if they are used in conjunction with other non-structural measures, are planned and

implemented with the participation of local people and with an understanding of possible negative consequences, and are integrated in the overall developmental policy (Field,2017).

These findings show that inadequate inclusive measures would hurt prompt and effective response by humanitarian organizations during flooding. Rudduck, (2002) also found that failing to include all the stakeholders of flood response including the affected communities would jeopardize efficient response to flood by the humanitarian organizations.

Challenges facing humanitarian organization in responding to flood in Lower Kano Plain

Communication Challenges

Effective communication is critical to drive material along the relief aid network within and among the field/aid workers (Krause, 1999). According to Russell (2004), disaster can damage telecommunication infrastructure. If an event happens in a densely populated area, thousands of people can try to make

calls at the same time overloading the system. NGOs recognize the importance of communication. Those with sufficient resources have developed internal communication solutions. The ability to have real time information on victims, volunteers, logistics, and financial information allows the humanitarian organization to respond in an efficiently coordinated manner (Rudduck, 2002).

Level of communication among humanitarian responders

The respondents were first asked to indicate the level of communication among the management in the organization.

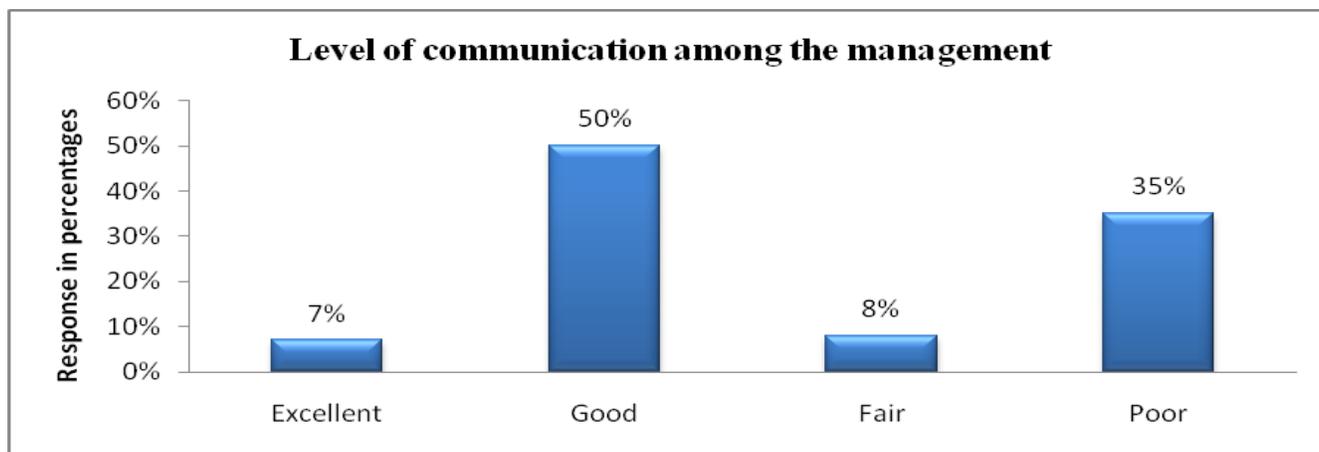


Figure 5 Level of communication among humanitarian responders

(Field data, 2017)

According to the study findings, 136 (50%) of the respondents interviewed indicated that the level of communication in the organization within the management was good but not to employees and (7%) of them indicated that it was excellent while (8%) of them indicated that it was fair and (35%) of them said it was poor. It was an implication from the study that there was only effective communication between top level managers only but poor trickle down of

information to the lower level employees thus making work difficult due to lack of basic and timely information as indicated by Haselkorn and Mark, (2005) who portrays the drastic repercussions of not having timely and accurate information to help in planning. It is interesting from interviews was that?

“It was an implication from the study that there is effective communication between top level managers only but poor trickle

down of information to the lower level employees thus making work difficult for us due to lack of basic and timely information hence, the situation of the

members continue to deteriorate since more food aid cannot be increased without basic information” (Field Data, 2017).

Logistic Challenges during Relief supplies

The respondents were first asked to show the flow of relief supplies into the organizations warehouses. The following were the findings as shown in Figure 6

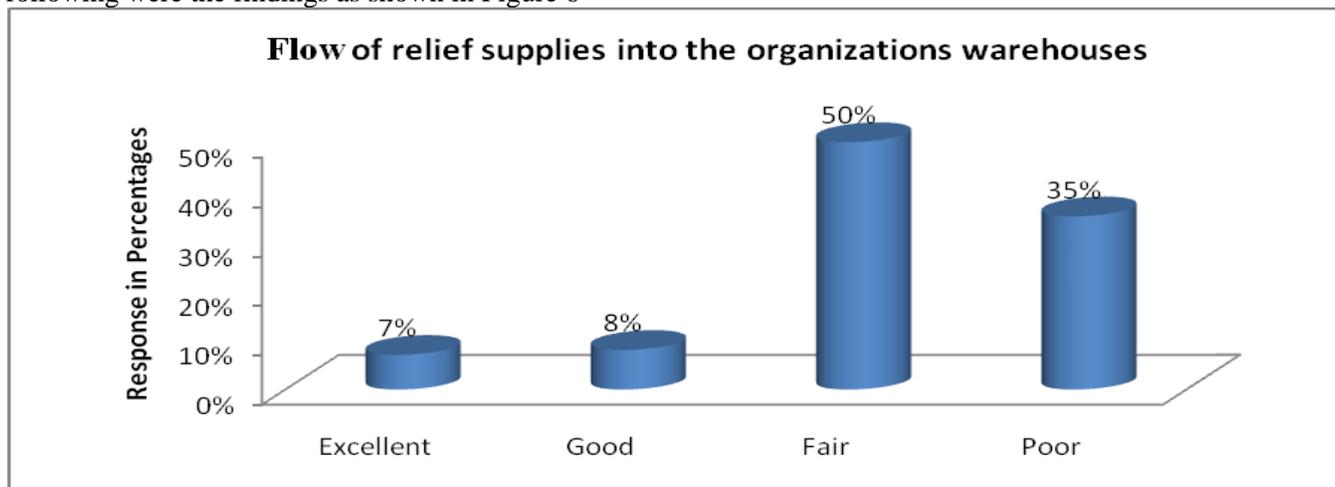


Figure 6 Logistic Challenges during Relief supplies

Field data, 2017

As indicated in Figure 4.2, (50%) of the respondents interviewed indicated that the flow of relief supplies into the organizations warehouses was fair since there were many challenges encountered during transportation of relief supplies like lack of communication and poor road networks. While (35%) of them indicated that the flow of relief supplies into the organizations warehouses was poor due to poor road and communication networks, 8% of them said that the flow of relief supplies into the organizations warehouses good due to good management practices and (7%) of them indicated that the flow of relief supplies into the organizations warehouses was excellent due to effective communication and planning. The findings implied that there were challenges encountered during the supply of relief materials to warehouse which included poor planning, poor communication and bad roads. During the interview one of the officials had this to say;

“Coordination is often difficult because of the many groups involved and often inadequate infrastructure, cause serious

logistical and administration problems for humanitarian organizations Making humanitarian supply chains generally suffer due to poor planning which leads to increased costs or the inability to deliver goods, and poor collaboration,” (Field data, 2017)

This shows that poor coordination with the humanitarian organization was a challenge to their efficient operations during floods. Humanitarian logistics is characterised by large-scale activities, irregular demand and unusual constraints (Oluseyi and Oloukoi 2013). The problems can range from a lack of electricity supplies to limited transport infrastructure including ‘controlled’ environment with some minor variability (e.g. traffic congestion).

5.8.4 Reasons for poor flow of relief supplies

The respondents were also asked to show the reasons for poor flow of relief supplies. The following were the findings as shown in Figure 7.

3.

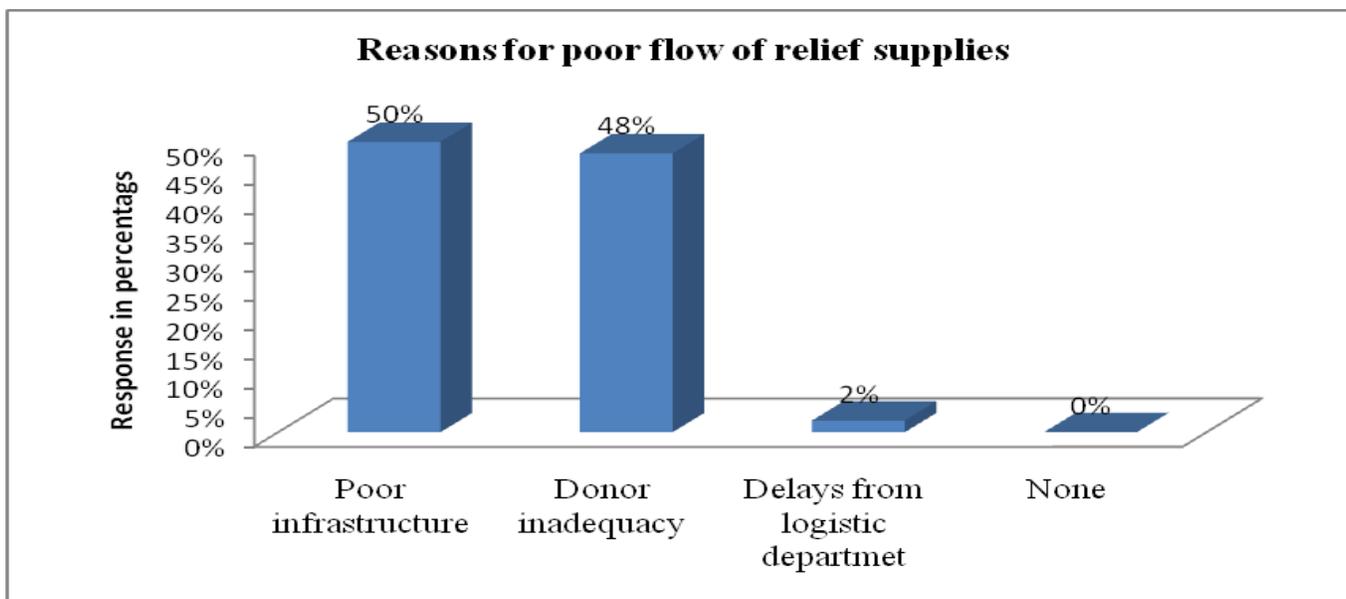


Figure 7 Reasons for poor flow of relief supplies

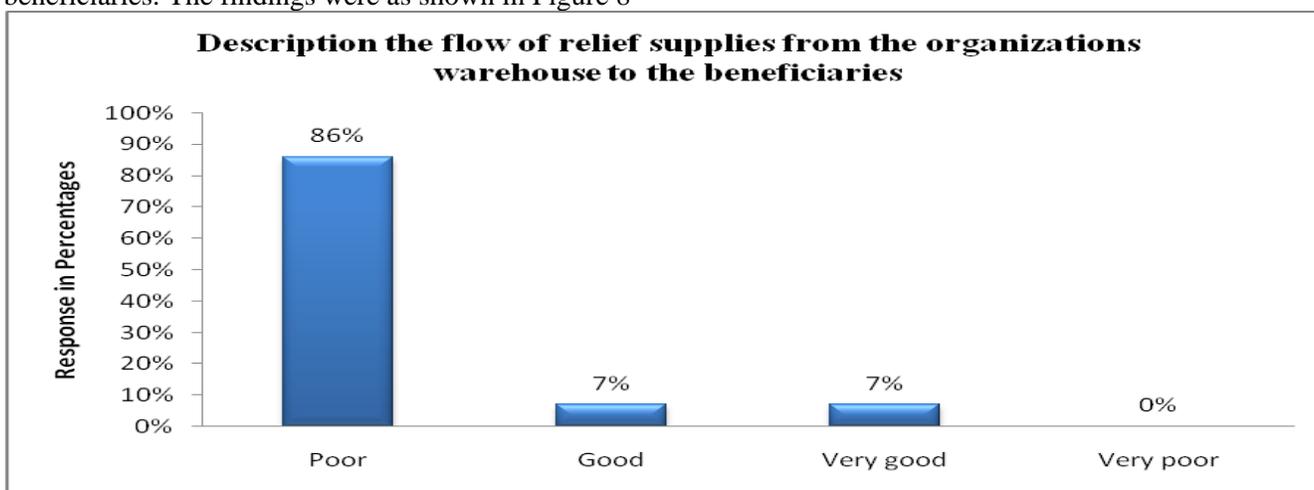
Source, Field data, 2017

As indicated in Figure 5.3, (50%) of the respondents indicated that poor roads were the major cause of delays of relief supplies into the organizations warehouses due to fewer efforts by the Government to construct and repair the roads. While (48%) of them indicated that donor inadequacy was another challenge that was experienced during the supply of relief materials to the right destination. This was due to lack of lack accurate information for effective planning. infrastructure

Only (2%) of them said that delays that were caused by suppliers due to lack of transit vehicles and unworthy road vehicles. Insecurity was another challenge suggested. The findings implied that infrastructure is a night mare in the area that causes delays in flow of relief supplies. This agrees with Van Wassenhove (2006) that there are several parts to prepare for effective flow, these include knowledge management (planning) and resources like

5.8.5 Description of flow of relief supplies from the organizations warehouse to the victims of floods in Lower Kano plain

The respondents were also asked to describe the flow of relief supplies from the organizations warehouse to the beneficiaries. The findings were as shown in Figure 8



Field data, 2017 ; N=273

Figure 8 Flow of relief supplies from the organizations warehouse to the victims of floods

As indicated in Figure 5.3, (86%) of the respondents indicated that there was poor flow of relief supplies from the organizations warehouse to the beneficiaries

due to poor coordination of logistical issues by the management and inadequate funds to facilitate the activities. While (7%) of them said that the flow of

relief supplies from the organizations warehouse to the beneficiaries was very good and good. The findings implied that there was a big problem in the flow of

supplies from the point of storage to the point of consumption.

5.9 Effects of staff motivation during Relief Aid distribution

In establishing the effects of employee motivation as a challenge, the study found that (46%) of the respondents indicated that there were measures in place for staff motivation in the organization which included differentiated salaries, field allowances, promotions

and yearly salary increment. Over half of the respondents at (54%) said that they were not motivated in any way due to a lot of challenges experienced during Relief Aid distribution (Figure 5.7). The findings implied that relief workers were highly demotivated which resulted to poor performance.

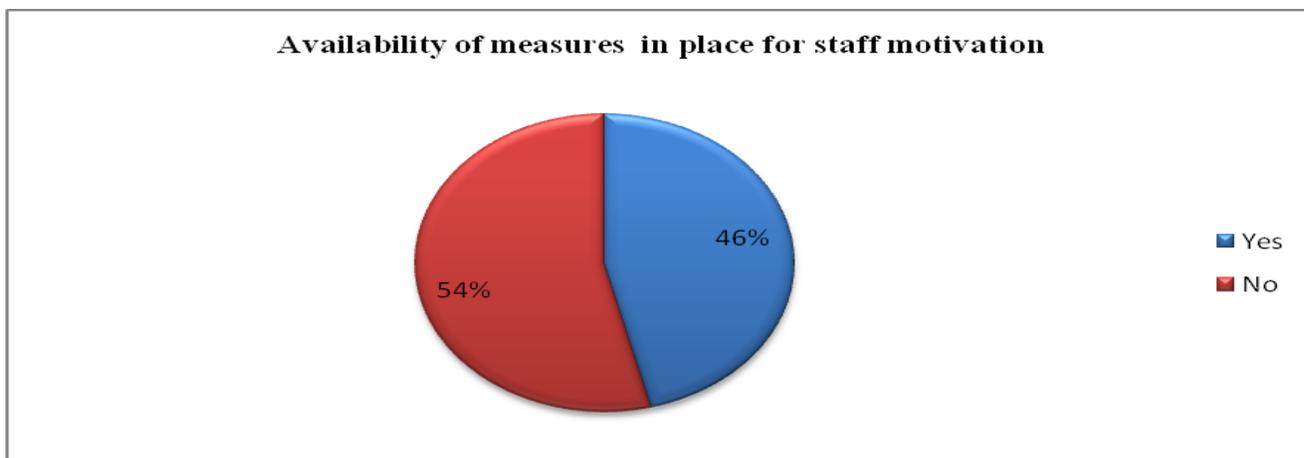


Figure 9 Effects of staff motivation during Relief Aid distribution
Field data, 2017

5.10 Rate of motivation during Relief Aid distribution

The respondents were asked to show rate of motivation during Relief Aid distribution. The findings were as shown in Figure 10

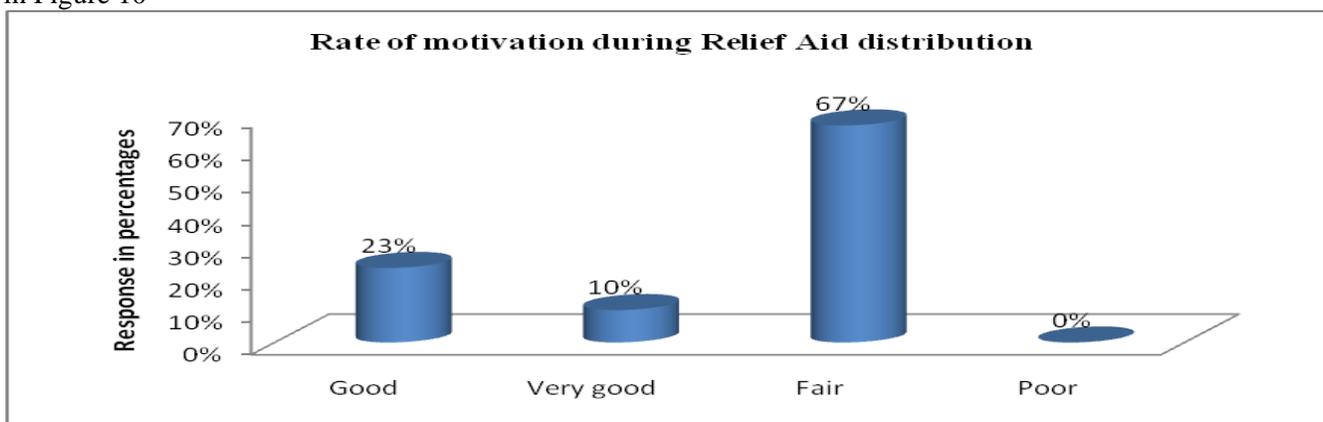


Figure 10 Rate of motivation during Relief Aid distribution
Field data, 2017

As indicated in Table 4.11. (23%) of the respondents indicated that motivation during Relief Aid distribution was good due to field allowances. (67%) of them indicated that motivation during Relief Aid distribution was fair due to security issues, untimely and inadequate allowances and lack of staff promotions. while (10%) of them indicated that motivation during

Relief Aid distribution was very good due to opportunities to interact and learn more from beneficiaries. These findings implied that people are motivated and able to work harder and more efficiently if employees are paid on basis of the amount and quality of work performed, managers providing rewards, long term employment, promotion, goal

setting, feedback, and commitment(Frederick Taylor 1963). One of the respondents interviewed had to say:

“The employees who are involved and committed to an organization goals are motivated to increase productivity by provide to motivate employees include, money (bonuses, Stock options, pay), benefits, flexible schedules, job responsibilities and duties, promotions, changes in status, supervision of others, praise and feedback, a good boss, strong leaders,

IV. CONCLUSIONS AND ECOMMENDATIONS

Based on findings, it can be concluded that floods in the region were also attached to some economic benefits. For instance, there was fishing taking place during floods and so residents in flood prone areas could not move away from the flood prone areas. This perception could therefore hamper successful and effective of humanitarian operations such as evacuation. There were also inadequate availability of resources such as money to relocate to safer lands and this could be attributed to low economic status of the majority of the respondents, hence impeding the implementation of some of the operations by the humanitarian organizations. The study also concluded that most of the respondents could not relocate to safer grounds during floods because whatever was given by Humanitarian Organizations was so small that it could not sustain their needs during floods.

The study also sought to find out the influence of local community's social factors on the operations of humanitarian organizations in Lower Kano Plains during flood seasons. Based on this objective, the study concluded that Humanitarian Organizations personal did not understand their culture so they could not help them well during flood management. It was also concluded that majority of the respondents were reluctance to relocate to safer grounds during flooding because of their ties with their ancestors and that they were not ready to leave their ancestor's land. The study also concluded that village elders understood the significance of their ancestral land and as such they would always give them the correct information during floods, which they heavily relied on more than the information given by the humanitarian organizations. It was also concluded that a significant number of the respondents believed that flood was a way through which their fore fathers cleaned them from evil doers and so they could not accept gifts from foreigners during flood.

inspirational people and nurturing organizational culture”(Field data, 2017).

This shows that good employee motivation enhance service delivery and hence good response to floods. Similarly, Islam (2006) found that motivation of employee's offers may benefits to the Organisation and also to the employees. This suggests the importance of motivating employees. Motivation acts as a technique for improving the performance of employees working at different levels.

The study found out that quite a number of challenges are faced by relief aid workers during relief aid distribution in Kenya. Therefore, this study recommends that employee-manager relationship should be enhanced to enable the organization to achieve the long term goals. This would be achieved by managers adopting organizational culture that is open to communication and democratic style of leadership. Bottom up decision making culture should be encouraged by the management. The study found out that there was poor communication between employees and top level management. Therefore, the study recommends that managers need to involve workers in decision making and empower them through trainings. The study found out that money was not the only motivator but working conditions and other incentives motivated staff to work effectively like trainings, foreign trips/team buildings, promotions, rewarding of best staff and open culture of communication. This aspect of motivation according to the staff suggestions increases commitment and team spirit.

On challenges facing the humanitarian organizations during flooding, the study concluded that poor communication between the managers and the field workers and between the managers themselves could hamper good operations by the organizations. The study also concluded that relief supplies into the organizations warehouses was fair since there were many challenges encountered during transportation of the relief supplies like poor donor supply due to lack of communication and planning and poor road networks. Poor roads were the major cause of delays of relief supplies into the organizations warehouses due to fewer efforts by the Government to construct and repair the roads infrastructure in the region. It was also concluded that there were measures in place for staff motivation in the organization which included differentiated salaries, field allowances, promotions and yearly salary increment even though they

suggested that an effective criteria needed to be established.

The government, through various ministries concerned with community development and disaster management, should design sustainable mitigation measures such as economically empowering the communities to minimize the impact of floods and the associated risks not only in Lower Kano Plain area but also in other flood prone areas.

It emerged from the study that social factors discussed herein had an influence on vulnerability to flood risk. There is need for the government to prepare and mitigate the consequence of floods by assisting the most honorable like orphan, women's, the aged and widows to build flood proof/resistant house or houses rising above the ground. Suitable flood prevention materials and equipment should be made available by the govern men in such risky Ares at subdued rates. Affected households should be given an option of being relocated to safer sides. The results of this study revealed that economic factors had a great influence on vulnerability of households to flood rise. Official response only deals with relief to keep off starvation

and despise with little attention to the economic recovery of the community on long term basis. Based on this finding, this study recommends that, emergency and disaster response, and preparedness be increased by the government to bring about sustained resilience of Nyando communities through diversification of livelihood and copying strategies.

On the impacts of flood on households, this study found out that homes, roads, business, education and households' help were most imparted by floods. The study recommends that the county government of Kisumu set aside funds of emergency, build strong infrastructure like schools, hospital and bridges by adhering to laid down flood proofing regulations, building well equipped rescue centers, hospitals and investing more on preparedness. Kisumu county government initiative to control house construction in the basin and across the natural drains should also be increased. Multispectral approach food mitigation as opposed to single sector should be should be promoted as there are inter-linkages in terms of flood impact on various aspects of society.

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Statistical Analysis of Delivery Care Service Utilization of Women in Gurage Zone, Ethiopia

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Abstract: Delivery care through access to health facilities and skilled health personnel are the main important interventions for safe motherhood and the child. Despite the international emphasis on the need to address the unmet health needs of pregnant women and children, progress in reducing maternal mortality has been slow. This research was conducted to fill the gaps, mothers not delivering at health institution, by identifying factors which affect delivery care services utilization of mothers in Gurage zone and the prevalence of delivery care service utilization was also estimated. 1056 women who gave birth in the past five years have been considered in the study from two woredas (Gummer and Abeshige) and one city administration (Butajira). About 750 (71%) of the women delivered at health institution and about 306 (29%) of them delivered at home. Mothers level of education, job category of women, frequency of watching television, information about antenatal care, frequency of antenatal care service during pregnancy significantly affect place of delivery of women. But husband's level of education, place of residence, religion, age of women, distance from health institution did not affect place of delivery of women. Based on the finding of this research we recommend that the governmental and non – governmental organization should work hard to address delivery care service utilization among women in reproductive age. Awareness creation about the service and empowering women should be considered.

Keywords: Maternal Delivery, Logistic regression, Gurage zone

1. Background

Improving delivery care system is the main important interventions for safe delivery of child and life of the mother. Historically, increasing women's access to health facilities with the capacity to provide emergency obstetric care has been responsible for large drops in maternal mortality [1].

International and national organization are working hard to address the unmet health needs of pregnant women and children, but the progress in reducing maternal mortality has been slow. According to estimates by WHO, UNICEF, UNFPA, and the World Bank, 358,000 maternal deaths occurred worldwide from preventable complications during pregnancy and childbirth. Moreover, 99% of maternal deaths (355,000) in 2008 occurred in developing countries, and an estimated 87% (313,000) occurred in sub-Saharan Africa and South Asia (WHO, 2008). This is particularly worrying in sub-Saharan Africa where over 162,000 women still die each year during pregnancy and childbirth, most of them because of the lack of access to skilled delivery attendance and emergency care [2-6].

With a maternal mortality ratio of 673 per 100,000 live births and 19,000 maternal deaths annually, Ethiopia is a major contributor to the worldwide death toll of mothers. Although improvements have been reported in regard to reducing infant and child mortality in the country, there has been slow progress regarding Millennium Development Goal 5, the cornerstone of maternal health [7].

According to 2011 Ethiopian demographic and health survey (EDHS), only 10% of births were delivered at a health facility (9% in a public facility and 1% in a private facility). Nine women in every ten have delivered at home. The percentage of deliveries in a health facility doubled by 5% from the 2005 EDHS, while home deliveries decreased slightly from 94% to the current level of 90%. A skilled birth attendant (4% by a doctor and 7% by a nurse or midwifery) assisted 10% of births, a health extension workers (HEW) assisted less than a relative, or some other person assisted only 1% of births. Similarly, from the report (2011 EDHS), 28% of births have assisted by a traditional birth attendants, while 4% of births were unattended. Skilled assistance at delivery increased from 6 to 10% in the last six years [8].

This study aims to determine the prevalence of maternal health care utilization and explores its determinant among women aged 15–49 years in Gurage zone, SNNP, Ethiopia.

2. Materials and Methods

The study was conducted in Gurage zone, which consists 13 Woredas and two cities administration. The study population was all women in the reproductive age (15-49 years) who gave birth in the last 5 years. The estimated number of women in the reproductive age is about 375,109 (23.3% of the total population). To get the appropriate respondents, two – stage cluster sampling was employed. From 13 woreda and two cities, three of them (Butajira city, Abeshige and Gumer woreda) were selected randomly and the respondents from each cluster were also selected accordingly.

Using statistical sample size determination formula (Cochran, 2002), considering all necessary inputs we found the sample size was 1,056, we taking proportion, $p = 0.55$ [9]

Structured questionnaire was used for data collection. In case of more than one delivery in last five year for particular respondent, we focused on the last delivery. Data collectors were recruited and trained by the researcher on how to use the research instrument and the easier way to collect data from respondents.

Variables

The response variable of this study was the place of delivery (place where mother’s gave birth), and coded as 0 if a mother gave birth at health institute and 1 if at home.

The independent variables includes, items for socio demographic characteristics, socio economic factors, health system factors and cultural factors.

Binary Logistic Regression model

Binary logistic regression is typically used when the dependent variable is dichotomous and the independent variables are either continuous or categorical variables. One key assumption in regular binary logistic regression is that observations are independent of each other. Violations of the assumption of independence of observations may results in incorrect statistical inferences due to biased standard errors. [10]

The binary logistic regression model is defined as:

$$P(x_i) = \frac{e^{(\beta_0 + \beta_1 x_{i1} + \dots + \beta_p x_{ip})}}{1 + e^{(\beta_0 + \beta_1 x_{i1} + \dots + \beta_p x_{ip})}} = \frac{e^{x\beta}}{1 + e^{x\beta}} = \frac{1}{1 + e^{-x\beta}}$$

Where, β_0 = the constant of the equation and β_i = the coefficient of the i^{th} predictor

The relationship between the predictor and response variables is not a linear function in logistic regression; instead, the logarithmic transformation of equation yields the linear relationship between the predictor and response variables.

The logit transformation of $P(x_i)$ given as follows:

$$\text{logit}[P(x_i)] = \log\left(\frac{P(x_i)}{1 - P(x_i)}\right) = \beta_0 + \beta_1 x_{i1} + \beta_2 x_{i2} + \dots + \beta_p x_{ip} \quad i = 1, 2, \dots, n$$

The coefficient can be interpreted as the change in the log-odds associated with a one unit change in the corresponding independent variable or the odd increases multiplicatively by e^β for every one unit change increase in x .

Logistic regression is popular in part because it over – come many of the restrictive assumption of ordinals least square (OLS) regression. Like it doesn’t assume linearity, the dependent variable need not normally distributed and so on.

Logistic regressions work with odds. The odds are simply the ratio of the probabilities for the two possible outcomes. If p is the probability that the event will occur, then $1 - p$ is the probability that the event will not occur: $odd = \frac{p}{1-p}$. In 2×2 tables, within row 1 the odds of success are $odd_1 = \frac{p_1}{1-p_1}$, and within row 2 the odds of success equal $odd_2 = \frac{p_2}{1-p_2}$,

The ratio of the odds from the two rows, which we call odds ratio, will be

$$P_i = \frac{odd_1}{odd_2} = \frac{\frac{p_1}{1-p_1}}{\frac{p_2}{1-p_2}}$$

Parameter Estimation

The general method of estimation that leads to the least squares function under the linear regression is called maximum likelihood. It is this method that provides the foundation for our approach to estimate the logistic regression model. In a very general sense the method of maximum likelihood yields values for the unknown parameters which maximize the probability of obtaining the observed set of data. In order to apply this method we must first construct a function called likelihood function. The maximum likelihood estimators of these parameters are chosen to be those values which maximize this function. Thus, the resulting estimators are those which agree most closely with the observed data.

Model Adequacy Checking

After the model is fitted it is important to check how the model adequacy is, which can tell us the goodness of fit of the model. For this research we used Hosmer – Lemeshow test, which measures the correspondence between the actual and predicted values of the dependent variable, and the Likelihood Ratio Test, which is a test of the significance of the difference between the likelihood ratio (-2LL) for the fitted model and the likelihood ratio for a reduced model.

3. RESULTS AND DISCUSSION

RESULTS

Descriptive Statistics and Chi-square Test of Association

The association between predictor variables and delivery care service utilization status was identified by conducting chi-square test of association.

From 1056 women respondents, 488 of them are from urban and 568 are from rural. Nearly half of them (49.6%) are orthodox, 34.8%) of them Muslim and the rest are Protestant and Catholic. About 750 (71%) of the women delivered at health institution and 306(29%) of them delivered at home. 73.4% of the women have information about ANC service.

Table 3.1 below reveals that mothers who lived in urban area have the lower home delivery status. More than half of the women (61.5%) in the study have a practice to visit for ANC more than four times. We can see all other results from the given table below.

Table 3.1: Maternal delivery status according to selected independent variables, 2017

Variables	N	Place of delivery		Chi-square value	DF	P - value
		Home	Health institution			
Place of residence						
Urban	488 (46.2%)	44(9%)	444(91%)	18.78	1	0.000
Rural	568 (53.2%)	103(18.1%)	465(81.9%)			
Mother's level of education						
Uneducated	385(36.6%)	69(17.9%)	316(82.1%)	19.35	3	0.001
Primary	380(36.1%)	57(15%)	323(85.0%)			
Secondary	121(11.5%)	6(5%)	115(95.0%)			
College and above	167(15.9%)	15(9.0%)	152(91.0%)			
Husband level of education						
Uneducated	293(27.9%)	64(21.8%)	229(78.2)	24.07	3	0.000
Primary	401(38.2%)	51(12.7%)	350(87.3)			
Secondary	160(15.3%)	13(8.1%)	147(91.9%)			
College and above	195(18.6%)	17(8.7%)	178(91.3%)			
Job category of mother						
Housewife	591(56.0%)	92(15.6%)	499(84.4%)	21.15	5	0.007
Merchant	156(14.8%)	23(14.7%)	133(85.3%)			
Causal laborer	74(7.0)	15(20.3%)	59(79.7%)			

Government institution	134(12.7%)	8(6.0%)	126(94.0%)			
NGO	29(2.7%)	0(0)	29(100%)			
Other	72(6.8%)	9(12.5%)	63(87.5%)			
Having information about ANC						
Yes	774 (73.4%)	91(11.8%)	683(88.2%)	9.95	1	0.002
No	281(26.6%)	55(19.6%)	226(80.4%)			
Frequency of ANC visit						
Not at all	72 (6.8%)	40 (55.6%)	32(44.4%)	100.66	3	0.000
One times	36 (9.4%)	15(41.7%)	21(58.3%)			
2-3 times	299 (28.3%)	31(10.4%)	268(89.6%)			
4 and above	649 (61.5)	61 (9.4%)	588 (90.6%)			
Frequency of watching TV						
Not at all	523 (50%)	89 (17.0%)	434 (83.0%)	19.5	3	0.000
Once a week	78(7.4%)	12(15.4%)	66 (84.6%)			
More than once in a week	80(7.6%)	15 (18.8%)	65 (81.3%)			
Always	366 (35.0%)	28 (7.7%)	338 (92.3%)			

Multi – variable Binary Logistic Regression Result

The significant variables from chi-square test of association and other additional variables were included in the multivariable binary logistic regression model. Six variables had significant joint impact in determining delivery care service utilization. The final binary logistic regression result is summarized in Table 3.2 below.

Table 3.2: Result of the Final Model, 2017

Variable	Level	β	SE	Wald	Sig.	OR
Mother Education	College and above (Ref.)					
	Uneducated	2.123	0.605	12.313	0.000	8.353
	Primary	1.681	0.580	8.404	0.004	5.371
	Secondary	0.084	0.638	0.017	0.895	1.087
Job category of women	Other (Ref.)					
	Housewife	-1.733	0.513	11.429	0.001	0.177
	Merchant	-2.113	0.552	14.645	0.000	0.121
	Causal labor	-2.224	0.599	13.790	0.000	0.108
	Gov. employed	-2.801	0.773	13.129	0.000	0.061
	NGO employed	-22.346	6.548	0.000	0.997	0.000
Distance		0.069	0.022	10.226	0.001	1.072
ANC	No (Ref.)					
	Yes	-0.523	0.226	5.334	0.021	0.593
ANC visit	Not at all (Ref.)					
	Only one time	-0.023	0.327	9.785	0.080	0.997
	2-3 time	-0.531	0.427	15.284	0.000	0.588
	4 and above	-0.789	0.273	18.809	0.000	0.454
TV	always (Ref.)					
	Not at all	2.448	0.256	91.578	0.000	11.570

	Once a week	1.566	0.370	17.891	0.000	4.787
	More than once	1.933	0.370	27.304	0.000	6.908

Based on table 3.2 the probability of delivery at home for mothers having no education is 8.353 times more likely than mothers having college and above level of education. The probability of delivery at home for mothers having primary education is 5.371 times more likely than mothers having college and above level of education but there is no significance difference on the place of delivery of women who have college and above education and women having secondary education when the effect of other variable is constant. The probability of delivery at home for mothers who have information about ANC is decreased by 40.7% (OR=0.593) than mothers who do not have information about ANC when the effect of other variables keep constant. There is no significance difference between mothers who do not have ANC visit and mothers having only one ANC visit during their pregnancy. The probability of delivery at home for mothers who have 2-3 times ANC visit is decreased by 41.2% (OR=0.0.588) than mothers who do not have ANC visit when the effect of other variables keep constant. The probability of delivery at home for mothers who have 4 and above times ANC visit is decreased by 54.6% (OR=0.454) than mothers who do not have ANC visit when the effect of other variable keep constant. The probability of delivery at home for mothers who do not watch TV is 11.570 (OR=11.570) more likely than mothers who watch TV always. The probability of delivery at home for mothers who watch TV once a week and more than once a week is 4.787 and 6.908 times more likely than mothers who watch TV always respectively by keeping the effect of other variables fixed.

Table 3.3: Hosmer and Lemeshow Test

Chi-Square	Df	Sig,
9.379	8	0.311

Based on table 3.3, P-value = 0.311 indicating no evidence of poor fit. This is good, since here we know the model is indeed correctly specified.

DISCUSSION

More than half of the women (61.5%) had a practice to visit health facility for ANC more than four times, this is different from Kifle (2014), in which only 54.5% of women got skilled attendance. This finding is also a little bit higher than research conducted in Nepal in 2013 where 644 pregnant women whose delivery location had been identified, 547 (85%) gave birth in a health care facility [11]. And also the above result tells us about 38% of the pregnant women fail to satisfy the minimum number of visit recommended by WHO.

Mother’s literacy level is also important determinant of place of delivery as those with non-formal education tend to deliver at home, and those educated tend to give birth in health facilities. Similar result is also obtained in research conducted in Nepal which showed that there is relationship between education and place of deliver as those with poor education are more like to deliver at home compared to educated women who tends to deliver at health facilities [12]. Another study from Cambodia noted that women who attend at least seven years of school are six times more likely to deliver in health facilities compared to those who did not attended school [13]. All those literatures shows that level of education were strongly associated with delivery in health facility where by more educated women tends to deliver in health facility compared to non-educated, therefore increased enrollment of girls to secondary education and above could help to improve delivery in health facility.

Information about antenatal care also brings significant difference to deliver at health institution or not. Insufficient counseling during antenatal visit is another factor for low delivery in health facility, minimal time used by health workers for counseling pregnant mothers during antenatal clinic is the missed opportunity to educate women importance of delivery at health institution. Also information about pregnancy risk and labour complications are not well communicated during antenatal clinical visit.

Job category of women, frequency of watching television, frequency of antenatal care service during pregnancy significantly affect place of delivery of women. But husband’s level of education, place of residence, religion, age of women, distance from health institution did not affect place of delivery of women. This result is consistent with the research conducted in Nepal using ordinal logistic regression model.

4. CONCLUSION AND RECOMMENDATION

CONCLUSION

About 1056 women in the reproductive age who gave birth in the past five years have been considered in the study from two woredas (Gummer and Abeshige) and one city administration (Butajira). From these respondents, 488 of them are from urban and 568 are

from rural. Nearly half of them (49.6%) are orthodox, 34.8% of them are Muslim, 14.3% of them are Protestant and the remaining (1.3%) of them are Catholic. About 71% of the respondents delivered at health institution were as the remaining 29% delivered at home.

Mothers' level of education, job category, frequency of watching television, information about antenatal care, frequency of antenatal care service during pregnancy significantly affect place of delivery. But husband's level of education, place of residence, religion, age of women, distance from health institution did not affect place of delivery of women.

RECOMMENDATION

Based on the finding of this research we recommend that the governmental and non – governmental organizations should work hard to address delivery care service utilization among women in reproductive age. Teaching women in reproductive age about antenatal care and the importance of delivering at health institution should be done by the concerned bodies. The government and the local administrators should work hard to improve women education which has influence on delivery care service utilization. The health workers should teach women about the risk of home delivery on the health of newborn and the mother. Additionally strong follow up and guidance is required to increase ANC visit during pregnancy and they have to provide detail information during the follow up period.

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Perceived Burnout as a Function of Gender and Sport Type among Youth-Athletes in Taraba State

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Abstract- Athletes face many challenges throughout their quest for perfection. The road to excellence, they may face numerous hours of training, injuries, and rehabilitation, stress, anxiety and interaction with coaches. The conceptualization of burnout involves the interaction of a number of different components such as behavioral, cognitive, physical, effective and emotional signs and symptoms.

The study was carried out using descriptive survey research design. 200 athletes were purposively selected in Taraba State Athletic Competition. A moderated Eades Athletic Burnout Inventory (MEABI) was administered to the respondents, 5- points Likert Scale ; Always (A), Almost Always (AA), Frequently (F), Sometimes (S), and Not At All (NA). The instrument has the reliability index of 0.88. Data was analysis using t-test at 0.05 level of significance to determine the association of gender and sports type on burnout among athletes. Perceived burnout as a function of gender and that of sport type among Taraba athletes were tested. The burnout level of female athletes is higher than that of male athlete in Taraba State and that gender has significant effect on the burnout of athletes in Taraba State. On sport types, burnout level among the athletes of team and individual sport are not significant. Therefore burnout in sports is not the function of sports types

It was therefore recommended that the coaches, the trainer and sport psychologist should be able to train the athletes whether male and the team and the individual on the psychological techniques to reduce the occurrence of burnout and enhance better performance in their sporting activities

I. INTRODUCTION

Increase in performance over time appear to come about partially based on increased need or desire by athletes to dedicate themselves to their sport and athletic accomplishment. Athletes practice countless hours to improve their skill and talent (Cremades & Wiggins, 2008). Dedication and devotion of long period of time for training to enhance good performance come on high expectation of not only athletes, but parent and coaches. Jones, Swain and Cale (1991) and Wiggins and Brustad (1996) emphasised that high expectation may increase the amount of stress an athlete experiences, and it has been shown to be related to higher levels of state anxiety which might ultimately lead to burnout.

With this type of emphasis placed on sport in our society, it is not unusual that the term burnout and anxiety have become almost synonymous with sport in many cultures across the world (Wiggins, Cremades, Lai, Lee & Erdmann, 2006). Burnout affects a wide variety of individuals participating in sport, including athletes and coaches. With regard to athlete burnout, there does not seem to be difference between recreational and elites athletes. According to Dale and Weinberg (1990) the primary cause of burnout seems to be long hours of practice requiring physical and mental energy as well as pressure to perform for game day. According to Rotella, Hanson, and Coop (1991), there are many athletes who excel under pressure, however, there are a significant number who turn away from their sport because of intensive training, high-pressure competition, extra adult pressure and induced stress.

Burnout is a condition of psychological, emotional and sometime physical withdrawal from sport participation as well as direct result from chronic stress (Rotella, Hanson & Coop, 1991). Each year many young athletes turn their heads from sport participation because of their frustrating experiences in sport. Sport Psychology research points out that it is the sum total of experiences over time, the judgement of one's performance, the pressure to perform, the stress in performing, the boredom, lack of joy, and the goals that others place on the athletes that ultimately lead the athletes to burnout and early retirement from sport (John, 2007)

Stress plays an important precursory role in burnout. Stress in reference to burnout is defined as a perceived imbalance between perceived demands and perceived response capabilities (Martens, 1977, & Martens, Burton, Vealey, Bump & Smith, 1991). Each person has tolerance level for stress. If the stress becomes considerably greater than the tolerance, a person will suffer emotional stress its negative consequences (Humphrey, 2003).

According to Vealey, Armstrong, Comar and Greenleaf (1998), burnout is defined as a psychological, emotional, and physical withdrawal from activities. It may be that an individual withdrawal from an activity from a length of time because there is no other perceived way to escape the situation and related stress (Raedeke, Granzyk & Warren, 2000, Raedeke & Smith, 2001). Stresses identified as being related to burnout are fear of failure, frustration, high expectations, anxiety, and pressure to perform (Dale & Weinberg, 1990). Characteristics associated

with burnout includes a physical and emotional exhaustion, negative effect, a lack of perceived accomplishment a loss of concern or interest in an activity, and depersonalisation (Smith, 1986 & Weinberg & Gould, 2003).

According to Rotella, (1991), Sport Psychology professionals generally agreed by sport psychologist that at the core of burnout is a general combination of the following symptoms; lack of energy, exhaustion, sleeplessness, some degree of depression, tension, irritability, anger, headaches or other physical ailments, decreased performance, a tendency to internalise all failure, disillusionment with sports, and loss of confidence. British Broadcasting Corporation Sport Academic (2005) opined that thou the symptoms of burnout can be confusing, but coaches and parents should watch for the following; constantly feeling tired, easily frustrated, not wanting to go to practice or training, increase irritability, headaches or minor body aches and worrying about failure and adult expectation <http://news.bbc.co.uk/sport2/hi/ten>

Burnout among athletes is equivocal in term of gender differences. According to Caccese & Mayerberg, 1984; Kelley, Eklund, and Ritter-Taylor (1999), Lee and Cremades (2004) and Pastore and Judd (1993), female athletes and coaches experience burnout more than male athletes and coaches. The reason behind this according to the authors is that female reported greater levels of emotional, physical and devaluation than males. In contrast to that is Lai and Wiggins (2003) who found that male soccer experienced burnout than female players.

When further examining reasons for burnout in sports, several differences based on demographics according to Gould and Carson (2004) are found, males reported the effect of win-loss record on their decision more than females. Martens and Seedfeldt (1979) stressed those female rated social aspects of sports (relationships with teammates, peer comparison) as more of an influence on their decision than males. Females have reported negative experiences in sport (physical and emotional trauma) that have led to some discontinuing sport participation (Gilbert, 2001).

A large numbers of female athletes experience a considerate amount of stress than male in their respective sport. It is when those high levels of stress and anxiety are maintained at the extended amount of time, the athlete may become burned out and loses the desire to continue participating in that sport (Pietraszuk, 2006). Caccese and Mayerberg (1984) indicated that female coaches and athletes are easily emotional exhausted and have lower personal accomplishment.

Caccese and Mayerberg (1984) stressed further that females were more burned out than males due to years of experience, less time to learn to cope with stress, too idealistic and have too high expectations. Vealey, Armstrong and Comar (1998) stressed that female athletes seek social support as a coping mechanism for performance-related stress in sport more than male athletes and that if the social support is withdraw, the female athletes are exposed to burnout.

According to Kalimo and Hakanen (1998) in Adekola (2010), women are better equipped for human relations and for sharing their negative emotion, while men tend to suppress their emotional impulses in order to live up to their roles, thereby

making women more inclined to adopt cynical attitude as means for coping with stress. It has also been explained that exhaustion does affect women than men because more often than not, women do carry double workload (job, housework, childcare). (Adekola, 2010).

Because depersonalisation is associated with burnout, factors such as encouragement, cooperation, and support from team members may influence the individual's resilience against burnout. These factors as mentioned above are constantly emphasised in team sports that require a task involving the whole team. Thus, the authors have categorized sports such as baseball, basketball, football, handball and volleyball are under team sports and sports such as tennis, table tennis, badminton, golf and track and field events are under individual sports (Cremades & Wiggin, 2008).

Skill development and performance was predicted by higher perceived social support in team sport than individual sport (Alfermann, Lee & Wuerth, 2005). According to the authors, past research has shown that greater satisfaction with social support is related to lower burnout levels (Price & Weiss, 2000; Raedeke & Smith, 2004) In a study by Kelley and Gill (1993), results revealed a relationship with greater levels of social support and lower levels of stress appraisal and burnout among coaches and players. Thus, athletes participating on team sports may be more likely to perform at optimal levels and less likely to burnout, as opposed to athletes who participate in individual sports. It is against this background that this study is designed to assess gender and sport types as a function of burnout among youth-athletes in Taraba State.

II. HYPOTHESES

- 1) There is no significant difference in burnout level between male and female athletes in Taraba State.
- 2) There is no significant difference in burnout level between athletes of team sports and individual sports.

III. METHODOLOGY

The study adopted survey research design. 200 athletes who participated in Taraba State Athletic Competition are involved in the study.. Moderated Eades Athletic Burnout Inventory (MEABI) was administered to the respondents. 5-points Likert Scale; Always (A), Almost Always (AA), Frequently (F), Sometimes (S) and Not At All (NA). The questionnaire was in two parts; demographic information and statement of facts. 4 items made up the demographic information while 20 statements were on the burnout. The instrument has the reliability index of 0.88. Data was analysed using t-test at 0.05 level of significance to determine the association of gender and sports type and burnout among athletes

Hypothesis 1: There is no significant difference in burnout level between male and female athletes in Taraba State.

Table 1: Perceived burnout as a function of gender among Taraba State athletes

Group	Mean	N	SD	Df	t-val	Sig (2-tailed)
Female	3.0778	50	.53867			
Male	1.9504	50	.61655	98	9.737	.000

t,df=.427 (P<0.05)

It is shown in the table 1 above that the t-test score of female athletes is 3.0778 ±.53867 while that of the male is 1.9504 ±.61655. It is also indicated that the t value 9.737 is higher than t. critical value of .427 and P <0.05. This indicates statistical significant difference in burnout level between male and female athletes in Taraba State. The data shows clearly that the burnout level of the female athletes is higher than that of male athletes. It can be deduced from the data that gender has

significant effect on the burnout of athletes in Taraba State. Therefore, burnout among Taraba State Athletes is the function of gender.

Hypothesis 2: There is no significant difference in burnout level between athletes of team sports and athletes of individual sports.

Table 2: Perceived burnout as a function of Sport types among Taraba State athletes

Group	Mean	N	SD	Df	t-val	Sig (2-tailed)
Team Sports	2.3600	51	.72330			
Individual Sports	2.6745	49	.86591	98	-1.974	0.51

t,df =1.297 (p>0.05)

The table above shows the t-test score of perceived burnout as a function of sport type (team and individual sport). It is shown that the mean score and standard deviation of team sport athletes burnout and individual sport athlete burnout is 2.3600 ±.72330 and 2.6745 ±.86592 respectively. The critical value of 1.297 is higher than t-value of -1.974 while P>0.05. The result according to the table indicates that the different in burnout level among the athletes of team and individual sport are not statistical significant. Therefore burnout in sports is not the function of sports types (team and individual sports)

and have too high expectations. According to Vealey, Armstrong and Comar (1998), female athletes seek social support as a coping mechanism for performance-related stress in sport more than male athletes and that if the social support is withdraw, the female athletes are exposed to burnout. Demographics factors such as gender according to Ryan and Gould (2004) are found to affect level of athlete’s burnout. In their study males reported the effect of win-loss record on their decision more than females; therefore men are less burned out. This finding of this study is in contrast to that is Lai and Wiggins (2003) who found that male soccer experienced burnout than female players.

IV. DISCUSSION

The study is to determine whether burnout among players is perceived as a function of gender and sport type. The findings of this study revealed a significant effect of gender on burnout among athletes. However, the result as shown in table 1 indicates that female athletes were burned out than male athletes. Considering the gender shift that is taking place in sport that has historically been dominated by men, sex difference is a factor to be considered in the study of athletic burnout. The burnout level was relatively low in men than in female. This findings collaborates the findings of Pasture and Judd (1993) Kelley, Eklund, and Ritter-Taylor (1999), Lee and Creamades (2004) that stressed that female athletes and coaches experience burnout more than male athletes and coaches. The reason behind this according to them is that female reported greater levels of emotional, physical and devaluation than males. Cremades and Wiggin (2008) study also revealed that female athletes displayed higher levels of burnout as opposed to male athletes.

With regard to burnout as function of sports types (individual and team sports), it is revealed in this study that burnout in sports is not the function of sports types (team and individual sports).The finding concur with the study of Vealey et, al (1992) who reported a lack of relationship between sport type and burnout. They pointed out trait anxiety as a stronger predictor of burnout. Contract to this finding is the finding of Kelley and Gill (1993), Price and Weiss (2000); Raedeke and Smith (2004) which revealed that athletes in individual sports would show higher levels of burnout as opposed to athletes on team sports. To them, social support factors as encouragement and cooperation from team members may influence the individual’s resilience against burnout. Thus social support is emphasised more in team sports than individual sports which may help to explain the finding of this study that athletes participating in team sports experience lower burnout levels. According to Alfermann, Lee and Wuerth, (2005), past research has shown that greater satisfaction with social support which is easily attainable in team sport is related to lower burnout levels. Kelley and Gill (1993); Price and Weiss (2000), Raedeke and Smith (2004) study revealed that females in team sports reported lower reduced sense of accomplishment levels than females in individual sports. Past research according to the authors has

shown that greater satisfaction with social support may be related to less burnout level.

V. CONCLUSION AND RECOMMENDATIONS

The burnout level of female athletes is higher than that of male athlete in Taraba State and that gender has significant effect on the burnout of athletes in Taraba State. On sport types, burnout level among the athletes of team and individual sport are not significant. Therefore burnout in sports is not the function of sports types.

It was therefore recommended that the coaches, the trainer and sport psychologist should be able to train the athletes whether male and the team and the individual on the psychological techniques to reduce the occurrence of burnout and enhance better performance in their sporting activities. It was also therefore suggested that trainer, coaches and sport psychologist should encourage their athletes with both intrinsic and extrinsic motivation and greater satisfaction with social support for less burnout levels.

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Evaluation of Endothelial Nitric Oxide Synthase Gene Expression in Mice Genetically Heterozygous in CX43 (CX43 + / - Mice)

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Abstract- Gap junctions are proteins made of connexins which are involved in the regulation of vascular function. Deletion of connexins 43 (Cx43) modifies expression of genes known to be involved in the regulation of the vasculature, differentiation and function of vascular cells. Interestingly, mutant mice lacking endothelial nitric oxide synthase (eNOS) gene have been shown to be hypertensive, suggesting that nitric oxide (NO) plays a role in the physiological control of blood pressure. It was therefore hypothesised that the endothelial deletion of Cx43 in the pulmonary vasculature induces endothelial dysfunction and causes eNOS impairment thereby reducing NO biosynthesis, thus leading to vasoconstriction and vascular remodelling which subsequently leads to the development of pulmonary arterial hypertension (PAH). This project was aimed at evaluating eNOS gene expression in mice genetically heterozygous (HET) in Cx43 (Cx43 +/- mice). This was achieved by using lung tissues from four groups of wild type (W/T) and Cx43 +/- (male and female) mice. Ribonucleic acid (RNA) was isolated from the lung tissues using RNA II isolation system and was reverse transcribed to complementary deoxyribonucleic acid (cDNA). End – point polymerase chain reaction (PCR) and real time PCR were used to measure the expression of eNOS gene. eNOS gene expression levels were found to be the same in all four groups of mice tested, with no significant difference. The result therefore suggests that eNOS gene is expressed in mice genetically heterozygous in Cx43 (Cx43 +/-). Key words: Connexin, eNOS, PCR, Reverse transcription.

Index Terms- Connexin, eNOS, PCR, Reverse transcription

I. INTRODUCTION

Pulmonary arterial hypertension (PAH) is a fatal progressive disease characterized by persistently elevated pulmonary arterial pressure (PAP), thereby leading to failure of the right ventricle (Chin and Rubin, 2008). The disease, in which its aetiology is unknown, is associated with low level of pulmonary NO (Xu *et al.*, 2004), with clinical manifestations including ventilation–perfusion mismatching, shortness of breath, exercise intolerance, fainting and heart failure in severe cases (Chin *et al.*, 2005; Hemnes and Champion, 2008). From the heart, the pulmonary arteries supply deoxygenated blood to the lungs where gas exchange takes place within the pulmonary capillaries

(Martini *et al.*, 2012). PAH is a multifactorial disease characterized by constriction and remodelling of the pulmonary vasculature, which is the basis for the persistently high pulmonary pressures (Dempsie *et al.*, 2015). The process of vascular remodelling gives rise to increased and disorganised proliferation of smooth muscle cells (SMCs), pulmonary endothelial cells and fibroblasts, thus resulting in reduction in the number of distal arterial vessels as a consequent of increased muscularization of the arteries, which later progresses and leads to vessel occlusion and then finally, formation of plexiform lesion (Rabinovitch, 2008).

The exact pathogenesis of PAH is not completely understood, however, serotonin, bone morphogenetic protein receptor type 2 and NO pathways have been shown to play major roles in the development of the disease (Rabinovitch, 2012; Runo and Loyd, 2003). There is need for novel drugs therapies targeting both vasoconstriction and remodelling, which can only be achieved with known pathogenesis (Dempsie *et al.*, 2015). Studies have demonstrated that Cx43 expression is restricted to the endothelial cells at branch parts of pulmonary arteries (Gabriel and Paul, 1998). Genetic deletion of Cx43 in mice corresponds with significantly elevated smooth muscle proliferation (Liao *et al.*, 2007). Studies on Cx43 expression in animal models appear to be inconsistent as different effects of Cx43 deletions have been reported (Brisset *et al.*, 2009). While increased neointimal and adventitia formation were observed in Cx43 knockout mice (Liao *et al.*, 2007), a recent study however revealed a reduced neointimal formation in Cx43 heterozygous mice (Chadijichristos *et al.*, 2006). Deletion of Cx43 has been shown to modify expression of genes known to be involved in differentiation and function of vascular cells and cell signalling pathways important for the regulation of vasculogenesis and angiogenesis (Walker *et al.*, 2005). Since mutant mice lacking eNOS gene has been shown to be hypertensive, supporting a role for physiological control of blood pressure by NO (Rang *et al.*, 2012), there seem to be interplay between Cx43 and eNOS expression (Kirca *et al.*, 2015).

The aim of this project was to assess whether eNOS gene is expressed in mice genetically heterozygous in Cx43 (Cx43 +/- mice). Lung tissues from four groups of wild type and Cx43 +/- (male and female) mice were used. RNA was isolated from the lung tissues using RNA II isolation system and was reverse transcribed to cDNA. To measure the expression of eNOS gene, end – point PCR and real time PCR were used.

II. MATERIALS AND METHODS

Animal model and Tissue preparation

The investigation conforms to the United Kingdom Animal procedures act 1986, and with the Guide for the Care and Use of Laboratory Animals published by the US National Institutes of Health (NIH publication, 8th Edition, 2011). Ethical approval was granted by the University Ethics Committee. Male and female wild type and connexin 43 heterozygous mice were maintained in group cages, on saw dust bedding, and subjected to a 12 h–12 h light/dark cycle with food and water provided *ad libitum*. In this study, a total of 12 wild type mice and 12 connexin 43 heterozygous mice aged between 20 and 28 weeks were used. Animals were culled using intraperitoneal administration of pentobarbital sodium (60mg/kg i.p.; JM Loveridge plc, Southampton, UK), lung tissues snap frozen and stored at -80°C until further use. The tissue samples were labelled as shown in table 1.

Extraction of RNA using Nucleospin RNA II isolation system

Total RNA was isolated from the mice lung tissues using NucleoSpin® RNA II kit supplied by Macherey-Nagel GmbH & Co. KG, Germany. In proceeding with the RNA extraction from the lung tissues, first, 70% ethanol was prepared from 100% ethanol stock solution. Using the mathematical equation $M_1V_1 = M_2V_2$, the volume of water added to ethanol to make it 70% concentrated was obtained by cross multiplying the equation. $V_1 = \text{volume of stock solution needed} = M_2V_2 / M_1 = (70 \times 100) / 100 = 70\text{ml}$. Therefore, 70ml stock ethanol was diluted with 30ml of water, concentrating it to 70%. Furthermore, a DNase reaction mix was prepared in an Eppendorf tube by adding 10 μl of reconstituted rDNase to 90 μl Reaction buffer for rDNase, enough for all the samples. The reaction mix was briefly vortexed and stored on ice, and when required, 95 μl from it was added to each of the RNA samples. Each of the dissected (~10 mg) tissue was placed into lysis tubes containing 3 metal beads, 320 μl lysis buffer RA1 and 3.5 μl TCEP. Using Fast prep -24 homogenizer (MP Biomedicals United Kingdom), tissues were disrupted and homogenized as they were lysed 3 times at speed 5 for 20 seconds. Each time the tissues were lysed, the lysis tubes were removed and placed on ice for 1 minute so as to prevent overheating. The lysate was added to Nucleospin filter unit, which was then placed in a 2ml collection tube. RNA was extracted from the lysate after centrifugation at 13,000 rpm for 1 minute. RNA binding condition was adjusted by adding 320 μl of 70% ethanol to each homogenised lysate in the collection tubes after removing the filter units. The content of the collection tubes were properly mixed by pipetting up and down for 5 times, using a pipette man. This was then transferred to a NucleoSpin RNA column in a 2ml collection tube alongside precipitate which had formed. The samples were centrifuged for 30 seconds at 10,00rpm and the flow-through discarded. 350 μl of membrane desalting buffer (MDB) was added to the NucleoSpin RNA column and centrifuged at 13,000rpm for 1 minute and then the flow-through was discarded. To digest the DNA, 95 μl from the DNase reaction mixture was added directly onto the centre of silica membrane of each of the columns and was then incubated at room temperature for 15 minutes. The silica membrane was washed and dried by first adding 200 μl RA2 to each of the spin columns and centrifuging them for 30 seconds at 10,000rpm.

This was shortly followed by placing the columns in fresh collecting tubes. Furthermore, 600 μl buffer RA3 was added to the columns in the fresh tubes and then centrifuged for 30 seconds at 10,000rpm. The flow-through was discarded and the columns dried completely by further adding 250 μl of RA3 buffer and centrifuging it for 2 minutes at 13,000rpm. Buffers RA2 and RA3 are wash buffers. While RA2 was used to inactivate the rDNase, the more concentrated RA3 was used to efficiently wash the inner rim and dry the membrane completely (Macherey-Nagel, 2015). The columns from the collection tubes were removed and transferred to a 1.5ml Eppendorf tube and 60 μl RNase free water was added directly onto the column membrane. The membranes were completely covered and then centrifuged at 13,000rpm for a minute. The columns were discarded and the tube containing the eluted RNA samples kept on ice before being stored at -20 °C till the next day.

To avoid contamination and degradation of the RNA, proper care was ensuring gloves were worn and frequently changed when handling RNA samples. Also, reactions were always prepared and kept on ice, thereby preventing RNA degradation.

RNA quantification

Quantification of the RNA samples was done by using NanoDrop® ND-1000 UV/V Spectrophotometer software (Thermo Fisher Scientific Inc., Waltham, MA, USA) and then calculating the volume of tissue necessary for reverse transcription. The fibre optic measurement surface of the Nano drop device was first cleansed with alcohol to avoid contamination. This was followed by blanking with 1 μl RNase free water directly dropped onto the optic measurement surface. This was followed by clicking the blank and ensuring the wavelength was set to zero, which was the absorbance background against which the samples were measured. Each sample was measured in duplicate and the readings presented in table 2. To know how much of each sample would be used, calculation was made based on the sample with the lowest concentration (85ng/ μl) and the required volume of water was added to normalize the tissues (table 2).

Primer Design – Reverse transcription (RT)

The precision nanoScript 2 RT kit used was supplied by Primerdesign Ltd., Southampton, UK. Frozen reagents were thawed and briefly centrifuged while the rest reagents were placed on ice. 9 μl of (85 ng/ μl) RNA samples, 0.5 μl Random hexamers and 0.5 μl Oligo dTs was added to a thin 0.2ml PCR tube, making up to 10 μl . A lid was applied to each sample and was placed in the PCR machine (Biometra GmbH, Göttingen, Germany) and programmed to heat the samples to 65°C for 5 minutes, which was the annealing temperature (used as per manufacturer's protocol). After 5 minutes, the samples were retrieved and immediately placed on ice for cooling. A RT master mix was made in a thin walled 0.2 ml PCR tube. For every RT reaction, 10 μl of the master mix was added to each sample on ice. The samples were covered with lids and vortexed briefly following a pulse spin and incubated as follows on the PCR machine: 25°C for 5 minutes, 42°C for 20 minutes (extension step), and 72°C for 15 minutes (inactivation step). After the PCR has completed the RT process, the cDNA samples

were removed from the machine and stored at -20°C till further use.

Dilution of cDNA

When required, 3µl each of stored cDNA was transferred into fresh PCR tubes. cDNA was diluted with 27µl RNase free water, making it up to 30µl. From the 30µl diluted cDNA, 5µl was transferred to a 0.2ml fresh PCR tube. The diluted cDNA was stored at -20°C for later use.

Reverse transcription – Polymerase Chain Reaction (end point PCR)

The primers used to amplify the cDNA and their expected product lengths were supplied by Applied Biosystems™ (Roche molecular systems, Inc., Branchburg, USA) and were given as follows: eNOS forward primer: 5'TGGAGAGAGCTTTGCAGCAG'3 and the reverse primer: 5'GATATCTCGGGCAGCAGCTT'3 (424 bp); β-actin forward primer: 5'CCCTGAACCCTAAGGCCA'3 and the reverse primer: 5'AGGATTCCATACCCAAGAAGGAA'3 (489 bp) (figure 2). The eNOS primers were delivered in powdered form as 25 nmoles and were therefore reconstituted with 1000µl RNase free water to result in final concentration of 25pmol/µl. A master mix for all 24 samples containing 25µl Reddy mix, 0.3 µl of forward eNOS primer and 0.3µl of reverse primer was made. The master mix was mixed by vortexing, and 26 µl from it was added to the 5 µl cDNA in the PCR tube. The reagents were mixed and briefly centrifuged to ensure contents were at the bottom of the tube. A PCR negative control was made with 26µl from the master mix and 5µl RNase free water instead of cDNA template, ensuring that the primers and the Reddy Mix were free of DNA contamination. The tubes were transferred to the PCR machine and were programmed at 95°C for 2 minutes (initial denaturation step), 34 x (94°C for 30 seconds (denaturation) /55°C for 60 seconds (annealing step) /72°C for 60 seconds (extension step)) and 72°C for 10 minutes (final extension). The RT-PCR was also carried out for the housekeeper gene, β-Actin with 0.6µl β-Actin added to each cDNA sample. At the end of the PCR, the cDNA samples were retrieved and stored at -20°C.

Gel electrophoresis

The specificity of the amplified gene and hyperladder was checked with gel electrophoresis analysis on a 1% agarose gel containing 4µl midori green (Nippon Genetics Europe GmbH, Düren, Germany) and 0.5X TBE (tris / borate / EDTA) solution made from 5X TBE solution following dilution. The 5X TBE was composed of 27g of Tris base powder, 13.5g of powdered boric acid and 1.6ml liquid Ethylenediaminetetraacetic acid (EDTA), all purchased from Fisher Scientific UK Ltd., Loughborough, UK. 10µl of 100bp hyperladder (NorgenBiotek Corp., Thorold, ON, Canada), 20µl of negative control and 20µl each of all cDNA samples incubated with eNOS gene were loaded onto the gel tank and was electrophoresed for 45 minutes at 120 Volts. Electrophoresis was again carried out for β-actin using the process detailed above but with 5µl of 100bp hyperladder IV (Bioline Reagents Limited, London, UK) as it was the only available hyperladder. The gel was photographed using Molecular Imager® Gel Doc™ XR+ System with Image

Lab™ Software (Bio- Rad Laboratories Ltd, UK) and the results shown in figure 1.

Quantitative Real - Time Polymerase Chain Reaction (qRT-PCR)

The primers used, as well as the 2x qPCR master mix kit were purchased from Primerdesign Ltd., Southampton, UK. First, into fresh PCR tubes on ice, 2µl each of stored cDNA was diluted with 18µl RNase free water, from which 1.5µl was transferred to a 96 well plate in triplicate for Real-time PCR (figure 2). A PCR negative control without cDNA was also made in triplicate with 1.5µl RNase free water. A master mix containing 5µl 2x master mix, 0.5 µl eNOS primer and 3µl water was made, sufficient for only 21 samples. The master mix was vortexed and 8.5 µl from it was added to each of the 96-well plate containing the 1.5 µl cDNA. The plate was covered with a film and briefly centrifuged using Allegra X-22R Centrifuge (Beckman Coulter Ltd., High Wycombe, UK) to ensure contents were at the bottom of the plate. The plate was thereafter placed in the ViiA™ 7 Real-Time PCR System (Life Technologies Ltd, Paisley, UK) and was programmed to cycle at 50 °C for 2 minutes, 95 °C for 10 minutes and 40 x (95 °C for 15 seconds/ 60 °C for 1 minute). The 50 degrees step was required to activate the uracil N-glycosylase (UNG) and to remove any contamination. The 95 degree step for 10 minutes was the Taq activating step, at same time denaturing the UNG. At 95 °C for 15 seconds, the dsDNA template denatured. The annealing and extension of the primers by the Taq occurred at 60 °C for 1 minute (Eurogentec, 2013). Real-time PCR was also done using the housekeeper, ubiquitin C (UBC) primer. The different templates of the gene served as coding and non-coding strands, with only the non - coding strand being transcribed during PCR as it contains the anti-codons (John and Igor, 2006). The 2 x qPCR master mix used was labelled with ROX™ fluorescent dye. The qPCR links the amplification of DNA to the generation of fluorescence of ROX dye and was detected during each PCR cycle in real time. The higher the amplified DNA, the higher the intensity of the fluorescence (Primerdesign, 2008). At the end of the qPCR, the data was first analysed on Microsoft office Excel 2010 (Microsoft Corporation, Redmond, USA). The quantitation cycle (CT) values for all the samples were obtained. The delta delta (ΔΔ) CT method was applied in calculating the change in gene expression. For example, for HET male 1, the average eNOS CT value for the triplicate was 27.665. Average UBC CT value was 24.308. Therefore, ΔCT value for HET male 1: GOI (HET male1) – HK (HET male 1) = 27.665 – 24.308 = 3.357. With the Excel, the average ΔCT values for all HET male were obtained and used in calculating the ΔΔCT values for all other groups. Using GraphPad Prism™ (GraphPad Software Inc., La Jolla, USA), data was collated and relative eNOS gene expression presented on a bar chart while statistical analysis was done using two-way ANOVA (figure 3).

Statistical analysis

Results are expressed as mean ± standard error of mean (SEM), and n shows the number of mice used for end point PCR and qPCR. For end point PCR, gene expressions were visually analysed by looking at the bands and comparing them with the 100bp hyperladder. For qPCR, eNOS gene expression was

analysed using two - way ANOVA followed by multiple comparison tests to compare the gene expression levels in both genotypes and phenotypes. A value for $p < 0.05$ was considered to be significant.

III. RESULTS

End point PCR

To investigate the gene expression of eNOS in heterozygous Cx 43 mice, end point PCR was used to measure the eNOS gene. PCR analysis was done with eNOS and β -Actin transcripts. PCR analysis of eNOS showed that the only visible eNOS bands were in W/T male and HET female and had band size of 200bp. This was however different from the expected size of 424 bp when compared with the hyperladder (figure 1A). Though, β -Actin was expressed in most of the samples, W/T female was not visible. The size of β -Actin detected was 600bp which was also different from the expected size of 489bp (figure 1B). There were no bands detected in the negative controls.

qRT - PCR

For more efficiency and reliability, qRT – PCR was used to check the specificity of amplified gene product. eNOS gene was detected in lung tissues relative to UBC (figure 3). Using two - way ANOVA, it was observed that there was no significant difference in the gene expression of eNOS in all four groups of mice models: HET male (1.0 ± 0.19 , $n = 5$), W/T male (0.86 ± 0.35 , $n = 6$), HET female (1.04 ± 0.14 , $n = 5$) and W/T female (0.82 ± 0.16 , $n = 5$). Both HET (Cx43) male and HET (Cx43) female mice showed approximately equal eNOS gene expression levels when compared with their W/T counterparts. There was no change in levels of expression of eNOS in W/T male and W/T female. When statistical analysis was performed at 95% confidence interval, there was no significant difference in eNOS gene expression in both genders ($P = 0.98$) and genotype ($P = 0.43$).

Table 1 The labelled lung tissue samples extracted from the 24 mice

RNA sample	Concentration (ng/ μ l)	DNA/RNA (260/280)	Volume of RNA (μ l)	Volume of water (μ l)	Total volume (μ l)
HET Male					
1	110	2.11	10	2.9	12.9
2	85	2.14	10	0	10.0
3	185	2.13	10	11.7	21.7
4	235	2.12	10	17.6	27.6
5	195	2.13	10	12.9	22.9
6	195	2.15	10	12.9	22.9
W/T Male					
1	275	2.18	10	22.35	32.35
2	130	2.10	10	5.29	15.29
3	260	2.12	10	20.58	30.58
4	185	2.17	10	11.76	21.76
5	135	2.09	10	5.88	15.88
6	205	2.09	10	14.11	24.11
HET Female					
1	300	2.10	10	25.29	35.29
2	85	2.06	10	0	10
3	320	2.10	10	27.64	37.64
4	525	2.13	10	51.76	61.76
5	490	2.12	10	47.64	57.64
6	245	2.10	10	18.82	28.82
W/T Female					
1	180	1.89	10	11.17	21.17
2	115	2.13	10	3.52	13.52
3	205	2.10	10	14.11	24.11
4	245	2.10	10	18.82	28.82
5	470	2.21	10	45.29	55.29
6	385	2.13	10	35.29	45.29

Table 2 Quantified RNA samples obtained after nanodrop and the volume of water added to each sample to normalise it to 85ng/ μ l. The concentrations and DNA/RNA ratio are in duplicate values.

HET (Cx 43 +/-) male	W/T male	HET (Cx43 +/-) female	W/T female
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6

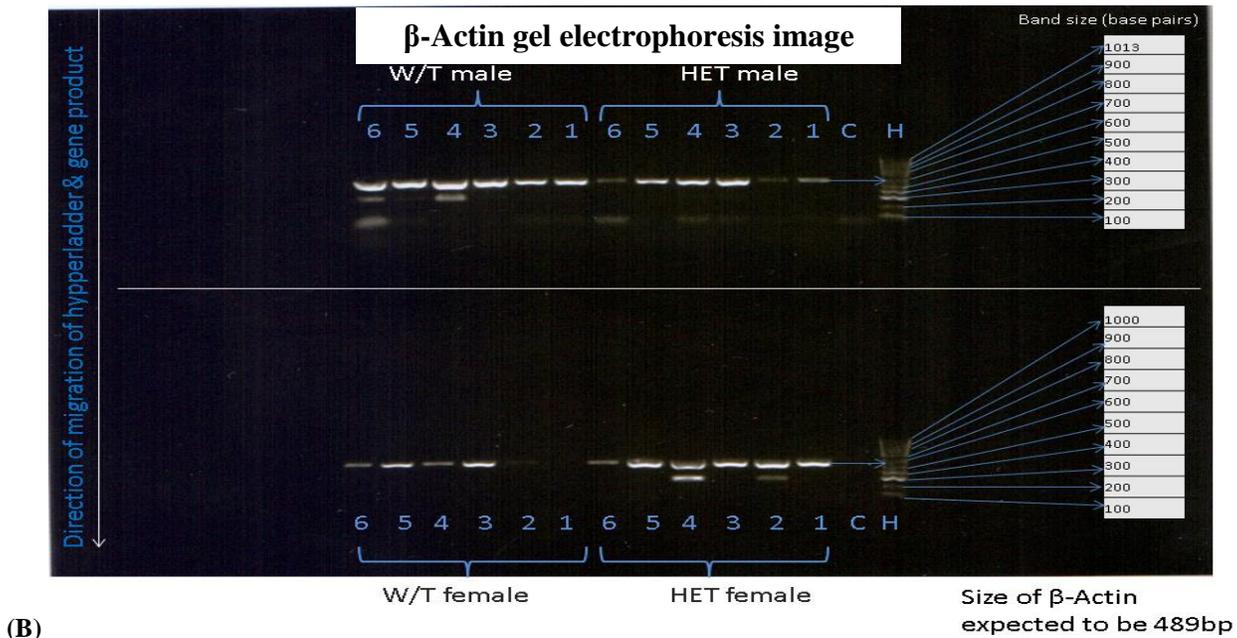
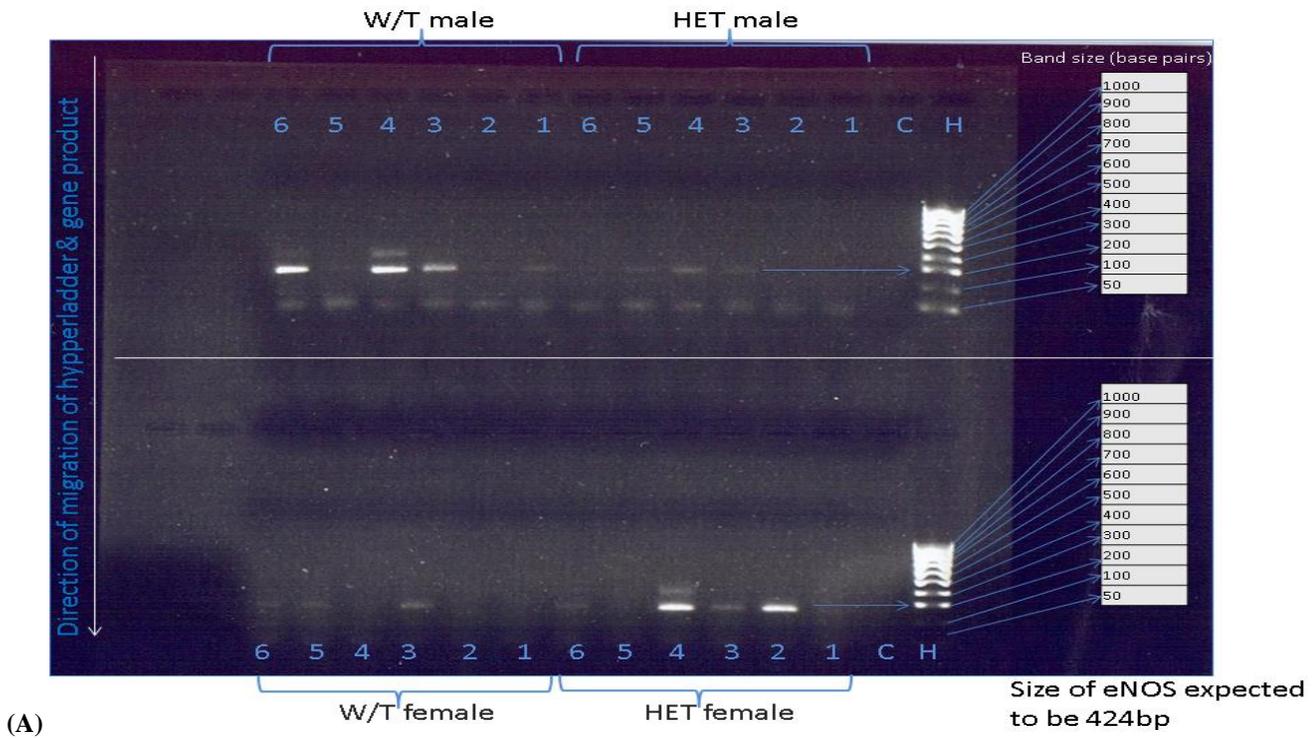


Figure 1 Gel electrophoresis image showing expression of eNOS gene (A) and β-Actin (B), control (C), with reference to 100bp hyperladder (H). The numbers represent each sample in a well, corresponding to cDNA from HET male (n = 6), W/T male (n = 6), HET female (n = 6) and W/T female (n = 6). Downward arrows indicate direction of migration of the samples. The expected gene size is also indicated.

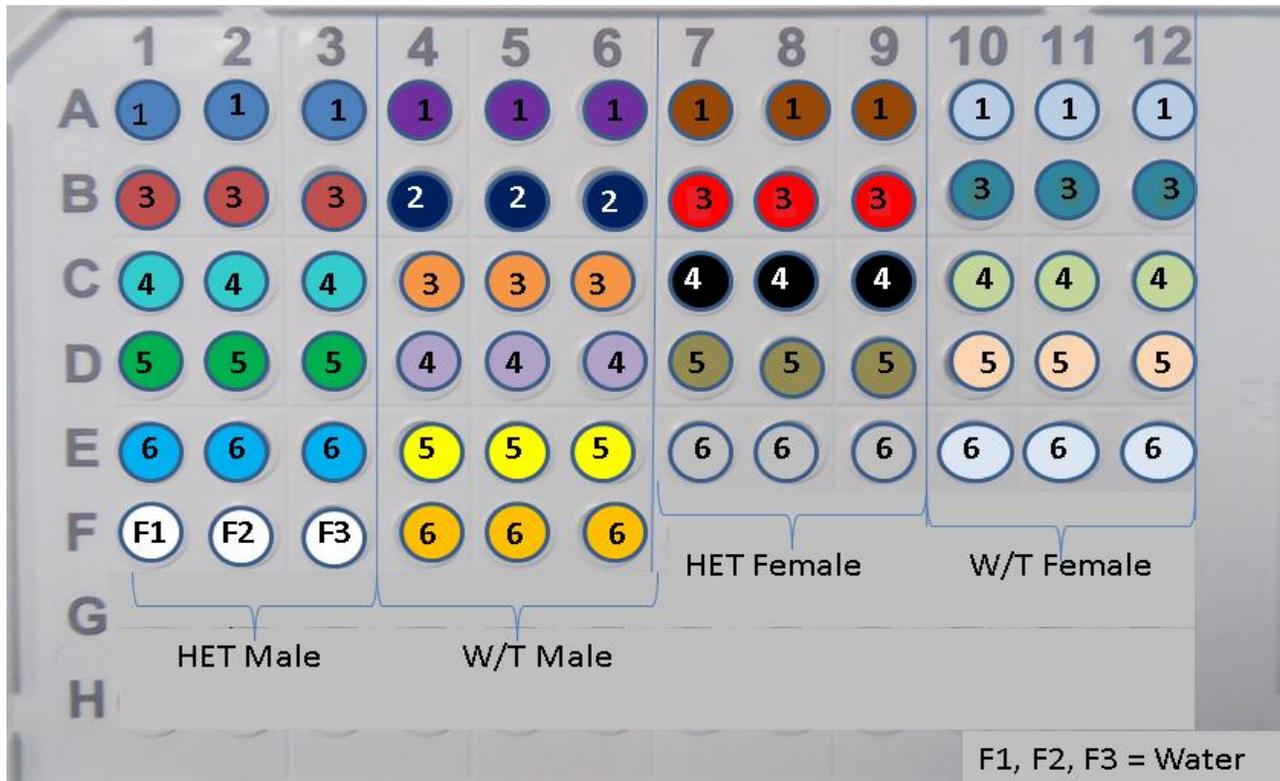


Figure 2 Shows a presentation of how cDNA from 21 lung tissue samples, together with UBC or eNOS (respectively) was introduced into the 96 well qPCR plates in triplicates. Coloured wells and numbers inscribed corresponds to cDNA extracted from any of HET male, W/T male, HET female and W/T female. Wells F1, F2 and F3 are the control wells.

Graph of eNOS gene expression relative to UBC in both wild type and heterozygous male and female mice

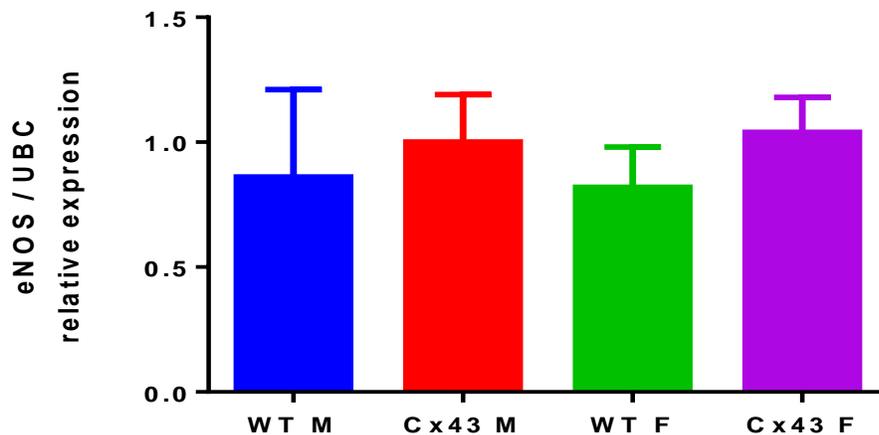


Figure 3 Expression of eNOS shows mean values \pm SEM of relative gene expression levels measured by qRT – PCR in lung tissues from W/T male (n =6, blue column), HET male (Cx43 M), n = 5, red), W/T female (n = 5, green) and HET female (Cx43 F, n = 5, pink).

IV. DISCUSSION

The present study tested the expression of eNOS gene in genetically heterozygous Cx 43 (Cx 43 +/-) mice conducted in four groups of mice: W/T male, Cx43 +/- male, W/T female and Cx43 +/- female. The investigation for eNOS expression from the mice lung tissues was first carried out using RT – PCR. Since the bands do not correspond to the expected size of eNOS gene (434bp), it was suggested that the eNOS primers did not pick up the eNOS gene from the cDNA. Also, the negative control wells did not show any bands as they did not contain any cDNA. The housekeeping genes are essential in cellular maintenance in humans and animals and are thought to maintain constant expression levels in all cells, and so, are used as normalizing standards in gene expression (Eisenberg and Levanon, 2013). β -Actin was expressed in most of the samples, however, the few samples which appeared not visible suggests insufficient cDNA or contamination. The discrepancy in the size of β -Actin could be also be due to primers not picking the gene. The use of agarose gel electrophoresis in measuring gene expression of eNOS was quick and easy to cast, it was however unsuitable in separating low molecular weight samples (Baril and Nates, 2012), hence the need for qRT – PCR. UBC was shown to be present in the target DNA under test and was used to confirm that the qRT-PCR process worked properly. Since there was no change in the gene expression levels of eNOS, it was therefore suggested that eNOS expression (and possibly its signalling pathway) is not impaired in mice heterozygous in Cx43 (Cx43 +/- mice). Also, gender does not affect eNOS expression as there was no observed change in its expression in both genders. This observation was however not consistent with a recent study by Ruiz-Holst *et al.*, (2010) in which sex-dependent alterations of eNOS protein expression in cardiac tissues of male and female W/T mice with heart failure was investigated. Female W/T mice eNOS protein expression levels and activation was shown to be higher than W/T males, and the difference could be due to the presence of eNOS de-phosphorylating calcineurin-A found in W/T males (Ruiz-Holst *et al.*, 2010).

Recent studies have shown Cx43 to be essential in coordinating cell proliferation and migration in vascular walls (Kwak *et al.*, 2001). This was confirmed in smooth muscle cells of Cx43 gene knockout mice in which manifestation of accelerated growth of the neointima and the adventitia was observed (Liao *et al.*, 2007). Diabetes – impelled inhibition of Cx 43 expression adds to vascular cell apoptosis in retinal endothelial cells of diabetic mice (Bobbie *et al.*, 2010). Quantitative evaluation of Cx 43 expression was shown to be significantly reduced in borderline hypertensive rats ($P < 0.05$) and spontaneously hypertensive rats ($P < 0.05$) compared to normotensive controls (Dlugosová *et al.*, 2008). The reduced Cx 43 expression was shown to contribute to remodelling of vascular cell wall and also affect gap junction communication, which was more pronounced in fully established hypertensive rats (Dlugosová *et al.*, 2008). This suggests that the accelerated growth of the SMC correlates with Cx43 deletion. However, another finding revealed reduced neointimal formation in Cx 43 heterozygous mice (Chadajichristos *et al.*, 2006). Interestingly, deletion of Cx43 in mice endothelial cells resulted in hypotension (Liao *et al.*, 2001) as Cx43 expression was shown to

be upregulated in pulmonary arteries from chronically hypoxic rats (Billaud *et al.*, 2011). However, a decrease in the expression of Cx43 was observed in rats' aorta when nitric oxide synthase was inhibited (Haefliger and Meda, 2000). Mice with endothelial cell (EC) specific deletion of Cx43 showed severely reduced Ca^{2+} communication between the EC (Parthasarathi *et al.*, 2006). Since NO biosynthesis in the EC depends on activation by Ca^{2+} - calmodulin complex, and since there has been evidence that mutant mice which lack eNOS gene appears to be hypertensive (Rang *et al.*, 2007), a link between Cx43 and eNOS expression has been established, though, with yet to be defined pathway (Yey *et al.*, 2006). Since vascular connexins do not operate in isolation, modifying the expression of one connexin may affect the expression of the other (Kruger *et al.*, 2002; Liao *et al.*, 2001), and may also influence eNOS gene expression. Given the different effects of Cx43 deletions in animal models, and the expression of eNOS gene in the mice tested, future work is therefore recommended in understanding the pathogenic basis of PAH. Reactive oxygen species, as well as the interaction of caveolin -1 and other Cx with eNOS affects eNOS activity (Loft Wilson *et al.*, 2012), and this should be taken into account when investigating eNOS expression within a larger population of mice models. How these interactions contribute to rise in PAP could then be measured by taking hemodynamic measurements of lung tissues from the mice under investigation.

V. CONCLUSION

In conclusion, the findings have demonstrated that eNOS gene is expressed in both W/T mice and mice heterozygous in Cx43 (Cx43 +/- mice). The expression level of eNOS gene has been shown not to be influenced by gender, and that Cx43 is involved in the development of PAH. Even though eNOS mutant mice seem to develop hypertension, the interaction of Cx43 and eNOS signalling pathway in the pulmonary vasculature appears to be a complex one. Based on these evidences, there are many routes for further research into the interaction of eNOS and other connexins, and how these interactions could affect the expression of eNOS which could possibly lead to the development of PAH.

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Sounds Fishy: Empirical Characterization of Underwater Ambient Noise in Bio-diverse Tropical Shallow Coastal Water

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Abstract

Underwater ambient noise is critical to success of naval operations. The underwater noise environment is also an important aspect of habitat for marine mammals and other organisms. Underwater noise is one of the human induced environmental threats to the ocean. Ambient noise calculations have role in the conduct of environmental-acoustic impact assessments. Documenting changes in underwater ambient noise helps in understanding the marine environment. In tropical coastal shallow waters, the acoustic environment is influenced by sea surface and bottom conditions, ship traffic and marine life. This study aims at characterizing underwater ambient noise to serve as a first reference survey of the soundscape of the site. The site is near bio-rich Grande island (15°18' N 73° 41' E) 18km off Goa, on India's western coast. Conventionally researchers use one of the three methods of noise measurements: hanging hydrophone from boat, moored hydrophone with autonomous acoustic recorder, and seabed-mounted hydrophone. In this work, we report experimental data recorded by all the three methods. Environmental parameters like sea state, wind, currents, salinity, temperature, and depth recorded to correlate with ambient noise variations. Underwater videography confirmed presence of vocal fish species at the site. Results analyzed to characterize ambient noise and identify significant contributors. At the site, the underwater ambient noise levels vary over range of 60 - 115 dB in 10 - 6400 Hz frequency band. Measurements during December 2014 – February 2016 confirm diurnal variations and that the fish chorus raised ambient noise levels by 20-30 dB in 400-1500Hz frequency range.

Keywords: *Underwater ambient noise, tropical coastal waters, marine soundscape, fish chorus, shallow water acoustics.*

I. INTRODUCTION

Underwater ambient noise is a complex phenomenon of keen interest to a diverse research community engaged in underwater acoustics, biology, ecology, meteorology and oceanography. Recreational, industrial, fishery, aquaculture, and military uses of the ocean resource require quantitative knowledge of the oceanic noise field and the influence these activities have on the environment and the marine biological systems. Estimation of noise levels is required for planning the future economic utilization of ocean resources. In addition, ambient noise has a role in the conduct of environmental-acoustic impact assessments.

Ambient noise calculations are used as naval sonar performance prediction tools. Underwater ambient noise characteristics determine acoustic properties which are of critical importance to submarine operations. Underwater acoustic conditions influence and determine operational modes of submarines and their stealth capabilities. It is extremely difficult to detect and accurately target submarines in shallow waters without the knowledge of ambient noise. A comprehensive understanding of all aspects of underwater ambient noise is critical to mission success of undersea operations. Accurate and detailed information on these areas is important for naval mission planning and operations. Coastal zones are particularly of great interest for both environmentalists as well as war strategists.

Studies showed that anthropogenic noise can cause damage to marine life and marine ecosystems. Managing underwater noise pollution has been identified as a pressing marine environments conservation issue. Many countries now require a noise impact assessment for proposed developments that may impact key marine species and the ecosystem. Particularly, there is a need to characterize the soundscapes of eco-sensitive, bio-diverse coastal/island sites.

The sources of underwater ambient noise are both natural and man-made. Ambient noise levels are highly dependent on geographic location, acoustic transmission characteristics, season of the year and weather. Shallow water noise is a combination of effects of shipping, wind, and biological noise and sea bottom topography [1]. The goal of this study is to examine the contributions of natural and anthropogenic sources of noise on the marine underwater soundscape. Ambient noise in mid frequency band (few Hz to 20kHz) is dominated by the effects of wind acting on sea surface, shipping noise, type of sea bottom and biological factors [2]. Unlike deep water, ambient noise in shallow waters have higher levels due to proximity to noise sources [3]. It is known that, soniferous (sound producing) fish, snapping shrimp, croakers, dolphins and various other ocean mammals add significantly to the noise background, especially in shallow tropical coastal waters.

High variability of ambient noise in tropical coastal shallow waters makes characterization of underwater marine environment difficult and complex. During different times of the day and seasons, the contributions by geo, bio and anthropogenic sources vary significantly. We have selected a site with unique acoustic environment with close proximity to airport, commercial shipping port, bio-diverse eco-sensitive islands and rivers flowing into the sea. Therefore, three different methods of ambient noise data measurement are used: sea-bed mounted sensors, moored vertical array hydrophones and hanging hydrophone from boat. Environmental data measured and collected at the site. Measurements of biological noise study was done by underwater videography to identify vocal fish species. Vessel traffic was studied using Automatic Identification System (AIS). Results obtained at the experimental site are analyzed, to correlate with environmental data to characterize and understand the ambient noise sources and their contributions.

The major source of ambient noise at the site is found to be bio-phonic noise. Over 800 species of fishes from 109 families worldwide are known to be vocal. Fishes produce different types of sounds using different mechanisms and for different reasons. Sounds (**vocalizations**) may be intentionally produced as signals to predators or competitors, to attract mates, or as a fright response. Sounds are also produced unintentionally including those made as a by-product of feeding or swimming. The three main ways fishes produce sounds are by using sonic muscles that are located on or near their swim bladder (**drumming**); striking or rubbing together skeletal components (**stridulation**); and by quickly changing speed and direction while swimming (**hydrodynamics**). The majority of sounds produced by fishes are of low frequency, typically around 1000 Hz. The next major contributor to underwater ambient noise at the site is wind generated noise. Contributions from commercial ships and fishing boats are third major source of ambient noise at the site during the period of measurement.

The paper is organized in six sections: Section 1 is introduction, Section 2 describes the experimental site uniqueness and Section 3 presents experimental study methods and instrumentation used. Section 4 deals with data recording and Section 5 presents results obtained and discussion. Section 6 concludes the paper.

II. SITE DESCRIPTION

The experimental site identified is located near Grande island, (15°18' 21.53" N 73°41' 27.24" E) 18 km off Goa, west coast of India, in the Arabian Sea. The acoustic characteristics of the area remain largely undiscovered. The proposed area has a unique acoustic environment due to its proximity to busy military airport also frequently used by civilian aircraft. The site is also close to Marmugaon Port (25 km) operating commercial ships, mining barges, fishing trawlers and tourist boats.



Figure-1. Site location

The Grande island is a bio-diverse eco-sensitive zone consisting of a ship wreck, corals, fish, snapping shrimps, and dolphins. Zuari and Mandovi rivers flow into the sea near the experimental site. Every year the site experiences severe monsoons (June-October), fresh water flooding of the site, and variations of seasonal salinity of water column. Also resulting in river mud deposition into seabed sediment changing acoustic properties of sea-bottom. Pikene and Grande Islands, with their marine bio-rich marine organisms make the experimental site unique and challenging for research and exploration.

III. MATERIAL AND METHODS

a) Instrumentation

The approach, including both instrumentation and analysis, is required to address these challenges in measurement of noise over a broad scale of frequency, time, and space. All instruments calibrated as per Original Equipment Manufacturer’s calibration procedure. The instrumentation used for acoustic data collection are shown in Table 1:

Table 1. List of instruments used for measurements at the site

SI	Instrument	Band width	Sensitivity	Resolution	Remarks
1	ITC8264 Hydrophone	10 Hz- 100 kHz	-175 dB re 1 micro Pa	16 bit	Sampling rate 262144 kHz
2	Songmeter SM2M+	2 Hz – 192 kHz		16 bit	2 channel recorder
3	Automated Ambient Noise Subsurface system	2kHz – 20kHz	-165 dB re 1 micro Pa		Vertical hydrophone array deployed at 15 m depth below sea surface. Sampling rate 100 kHz
4	Current meter				Sea Gaurd RCM
5	CTD meter				CC1404003

b) Measurement Methods

Measurement of ambient noise requires care to ensure that the data exclude system noise, pressure fluctuations induced by turbulence in water flow around the hydrophone and supporting cable. The measurement method is chosen to sample the sound field at appropriate points in the water column. The three main methods are:

i) Boat based hanging hydrophone measurement.

Hydrophones are deployed from a boat, with analysis and recording equipment remaining onboard. The boat is anchored or adrift. GPS system is used to record the location during each measurement. Advantage of this method is deployment can be quick and mobile and a large area can be covered. Data can be monitored as acquired, and instrument settings adjusted in real time to optimum levels ensuring high data quality. This method is prone to platform-related noise (noise from engines and echo sounders, wave slap on the vessel hull, hydrostatically induced signals due to surface wave motion).

ii) Moored static hydrophone Method.

Static systems use hydrophone-array moored to seabed with a sinker and a float on sea surface. These are suitable for longer-term deployments enabling the measured data to be sampled for a range of tidal cycles, weather conditions, operational states, etc. The data is streamed directly to shore base, either by cable, or through satellite or modem link (this is limited by transmission bandwidth). The advantage is near real-time data availability. The disadvantages are that they measure in only one location, have a higher risk of data loss and suffer from parasitic noise effects such as cable strum or flow noise.

iii) Bottom mounted hydrophone with cabled systems.

These are ideal systems with hydrophones installed on seabed, with a complex undersea cable (power and data) run from hydrophones to shore setup. The set up cannot be shifted from one location to another. The data is streamed to shore real time and data quality and control on the operation is better. There are no limitations in terms of time duration of deployment (months or years), power or data storage requirements (are provided from shore).

IV. DATA RECORDINGS

Underwater ambient noise data recorded by three methods over two square km site area over different periods covering all seasons except monsoon (June - October). Data collected using seabed-mounted hydrophones during December 2014 - March 2015; December 2015 - February 2016, hanging hydrophone from boat during May 2015, and moored vertical array hydrophones during November 2015 – January 2016. For all measurement campaigns, standard methods of ocean noise measurement [4] and good practices guide [5] were followed.

i) Hanging hydrophone from boat

Measurements were undertaken by hanging Songmeter SM2M+ hydrophone shown in Figure.2 from drifting boat with engines shut down, at site during 07 -12 May 2015. Simultaneously wind speed and direction; current speed and direction; conductivity,

temperature and depth measurements were recorded at the site. A device CTD meter, sampling at 20-sec intervals, used for recording conductivity (uS/cm), temperature ($^{\circ}$ C), and pressure (depth; m).



Figure-2. Songmeter SM2M+

ii) Moored hydrophone

An autonomous sub-surface noise measurement system was deployed at experimental site, at a depth of 32 m from 07 October 2015 - 21 January 2016. Subsurface system comprises a vertical linear array of omnidirectional hydrophones with data acquisition modules. Sampling frequency of the data acquisition system was set to 100 kHz. Sampling interval was set to 3 hours with data recording duration to be 60 seconds and eight samples of the data are acquired per day.

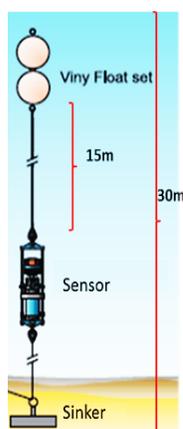


Figure-3. Noise measurement system

The hydrophone has frequency response up to 20 kHz. Array of hydrophones sense acoustic pressure fluctuations due to various sources of noise. These are converted into electrical signals and then logged by the data acquisition system. Recorded voltage is then converted into units of micropascal (μ Pa) by applying preamplifier gain and receiving sensitivity of the hydrophone. Wind data at the sea surface was recorded using wind data logger.

iii) Seabed-mounted hydrophones

Five ITC 8062 hydrophones were used with a 100 m separation at a depth of 30 m at the experimental site. A complex undersea cable (power and data) run from hydrophones to shore based recording and analysis equipment. Readings over a period of three months (20 December 2014 to 26 March 2015) and (01 December 2015 to 18 February 2016) were recorded. The recordings were undertaken with hourly intervals 0900 hrs to 1600 hrs. The recordings were analyzed using continuous data.

iv) Shipping traffic:

Shipping noise is one of the dominant contributor to ambient noise in shallow water areas close to shipping lanes. Shipping noise is in the 50-300 Hz frequency range. To quantify the noise due to commercial and military ships in the area, location data from the Automatic Identification System (AIS) installed at a shore station (15° 22'38" N 73°48'33" E) were used. The system transmits information via VHF, including ship identity, position, speed and course.

v) Aircraft Noise

Aircraft noise can couple through the sea surface when an aircraft flies low over the sea surface. This happens when fixed wing aircraft approach a runway located close to the coast, or a helicopter operates at low altitudes over the sea. Helicopter noise originates from the disturbance of the sea surface by the "down wash" from the blades and by coupling of blade noise directly into the sea. The down wash noise is very similar to wind noise in frequency characteristics and is greatest in the 2-20 kHz spectrum. The supersonic Figurehter aircraft operations did not add to the ambient noise levels measured due to the high altitude of the aircraft. Measurements with helicopter hovering at the site were taken with seabed sensors and the noise contribution found to be not significant. Measurements also taken coinciding the landing and taking of commercial aircraft and supersonic Figurehters and no appreciable change in the ambient noise observed due to the high altitude of aircraft operation.

vi) Biological Noise

Over 800 species of fishes from 109 families worldwide are known to be vocal. Fishes produce different types of sounds using different mechanisms and for different reasons. Sounds (**vocalizations**) may be intentionally produced as signals to predators or competitors, to attract mates, or as a fright response. Sounds are also produced unintentionally including those made as a by-product of feeding or swimming. The three main ways fishes produce sounds are by using sonic muscles that are located on or near their swim

bladder (**drumming**); striking or rubbing together skeletal components (**stridulation**); and by quickly changing speed and direction while swimming (**hydrodynamics**). The majority of sounds produced by fishes are of low frequency, typically around 1000 Hz.

Study carried out by GB Sreekanth et al [6] to monitor the fish communities of Grande Island through underwater visual census (UVC). The major coastal island ecosystems of Goa include Grande Island and Sao Jorge Island near to the mouth of Zuari estuary off Vasco De Gama in South Goa. These ecosystems include habitats like natural coral reef patches, shipwrecks, submerged rocky zones covered of corals and sandy bottoms all around the islands. Hence, they provide conducive habitats with respect to breeding, feeding and shelter for a variety of aquatic fish and shellfish species. A total of 85 species from 35 families was recorded during the study at the site.



Figure. 4 (a) Indian Mackerel, (*Rastrelliger Kanagurta*) soniferous fish found at experimental site (b) School of fish making chorus (c) Aquamap showing habitat map of *Rastrelliger Kanagurta*

In tropical shallow coastal bio-diverse waters, the contribution of biological noise is very significant [7]. The major source of ambient noise at the site is found to be biophonic noise made by Terapontidae and planktivorous fish chorus. Underwater videography confirmed vocal fish presence at the site. The analyses carried out reveals fish chorus belonging to the family “Terapontidae” which is found in South east Arabian Sea (SEAS) [8] is also found in abundance near the Goa test site. William Fernandez et al [9] of NIO and NIOT, who carried out recording of noise made by fish near Grande island, reported similar results. Efforts made to identify noise making fish off Goa coast in consultation with Department of Fisheries, and Indian Council of Agricultural Research (ICAR), Central Marine Fisheries Research Institute (CMFRI), NIO, Goa and local fishermen communities. Diving operations conducted and underwater videography undertaken on 12 April 2015 to ascertain the type of vocal fish species available at the site. It was observed that the experimental site has a diverse range of noise-making fish species. The major source of ambient noise at the site is found to be biophonic noise made by Terapontidae and planktivorous fish chorus. The Indian mackerel (*Rastrelliger kanagurta*) which is Planktivorous fish is a species of mackerel in the scombridae family of order Perciformes[10]. Underwater videography confirmed this vocal fish presence at the site. The details of fish and its habitat are shown in Figure. 4.

vii) Environmental Parameters

It is known that, sea surface, sea bottom and the water column between the two, significantly influence the ambient noise in shallow coastal tropical waters. Environmental parameters like wind speed/direction, salinity, bathymetry and sound speed profile were measured at location. Wind speed and direction data was also collected from Indian Navy weather station located at ~5km from the site.

V. RESULTS AND DISCUSSION

The underwater ambient noise in marine environment is measured by three methods: (i) portable hydrophones from boat (ii) moored autonomous acoustic vertical array and (iii) sensors placed on sea bed. The measurements taken up at the site and the results obtained are discussed in detail.

a) Wind

Wind-dependent noise results from the oscillation of bubbles formed by air entrainment as waves break and this is more dependent on the forcing by the wind. The dependence of noise on wind speed provides a simple way of predicting and forecasting the noise from weather forecasts, and if wind speed is measured together with measurements of ambient noise, this component can be separated from other components. Noise generated by wind has a distinctive shape with the frequency range up to 0.5-8 kHz. The noise level fluctuation is higher in the lower frequency and lower in the higher frequency. Figure. 5(a) shows the ambient noise observed at different wind speeds. Figure. 5(b) shows ambient noise measured during the same wind speed conditions.

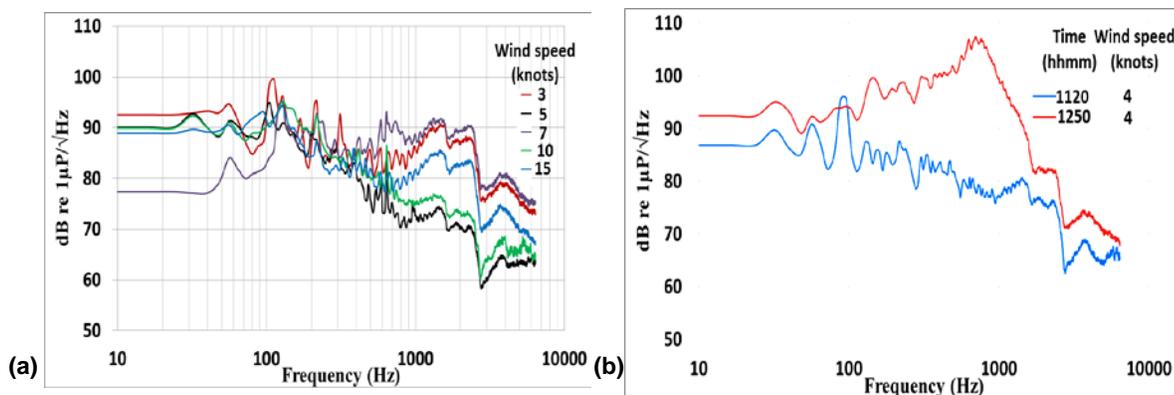


Figure.5 Measurement of the ambient noise on 27 and 28 January 2015 (a) at different wind speeds (b) at same wind speed and different times.

Ambient noise level variations observed from 60-100 dB at different frequencies 10Hz-10kHz. with wind speeds 3-15 knots (1.54 - 7.72m/s).When the wind speed was consistent at 4 knots the peak noise level increased by 25 dB at 1000 Hz frequency during time period 1120 hrs to 1250 hrs. It is observed that wind is not significantly responsible for increase in ambient noise from 1200 hrs –

2300 hrs at the site. This increase in ambient noise cannot be attributed to wind variations. It can be by other sources like biophonic and/or anthropogenic sources (shipping).

b) Velocity profile

The cast away conductivity-temperature-depth (CTD) instrument was deployed from boat and various parameters recorded to determine the effect of sound velocity profiling, temperature, conductivity, density and salinity on ambient noise at the site. Figure. 6

(a) shows the variation of

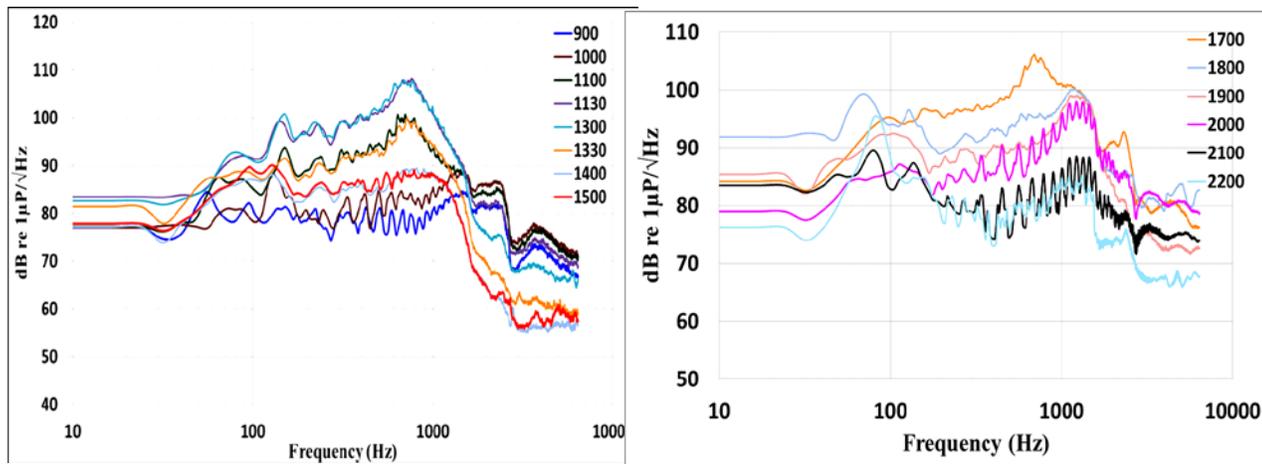


Figure.6 Ambient noise levels recorded at the site on 13 February 2015 (a) from 0900-1500 hrs and (b) from 1700-2200 hrs

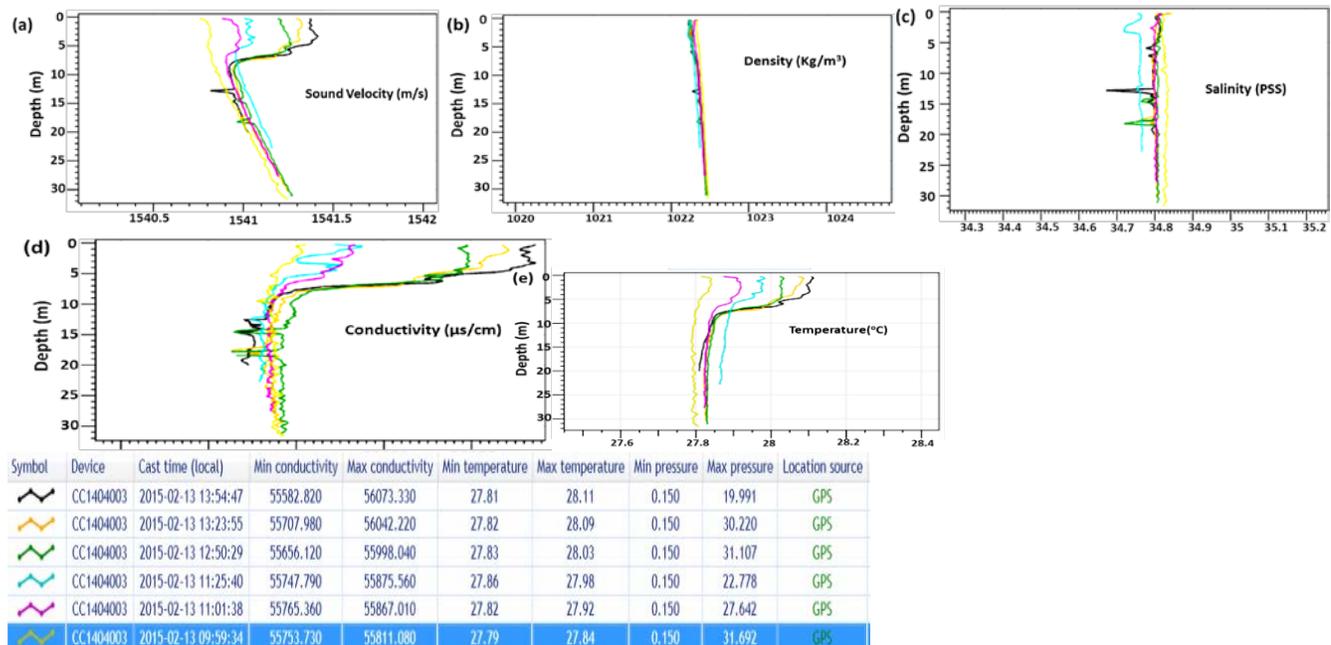


Figure.7 Environmental parameter measurements on 13 Feb 15 from 1000 to 1400 hrs by using a CTD (conductivity depth temperature). (a) Sound velocity profile (b) Density (c) Salinity (d) Conductivity and (e) Temperature and device log details with color code.

(a) Sound

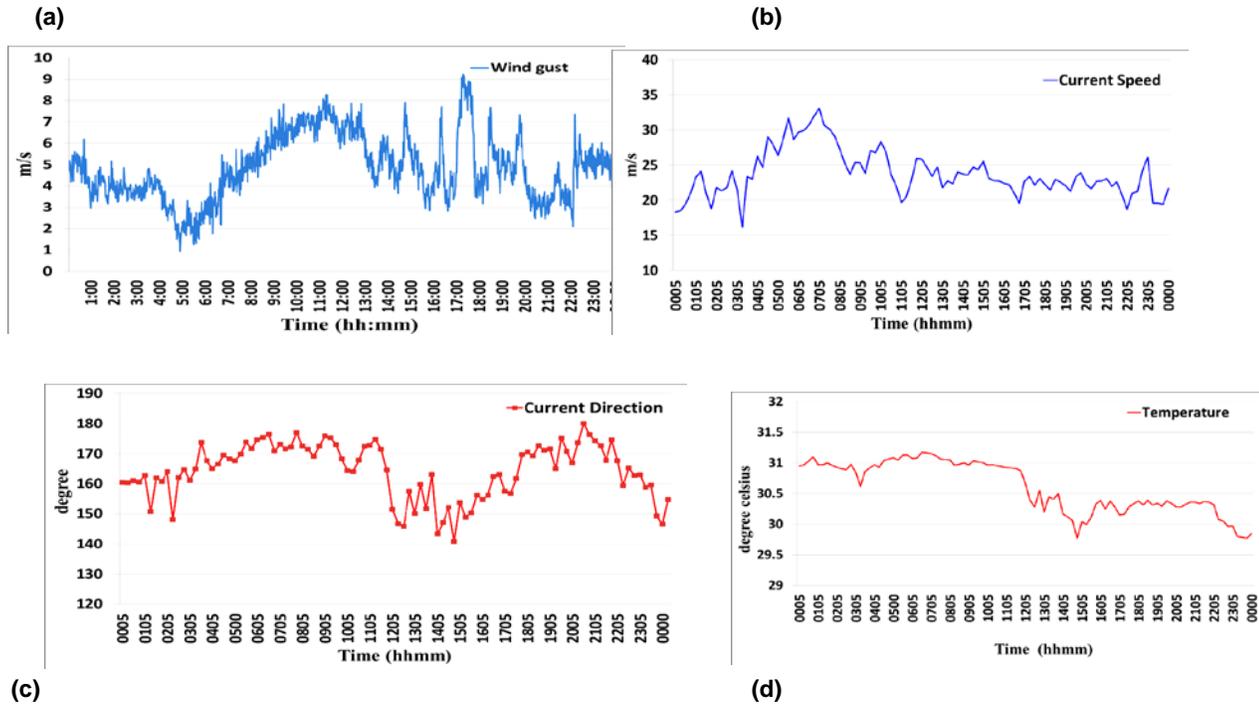


Figure. 8 Weather parameter measurements at site a) Wind gust b) Current speed c) Current direction and d) Temperature of sea water

ambient noise from 0900-1500 hrs and Figure. 6 (b) shows ambient noise variations from 1700-2200 hrs on 13 February 2015. As seen from Figure.6 (a) and (b), the ambient noise level was low at 0900 hrs around 70-80 dB. Noise level started to increase from 1130 hrs and peaked at 1700 hrs (85-105 dB). The noise level was observed to decrease to 70-80 dB range at 2200 hrs. The increase is correlated to changes in sound velocity profile, current speed/direction, wind speed/direction and sea water temperature, conductivity as seen from Figures 7 and 8.

c) Noise Measurements using hanging hydrophone from boat

Noise measurements using Songmeter SM2M+ from boat with engine shutdown were taken at the site on 10 and 11 May 2015. The results are shown below. The ambient noise spectrum is plotted against frequency upto 6400 Hz for narrow band analysis.

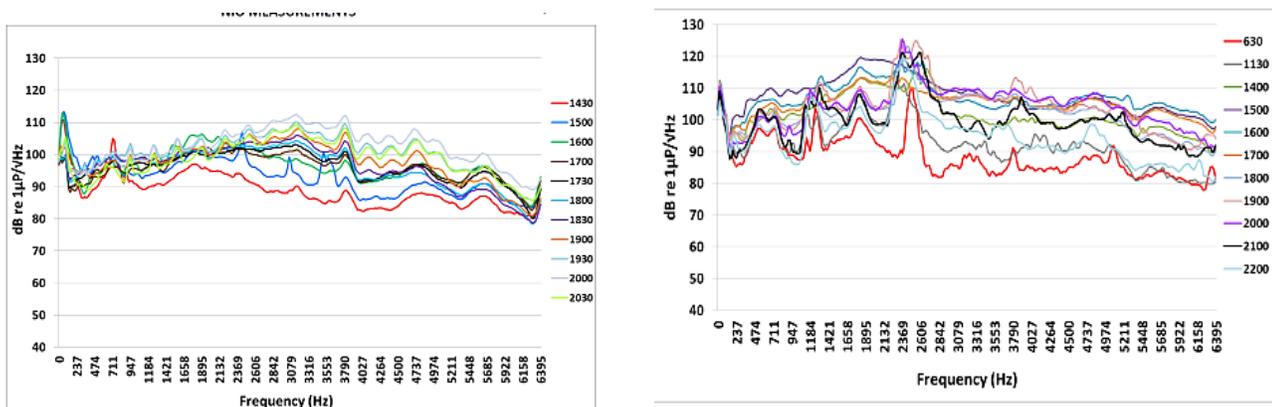


Figure 9 (a) shows the

(a) (b)

Figure 9. Ambient noise levels measured by hanging hydrophone from boat a) 10 May 2015 and b) 11 May 2015

levels recorded at half-hourly basis at different times of the day starting 14:30 hrs to 20:30 hrs on 10 May 2015. There is a consistent increase in noise levels through out the frequency range. Figure 9 (b) shows the recorded noise levels from 06:30 hrs to 22:00 hrs on 11 May 2015. The noise levels consistently increased with time and few peaks observed at frequencies 1000-2800 Hz. The variations are pronounced in this graph as the recordings presented are from 06:30 hrs where the ambient noise levels are at minimum and increased steadily throughout the day and night.

d) Comparison of ambient Noise data recorded from seabed sensors and hanging hydrophone from boat

Figure 10 shows the comparison of the ambient noise level spectrum measured on 10 and 11 May 2015 with hanging hydrophone from boat (a) and (c) and seabed mounted hydrophones (b) and (d). The noise levels measured by both methods follow a similar spectral distribution. The noise levels measured on 10 May 2015 by hanging hydrophone from boat are in the range of 80-110 dB over a frequency band of 0-6395 Hz. The noise levels measured by hanging hydrophones are 20-30 dB higher than the seabed mounted hydrophone measured noise levels (50-90 dB) over the same frequency range on the same day.

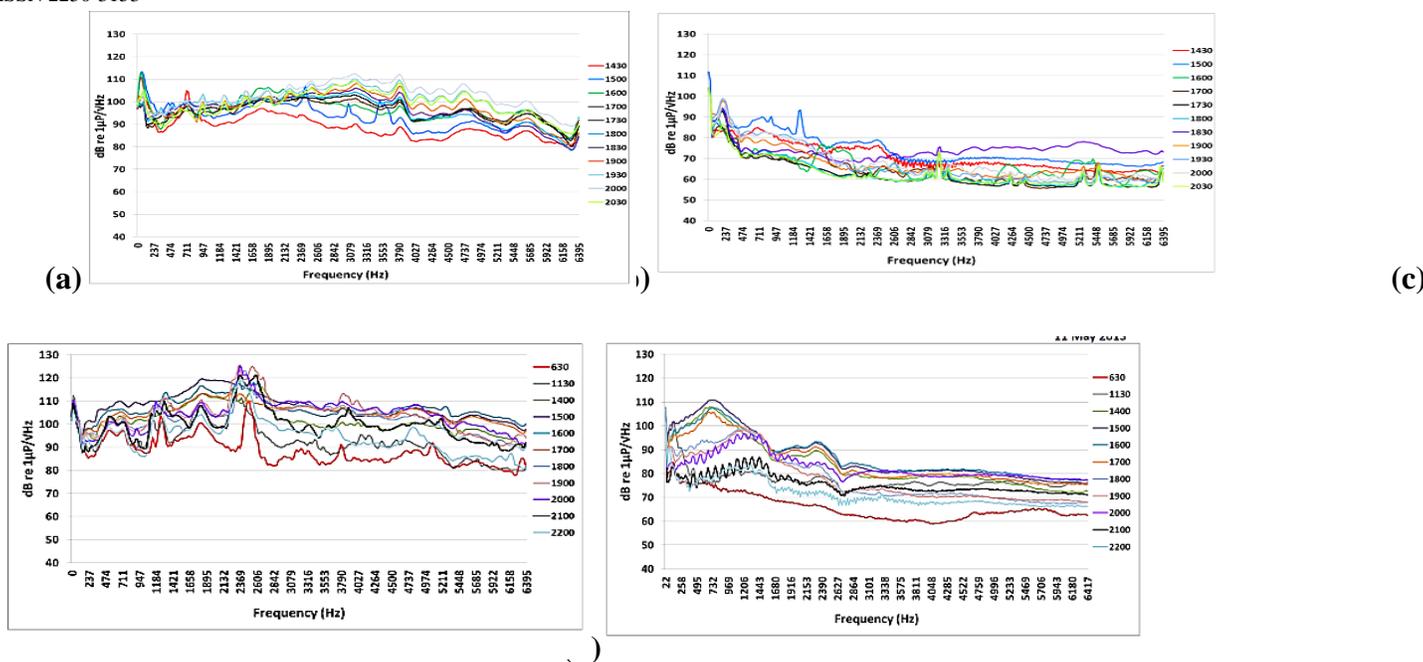


Figure.10 Ambient noise measurements 10 May 2015 with (a) hanging hydrophone from boat (b) seabed mounted hydrophones: 11 May 2015 with (c) hanging hydrophone from boat (d) seabed mounted hydrophones

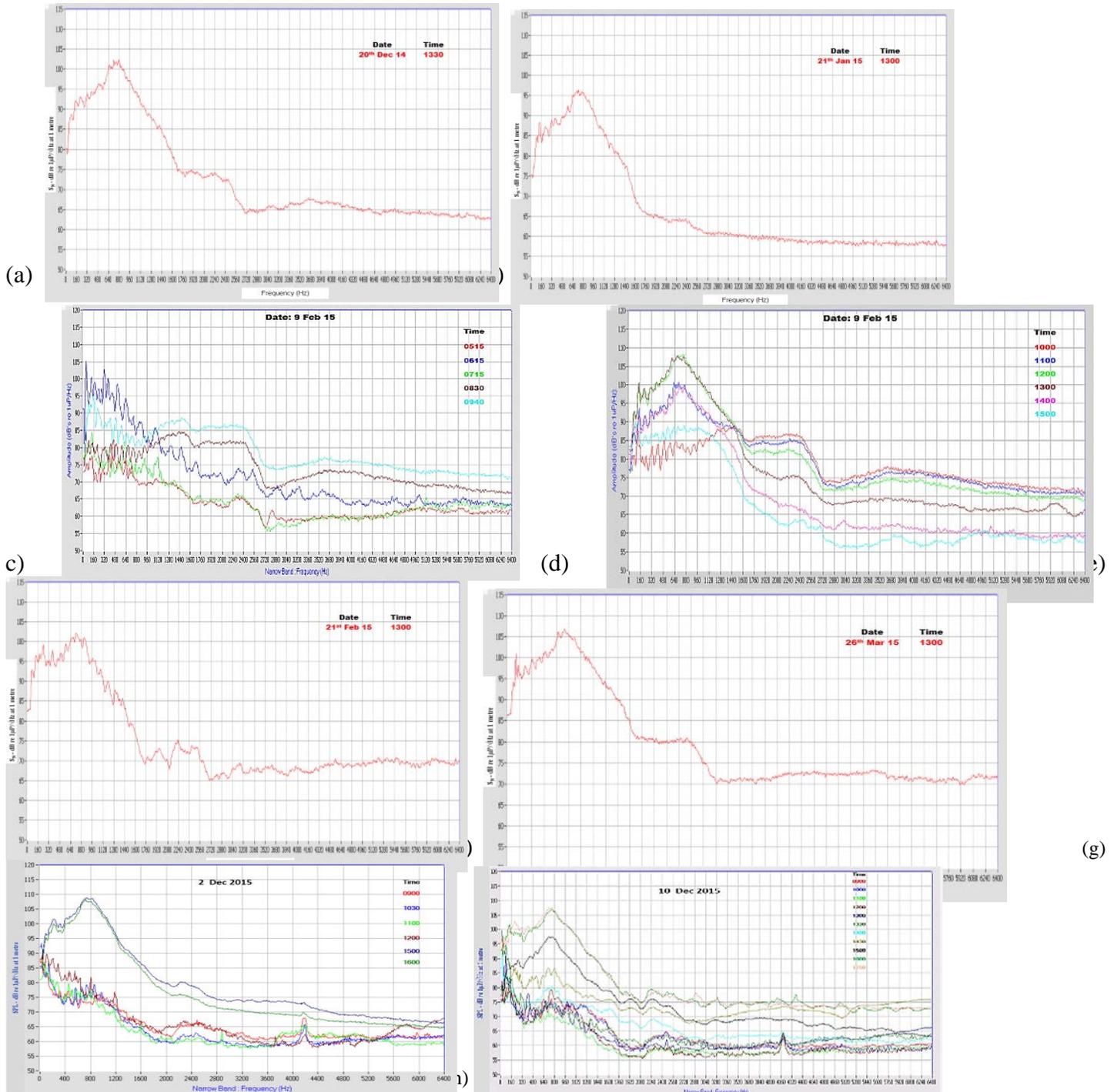
The noise levels measured on 11 May 2015 by hanging hydrophone from boat are in the range of 80-125 dB over a frequency band of 0-6395 Hz. However, there is a peak power level of 110-125 dB over frequency range of 1000-2600 Hz. The noise levels measured by seabed mounted hydrophone are 60-110 dB with peak power levels of 100-110 dB over frequency range of 500-1500 Hz. The noise levels measured by hanging hydrophone are 20-30 dB higher than the seabed mounted hydrophones.

This phenomenon is due to the fact that hanging hydrophone is closer to the sea surface (5-10 m below sea surface) and the noise making sources (wind, ships, and fishing boats) than the seabed mounted hydrophones (30 m below sea surface). The spreading (spherical), propagation, refraction/reflection and absorption losses account for the difference in ambient noise power levels near the surface and near the bottom of the sea in shallow water waveguide like scenario.

e) Noise measurement using seabed mounted hydrophones

Ambient noise measurements carried out from 20 December 2014 to 08 Feb 2016 except monsoon period of June-October. Figure 11 shows noise power spectrum levels during typical days throughout the measurement cycle. The noise level variations at 1330hrs on 20 Dec 2014 and at 1300 hrs 21 Jan 2015 show a similar pattern with lower peak power (by 6 dB) on 21 Jan 2015. On 09 February 2015 the noise levels in the morning and noon sessions are shown at Figure.11 (c) and (d) respectively. The gradual increase in the ambient noise power levels over a frequency band of 0-6400 Hz with time of the day can be clearly seen. Most of the noise power is concentrated in the lower frequency zone with clear peak power level of 107 dB at frequency range of 600-800 Hz near noon

time and decaying and leveling with increase in frequency. The power levels recorded at 1300 hrs on 21 Feb 2015 and 26 Mar 2015 (e) and (f) are almost same and the pattern is identical. Typical pattern is also observed on 02-10 December 2015 (g) and (h) at different times increasing from morning till late evening with peaks at 800-1000 Hz frequency range. During 01-06 January 2016 (i) and (j) the results are same with high power peaks at lower frequency and power levels increasing as the day progresses. On 02-08 Feb 2016 (k) and (l) the same phenomenon occurs with typical power levels indicating a typical pattern recorded by seabed mounted hydrophones.



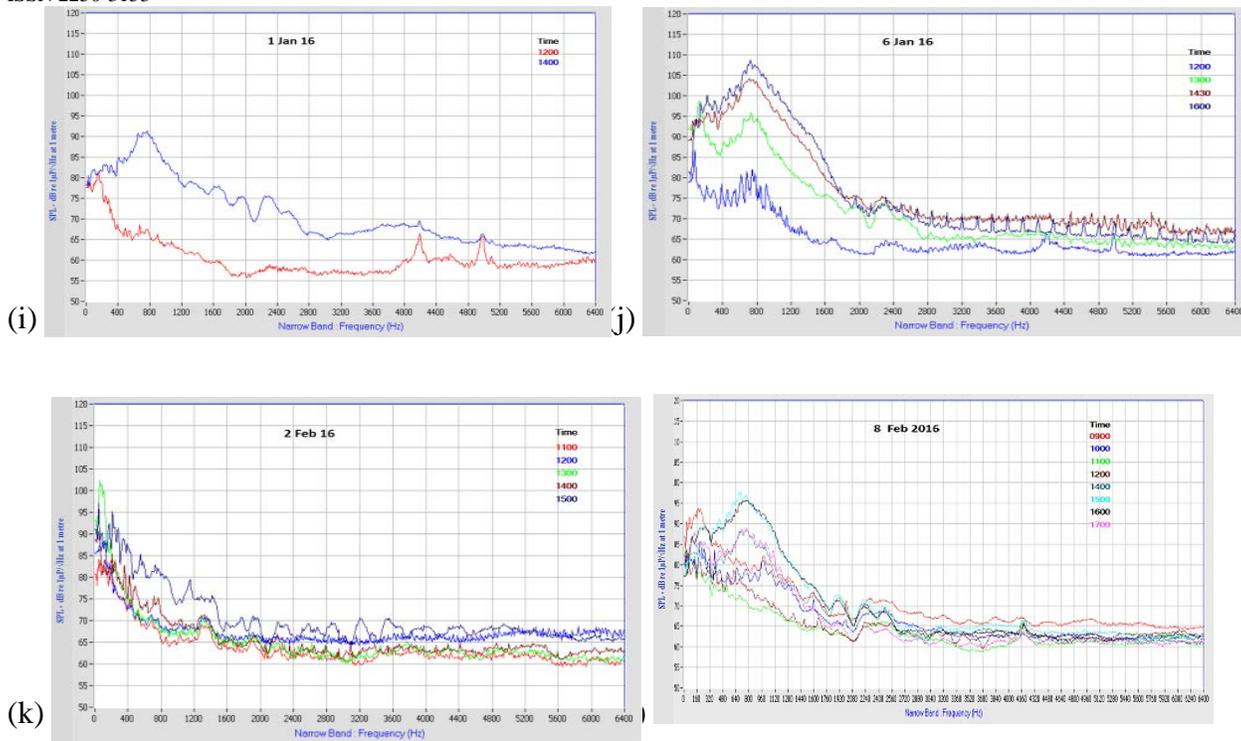
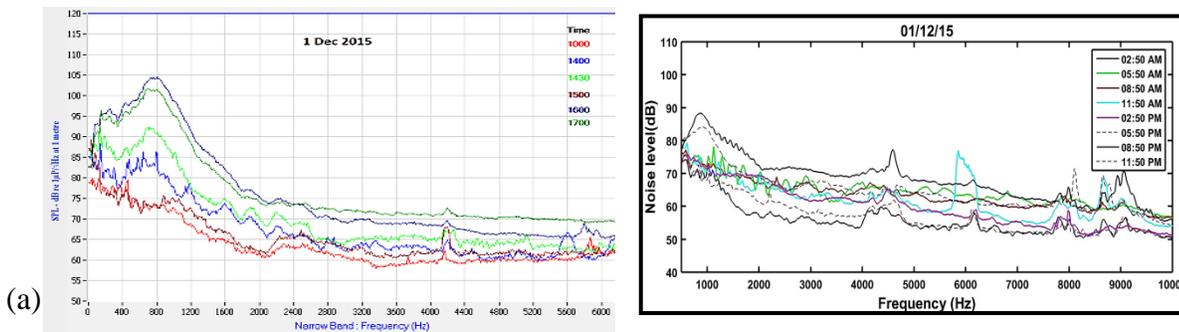


Figure.11 underwater ambient noise spectrum levels recorded by seabed mounted hydrophones on (a) 20 Dec 2014 and (b) 21 January 2015; 09 February 2015 (c) 0515 – 0940 hrs and (d) 1000-1500 hrs; (e) 21 February 2015 and (f) 26 March 2015; (g) 02 December 2015 and (h) 10 December 2015; (i) 01 January 2016 and (j) 06 January 2016; (k) 02 February 2016 and (l) 08 February 2016

f) Comparison of ambient noise measured by Seabed hydrophone vs moored hydrophone

Passive acoustic datasets were collected using moored hydrophones and seabed mounted hydrophones concurrently, during December 2015 and January 2016 at the site. The results shown in Figure 12 (a), (b) and (c) are the noise levels recorded on 01 Dec, 10 Dec 2015 and 06 Jan 2016 respectively. Left hand side is seabed mounted hydrophone recorded data and right hand side is moored hydrophone data .



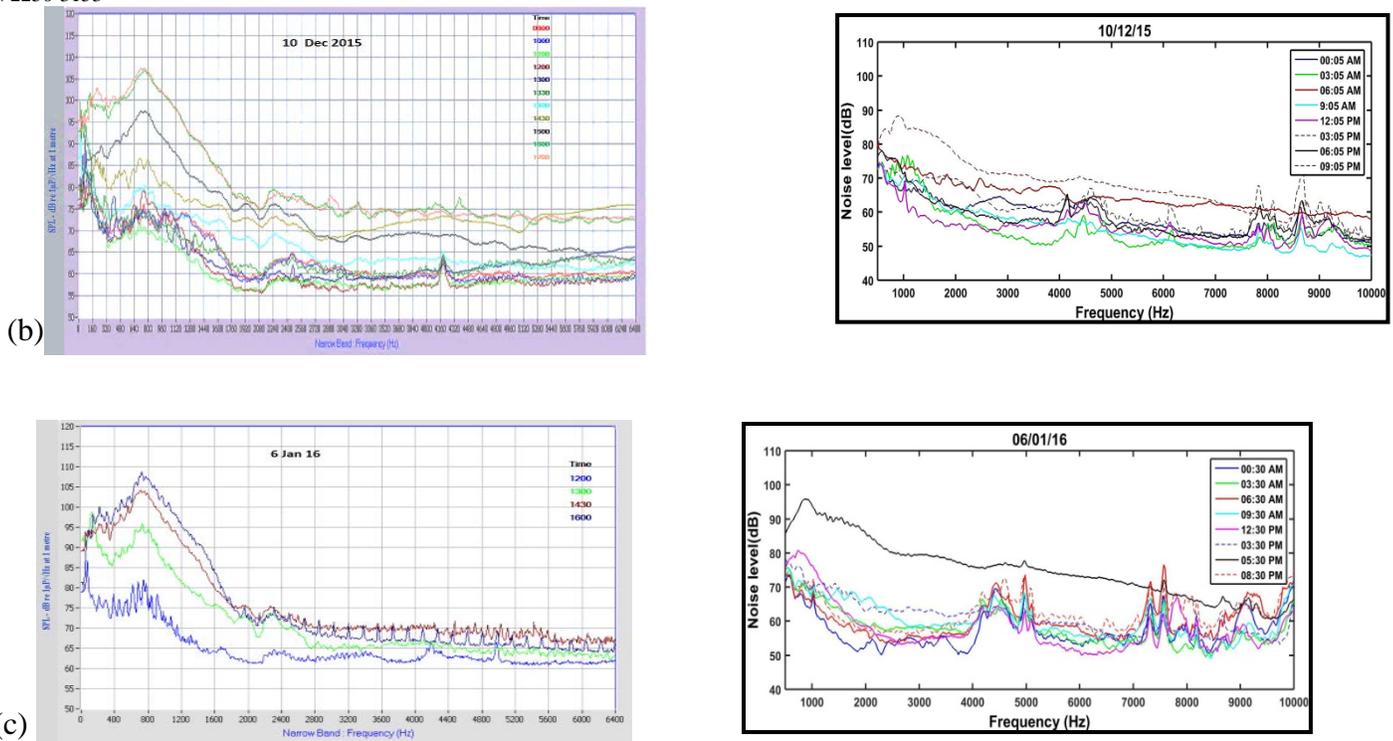


Figure 12 Ambient noise level data recorded by seabed hydrophone (left) and moored hydrophone (right) on (a) 01 December 2015 (b) 10 December 2015 and (c) 06 January 2016

The seabed sensors data is presented in power spectrum density level vs frequency (0-6400Hz) whereas the autonomous recorder data is presented sound pressure level vs frequency (0-10000Hz). However, the shape of both ambient noise curves show the same varying pattern. The area is dominated by the noise due to geophonic and biophonic as well as anthroponic sources. Noise generated by wind has a distinctive shape with the frequency range up to 0.5-8 kHz. The noise level fluctuation is higher in the lower frequency spectrum.

VI. CONCLUSIONS

In this study, an attempt is made to empirically characterize the underwater ambient noise in coastal tropical shallow waters of Goa coast. Three methods of underwater ambient noise measurement used for recording data at experimental site to cover the entire water column and the results compared. It is observed that seabed mounted hydrophones cabled to the shore measurement method is better suited for shallow coastal underwater ambient noise measurements. This method gives accurate results compared to moored hydrophone autonomous recorder or hanging hydrophone method. The underwater ambient noise levels and variations measured simultaneously during December 2015 – January 2016 by using seabed hydrophones and moored autonomous recorder with vertical array of hydrophones, at the site, gave almost similar results. Effect of different environmental factors such as ocean currents,

wind, temperature, conductivity, density of seawater, velocity profiling, shipping and air traffic and biological noise were determined for the increase in ambient noise at the site.

The underwater noise levels varied in the range 60-115 dB corresponding to 10-6400 Hz frequency band. The major source of ambient noise at the site is found to be bio-phonic noise made by Indian mackerel (*Rastrelliger kanagurta*) which is Planktivorous fish is a species of mackerel in the scombridae family of order Perciformes. Measurements confirm that fish chorus raised the ambient noise level by 20-30 dB. The fish chorus noise started at 1200 Hrs and reduced by 2300 Hrs during most of the period of measurement from December 2014 - February 2016. The results clearly show that second-largest contribution to ambient noise is wind. Contributions from ships and fishing boats are occasional and is observed to be the third major source of ambient noise at the site. The wind speed during the period of observation varies from 1 to 7 m/s, and the increase in noise level with wind speed is observed in the noise records. Shipping noise and chirp signals were observed during the first week of December 2015. Analysis revealed the highest underwater ambient noise levels occurring in Mar-May 2015 (105 ± 0.6 dB_{rms} ref 1 μ Pa) and December 2015-February 2016 (108 ± 0.6 dB_{rms} ref 1 μ Pa) at the site. There was significant temporal variation over a 24 h period in measured sound levels, with higher sound levels generally occurring at dawn. Spectral analysis revealed a rise in spectral power in the 0.5–4 kHz bandwidths during afternoon periods within the site.

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Negative Effect of Early Girl-Child Marriage on Nigeria the Way Forward

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ABSTRACT

Early girl-child marriage is a barbaric act, man's inhumanity to man, is a common practice in most developing countries. Every minute a girl-child is married off against her will, education attainment terminated and dreams aborted by this reoccurring act. This has called for a clarion call and a serious concern to the international community at large. The research seeks to look inwardly into variables that invigorate the common practice, how it affects the Nigerian society and the way forward. Secondary and primary source were applied in retrieving data for the study, 296 self-administered questionnaires were completed by female respondent between the ages of 10-45years. The location of the study was kastina state, the Northern part of Nigeria where early girl-child marriage is predominantly high. Two research hypotheses were tested using Chi-square and the result shows that early girl-child marriage has a negative effect on Nigeria. The study recommended feasible and applicable way forward to abolish and manage the victims of early girl-child marriage.

Keywords: *Girl-child, Marriage, Education, Poverty*

I. INTRODUCTION

Marriage is a union ordained by God and is the only remarkable event in a human life that is associated with choice. The choice to be married and stay married is a personal decision, but is unfortunate that this present world most girls do not have the opportunity to choose rather they are forced into marriages at early age without their approval. According to a report by UNICEF 2017 about 17% of Nigerian young girls are married before 15years while 43% are married before they attain 18years. However, child marriage report defer from regions, North-west geopolitical zone of Nigeria record about 76% while South-east zone record 10%. The fact still remains that a girl-child is married off in every 3 seconds in developing countries. The constitution of the Federal Republic of Nigeria Section 23 states that a "person under the age of 18years is incapable of contracting a valid marriage, in the event such marriage hold, it should be proclaimed null and void" while Section 29(4b) states that any woman who is married shall be deemed to be of full age. This section implies that irrespective of a woman's age for the fact that she is married she is assumed an adult; this has indirectly encouraged girl-child marriage. Oxford dictionary defines a child as a young human being below the age of puberty or legal age. UNICEF defines early marriage as a formal marriage or informal union before the age of 18; it further states that is a violation of fundamental human rights. Jain et al (2011) refers to child marriage as any marriage carried out below the age of eighteen (18yrs) years before the girl is physically, physiologically and psychologically ready to shoulder the responsibilities of marriage and child bearing. In international law article 16 of the universal declaration of human right states that marriage should be engage freely with the full consent of the parties and that a person must be at full age as at the time of marriage. The Nigerian Child Right Act 2003 defines a child as a person who has not attained the age of 18years. However, Nigeria has not official declared null and void the contradictory section of the constitution section 29 (4b) which gave right for any person engaged in marriage as an adult.

Figure 1

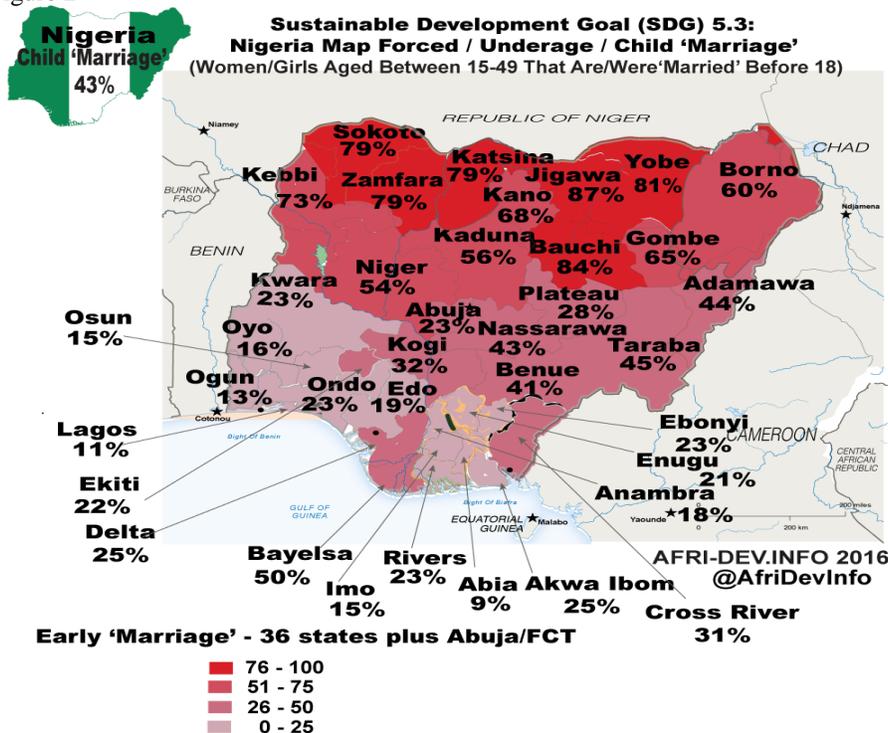
Global Top 10 Underage/Child/Forced 'Marriage' - Under 18 Years

Ranking	Country	Underage/Child/Forced 'Marriage' Under 18 Years
1	Niger	76%
Joint 2	Central African Rep.	68%
Joint 2	Chad	68%
3	Bangladesh	65%
Non African Country		
4	Mali	55%
Joint 5	Burkina Faso	52%
Joint 5	Guinea	52%
Joint 5	South Sudan	52%
6	Malawi	50%
7	Mozambique	48%
7	India	47%
Non African Country		
8	Somalia	45%
9	Sierra Leone	44%
10	Nigeria	43%

Afri-Dev.Info 2015

In the year 2015 as shown in figure 1. Nigeria was ranked the 10th country with 43% out of 20 countries with the high rate of child marriage. Association for Reproductive and Family Health (ARFH) affirms that child marriage affects a child's physical development in which the aftermath is early pregnancy, school dropout, health issues, domestic violence, zero level of empowerment and segregation from social life.

Figure 2



Source: <http://www.afri-dev.info/>

Figure 2. Shows the 36 states of Nigeria and the percentage of female marriage before the age of 18 years. This agrees with the fact that child marriage is predominantly in the northern region of Nigeria, the distribution is as follows: Jigawa 87%, Bauchi 84%, Yobe 81% while Sokoto, Katsina and Zamfara has 79% each, the location of the study Katsina has 79% which is still very high. These girls are married off against their will, their social life and education aborted, early pregnancy with complications and health risk. It is verifiably on record that obstetric fistula is an ailment mostly found in the northern Nigeria due to early marriage practice, 120,000 new cases erupt every year. The probability of a girl-child having fistula is very high; most girls lose their lives or their child at birth while some give birth to still born. Can a child take care of a child? The answer is a capital 'No' without a clause, Legal laws of

countries and previous research makes it point and clear that a girl below the age of 18years is considered a child therefore cannot mother a child. Neonatal mortality is on the rise as these girls lose their babies due to lack of experience and proper care. Child marriages tend to vary with a girls educational attainment and financial capability of the family, applicable calculation shows that a girl who completes secondary education is liable to marry at the age of 23years for wealthy families while for poor families 21years. That's the feasible age when a girl is ripped and ready to face the challenges that comes with marriage. The fact still remains that education is the basis that indicate the marriage of a girl, research shows that 82% of girls without formal education were married off before the attainment of 18years whereas girls who complete secondary education about 13% marry at the right age. The reality of the inhuman practice of early girl-child marriage must be a thing of the past, it is the worst social injustice and man's inhumanity to man. The side effect of this barbaric act are enormous, the physical and psychological trauma is out of place as it affects both the society and the girl.

1.1 Attributes of early girl-child marriage

Early girl-child marriages are triggered by some factors such as financial constraint, lack of education, religious/traditional belief, gender inequality and insecurity. For the purpose of this study these attributes are discussed below.

Poverty: poverty is said to be a disease, when a man has the poverty of the mind and mentality: he is also said to be crippled. Financial problem has lured a lot of people to this mess of giving out their girl in marriage in other to be free from the burden of female expenses. Child marriage is predominately in the northern part of Nigeria due to their polygamous marriage practice; their religion supports a man to marry more than one woman and the proceeds of the numerous marriages are multiple child births. They bring forth children they cannot train due to poverty, the alternative is to enrich their pockets or up lift the burden of training a girl child by giving her out in marriage at a tender age as an exchange.

Lack of education: Education is paramount to attaining greater heights in the future but the dreams of a girl-child are cut off at early marriage. Family educational background has a vital role to play in a child's educational attainment, the probability that an educated parent will marry off her girl-child at early age is very slim as they know the value of education. Lack of education propels parents to believe that training a girl-child is a waste of resources, that marriage is the only alternative that will protect her without knowing the precautions of the act. They are also made to believe that it is safer, more economical to train a boy because it entails limited resources compared to a girl. Many of them do not know the aftermath of early child marriage due to the fact that they still hold on to their ancient beliefs.

Traditional/Religious beliefs: Most traditions and religious belief varies; some are based on old time religious traditions which encourage child marriage. There is a certain age a girl is married off in other not to bring shame to the family and they also believe that a girl must be married as a virgin, to maintain their belief parents marry off their girl before she becomes sexually active. Also child marriage can be an avenue for settling obligations/debts or sealing family relationship, in this aspect the girl child is formally betrothed to the man as soon as she is born. However, this makes it easier for marriage as soon as she attains a certain age.

Gender Inequality: Gender inequality is one of the challenges women face presently, were more preference are given to men over a woman, this is practically transferred to young girls of nowadays. This is one of the main attribute that has facilitated early girl-child marriage. It is believed that no matter how you train a woman she will certainly end up in a man's house, so therefore they marry their girls off in other not to waste their resources.

Insecurity: This is a contributory factor to early marriage; parents are concerned about security of their girls without thinking of the consequences of early marriage. Female sexual harassment, rape and teenage pregnancy keeps increasing on daily basis, in other to secure and protect their girls they give them out to a much older men.

1.2. Consequences of early girl-child marriage

The results of early marriage are enormous, for the purpose of this study some of the aftermath will be elaborated for a clear understanding.

Domestic Violence: Most men are impatient when they marry a young girl forgetting the fact that the so called wife is a child that needs to be corrected with love. They unleash their anger at every mistake by the child, thereby causing physiological trauma for the child. Often times they live in fear of the unknown, due to the series of abuses from the husband or his family members. Inflated injuries from violence or physical abuse pose a threat to her existence; it can lead to premature death. It's on record that most girls lose their lives in the name of marriage, when they run back to their parent they are sent back, they digest all the violence because they are made to believe that marriage is for better for worse.

Illiteracy: A girl-child's education is terminated, dreams cut short due to early marriage. In most cases during the marriage the men promises to send the girl to school but could not keep the promise as the girl is turned to baby making factory. The survey indicates that 55% & 63% of the female respondent are illiterates they can neither read nor write (see table 4).

Early Pregnancy: Early pregnancy is associated with early marriage, the girls life is endangered due to the fact that their reproductive system is not mature for pregnancy. Para venture, they get pregnant the risk is very high in most cases they either lose their lives or that of their babies at birth. Complications due arise due to lack of proper medical care which result in so many health issues in the long run.

Health Risk: In most cases child marriage results in many issues one of such is Vesico Vaginal Fistula (VVF) is a hole between the female vagina and the bladder, this erupts from a prolonged obstructed labour of a girl-child. The child suffers this after child birth for

a long run, during the period the girl-child leaks urine or feces sometime both uncontrollably. Often times VVF leads to chronic medical issues like constant infection, kidney diseases and infertility. Medically it is observed that a female organ is open and vulnerable to infections they are at risk of suffering sexual transmitted disease which could be contacted from sex, toilet and unclean environment. The girls face the challenges of severe pain during intercourse due to their sex organs are not developed enough.

Social stigma: Arises from early marriage, most especially for those that survive fistula, they are often sidelined by their friends and families. They hardly identify or associate in any occasion or ceremonies as they are enclosed to forced life of introvert. The stigma of lack of education not being able to express one's self among peers, contribute to discussion or knowledge of the things happening in the community also affects the girl.

Hypothesis formulated for the study

H₀ Early girl-child marriage does not affect Nigerian society rather individual

H₁ Early girl-child marriage negatively affects Nigerian Society

II. LITERATURE REVIEW

In Africa there are lots of programs advocating for the abolishment of early girl-child marriage, studies which include research projects and numerous surveys are on the rise on the issue of early marriage in Nigeria and other developing countries that still practice the act. According to Health Demographic survey (1992) it was observed that Niger state had 47% of young girls between the ages of 20-24years were already married before they attained the age of 15years, 87% was married before 18years while 53% of the girls already had children before the age of 18years. UNICEf (1994) observed that the negative impact of child marriage does not only affect the individual rather the society at large. The society shoulders mostly all the burden that arises from early marriage as the girl has formally turn to liability for the society. Part of this burden can be alleviated from the society when a girl child is given an opportunity for a formal education in other for her to decide her future. Bunch observed that early girl-child marriage practice contributes to poverty widespread in a developing country, which makes it difficult for developed countries to render assistance while Holborn (2011) concur with an observation that early marriage affects the lives of the girl-child negatively as the marriage was carried out without maturity and consent of the child. According to Forward (2008), the practice of child marriage is predominantly in the rural area and poor communities, a girl is seen as a liability to the family in other to reduce the so called burden that comes with girl child training, the parents marry her off. He further stated that poverty level of a country is enough to encourage girl child marriage, is perceived as family building strategy and economic strategy. Girl's marriages sometimes are treated as commodities were the families use their daughters to settle debt or seal a family long tiles/relationship. A survey was conducted by Adedokun et al (2012) on the maternal health constraints of early married young mother in Gombe State Nigeria. He applied the data retrieved from 200 female respondents between the ages of 15-24years, the result indicates that family decision, and education level of the female, age at first marriage and current age contributes to maternal health issues. The study also shows that 70% of the respondent had experienced complication either before or after childbirth, 60% attained only primary education before marriage, while 50% are already married for 5-9 years. According to Malhotra et al (1997) there is a relationship between delayed marriage and adult earning. He further explained that when a woman attain full age of marriage with the required education, there tends to be labour participation and contribution to economy growth, these can never be achieved at early marriage as dreams are cut short and poverty level increases. Giyan (2009) observed the Islamic religious context, he noted that the religion invigorate the early girl-child marriage practice, on the other hand their belief forbids a girl child to be pregnant before marriage. Early marriage has been defended in Nigeria as clearly permissible by the Islamic religion, but with the cautionary measure that such marriages can only be consummated when the bride is mature enough. He concluded that most times these decisions are often made without the consent of the child and with no recourse to the consequences of the actions. Abdallah (2011) opined that Nigeria is amongst the highest countries that practice child marriage in the world. With the 42% of girls been married before adulthood basically in the northern part of Nigeria while 20% are married before 15years in other parts of the country where the practice is low. He further stated that Nigeria is so entrenched in the practice which is practically linked to religion, culture and traditional beliefs. Bayisenga (2012) observation was basically on Sub-Sahara Africa, his discoveries indicates the factors that propels parents to child marriage, the aftermath of the act and its effects on the development of the countries involved. The factors includes but not limited to family pressure, economic survival, insecurity, wars and civil conflicts, traditional and religious beliefs. He further stated that the act deprives young girls of her personal development, legal right and right to the future. The challenges country face due to the aftermath of the acts is that it increases population pressure, decline in human development and increase in health care cost. Millennium Development Goals (MDGs); advocates for basic education for a child, eradication of poverty, prevention of HIV/AIDS and reduction of high maternal mortality.

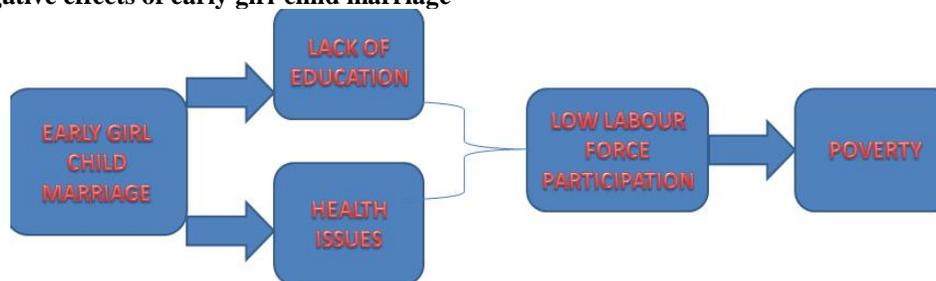
1.1 Negative impact of early girl-child marriage on Nigeria

Personal development of a girl-child is aborted when her education is terminated for marriage, this do not only affect the girl it also affects the community and the future generation. According to Klasea et al (2012) child marriage affects female labour force participation in the area of returns when they are actively employed, this is due to lack of education which has contributed to the increase in unpaid house work. While Chaaban & Cumingham (2011) further opined that female decrease in labour force participation has negative effects on the economic growth of the societies, as well as the women and their families. It noted that early girl-child marriage contributes immensely to the quick increase in population size of any country involved; this is associated with child bearing

of the girl-child who is a novice in family planning. Due to lack of education the tendency is obvious that she will bear children without spacing, often times they deliver more than the family can train thereby populating the society with liabilities. It also contributes to increase in unemployment for the children and decrease in work force participation for the women due to child rearing; this has an adverse effect on the economic growth of the country.

Koblinsky et al (2012) observed that early girl-child health issues or complication contributes to labour force withdrawal thereby affecting the economic development of a country

Figure 3
Negative effects of early girl-child marriage

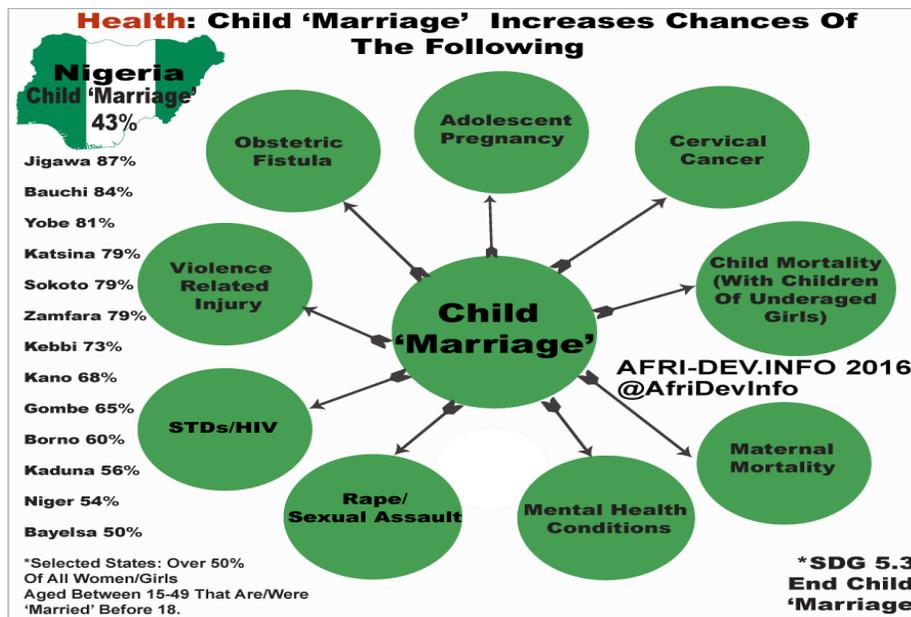


Source: Authors description

Low participation in labour force increases poverty level of a family likewise a decrease in the household contribution to the economic growth of the society. Poverty limits the capability of the individual in the society; there is no access to education in their predicament. There is the saying that information is knowledge or wealth, due to poverty their access to information is limited this is as a result of lack of education. The effect of early marriage on a girl child is also transferred to their children, they lack the basic capacity to build and train a child, and poverty is automatically transferred to the children. It also contributes to increased early marriages for their girl child which poverty is the architect that lures them to repeat the same mistake made by their parents.

Lack of proper medical care leads to premature death of girls who married below the age of 18years, they have no knowledge on how to maintain their health. Premature death is a loss to the economic growth of Nigeria. According to Xu e tal (2003) they observed that young marriages are typically immature girls who lack the proper knowledge and medical care during pregnancy. The study further stated that early child births endanger the life of the girl likewise the child. UNFPA (2013) discovered that complications from early child pregnancy and childbirth are the second leading causes of death among girls of 15-19years with recorded estimates of 70,000 deaths yearly. Wach (2008) confirmed that children of young mothers are likely to have low-birth weight and poor nutrition. UNICEF (2014a) states that infant mortality among babies born of mothers under age 18 is 60% higher than those born of mothers above 18years.

Figure 4.



Source: <http://www.afri-dev.info/>

Skills and productivity is entangled together, lack of skills and less productive has an adverse effect on the economy of the Nigerian society. A marriage of a girl-child aborts her educational attainment and future dreams; education is the basic and formal skills required to be productive in the society. Skills acquired increases empowerment and it also plays a significant role in the success of ones carrier in life, its impact to the growth of individual and the economy are enormous. However lack of education limits a child’s social network achievement which has a psychological impact that traumatizes them in life. Khanna et al (2013) also opined that depriving a girl of the opportunity to learn limits her prospects for employment and her ability to gain useful skills.

Early girl-child marriage aftermath to the society includes low participation in decision making both in their household and the society, gender disparity has encouraged it the more where women are marginalized in decision making roles. Nigeria has few women in the parliamentary and leadership roles in the country this due to lack of educational attainment which has limited women in active role in the country. It’s already observed by stakeholders during the International Federation of Women Lawyers (FIDA) annual meeting of 2018, that there is a decline participation rate by women in the upcoming general election 2019. To be active in decision making, education must be achieved as these young girls are silenced in their household which limits their decision making. There is an adage that says “you need to look beautiful at home before coming outside”, it means that charity begins at home. These young women can neither take decision on personal issues, child bearing nor household finances which has a contributory effect on the economic development of a country. Beaman et al (2012) is of the opinion that early girl child marriage is accompanied by lack of voice in the household decision and civic participation has immensely limit young women’s input into the society and national development. The author concurred to the other research that affirmed that it is likely for an increase in investment of social service when women participate in political decision making.

III. METHODOLOGY

The dependent variable used for the research was basically from primary sources. The location of the study was Kastina State North-west geopolitical zone of Nigeria; random sampling was applied in selecting 350 female respondents. A semi-structured self-administered questionnaire was applied in retrieving critical information’s from the girls for a stipulated period; at the end 296 questionnaires were properly completed and were used in the data computation. Ages 10-30years and above gave their full consent to support the survey. Chi-square test was adopted in other to ascertain the negative effect of early girl-child marriage on Nigeria. In other to get maximum participation and responses from the female the survey was conducted after school at their respective homes, those in the labour field and streets were also captured.

1.1 Data analysis and interpretation of result

Table 1: Distribution of the respondent according to age

Age group	Respondent	Percentage(%)
10-15	70	23.6
16-20	87	29.3
21-25	64	21.6

26-30	32	10.8
31- above	43	14.8

Source: Field data 2018

Table 2: Distribution of respondent according marital status

Marital Status	Respondent	Percentage(%)
Married	132	45
Single	94	32
Widowed	42	14
Divorced	28	9

Source: Field data 2018

Table 3: Age at first marriage

Age at first marriage	Respondent	Percentage (%)
10-18years	94	48
19-24years	54	27
25-30years	33	16
31-Above	18	9
Total	202	100%

296 respondent minus 94 Singles= 202 Total no of Married

Source: Field data 2018

Table 4:Child marriage by Education and literacy status

Education level	Ages 10-22 (%)	Ages 23-Above (%)
No education	22	31
Primary drop out	17	22
Primary complete	13	10
Secondary drop out	16	11
Secondary complete	21	16
Higher	8	10
Literacy		
Cannot read/write	55	63
Limited ability	28	30
Full ability	17	7

Source: Field data 2018

Table 1. Indicate the distribution of the respondent by age; the age bracket 10-15years has 23.6% of the female respondent while 16-20years has 29.3% which was the highest of the respondent in the survey. **Table 2.** Shows the respondent marital status, from the table 132 female respondent are married which has the highest percentage of 45, 94 is the total no of single respondent which ranked 2nd in the table with 32%. 42 female respondents were widow which represents 14% of the entire respondent in the survey while divorced female represents 9% which was the least in the distribution table. Divorced is seen as a western culture in northern part of Nigeria due to their tradition and religious belief, very few of their females are divorced reason being that it is against their belief. **Table 3.** Represents the ages of respondent as at the age of their first marriage, 48% of the girls were married before the attainment of 18years. **Table 4.** Shows the educational level of the respondent, it shows 23% and 31% has no formal education where as 17% and 22% has partly primary school education while 13% and 10% virtually completed primary school. From indication there was an increase in secondary attended and completion but a drop in higher level as they could not further their education due to one constraints or the other. Though most completed their primary and secondary education but the illiteracy level was a bit high due to lack of qualified teachers. It is seen from the distribution that 55% and 63% of both the educated and non-educated cannot read nor write. Thus 28% and 30% has limited ability while only 17% and 7% has the full ability to read and write with proper communication. From the table it shows that the illiteracy levels of the respondents are high.

Table 5: Attributes of early girl-child marriage by distribution

Attributes	Respondent	Percentage(%)
Poverty	141	48
Education of parent	75	25
Traditional/religious belief	69	23
Gender Inequality	58	20

Insecurity	33	11
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Source: Field data 2018

Table 6: Consequences of early girl-child marriage by distribution

Consequences	Respondent	Percentage(%)
Domestic Violence	123	42
Illiteracy	74	25
Early pregnancy	58	20
Health Risk	52	18
Social Stigma	51	17
High maternal mortality	47	16
Sex slave	44	15
Neonatal mortality	31	10

Source: Field data 2018

Table 7: The Negative effect of early girl-child marriage on Nigeria

Effects	Respondent	Percentage(%)
Poverty	89	30
Decrease in Labour force participation	78	26
Lack of power	67	23
Premature death	36	12
No skills & less productive	26	9

Source: Field data 2018

Table 5. Indicates the attributes of early girl-child marriage on Nigeria, 141 respondents which represents 48% opined that poverty and financial capability of their parents lured them into marriage, it is a major problem in Northern part of Nigeria as men marry more than one wife thereby producing many children without the capability of training them. It is noted that an educated parent lives a developed life which is basically transferred to their children, this fact is confirmed from the distribution that most of the parents are uneducated, 25% of the respondent agree to the fact that their parent gave them out for marriage because they don't know the value of education. An educated parent knows the value of education and therefore will not subject their girl-child to early suffering in the name of marriage. Traditional and religious beliefs is also seen as a challenge that contributes to early girl-child marriage in the northern region, it ranked 3rd in the distribution with a percentage of 23. Most religion forbids training a girl-child to a certain level, as it is viewed as a waste of time and resource. 20% of the respondent opined that gender inequality has denied them their right, it has been a big challenges in the Nigerian system were more preference are given to the men, in this study it also indicates that the parents of these girls prefers to train the boys with a superstitious belief that training a girl-child is a waste and that they will eventually end up in marriage responsibilities. 11% represents insecurity, were by the parent of the girl-child feels insecure over their girl-child safety. They believe that keeping a girl-child for long will affect her sexual life; they want their girls to get married untemper. **Table 6.** Represents the consequences of early girl-child marriage in a distribution. From indication it shows that domestic violence ranks the highest, 42% of the respondent attest to the fact that violence is being seen as a norm in their marriage, as they cannot voice out due to the punishment that comes thereafter. For this reasons they a treated like a no body by their imposed husbands. 15% affirmed that they are sex slaves to their so called husbands, as they are forced to sex at any time against their will. 25% of the female respondent concur that most of them are illiterates because they had no opportunity for formal education. From table 4, it shows that 55% and 63% of the females that had no formal education and those that attended school cannot read nor write. This was practically confirmed by the author during administering the questionnaires to the respondent, it was hectic as most of the female do not understand English which is a general acceptable language for communication in Nigeria. For the survey to be hitch free the author employed the services of an interpreter, who got useful information's from the female respondents. Early pregnancy represents 20%, this situation where a young girl gets pregnant before her reproductive system is ripe, the respondents affirmed that most of them get pregnant after they are married off against their will which poise a serious health issues for them. 18% of the female lamented of having complications from child-birth, sickness which has affected their normal life, while neonatal and maternal mortality was represented by 10% and 16% respectively this is also caused by early girl-child marriage most of them die at child birth, prolong labour while some lose their child due to lack of experience. Social stigma represents 17%, the females posit that their social life is dead; they cannot associate with their peers due to the stigma of early marriage. **Table 7.** The consequences of early girl-child marriage have a damaging effect on the society and economy of Nigeria. The girl-child ought to be our future leaders but their dreams have been cut short by early marriage. Presently they cannot make any impact in the society rather they turn out to be liabilities to the Nigerian society. Poverty ranked highest with 30%, as it is poverty can never be alleviated in this context as the basic instrument

education is missing. Decrease in Labour force participation is represented in the distribution by 26% which is agreed that it dwindles the economy growth of Nigeria as well as the individual involved. 23% of the female respondent affirmed that they are powerless rather liabilities to their husbands and the country. They have no positive contributions to their lives or their environment and this is also transferred to their children which at the long run affects the country. It is in the know that a skilled mother will always transfer and educate her children thereby reducing the poverty level and increasing the economic growth of Nigeria. Furthermore 12% of the females noted premature death; they lose their loved ones out of early marriages. In most cases of early pregnancies young mothers and their children survive on a narrow escape living them at the mercy of death, thereby affecting the society. 9% of the female are less productive as they are worried that they are not able to work and earn a decent living due to lack of education and skills. This had a negative impact to Nigerian economy as the female labour force participation is decreasing due to these facts.

Table 8. Computation of the distribution χ^2

Effects	O	E	O-E	(O-E) ²	$\frac{(O-E)^2}{E}$
Poverty	89	59	30	900	15.25
Decrease in Labour force participation	78	59	19	361	16.11
Liability	67	59	8	64	1.08
Premature death	36	59	-23	529	8.96
No skills & less productive	26	59	-32	1,024	$\frac{17.35}{\Sigma=48.75}$

Source: Authors computation

Table 8. Is a broad explanation of chi-square computation, the sum of the value is $\chi^2_{cal}=48.75$ while the tabulated value is $\chi^2_{tab}=9.49$. In this scenario the calculated value is more than the tabulated value ($48.75 < 9.49$) which obviously indicates that there is a negative effect of early girl-child marriage in Nigeria.

1.2 Hypothesis Testing

Chi-square test was applied in testing the hypothesis in other to comprehend the negative effect of early girl-child marriage on Nigerian society. The formula for chi-square computation is below:

$$\chi^2 = \sum \frac{(O-E)^2}{E}$$

Representation of the symbols

E= Expected frequency

O= Number of observation

N = Number of observation

Σ = Summation

χ^2 = Chi-square

Degree of freedom (df) = n-1

$$5-1=4 \quad \alpha = 5\% = 0.05$$

$$\chi^2_{cal} = 48.75$$

$$\chi^2_{tab} = \chi^2_{0.05} = 9.49$$

If $\chi^2_{cal} > \chi^2_{tab}$ the study reject the null hypothesis H_0 early girl-child marriage does not affect Nigerian society rather individual and accept the alternative hypothesis H_1 early girl-child marriage negatively affects Nigerian Society. From the outcome of the survey, it is very obvious of the effect on the economic growth of Nigeria, this result also agree with previous research result by Enzuladu e tal (2016) observed that early girl-child marriage aftermath is worrisome, the authors further stated that it affects the child medically and socially in the society.

IV. THE WAY FORWARD AND CONCLUSION

Early girl-child marriage is mostly associated with culture and religious belief which may be difficult to alter, but it can still be limited and abolished. It's also noted in the study that early marriage is part of the gender discrimination that women face in the society where prevalence are given to the boys over the girls. The study revealed that education is the most paramount instrument required to abort early marriage, as the research perceived its prevalent more in the northern part of Nigeria where educating a girl-child is viewed as a waste of resource. In most cases were parent give out their girl due to poverty with a selfish interest of being empowered in return by the husband of the girl, this act is heartless and self-centered because they never considered the interest of the girl-child. At long run when their child is maltreated they are unable to protect their child due to the fact that they have sold their birth right when they were settled financially. In the aspect of the girl-child she is rubbed off her future dreams, her right violated due to the termination of her education, social, economic and psychological development.

This study proposes the way forward:-

* Firstly, the constitution of the Federal Republic of Nigeria Section 29(4b) which states that any woman who is married shall be deemed to be of full age should be amended and clearly state the punishment for any community/parent involved in the barbaric act. Nobody is above the law.

- * Compulsory completion of secondary school education, it should be free in other for the poor citizens to access and take advantage.
 - * Strong advocacy and awareness should be established in collaboration with religious and community leaders, so as to inculcate the need for the abolishment of early girl-child marriage in Nigerian society.
 - * Young girls who married early should not be a write off from the society; a rehabilitation center can be established as this will contribute in resuscitating the psychological effect of early marriage on them.
 - * The services of social workers is also important in assisting the girls recuperate back to the society, they can still be productive if guided properly.
 - * Empowerment centers ought to be established were they can still gain skills irrespective of their predicament as this will alleviate them from poverty.
 - * A functional government organization should be established, their basic role should be on early marriages to take reports on any location, they also will take prominent action to prosecute and as well protect the girl-child.
 - * Nigeria encourages community policing, early girl-child marriage policing should be considered, this will enable individuals to report immediately it is noticed.
- To an extend it will curb the madness, it is said that whatever that effects the tongue, directly or indirectly affects the mouth in other words early girl child marriage do not only affect the individual negatively rather the entire country at large.

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Seasonal changes of reproductive cycle and proximate compositions in *Cerithidea obtusa* from Ca Mau mangrove forest, Vietnam

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Abstract- The present study investigated seasonal changes in gonad development and proximate compositions of the mangrove snail, *Cerithidea obtusa* in the mangrove forest of Ca Mau province, Mekong Delta of Vietnam. Our findings showed that gametogenesis of *C. obtusa* occurred year around, however, the major spawning period lasted from September to November. The highest spawning synchrony was observed in November with 43% collected individuals in spawning stage. The results also showed that in mangrove snails, proteins are the major component (~60%) followed by carbohydrates (~25%) and then lipids (~5%). Proteins could be the major energy resource to support growth and reproductive cycle of this species. Results from this study provide detail information on the biology of mangrove snails and it could be useful for resource management, bio-conservation and sustainable aquaculture in mangrove forests of Vietnam.

Index Terms- *Cerithidea obtusa*, gonad index, proximate composition, reproductive cycle

I. INTRODUCTION

Mangrove snail, *Cerithidea obtusa* is common species in the mangrove ecosystem in Asian-Pacific region (Ellison *et al.*, 1999; Tan and Chou, 2000). This snail species plays an important role in food web inside mangrove forest because they feed on benthic diatoms and the detritus that original from the mangrove leaf litter decompositions (Bouillon *et al.*, 2002). Several studies have been conducted on *Cerithidea* genus, such as oxygen consumption (Houlihan, 1979), feeding behaviour (Bouillon *et al.*, 2002) and lipid and fatty acids of *C. obtusa* (Misra *et al.*, 1986). Studying on the reproduction, Suwanjarat and Klepal (2001) described the ultrastructural characteristics of euspermatogenesis and euspermatozoa of *Cerithidea obtusa* but not reproductive cycle. The snail is a highly priced in domestic market of Vietnam with around 5-7 USD/kg, and annual landings in Vietnam rely mainly on its wild fishery and partially from aquaculture. Until now, there is no report about the production of this snail species in Vietnam, however, Chau *et al.* (2009) reported that the wild fishery dropped dramatically. Authors suggested that water quality decreased, mangrove destruction and over-exploitation are the main reasons to be responsible for the decline. Several studies have reported that population decreases in marine mollusk in coastal areas are often associated with overfishing and environmental problems (Peterson, 2002; Gangloff *et al.*, 2008; Ren *et al.*, 2008). To protect the spawning bloodstocks and to improve the recruitment of the wild population, fishing is often limited or suspended for a certain period based on the annual reproductive cycle of the species.

On aquaculture aspect, mangrove snail has been cultivated inside mangrove systems in Ca Mau province, Mekong Delta of Vietnam since 1990s (Chau *et al.*, 2009). In the intensive culture system or co-culture with blood cockles, juvenile snails have been released at the stocking density above 30 ind./m² and the required seed amount at 1000-1500 kg/ha (Chau *et al.*, 2009; Thao *et al.*, 2011). Therefore, seed requirements are increasing year by year and the population size of this species has been decreased over two past decades. It is necessary to understand biology, especially reproductive characteristics of *Cerithidea obtusa* for the sake of resource management, biodiversity conservation and sustainable aquaculture. The objectives of this research are to: (1) investigate the reproductive cycle; and (2) determine the seasonal variation of proximate compositions in body tissues of *C. obtusa* in mangrove forests of Ca Mau province, Mekong Delta of Vietnam. Based on the findings of annual reproductive cycle, we would like to recommend the period of limited fishing for *C. cerithidea* in studied area in order to ensure the population recruitment.

II. MATERIAL AND METHODS

Snail sampling

This research was conducted in Ca Mau province in the Mekong Delta of Vietnam, located from 8°30' to 9°10'N, 104°80' to 105°5'E with 107 and 147 km of east and west coastline, respectively. With its dense network of canals, creeks and rivers, mangroves, this province is considered a very important area for forestry, fisheries and agriculture (Fig. 1).

Samples of *Cerithidea obtusa* were collected from April 2007 to March 2008. A sample set comprised at least 100 individuals, collected randomly from all tidal levels, kept alive and transferred to the laboratory.

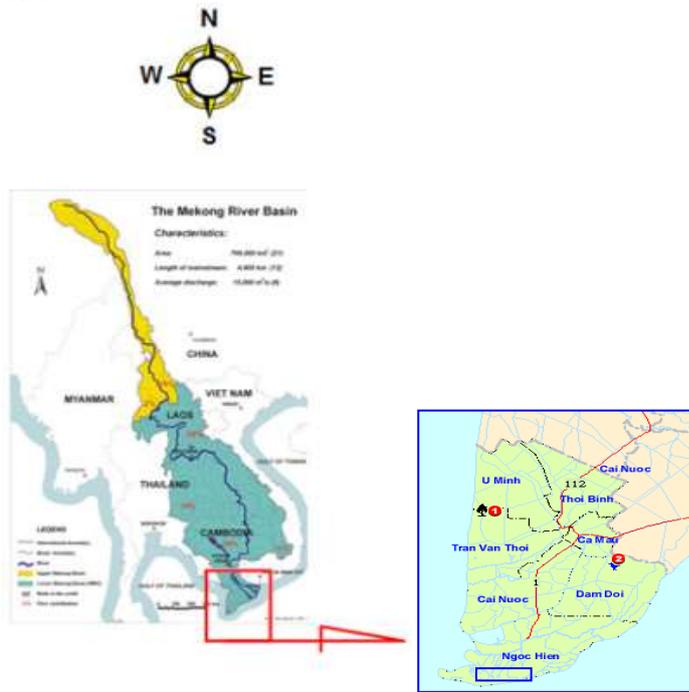


Fig.1: Map showing the location of Ca Mau province and sampling site (□)

Histological preparation

At the laboratory, after recording the shell height and width, tissues of 30 snails were weighed. After drying at 60°C for 24 hours, snail tissues were ground and then the biochemical components (organic matter, protein, carbohydrate, lipid, ash) were analyzed on pooled sample of 30 snails from each sampling site per month (AOAC, 2001). Another 30 adult snails were used to determine the reproductive cycle of the population by histological method (Howard *et al.*, 2004). Transverse cut was made in the middle of body part where gonad present, and a 3 mm thick section extracted and fixed in Davidson fixative. Tissue samples were then processed and embedded in paraffin. Serial sections, 4 µm thick, were obtained with a rotary microtome and stained with Harris' hematoxylin and eosin Y. Histological slides were observed under microscope to grade the developmental stages of snail gonads.

Based upon microscopic examination of histology, gonad development of *C. obtusa* was categorized into different stages as described by Horiguchi *et al.* (2006) with some modifications. Gonad development of each female snail was scored as the following: undifferentiated stage (0); initial development (1); developing stage (2); ripe stage (3) and spawning (4). Male gonadal development was also staged 0 to 4, however the initial development stage was not considered.

Environmental conditions

Organic matter of mudflat, humidity, water temperature, water salinity and pH were recorded at each sampling to figure the variation of environmental conditions.

III. RESULTS

Seasonal variation of environmental conditions

Humidity was stable from May to October (~80%) during rainy season (Fig. 2). High variation of humidity occurred from November to April with the highest value in November (90.4%) and the lowest value in February (69.1%).

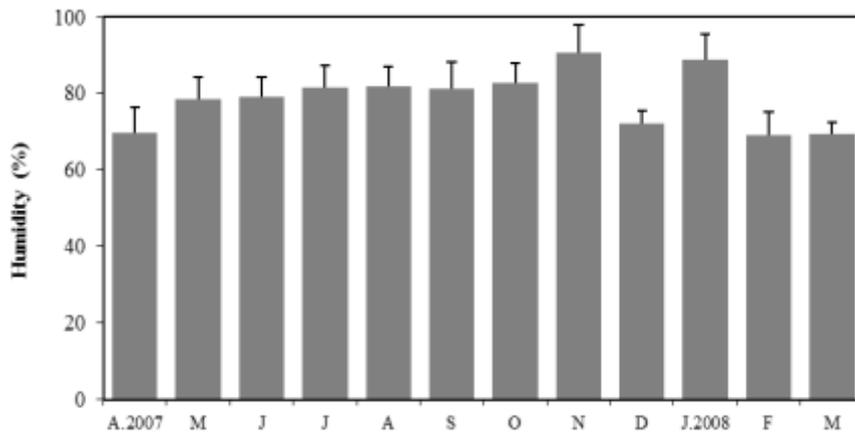


Fig. 2: Variation of humidity (%) during sampling period

Monthly mean temperature is presented in Fig. 3. Morning temperature varied from 23.5°C (January) to 26.3°C (April). Temperature in the afternoon showed low values in November and January (~29.5°C) and highest in April (33.0°C). In general, morning temperature was high from April to June (early rainy season) and low from November to February (early dry season).

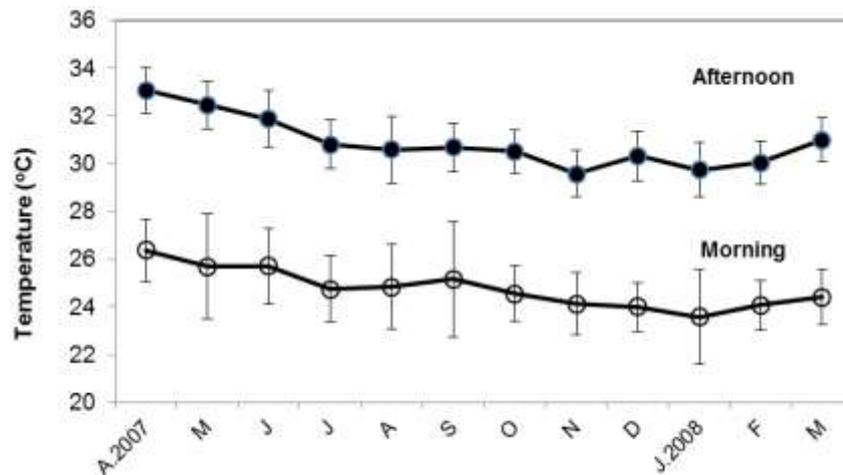


Fig.3: Variation of water temperature (°C) during sampling period

Water pH decreased from April to July, remained high in August-September, dropped abruptly and reached minimum in October (6.4). From November onward, pH decreased steadily to 6.9 in March. Highest salinity was recorded in May (32.3 ppt). From June to December, salinity decreased steadily and reached minimum value at 25.4ppt. From January onwards, salinity fluctuated around 29 ppt and increased to 31.4 ppt in April. There is no clear relationship between rainy period (April – November) and levels of pH and salinity at sampling sites. Probably, the variation of pH and salinity was affected by high tidal level and flooded period that occur annually from August to November (Fig. 4).

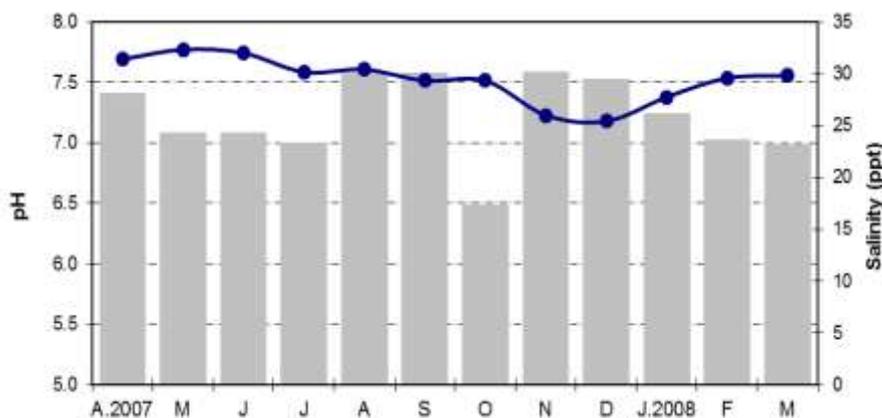


Fig. 4: Variation of pH (bar) and salinity (line) during sampling period

Total organic matter (TOM, %) showed high level from December to March (Fig. 5). TOM was low from June to November. Highest and lowest value was recorded in April (18.9%) and in August (9.1%), respectively. In general, TOM was low from May to November corresponding to rainy season in Mekong Delta.

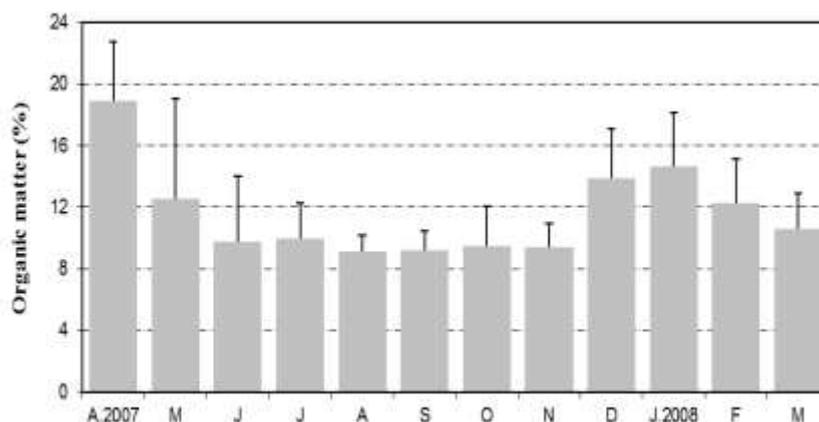


Fig. 5: Variation of total organic matter (%) of sediment during sampling period

Reproductive cycle of *Cerithidea obtusa*

Table 1 showed biometric data of samples used for histological analysis. Mean shell height of snails varied from 36.3 to 42.2 mm, total weight from 3.7 to 6.1 g/snail and body mass varied 1.2 – 2.0 g/snail. Ratio between wet meat weight and total weight of snails was lowest in April (26.2%), highest in July (40.6%) and not relating to shell height of snails.

Table 1. Mean shell height (mm), total weight (g), meat weight (g), ratio of meat weight to total weight (%) and gonad index of individuals used for histological analysis.

Months	SH	Wtt	Wm	Wm/Wtt	GI
Apr.2007	40.4 ±0.7	5.7 ±0.5	1.5 ±0.2	26.2 ±1.5	1.6 ±0.4
May	42.2 ±0.1	6.1 ±0.5	2.0 ±0.0	32.8 ±2.7	1.6 ±0.2
Jun	40.2 ±0.8	5.2 ±0.2	1.7 ±0.0	33.0 ±2.3	1.4 ±0.2
Jul	39.3 ±0.4	4.7 ±0.6	1.9 ±0.2	40.6 ±0.7	1.7 ±0.0
Aug	39.6 ±0.4	4.7 ±0.5	1.7 ±0.2	39.0 ±1.7	2.0 ±0.1
Sep	37.4 ±0.9	3.7 ±0.3	1.2 ±0.0	33.3 ±3.6	2.3 ±0.1
Oct	39.6 ±1.8	4.6 ±0.7	1.6 ±0.3	35.1 ±1.7	2.3 ±0.1
Nov	38.3 ±1.1	4.7 ±0.8	1.4 ±0.4	30.3 ±3.4	2.9 ±0.3
Dec	36.3 ±2.2	3.7 ±0.9	1.2 ±0.4	32.7 ±3.0	1.4 ±0.3
Jan.2008	37.5 ±2.3	4.2 ±0.8	1.4 ±0.3	35.0 ±2.4	1.2 ±0.4
Feb	38.1 ±2.3	4.7 ±1.1	1.6 ±0.6	34.3 ±5.0	1.3 ±0.1
Mar	38.0 ±3.2	4.6 ±0.8	1.7 ±0.4	37.6 ±2.6	1.3 ±0.1

SH, shell height (mm); Wtt, total weight (g); Wm, meat weight (g), Wm/Wtt, ratio of meat weight to total weight (%); GI, gonad index.

Photomicrographs of various developmental stages of male and female snails are presented in Fig. 6 and Fig. 7. In undifferent stage, little or no gonad tissue was visible, and the gender of snails was not distinguished in this period. During developing stage, the number of follicles increased and they became expanded in male. In females, egg capsule glands appeared and the primary oocytes located on the wall of digestive gland. As developing stage progressed, the follicles continued to expand and coalesce. Some mature gametes were observed in male, however in female gonad, oocytes increased in size and became more spherical. During ripe stage, mature oocytes moved to the center of the lumen while male gonad showing free mature sperm filling the follicles. In spawning male, the follicles were almost filled with spermatozoa. Female gonad showed different size class of oocytes, some lumen already empty.

Table 2. Classification of female *Cerithidea obtusa* gonad developmental stages (0-4) with numerical score (0-4)

Developmental stages	Numerical score	Histological description
Sexually undifferentiated	0	No egg capsule gland present. No gonad tissue visible.
Initial development	1	Egg capsule gland present. Little or no primary oocyte.
Developing	2	Egg capsule gland present. Increasing numbers and size of accumulating oocytes.
Mature	3	No or little egg capsule gland present. Most mature oocytes have round shape and similar size.
Spawning	4	No egg capsule gland present. Reduced numbers of oocytes.

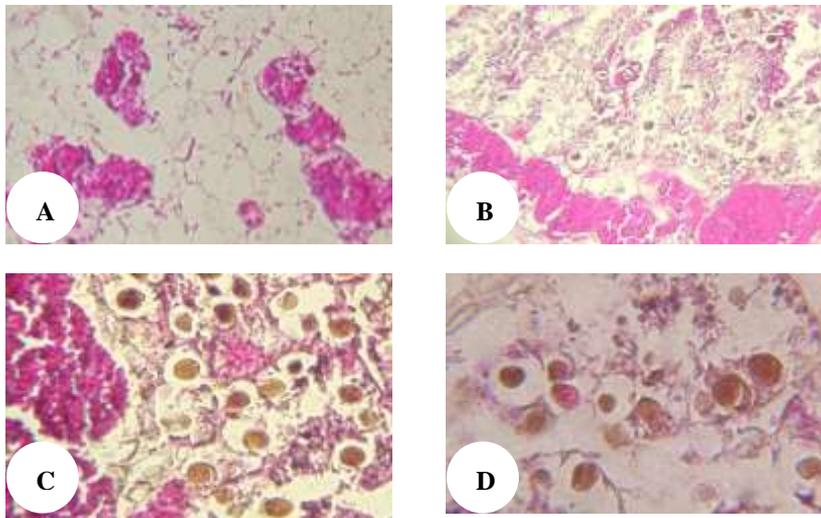


Fig. 6: Gonad development in female *Cerithidea obtusa*. A. Initial development; B. Developing stage; C. Ripe stage; D. Spawning stage

Table 3. Classification of male *Cerithidea obtusa* gonad developmental stages (0-4)

Developmental stage	Numerical score	Histological description
Sexually undifferentiated	0	No gonad tissue visible.
Developing	2	Increasing numbers and size of follicles; spermatocytes present.
Ripe	3	Little connective tissue remaining; most spermatozoon has thread shape and concentrated at the center of follicle.
Spawning	4	Reduced numbers of gametes. Follicle wall is thin and testis volume is small.

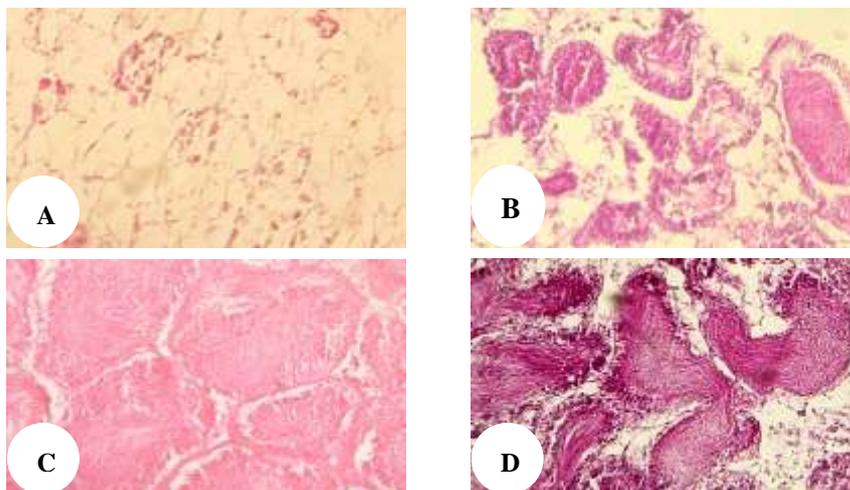


Fig. 7: Gonad development in male mangrove snail *Cerithidea obtusa*. (A. Sexually undifferentiated stage; B. Developing stage; C. Ripe stage; D. Spawning stage)

Fig 8. shows changes in mean GI of snails at different sampling sites. Observation of the histological slides indicated that gametogenesis of snails occurred almost year around. Mean GI increased quickly from June to October when the salinity and temperature decreased. In November, mean GI of snails showed that most snails were ready for spawning or in partial spawning. Relatively lower GI observed in December onward suggested that major spawning of snails occurred from September to November.

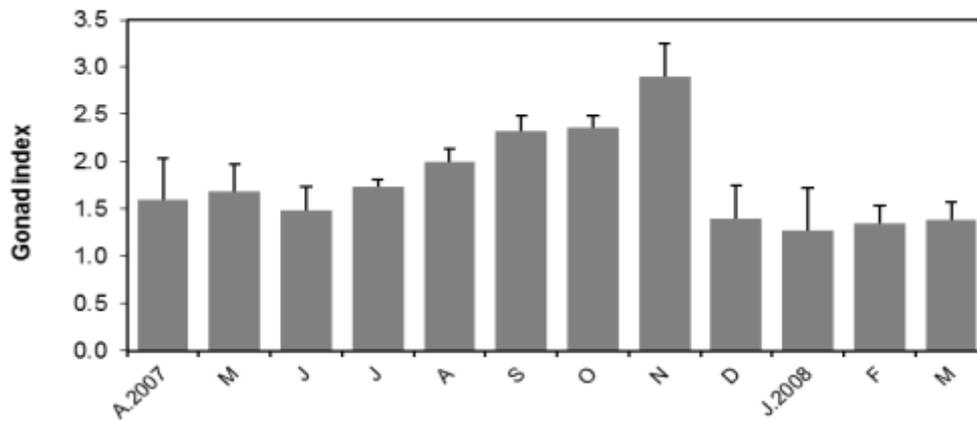


Fig. 8: Seasonal variation of gonad index of *Cerithidea obtusa* during sampling period

Monthly changes in percent composition of various gonad development stages were summarized in Table 4. The data showed that spawning more synchronous in November (43.3%) compare to those in September or October (20.0 – 23.3%). Gonad developing snails were dominant during January to July, however mature individuals were only abundant from August to October.

Table 4. Percentage of snails at each reproductive stage during sampling period (%)

Gonad stages	Sampling period											
	Apr.2007	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec	Jan.2008	Feb	Mar.
Indifferent	23.3	20.0	22.5	15.0	20.0	16.7	6.7	3.3	26.7	23.3	16.7	16.7
Developing	55.0	53.3	60.0	65.0	31.7	28.3	30.0	31.7	55.0	66.7	70.0	68.3
Ripe	16.7	18.3	7.5	10.0	35.0	35.0	40.0	21.7	15.0	10.0	11.7	15.0
Spawning	5.0	8.3	10.0	10.0	13.3	20.0	23.3	43.3	3.3	0.0	1.7	0.0

Changes of proximate compositions in snail tissues

Protein content in mangrove snail decreased gradually from April to September (63.3 to 54.4%). It increased slightly in October (58.2%) and then decreased again to February (52.0%). From June to September, variation of protein level seemed to be opposite with gonad index in mangrove snails. High values of protein in October (58.2%) and November (55.6%), probably link to the reproduction of this species, especially females.

Table 5. Mean shell height (mm), total weight (g), meat weight (g), ratio of meat weight/total weight (%) and gonad index of individuals used for biochemical analysis.

Months	SH	Wtt	Wm	Wm/Wtt	Dw	Dw/Wtt
Apr.2007	34.3 ±5.3	3.7 ±1.3	0.9 ±0.3	23.8 ±0.0	0.3 ±0.0	7.3 ±0.1
May	38.1 ±2.1	4.6 ±0.6	1.4 ±0.2	31.3 ±1.4	0.3 ±0.0	8.4 ±1.0
Jun	41.7 ±1.7	5.5 ±0.0	1.7 ±0.1	29.1 ±0.9	0.4 ±0.1	7.8 ±1.7
Jul	38.5 ±0.8	4.6 ±0.2	1.8 ±0.0	40.4 ±2.2	0.2 ±0.0	5.4 ±1.2
Aug	39.3 ± 0.9	4.7 ±0.7	1.8 ±0.3	38.6 ±3.1	0.3 ±0.0	7.7 ±0.8
Sep	36.5 ±3.8	3.7 ±1.0	1.2 ±0.2	33.7 ±2.5	0.3 ±0.1	8.1 ±1.5
Oct	39.2 ±2.2	4.5 ±0.7	1.6 ±0.3	35.9 ±2.4	0.3 ±0.1	7.9 ±1.0
Nov	39.1 ±0.0	4.9 ±0.4	1.5 ±0.2	29.6 ±3.0	0.3 ±0.0	6.9 ±1.7
Dec	34.9 ±2.0	3.9 ±0.4	1.3 ±0.2	34.4 ±4.8	0.4 ±0.0	11.3 ±1.9
Jan.2008	37.9 ±1.4	4.7 ±0.5	1.7 ±0.3	34.2 ±2.6	0.4 ±0.0	9.1 ±0.6
Feb	34.6 ±2.1	4.1 ±0.9	1.4 ±0.5	33.2 ±3.4	0.3 ±0.1	9.0 ±0.8
Mar	34.5 ±6.9	3.8 ±1.4	1.5 ±0.6	38.4 ±5.1	0.3 ±0.1	8.2 ±1.9

SH: shell height (mm); Wtt: total weight (g); Wm: meat weight (g), Wm/Wtt: ratio of meat weight to total weight (%); GI: gonad index.

Lipid level was high in May, July and February with major peak in July (11.3 %). Lipid showed high variation from April to July. After major spawning peak, lipid level was lowest in November (5.9 %) and varied slightly from late to early of the year. From July to November, variation of lipid level seemed to be opposite with gonad index in mangrove snails. It indicated certain link between this energy resource and the gametogenesis of mangrove snails.

Among proximate compositions, Carbohydrates showed high variation during year cycle. It increased steadily from April (13.0 %) to September (29.9 %) and then fluctuated from November onward. Carbohydrates showed limited link to gametogenesis during June to September and the relationship is unclear for other months of the year.

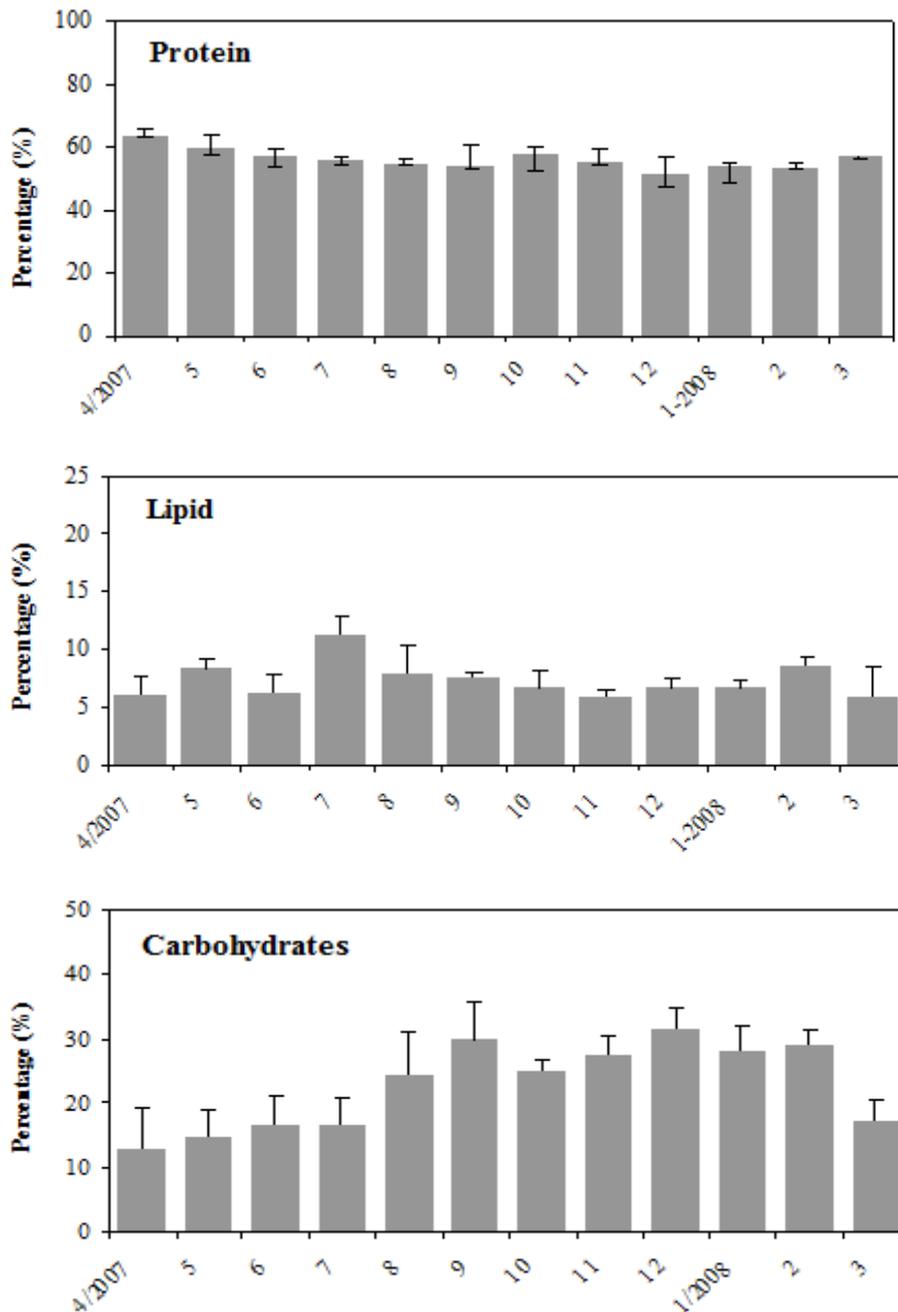


Fig. 9: Change of protein, lipid and carbohydrates during sampling period

IV. DISCUSSION

Simpson (1978) determined the relationships between organic carbon content, total dry weight and shell length in small euryhaline gastropod *Potamopyrgus jenkinsi* living in different combinations of salinity and temperature. The author found that differences in organic carbon content were found in relation to weight at different growth temperatures. Our findings showed that total organic matter (TOM) seemed to be related to protein content of mud snails than other proximate compositions such as lipid or carbohydrates. In addition, Christensen *et al.* (2001) used stable isotope technique to analyse gut contents of several snail species in mangrove forests and reported that *C. obtusa* was selective feeder on diatoms and organic sediments.

In bivalve mollusc, Gabbott (1976) indicated that the natural gametogenic cycle is closely linked to cycles of glycogen storage and subsequent de novo synthesis of lipid during vitellogenesis. However, in mangrove snails proteins are the major component (around 60%) followed by carbohydrates (about 25%). It is suggested that protein could be the major energy resource to support growth and reproductive cycle of mangrove snails. Thao *et al.* (2008) analysed the proximate components of adult mangrove snails after 120 cultured days and showed that protein levels (around 40%) were higher than carbohydrates (about 25%) or lipids (less than 12%). Gomot (1998) found that the percentage of protein in artificially reared or wild *Helix* snails varied between 55-59.3%. Author also reported the percentage of total sugars is 23.7% and lowest lipid levels in *H. lucorum* and *H. pomatia* (1.9 – 3.1%). In snails produced egg capsules, Martinez *et al.* (2008) observed that during intracapsular life of muricid snail *Chorus giganteus*, protein was high (around 35% organic matter) followed by lipid (about 12%). Except for remarkable increase in July and minor increases in May or February, lipid levels remain almost unchanged in other months of the year. Carbohydrates showed two peaks before and after major spawning which has been suggested as a secondary energy source to support the gametogenesis in mangrove snails.

Cerithidea obtusa develops a thickened outer lip at the shell apertures upon reaching sexual maturity as description in other species of *Cerithidea* genus (Houbrick, 1984, Vemerij, 1993). *Cerithidea scalariformis* is dioecious, females being slightly larger than males (Houbrick, 1984). According to this author, females produce masses of eggs, which are laid in long strings (~51mm) on the bottom sediments and plant materials, undergo direct development, and hatch as juvenile snails. During sampling period, we could not see any egg string in the field. However, the histological observations showed the present of egg capsule gland and there were not different developmental stages of oocytes. Those results suggested that this species did not release separated eggs into the environment. In addition, we observed abundant individuals which bearing both mature oocytes and spermatozoa in gonad during spawning peak from September to November. Previous studies suggested *C. scalariformis* is aphallate and after matching, the sperm will migrate to the seminal receptacle where eggs fertilization takes place. Probably, mangrove snail *C. obtusa* is also possessing this character.

Our findings showed that gametogenesis of *C. obtusa* occurred year around with major spawning from September to November. Smith and Ruiz (2004) reported that snail *C. scalariformis* deposited egg strings in the field from late September through November when hatchlings were also found. However, Bagarinao and Lantin-Olaguer (2000) found that *C. cingulata* in shrimp ponds reproduced the whole year with a peak in March-September. In Japan, Harumi *et al.* (2001) observed mating behavior of snail *C. rhizophorarum* in July and August. It is suggested that species of *Cerithidea* genus is able to shift its life history (e.g. lifespan, growth, maturation rate) with current environmental conditions as findings from *Thais kioisquiformis* (Koch and Wolff, 1996) or *C. scalariformis* (Smith and Ruiz, 2004).

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Strategy to develop the organic farming system based on farmer perception and knowledge in Pagelaran Malang East Java Indonesia

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Abstract- Organic farming systems in Malang are still limited to areas that have an area of less than 1% of the total area of existing rice fields. This study aims to reveal farmers' perceptions of organic farming systems and formulate strategies for developing organic farming systems based on farmer perception and knowledge in Pagelaran Malang East Java Indonesia. This research was conducted in Kademangan village, Pagelaran Subdistrict, Malang District, East Java, Indonesia. Data collection techniques used is through direct observation of farming system, interviews and filling out a list of questions. A series of deep interviews was conducted in order to identify knowledge and attitude of farmer on organic farming system. The interviews were conducted with five key persons, including staff of agriculture office, and farmers. Result revealed that in general, farmers know that the use of chemical pesticides and fertilizers is harmful to agricultural land and non-target organisms, but they still

maintain this because they are considered practical. The reason farmers do not practice organic farming systems because the conventional system that they have practiced so far is very easy. Fertilizers and pesticides needed are always available. The marketing of its products is not difficult. The knowledge of farmers about the organic farming system is actually enough. The development strategy that needs to be carried out is the sustainable development of farmers and the improvement of cooperation with other farmer groups that have implemented organic farming systems as well as with other stakeholders.

Key words- biodiversity, collaboration, organic farming, Malang, small farmer, strategy.

I. INTRODUCTION

For centuries, traditional farmers have developed diverse and locally adapted agricultural systems, managing them with ingenious practices that often result in both community food security and the conservation of agrobiodiversity. However, since the revolution began in the agricultural system, which was generally dominated by conventional approaches, ingenious practices began to be abandoned. Agroecosystem rice that is processed with conventional systems generally has low flora and fauna diversity, and causes several environmental problems. Insect pests are a major problem in rice farming from planting to harvest.

Agricultural systems that have been implemented with a green revolution approach have reduced soil quality, increased erosion, reduced biodiversity, created habitat destruction, and triggered deforestation [1]. One effort to overcome this problem is to implement an organic rice farming system by returning to ingenious practices. This system is characterized by the use of organic fertilizers and pesticides; avoid using germ-modified organisms; and efforts to improve biodiversity to maintain ecosystem balance [2]).

Sustainability of organic farming cannot be separated from the environmental, social and economic dimensions. Organic farming is not enough to eliminate the use of synthetic inputs, but also more importantly the sustainable use of local natural resources [3]. Economic aspects can be sustainable if agricultural production is able to meet the needs and provide sufficient income for farmers. But, often the economic motivation is the driving force in the direction of development organic agriculture. Awareness of the dangers caused by the use of chemicals synthetic in agriculture makes organic farming attract good attention at the level producers and consumers. Most consumers will choose foods that are safe for health and environmentally friendly, thus encouraging the increasing demand for organic products [4].

II. MATERIAL AND METHOD

This research was conducted in Kademangan village, Pagelaran Subdistrict, Malang District, East Java, Indonesia. Distance of research location with capital of Malang District is about 12 km. Data collection techniques used are through direct observation of farming system, interviews and filling out a list of questions. A series of deep interviews was conducted in order to identify

knowledge and attitude of farmer on organic farming system. The interviews were conducted with five key persons, four men and a women. The selected informants were those who have knowledge, experience, in the paddy field farming system. With the knowledge criteria of the culture in which they live. The selected key persons were sub-village chief, two farmers, a worker woman and staff of Malang District Agriculture Office. Test the validity of data was done by triangulation of sources and triangulation method. Data analysis was done by interactive data model analysis. The result was analyzed by a series of scientific selection, as follows: sorting, organizing and data condensation. Further, the data were grouped, interpreted and concluded. Data condensation is an analysis of collected data in order to sort through, classify, remove unnecessary and organize data. Condensation data also means grouping data in their respective places, so that conclusions can be made. A focus group discussion was adopted to clarify the strategy based on the stakeholder participation. The duration of the discussion was 90 minutes.

III. RESULT AND DISCUSSION

This study revealed that the coaching system by government official carries out in general content of agriculture system. Sub-village chief said that

"The government is not doing guidance on organic farming systems. Guidance by field instructors is related to general topics, such as irrigation, pest control."

Special guidance on organic farming systems has never been done. This is because the organic farming system is an option, not yet a systematic regional or national program. This was conveyed by agriculture office staff.

"Since 2010 the central government has begun to launch policy policies on the development of organic agriculture such as 'Go Organic 2010'. The poor regional government itself strongly supports the policy and wants to be a center for the development of organic rice. However, in terms of organic land area in the the organic area is considered small because covering less than 1%. This causes the coaching pattern that is carried out is still localized in certain regions. "

To develop organic farming systems, the use of chemical pesticides and fertilizers must be avoided. Generally, farmers know that the use of chemical pesticides and fertilizers is harmful to agricultural land and non-target organisms, but they still maintain this because they are considered practical. This is said by farmer A.

"We know that pesticides and chemical fertilizers can have a negative impact on the quality of soil and other animals. But farmers still practice it. This is because it's easy to get it, it's practical to use and there is even a subsidy from the government. "

The reason farmers do not practice organic farming systems because the conventional system that they have practiced so far is very easy. Fertilizers and pesticides needed are always available. The marketing of its products is not difficult. This was stated by farmer C.

"We don't know where to market products, if we apply organic farming systems."

This was also supported by a statement from agriculture office staff.

"The constraints of developing organic farming systems are generally caused by high prices so that they are not affordable to consumers and the certification process and costs are still quite expensive."

The use of manure or compost is actually done by farmers in sufficient quantities. Farmer B stated that

"Many farmers still use manure. Usually cow or goat feces that have accumulated long ago are brought to the rice fields. We have never made organic fertilizer specifically, meaning that farmers just leave the dirt piled up for several months."

Farmers' knowledge of the organic farming system is actually enough. Farmer C stated that

"We have heard information about organic farming systems. But it has not been practiced because farmers are still implementing intensive systems. Intensive system produces high productivity."

Farmers generally do not know that organic farming has many benefits. Farmer D stated that

"We do not know if the results of organic farming are healthier, we think the quality is the same."

This situation is caused by various constraints including market constraints, interests consumers and understanding of organic products, the certification process is in consider weight by small farmers, farmer organizations and partnership with farmers and entrepreneurs. But the interest in farming towards organic farming has grown. This is expected to have a positive impact on the development of organic farming [5].

Strategy developed

There are strengths included awareness that intensive farming systems have a negative impact and the existence of farmer groups that have good cooperation. The weaknesses were dependence on pesticides and fertilizers from government subsidies and farmer already used to implementing a farming system and poor understanding of the benefits of organic farming. The opportunities were customer demand is increasing and collaboration with other farmer groups that have implemented organic farming systems. While the threats consisted of costly certification fees and the marketing system is still difficult (Table 1). Based on the SWOT analysis this study proposed two strategies consisted of the development strategy that needs to be carried out is the sustainable development of farmers and the improvement of cooperation with other farmer groups that have implemented organic farming systems as well as with other stakeholders.

Table 1. Analysis of strengths, weaknesses, opportunities and threat

Strengths Awareness that intensive farming systems have a negative impact The existence of farmer groups that have good cooperation
Weakness Dependence on pesticides and fertilizers from government subsidies Already used to implementing a farming system Poor understanding of the benefits of organic farming
Opportunity Customer demand is increasing Collaboration with other farmer groups that have implemented organic farming systems
Threat Costly certification fees The marketing system is still difficult

Sustainable development of farmers

Guidance for farmers to get to know the organic farming system must be carried out sustainably. The guidance system is carried out through groups, with some farmers who are pioneers. This must involve all parties including from universities, and research institutions. Generally farmers are lacking in the initiative to initiate a change. They tend to wait for the success of other farmers, and then are willing to imitate it. Therefore, with an intensive and sustainable coaching system, the pioneers are expected to succeed, so that the best practices that have been implemented can be replicated by other farmers. In addition, the government also needs to facilitate certification efforts because this is often complained by organic farming groups. The form of government support is helping to monitor and evaluate and look for links to funding support in the certification process.

The second focus of guidance is the skills of farmers in carrying out the cultivation of organic farming systems. There are actually farmers who apply the characteristics of organic farming, but their understanding of the organic farming system itself is still lacking, so efforts need to continue to be encouraged to increase the knowledge and skills of farmers in processing organic fertilizers independently, identify types of pests and natural enemies, and maintain diversity, living in an agricultural environment.

Increased collaboration with other farmer groups that have implemented organic farming systems as well as with other stakeholders

Increasing the deep cooperation with other farmer groups must be implemented organic farming systems as well as with other stakeholders needs to be continued. This increase in cooperation includes the transfer of best practices and cooperation in the marketing of products for example with cooperatives. Furthermore, through this collaboration it is necessary to increase the role of all parties to support the success of organic farming systems by increasing efforts to introduce organic agricultural products to the community through various events including exhibitions and competitions. At present the thematic village is very popular with the community. Because of this, the introduction of the organic farming system theme also needs to be encouraged so that the

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community can support the implementation of this organic farming system.

The strategy of developing organic farming cannot be separated from efforts to increase the role of experts with farmers in developing sustainable agricultural systems. Efforts include the preservation of traditional agricultural knowledge already owned by farmers, increased utilization of local and animal plant varieties, and original forms of socio-cultural organizations. By studying this system, farmers' knowledge of complex system dynamics, especially the relationship between biodiversity and ecosystem functions and practical principles for a more sustainable agroecosystem design that is suitable for smallholders [3].

Diversity can maintain and increase soil fertility and mitigate the impact of pests and diseases. Diversity of diet, founded on diverse farming systems, delivers better nutrition and greater health, with additional benefits for human productivity and livelihoods. Many of the benefits of agricultural biodiversity are manifested at different ecological and human scales, and cut across political divisions, requiring a cross-sector approach to reassess the role of agricultural biodiversity in sustainable and secure food production [6].

Case studies from Cuba, Brazil, the Philippines and Africa are presented to show how the agroecological development paradigm based on small agricultural revitalization that emphasizes diversity, synergy, recycling and integration, and social processes that value community participation and empowerment, are proven to be the only choices can meet current and future food needs [7].

The synergies that exist between organic agriculture and sustainable rural development, through a special analytical framework built on the implicit assumption that modern and dynamic and multifaceted organic farming systems are 'hybrid and composite networks', can be analyzed according to evolutionary perspectives and analytical approaches network. This work identifies the four main points of communality between organic agriculture and sustainable rural development: innovation, conservation, participation and integration [8].

IV. CONCLUSION

Result revealed that in general, farmers know that the use of chemical pesticides and fertilizers is harmful to agricultural land and non-target organisms, but they still maintain this because they are considered practical. The reason farmers do not practice organic farming systems because the conventional system that they have practiced so far is very easy. Fertilizers and pesticides needed are always available. The marketing of its products is not difficult. The knowledge of farmers about the organic farming system is actually enough. The development strategy that needs to be carried out is the sustainable development of farmers and the improvement of cooperation with other farmer groups that have implemented organic farming systems as well as with other stakeholders

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Identifying Reproductive Health Issues among Adolescent in Nyanza District, Rwanda

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Abstract- Adolescence is a demographic force and its sexual and reproductive health has become an area of focus for many national governments in both developed and developing countries. This study aimed to identify reproductive health issues among adolescents in Nyanza District, in Rwanda. To meet this objective, a cross sectional study was carried out, stratified random sampling technique was used. The study participants were 298 adolescents. Unplanned pregnancy was mentioned by (27%), Abortion was mentioned by (25%) of participants, STIs and HIV/AIDs (24%). Condom use was reported by 18.9% among males and 6.0% among females. Early marriage 35.5%, knowledge about body changes in puberty (24.8%). Alcohol and other substance abuse (56.4%), sex abuse and exploitation (3.0%) among male and (9.0%) among female. School dropout (70.4%). Health facilities with supplies, strengthening, and promoting sexual education in and out of school, and condom and contraception use among adolescents should be intensified.

Index Terms- Reproductive health, adolescent.

I. INTRODUCTION

Adolescent sexual and reproductive health (ASRH) comprises a major component of the global burden of sexual ill health. Although overlooked historically, international agencies are now focusing on improving ASRH and providing programmatic funding. Various terms are used to categorize young people: “adolescents” refers to 10–19 years olds (divided into early [10–14 years] and late [15–19 years] adolescence); “youth” refers to 15–24 year olds; and “young people” refers to 10–24 years old.^[1] Approximately half of the population is under 25, with 1.8 billion people aged between 10 and 24 years 90% of whom live in low- and middle-income countries and many experiencing poverty and unemployment.^[2] Adolescent sexual activity, within or outside of marriage, can lead to negative reproductive health outcomes.^[3] Reproductive health conditions are and will continue to be one of the leading causes of the burden of diseases among young people: Unprotected sexual activity can expose young women to the risks of unintended pregnancy, unwanted childbearing and abortion, as well as HIV and other STIs. In addition to being a human rights concern, coerced or unwanted sex is associated with these same adverse reproductive health outcomes [4]. In Rwanda adolescents represent a particularly large group, adolescents between 10 and 19 years old make up 28% of the population. Many Rwandan adolescents engage in sexual behaviors that expose them to the risk of HIV infection.

Existing literature shows evidence of early sexual experimentation coupled with limited condom use among both boys and girls. Young people need access to sexual and reproductive health information and services so that they can use contraception, prevent unintended pregnancy and decide if and when to have children. At the same time, these investments allow young people especially girls to take advantage of education and employment opportunities.^[6] Therefore the study will fill an important gap in what is known about Rwanda’s reproductive health issues among adolescents particularly in Nyanza District, where very little is known.

II. MATERIALS AND METHODS

Research Design

A descriptive cross-sectional study was used to identify reproductive health issues among participants.

Study area and population

The study was carried out in Nyanza district and study population were adolescents aged between 15-19 years.

Data Collection Procedure

A letter of introduction was obtained from the graduate school of Kampala University. This was used to request permission to conduct the study in the catchment zone of Nyanza District. After the introduction, arrangements were made with the selected respondents at each site of the research. There was informed consent form regarded to adolescents for obtaining their consent to participate in this research. Questionnaires were distributed to the adolescents who participated in the study.

Data Management and Analysis

Completed copies of the questionnaires were coded and entered into the computer. A descriptive analysis was carried out for each of the variable.

III. RESULTS

Demographic information of participants

Table 1 describes demographic information of participants. Males were presented in great proportion by 51%. The age was assessed in this study, and a large proportion is 15 years old with 33%. When asked class attendance in secondary school, a large

proportion attended 3rd ordinary class with 36%. When asked duration of stay at school 36% reported three years.

Table 1: Demographic information of participants

Variables	Frequency	Percent
Gender of Respondents		
Female	146	49
Male	152	51
Age of respondents		
15 years old	98	33
16 years old	56	19
17 years old	52	17
18 years old	48	16
19 years old	44	15
Class attended in secondary school		
3 rd ordinary class	106	36
4 th class	70	24
5 th class	64	21
6 th class	58	19
Duration of stay at school		
One year	70	24
Two years	58	19
Three years	106	36
Four years	24	8
Five years	22	7
Six years	18	6

Adolescent Sexual and Reproductive Health Issues

Table 2 describes adolescent sexual and reproductive health issues. Those with unwanted pregnancy 27.0%, unsafe abortion 25.0%, STI's and HIV/AIDS 24.0%. Among those who ever had sex intercourse, the condom use was reported among males by 18.9%, females by 6.0 %,35.5% of them reported early marriage, those who reported having enough knowledge about body changes in puberty were 24.8%, alcohol and other substance abuse 56.4%.

Table 2: Adolescent Sexual and Reproductive Health Issues

Variables	Frequency	Percent
Ever had sex intercourse		
Yes	201	67.0
No	97	33.0
Unwanted pregnancy		
Unsafe abortion	81	27.0
STI's and HIV/AIDS	75	25.0
Condom use among adolescents	74	24.0
Male		

Yes	38	18.9
No	10	5.0
<i>Female</i>		
Yes	12	6.0
No	26	13.0
Early marriage		106
35.5.knowledge about changes in puberty		body
Yes	74	24.8
No	224	75.2
Alcohol and other substance abuse		
Yes	168	56.4
No	130	43.6
Sex abuse and exploitation		
Male	8	3.0
Female	28	9.0
School dropout	201	70.4

Among male 3.0% reported experiencing sex abuse and exploitation, and among female 9.0% reported experiencing sex abuse and exploitation. Among respondents 70.4% reported school dropout.

IV. DISCUSSION

Results from this study showed that 67% of adolescents had sex intercourse. The results are nearly similar to the results of the study conducted in Gikongoro. [7] Unwanted pregnancy was reported by 27%. This result is slightly higher than the study conducted in Sub-Saharan Africa. [8] Unsafe abortion was reported in this study. In most cases, an abortion occurring in the community was reported to be unsafe. Abortion was said to occur among girls who got pregnant and were in school, girls who were not ready for marriage and in cases of pregnancy as a result of rape. In some cases girls who went into prostitution and got pregnant opted to having abortion. Sexually transmitted infection (STI's) and HIV/AIDS have been reported in this study with 24%. Young persons are vulnerable to STI's and HIV/AIDS, and a large number is in Sub-Saharan Africa. [3] Biologically, the immature reproductive and immune systems of adolescents translate to increase susceptibility to STI and HIV transmission. [9, 10] In addition to biological vulnerability, cultural and socioeconomic factors particularly social inequality and exclusion, as well as having older partners increase their susceptibility. [1] The study levelled that large proportion did not use condoms during sexual intercourse. The low level of use of condom may be due to lack of information. Misconception and beliefs could affect condom use among adolescents. Early marriage was documented in this study. The literature on child marriage globally and Sub-Saharan Africa shows that this practice is due to poverty and gender inequality. [11] The research shows that the greatest number of adolescents didn't have enough knowledge about their body changes during puberty. Girls were concerned about lack of basic information on body changes, how to handle themselves when their menstrual cycle begun. Adolescents noted to have lacked information about their sexual and reproductive health as well as knowledge and skills on boy-girl relationships and particularly how to interact with

boys or girls during puberty. Education of adolescent girls on body changes is important, because some misconceptions exist among them about body changes during puberty.^[14] Alcohol use was reported in this study. It is known that Alcohol or other substance abuse may drive adolescents into risky sexual behavior. Alcohol was generally said to be very addictive and tended to increase adolescent's sexual drive or libido and this made some of them get involved in sexual activity and crimes such as rape. The use of alcohol and drugs may also increase their vulnerability especially with regards to sexual experimentation and the likelihood of having unprotected sex [12] Studies have also shown that there is no safe level of alcohol consumption among 15-16 years old and often teenagers engage in regretted-sex after consuming.[13]

Respondents reported experiencing sex abuse and exploitation, in this study. Sex exploitation of adolescents involves the older men to have sex with young girls and referred to as sugar daddies while women who also force young boys including male adolescents are referred to as sugar mummies. The results of the study revealed a high rate of school dropout. Researchers have shown that adolescence which is the transitional period between puberty and adulthood in children's development has become a vital factor to dropout. [15]

V. CONCLUSION

Based on the information collected on the given sample reproductive health of adolescents remain a major public health problem in Rwanda .Today, particularly in Nyanza District where the study has been conducted health facilities with supplies, strengthening, and promoting sexual education in and out of school, and condom and contraception use among adolescents should be intensified.

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Assessment of Knowledge and Attitude towards Diabetes Mellitus among Type 2 Diabetes Patients Attending Biryogo Health Centre.

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Abstract- Diabetes is recognized as a growing public health problem in the world and in Rwanda. One of the critical inputs to the strategies for combating this disease is to create attitudes and build knowledge about it within a population. This study aimed to find out Knowledge and Attitude towards Diabetes Mellitus among Type 2 Diabetes patients attending Biryogo Health centre. A cross sectional study that involved randomly selected 103 diabetes mellitus type 2 patients was conducted. The results revealed that the level of knowledge was good for the participants. However this knowledge is not translated into desired attitude. Statistically significant demographic characteristics associated with diabetes knowledge level indicator developed in the course of the study were gender ($p<0.05$) and duration of diabetes ($p<0.01$). It was further found out that significant variables associated with diabetes attitude level were respondent's education level ($p<0.05$) and duration of diabetes ($p<0.05$). The findings of the study suggest that efforts to educate adults with diabetes mellitus (DM) to change their attitude should be reinforced.

Index Terms- Knowledge, Attitude, Diabetes mellitus

I. INTRODUCTION

Diabetes mellitus type 2 is a chronic disease that occurs either when the pancreas does not produce enough insulin (a hormone that regulates blood sugar, or glucose), or when the body cannot effectively use the insulin it produces.^[1] Diabetes is an important public health problem and one of the four priorities of non-communicable diseases (NCDs) targeted for action by world leaders, especially since both the number of death cases and the prevalence of diabetes have been steadily increasing over the past few decades.^[1]

Over the past decade, diabetes prevalence has risen faster in low- and middle-income countries than in high-income countries, and caused 1.5 million deaths. In 2012, 1.5 million deaths were caused by diabetes and 2.2 millions deaths were caused by high blood glucose levels, which also increase the risk of cardiovascular diseases. The World Health Organization estimates that diabetes will be the 7th leading cause of death by year 2030 (WHO, 2016).

According to International Diabetes Federation Report of 2011 an estimated 366 millions people had DM, by 2030 this number is estimated to reach around 552 million.^[3]

Knowledge of diabetes can prevent the imminent chronic morbidities of DM, which impact significantly on the quality of life of the diabetic patients. Information can help people to assess their risk of diabetes, motivate them to seek proper treatment and care, and inspire them to take charge of their disease for their lifetime.^[4]

The use of self-management programs in chronic disease including type 2 diabetes mellitus is relatively well known, and some of these programs are beginning to show success.^[5]

According to Rwanda Diabetic Association the prevalence of diabetes in Rwanda is about 3.16% of the population with 1,918 diabetes related deaths per year.^[6] Biryogo health center started following up the patients living with diabetes mellitus since 2008 where it has a big number of patients with diabetes who are on follow up on appointments accordingly with a total number of 250 patients with diabetes.^[7] At Biryogo health center there is no documented study that has assessed the knowledge and attitude towards patients with diabetes Mellitus type 2 about diabetes. Thus, this study aimed to assess the knowledge and attitude towards diabetes mellitus type 2 for patients with diabetes type two attending Biryogo health centre.

II. MATERIAL AND METHODS

Study area

The study was conducted at Biryogo health centre which is located in Nyarugenge District, Kigali City Nyarugenge sector, Biryogo cell and Nyiranuma village, with a total number of 250 diabetic patients. Biryogo health centre was purposively selected because it has a relatively big number of the patients living with diabetes mellitus and has had a tradition of following them regularly since 2008.

Study design

Quantitative cross-sectional study design was used.

Study population

The study population was patients with type 2 diabetes mellitus attending Biryogo health centre. At the time of conducting this study, 205 type 2 diabetes patients were attending Biryogo health center.

Sample size

Using Yamane approach, the sample size calculation for the finite population was used. Based on the study population of 205 type 2 diabetes patients and 0.05 margin of error, the required sample size was 136 type 2 diabetes patients.

Sampling strategies

Simple random sampling, which implied that each of 136 type 2 diabetes mellitus patients had an equal chance of being selected, was used. The list of all the type 2 diabetic patients was used as the sampling frame.

Data collection instruments

The instrument used was a three-part questionnaire adapted from a questionnaire used in a similar study in Western Nepal, and on the survey, instruments provided online by the Michigan Diabetes Research Training Centre which were adjusted to suit the local culture and expanded to include questions on knowledge, and attitudes about diabetes. The permission was requested to adapt this questionnaire and the feedback was received. The questionnaire consisted of 45 questions. Section 1 was composed of 8 Demographic data. Section 2 was composed of 25 questions of Knowledge and Section 3 was composed of 13 Attitude questions.

Data collection Procedures

After getting the permission from Biryogo health centre to conduct the study, the study investigation team requested for the list of type two Diabetes mellitus patients attending Biryogo health centre, during the period of the

study and were invited to participate in the study. Those who agreed to participate, they got more explanations about the purpose of the study clearly and researchers read the questionnaire to the participants explained to them before starting the study. The participants, who voluntarily accepted to participate in the study, were requested to sign consent forms after giving them the explanations about the consents, the participants signed the consent forms and started to answer the questionnaires and were informed that they had no obligation to participate in the study.

Data analysis

The collected data were checked for completeness and entered using SPSS version 21 for analysis. Appropriate answers were assigned 1 point. Other answers were assigned a score of zero. Statistical tests were performed using 0.05 as the level of significance. Descriptive statistics was used to analyze the demographic data. Chi-square testing was conducted to determine associations between knowledge and demographical variables and between demographic variables and attitude was conducted to determine the existing association.

Ethical consideration

The ethical approval was obtained from Institutional Review Board (IRB) of University of Rwanda, and a letter from the Head of the Biryogo Health centre to allow us to conduct the study in Biryogo Health centre. We informed the participants that the participation was voluntary and before participating they were informed about the study and its purpose, and the participants interviewed and signed the consent for those who accepted to participate in study. Anonymity and confidentiality was ensured, and participants were given all instructions related to the data collection.

III. RESULTS

Socio demographic information of participants

Table 1 describes Sociodemographic information of participants. The findings revealed that the majority of respondents involved in this study were aged more than 40 years old: 41 to 65 years (53.4%), and those who are 66 years and more were 27.2%. The majority (58.3%) of diabetes patients who come to Biryogo health centre are mainly women. A large proportion (74.8%) of participants is married. Education was assessed in this study. Findings showed that diabetes patients found at Biryogo health centre and involved in this study were in majority people with relatively low education level. Largely respondents were not working. On the other hand, (28.2 %) and (13.6 %) were working full-time and part time respectively. The results of the study found that the majority of respondents were affiliated to Christianity with (67%).

Knowledge towards Diabetes Mellitus among Type 2 Diabetes Patients Attending Biryogo Health Center

Knowledge towards Diabetes mellitus was assessed (Table 2). Overall, the results reveal that the majority of respondents knew correct responses about the posed questions about diabetes. This indicates however that other education session should be organized to further knowledge among all the diabetes patients.

Attitude towards Diabetes Mellitus among Type 2 Diabetes Patients Attending Biryogo Health Center

The results on attitudes of respondents regarding diabetes revealed that there were different attitudes among different respondents. Generally, almost 87.3 % (n=90) of the respondents agreed that it was very important to learn about diabetes. It was also indicated that 78.6% (n=81) believed that patient actions affect health more than health practitioners' actions. Other attitudes of respondents were also reflected in other questions summarized in table 3

Table 1 Socio demographic information of participants

Variables	Frequency	Percent
Age group (N=103)		
<=40 years	20	19.5
41 to 65 years	55	53.4
=>66 years	28	27.2
Sex of respondents (N=103)		
Female	60	58.3
Male	43	41.7
Marital status (N=103)		
Never married	4	3.9
Married	77	74.8
Separated/divorces	4	3.8
Widowed	18	17.5
Education level(N=103)		
Partial primary school	27	26.2
Completed primary school	30	29.1
Partial high school	29	28.2
Completed high school	8	7.8
Technical or trade school	2	1.9
University graduate	7	6.8
Occupation(N=103)		
Unemployed not looking for work	25	24.3
Unemployed or laid looking for work	3	2.9
Working full-time 35 hours or more a week	29	28.2
Working part-time less than 35 hours a week	14	13.6
Disabled/not able to work	14	13.6
Retired	18	17.5
Religion(N=103)		
Christian	69	67.0
Muslim	34	33.0

Source: Primary data, 2018

Table 2: Knowledge towards Diabetes Mellitus among Type 2 Diabetes Patients Attending Biryogo Health Center

Knowledge about diabetes	incorrect responses	correct responses
What is diabetes	8	98
Major causes of diabetes	39	64
Symptoms of diabetes	7	96
Knowledge on method to monitor diabetes	10	93
Effect of high blood pressure on diabetes	9	94
Frequency of blood pressure check up	11	92
Frequency of eye check up	19	84
Regular exercise and diabetes	21	82
Purpose of regular urinary test	12	91
Elements of well balanced diets that control blood sugar	11	92
A well balanced diet components	15	88
Diabetic foot care requirements for diabetes management	13	90
Knowledge of diabetes treatments	30	73
Action for low blood sugar	12	91
Effect of untreated diabetes	12	91
Cause of rise of sugar in blood	35	68
People with diabetes may have poor circulation of blood in the feet	18	85
Sore feet are common in people with diabetes	24	79
Diabetic medication may cause swelling of the feet	32	71
Salty food will prevent sugar levels from dropping	22	81
Poor control of diabetes could result in a greater chance of complications	12	91
Diabetes medication can cure diabetes	34	69
Diabetes medication should be taken for life	23	80
Stop taking diabetes medication in case of other sickness	24	79
Knowledge of food classes	18	85

Source: Primary data, 2018

Table 3: Attitude towards Diabetes Mellitus among Type 2 Diabetes Patients Attending Biryogo Health Center

Attitude of participants	Negative attitude	positive attitude
Learning diabetes is important	10	93
Patient actions affect health more than health practitioner action?	22	81
Being drunk while on diabetic drugs is not a serious problem	58	45
Knowing enough information about a person who make prepare your food is important	26	77
I often think it is unfair that I should have diabetes when other people are so healthy	35	68
If I did not have diabetes I think I would be quite a different person	47	56
I dislike being referred to as a diabetic	51	52
Diabetes is the worst thing that has ever happened to me.	39	64
I often feel embarrassed about having diabetes	62	41
There is little hope of leading a normal life with diabetes	64	39
I avoid telling people I have diabetes	69	34
My diabetic diet spoils my social life	56	47
Being told you have diabetes is like	55	48

Source: Primary data, 2018

Multiple logistic regression analyses between Sociodemographic characteristics and Knowledge, attitude towards Diabetes Mellitus

Results from multiple logistic regression showed that males are two times more likely to be knowledgeable than female [AOR=2.1; 95% CI: 1.9–3.2]. However this knowledge is not translated into desired attitude. Knowledge towards diabetes mellitus increases with level of education. Those who completed high school and above are more than two times more likely to be knowledgeable [AOR=2.6; 95% CI: 2.0–3.7]. The study revealed that those who completed secondary school were two times more likely to have good attitude towards diabetes [AOR=1.9; 95%

CI: 1.6–2.7] than those without education level. Knowledge towards diabetes increases with the duration of diabetes. Those who reported that the duration of diabetes is more than ten years are more knowledgeable two times more than those who said that the duration of diabetes is less than one year [AOR=2.8; 95% CI: 2.2–4.4]. Those with more than ten years were more than three times more likely be knowledgeable towards diabetes [AOR=3.6; 95% CI: 2.9–5.5] than those of less than one year. Those who reported to be employed were more than 1 time to be knowledgeable than their counterparts [AOR=1.7; 95% CI: 1.2–2.2].

Table 4: Multiple logistic regression analyses between Sociodemographic characteristics and Knowledge, attitude towards Diabetes Mellitus

Variables	Knowledge AOR(95%CI)	Attitude AOR(95%CI)
Age		
<= 40 years	1.6(1.2–1.9 ^{NS})	0.9(0.8–1.9 ^{NS})
=> 41	Ref	Ref
Sex of respondents		
Male	2.1(1.9–3.2*)	1.5(1.3–2.4 ^{NS})
Female	Ref	Ref
Marital status		
Never married	1.8(1.6–2.2 ^{NS})	1.6(1.23–.2 ^{NS})
Married	Ref	Ref
Education level		
None	Ref	Ref
Partial high school and below	0.9(0.71–1.4 ^{NS})	0.4(0.21–1.2 ^{NS})
Completed high school and above	2.6(2.0–3.7**)	1.9(1.6–2.7**)
Duration of diabetes		
Less than one year	Ref	Ref
two to ten years	2.8(2.2–4.4*)	2.5(1.2–3.0*)
More than ten years	3.6(2.9–5.5**)	3.1(2.6–4.1**)
Occupation		
employed	1.7(1.2–.2.2*)	1.1(0.9–1.9 ^{NS})
Unemployed	Ref	Ref
Religion		
Christian	Ref	Ref
Muslim	1.4(0.9–1.8 ^{NS})	1.1(0.6–1.4 ^{NS})

NS= Not statistically significant *p ≤ 0.05; **p ≤ 0.01

IV. DISCUSSION

This study aimed to assess the knowledge and attitude towards diabetes mellitus type 2 for patients with diabetes type two attending Biryogo health centre. The main findings about knowledge and attitude towards diabetes were found to be higher as compared to other studies conducted in some parts of the world: Kenya [8], Sudan [9], and Sri Lanka. [10] Those differences were probably due to that these studies were conducted in rural areas. Similarly, this study found out that knowledge plays a vital role in any future disease development and its early prevention and detection. Positive knowledge and attitude (KA) are important for DM patients. Elements of KA are interrelated and dependent on each other. If the level of one element is higher, the other two factors should be affected positively. KA regarding diabetes varies greatly depending on socio-economic conditions, cultural beliefs and habits. [11] Knowledge of diabetes can prevent the imminent chronic morbidities of DM, which impact significantly on the quality of life of the diabetic patients. Information can help people to assess their risk of diabetes, motivate them to seek proper treatment and care, and inspire them to take charge of their disease for their lifetime. [12] Regarding factors associated with knowledge, this study found out that higher educational status was associated with both good knowledge level and attitude. This was however not supported by a study conducted by Herath that indicated that the attitude towards diabetes was poor in majority (90%) and level of

education had no significant effect on attitude. [13] It is in line with the study done by Mukeshimana (2010) conducted in Rwanda. The study further revealed that factors such as duration of diabetes were significantly associated with knowledge level whereas others demographic variables (age, marital status, and religion) were not significantly associated with knowledge level. [14]

V. CONCLUSION

This study aimed to assess the knowledge and attitude towards diabetes mellitus type 2 for patients with diabetes type two attending Biryogo health center. Overall the findings of the study revealed that the level of knowledge was good. However this knowledge is not translated into desired attitude. Education with the purpose of changing bad attitude to good attitude towards diabetes should be reinforced.

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Interactive Evaluation of Soil Erosion using Soil Loss Equation and Interviews in the Desertification Prone Katsina State of Nigeria

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Abstract- The paucity of knowledge by the majority of the rural farmers has made information on soil erosion difficult to perceive. The problem, however, can be overcome by using predictive models for planning, assessment and extension purposes. The objective of this paper was to predict soil loss by the methods of USLE and interview the farming families. The study showed that the factors that determined the rate of soil loss in the study area were the Topographical Factor and the Soil Erodibility of the different textural classes. There was agreement between the conclusions of the USLE and the responses of the farming families and the community leaders. This Sahel Savannah Agro-ecological zone has the highest rate of soil loss with the three observation sites recording 68.5 t/ha/year, 69.9 t/ha/year and 69.6 t/ha/year, respectively. Thus the total average of 69.3t/ha/year. The Northern Guinea Savannah followed at the rates of 53.5t/ha/year, 59.2t/ha/year and 56.1t/ha/year respectively for the three observation sites with a total average of 56.3t/ha/year. The Sudan Savannah sites revealed a soil loss rate of 46.7t/ha/year, 59.2t/ha/year and 53.5t/ha/year respectively at a total average of 53.1t/ha/year. The study concluded that there was a significant soil loss in the desertification prone State of Katsina, hence bringing knowledge on the extent of the soil loss in the area. This data is instrumental in informing future interventions.

Index Terms- Land Degradation, Soil Erosion, Tolerance Value, Rural Farmers, Agriculture.

I. INTRODUCTION

Soil erosion is one of the critical processes which signifies a reduction in the nutrient status of the affected zones – in contrast to the depositional sites [1, 2,3] and provides a means of characterizing desertification in time and space. Exploitative cropping is perceived to cause soil degradation. The agents could be water, wind or both. The soil degradation impact, is its major constraint for production, for both crops and natural vegetation [4].

In water erosion, the rain drops falling on bare soil breaks the structure of the surface soil, detaching and dispersing the particles. If the land is sloping and water cannot be immediately absorbed by the soil or detained by microtopography, the water

moves off down the slope in the form of run-off carrying dislodged particles with it [3].

The USLE is a convenient way to predict the long-term average annual rate of erosion on field slopes, based on the rainfall pattern, soil type, topography, crop system and management practices [5]. USLE only predicts the amount of soil loss that results from sheet or rill erosion and does not account for additional soil losses that might occur from gully or tillage erosion. Some case studies in the continent that employed USLE method, include [6] to determine soil loss due to sheet and rill erosion in Morocco; and [7] in their study of the Condo eroded area in Tanzania. USLE is popular because it (i) combines acceptable accuracy with relative simplicity (ii) can use quite basic data, and (iii) the model relies on a global (i.e. Worldwide distributed) dataset [8,9,10,11].

The K Factor of the USLE is the most important measure of erodibility and can be estimated from simple soil properties by a nomograph [2].

The study objectives addressed gaps in knowledge for Katsina State. Hence the objectives were to: i) to determine soil losses in three agro-ecological areas of the Sahel, ii) to document land degradation process in the study area, hence providing knowledge on the extent of the problem; and iii) to compare results of the USLE with farmers' perceptions for validity and contrasting the traditional and modern scientific knowledge systems. Thus the study's contribution is to contribute precise data on the land degradation process. Hence, this will add to documented knowledge on effects of soil erosion in terms of soil loss for Katsina State in Nigeria.

II. MATERIALS AND METHODS

Description of the Study area

Katsina State lies in the semi-arid region of Nigeria[13], and it is predominantly an agricultural state with over 75% of the population involved in agriculture [14]. The state covers an area of 24,192 km². Physically, the State is made up of undulating plains that generally rise gently from 360m in the northeast around Daura, to 600m around Funtua in the southwest. The two main geological regions are - . the southern and central parts which are underlain by crystalline rocks of the basement complex, but in the northern parts cretaceous sediments overlap

the crystalline rock. The Katsina –Daura plains are at a lower base level than other parts of the state. Southwards of the Katsina-Daura plains is a flat and gently undulating surface which manifests long periods of surface erosion.

In the southern parts of the State, the soil cover is largely clay of about 5 meters in depth. The soil exhibits smectitic properties - becoming waterlogged with heavy rains, dries/cracks down during the dry season. Subsistence rain-fed farming is the common economic activity in the area and fragmented farmland forms the dominant land use pattern[15]. In the north, the drift deposits are coarser, resulting in light sandy soils of buff or reddish color with medium fertility, and suited for millet and guinea corn. The State falls into two climatic zones: the tropical continental and the semi –arid continental. The southern part of the state belongs to the former with annual rainfall ranging from 1000mm around Funtua to over 800mm around Dutsinma (Figure 1). The north of Katsina has total rainfall figures ranging from 600mm-700mm annually.

Following a reconnaissance survey, three (3) selected observation sites were randomly selected in Mai’adua, Charanchi and Funtua Local Governments representing the three agro-ecological zones (of Katsina State. The field observation sites are fairly representative of the larger part of each of the agro-ecological zones. The following steps were taken to select a representative site for observation (1) conducted a investigation of the intended study areas using available maps and remote sensing images and previous studies and reports that elucidated any major erosion features, their place in the landscape and their association with recognizable land uses in the area.(2) The representative sites in the various land use types (LUT) in the area (e.g. Cropping land, forest) was sought for, and (3) led by locals who live or work in the area (i.e. Farmers) to those areas that they believed were most degraded, or on which they are most dependent (e.g. For food production, forest replanting etc.) Additionally/alternatively, the previously eroded areas that have been effectively restored through effective management measures. A representative site was then selected.

Field observation sites – their choice, field analysis and results

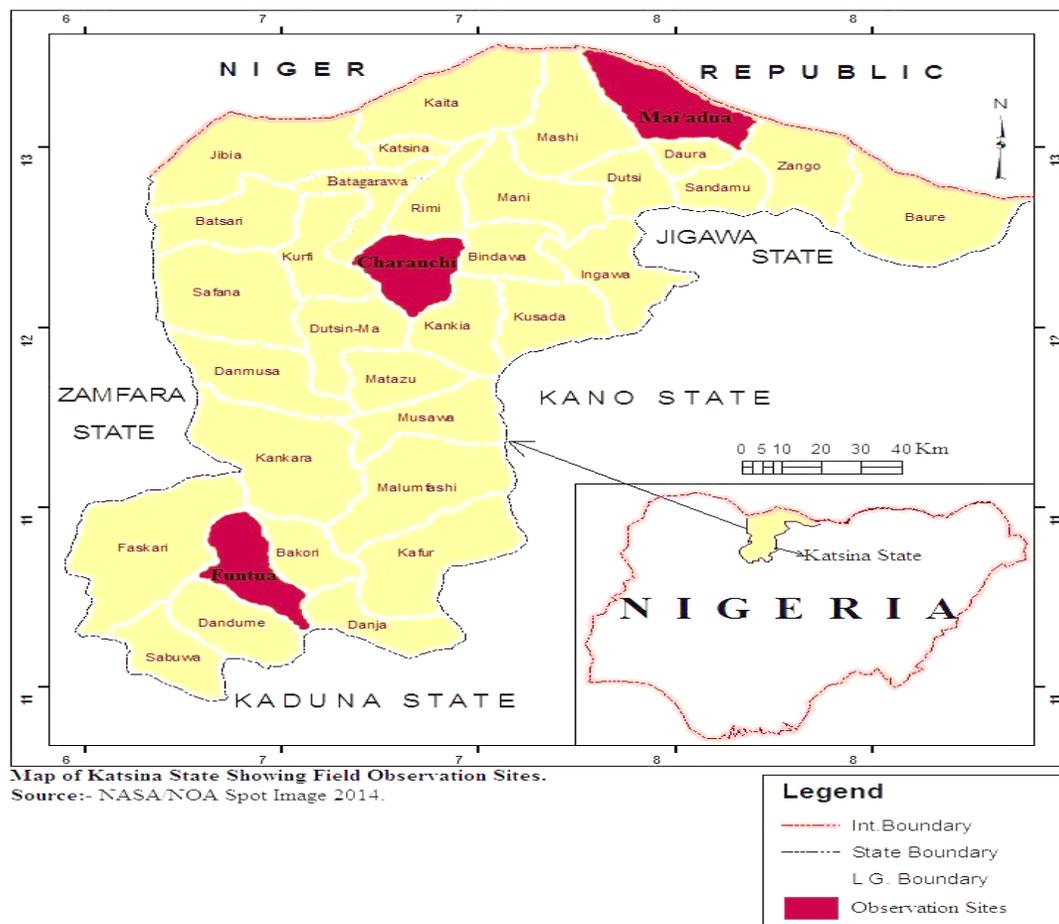


Figure 1 Map of Katsina State showing Field Observation Site

Source: NASA/NOA Spot image (2014)

The Rate of soil loss was determined using the Universal Soil Loss Equation (USLE) following the formula: $A=KR (LS)$

800mm	360
1000mm	450

Source: Field Survey (2015)

Values for different soil textures			
matter content (%) Textural Class	Organic		
	0.5	2.0	4.0
Fine Sand	0.16	0.14	0.10
Very fine sand	0.42	0.36	0.28
Loamy sand loam	0.12	0.10	0.08
Very fine sand	0.44	0.38	0.30
Sandy loam	0.27	0.24	0.19
Very fine sand loam silt	0.47	0.41	0.33
Clay loam	0.48	0.42	0.33
Silty clay loam	0.28	0.25	0.21
Clay	0.37	0.32	0.26
	0.25	0.23	0.19

CP where A=estimate of soil loss rate in ton/hectare/year

- K= soil erodibility factor
- R=rainfall factor
- LS= slope factor
- C=crop management factor
- P=conservation practice factor

The potential soil loss was then categorized into a soil erosion class of Low, Moderate and High.

R-Factor

The rainfall pattern of the study area is such that rainfall increases southward with the northern parts receiving an average of 600mm annually, while the southern parts experience an average of 1000mm (Nigeria Meteorological Agency (NIMET)). Although the annual R Index is not directly linked to annual rainfall, in West Africa, [16] has shown that the mean annual R over 10 years= Mean annual rainfall × a
 a=. 05 in most cases ±0. 05
 = 0.6 near the sea (<40km)
 =0.03 to 0.02 in tropical mountain area
 =0.1 in Mediterranean mountain.
 Thus, following [16] the calculated R-Factor values, with a =0.45 [17] for the study area for each of the three agro-ecological zones, are shown in table 1.

Table 1 computed R Factor values

Average Annual Rainfall	R Factor
600mm	270

K Factor (Soil erodibility)

A descriptive soil map of the study area obtained from a previous FAO survey in Nigeria was used. The description in the attribute table, allowed for computing K Factor for each soil textural class using values in the table 2.

Table 2 K Factor values determination

Adapted from [17].

SL Factor

Derivation of the slope factor (LS) was from the use of the Topographical factor nomograph [18]. In Nigeria[19] observed that run-off stabilizes above a certain gradient depending on the way crop residues were used and on soil type. The ratio between erosion and length of slope varies from year to year than from one site to another [20]. The slope length was measured using a measuring tape from the point where the rain drops to the point of the deposition (Figure 2). In particular, the slope steepness and slope length (LS) factor represents the erosive potential of a particular combination of slope length and slope steepness. Slope length is not the distance from the uppermost point in the field to the lowest point. To determine slope length, the researcher walked the field and determined where the water will flow. Contour farming channels on natural flow patterns were disregarded. Once the natural flow patterns were identified, the determination of the point on the slope where the flow began, was made. The slope length was then the distance from this point to the point where (1) the slope gradient decreases enough that sediment deposition generally occurred, or (2) the runoff water becomes a concentrated flow, or (3) the runoff enters a well-defined channel, for example, part of a natural drainage network or a constructed grass waterway or terrace channel. Once the slope length and steepness were determined, use can be made of tables and nomograph presented by FAO to substitute for other values [21].

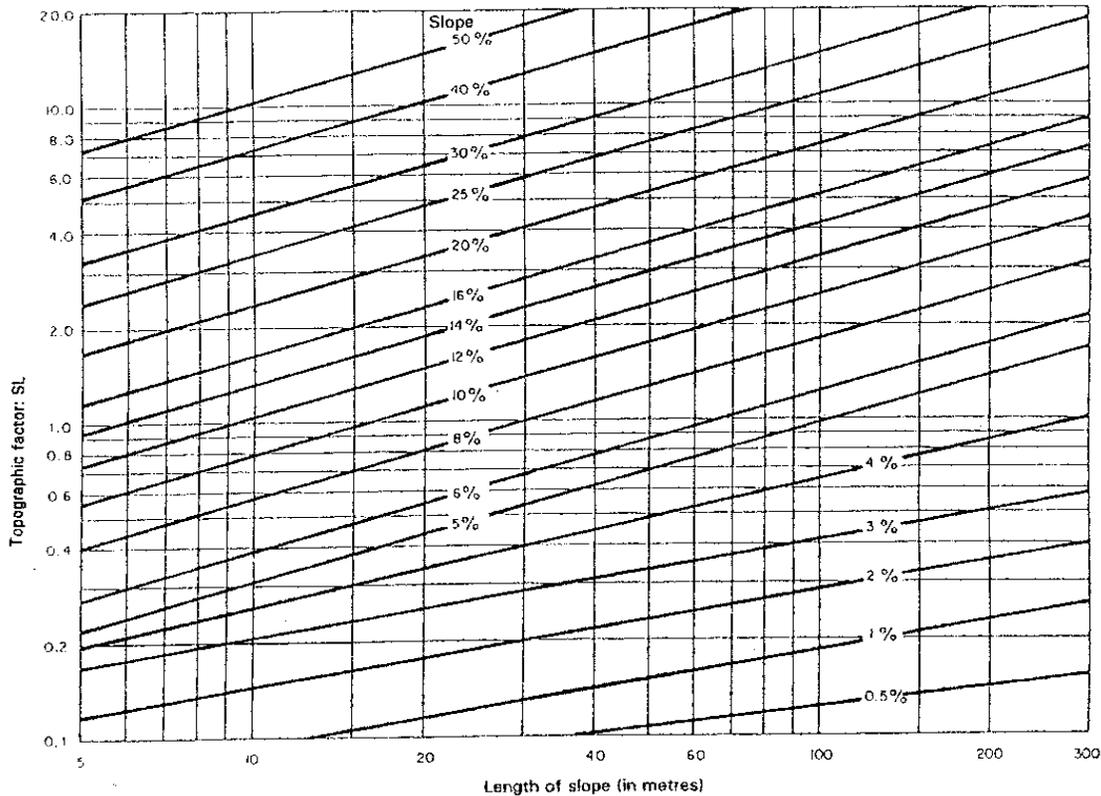


Figure 2

Topographical factor (cf. Wischmier and Smith 1978)

C-Factor

The land cover and vegetation parameter and cultural technique values produced by [22] were used to arrive at the corresponding C-factor for the different cultural techniques as provided in Table 3.

Adapted from Roose (1976)

Table 3 Vegetal Cover Factor and Cultural Practices (C Factor) in West Africa

Cultural Techniques
Bare continuously fallowed
Forest or dense shrub, high mulch crops
Savannah, prairie in good condition
Overgrazed savannah or prairie
Crop cover of slow development or late planting-first year
Crop cover of rapid development or early planting-first year
Crop cover of slow development or late planting-second year
Corn, sorghum, millet (as a function of yield)
Rice (intensive fertilization)
Cotton, tobacco (second cycle)
Peanuts (as a function of yield and the date of planting)
1 st year cassava and yam (as a function of the date of planting)
Palm tree, coffee, cocoa with crop cover
Pineapple on contour (as a function of slope)
burned residue
Buried residue
Surface residue

P-Factor

The P-Factor values were derived, according to the land use type as guided by Federal Department of Agriculture Land Resources [23]. The P-Parameter was set as 1 since it was not possible to distinguish differences in cultivation practices between adjacent smaller areas. The T Value which is the soil loss tolerance for shallow tropical soils with a limited rooting depth is extremely low. This is because the loss of nutrient-rich surface soil cannot be compensated by the addition of fertilizers alone. Tolerance values for tropical soils ranges between 0.2-2t/ha/year [24].

The Interview

The interview was conducted in each of the agroecological zone. Purposeful sampling was employed for the selection of 10 heads of farming families and 3 community leaders in each of the agroecological zones. The questions raised were principally on the state of the farmlands, the perceived causes and problems of soil loss in the study area, including the likely control measures of the morphodynamic process. The choice of the farming families was informed by the fact that Katsina is predominantly an agricultural State with over 75% of the population involved in agriculture [14]. In addition, according to [25] 67% of the land in Katsina state is devoted to cultivation. The community leaders were selected because, as observed by [26], key informant participants by their expertise and mandates are expected to hold rich

information or experiences related to the phenomenon under investigation.

III. RESULTS AND DISCUSSION

The computed soil loss table (Table 4) represent the data collected on each of the key factors of the USLE Model from the 3 observation sites in each of the agroecological zone. The

factors were then computed and an annual soil loss per hectare arrived at. The results of the 3 observation sites provided an average soil loss in tonnes per hectare per year of each agroecological zone. The results obtained showed the intensity of the soil loss and brought about a renewed interest among the farming families and the community leaders.

Table 4 Computed Soil Loss
A= RK(SL)CP

SiteNo.	Observation site	Agro-ecological zone	R	K	SL	C	P	A (t/ha/year)	Average A t/ha/year
1	Mai'adua 1	Sahel savannah	270	0.47	0.6	0.9	1	68.5	69.3
	2		270	0.48	0.6	0.9	1	69.9	
	3		270	0.47	0.61	0.9	1	69.6	
2	Charanchi 1	Sudan Savannah	360	0.24	0.6	0.9	1	46.7	53.1
	2		360	0.30	0.61	0.9	1	59.2	
	3		360	0.28	0.59	0.9	1	53.5	
3	Funtua 1	Northern Guinea savannah	450	0.33	0.4	0.9	1	53.5	56.3
	2		450	0.34	0.43	0.9	1	59.2	
	3		450	0.33	0.42	0.9	1	56.1	

Source: Field Survey (2015)

The T Value, the soil loss tolerance for shallow tropical soils with a limited rooting depth is extremely low. The results obtained above have shown A values to be higher than the T values, indicating significant soil loss in all the agro-ecological zones in the study area. It could be deduced that the major factors that define the rate of soil loss in the study area were the topographical factor and the soil erodibility of the different soil textural classes. The findings mirror the study of [17] which recorded a similar significant soil loss in the Katsina area. The area with the highest soil loss Mai'adua in the Sahel Savannah agro-ecological zone, had an average of 69.3 t/ha/year. The Northern Guinea Savannah represented by Funtua has a soil loss of 53.1 t/ha/year on average. The Sudan Savannah however recorded lesser soil loss in comparison to the two earlier agro-ecological zones. The USLE record showed 56.3 t/ha/year as the soil loss.

All of the key informants were unanimous in appreciating the general problem of soil erosion as a result of water and wind erosion and provided the causes of the soil loss in the study area. There was also an understanding of the need for more interventions from the Government because some of the control measures were far beyond the capacity of a farming family to adopt.

A key informant observed with trepidation that:

“The problem of soil erosion in this part of the area seems to be exacerbated by the farming families for their refusal to provide drainage in their farmlands, and they are aware that where vegetation is scant; run-off will be serious.”

While another key informant who was concerned in a different perspective observed that:

“The problem of soil erosion goes beyond the sheet erosion we see but rather we are always faced with an economic

loss by repeating application of fertilizer whenever there is a heavy downpour. This is because the applied fertilizer is washed away to low lying areas or adjacent farmlands thus necessitating another fertilizer application and you could see most of the farmlands do not have the preventive thick bushes to prevent the run-off.”

Another key informant who has been in the study area for over sixty years shared his experience on soil erosion where he identified sheet erosion to be devastating process in the following order:

“Our major problem here is not only the increase of rainfall we receive, but the wind speed is high...so you find deposition of sand being made at short and long distances even though it is not a rainy season. Over time, many farmlands have visibly become a mixture of sand and gravel because of the weathering effect of the winds.”

A key informant who has watched the happenings in the Bun-Bum Village of the Mai'adua Local Government elucidated that:

“This area Unguwar Jummai has been noted by the Government and in fact, some programs have been set in motion to arrest the visible sand movement that is threatening both farmland and settlements. We are going to engage the rural people in identifying local adaptive strategies that could be cost effective.” When asked whether they have been experiencing soil erosion, the majority of the farming families (93.5%) were of the view that they have experienced soil erosion over time in the study area.

IV. CONCLUSION

The northern part of the study area comprising of the Sahel Savannah and some part of the Sudan Savannah has shown a high degree of soil loss as it was the same area identified to have a significant decline in vegetation. Hence, it could be inferred that the significant soil loss experienced in the Sahel Savannah has a direct correlation with the vegetation cover of the study area as noted by [27] who emphasized that vegetation controls soil erosion rates significantly. At the same time high rate of the soil loss recorded in the wetter Northern Guinea Savannah may not be unconnected with the terrain and run-off. Overall, study findings showed that the factors that determined the rate of soil loss in the study area were the Topographical Factor and the Soil Erodibility of the different textural classes. The study area is predisposed to soil loss owing to a number of factors; making it one of the most degraded areas in Nigeria, hence the need for urgent attention. There farming families observed the phenomenon with great concern and were disposed to evolve traditional techniques to reduce the soil loss as a result of water and wind. There was a strategic alliance between the families and the government in order to introduce technical control measures and extended drainages system, which were beyond the financial capacity of individuals.

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Numerical Investigation of Power Output and Flow Visualization of Straight blade Vertical Axis Wind Turbine Integrated with Wind Accelerator

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Abstract- The main goal of wind turbine development is to increase the power output of the turbine. One of the methods for promising of wind power output is to increase the effective wind velocity by using an augmentation device around the rotor. This paper is an attempt to observe the effect of flat plate acceleration device on the performance of the wind turbine. A numerical simulation was conducted to investigate the performance of straight bladed vertical axis wind turbine applying simple flat plate wind acceleration device. In this study, straight bladed vertical axis wind turbines (SVAWT) of NACA0016 with wind cord length 113 mm was used to investigate its performance by adding two flat plates on both sides of the rotor at different separation gaps. The power output of the turbine at various wind speed of 2.6-7.5 m/s at different separation gaps and different clearance between turbine and accelerator were investigated. Wind turbine power output has significantly increased by presenting two flat plates around the rotor. Maximum peak power has attained at certain separation gap from the view of the upwind side and it was 1.5 times of the bare turbine output. The flow phenomenon behind the blade was also investigated. The flat plate guides the mainstream to be a narrow passage between the two flat plates, creating a vortex behind the flat plate which phenomenon cannot occur in the bare turbine case. Narrow passage mainstream between flat plates gives more accelerated effect of the blade, resulting speed increasing of upstream side blade to make lift. There are sensitive changes of power output when the positions of both plates are changed to different separation gaps and different clearances from their reference places. All the results demonstrate that the flat plate technique can give high increased power to the straight bladed vertical axis wind turbine.

Index Terms- Numerical investigation, Power output, SVAWT, Wind accelerator, Wind speed.

I. INTRODUCTION

Wind-powered energy generation has encountered massive growth around the world and it is examined as an environmentally and economically ambitious advantage of electric power generation by reducing CO₂ emissions into the atmosphere and meeting the growing demand [1]. By World Wind Energy report of 2010, 430 terawatt-hours per year, which is 2.5% of the global electricity consumption, can be generated by wind energy technology (World Wind Energy Report, 2010). Wind energy is generated from the wind by using wind turbines (energy conversion systems) to convert kinetic energy to electricity.

The power in the wind is varying with the cubic flow velocity to the wind turbine, which results in a huge energy generation increment by a small wind velocity rise. The main goal of wind turbine development is to increase the power output of the turbine. The output performance of the turbine is described by the power coefficient C_p which is the fraction of power output extracted from the power in the wind by a wind turbine. According to the Betz limit, the power coefficient is a limited parameter for the conventional wind turbines. The maximum average C_p value can be increased by creating higher wind speed, increasing the higher torque extracted by the turbine. A feasible way to improve the power of wind turbines is the application of flow augmenting structures around the turbines. That design sometimes referred as a Diffuser Augmented Wind Turbine (DAWT). The augmented device such as shroud or diffuser integrating turbine gives the power coefficient higher than the Betz limit [2, 3]. A shroud is developed to locate around the wind turbine to represent as a diffuser for mass flow enhancement. The main principle of the diffuser is to convert the kinetic energy of the approaching flow to the rotor into a pressure rise. This creates the lower pressure level in the rotor wake region and makes to

capture greater incoming airflow from a free-stream tube to the rotor [4]. Thus, during the past few years, many research works have been conducted various models of ducted wind turbines which increase upstream wind speed enhancing the performance of traditional wind turbines. Various types of Diffuser Augmented Wind Turbine, DAWT, or shrouded wind turbines concept over the last century were done shown in Figure 1.

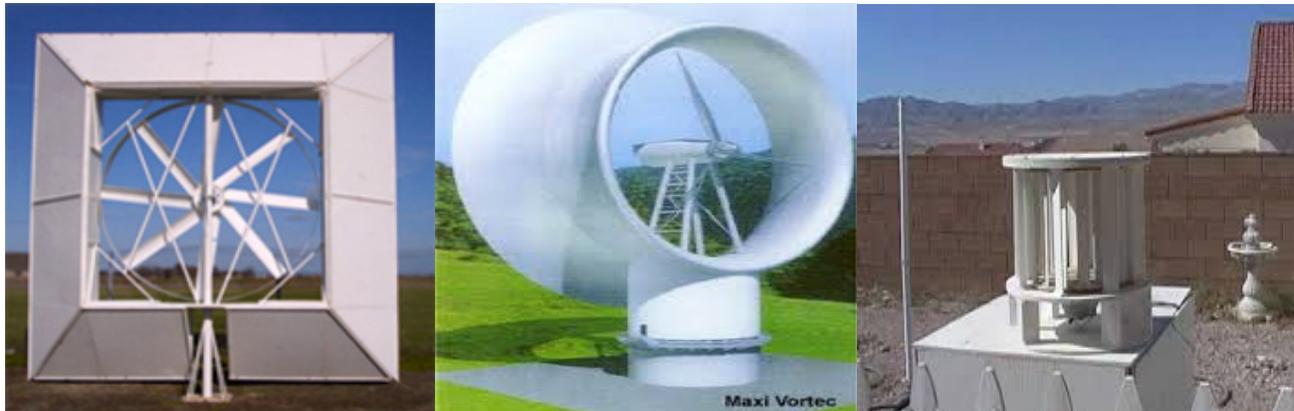


Figure 1: (a) Straight Diffuser-Augmented Wind Turbine for HAWT (b) Flanged diffuser shroud for HAWT (c) Omni-direction-guide-vane for VAWT

Many previous studies have shown that integrating the diffuser can give a favorable effect on the performance of horizontal axis wind turbines, applying the diffuser around the rotor. But it is still at research phase. Frankovic & Vrsalovic have designed a nozzle shaped ring with wings with its lower pressure side pointed towards the center so that the lift force on each part of the wing is directed radially towards the center. As a result, their nozzle augmented wind turbines were producing 3.28 times more energy than conventional turbines [5]. Bet & Grassmann have reported that a field of low pressure is created behind the turbine by means of employing a wing structure placed at some distance around the turbine [6]. This effect slowed down and widened the air flow hence the corresponding loss in efficiency can be avoided. The wing structure can successfully increase the power of a wind turbine by a factor of 2.0. According to Van Bussel, mass flow can be augmented by high diffuser exit area and/or by low negative back pressure at the exit. However, the major problem in diffuser-augmented wind turbines is to balance at the outlet the pressure drop caused by the turbine's energy extraction inside the duct. A notable power increase can be achieved by a pretty compact design shroud [7]. According to Vries, a power factor of 2.0 can be successfully increased by the wing structure [8]. Hansen developed a CFD model to compare the efficiency of a bare wind turbine with the diffuser added turbine. He proved that the power coefficient can exceed Betz limit by diffuser effect [9].

A research discussed the augmentation of power and conducted experiments on duct type water and wind turbines [10]. The numerical investigation was carried out for the flow fields around the flanged diffuser geometry by Abe [11]. Matsushima studied the effect of the frustum-shaped diffuser on the propeller type small wind turbine [12]. The study showed that maximum wind speed increased 1.7 times with diffuser integrated wind generator. The extracted power of diffuser added turbine increased by up to 2.4 times compare to that of a conventional turbine. Ohya and Karasudani developed the optimal design of diffuser shroud equipped with a flange for HAWT [13]. The study focuses on placing the flange at the diffuser exit and a horizontal axis wind turbine inside it. The flange creates a low-pressure region due to a vortex formation behind the diffuser and draws more mass flow to the wind turbine inside the diffuser shroud. The optimized shrouded wind turbine offers a higher power output of about 4–5 times higher than a conventional wind turbine and also almost the same output performance with the field test experiment of a prototype of flanged diffuser shroud turbine. Kosasih explored a test on three different diffuser designs: straight diffuser, nozzle-diffuser combination, and diffuser-brim combination [14]. The test examined that straight diffuser gives the improved performance of 56% compared to the bare turbine while the nozzle-diffuser performance increases to 61%. It also demonstrated that integrating brim at the diffuser exit can improve the turbine performance but increasing the diffuser length doesn't have certain effect on the performance

On the other hand, flow enhancing also greatly improves the performance of the vertical axis wind turbine (VAWT). The comparative studies on lift-based turbine have shown that VAWTs are advantageous to HAWTs in several aspects [15]. Compared to HAWTs, the VAWTs present a number of advantages. VAWTs do not influence on the wind direction, eliminating a yawing system to adjust the direction of the blades. Also, the turbine can be used in the regions where there are highly unsteady flow direction, providing operational safety and low noise. Its operational equipment such as generator and gearbox can be set on the ground, making easier tower construction and resulting in installation and maintenance cost is lower and the load acting on the tower is also smaller. VAWTs are better suited to meet the energy demands for villages and remote areas because of lower blade speeds and safety. However, the main disadvantage of the VAWTs with respect to the HAWTs is low power output for the same swept area of the blades [16].

Some researchers studied VAWT power augmentation. But it also still in research phase. Irabu & Roy designed a rectangular guide-box tunnel to guide the inlet mass flow so as to improve the output power of the Savonius rotor [17]. The output power coefficient of

Savonius turbine with guide-box tunnel was increased about 1.23 times for three-bladed rotor and 1.5 times for a two-bladed rotor respectively. Krike carried out a test on the effect of slatted diffuser on several helical and straight blade Darrieus hydrokinetic turbines [18]. The result showed that the power output of the diffuser augmented rotor increased by a factor of 3 in one configuration. Takao studied the effect of guide vane row on the power coefficient of straight-bladed vertical axis wind turbine (VAWT) and showed that the increased power was 1.5 times greater than that of the bare wind turbine [19]. Nobile introduced that an omnidirectional stator around a straight-bladed Darrieus rotor can increase 1.35 times of the power coefficient compared to the open rotor [20]. An innovative Power-Augmentation-Guide-Vane (PAGV) design with vertical axis wind turbine was developed for Urban High Rise Application by Tong [21]. The output power of PAGV integrated VAWT is 1.25 times higher than that of the same bare VAWT. Chong also designed a novel Omni-Direction-Guide-Vane (ODGV) to equip the vertical axis wind turbine (VAWT) inside it. ODGV encloses the rotor and rises the oncoming wind speed, guiding the direction of the flow to the turbine and improving its starting behavior [22]. The highest C_p value was increased to 62.5% at TSR of 0.95 and wind speed of 3 m/s. Allaei and Andreopoulos have recently introduced the innovative feature of wind turbines, namely INVELOX in US. CFD simulations and field testing were conducted to evaluate performance of this wind turbine. The results of their studies showed that it is possible to capture, accelerate and concentrate the wind. The total average wind power augmentation of INVELOX over 8 days was reported about 314% compared with bare wind turbine. The cut-in wind speed of 1 m/s is promising for development of enclosure wind turbines integrated within wind catcher designs for low speed regions in hot deserts [23]. Jafari and Kosasih also reported experimental and CFD studies for diffuser shrouded an AMPAIR300 wind turbine. Different diffuser shapes and dimensions were investigated to understand their effects on power augmentation. From the CFD results, sub-atmospheric back pressure is found to be the most influential factor in power augmentation [24]. Shonhiwa and Makaka have reviewed the concept of Concentrator Augmented Wind Turbine (CAWT). They found that the best concentrator should locate 5 cm in front of the wind turbine and it should be a nozzle shape with inlet to outlet ratio of 6 [25]. Wong, et al. also reviewed various flow augmentation methods for the purpose of utilizing with Vertical Axis Wind Turbines (VAWTs) and reported large magnification of 9 times output power [26]. Joss E. Kesby, et al. proposes a method of determining power output, cut-in speed and starting time using a combination of Computational Fluid Dynamics and Blade Element Momentum theory. They present the simulation methodology of calculating the starting performance and power output of a DAWT [27]. Lino Maia, et al, studied the effect of a shrouded structure around a small wind turbine. Laboratory measurements showed that improvements were obtained on electrical output, resulting in a maximum increase of 120 %. Measurements showed a power augmentation by a factor about 1.5-2.3, compared with the rotor without the shroud [28].

Therefore augmentation device/ diffuser concept can offer several benefits in the future electrical generation. But one of the disadvantages of using the diffuser is that the overall weight of the structure is increased and makes the design more complicated, which increases the cost of diffuser integrated wind turbines. Also, previous studies have not widely considered yet the detail design of simple flat plate power-augmented device for vertical axis wind turbines (VAWTs). In order to overcome the few disadvantages of the aerodynamics of a straight bladed vertical axis wind machine and to reduce the cost of complex diffuser design, a very simple augmented wind accelerator design has been considered in this study. This study is an attempt to investigate the effect of flat plate wind accelerator at its different sizes on the incoming flow through a straight blade vertical axis wind turbine (SVAWT) numerically. The wind accelerator used in this study consists of two of very simple flat plates. The power rise due to the simple flat plates is absolutely a result of the enhanced mass flow through the rotor. Also, the flow around flat plate integrated wind turbine was conducted to understand the phenomena of the flow behind the rotor.

II. MATERIALS AND METHODOLOGY

According to [29-31], wind power and wind generator power output can be determined by Eq.1 and Eq.2:

$$P_{\text{wind}} = \frac{1}{2} \rho A v^3 \quad (1)$$

$$P_{\text{turbine}} = T \times \omega \quad (2)$$

The power in the wind is directly proportional to the air density ρ (kg/m^3), the swept area of the rotor blades A (m^2) and cubed value of the wind speed v^3 (m/s) while the output of the turbine is calculated by the torque T (N.m) and angular velocity ω (rad/s). The performance of the turbine is defined by the power coefficient C_p and it can be calculated by Eq.3:

$$C_p = \frac{T \times \omega}{\frac{1}{2} \rho A v^3} \quad (3)$$

Turbine torque is produced by the lift and drags force of each blade as Eq.4 and Eq.5:

$$T = \frac{1}{2} \rho A C_T W^2 \quad (4)$$

$$C_T = C_L \sin \alpha + C_D \cos \alpha \tag{5}$$

Where C_L is lift coefficient of the blade, C_D is drag coefficient of the blade, ρ is air density (kg/m^3), A is blade profile area (m^2), W is relative wind speed (m/s) and α is angle of attack (deg).

Various rotational speeds of the rotor can be controlled by the turbine controller for a particular wind speed and represented by the tip speed ratio (TSR). The tip speed ratio is the ratio of the blade tip speed $R\omega$ to the free stream velocity v . It is calculated from the radius of rotor R (m) and angular velocity ω (rad/s) [7]:

$$\text{TSR} = \frac{R \omega}{v} \tag{6}$$

A. Power-Augmenting concept for wind turbines

There are two parameters that affect the value of the power - the swept area of blades and the wind speed. Therefore the power output can be enhanced by increasing one of those two parameters. One of the methods to increase the effective wind velocity is to use a duct around the rotor. Figure 2 illustrates a schematic of this design applied to a VAWT and the change in the stream tube comparing to the conventional (free-stream) wind turbine.

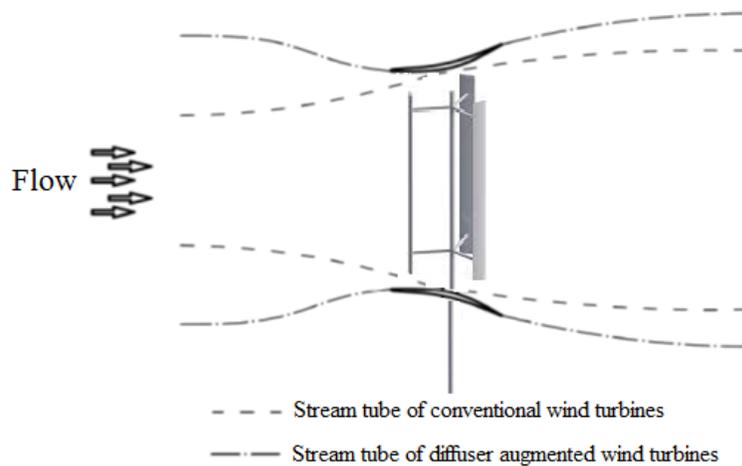


Figure 2: Stream tube comparisons between a conventional wind turbine and a DAWT

B. Use of CFD in the work

Computational fluid dynamics is a software tool used to simulate flow phenomenon of gases and liquids. A vertical prototype of any system can be built using the simulated results of CFD software. Modeling Analysis of CFD software tool is used for numerical simulation of wind turbines. It provides the images and information, which predict the performance of the turbine. In the present research, CFD is used for the validation test of power output and flow visualization of the proposed system.

C. Proposed wind turbine and wind accelerator assembly

The rotor considered in this study is a straight-bladed Darrieus (or Giromill) rotor with a diameter of 1130 mm as shown in Figure 3 for the target electrical power output of 50 Watts. The rotor is composed of three blades, and each blade is attached to a central shaft by two supporting arms. In this study NACA0016 was considered as a selected aerofoil because it is a common type of symmetrical aerofoil for H rotor type vertical axis wind turbine blade and its characteristics are listed in Table 1. NACA0016 airfoil data was taken from the UIUC airfoil website and full scale data. The rotor solidity is equal to 0.3. The pitch angle of the blades was set to zero degrees.

NACA0016 airfoil blade

Rotor arm

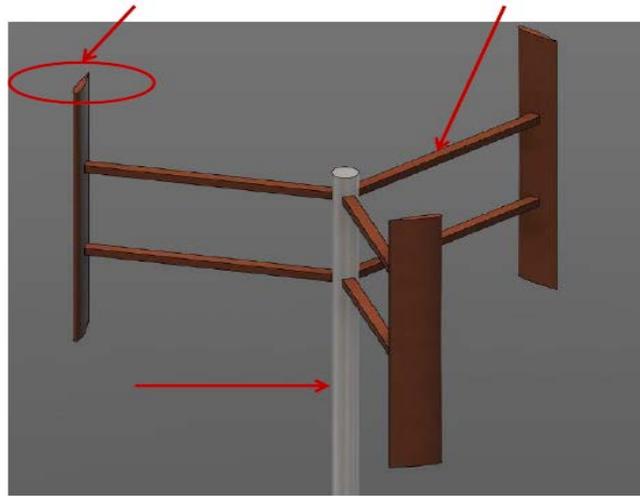


Figure 3: Proposed 3D vertical axis wind turbine

Table 1: Proposed design parameters for rotor

No	Parameter	Symbol	Result	Unit
1	Swept area	A	1032820	mm ²
2	Diameter of turbine rotor	D	1130	mm
3	Height of rotor	H	914	mm
4	Tip speed ratio	λ	2	-
5	Number of blades	n	3	-
7	Reynolds number	Re	130000	-
8	Chord length of airfoil	c	113	mm

The purpose of this study is to increase the generated power of the VAWT by integrating a pair of simple structured flat plates. The arrangement of a pair of flat plates around the rotor is as shown in Figure 4 - Figure 7. The concept of this flat plate principle is that the plates create the flow channel by changing the incoming flow direction to the rotor and accelerates the flow velocity. In addition, when the two wings are located in the 90 degree positions, the mainstream of turbulence is recovered quickly after the mainstream passes through between the two wings [32].

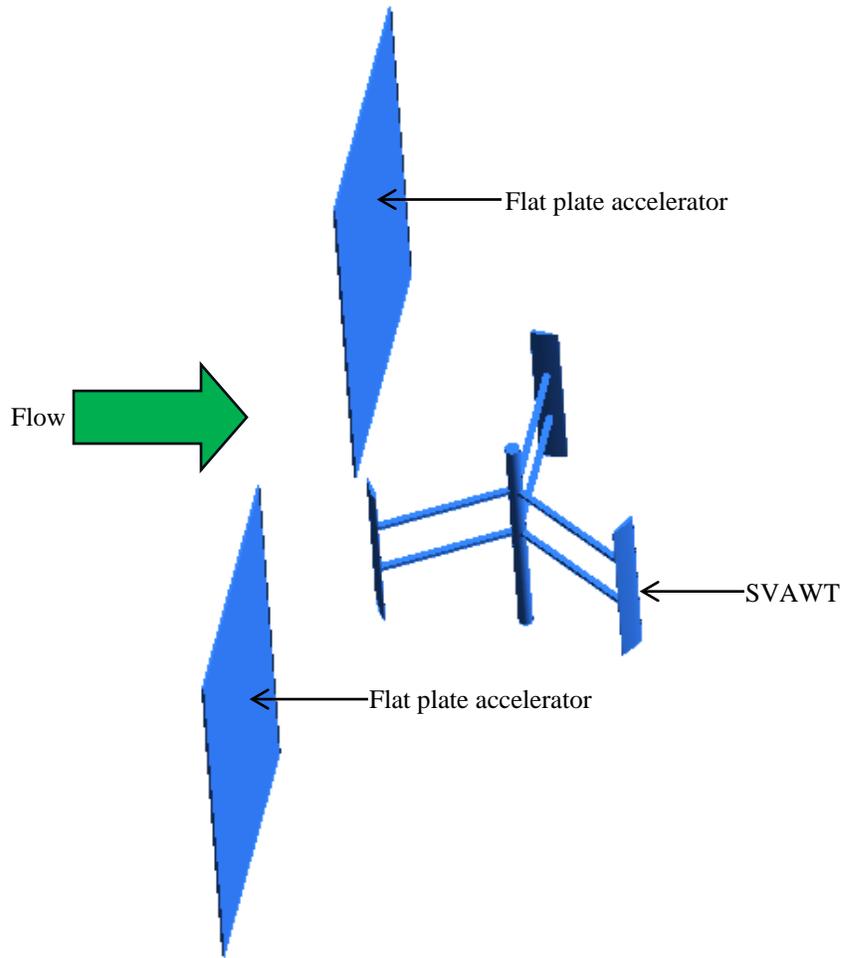


Figure 4: 3D schematic diagram of augmented flat plate accelerator integrated VAWT

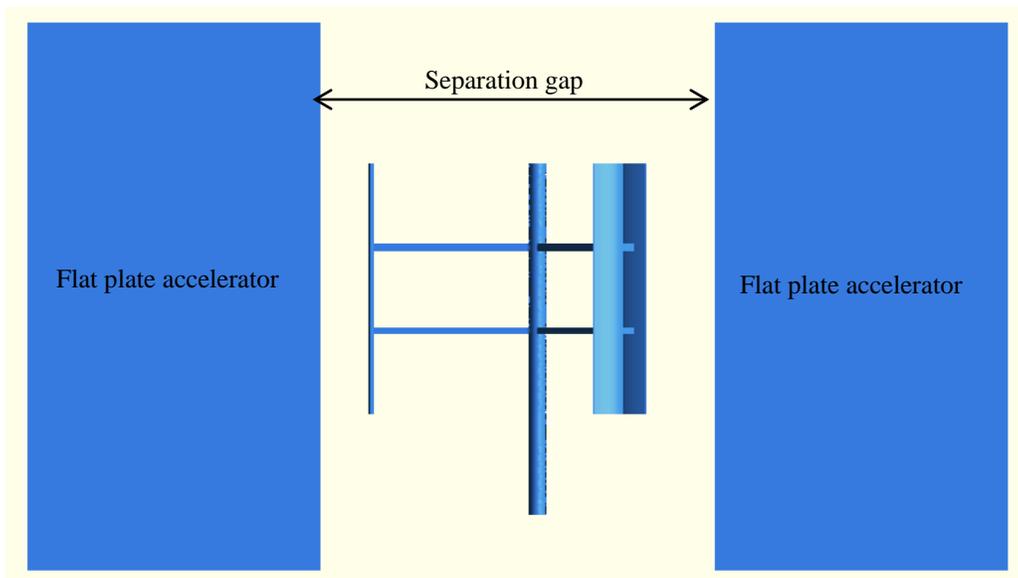


Figure 5: Front view of flat plate accelerator integrated VAWT

In this study, the effect of separation gap and clearance between rotor and accelerator at two different sizes of the plates on the amount of wind mill power generation will be investigated numerically. The wind turbine performance will be considered in different dimensions of acceleration gap and clearance between the rotor and flat plate arrangement as shown in Figure 6 and Figure 7.

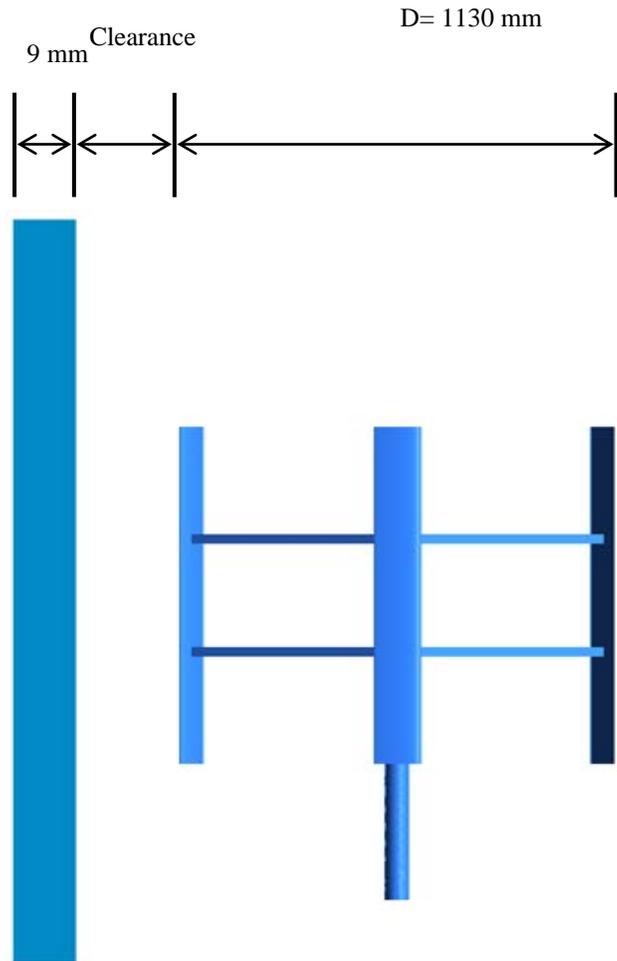


Figure 6: Side view of wind turbine and wind accelerator arrangement

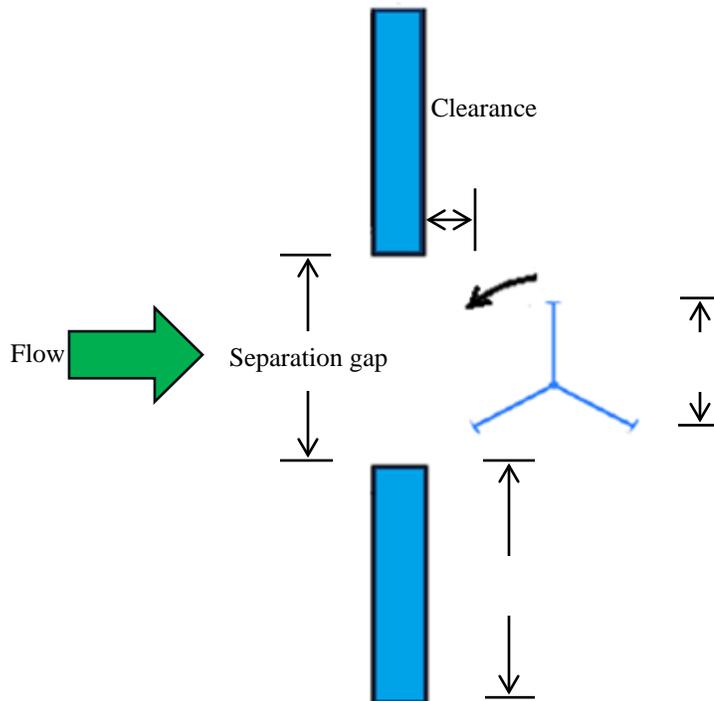


Figure 7: Top view of wind turbine and accelerator arrangement

III. NUMERICAL SIMULATION PROCESS

The step by step process of this study can be categorized into three different parts according to standard procedure of numerical simulation. The analysis of flow field characteristics was done by a series of simulation based on the following process: pre-processing, simulation, and post-processing by using computational fluid dynamic (CFD).

The main challenge step for conducting the numerical simulation is defining the computational domain and meshing. Here wind accelerator integrated three-bladed rotor Giromill wind turbine was analyzed. All the specifications used were based on the design data. The domain was split into two parts: a fixed rectangular outer stationary domain and a circular rotating inner domain as can be seen in Figure 8.

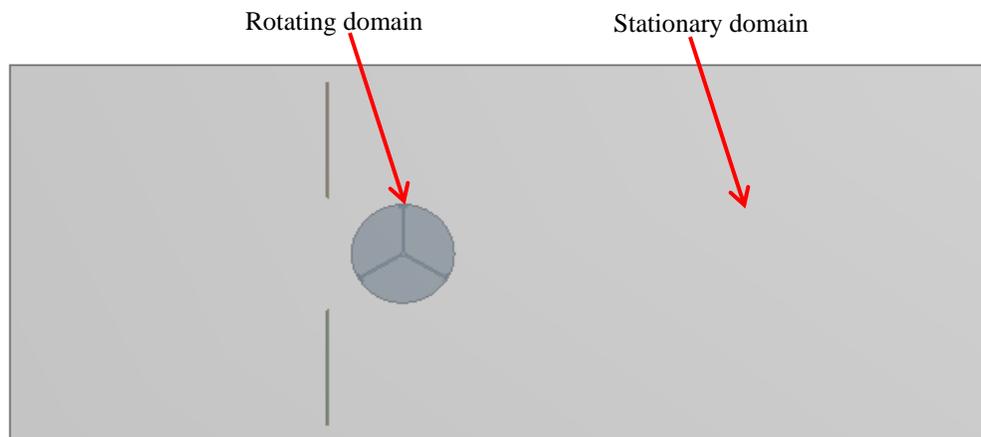


Figure 8: Computational domain

The outer domain was set as a generic domain in order to match the wind tunnel testing conditions while turbine was bounded by a small cylinder around it in order to obtain the finer mesh. The width and length of the outer domain was chosen as 4 times and 10 times of the rotor diameter and the height of the domain was approximately 3 times the diameter of the rotor. The domain was made large enough to capture the free stream condition of the surrounding fluid. The geometry was modeled and the mesh was generated in ANSYS 17. The mesh was characterized by tetrahedral elements. In particular, the maximum element size for the fixed domain was set to 0.05 m; the length of the element at the interface was equal to 0.03 m, whereas the minimum element size was 0.003 m and is used to discretize the fluid domain on the turbine wall as shown in Figure 9.

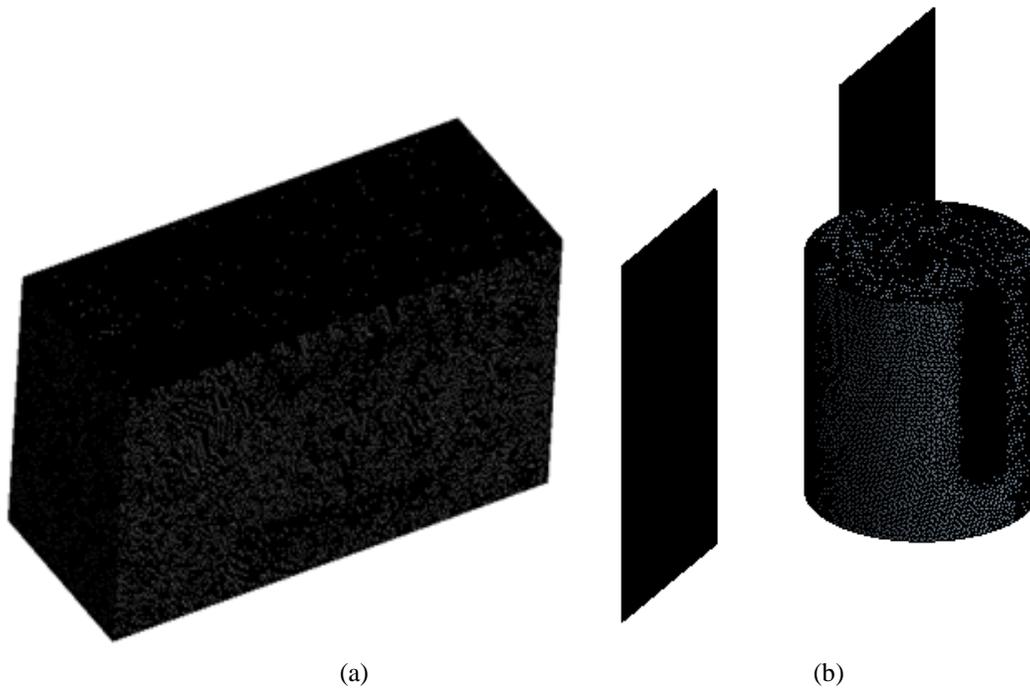


Figure 9(a,b) : Stationary and rotating domain mesh

In this study, CFX was used to analyze the fluid flow properties such as the velocity distribution through and around turbine blade, and variables to describe the fluid flow. The gauge pressure at domain outlet was equal to zero as shown in Figure 10. Air flows around the blade inside the domain were in the range of 2.6-7.5 m/s. Free stream air was flowing in normal direction to the domain inlet. Operating pressure was equal to the atmospheric pressure.

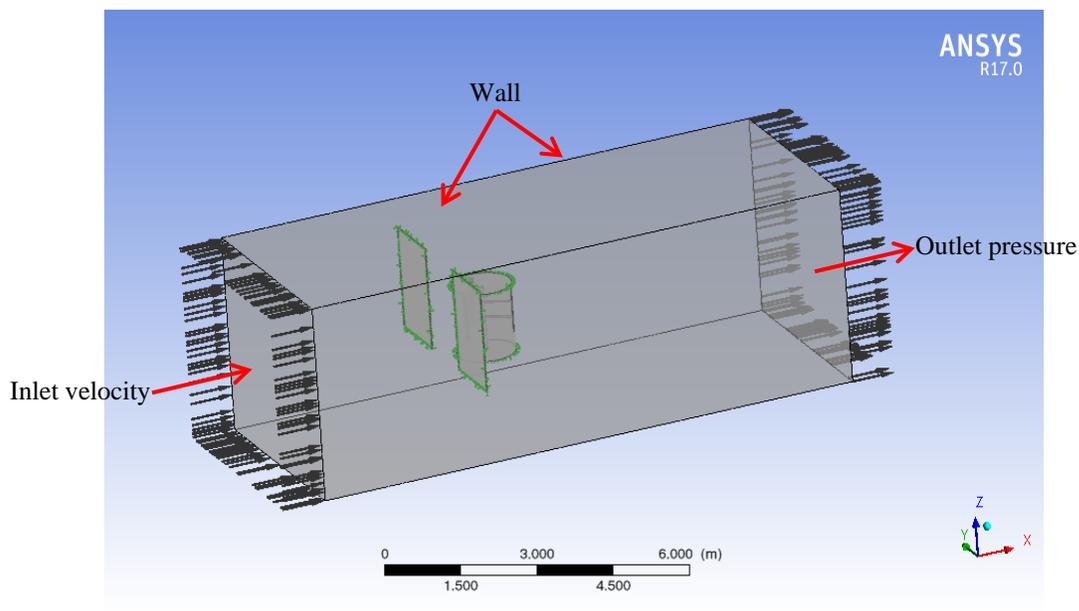


Figure 10: Boundary Conditions

Boundary conditions were changed to vary different procedure. The left side of the grid was assigned as inlet where it was considered that air was flowing in X- direction called upstream. The air hits the rotor blade through the pair of accelerator and helps rotating it and then going away. The right side was main outlet and, top and bottom were side outlets at atmospheric pressure. The air velocity at the inlet was considered as 2.6 m/s, 3 m/s, 4 m/s, 5 m/s, 6 m/s, 7 m/s and 7.5 m/s respectively. Blades were considered as no slip wall. For uniformity of the results all the models were kept at the same starting position.

The numerical solver used in this case is based on solving the Reynolds Averaged Navier Stokes (RANS) equations at steady state condition by employing a finite-element method. The RANS turbulence methods analyzed was the standard k- ω model, which is two-equation turbulence model to represent the turbulent properties of the flow.

IV. RESULTS AND DISCUSSION

In this study, three-bladed turbine, NACA0016 with the chord length of 113mm was used to investigate the performance of the rotor on the effect of separation gaps and clearance of the two flat plates. In this case, maximum upstream wind speed in the simulation was 7.5 m/s with Reynolds number of 1.3×10^4 while tip speed ratios were set in a range of 3. The maximum rotational speed is 380 rpm and turbine is rotated in counter-clockwise direction. After getting the converged results from CFX, the case and data were saved and opened in CFD-post which is the post-processor bundled with ANSYS. The torque is obtained by the simulation process.

A. Analysis of Wind turbine power Output

In the different separation gaps case, 1150 mm separation gap is set as a reference gap and changes to larger gaps to test the effect of gap changes on the performance of the turbine by using flat plate size of 1380 mm width and 2150 mm height as shown in Table 2. Simulation was done at maximum wind speed of 7.5 m/s. The values of torque from the simulation are plotted against various separation gaps as shown in Figure 11. From the Figure 11, it can be obviously seen that torque value varies by increasing the separation gap from the reference gap. The torque reached to peak value of 2.69 N.m at the separation gap of 1350 mm by adding the flat plates to the turbine. It was about 1.35 times of the bare turbine torque value of 1.98 N.m at the rated wind speed of 7.5 m/s which was conducted by Thandar Nwe [33]. Therefore 1350 mm separation gap is considered as the optimum value.

Table 2 Specifications of different separation gaps between two flat plates

Windmill type	Separation gap between two plates (mm)	Left side plate placement from the center (mm)	right side plate placement from the center (mm)	Clearance (mm)
NACA0016 3-bladed vertical axis wind turbine integrated with large plate accelerators of 1380 mm width and 2150 mm height	1150	575	575	300
	1250	625	625	300
	1350	675	675	300
	1450	725	725	300
	1550	775	775	300

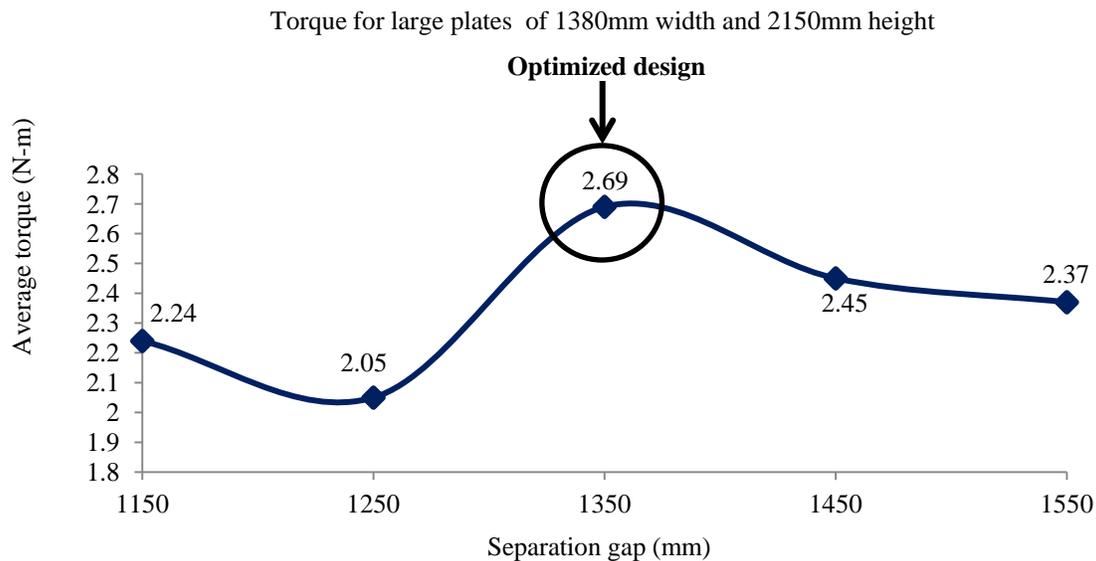


Figure 11: Average torque at different separation gaps

In various clearance cases, two different sizes of flat plate accelerators: the larger plate of 1380 mm width and smaller plate of 1000 mm width with same height of 1250 mm cases are considered as shown in Table 3. The same reference gap of 1350 mm was set in both cases as it is the optimum separation gap as shown in Figure 11. The torque value at various clearance values are plotted as shown in Figure 12. In the larger plate case; the torque rises to maximum value of 2.69 N.m at optimum clearance of 150 mm. Then

the performance of turbine is tested again for the smaller flat plate case. In this case, maximum torque value of 3.05 N.m was attained at 250 mm clearance as shown in Figure 12. It was about 1.5 times of the bare turbine output.

Table 3 Specifications of different clearances between two difference sizes of flat plates

Windmill type	Separation gap between two plates (mm)	Left side plate placement from the center (mm)	right side plate placement from the center (mm)	Clearance (mm)
NACA0016 3-bladed vertical axis wind turbine integrated with large plate accelerators(1380 mm width and 2150 mm height)	1350	675	675	50
				100
				150
				200
				250
				300
				350
NACA0016 3-bladed vertical axis wind turbine integrated with small plate accelerators (1000 mm width and 2150 mm height)	1350	675	675	50
				100
				150
				200
				250
				300
				350

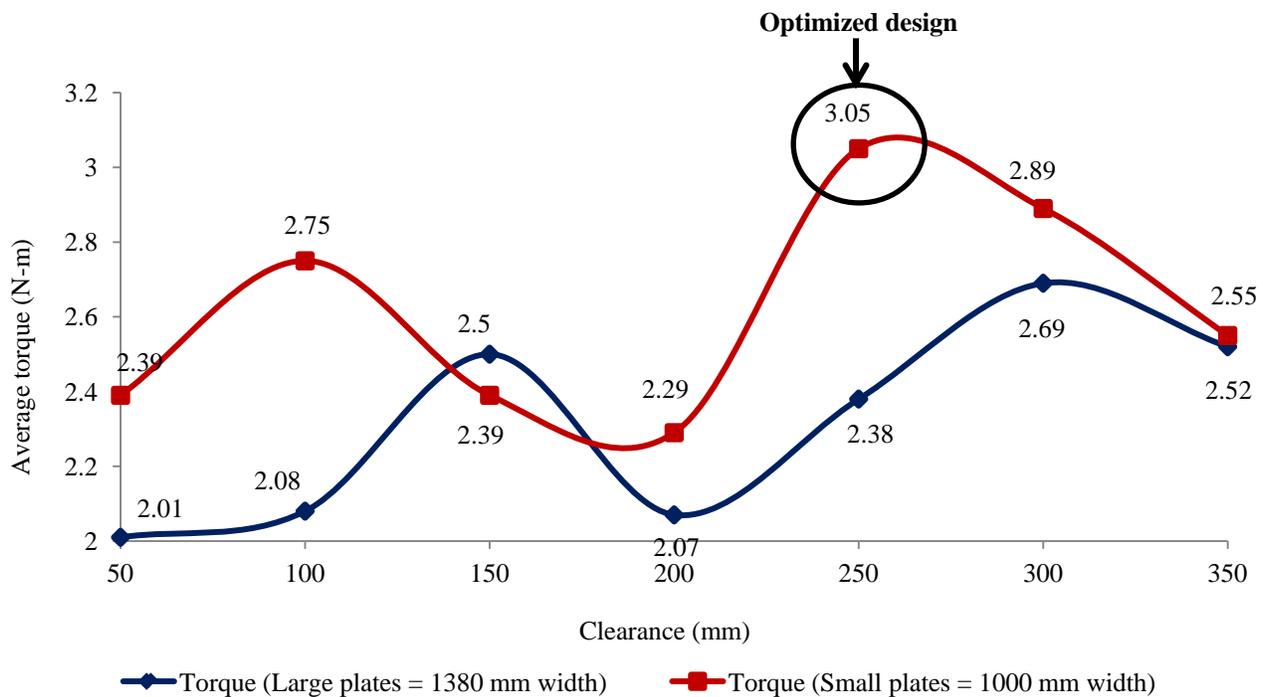


Figure 12: Average torque at different clearances of two different sized plates

Therefore the optimized system design is separation gap of 1350 mm and clearance of 250 mm by 1000 mm width and 2150 mm height of flat plates integrated vertical axis wind turbine. In the vertical axis windmill, different places of blade and upcoming wind speed create different angles of attack in the 360° rotation of the rotor as shown in Figure 13 and Figure 14. Different angle of attacks make different pressure level between the upper and lower surface of the airfoil, which causes the lift and draft force of the blade. Turbine torque is produced by the lift and drag force of each blade. Generally for vertical-axis wind turbine, a positive torque lift is generated when the blade passes through the upstream side. When the blade is located on the upstream side, angle of attack is a positive value while negative value of angle of attack is experiencing by the opposite blade. The incoming wind speed with respect to the blade becomes larger as the peripheral speed ratio increases while the Reynolds number also increases correspondingly [34]. It should be noted that, the forces on the blade change due to the continuous changing angle of attack. Therefore the flat plate collector concept is applied in this study for the optimum angle of attack by changing the direction of incoming flow and collecting the flow to the narrow passage.

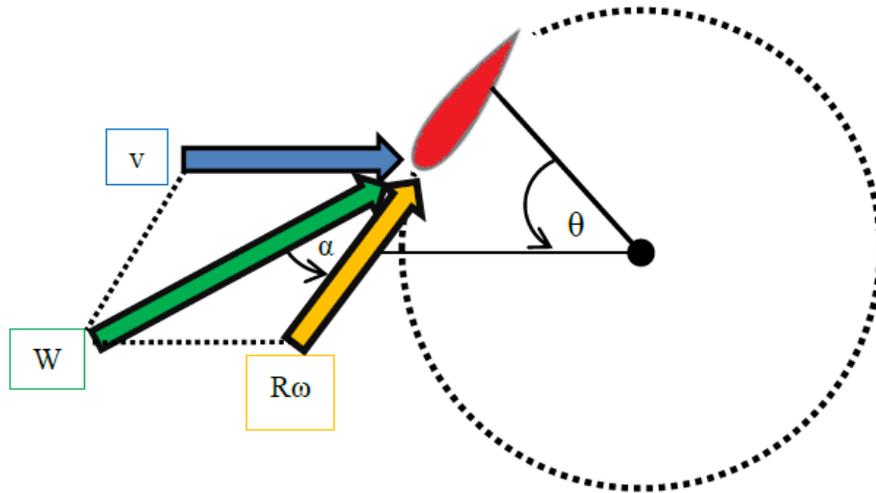


Figure 13: The geometric relationship of the oncoming wind and the angle of attack for the blades

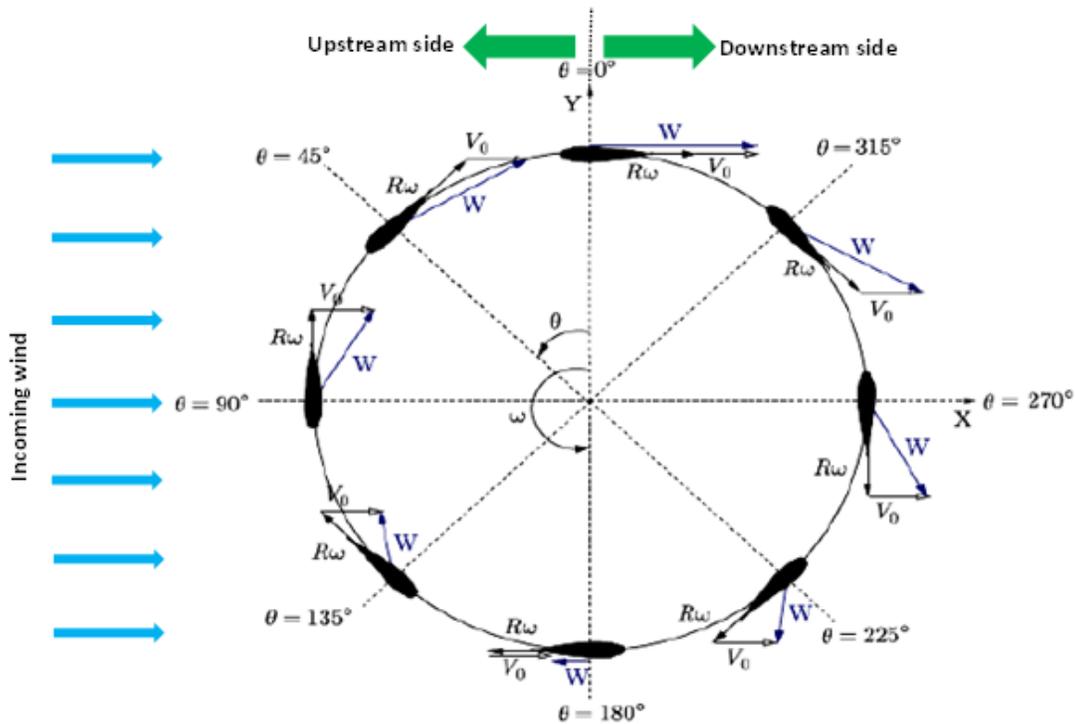


Figure 15: Continuous changing of relative velocities and angle of attack values on rotor 360° rotational plane

The average static effective pressure difference acting on each blade of the rotor creates the lift and drag value of the rotor which produce the turbine torque. The two different sides of each blade have different pressure levels. The upper side of camber has lower pressure than the lower camber side. This creates the positive and negative pressure regions and the difference causes the rotation. The pressure difference acting on the rotor was set against the various flow velocities as shown in Figure 15. The higher pressure difference was attained in all flow velocity conditions. It seems the blades are experiencing around optimal angle of attack. At the rated flow velocity of 7.5 m/s, the highest pressure difference of the rotor was about 270 Pa and while the lowest pressure difference of about 33 Pa occurred at 2.6 m/s in this accelerator integrated turbine case. The average static pressure obviously increased compared to the bare turbine (without accelerator) case [33]. In the bare turbine case, the rotor attained the highest pressure difference of 40.17 Pa at the rated velocity of 7.5 m/s. The lowest pressure difference at 2.6 m/s was occurred at 7.98 Pa.

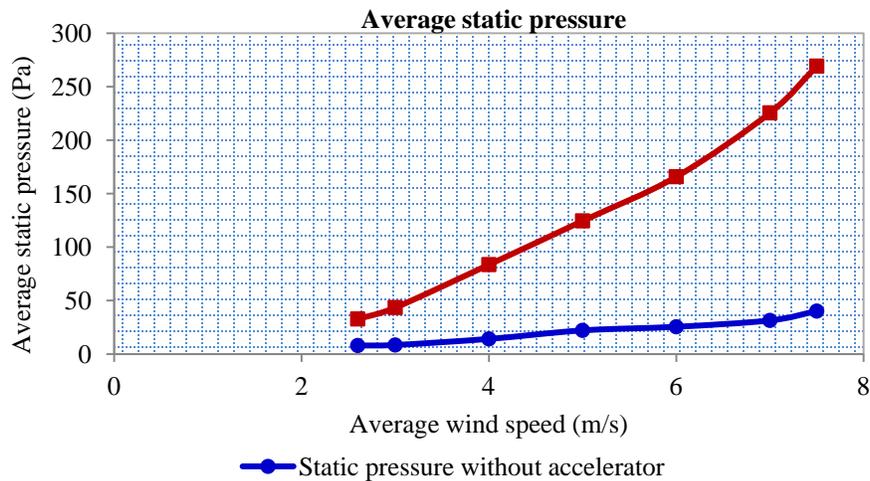


Figure 15: Comparison of average static pressure differences on each blade of wind accelerator integrated turbine

In the CFD analysis, the overall torque during the steady movement of the rotor at different wind velocities was extracted and the results of both with and without accelerator cases are compared as shown in Figure 16. It showed that the two analytical results of torque value are different.

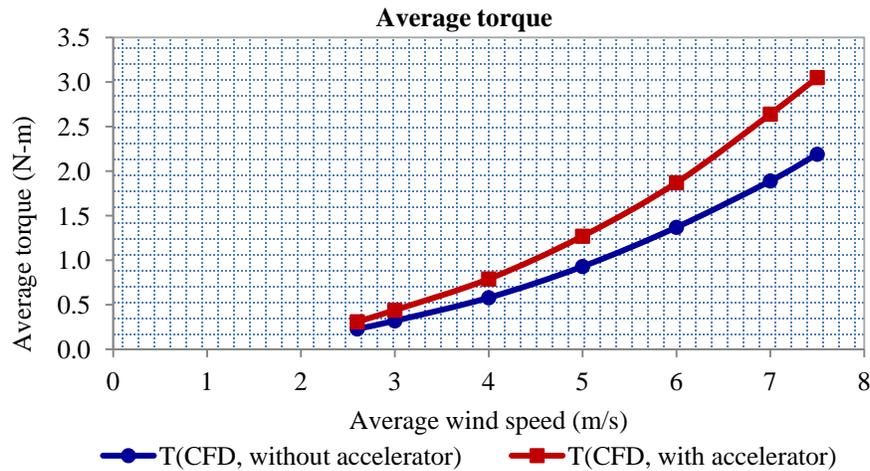


Figure 16: Comparison of average torque of the turbine with and without wind accelerator

The power output of the accelerator augmented turbine at various wind velocities were compared with bare turbine power output as shown in Figure 17. At rated velocity of 7.5 m/s, the rotor power output of accelerator integrated turbine was 94.62 W while the bare turbine value is 67.94 W.

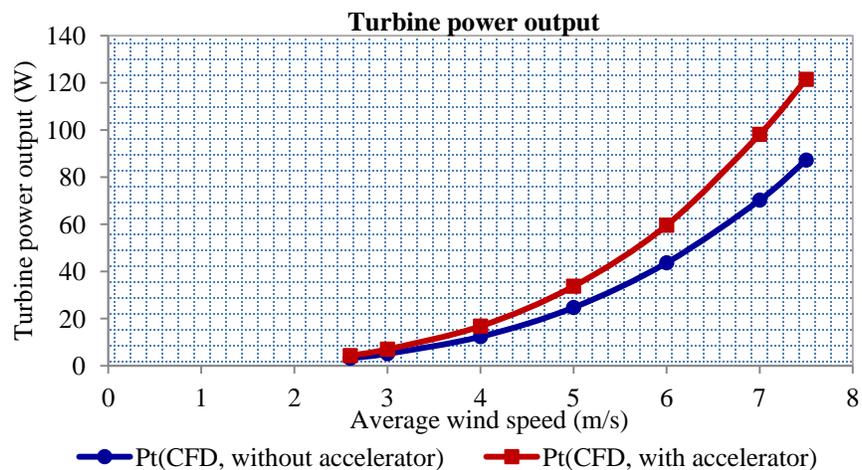


Figure 17: Comparison of power output of the turbine with and without wind accelerator

The comparison of electrical power output was shown in Figure 18 and it could be seen that the electrical power output increases to 87W when bare turbine result was 63W. From the two analytical results, it is obviously seen that the power augmented turbine can give more power than the conventional wind turbine.

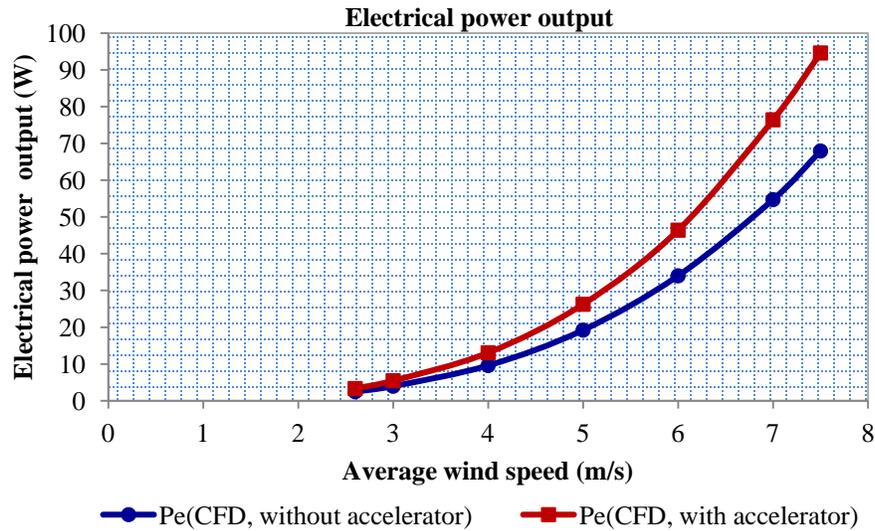


Figure 18: Comparison of electrical power output of the turbine with and without wind accelerator

The efficiency of the turbine is defined by power coefficient (C_p) and it plays a key role on the assessment of wind machines performance. The power coefficients (C_p) of the bare turbine and accelerator integrated turbine are achieved by the power turbine output and plotted against the various average wind speed as shown in Figure 19.

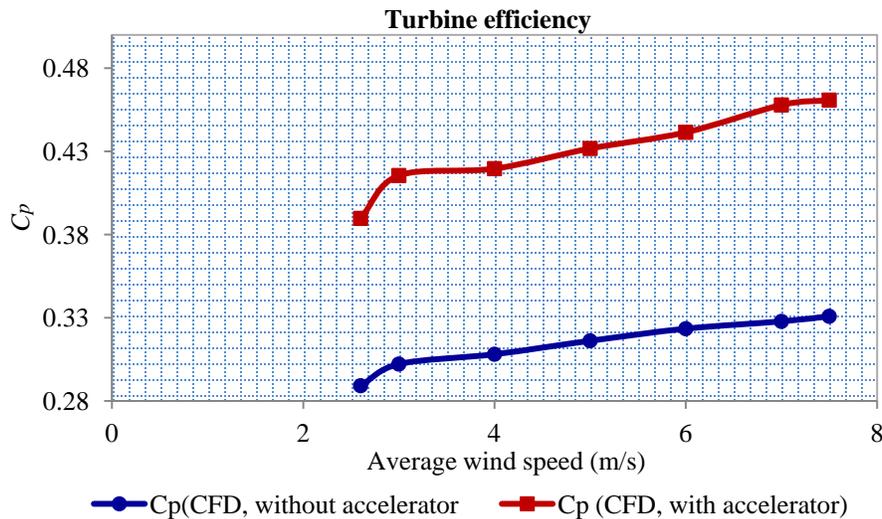


Figure 19: Comparison of power coefficient of the turbine with and without wind accelerator

From the Figure 19, it can be obviously seen that the bare turbine efficiency increases to about 1.5 times by adding the flat plates to the turbine. The maximum C_p value reached to 0.46 while bare turbine attained maximum C_p value of 0.34 at the wind speed of 7 m/s.

B. Flow Phenomenon of placing flat plate to the SVAWT

Post-processor software CFD post includes the option to show the velocity vectors and pressure contours, and streamlines in any plane within the domain. The flow around the rotor of flat plate accelerator integrated VAWT was presented for the rated inlet velocity of 7.5 m/s condition by streamlines as shown in Figure 20 compared with the flow phenomenon of the bare turbine case shown in Figure 19 [34]. It also showed that the higher values of velocity present on the outer region of the blade rotation. The higher values of velocity on upper regions made reduction in pressure in the same regions. The rotor here is rotating counter-clockwise and flow from left to right in the figure. In the bare turbine case, when the incoming flow hits the rotor, the incoming flow disturbs the rotation of the blade 1 as circle ① while it increases the rotation of the blade 2 and blade 3 by pushing them (circle ②) and circle ③) as shown in Figure 20. Therefore blade 2 and blade 3 may attain more power from the flow.

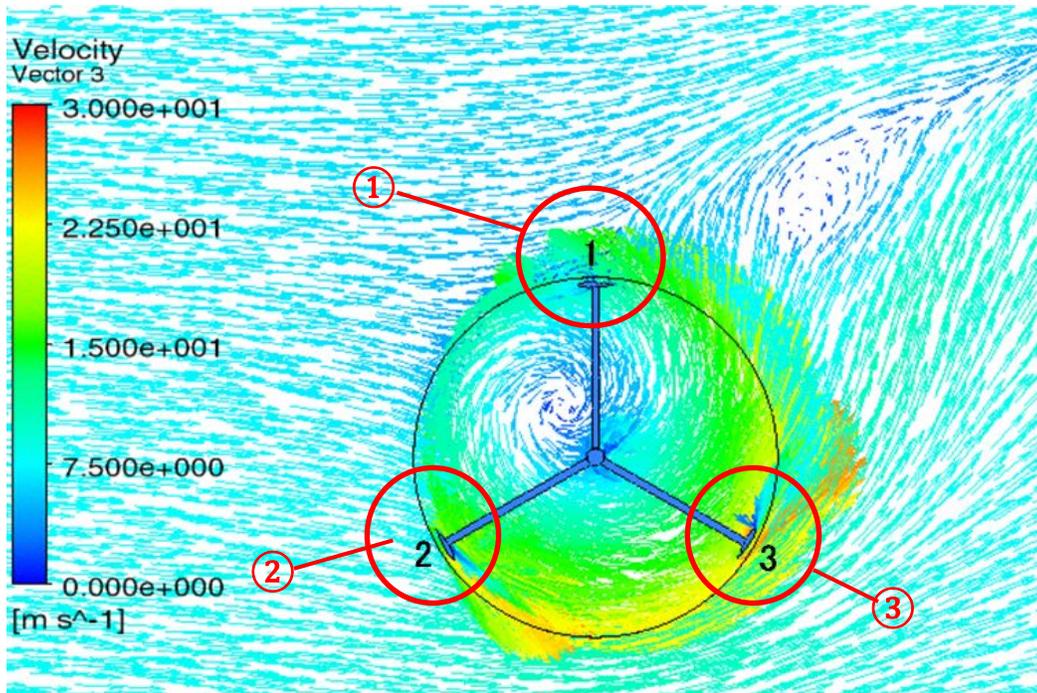


Figure 20: Velocity distribution through the blade for the bare turbine at 7.5 m/s [28]

In the turbine with flat plate case, vortex is generated around the blade 1 and blade 2 by the effect of flat plates as shown in Figure 21 (circle ③), which phenomenon cannot occur in the bare turbine case. When the plates are positioned on the side of the blade against the mainstream in the 90-degree positions, the flow passes through the left blade from the view of the upstream is slow down by the left plate as ②. Therefore, there is a possibility that the magnitude of the negative torque which has been generated in the original position is smaller. At the same time, the right plate from the view of upstream side changes the angle of attack as circle ① affecting to be greater the lift which mainly generates positive torque. At the same time, negative torque is reduced by the left plate, decelerating the mainstream by the effect of wake region behind the plate. In this way, it is estimated that the output increases greatly.

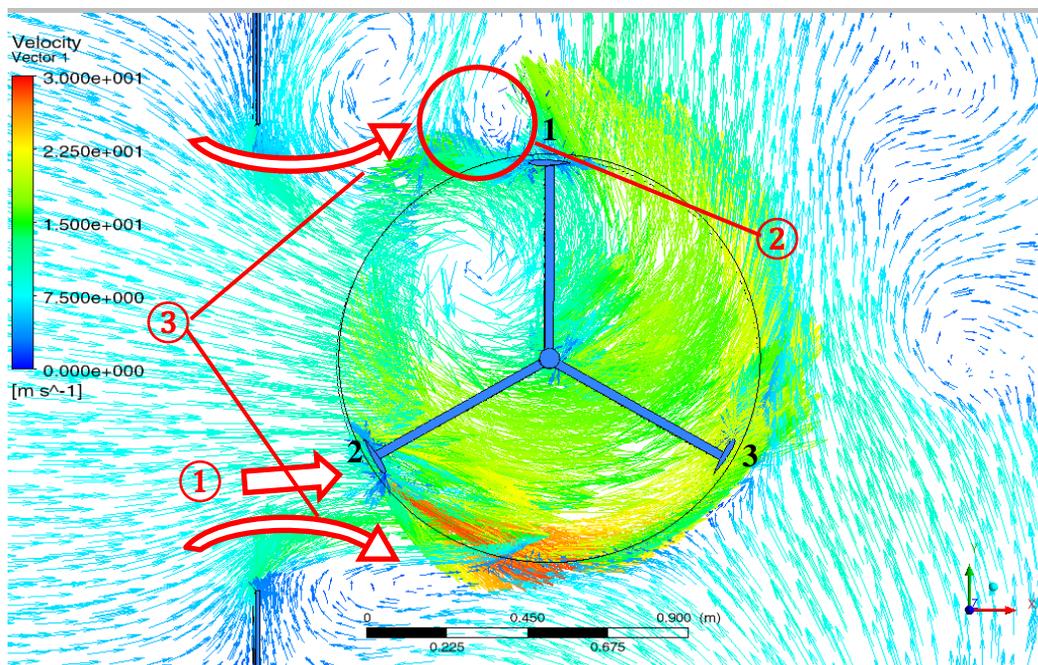


Figure 21: Velocity distribution through the blade for the optimized design of accelerator integrated turbine at 7.5 m/s

Flow velocities around the rotor of the turbine were shown in Figure 22 by the 3D isometric view of the complete rotor. From the figure it can be seen that the highest velocity region occurred at the outer path of the rotor rotation. The velocity always remains zero at the blade wall. After hitting the wind at the blade the wind also produces some angular velocity and start to gain the velocity again. In general the higher velocity region is displayed at the leading edge of the blade especially at the blade which is on the pressure side. It is apparently seen that the highest velocity region occurred at the blade 2 and the blade 3 at the outer path of the rotation and these two blades may mainly drive the rotor.

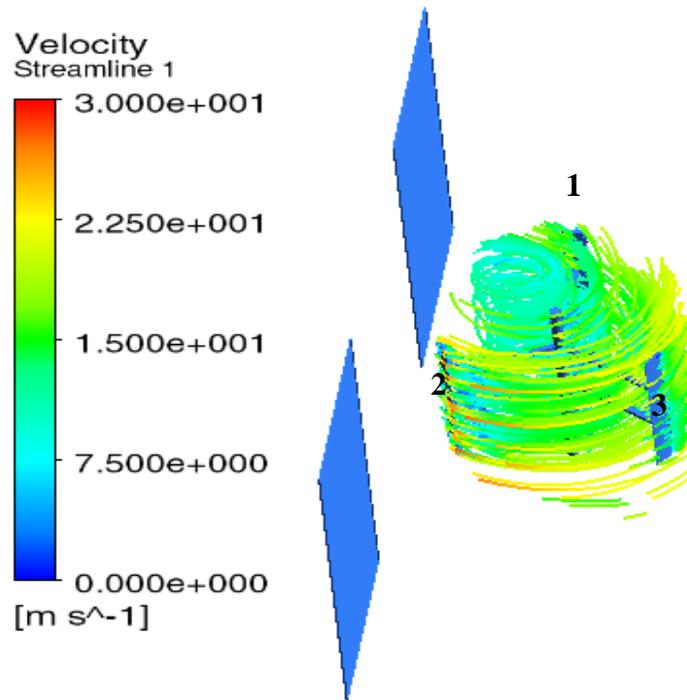


Figure 22: 3D view of velocity streamlines around the turbine at 7.5m/s

Figure 23 represents the pressure distribution in 2D view along the rotor while Figure 24 presents the pressure distribution in 3D isometric view of the complete rotor. They provide the pressure contours for the rated velocity of 7.5 m/s. The two different sides of each blade have different pressure levels. The upper side of camber has lower pressure than the lower camber side. This creates the positive and negative pressure regions and the difference causes the rotation.

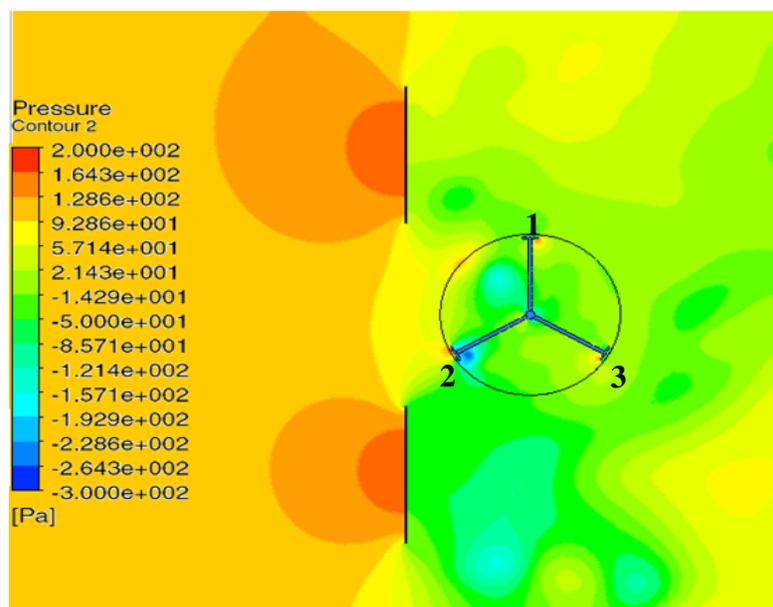


Figure 23: Pressure distribution through the blade for the optimized design of accelerator integrated turbine at 7.5 m/s

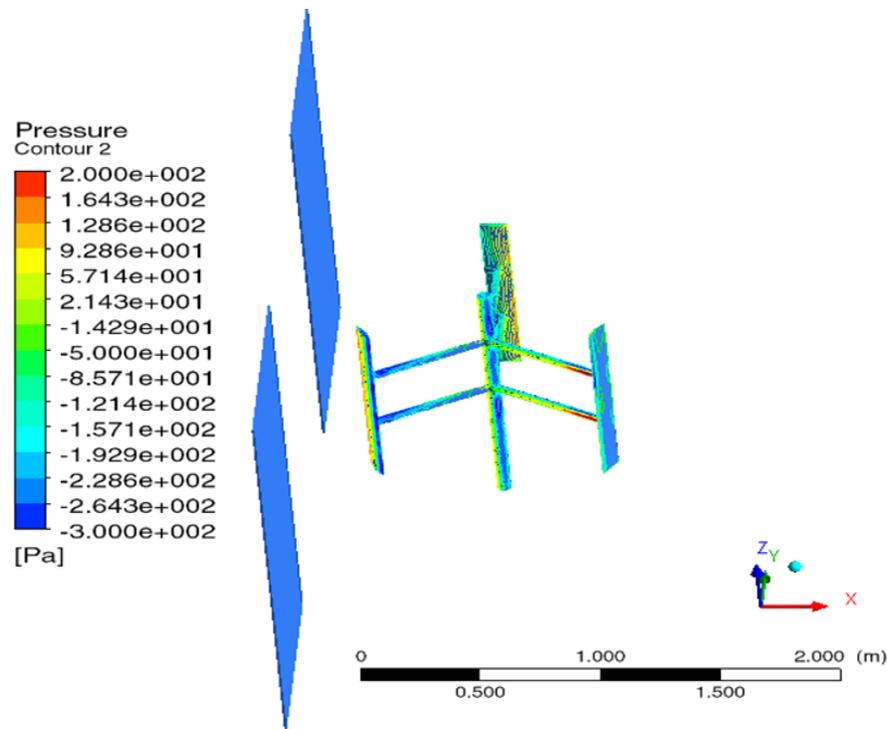


Figure 24: 3D view of pressure contour around the turbine blade at 7.5 m/s

With respect to the effect of the adding flat plates to the conventional turbine, the changing of output value is obviously visible at different separation gaps. Especially there are sensitive changes of power when the both plate are changed different separation gaps from the reference place. As a result, different places of left plate create different angle of attack which gives different positive torque values. The optimum positive torque lift is generated when the blade passes through the upstream at the separation gap of 1350 mm by creating an optimum angle of attack which results in the optimum positive torque in order to induce lift. Therefore the right plate from the view of upstream side changes angle of attack and accelerates the incoming flow, affecting the greater lift which mainly generates positive torque. At the same time, more negative torque is reduced by the left flat plate decelerating the mainstream which increases negative torque, by the effect of wake region behind the plate. Therefore, there is a possibility that the magnitude of the negative torque which has been changed by changing the place of the left flat plate. There are sensitive changes of power output when the positions of both plates are changed to different clearance before the turbine. The optimized design meets at the separation gap of 1350 mm and clearance of 250 mm by smaller width plate of 1000 mm with 2150 mm height.

V. CONCLUSION

In this study, the numerical simulation of straight-bladed vertical axis wind turbine was carried out by CFD technique if the presence of an augmentation device around the rotor of a VAWT can be favorable to the wind machine energy output. As power output plays a key role in the assessment of wind machines performance, the power output as the function of different wind speed was investigated by integrating flat plates at different separation gaps and different clearance in the simulation. Maximum peak power of 94.62 W was occurred at 1350 mm separation gap and 250mm clearance at the rated velocity of 7.5 m/s by the flat plate size of 1000 mm width with 2150 mm height. It was about 1.5 times of the bare turbine output of 67.94 W. This is an acceptable result with the some output results of diffuser augmented turbine which were investigated by the previous researchers. The visualization of the flow around flat plate integrated wind turbine was also conducted to understand the phenomena of the flow around the rotor. From the visualization process it can be seen that different place of flat plate creates different angle of attack which gives different torque values. The right plate from the view of upstream side changes angle of attack of the flow and accelerates the incoming flow velocity. Negative torque is reduced by the left plate, decelerating the mainstream by the effect of wake region behind of it. In this way, it is estimated that the output power value can be affected by placing a pair of flat plates around the rotor at the specific position. Due to this sensitive phenomenon of aerodynamic characteristic of flowing around the rotor integrated with the flat plates, CFD technique is a special tool to simulate the prediction of this augmented accelerator integrated straight blade vertical axis wind turbine successfully. In conclude, this study supports us the knowledge that the flat plate technique can give higher increase power output to the straight bladed vertical axis wind turbine and it can be seen that the performance of straight bladed VAWT is significantly changed by presenting the simple wind accelerator at the different separation gaps and different clearance.

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IOT Enabled Air Pollution Meter with Digital Dashboard

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Abstract- This project explains the depiction and execution of an Air Pollution Meter. The innovation grasped here, is a hands-on execution of the idea of Internet of Things. This specific work is an exploration of the probabilities of utilization of this innovation, in this world, where natural well-being is turning into a genuine risk. The work is actualized utilizing Android, iOS and microcontroller board of Arduino. A couple of sensors are likewise utilized, for example, temperature and humidity sensors and a couple of gas sensors to screen changes.

Index Terms- air quality; pollution; pollution detector; Arduino Uno;

I. INTRODUCTION

The changes in weather in nature around us is an evident reality. It is gradually yet unquestionably having unfavorable consequences on our lives and the things around us. With the ongoing increment in industrialization, release of harmful substances have expanded complex. The levels of lethal gases noticeable all around is disturbing. These are causing an irreversible change.

As indicated by rehashed studies and reports around the world it has been inferred that:

- Degradation in Air Quality costs the worldwide economy \$5 trillion yearly.
- 1 out of 8 deaths around the globe is linked to air contamination.
- 92% of total populace lives with hazardous air contamination.

Under these conditions it is very much important for everybody to have the capacity to keep a check on the circumstance of Air Pollution and Air Quality around us. Asian countries have a portion of the most exceedingly bad Air Qualities around the globe, with the centralizations of noxious and combustible gases having reliably high fixations. In India the circumstance is ending up to be more disgusting day by day. Our capital has been most awfully hit via Air Pollution, with 2016 winter recording a portion of the most astounding numbers ever.

Current air contamination systems comprise on few stations instrumented with exorbitant air quality screens, which give exact information yet just in couple of static areas, and which are additionally supplemented with scattering models.

The most recent in the field of correspondence innovation is the Internet of Things (IoT). By utilizing IoT one can remotely computerize and speak with various machines and gadgets over the Internet. This type of correspondence can utilize Bluetooth, LAN or WLAN for correspondence. In this manner, a pragmatic acknowledgment of utilizing Internet of Things by means of Blynk App has been endeavored here.

In the light of the present rates of industrialization and unfortunate contamination levels, observing the air quality is important to guarantee preventive measures and better nature of living.

Here a convenient model is introduced that will join Blynk and a couple of condition sensors to screen gas levels. The thought behind this work is to address the upcoming difficulties and to encourage our successors with magnificent thoughts that should clear their idea about remote correspondence and control framework. There will be examples where a wired association between a remote machine/gadget and the control unit probably won't be plausible because of auxiliary issues. In such cases a remote association is a superior alternative.

II. LITERATURE SURVEY

[1]Design of Air Quality Meter and Pollution Detector (Arunava Mukhopadhyay). This work describes the design and implementation of a Air Quality Meter and Air Pollution Detector. The innovation embraced is a pragmatic usage of the idea of Internet of Things.

[2]Smart Vehicle Monitoring System for Air Pollution Detection using Wsn (Suganya E, Vijayashaarathi S). This proposed studies concentrates on measuring the fuel level of air contamination across the cities and reduces the man energy and likewise builds the general adaptability of sender and collector. The primary objective of the proposed system for the moving cars is to monitor the NO₂, Humidity, Temperature, CO ranges of air contamination via using NO₂ sensor, Moistness, Temperature and CO sensor.

[3]Automated Control System for Air Pollution Detection in Vehicles (Siva Shankar Chandrasekaran). This paper interests at the utilization of the semi-conductor sensors on the outflow retailers of vehicles which recognizes the level of contamination and furthermore shows this level with a meter.

[4]A method for the monitoring of the air pollution in the operating room caused by anaesthesia agents (B. Spyropoulos). A fuel chromatographic technique using a frequency modulated ECD and a hilass Spectrometer (1-two hundred AMU) had been

used for the dedication of Nitrous Oxide, Halothan and Isofluran lines in Operating Theatre environment.

III. PROPOSED SYSTEM

This task is an IoT enabled air tainting meter to screen air quality on your mobile phone using Blynk application and Arduino board. Blynk is an Internet of Things (IoT) stage generally used, to control Arduino.

Here, Blynk gives a computerized dashboard on your cell phone that showcases continuous air quality readings for your surroundings.

Blynk isn't intended for a particular board or shield. It will prepare you on the web and for the IoT, independent of whether Arduino or Raspberry Pi is connected to the Internet over Wi-Fi, Ethernet or an ESP8266 chip.

IV. SYSTEM ARCHITECTURE

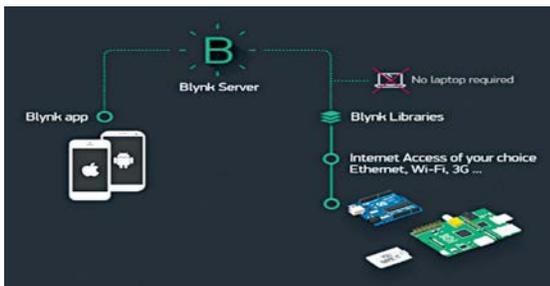


Fig 1: System Architecture

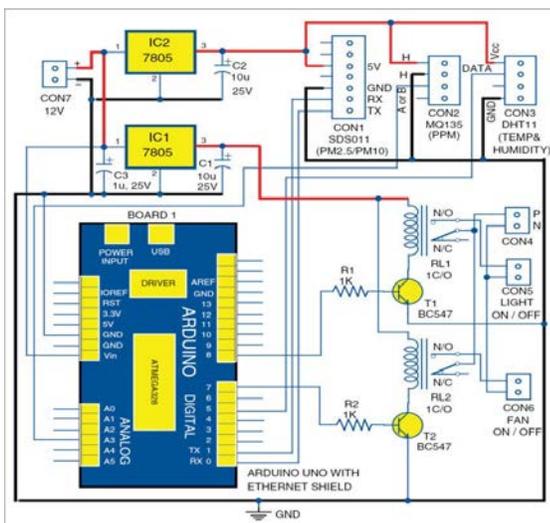


Fig 2: Internal Architecture

V. MODULE IDENTIFICATION

The various modules of this particular project is described as follows:

- i. PM2.5/PM10 sensor (SDS011)

Particulate matter (or PM), is a blend of strong particles and fluid beads skimming noticeable all around. A few particles are discharged specifically from a particular source, while others are shaped in convoluted concoction responses in the climate.

The PM2.5/PM10 sensor associated crosswise over CON1 was created by INOVAFIT, which is an upshot off from University of Jinan, China. It utilizes the principle of laser disseminating, and can recognize suspended particulate issue fixation running from 0.3 to 10 microns. Information gathered by the sensor is steady and dependable. SDS011 sensor is associated with UART port (TX and RX) of Arduino Uno board.

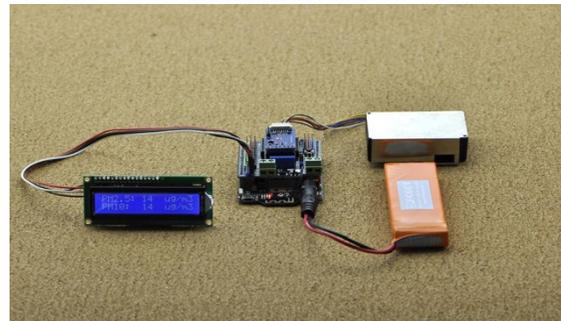


Fig 3: PM Nova Sensor

- ii. Temperature and humidity sensor (DHT11)

This composite sensor contains aligned advanced flag yields of temperature and dampness. Related with connector CON3, it joins a resistive-type moisture estimation part and a NTC temperature-estimation device. Its output pin is associated to digital pin 5 of Arduino Uno board. It is generally pocket-friendly as compared to its execution.

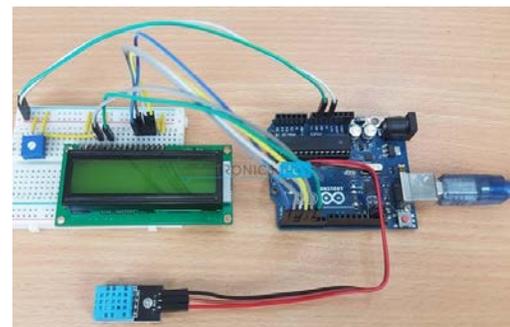


Fig 4: Temperature and Humidity Sensor

- iii. Power Supply

A 12V battery or supply is associated with connector CON7, which is regulated to 5V utilizing 7805 controllers (IC1 and IC2). At the point when the framework is controlled on, the gadget takes one moment to preheat the gas sensor before it is prepared for task. The entire sensor circuit can be fueled by 9V or 12V connector or battery. Here, IC1 and IC2 have been utilized for driving different parts of the circuit.

Encase the entire sensor circuit in an appropriate box, which ought to be set where you need to screen air quality or pollution.

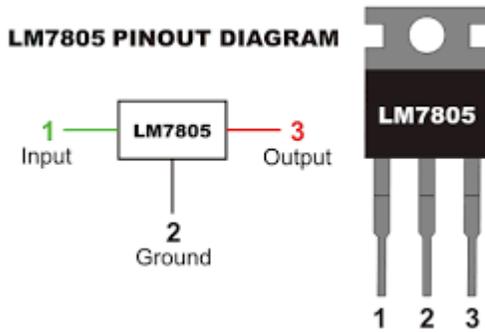


Fig 5: Power Supply

iv. Ethernet shield

Arduino Ethernet shield enables you to effortlessly associate Arduino to the Internet. This shield empowers Arduino on the planet, with an Interto send and get information from anyplace that has net connection.



Fig 6: Ethernet Shield

v. Blynk App

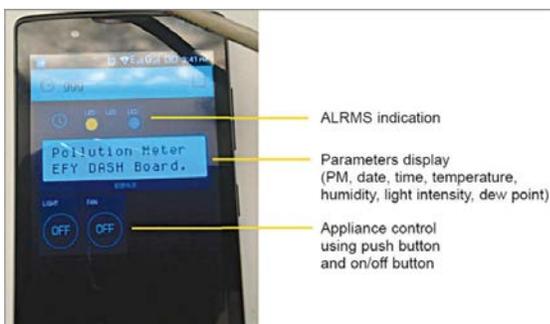


Fig 7: Blynk App

Blynk can control equipment remotely. It can show sensor information, store and imagine it, among other unique things. There are three noteworthy segments in the stage as given underneath:

- Blynk application

It enables you to make astonishing interfaces for your activities utilizing different gadgets.

- Blynk server

It is in charge of all correspondence between the cell phone and equipment. You can utilize Blynk Cloud or run your private Blynk server locally. It is open source, and can deal with a large number of gadgets. It can likewise be propelled on Raspberry Pi.

- Blynk libraries

Libraries are accessible for all mainstream equipment stages. The libraries empower correspondence with the server, and process all approaching and active commands. When you press a catch on Blynk application on the telephone, the flag goes to the Blynk Cloud, where it discovers its way to the equipment. It works on a similar route the other way, and everything occurs in a squint of an eye.

VI. WORKING PRINCIPLE

Stage 1: Mount Ethernet shield on Arduino Uno and interface Board1 to PC utilizing a USB link.

Stage 2: Change the IP address in IPAddress IP (your IP address) in Arduino portray ethernetclient.ino. This outline/program code can be downloaded from the finish of the article.

Assemble and transfer the code into Arduino Uno from Arduino IDE. This code demonstrates to you industry standards to make a HTTP ask for utilizing an Ethernet shield. It restores a Google scan for the word Arduino. Aftereffects of this inquiry are distinguishable as HTML through Arduino's serial window.

Stage 3: Compile ethernetserver.ino portray and transfer it to Arduino Uno board. Change your IP address in IPAddress IP (your IP address) in the draw. In this point of reference, use your Ethernet shield and Arduino board to make a clear Web server. Using the Ethernet library, your contraction will have the ability to answer a HTTP request with the Ethernet shield.

Subsequent to exploring to the Ethernet shield's IP address, Arduino will react through HTML program and will be prepared to acknowledge input esteems from simple pins [A0 through A5] of Board-1.

Stage 4: Connect your adaptable with Wi-Fi. Download and present Blynk application from Google Play store. At that point, make another Blynk account. This record is separate from the records utilized for Blynk Forums, on the off chance that you as of now have one.

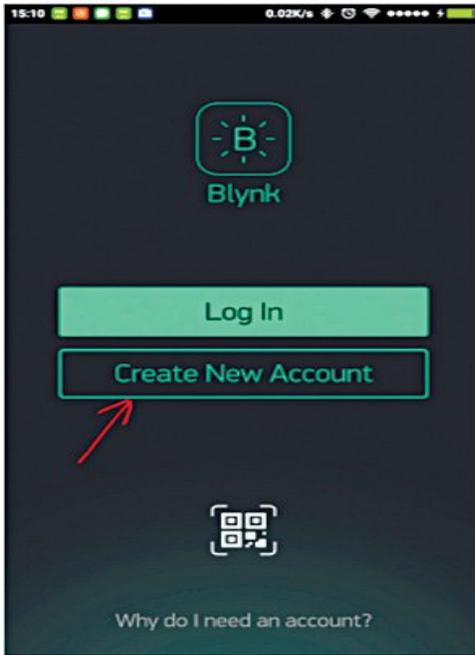


Fig 8: Making another record in Blynk

A record is expected to spare your ventures and approach these from different gadgets anyplace on the planet. It is additionally a safety effort.

Stage 5: After you have effectively signed into your record, begin by making another venture and give it a name.

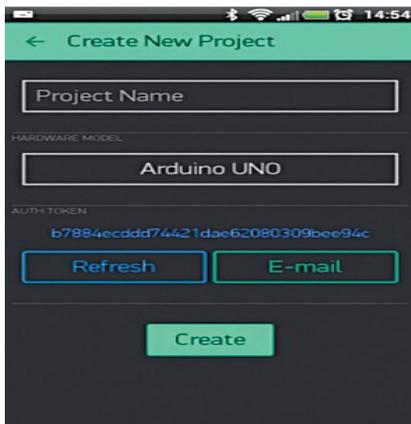


Fig 9: Creating a new project window

Stage 6: Select the equipment show you expect to utilize. For this situation it is Arduino Uno.

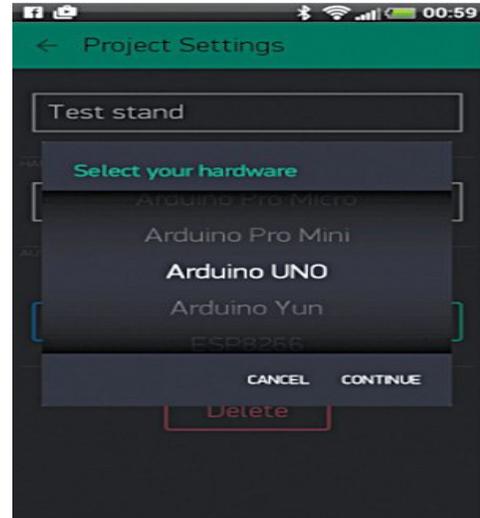


Fig 10: Selecting the hardware

Stage 7: Authorisation (or Auth) token is a unique identifier that is needed to connect the hardware to your smartphone. Each new venture you make will have its own Auth token. Snap email catch and the token will be sent to the email address you utilized for enrollment. Utilize this token in `auth[] = "your token"` in `pollution.ino` record.

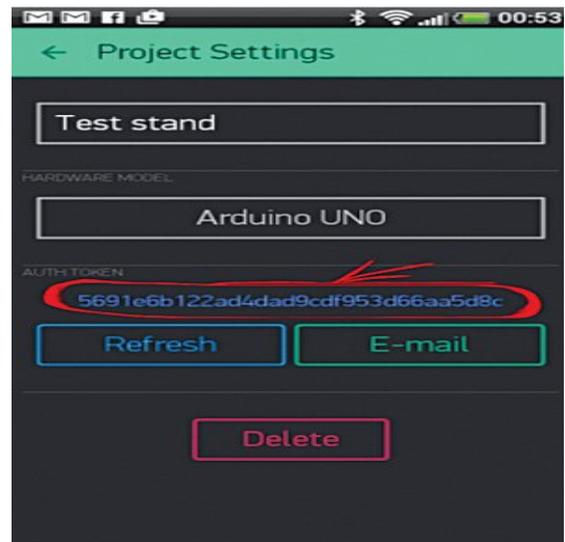


Fig 11: Typical authorisation token

Stage 8: Press Create

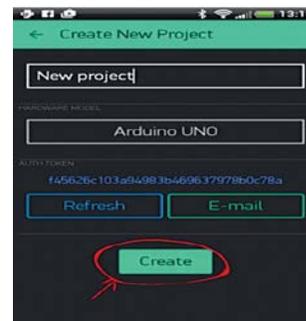


Fig 12: Create Button

Stage 9: The task canvas is vacant right now. Tap anyplace on the canvas to open the gadget box; every single accessible gadget is situated here.

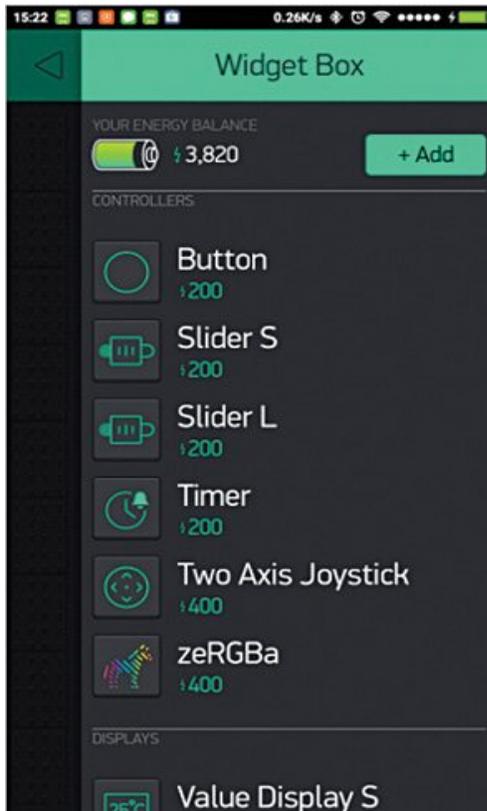


Fig 13: Widget Box

Add the following widgets in the settings and make the screen look like a digital dashboard as shown in. This incorporates including the LCD, LED, on/off switch, pushbuttons and RTC gadgets.



Fig 14: Including the widgets

Stage 10: Now, run the Blynk application program. When you are finished with the settings, squeeze Play. This will change the presentation from alter to play mode where you can communicate with the equipment. While in play mode, you won't have the capacity to drag or set up new gadgets. Press Stop and return to alter mode.

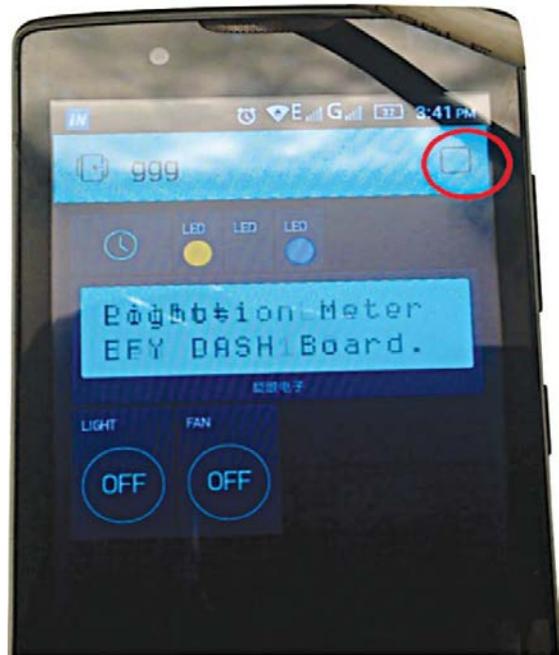


Fig 15: Run the Program.

VII. CONCLUSION

Air contamination is a mind boggling issue as far as toxicology and wellbeing hazard appraisal. There are a wide range of kinds of toxins which may offer ascent to consolidated impacts. To stop the contamination we have to spread mindfulness among individuals. They should know the current circumstance of the air and in what condition they are living. There is an immediate connection between the air quality of a surrounding and the strength of its inhabitants. It has been seen that on familiarity with the air contamination with real time data there have been changes in behavior that lead to healthier choices that are beneficial to the environment as well.

Here an endeavor has been made to assemble an air quality checking gadget, utilizing air contamination meter along with computerized dash board.

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The impact of consumer ethnocentrism on purchase intentions: Case of Kosovo

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Abstract- This study aims to determine the impact of consumer ethnocentrism on purchase intentions towards domestic and foreign products. Due to the fact that Kosovo is a developing country, and taking into consideration its last political conflict with Serbia, the emphasis is specifically placed on products imported from Serbia and products from European Union countries. Data was collected through a questionnaire which was distributed online to a representative sample, consisting of 150 individuals. Data was analyzed using the SPSS software. Factor analysis and Spearman correlation coefficient were used to test the research hypotheses. Study results show that the consumer ethnocentric tendencies are positively related to intention to purchase domestic products and negatively related to products from Serbia and the European Union.

Index Terms- Cetscale, consumer ethnocentrism, ethnocentrism, Kosovo, purchase intention.

I. INTRODUCTION

Being influenced from rapid market globalization, marketing experts are increasingly interested in cross-cultural market analysis and customer characteristics influenced by cultural factors, as well as by other factors on basis of which markets differ from each other. "With growing globalization of the global market and ever-increasing competition in the field of international products and services, consumers are increasingly concerned about their cultural and ethnic identities. And obviously their concerns and ethnic sentiments are reflected on their consumer behavior, making them inclined towards domestic products (such an approach is known as the ethnocentric consumer orientation) or, on the other hand, an increased inclination of consumers towards imported products is noted, which in marketing is known as the polycentric customer orientation." (Vida and Fairhurst, 1999).

Despite the major changes and movements in the global markets, consumer ethnocentrism has emerged as a result of the love and care of individuals towards their country, and as a result of the fear that the high level of import of products and services from other countries may have negative consequences to the local economy. Consumer ethnocentrism today is a concept that is given special attention and is used extremely often whenever it comes to the consumer opinions and approach towards foreign products. Shimp and Sharma (1987) were the first to use the term "ethnocentric consumer tendencies", claiming that consumer ethnocentrism represents "consumer beliefs about the appropriateness, the morale of purchasing foreign products, and the consumer loyalty towards products produced in their own country. "They also developed a standard format named Cetscale (Consumer Ethnocentric Tendencies Scale), consisting of 17 statements that aim to assess the degree of ethnocentric tendencies among consumers.

Even though the consumer ethnocentrism concept was introduced and used for the first time in studies on US consumers, later experience has proven that this concept and Cetscale are not limited to studies related to one culture only. Cetscale was integrated as part of the questionnaire used in the present study, in order to assess the ethnocentric tendencies of Kosovar consumers.

Globalization has also affected our domestic market. Kosovo is characterized by a low export rate compared to imports. Only in November last year, data from Foreign Trade in Kosovo show a trade deficit that is higher by 4.3% in the month relative to the same period of 2015. The export of goods in November 2016 amounted to 32.1 million Euro, while imports amounted to 234.8 million Euro (KSA, 2017).

Therefore, the purpose of this study is to determine the impact of ethnocentric consumer tendencies in purchasing intentions towards domestic products and the intensity of ethnocentric tendencies towards European countries' products and products imported from Serbia. Serbia was selected because despite the fact that Kosovo still has not completed two entire decades since the end of the conflict with Serbia, the latter country is now among the largest importers in Kosovo. In addition, it is assumed that the recent war may be a key factor that may have contributed to an increase in the ethnocentric tendencies of Kosovo consumers. While concerning the selection of European Union countries. The selection was made on basis of geographical proximity, cultural similarities, common

history and mutual competition. Likewise, the study aims to test the validity and reliability of CETSCALE, used to assess the ethnocentric tendencies of Kosovo consumers.

The results of this study will provide valuable guidance to local Kosovo companies, enabling them to undertake strategic actions in order to improve their performance in a developing market such as Kosovo.

II. LITERATURE REVIEW

A. Definition of Consumer Ethnocentrism

The term "consumer ethnocentrism" is a concept adapted from the general concept of "ethnocentrism" first mentioned by Sumner in 1906 (Shimp & Sharma, 1987) and it was defined as a "view of things in which one's own group is the center of everything, and all others are scaled and rated with reference to it." Kwak, Jaju and Larsen, (2006) pointed out that an ethnocentric consumer strongly supports traditions, symbols, icons and products of his culture while at the same time underrating the traditions, symbols, icons and products of other cultures.

Ethnocentrism initially became known as a sociological concept. This is supported by Levine and Campbell, according to whom ethnocentrism was initially simply a sociological concept, which then became a psychosocial construct important to personality systems at an individual level, as well as to the more general cultural and social and analytical frameworks.

Ethnocentric consumers believe that it is wrong to buy foreign products, as this damages the domestic economy, increases unemployment and is an unpatriotic gesture. Without a doubt, the ethnocentric consumer phenomenon has its own consequences, and the following can be mentioned: (1) overestimating the quality and value of local products or underestimating imports, (2) the moral obligation to buy local products, and (3) an intensive preference for local products (Sharma et al., 1995, p. 27). In particular, ethnocentric consumers point out the positive aspects of products coming from their country (Jain & Jain, 2013).

Highly ethnocentric consumers buy local products even when they are aware that a foreign country is known for developing high quality products. In addition, domestic products are seen as superior, while foreign products are negatively rated thus discouraging purchasing them (Auruskeviciene, Vianelli & Reardon, 2012). Non-ethnocentric consumers, however, rate products on basis of their objective attributes, regardless of the country of origin (Shimp & Sharma, 1987).

However, in spite of what was said above, consumers with ethnocentric tendency cannot always be defined in such a "radical" manner. In cases where the product perception is related to the country's image (e.g., level of industrialization or economic development), the ethnocentric consumer will continue to consider certain local products as superior products, but at the same time, foreign products will be positively rated and will not be underestimated. In addition, Sharma et al. (1995) claim that the concept of ethnocentrism cannot be generalized to all brands and product categories equally.

Thus, to conclude with definitions of consumer ethnocentrism, we can say that consumer ethnocentrism can be considered as a "general tendency" to avoid purchasing foreign products as against domestic products (Shankarmahesh, 2006).

B. Consumer ethnocentrism tendencies depend on the degree of the development of a country

In accordance with existing literature, consumers' ethnocentric tendencies depend on the degree of the development of a country. Initially, the original concept of consumer ethnocentrism emerged in developed countries, where consumers generally and usually rated the quality of local products positively (Herche, 1992; Elliot, Cameron, 1994; Ahmed et al., 2004). Some other research (Suppeyle, Gronhaug, 2003; Reardon et al., 2005; Klein et al., 2006) has shown that the same concept is applicable in the context of developing countries. Recent research in Central and Eastern Europe has confirmed the increase of ethnocentric tendency as a result of limited cosmopolitanism (Vida, Fairhurst, 1999; Vida, Reardon, 2008).

C. Measurement of consumer ethnocentrism

Measurement of customer ethnocentrism was made possible with the development of Consumer Ethnocentrism Tendency Scale (Cetscale). Shimp and Sharma (1987) were the first to develop an effective instrument for measuring ethnocentric tendencies affecting consumer's purchase decisions. They proved that consumer ethnocentrism may explain and provide an answer as to why and to what extent consumers prefer local products as opposed to foreign ones. Therefore today, Cetscale is a successful predictor of consumers' beliefs and attitudes, and is widely used to measure consumer ethnocentrism tendencies in many studies in developed and developing countries (Luque-Martinez, et al., 2000; Chrysochoidis et al., 2007, Teo, et al. Mohamad, Ramayah, 2011). Although many similar instruments were suggested in addition to Cetscale, Cetscale is still considered to be the most commonly used instrument in measuring consumer ethnocentrism (Chrysochoidis et al., 2007).

III. RESEARCH METHODOLOGY

Considering the great availability of imported products in the Kosovo market and the limited availability of local products, a review of Kosovo consumer preferences and tendencies was deemed to be very reasonable and necessary in this context. The aim of this research is to determine the level of consumer ethnocentric tendencies in Kosovo and the impact of such tendencies on the process of product rating and their willingness to buy domestic or imported products.

A. Research Instrument

The instrument used in this quantitative study is a structured questionnaire which applies the well-known Likert's scale (1 = completely disagree, 5 = strongly agree), where respondents expressed their agreement or disagreement related to the statements given in the questionnaire. The questionnaire used in the study is composed of three parts. The first part includes the standard form of the well-known Cetscale questionnaire, consisting of a total of 17 statements in which the respondents expressed their individual attitudes using the Likert's scale. The second part of the questionnaire uses 9 statements, which aim to determine the purchase intentions of Kosovar consumers towards domestic products and products imported from Serbia and from the European Union countries. The last part of the questionnaire, summarizes the demographic characteristics of respondents, including age, gender, education, and monthly family income. Such data were presented in the study as the characteristics of the selected sample.

B. Research Hypotheses

Based on the aims of this study, the research hypotheses were raised. Also we took in considering the findings of some similar studies conducted in other developing countries and related to the impact of consumer ethnocentrism on consumer purchase intention.

Hypothesis 1: Consumer ethnocentrism is positively related to consumers' intentions to purchase domestic products.

Hypothesis 2: Consumer ethnocentrism is negatively related to consumers' intentions to purchase products imported from Serbia and from the European Union countries.

C. Sample characteristics

Table I: Sample characteristics

Characteristics	N (out of total of 1000 respondents)	Percentage (%)
Age:		
15-24	81	67.5
25-34	28	23.3
35-44	5	4.2
45-54	5	4.2
55-65	1	0.8
Sex:		
Female	93	77.5
Male	27	22.5
Education:		
Elementary school or less	8	6.7
Secondary /qualified workers	1	0.8
Bachelor	97	80.8
Master	12	10.0
PhD	2	1.7
Household income (€):		
Without incomes or to 150€/month	9	7.5
151-400€/month	30	25.0
401-650€/month	30	25.0
651-900€/month	22	18.3
901-1150€/month	12	10.0
1151-1400€/month	3	2.5
1401€/month –	14	11.7

IV. DATA ANALYSIS

This section presents data analysis and aims to test the hypotheses of this paper. Since the number of variables included in the analysis is very high, this section uses factor analysis and principal components to reduce such number. For this reason, some analyzes are initially carried out, using which a reduced number of factors will be derived, and such factors will be included in the next section in a regressive analysis to test the presented hypotheses on how Kosovar consumer behavior is influenced by ethnocentric factors.

Several tests are used to test how relevant the data is for a factorial analysis and how reliable the data/results of such an analysis can be. A measure of the adequacy of data for performing the factor analysis is the Kaiser-Meyer-Olkin (KMO) measurement, which must have a value greater than 0.5 and the Bartlett's Test of Sphericity, which must result as statistically significant. Both tests are based on exploring the correlation matrix. Therefore, there must be a correlation between the variables taken into consideration for the analysis.

KMO may obtain values between 0 and 1, but researchers recommend that its value must be over 0.6. The Bartlett test of sphericity tests the null hypothesis that the correlation matrix is a unit matrix, therefore the elements of the main diagonal are 1 and the elements outside the diagonal are 0. This is an ideal case in which the variables under consideration have no relation to each other. The Bartlett test of sphericity relates to the importance of the study, thus showing the validity and adequacy of the responses collected through questionnaires to address the problem being studied. The analysis is considered appropriate if the test value is less than 0.05, in which case the null hypothesis of lack of correlation between the variables at the 5 percent level is rejected, thus confirming the factor analysis precondition for correlated variables.

A. Reliability Analysis

Before the factor analysis was performed, the Cronbach's Alpha coefficient was calculated for the variables included in the analysis, which resulted in 0.923 for the 17 variables included in the analysis. This number indicates that the data have a relatively high stability, therefore the reliability of the scale is good for performing a factor analysis (Table 2).

Table II: Reliability Statistics - Reliability of Cetscale

Cronbach's Alpha	Number of variable
,923	17

In addition, two other tests on the data adequacy were carried out at the start of the factor analysis. Specifically Bartlett's Test of Sphericity was performed and the KaiserMeyer-Olkin (KMO) sampling adequacy was calculated. The conclusions of the above tests are presented in Table 3. The Bartlett's Test of Sphericity resulted statistically significant at the level of 1 percent, while the KMO measurement indicates a very good sample for performing a factor analysis. This guarantees reliable results of the analysis.

Table III: Kaiser-Meyer-Olkin Measure, Bartlett's Test of Sphericity of Cetscale

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.904
Bartlett's Test of Sphericity	Approx. Chi-Square	1039.476
	df	136
	Sig.	.000

B. Principal Components Analysis (PCA)

Principal Components Analysis (PCA) is a technique used to summarize the information collected from several observed variables in a smaller number of factors. The purpose of this analysis is to derive a reduced number of components by not including all initial measurements but taking into consideration the information generated from such measurements. Factors are a linear combination of observed variables. The principal component analysis starts with calculation of the eigen values of the matrix. A positive eigen value determines the number of dimensions needed to present a result without losing information, hence an eigen positive value (eigen > 1) determines the number of factors. Using eigenvectors, a factor matrix is calculated. After construction of the factor matrix, the factor loading is calculated simply by calculating the correlation between the observed variables and the factors. There are two criteria to be taken into consideration when calculating the principal components: first, the new variables (principal components) must be selected

such that the first factor describes the vast majority of variance variability, the second component must be responsible for the vast majority of the residual variance and so on, and second, the new variables are not correlated (Field, 2000).

Table IV: Total Variance Explained for Cetscale

Component	Initial Eigen values			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	7.874	46.319	46.319	7.874	46.319	46.319
2	1.182	6.951	53.270	1.182	6.951	53.270
3	1.014	5.964	59.233	1.014	5.964	59.233
4	.904	5.319	64.552			
5	.863	5.075	69.628			
6	.735	4.322	73.950			
7	.647	3.807	77.757			
8	.616	3.622	81.379			
9	.541	3.181	84.560			
10	.473	2.782	87.343			
11	.467	2.749	90.092			
12	.366	2.153	92.245			
13	.343	2.019	94.264			
14	.312	1.836	96.100			
15	.271	1.593	97.693			
16	.251	1.474	99.167			
17	.142	.833	100.000			

Extraction Method: Principal Component Analysis.

The principal components analysis is the most commonly used data analysis in order to determine how many factors or components will remain after reducing the variables. How many will be used in the further data analysis.

Based on factorial analysis we know that the rule is that factors or components having an eigenvalue greater than 1 (eigen > 1) must be retained, and all other factors or components having a value less than 1 are not kept for further processing.

Based on the above rules, we may observe that in our case the first three factors or components can be used for further data analysis. Therefore, 17 variables were reduced into 3 components. Which means that the first three components are considered adequate to explain the relationship that exists between all the initial variables.

The best way to determine how well the components or factors retained for further analysis explain the correlation between variables is to stop and analyze the percentage of variance or variability of the retained factors. And in our case the first factor is calculated at 46.319% of variance or variability, the second factor is at 6.951% of variance, and the third factor is 5.964% of the overall variance. In fact, the best choices in practice are considered values ranging between 40% and 60%. Selections under 40% are usually not considered sufficiently strong, thus based on these results, the only factor that will remain for further analysis of data is factor 1, which will also be called consumer ethnocentrism.

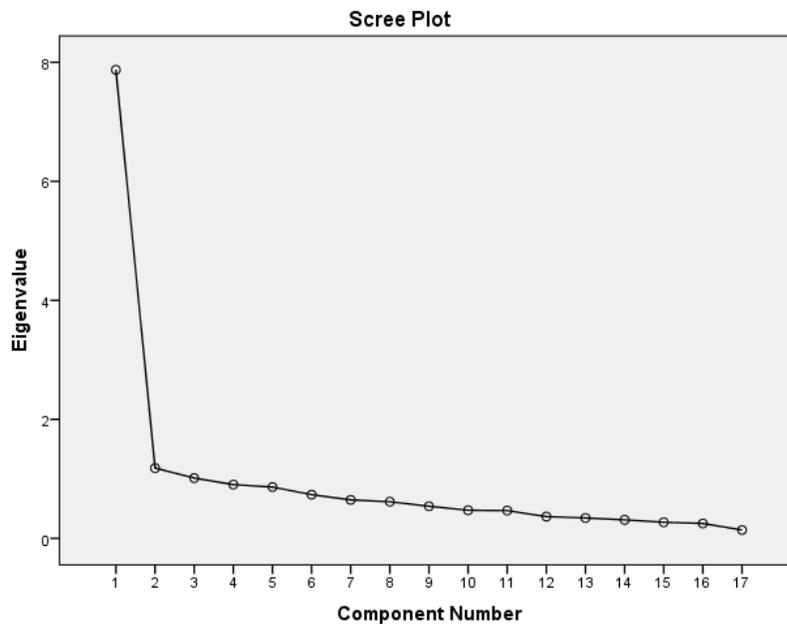


Figure 1: Principal Components Analysis, presented visually

The Figure 1 shows visually that for further data analysis, only the first factor or component will be used. This is because, as can be seen from the graph, the value of factor 1 is the highest value in the graph, and is the only value standing above the line that permeates values that do not differ much from each other.

C. Analysis of the correlation between consumer's ethnocentrism tendency and customer purchase intentions towards domestic products

Hypothesis 1: Consumer ethnocentrism is positively related to consumers' intentions to purchase domestic products.

In order to determine the internal consistency of the measurement scale of consumer purchasing intentions towards domestic products, the Chronbach's Alpha coefficient was calculated, the results of which are shown in table below. Questions that were used to assess the consumer intention to purchase domestic products have resulted in an acceptable level of reliability ($\alpha = 0,700$).

Table V: Reliability of purchase intentions scale towards domestically product

Cronbach's Alpha	Number of variable
.700	3

Spearman's correlation coefficient (rho) was used to determine the relationship existing between ethnocentric tendencies and the consumer intention to purchase local products. The table below shows the results of the performed correlation analysis in order to test the H1 hypothesis.

Table VI: Correlation analysis between consumer ethnocentrism and purchase intentions towards domestic products

Sperman's rho (Correlation Coeficient)	I would feel guilty if I did not buy products produced in Kosovo.	I always buy only products produced in Kosovo.	Whenever possible, I buy products produced in Kosovo.
↓			
Consumer ethnocentrism	,598**	,486**	,299**
	,000	,000	,000

Correlation coefficient (Spearman's rho) obtains values from -1 to +1. Values from 0.5 to 1.0 show a strong correlation between the variables. Values from 0.3 to 0.49 show an average correlation. Values from 0.1 to 0.29 indicate a weak correlation and the values from 0 to 0.09 show a very weak correlation or no correlation between variables. The same categorization applies to negative values. Based on such data, the correlation analysis in our case shows a positive, statistically significant relationship between consumer ethnocentrism and consumer purchasing intentions towards domestic products. Although in the three analyzed variables directly related to domestic products, the correlation coefficient is increasingly weaker, we can draw the conclusion that this relationship between such two variables is an average positive correlation.

In terms of the other value shown in the tables above (Sig. =.000), this is a value that indicates whether there is a real correlation between the variables or if the null hypothesis is confirmed. If this value is smaller than .05 this means that there is sufficient evidence to reject the null hypothesis and to automatically accept the hypothesis we have raised which in our case assumes a positive relationship between consumer ethnocentrism and consumer purchasing intentions towards local products.

Based on this analysis, as a conclusion of this section, it may be said that the Kosovar consumers show marked ethnocentric tendencies which urge them to have pronounced preferences towards domestic products.

D. Analysis of correlation between consumer's ethnocentric tendencies and the purchase intentions towards products imported from Serbia and the European Union countries

Hypothesis 2: Consumer ethnocentrism is negatively related to consumers' intentions to purchase products imported from Serbia and from the European Union countries.

The results from the data analysis show a high Cronbach's alpha coefficient for the scale used to assess consumer purchasing intentions towards products imported from Serbia (0.810), as well as a good Cronbach's alpha coefficient for the scale which is used to assess consumer purchasing intentions towards products imported from European Union countries (0.797). These coefficients indicate a high level of reliability of data collected in the field. The following tables show Chronbach's alpha coefficient.

Table VII: Reliability of purchase intentions scale towards products imported from Serbia

Cronbach's Alpha	Number of variable
.810	3

Table VIII: Reliability of purchase intentions scale towards products from countries of the European Union

Cronbach's Alpha	Number of variable
.797	3

To test hypothesis 2, the correlation coefficient known as Spearman's rho was used. The table below shows the results of correlation analysis between consumer ethnocentric tendencies and consumer purchasing intentions towards products imported from Serbia.

Table IX. Correlation analysis between consumer ethnocentrism and purchase intentions towards products imported from Serbia

Sperman's rho (Correlation Coefficient)	I would feel guilty if I would buy products imported from Serbia	I would never buy imported products from Serbia	Whenever I can, I avoid buying imported products from Serbia.
Consumer ethnocentrism	,302**	,351**	,241**
	,000	,000	,000

The above findings show a positive, statistically significant, moderately weak relationship between ethnocentric tendencies and consumer purchasing intentions towards products imported from Serbia.

The table below shows results of the correlation analysis between the consumer ethnocentric tendencies and consumer purchasing intentions towards products imported from European Union countries.

Table X. Correlation analysis between consumer ethnocentrism and purchase intentions towards products of European Union

Sperman's rho (Correlation Coefficient)	I would feel guilty if I would buy products imported from the EU countries.	I would never buy imported products from any EU country.	Whenever I can, I avoid buying imported products from any EU country.
Consumer ethnocentrism	,256**	,187**	,260**
	,002	,000	,002

The results found show that consumer ethnocentrism affects consumer purchasing intentions, because a positive correlation coefficient was achieved which in fact indicates the correlation between these two variables and is statistically shown to be significant. However, it should not be forgotten to mention that this link is weak and it cannot be said that Kosovar consumers do not prefer products from the European Union. Therefore, based on the results from both two tables above it can be deduced that Hypothesis 2 is confirmed.

V. CONCLUSION

The results show three statistically significant correlations between the consumer ethnocentric tendencies and consumer intentions to purchase domestic products. Although correlation coefficients are generally low, the results imply that consumers are more likely to prefer domestic products over foreign products. Therefore, we conclude that hypothesis H1 has been confirmed.

It is worth noting that a low correlation coefficient indicates that purchasing only domestic products will not be the only consumer choice. This is because this study does not take into consideration other factors that may clarify such an outcome, and this is considered to be the main limitation of this study, in a way.

The research results show that consumer ethnocentric tendencies have a significant impact on customer purchase intentions towards foreign products. According to the results, such tendencies lead the Kosovar consumers towards rejecting products imported by Serbia and the EU countries. On this basis, H2 has been confirmed. However, it must be pointed out that we are dealing with statistically significant correlation coefficients, but which are moderately weak. Without simpler explanation, on basis of these results, we can say that the Kosovar consumers do not strictly reject products imported from Serbia and the EU countries, but they prefer domestic products, and as much as they can, avoid buying foreign products.

As in many of the studies mentioned above in this paper, this study confirms that consumer ethnocentrism affects its purchasing behavior. Precisely the consumer ethnocentric tendencies and their measurement are factors that may assist managers and executives of companies to develop successful marketing strategies.

Overall, it can be concluded that Kosovar consumers show weak but significant preference towards domestic products, and on the other hand there are more pronounced ethnocentric tendencies especially towards products imported from Serbia.

Future studies on this matter are recommended to include a certain number of additional factors, which also presents the main limitation of this study. It is also recommended a comparison of the results of the present development period of Kosovo, with potential results of a future period in which a similar study would be conducted.

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Dynamic Analysis of the Belt Conveyor System for Detergent Industry

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Abstract- This research focus on the dynamic analysis for inclined belt conveyor system. The aim of research is to improve the reliability and design level. This analysis is done by using Belt Analyst V18.1.6.0 software. This research presents an approach to estimate the velocity time of inclined belt conveyor. The simulations with finite element model are carried out to analyze the belt dynamic behaviors such as pulley resultant force, belt power, tension in transient operation. Further simulations are carried out to get the optimum velocity time for starting and stopping process. The maximum pulley resultant force is 1.4kN, the maximum belt power is 0.4kW and the maximum belt tension is 1.1kN for starting and stopping process. The maximum velocity for starting is 1.09m/sec and for stopping of the process 1.46m/sec by using Belt Analyst V18.1.6.0. The maximum velocity in running condition of belt conveyor system is 1m/sec by using theoretical calculation.

Index Terms- Belt conveyor, Transient operation, Belt power, Pulley resultant force, Belt velocity

I. INTRODUCTION

Belt conveyor is widely used in all kinds of industry fields, such as electric power, coal, mine, metallurgy, chemical, port, architecture and food supplies [1]. It is one of the most important devices to transport bulk material of long distance [9]. For detergent industry, the inclined flat belt conveyor is used when the detergent bags are transported from the semi-finished product shop to packing machines shop. Figure 1 shows inclined flat belt conveyor system from E-Lan detergent industry in Mandalay Industrial Zone.

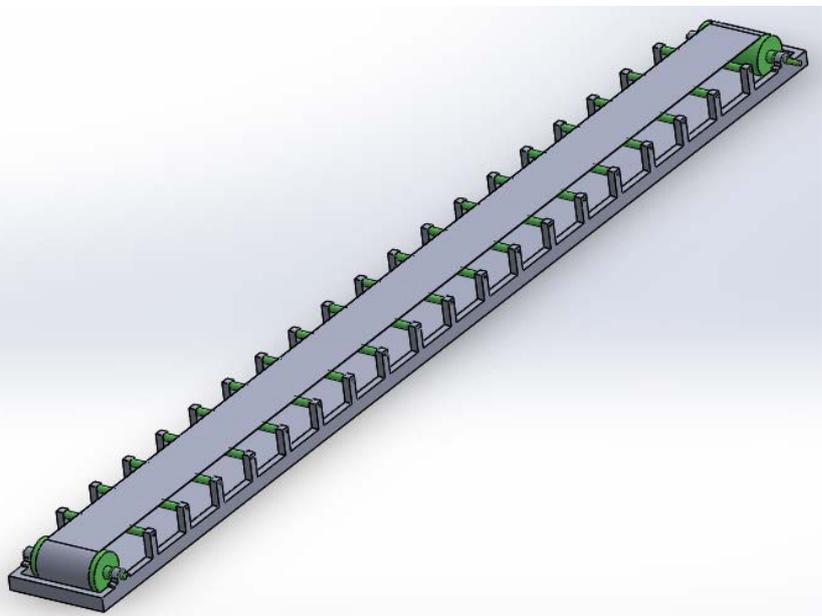


Fig. 1 The inclined flat belt conveyor

Many research institutions, engineers and technicians did a lot of deep researches on design theory, calculation methods, system control methods, design standards and design analysis system [11]. The traditional design of belt conveyor was thought more about static properties than dynamic properties. Otherwise, if only thinking static properties when designing, choosing type and using, some serious problems will happen, such as unstable starting-up or failure starting, sharp rising belt tension, belt skidding, running deviation, irrational system design, too high safe factor and so on. The recent researches on dynamic properties of conveyor are introduced. The main research of conveyor dynamics is analysis [11].

The dynamic behavior of conveyors has not been an issue of interest until a few decades ago [7]. However, as a general issue, dynamic behavior of axially moving continua is first examined in late 19th century [7]. This subject hasn't met a general interest until 1960s [7]. Scientists and engineers accelerated their research on analytical solutions for axially moving strings as they are the simplest form. From 1960s to 1970s, the solution techniques, scenarios and models have been improved [7]. From 1970s, various beam models have been introduced [7]. In parallel to emerging capabilities of computers, in 1984 first FE (finite element) model of a belt conveyor is applied [7]. The use of FE models expanded the research of belt conveyor dynamic behavior research. As an advantage of FEM (finite element methods) planar and web methods have been introduced lately [7].

Dynamic analysis is used to verify the maximum and minimum loads on all belt conveyor components during all possible transient conditions of stopping and starting [13]. It is also used to develop and test the control algorithms necessary to safely and reliability stop and start the load [13]. Proper dynamic analysis requires a time based, FEA solver which considers the elasticity of the belting and all the masses which make us the conveyance system [13].

There are three types of basic dynamic analysis real eigenvalue analysis, linear frequency response analysis, linear transient response analysis [12].

Real eigenvalue analysis is used to determine the basic dynamic characteristics of a structure [12]. The results of an eigenvalue analysis indicate the frequencies and shapes at which a structure naturally tends to vibrate. Although the results of an eigenvalue analysis are not based on a specific loading, they can be used to predict the effects of applying various dynamic loads [12].

Frequency response analysis is an efficient method for finding the steady-state response to sinusoidal excitation. In frequency response analysis, the loading is a sine wave for which the frequency, amplitude, and phase are specified. Frequency response analysis is limited to linear elastic structures [12].

Transient response analysis is the most general method of computing the response to time-varying loads. The loading in a transient analysis can be of an arbitrary nature, but is explicitly defined (i.e., known) at every point in time. The time-varying (transient) loading can also include nonlinear effects that are a function of displacement or velocity. Transient response analysis is most commonly applied to structures with linear elastic behavior [12].

II. SPECIFICATION DATA

The specification data are surveyed from E-Lan detergent industry in Mandalay Industrial Zone. To analyse the inclination flat belt conveyor system of detergent industry, the following data must be known.

TABLE I
 SPECIFICATION DATA OF CONVEYOR SYSTEM

No	Description	Symbol	Value	Unit
1.	Capacity	C	40	ton/hr
2.	Belt width	B	500	mm
3.	Belt thickness	t	4	mm
4.	Length between centers	L	9	m
5.	Vertical height of the conveyor	H	4.5	m
6.	Conveyor inclination angle	α	30	Deg
7.	Arc of contact	θ	180	Deg
8.	Belt tension before the drive pulley	F_1	1370	N
9.	Belt tension after the drive pulley	F_2	456	N
10.	Drive force of pulley in steady operating condition	F_d	913.8	N
11.	Average mass per unit length due to rotating rolls	m_{roll}	1.27	kg/m
12.	Mass of belt per unit length	m_{belt}	2.8	kg/m
13.	Average mass of specified bulk materials	m_{bulk}	5.9	kg/m
14.	Coefficient of friction between belt and drive pulley	μ	0.35	-
15.	Artificial friction coefficient	f	0.018	-
16.	Safety factors in transient operation	S_A	5.4	-

17.	safety factor in steady operating condition	S_B	8	-
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III. THEROTICAL CALCULATION OF THE BELT SPEED

The belt speed is important because the wrong speed ratio will cause the material to pile up inside the screen or bounce of the belts. To analyse the belt velocity of starting and stopping process for inclined belt conveyor system by using Belt Analyst V 18.1.6.0, the belt velocity from theoretical equations derives out [2].

The belt velocity equals,

$$v(t) = -\frac{\pi \Delta V}{2 T_a} \cos \frac{\pi t^2}{2T_a} \tag{1}$$

The required minimum acceleration time [2],

$$T_{a,min} = C_p \times \frac{\Delta V}{a_{max}} \tag{2}$$

With regard to risks of both breaking and slipping, the permitted acceleration a_{max} in transient operation equals [2],

$$a_{max} = \min \{ a_{max,break}, a_{max,slip} \} \tag{3}$$

The permitted maximum acceleration honoring the belt tension rating and safety factor [2],

$$a_{max,break} = \left[\frac{F_{2A}}{L(m_{roll} + 2m_{belt} + m_{bulk})} + Cfg \right] \frac{S_B - S_A}{S_A} \tag{4}$$

The permitted acceleration which honors the ratio between the belt tension before and after drive pulley [2],

$$a_{max,slip} = \left[\frac{(e^{\mu\alpha} - 1)F_{2A}}{L(m_{roll} + 2m_{belt} + m_{bulk})} - Cfg \right] \tag{5}$$

The belt tension after the drive pulley in transient operation [2],

$$F_1 = F_2 + F_d \tag{6}$$

The maximum extra drive force of pulley in transient operation [2],

$$F_{ac,max} = (F_2 + F_d) \frac{S_B - S_A}{S_A} \tag{7}$$

In transient operation, the peripheral driving forces on the drive pulley(s) equal [2],

$$F_{dA} = F_d + F_{ac} \tag{8}$$

The permitted belt tension in transient operation [2]:

$$F_{1A,max} = \frac{F_1 S_B}{S_A} \tag{9}$$

The belt tension after the drive pulley in transient operation equals [2],

$$F_{1A} = F_{2A} + F_{dA} \tag{10}$$

IV. DYNAMIC ANALYSIS OF BELT CONVEYOR

Belt conveyor system is analyzed by using Belt Analyst V18.1.6.0 software. Belt Analyst is the belt conveyor design software that was first created in 1996. It was developed by conveyor engineers as a consulting tool in order to design and analyze the most difficult belt conveyor applications. The list of successfully built applications is huge. This is not just design software, but a real engineering tool [13]. There are five analyze in this software;

1. Feeder analyst
2. Lagging analyst
3. Horizontal curve analyst
4. Dynamic analyst
5. Idler analyst.

For inclined belt conveyor for detergent industry, dynamic analyst is used. Dynamic analysis is used to verify the maximum and minimum loads on all belt conveyor components during all possible transient conditions of starting and stopping

[13]. It is also used to develop and test the control algorithms necessary to safely and reliability stop and start the loads [13]. Proper dynamic analysis requires a time based, FEA solver which considered the elasticity of the belting and all the masses which makes us the conveyance system [13].

The input data for the dynamic analysis of inclined belt conveyor system is types of conveyed material, types of belt, types of idlers, types of pulley and drives. The table shows the input data for the dynamic analysis. Pulley resultant force, belt power, tension and velocity according to the time for this research are shown in followings;

TABLE II
 INPUT DATA FOR THE DYNAMIC ANALYSIS OF BELT CONVEYOR SYSTEM

1.	General	Belt width (mm) Belt speed (m/sec) Load (ton/hr)	500 1.65 40
2.	Material	Description Material density (kg/m ³) Lump size (mm) Chute drop height (m)	Soap powder 961 400 9
3.	Profile	Horizontal length (m) Vertical lift (m)	9 4.5
4.	Belt	Specification Belt weight (kg/m) Top cover gauge (mm) Bottom cover gauge (mm)	Fabric-ISO 2.8 1 1
5.	Idlers	No of idlers Roll diameter (mm) Roll material Rotating weight (kg) Bearing tight Idler to belt friction factor	22 60 Steel 11.4 Roller
6.	Pulleys	No of pulley Wrap direction Wrap angle (degree) Pulley diameter (mm) Face width (mm) Shaft diameter (mm) Shaft length (mm) Bearing type	2 Clockwise 180 330 600 55 1197 Ball
7.	Drives	Power ratio Efficiency Wrap angle (Degree) Synchronous RPM	1 0.95 180 95

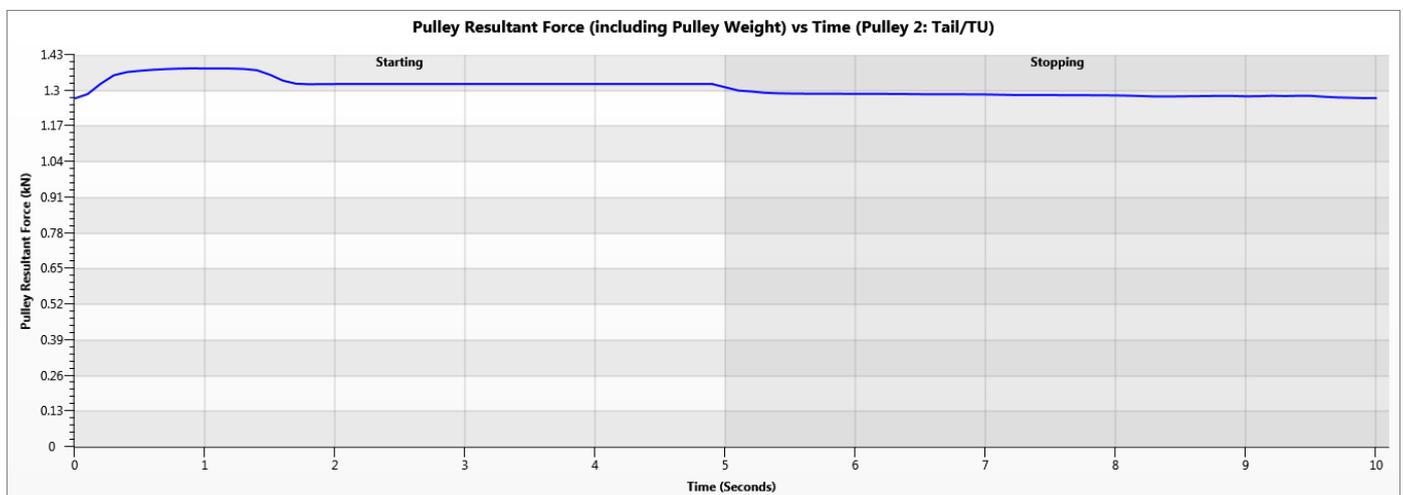


Fig. 2 The relation between pulley resultant force and time

Figure 2 shows the relation between pulley resultant force and time. The maximum pulley resultant force is 1.4kN for starting and stopping process.

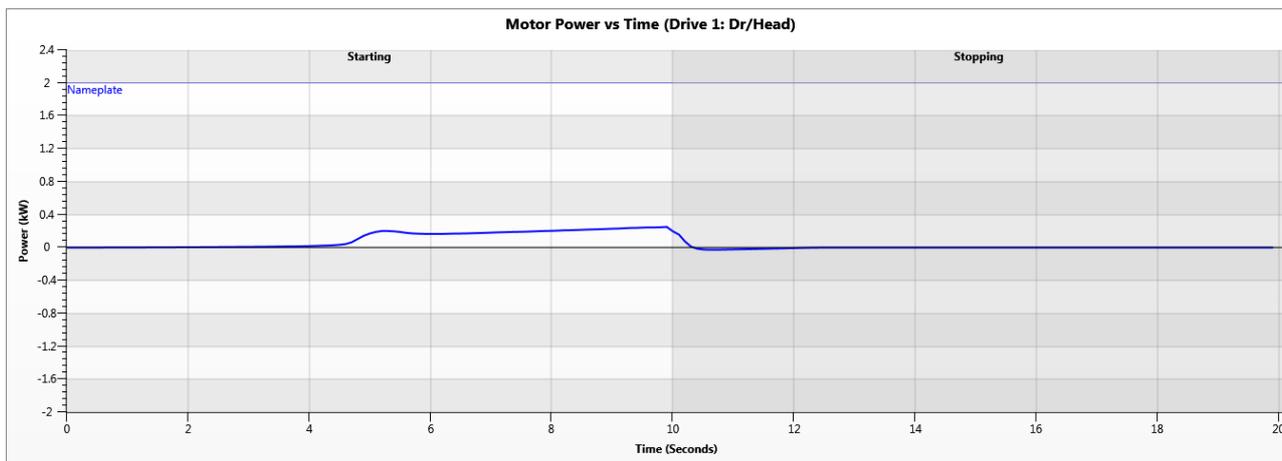


Fig. 3 The relation between belt power and time

Figure 3 shows the relation between belt power and time. The maximum belt power is 0.4kW and minimum power is zero for starting and stopping.

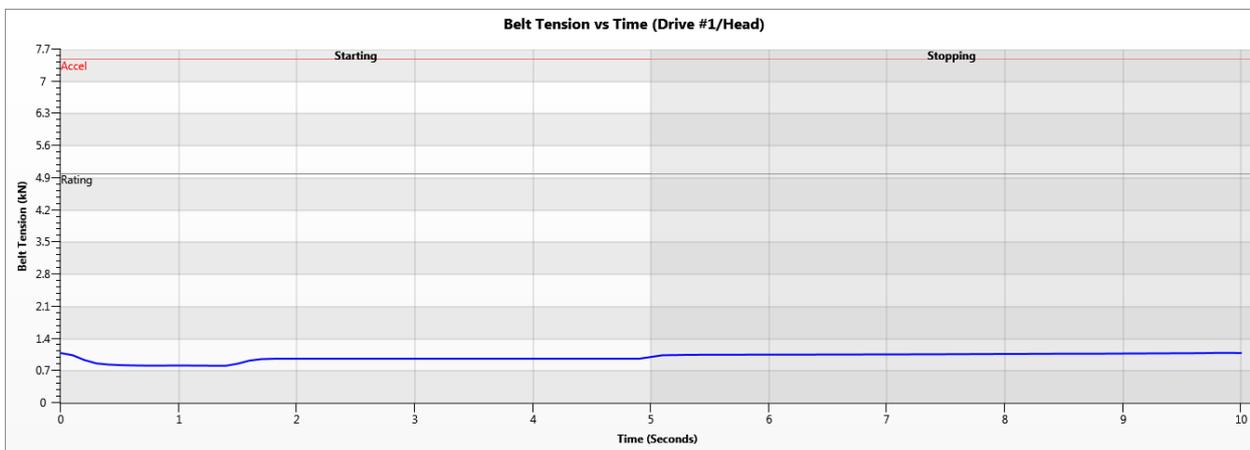


Fig. 4 The relation between belt tension and time

Figure 4 shows the relation between belt tension and time. The maximum belt tension is 1.1kN and the minimum belt tension is 0.8kN for starting and stopping process.

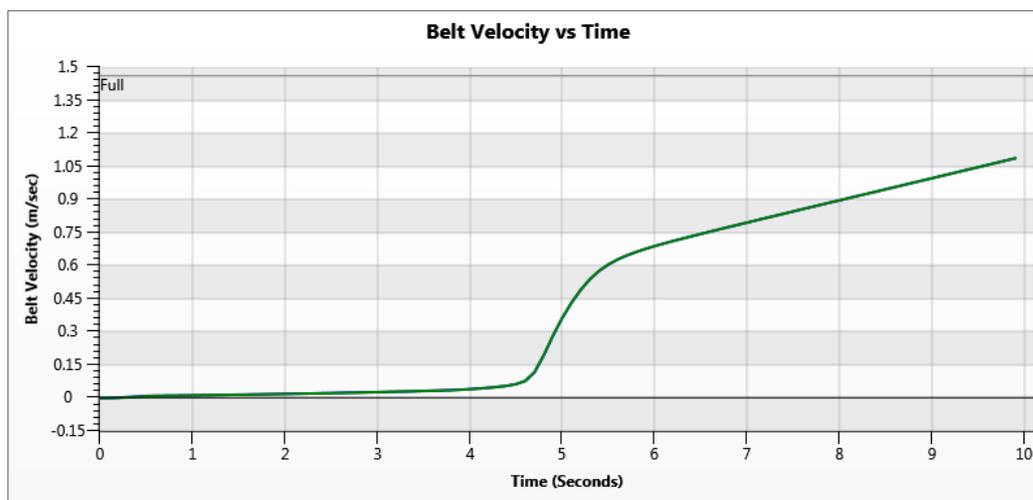


Fig. 5 The relation between belt velocity and time for starting process

Figure 5 shows the relation between belt velocity and time. The maximum belt velocity is 1.09m/sec and minimum belt velocity is zero for starting process.

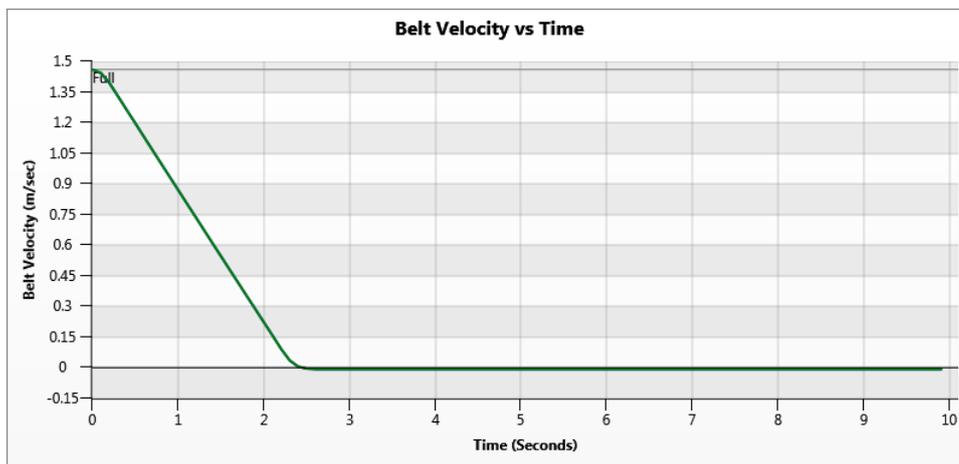


Fig. 6 The relation between belt velocity and time for stopping process

Figure 6 shows the relation between belt velocity and time. The maximum belt velocity is 1.46m/sec and minimum belt velocity is -0.01m/sec for stopping process.

V. COMPARISON BETWEEN SIMULATION AND THEORETICAL RESULT FOR BELT CONVEYOR SYSTEM

Figure 7 and 8 are shown the velocity results to compare the theoretical and simulation results. The stopping condition means that before the belt velocity reaches till 0 m/sec from running condition. In stopping condition, the ten seconds are chosen to express the belt velocity how to reach the zero condition.

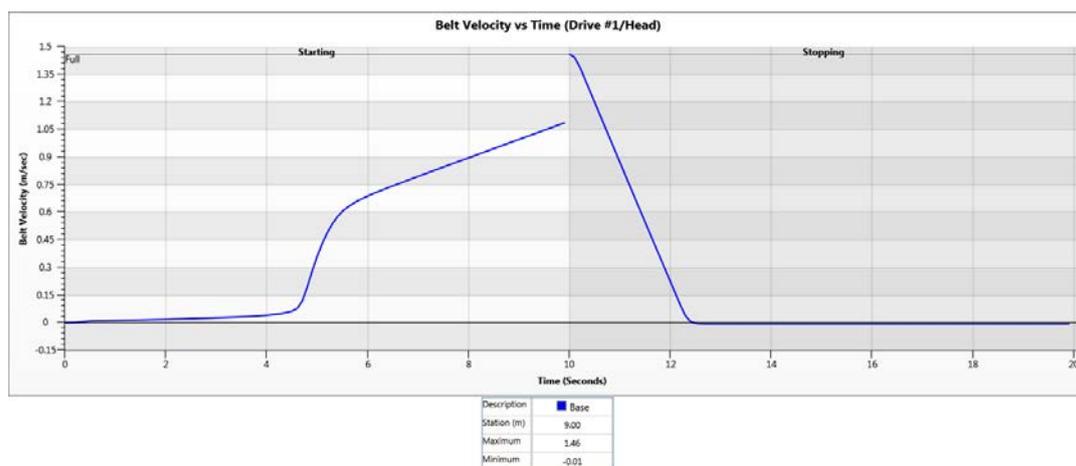


Fig. 7 The relation between belt velocity and time for starting and stopping from Belt Analyst

Figure 7 shows the velocity in starting condition during 10 seconds and in stopping condition during 10 seconds. The starting condition means that the belt starts the velocity 0 m/sec to running condition. The ten seconds are chosen to show the velocity changes in starting condition. The maximum belt velocity for starting and stopping process is 1.46m/sec from Belt Analyst software.

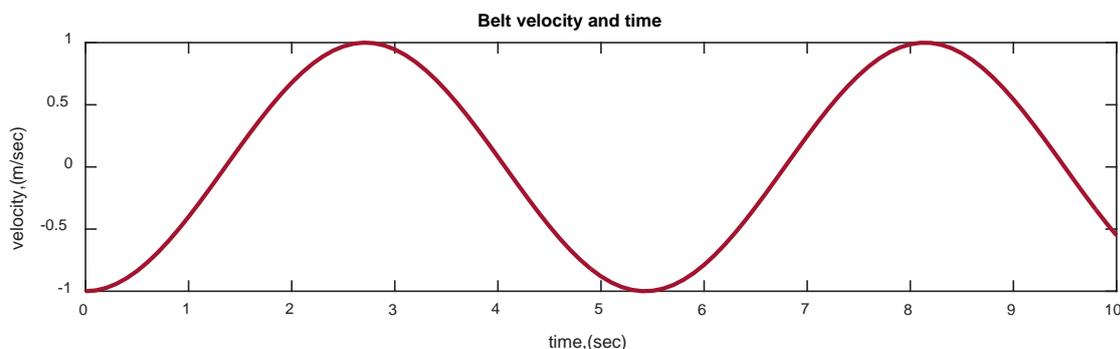


Fig. 8 The relation between belt velocity and time for starting and stopping from Belt Analyst

Figure 8 shows the velocity in running condition of the flat belt conveyor system during ten seconds by using theoretical calculations. The maximum velocity in running condition for inclined belt conveyor system is 1m/sec from Matlab software.

DISCUSSION AND CONCLUSION

This paper presents dynamic analyst for inclined belt conveyor system. Pulley resultant force, power, tension and belt velocity for starting and stopping according the time are expressed. In transient operation, the maximum pulley resultant force is 1.4kN, the maximum belt power is 1kW and the maximum belt tension is 1.1kN. The maximum velocity for starting is 1.09m/sec and for stopping of the process 1.46m/sec by using Belt Analyst V18.1.6.0. The maximum velocity in running condition of belt conveyor system is 1m/sec by using theoretical calculation. Taking polyvinyl chloride (PVC) an example look for solving dynamic to verify the reliability of theory the result showed it objectively reflected the actual work of conveyor belt.

APPENDIX

TABLE III
PROFILE COEFFICIENT WITH VARIOUS ACCELERATION PROFILES

Acceleration profile	Rectangular	Sinusoid	Deltoid	Parabolic
Coefficient (C _p)	1	$\frac{\pi}{2}$	2	1.5

TABLE IV
SECONDARY RESISTANCE COEFFICIENT

Length(m)	3	4	5	6	8	10	13	16	20
Secondary resistance coefficient (C)	9.0	7.6	6.6	5.9	5.1	4.5	4.0	3.6	3.0

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Social Media Peace Messages Campaigns in Peace Building Since Kenya 2007 Elections

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ABSTRACT: *Social media is considered to contribute to government accountability and transparency, human rights activism, the development of civil society and practices of citizenship. The use of mobile phones and the Internet, for example, allow for news of any inappropriate government actions to quickly reach the public and to be challenged. If you want to liberate a society just give them the internet. The objective of this study Analyze Social Media Peace Messages Campaigns in peace building since 2007 Elections. Kenyan bloggers became a critical part of the information flow in the country, starting from the three-day ban on live broadcasts, when it is reported that the web traffic from within Kenya shot through the roof. The study revealed that during the Kenya 2007 Elections, while the international media only scratched the surface of what was happening, and the traditional media partly resigned to censorship due to fears of repression, the social media offered swifter, more subjective, and more detailed coverage during a fast moving and changing situation this in turn resulted into the main stream media relying on social media sites for information as they quickly gained confidence from the general public. Further findings is that, the use of mobile phones SMSs was very effective in deescalating the violence during Kenya 2007/2008 PEV because people were able to make informed decisions. Other felt that SMSs was used widely to convey peace messages because charges are cheap and reliable. They were also used to share prayers for the Nation and loved ones. Chiefs could update the Communities by forwarding message of peace to many. Findings revealed that during the Kenya 2013 Election, for the first time social media offered an opportunity by allowing Kenyans to question candidates using short mobile phone messages. However during the Kenya 2007 Elections, the social media peace messages campaigns were not a standalone activities. The mainstream media incorporated various social media platforms in peace building. In Kenya, political conflict prevention is made easier by the fact that the violence occurs around elections; the mainstream Media in conjunction with various social media platforms has time to reach out to leaders beforehand, set up programs, test software, and organize networks of trusted reporters which promotes peace. The study recommends promotion of continued efforts that scrutinize Social media behavior is desirable. This is because it is very difficult to verify the authenticity and accuracy of Internet reports, including visual materials. Audiences may not know who, when, where, and under what circumstances a particular photo or video clip was taken. Geo-referencing: Another feature of great importance in contexts of peace building in fragile or conflict-affected situations is the possibility to include GPS coordinates in the data transmitted. GPS coordinates allow to link pieces of information to the exact location where they are reported and software may present this information visually and spatially.*

Key Words: Social Media, Peace, Campaigns, Peace- building

1.0 Introduction

In the Global arena, while the exact significance of the New Media “revolution” for peace-building is still hard to pin down, the use of social networking sites Facebook and Twitter to organize protests in Colombia, Iran and Egypt, and the use of text messages for activist mapping by the Ushahidi website during the post-election violence in Kenya, are promising examples of the possibilities. The greatest potential of social media is their ability in peace-building interventions are more participatory. Radio phone-in shows are ideally suited to spur this dialogue within the safety of anonymity Adam and Schoemaker, (2010). It's in conjunction with this background that this study sought to Analyze Social Media Peace Messages Campaigns in peace building since 2007 Elections.

In Africa for example, millions of finger plucking and poking at touch screen phones, a logging in posting, can bring down a government as they did in Egypt declares, Countemanche (2011). According to Goldstein and Rotich (2009), Kenya has perhaps the richest blogging tradition in sub-Saharan Africa, which made their use even more effective and readily available during the election. Kenyan bloggers became a critical part of the information flow in the country, starting from the three-day ban on live broadcasts Kenya's post-election violence demonstrated the effects that new technology can have. Despite a history of violence associated with elections, these were the first elections where mobile phones and access to vernacular radio stations were widely available.

Shortly after Kibaki was proclaimed winner on December 30th, 2007, the Kenyan internal security minister John Michuki announced the ban of live broadcast, (The Standard 2007). During the media black-out, online networks proved to be the next best option to some Kenyans. A social media platform is known as ‘Ushahidi’ meaning ‘witness’ in Swahili. The Ushahidi platform was developed as a rapid prototype model that enabled individuals to submit reports via SMS or e-mail detailing acts of violence and trouble spots. A Kenyan could send an incident report with location details to a short code number, (Cuman, 2012). Also Sisi Ni Amani programs that are not technology-focused, one of their core projects is a SMS text message subscriber service that provides information about leadership, local news, and provides a neutral source for information during tense periods such as elections (Sisi Ni Amani, 2013). This effort is in direct reaction to the violence in 2007/8, which was facilitated in part by mobile phone communication; Sisi Ni Amani is making an effort to take the same medium and use it to project political information, and knowledge about peace building. Sisi Ni Amani currently runs mobile phone SMS programs across Kenya, and works with national networks such as the National Steering Committee on Peace building and Conflict (NSC) to increase the reach of their programming to as many communities as possible (Okuthe, 2013). When the violence erupted, the leading mobile service providers, Safaricom and Celtel, allowed providers to send messages of peace and unity provided by the service providers themselves. This was after the then Chief Executive Officer (CEO) of Safaricom, Michael Joseph, convinced the government not to shut down the SMS. During this time, Safaricom and Celtel called upon citizens to shun violence and keep the peace, (Munyua, 2011).

2.0 Theoretical Framework

The study was based upon the social responsibility theory. Social Judgment Theory is a self-persuasion theory proposed by Carolyn Sherif, Muzafer Sherif, and Carl Hovland (1980), defined by Sherif and Sherif as the perception and evaluation of an idea by comparing it with current attitudes. Social judgment theory is a framework that studies human judgment. The concept was intended to be an explanatory method designed to detail when persuasive messages are most likely to succeed. Attitude change is the fundamental objective of persuasive communication. SJT seeks to specify the conditions under which this change takes place and predict the direction and extent of the attitude change, while attempting to explain how likely a person might be to change his or her opinion, the probable direction of that change, their tolerance toward the opinion of others, and their level of commitment to their position, (Carolyn, and Carl 1980).

Specifically, a listener judges how much the message agrees or disagrees with his or her own attitude, (Schwartz, 2000). Communicated messages through the Media especially through the use of readily available Social Media platforms can make people change an attitude towards others if there was animosity or conflict in the community. Judging from commutated message, people can make informed decisions on how to live together, work together and the best ways on conflicts/animosity reduction. If the communicated message by the Media is rejected by the audience it is therefore calls for a balance between the Media and audience to ensure that the Media are successful in delivering the intended message and on the other hand, the audience are able to receive the message with acceptance.

3.0 Methodology

The study adopted a descriptive survey design which according to Churchill (1991) is appropriate where the study seeks to describe the characteristics of certain groups, estimate the proportion of people who have certain characteristics and make predictions. The research was carried out in selected hotspots where 2007/2008 PEV in Kenya was more prevalent. These are Kibera in Nairobi County, Kibuye in Kisumu County, Flower Farms in Naivasha in Nakuru County, Likoni Town in Kwale County and Kiamba Rural Village Church, in Uasin Gishu County. At least 30% of the total population is representative (Borg and Gall, 2003). Thus, 30% of the accessible population is enough for the sample size. The target population of this study was 30% (200) of online bloggers, websites administrators and population from the members of the public who are daily users of these online platforms. These are Ushahidi, Sisi ni Amani other Social Media platforms such as Face book; Blogs; Twitter and Youtube. Therefore, 60 Social Media users (200x0.3), sampled from the hotspots.

The researcher adopted Convenience Sampling to get information from the respondents from online bloggers, websites administrators and on various Social Media platforms hosts under study and also from the members of the public. The researcher then did convenient sampling where by the selection of the informants was on the first come first served basis. In other words, the volunteers/ first top names given to the researcher were the chosen informants hence cutting off others who wanted to share their views.

4.1 Social Media Commonly Known in Kenya

During focus group discussion, the consensus was that Face book, Twitter, you Tube, Instagram, blogs and Mobile Phone Short Messages Services (SMs) were and are still the most known Social Media used widely in Kenya. The study sought to find out the popularity and strengths of social media as tools of conflict prevention and peace building. It was thus important to look at the penetration and popularity level of the social media platforms amongst the respondents. The study revealed that during Kenya 2007/2008 PEV Mobile Phone Short Messages Services (SMs) was the most popular used with 56%, followed by Face book with 17%, as indicated in Figure 4.1.

During the PEV in Kenya smart phones were not available, so most of us used our mobile phones for texting and calling. We could not share photos through our mobiles. Smses are easy to do and they are cheap compared to browsing in the internet, (Mburu, 10th February, 2017).

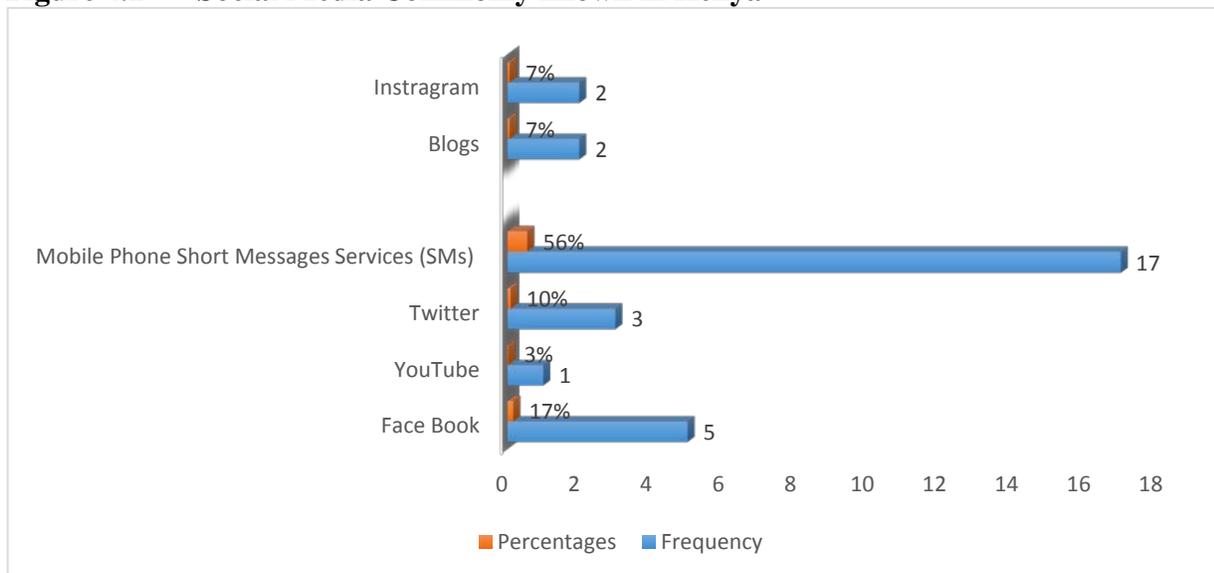
Findings from FGDs revealed that Mobile Phone was highly used to relay information instantly unlike Broadcast or Print Media. Kenyans have access to mobile phones and therefore peace messages were relayed within shortest time possible and also it can reach many people. Further from the literature review, the findings indicated that there were some inspiring examples of using mobile devices as social media tools in Kenya's crisis. One such example is Voices of Africa, a concept of mobile reporters, which was also practiced in time of violence in Kenya. These local reporters used mobile phones and a portable keyboard to write, take photos, short videos, and also to publish their reports online.

In March 2010 there were a little over two million Facebook accounts according to the Communication Council of Kenya CCK (Wambugu (2011)). This accounts for about 5 percent of the entire population. These numbers are much large now with more and more Kenyans joining Facebook. A great majority of those on social media are the youth. The reason for their popularity has been attributed to the easy access from cell phones. There is a Short Message Service SMS to Facebook for instance, that sends a text to the users on every time something happens on Facebook. According to Goldstein and Rotich (2009), Kenya has perhaps the richest blogging tradition in sub-Saharan Africa, which made their use even more effective and readily available during the election.

Kenyan bloggers became a critical part of the information flow in the country, starting from the three-day ban on live broadcasts, when it is reported that the web traffic from within Kenya shot through the roof. The influence grew further when radio broadcasters began to read entries from influential bloggers over the airwaves, helping them reach not 5 per cent, but 95 per cent of the Kenya population. Shortly after Kibaki was proclaimed winner on December 30th, 2007, the Kenyan internal security minister John Michuki announced the ban of live broadcast. The ban had been ordered in the interest of public safety and tranquility (The Standard 2007; AllAfrica.com 2007).

Social media is considered to contribute to government accountability, human rights activism, the development of civil society and practices of citizenship. In terms of accountability and transparency, it is increasingly difficult for governments to hide or manipulate information or to act inconsistently with citizen concerns. The use of mobile phones and the Internet, for example, allow for news of any inappropriate government actions to quickly reach the public and to be challenged (Haider 2011).

Figure 4.1 Social Media Commonly known in Kenya



Source: Researcher (2017)

4.2 Effectiveness of Social Media in Peace building

The question sought to know whether Social Media can be used effectively among the Communities in peace process in Kenya. 80% of the respondent indicated yes, 20% indicated No. All epicenters, registered high frequency of agreement to the fact that social media was effective in peace fostering process during the PEV period as indicate in Table 4.1. Further findings from one a participant from the FDGs revealed that Social Media was and can be used in peace process in Kenya because of the fact that many Kenyans have access to mobile phones and therefore peace messages can be relayed within shortest time possible and also it can reach many people.

As a resident of Naivasha, Nakuru County I no longer buys newspapers, instead I spend the sixty shillings in buying internet bundles and reads online version of the newspaper and eventually connect to social media to see what my friends are saying about the political developments". This was during the FDGs at Sunflower Flower Farm, (Jackie, 10th February, 2017).

Jackie comments are articulated by findings from various Scholars from the literature review in that, Social media sites have distinct inherent properties conceptualized as affordances and network functionalities. These properties are seen to reduce the cost of civic and political participation. As we know the resources required for political participation are usually expressed in terms of time, money and civic skills, which include communication and organizational capacities. With online communication, the cost of information retrieval and communication in general falls and political participation becomes less costly (Enjolras, Steen-Johnsen, and Wollebæk 2012).

While the exact significance of the new media “revolution” for peace-building is still hard to pin down, the use of social networking sites Facebook and Twitter to organize protests in Colombia, Iran and Egypt, and the use of text messages for activist mapping by the Ushahidi website during the post-election violence in Kenya, are promising examples of the possibilities. The greatest potential of social media is their ability to make media peace-building interventions more participatory. Dialogue is the first step in creating the sense that disputes should be settled through negotiation rather than violence. Radio phone-in shows are ideally suited to spur this dialogue within the safety of anonymity, (Adam and Schoemaker, 2010).

For many years’ political violence upheavals, nuclear proliferation and international terrorism have posed the biggest threats to the nation state. We are now in an era in which the internet has been added to that arsenal. Where millions of finger plucking and poking at touch screen phones, a logging in posting, can bring down a government as they did in Egypt declares, Countemanche (2011).

“I’ve always said that if you want to liberate a society just give them the internet” said Wael Ghonim a Google executive and the administrator of Facebook page, Ghannam, (2010). The social media tools gave Hosni Mubarak’s opponents unprecedented ability to share information and organize their activities including the massive protests which riveted the world attention asserts, Tapscott (2011). As hundreds of thousands Egyptians in Cairo’s Tahrir square celebrated the resignation of President Hosni Mubarak on 11th February 2011, some wielded signs proclaiming “Thank you Facebook” (Harsch 2011). Although empirical evidence is thin, there is positive anecdotal evidence that social media can contribute to peace building by improving knowledge for conflict prevention and increasing contact and understanding between opposing groups (Oatley and Gagliardone, 2011).

Table 4.1 Effectiveness of Social Media in Peace building Process

Response	Frequency	Percentages
Yes	24	75%
No	6	15%
Total	30	100%

Source: Researcher (2017)

4.3 Mobile Phone SMSs and De-escalation of Violence in Kenya 2007/2008 PEV

During the Focus Discussion Group from Kenya Assemblies of God Church, Kiambaa in Uasin Gishu County in Plate 4.1 and findings from literature reveals that, shortly after Kibaki was proclaimed winner on December 30th, 2007, the Kenyan internal security minister John Michuki announced the ban of live broadcast.

Given the news blackout, many Kenyans turned to other means of getting and relaying information with mobile SMSes shorting high at the rate of 50% compared to other information channels. People used mobile phones to communicate and circumvent the media blackout. SMS messages were used to share news and feelings, but the ability to send mass SMS had been disabled by the government to prevent people from sending what it deemed to be “provocative messages.”

I think the media contributed to the reconciliation in Kenya when they broadcasted peace messages to all Safaricom users. Also, supermarkets like Nakumatt printed peace messages on their receipts to promote reconciliation. My sister told me that one time when she was withdrawing money from an ATM, instead of the usual thank you message, it was a peaceful message saying something about Kenyans reuniting. This was during the FGDs at Sunflower Flower Farm, (Nafula, 10th February, 2017).

Nafula comments are supported and collaborated by Scholar Munyua in that, the main mobile service providers, Safaricom and Celtel began sending texts with peace messages through their Short Message Service (SMS) to all mobile users in an effort to help shun the violence and instead promote reconciliation (Munyua, 2011).

These findings collaborate with the findings from one of the scholar Cullum who voiced that, during the media black-out, online networks proved to be the next best option to some Kenyans. This saw the creation of political blogs whereby bloggers wrote on what was going on wherever they were and asked readers to e-mail or post comments with details about incidences they witnessed. Eventually a mash-up was created showing where incidents occurred on a map. Following this development, a platform was created to serve as a centralized repository for on-the-ground reports from any Kenyan via SMS. This platform was what came to be known as ‘Ushahidi’ meaning ‘witness’ in Swahili. The Ushahidi platform was developed as a rapid prototype model that enabled individuals to submit reports via SMS or e-mail detailing acts of violence and trouble spots. A Kenyan could send an incident report with location details to a short code number (Cullum 2011).

When the Government announced a media blackout by the Minister, us Kenyans were left with no other alternative on how to get information and security updates other than through the use of Mobile Phone Short Messages Services (SMs)." This was during Focused Group discussion in Olympic Estate Kibera, Nairobi County, (Kibet, 10th February, 2017).

We Kenyans, during Kenya PEV we used our Mobile Phones to warn others of the places which were perceived to be insecure. We also used our Mobile Phones to pass Peace Messages to different Communities as we were encouraged by the media". This was during Focused Group discussion in Olympic Estate Kibera, Nairobi County (Eunice, 10th February, 2017).

For example, Chiefs could update the Communities by forwarding message of peace to many. Mobile Phone was used to relay information instantly unlike Broadcast or Print Media. Further finding from FGDs, is that the use of mobile phones was very effective in deescalating the violence during Kenya 2007/2008 PEV because people were able to make informed decisions. Other felt that SMSs was used widely to convey peace messages because charges are cheap and reliable. They were also use to share prayers for the Nation and loved ones.

Again, from the literature review the findings indicated that there were some inspiring examples of using mobile devices as social media tools in Kenya's crisis. One such example is Voices of Africa, a concept of mobile reporters, which was also practiced in time of violence in Kenya. These local reporters used mobile phones and a portable keyboard to write, take photos, short videos, and also to publish their reports online. The project covered the electoral process from the preparations to the post-election violence and riots. In situations of crisis when the mainstream media suffer restrictions and do not cover many events and grassroots opinions, new social media offer opportunities for a diversity of voices to be heard and connect with each other.

Rather than speaking for Kenyan people affected the situation, we could point to the several ways people raise their voices and make stories more nuanced. Further, Literature findings also revealed that, the 2013 elections saw the creation of Uchaguzi, A fancier version of its 2007 crisis-mapping online platform. It was created under the title of Uchaguzi, meaning "choice" in Kiswahili.

On this new platform, citizens could report on security and tension as in 2007, but also now items directly related to the vote, including announcements of results, problems with staffing and polling station administration and logistics, as well as, comfortably, any "positive events." While in 2007 reports were primarily submitted through SMS, this year reports could also be submitted through virtually any electronic means imaginable, including Twitter, email, and even a specially-designed Uchaguzi Android and iPhone app (Marchant 2013).

This collaborate in a study conducted by Mäkinen & Kuira, social media generated an alternative public sphere, which widened the perspectives about the crisis and enabled new kinds of citizen participation in discussing the situation. The crisis also showed the significance of the social media as a horizontal form for information sharing. The social media offered narratives by citizen reporters and digital activists that were more diverse than the views presented in the mainstream media and represented grassroots reactions during the crisis. While the international media only scratched the surface of what was happening, and the traditional media partly resigned to censorship due to fears of repression, the social media offered swifter, more subjective, and more detailed coverage during a fast moving and changing situation this in turn resulted into the main stream media relying on social media sites for information as they quickly gained confidence from the general public (Makinen and Kuira 2008).

For the first time social media offered an opportunity by allowing Kenyans to question candidates using short mobile phone messages, social media and crowd sourcing information and on the other hand social media affordances and network logic was leveraged by individual citizens wanting to encourage other citizens to take action resulting into the flourishing of hate speech (Abshir 2013). Further Findings from the literature review revealed that, the impact of the social media was clearly significant at the level of individual agency in the process of political mobilization. Social media played a significant role in facilitating the dissemination of news especially the feature of Twitter's news propagation in the use of re-tweets which allows users to record the importance they attach to an item of news. Popular tweets therefore spread very quickly through cascades (Enjolras, Steen-Johnsen, and Wollebæk 2012).

According to Goldstein and Rotich (2009), Kenya's post-election violence demonstrated the effects that new technology can have. Despite a history of violence associated with elections, these were the first elections where mobile phones and access to vernacular radio stations were widely available. Mobile phones and media (including social media) can play the roles of mirroring events and providing an important opportunity for reflection and insight into political dynamics. They can analyze the level of dialogue, the polarization, and progress towards reconciliation, including possible avenues for the peaceful resolution of disputes. In these cases, the media, internet and mobile phones acted as enablers providing a positive role in mediating divergent perspectives, and creating a national vision of reconciliation; a space for dialogue that helped to reduce polarization and supported transitional justice processes.

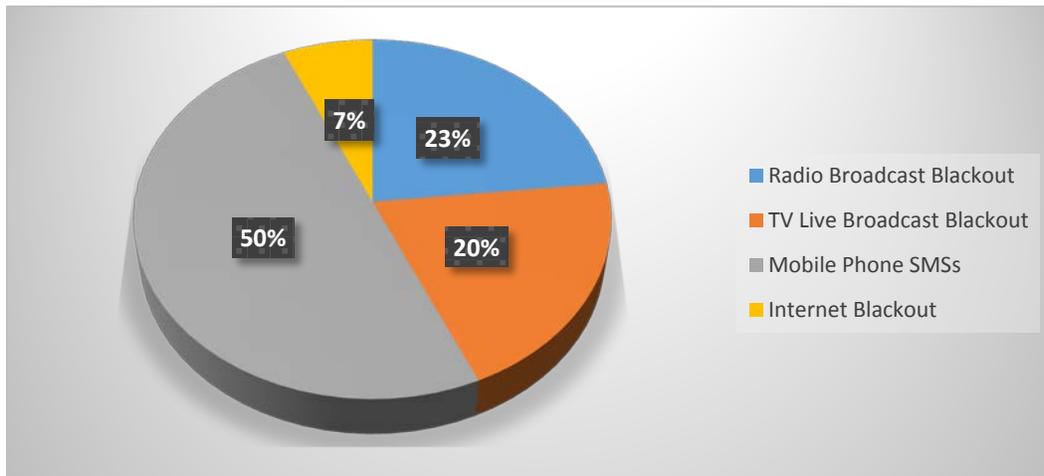
Sisi Ni Amani, which is Kiswahili for 'We are peace,' is a grassroots peace building program that links local NGOs in Kenya to support peace efforts at the local level. While Sisi Ni Amani has programs that are not technology-focused, one of their core projects is a SMS text message subscriber service that provides information about leadership, local news, and provides a neutral source for information during tense periods such as elections (Sisi Ni Amani, 2013). This effort is in direct reaction to the violence in 2007/8, which was facilitated in part by mobile phone communication; Sisi Ni Amani is making an effort to take the same medium and use it to project political information, and knowledge about peace building fostering. Sisi Ni Amani currently runs mobile phone SMS programs across Kenya, and works with national networks such as the National Steering Committee on Peace building and Conflict (NSC) to increase the reach of their programming to as many communities as possible (Okuthe, 2013).

Amani Kenya @108 operates differently from Sisi Ni Amani's mobile phone SMS information sharing since it is rather a data collection and management program. It is part of the Uwiano Platform for Peace comprehensive peace architecture, which encourages information sharing between government, international, and NGO actors in Kenya who are working to prevent violence (Chuma and Ojielo, 2012). This platform was what came to be known as 'Ushahidi' meaning 'witness' in Swahili. The Ushahidi platform was developed as a rapid prototype model that enabled individuals to submit reports via SMS or e-mail detailing acts of violence and trouble spots. A Kenyan could send an incident report with location details to a short code number (Cullum 2011). The text or e-mail could be rerouted through Frontline SMS, a free software that turns a laptop and a mobile phone or modem into a central communications hub (Vila 2010). The functionalities and affordances of the program, made it a very efficient means of spreading information among the population about forthcoming actions and demonstrations. The program enabled users to send and receive text messages with large groups of people through mobile phones. It did not require an Internet connection, and worked with existing plans on all GSM phones, modems and networks, and synched with the Ushahidi platform.

The message would then be received by an administrator who would verify the information with the original sender. If the report proved credible, it would be uploaded onto Google Maps in as close to real time as possible.

This we see as evidence of the capability of digital networks enabling social processes such as in this case information cascades whereby people are seen to make decisions sequentially, observe others' decisions, draw rational inferences from these decisions and imitate them or share them on the basis of their inference (Cullum (2011)).

Figure 4.2 Mobile Phone SMSs in de-escalation Kenya 2007/2008 PEV



Source: Researcher (2017)



Plate 4.1 Focus Discussion Group in KAG Church Kiambaa, Rev Stephen and Assistant Researcher Mr. Boniface Opany, Gentleman on right side.

4.4 Instant Messages from face book, YouTube, /Mobile SMS in Peace Building Since Kenya 2007 Elections

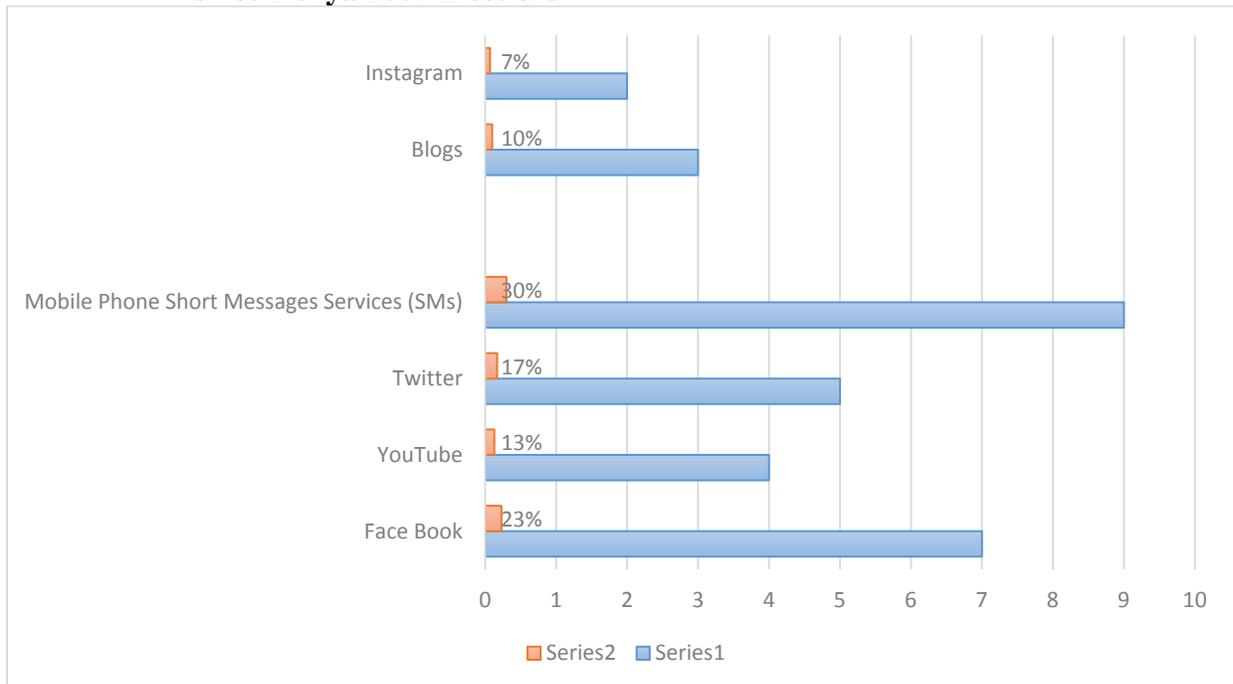
During the Focus Discussion Group from Focused Group discussion in Olympic Estate Kibera, Nairobi County during Peace Journalism Training in Plate 4.1, it was revealed that Mobile short messages were highly used compared to other social media platforms during Kenya 2007/2008 PEV. The usage as follows; Face Book 23%, YouTube 13%, Twitter 17%, Mobile Phone Short Messages Services (SMS) 30%, Blogs 10% and Intragam 7% as indicated in Figure 4.4.

These findings are consistent with Scholar Haider in that, Social media is considered to contribute to government accountability, human rights activism, the development of civil society and practices of citizenship. In terms of accountability and transparency, it is increasingly difficult for governments to hide or manipulate information or to act inconsistently with citizen concerns. The use of mobile phones and the Internet, for example, allow for news of any inappropriate government actions to quickly reach the public and to be challenged (Haider 2011). It also allows for people to follow decision-making processes and discuss issues of common concern. Kenya's post-election violence demonstrated the effects that new technology can have. Despite a history of violence associated with elections, these were the first elections where mobile phones and access to vernacular radio stations were widely available. Mobile phones and media (including social media) can play the roles of mirroring events and providing an important opportunity for reflection and insight into political dynamics. They can analyze the level of dialogue, the polarization, and progress towards reconciliation, including possible avenues for the peaceful resolution of disputes.

Findings from the literature reviews indicates that, for many years' political violence upheavals, nuclear proliferation and international terrorism have posed the biggest threats to the nation state. We are now in an era in which the internet has been added to that arsenal. Finding from various blogs which promote peace in Kenya, it was revealed that Social Media Peace projects were established at a grassroots peace building program that links local NGOs in Kenya to support peace efforts at the local level. Sisi Ni Amani, which is Kiswahili for 'We are peace,' is a SMS text message subscriber service that provides information about leadership, local news, and provides a neutral source for information during tense periods such as elections.

This effort is in direct reaction to the violence in 2007/8, which was facilitated in part by mobile phone communication; Sisi Ni Amani is making an effort to take the same medium and use it to project political information, and knowledge about peace building fostering. In addition to re-tweet, hashtags also played a role in targeting online conversations and the communities that had been formed online and also bolster the position of traditional media online. There was a generally high concern of the possibility of another post-election violence and therefore, to counter the hate speech there was a lot of individuals who used Twitter to call for a peaceful election and post-election.

Figure 4.3 Instant Messages from face book, YouTube, /Mobile SMS in peace building since Kenya 2007 Elections



Source: Researcher (2017)



Plate 4.2 Focused Group discussion in Olympic Estate Kibera, Nairobi County during Peace Journalism Training

4.5 Factors that Necessitated Popularity of Social Media During Kenya 2007/2008 PEV

Discussions from Focused Group discussion in Likoni Social Hall, Kwale County, Focused Group discussion by KAG Church Kiambaa members, Uasin Gishu County and highlighting from Table 4.2 and Plate 4.2 and Plate 4.3, is that, respondents were asked to indicate the factors that necessitated Popularity of Social Media during Kenya 2007/2008 PEV, this was the indication:

To Share information was 17%, Express their fears were 33%, Conflict/ Animosity Reduction was 23% and security updates was 27%. This findings therefore reveals that the factor which necessitated popularity of the Social Media during Kenya 2007/2008 PEV was primarily to express fear and for security updates, thus the two coming very strongly.

Table 4.2 Factors that Necessitated Popularity of Social Media during Kenya 2007/2008 PEV

Response	Frequency	Percentages
Share Information	5	17%
Express fear	10	33%
Conflict Animosity Reduction	7	23%
Security	8	27%
Total	30	100%

Source: Researcher (2017)



Plate 4.3 Focused Group discussion in Likoni Social Hall, Kwale County



Plate 4.4 Focused Group discussion by KAG Church Kiambaa members, Uansin Gishu County

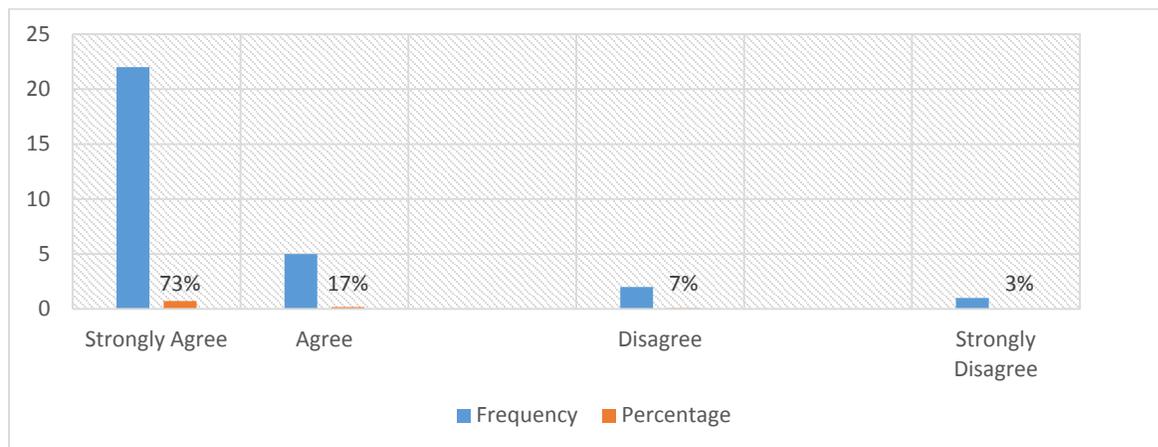
This findings are consistent with Goldstein and Rotich (2009) in that, Kenya has perhaps the richest blogging tradition in sub-Saharan Africa, which made their use even more effective and readily available during the election. Kenyan bloggers became a critical part of the information flow in the country, starting from the three-day ban on live broadcasts, when it is reported that the web traffic from within Kenya shot through the roof. The influence grew further when radio broadcasters began to read entries from influential bloggers over the airwaves, helping them reach not 5 per cent, but 95 per cent of the Kenya population. Social media is considered to contribute to government accountability, human rights activism, the development of civil society and practices of citizenship. In terms of accountability and transparency, it is increasingly difficult for governments to hide or manipulate information or to act inconsistently with citizen concerns. The use of mobile phones and the Internet, for example, allow for news of any inappropriate government actions to quickly reach the public and to be challenged (Haider 2011).

Kenya's post-election violence demonstrated the effects that new technology can have. Despite a history of violence associated with elections, these were the first elections where mobile phones and access to vernacular radio stations were widely available. Mobile phones and media (including social media) can play the roles of mirroring events and providing an important opportunity for reflection and insight into political dynamics. They can analyze the level of dialogue, the polarization, and progress towards reconciliation, including possible avenues for the peaceful resolution of disputes. In these cases, the media, internet and mobile phones acted as enablers providing a positive role in mediating divergent perspectives, and creating a national vision of reconciliation; a space for dialogue that helped to reduce polarization and supported transitional justice processes.

4.6 Influence of Social Media on Communities in Living Together, Working together and Conflict/animosity Reduction

From the findings from the FGDs as indicated figure 4.5 is that, all epicenters registered high frequency of agreement that most of Social Media platforms are able to influence Communities in living together, working together and conflict/animosity reduction in that 73% of the respondents strongly agreed, 17% agreed, 7% Disagreed while 3% strongly disagreed. These findings are supported by Jorgie who avers that, online participation has become an important avenue of citizen participation therefore the arrival of affordable smart phones on the Kenyan market increased internet use on cell-phones and caused an explosion of social media (Jorgic 2013). However even though a number of authors have expressed hope of increased citizen participation, others have been more skeptical about the internet’s democratic potential and in this case there was fear that Facebook and Twitter would take the place of text messages during the upcoming 2013 elections and be used to incite violence as it had happened in 2007/2008. Respondents perceived that interactive shows inspired audience participation, and implementation of policies at grassroots levels, to some extent they were used as platforms for listeners to relay Information. From the data, it was evident that new tools of social communication such as, text messaging and Facebook hastened the spread of information.

Figure 4.4 Influence of Social Media on Communities in living together, working together and conflict/animosity reduction



Source: Researcher (2017)

4.7 Satisfaction with the Influence of Social Media in Peace Building

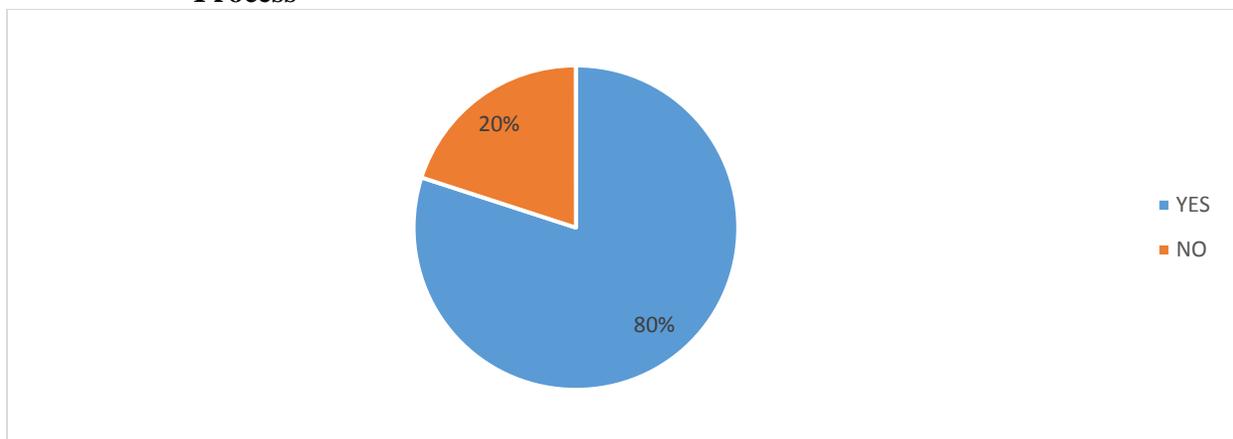
The question sought to know whether the respondent was satisfied with the Influence of Social Media in Peace Fostering process. As indicated in Figure 4.5 is that 80% of the respondent indicated yes and 20% indicated No. From all epicenters I learnt that the general public were satisfied with the Influence of Social Media in Peace Fostering process in that it helps Kenyans speaks out their feelings, fears and the do it honesty. Kenyans also felt that the Social Media especially SMSs are secure mode of communication.

Collaborating my findings with Goldstein and Rotich argues that, in Kenya, as in the rest of Africa, SMS is the most widely used digital application. The leading Kenyan online community, Mashada, during the elections period became overwhelmed with divisive and hostile messages. By the end of January 2008, the moderators decided to shut down the site, recognizing that civil discourse was rapidly becoming impossible. However, a few days later Mashada's site administrator David Kobia launched 'I Have No Tribe', a site explicitly centered on constructive dialogue among Kenyans. The Mashada site was then redirected to the new site of which it rapidly filled with comments (Goldstein and Rotich 2007). This was a period that accelerated the development of the Kenya blogosphere and blogs were suddenly a critical source for Kenyans in Nairobi and the diaspora. Rumors that were spread via text message were dispelled via an online dialogue that took place on blogs and in the comments section of blogs, *Ibid*).

Kenyan bloggers became a critical part of the national conversation, starting during the three-day ban on live broadcasts, when the web traffic from within Kenya shot through the roof. The influence ballooned further when radio broadcasters began to read influential bloggers over the airwaves, helping them reach not 5 percent, but 95 percent of the Kenya population. The people formerly known as the audience are simply the public made realer, less fictional, more able, less predictable (*Ibid*).

Further findings from secondary data further reveals that, we are now in an era in which the internet has been added to arsenal where millions of finger plucking and poking at touch screen phones, a logging in posting, can bring down a government as they did in Egypt. The feeling is that; if you want to liberate a society just give them the internet". Triangulation from literature/documents reviews, Interviews and the FGDs is that the potential of social Media as a tool for peace building is evident by the elaborate penetration of Social Media as a communication tool. This is because it's effectiveness derives from the fact that it's communication is built primarily on relationships and deals with the user's circle of influence".

Figure 4.5 Satisfaction with the Influence of Social Media in Peace Fostering Process



Source: Researcher (2017)

5.0 Conclusion

The study established that most of Social Media platforms are able to influence in peace processes. The study revealed that during the Kenya 2007 Elections, while the international media only scratched the surface of what was happening, and the traditional media partly resigned to censorship due to fears of repression, the social media offered swifter, more subjective, and more detailed coverage during a fast moving and changing situation this in turn resulted into the main stream media relying on social media sites for information as they quickly gained confidence from the general public. Further findings is that, the use of mobile phones SMSs was very effective in deescalating the violence during Kenya 2007/2008 PEV because people were able to make informed decisions. Other felt that SMSs was used widely to convey peace messages because charges are cheap and reliable. They were also used to share prayers for the Nation and loved ones. Chiefs could update the Communities by forwarding message of peace to many. Findings revealed that during the Kenya 2013 Election, for the first time social media offered an opportunity by allowing Kenyans to question candidates using short mobile phone messages.

However during the Kenya 2007 Elections, the social media peace messages campaigns were not a standalone activities. The mainstream media incorporated various social media platforms in peace building. In Kenya, political conflict prevention is made easier by the fact that the violence occurs around elections; the mainstream Media in conjunction with various social media platforms has time to reach out to leaders beforehand, set up programs, test software, and organize networks of trusted reporters which promotes peace.

6.0 Recommendations

The study recommends promotion of continued efforts that scrutinize Social media behavior is desirable. This is because it is very difficult to verify the authenticity and accuracy of Internet reports, including visual materials. Audiences may not know who, when, where, and under what circumstances a particular photo or video clip was taken. Also recommends Geo-referencing: another feature of great importance in contexts of peace building in fragile or conflict-affected situations is the possibility to include GPS coordinates in the data transmitted. GPS coordinates allow to link pieces of information to the exact location where they are reported and software may present this information visually and spatially.

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Media Peace Intervention Programs Influencing Peace Building Since Kenya 2007 Elections

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ABSTRACT: *Media is considered to be the 4th pillar of the society after legislature, executive and judiciary. The influence of the media continues to grow with time. Because of the influence it has over society, the Media can play a significant role in peace building. In Kenya, media have been a key component during elections. The role of media has becoming so essential in building peace or bringing sustainable solution for the particular incidences or conflicts. The argument is that as it is possible to use the media for mass mobilization in the wartime, they shall also play their contribution for peace building during conflicts. The objective of this study was to examine Media Peace Intervention programs employed by Media Houses in peace building during and after 2007 Elections in Kenya. Media Peace Interventions Programs organized deliberately influencing peace building in Kenya, played a great impact to bring back sanity in Kenya. Media served to encourage dialogue, tolerance and interaction among communities hence reducing inherent conflicts and building lasting peace. For example, creation of programming for mass consumption inform of content stories, television and radio programs, songs, whereby the programs contained educating information on non-violent modes of conflict resolution. Moreover, production of documentaries, talk show programs exposing the dangers of conflict. Media owners resolved, to find a common approach, common joint headlines, Joint broadcasts, common DVDs being distributed to all media houses to help bring down the passions. The Print and Broadcast Media houses organized Peace Intervention Programs such as Mobile peace caravans, Kikuyu Elders, Kamba Elders and Luo Elders Radio Talk Programs an initiative from Pamoja FM influenced in calming violence. There was also an initiative of Female journalists "White Ribbon Peace Campaign", Media Houses distributed handbills and T-shirts with peace and reconciliation messages to the public. Media finally stopped airing politicians stopped inviting analysts, stopped talk shows for a while. It's worth noting that the peace building interventions programs by the broadcast and print media in particular were not sufficient in bringing sanity in Kenya during 2007 Elections and there were other options which were incorporated with the help of the various Social Media platforms. The study recommends that Media houses should adopt a common Conflict Reporting Approach. This will help in mitigating the discrepancies in coverage to unearth areas of dispute and consensus objectively with a view of encouraging amicable solution to the matters at hand. They must cultivate the attitude of reporting what can unite rather than divide the people.*

Key words: Media, Interventions, Programs, Peace-building.

1.0 Introduction

According to Westphal (2004), the Media have the power to defuse tensions before they even reach a critical point. By supplying credible information and reaching a large audience, the media help in managing conflicts and promote democratic principles. Peace-building seeks to build a bridge between groups of people de-polarizing people's attitudes and behaviors toward each other. In Bratic's words, "if the media is often found to support forces that lead to violent conflicts, it should also have power to support forces to peace" (Bratic, 2006). In coverage of conflict, Media encourages dialogue, tolerance and interaction among communities hence reducing inherent conflicts and building lasting peace. It's alongside this background that this study sought to examine Media Peace Intervention programs employed by Media Houses in peace building during and after 2007 Elections in Kenya.

The essential role of the Media in reporting conflicts especially during elections is to accurately present events in a fair and balanced manner. In fact, the United Nations classified the development of local media as a 'cross-cutting' peace-building concern, 'transcending' all types of activities (United Nations, 1996). For this very reason the intervention of unbiased and free global media is important not only for the world public but also for the people directly affected. In Africa, there are positive examples where the Media has been useful in peace initiatives, albeit when violent conflicts have ended. The media served as voice for those who could not be heard in the society, (Ogola, 2011). These was particularly true with the some Kenya local language radio stations where they provided platforms where the listeners could call in and air their grievances. The Kenyan media abandoned the notion of commercializing news content for the sake of profits, avoided naming either the victims or the perpetrators of the violence, employed investigative/critical journalism and chose to preach peace. This was a positive move, which was later to help reunify Kenya.

The programmes should be accurate and impartial and must effectively inform voters about the voting process, including how, when and where to vote, register to vote and verify proper registration, the secrecy of the ballot (and thus safety from retaliation) and, the importance of voting (Shitemi, et. al, 2013). How, then, did the Kenyan media report on the crisis? Prior to the elections the media did a tremendous job covering campaigns and providing air time and space for candidates to reach the masses. They also did well in releasing opinion polls that proved largely correct in predicting the outcome of parliamentary elections. One reason for the contested presidential election is that the media carried extensive coverage of the voting process and released unofficial results in which Kenyans believed. The role of media can be inferred from how media behaved before, during and after the 2007/8 PEV. It wasn't until 4 January 2008 that a significant break occurred with the joint-headline "Save Our Beloved Country" appearing on the front page of the Nation, Standard, People, and three other Kenyan newspapers. Before this orchestrated call for unity, nearly all coverage was split into a two-party framework, pitting the PNU against ODM, instead of framing the coverage within the greater concern for national well-being (Karoney, 2005). Joint radio broadcast and joint newspaper headline also had significant impact, among other media events. The Swedish Embassy called senior women editors of the papers with a message out that 'Enough is enough!' The impact was immense and it was called the White Ribbon Peace Campaign and so this led the way for other women groups to rally, thus the interventionist movement (BBC Report, 2008).

2.0 Theoretical Framework

The study was based upon the social responsibility theory. The proponents of social responsibility theory include among others. Social responsibility theory was born as a result of problems created by its predecessor, the libertarian theory of the press. With these assumptions, Patterson and Wilkins (2005) posit that the theory reflects Milton's concept of the market place of ideas where anyone could operate a printing press, particularly anyone aligned with a political group. The press should be free to perform the functions which the libertarian theory granted it freedom to perform, but that this freedom should be exercised with responsibility (Okunna & Omenugha, 2012). Dominick (2009) writes that, this approach holds that the press has a right to criticize government and other institutions, but it also has a responsibility to preserve democracy by properly informing the public and by responding to society's needs and interests. In other words, freedom should be exercised with utmost responsibility to societal interest.

The Media should accept certain responsibilities by practicing accuracy, objectivity and balance in their reporting. In addition, they need to regulate themselves within the framework of the law and established institutions. Yadav, (2011), which affirm that "within the framework of open and free press criticism, codes of ethics or government regulation, and guidelines for responsible action on the part of members of the press, lies the Social Responsibility Theory". Social responsibility theory allows media to broadcast and report anything provided the media are responsible for what is broadcasted and can be held accountable. It's alongside this background that this study sought to examine Media Peace Intervention programs employed by Media Houses in peace building during and after 2007 Elections in Kenya.

3.0 Methodology

The study adopted descriptive Research design in describing the objectives of the study. Descriptive research is used to describe characteristics of a population or phenomenon being studied. It does not answer questions about how/when/why the characteristics occurred. Rather it addresses the "what" question (what are the characteristics of the population or situation being studied?), (Shields, and Rangarajan, 2013). According to Mugenda and Mugenda (2003) the purpose of descriptive research is to determine and report the way things are and it helps in establishing the current status of the population under study. The study covered following Media Houses; Daily Nation; The East African Standard and The People Daily; KBC TV, Pamoja FM; and Ghetto.

At least 30% of the total population is representative (Borg and Gall, 2003). Thus, 30% of the accessible population is enough for the sample size. The target population of this study was 30% (200) of the Middle Management staff of the Media Houses in Kenya, Print and Broadcast Media under study. These are Managers, Directors, editors, producers, presenter, reporters, correspondents, media analysts and investigators. Therefore, 60 Middle Management staff of the Print and Broadcast Media Houses (200x0.3). The researcher used Purposive Sampling here to get information from the respondents from Print and Broadcast Media.

4.0 Study Findings

4.1 Kenyan Print Media in Peace building Programs

The findings in this study regarding Print Media in Peace building Programs were consistent with findings by others. According to Mahatma Gandhi (*World Development Report*, 2002), the newspaper as a media has a role to understand the popular feeling and give expression to it as well as arouse among the people desirable sentiments and to fearlessly expose popular defects. Wolfsfeld (2004), on the other hand, notes that an influential role of the media is that of being a bridge between the government and people. The finding regarding the media's role in promoting peace building supports finding by Reddy (2002), that the media has an obligation not to jeopardize or harm the welfare of the society.

The finding from the interviews indicating that ethnic media was likely to fuel conflicts lends support to findings by Wolfsfeld (2004) that the media can either report negatively on political opponents, or raise legitimacy of those supporting peaceful negotiations.

With the ban on the other forms of media the print media through anonymous leaflets, flyer and newspapers flourished and countered the lack of information flow. One Participant as a media practitioner noted that;

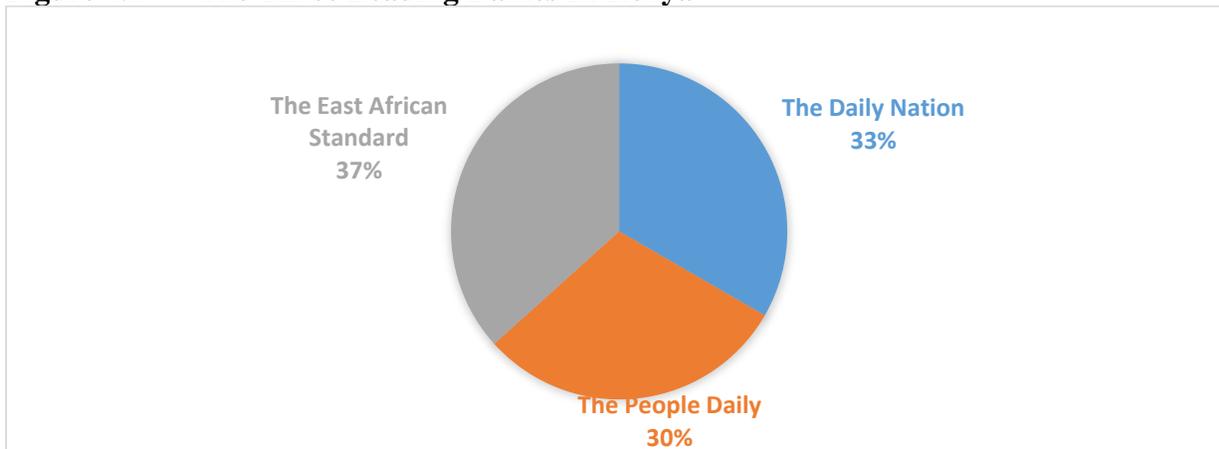
The ban was counterproductive because the print media was consistent in criticizing the government over the decision to ban their counterparts in broadcast media. Newspapers took center stage in fighting the ban with some printing three copies of their papers per day. (Interview, 15.01.2017).

On 30th of December the Kenyan government officially banned live broadcasts or any anti-government coverage. This meant news would only be reported once it was a past tense. With lack of radio and TV updates, the cell phones came in handy as information or rumours of war were being spread all over the country. The newspapers also took advantage on the live broadcast and started printing newspaper in almost two hours' intervals. During the 2007 elections in Kenya, the Print Media played a positive role in disseminating information on the electoral process to the electorates. In Print Media, the newspaper frames the news within a particular viewpoint. This can change the perception of the issue among the readers. The underlying rationale motivating the study of political conflict imagery is that news photographs set a visual agenda that affects the recall of political events. Images draw reader attention to written articles and are in and of themselves the subject of focused attention, Griffin (2010, 15).

4.1.1 The Three Leading Dailies In Kenya

Studying parts of the statistics related to the key respondents from the 3 Print Media dailies i.e. The Daily Nation, People daily and The East African Standard, these were the Managers, Editors, Correspondents Reporters, Investigators, Media analysts. Findings revealed that the 3 Newspapers dailies sampled have the most circulation in most of major towns in Kenya and therefore news about what was happening Kenya, Regionally and internationally was readily accessible. Figure 4.1 below represent the summary of the findings from the three dailies under study.

Figure 4.1 The Three Leading Dailies In Kenya



Source: Researcher (2017)

4.1.2 Period of Circulation

In relation to the previous data, the respondents were asked to indicate the period of circulation. For The Daily Nation, it has been in existence for 58 years, The East African Standard has been in existence for 115 years while People daily has been in existence for 14Years. This implied that Kenya Print Media has been existence in quite good number of and their influence has been realized in Kenya vis-à-vis their influence in fostering Peace in Kenya and especially when they did a co-operate Editorial and Joined Headlines as was the case during Kenya PEV of 2007/8. Table 4.2 below shows the summary of the leading dailies in Kenya, their year of inception and the period of circulation. This is important data to determine their level of authority in the Print Media industry as well to determine the reliability and validity of the information provided therefore.

Table: 4.1 The Three Leading Dailies In Kenya - Period of Circulation

Name of the Broadcasting	Duration (Years)	Year of Inception
The Daily Nation	Over 10 years	1959
The East African Standard	Over 10 years	1902
People Daily	Over 10 years	2003

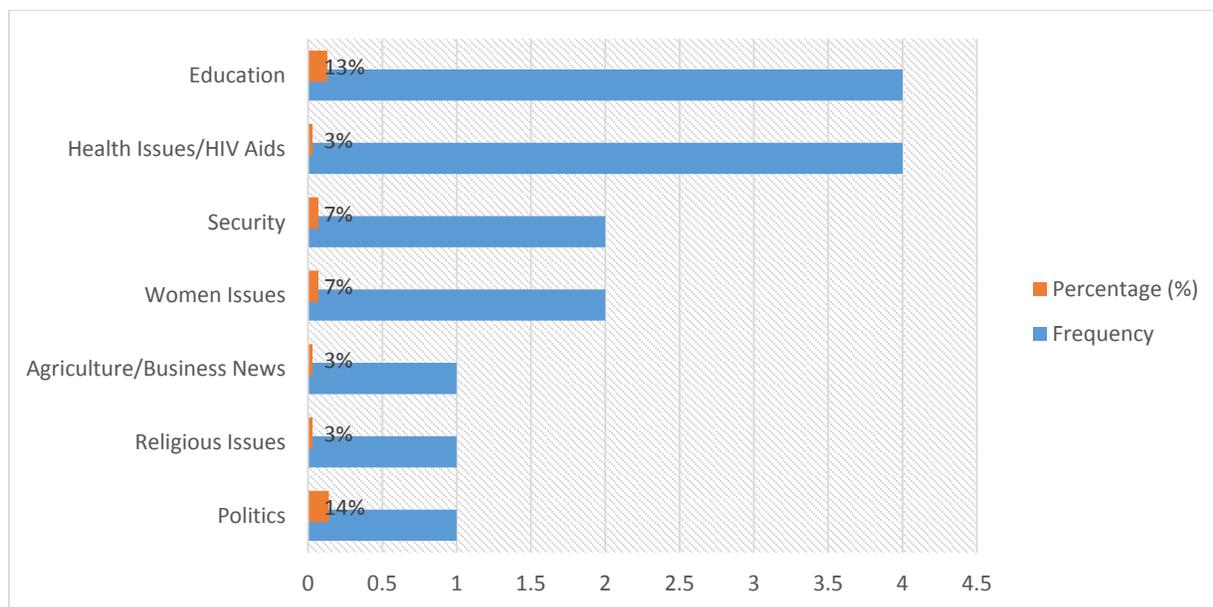
Source: Researcher (2017)

4.1.3 Core Publication Contents

From the above data we can see that when respondents were asked to indicate the core publication content, 30% indicated news, 20% indicated music and entertainment, 13% indicated education as the core content, 14% said health issues and HIV Aids, 3% indicated security, 7% indicated women, while agriculture/business news, religious issues and politics were represented by 14% as indicated in Figure 4.3.

This means that news rated highly as core publication content but news and information has to be geared toward reaching the audiences in rural areas of Kenya. Respondents also indicated that various element of Publishing Content is able to influence in fostering Peace and Conflict Management because they are packaged based on current issues affecting various Communities and also information can be relayed quickly in times of crisis for example during the Kenya 2007/2008 PEV period.

Figure 4.2 The Three Dailies Core Publication Content



Source: Researcher (2017)

4.1.4 People Who Influences on Publication Content

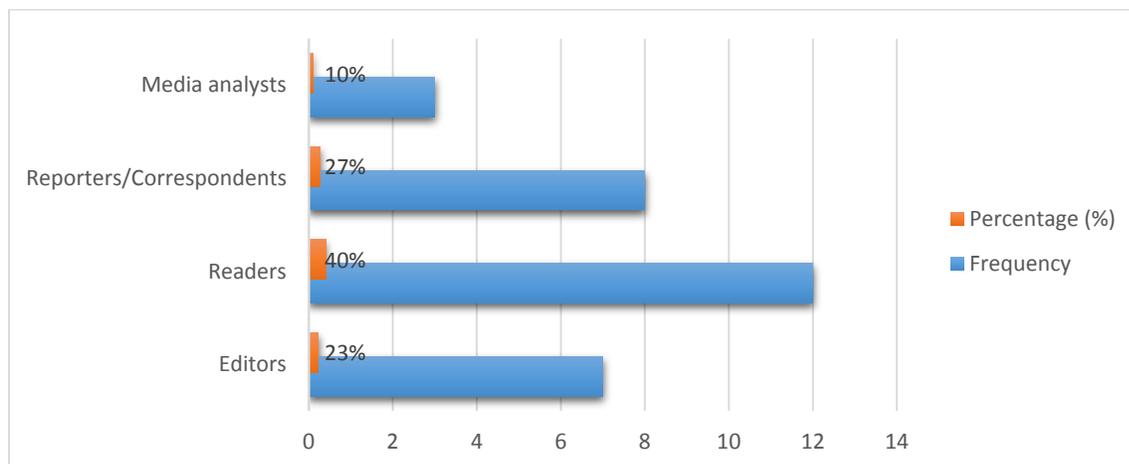
In relation to the previous data, the respondents were asked about who influences the publication content and they indicated that 40% is influenced by the newspaper readers, followed by 27% by reporters/correspondents, 23% by the editors and media analysts at 10%. From the findings we learnt that readers have an upper hand in influencing publication content because they will always react positively or negatively to the published content.

The above finds collaborates with Journal of Social and Political Psychology (2013), in Media play a central role in informing the public about what happens in the world, particularly in those areas in which audiences do not possess direct knowledge or experience. Findings across these areas show the way in which the media shape public debate in terms of setting agendas and focusing public interest on particular subjects.

For example, in our work on disability we showed the relationship between negative media coverage of people on disability benefit and a hardening of attitudes towards them. Further, the media also severely limit the information with which audiences understand these issues and that alternative solutions to political problems are effectively removed from public debate. The media has the biggest influence on public opinion, especially on topics that the public has insufficient information. Reporter in the media industry, they are mostly diligent people who go an extra mile to get the true story. Their main goal is to inform the public so that people can make their own decision.

Media is the most powerful tool for the formation of Public opinion in contemporary times. It is the Television, the press, the radio and the Internet. (Films, magazines, posters, studies, reports, theater, art, dance, public speeches, hearings) Talking about the media is like talking about a mission. A source of information and education that will shape the daily choices in people's life. We can therefore conclude that after Media sets the agenda to the public, the public reacts to the information given and so they readers have an upper hand of what information they desire to receive from the Media.

Figure: 4.3 The People Who Influences on Publication Content



Source: Researcher (2017)

4.1.5 Influence of the Three Dailies

In one of the first calls for reconciliation and negotiation, an editor asked Kibaki and Raila: 'How many more must die, how much more must be destroyed before you come to your senses?' (*Daily Nation*, January 3, 2008). This portrayed a media that demonstrated social responsibility by directly questioning the moral probity of the leading antagonists. It followed the realization that the media could not simply remain objective and highlight the conflict without contributing to attempts at resolving it. Consequently, media owners, in conjunction with the Concerned Citizens for Peace, changed tack and began a programme of peace education. This demonstrated a humane and patriotic, as opposed to an objective but aloof, media. They realized that focusing on the blame game in the face of a humanitarian catastrophe could only promote hatred and vengeance and prolong the conflict.

As the KNDRT team got to work, the press portrayed the peace and reconciliation process as very delicate by propagating phrases like ‘the stakes are high’, ‘the world is watching’, and that it was ‘a race against time’ (*Sunday Standard*, February 3, 2008).

As the respondent said;

The government must have found itself between a rock and a hard place. Besides, over the years, successive opinion polls have proved that Kenyans esteem the media as the most reliable institution. It was therefore no surprise when the public took sides and support the media in this government and media row.

Such phrases put all observer son tenterhooks, besides putting pressure on the negotiators to find a quick fix to peace. Such ultimatums could have led to the subsequent shaky peace deal that later spawned new conflicts over power sharing. The gesture of peace and reconciliation imminent in the handshake by Kibaki and Raila on February 1, 2008 was expected to neutralize the preceding period of fierce media and public outrage over how the government had failed to manage the conflict. It is in this second phase of media coverage of the post-election violence that we see the media tone down its language that seemed to escalate the violence, and focus more on communicating messages that sought to promote reconciliation and peace.

Of interest is how the media articulated their role in the post-conflict setting. A report in the *Sunday Standard* highlighted the fact that the media were required to show leadership in areas of dialogue, national cohesion and reconciliation (Okello 2009). Bratic (2005) argues that in order to work for the public good, the media should convey messages in forms that contribute to the formation of positive attitudes and opinions and to the increase of knowledge and awareness. He concludes that the journalistic agenda of social responsibility could facilitate the agenda of peace building. The media in Kenya has on various occasions indulged directly in national crises by creating public sentiment.

For instance, the Daily Nation of January 3, 2008 addressed Kibaki and Raila in an editorial and told them that: ‘the earnest cry of all Kenyans is: step back from the brink’. In another report, The Standard incited the public sentiment by telling Kenyans to shun politicians who would flee the country by plane if a full-scale war broke out. Therefore, in times of public repression, the media reflects public sentiment by being the mouthpiece of the masses. However, in times of normalcy, the media can whip up emotions by their reports of investigative journalists. Bratic (2005) opines that, since the need for information is increased by uncertainty in conflict situations, the power of the media as the main agenda setter increases, in part due to its power to summarize overarching developments in the conflict. The media should be arbiters in conflict rather than catalysts. Tehranian (1993) envisages that new cultural forces, including responsible mass media, peace discourse and peace journalism, are essential for achieving a transition to a peace culture. Similarly, Bratic (2005) suggests that the media should represent all sides and opinions in a conflict and post-conflict situation since this promotes the potential for reconciliation and acceptance of a diversity of ideas.

Table 4.4 below shows the summary of the leading dailies in Kenya and their level of influence to the public depending on their level of circulation and the confidence they portly to the public in terms of giving authoritative information.

Table: 4.2 Influence of the Three Dailies

Print Media	Frequency	Percentage%
The Daily Nation	14	46%
People Daily	3	10%
The East African Standard	13	44%
Total	30	100%

Source: Researcher (2017)

4.1.6 Influence of Newspapers Pictorial Peace Messages

This study analyzed the content of three leading Nairobi dailies during the Kenya 2007/2008 PEV. The analysis intended to track how each daily newspaper reported Kenya 2007/2008 PEV using Pictorial Peace Messages and whether they showed credible interest in the principles of Peace Journalism. A picture is worth a thousand words" It refers to the notion that a complex idea can be conveyed with just a single still image or that an image of a subject conveys its meaning or essence more effectively than a description does.

Respondents from the 3 dailies agreed that the use of Peace photos in cooperation with a Newspaper joint-headline " Save Our Beloved Country" by the Print Media was a great breakthrough for much coveted peace during the Kenya 2007/2008 PEV, (Interview,15.01.2017).

For example as shown in plate 4.1. and plate 4.2. Following live broadcast of the photograph of the two rival political leaders shaking hands in agreement following mediation, violence halted. The media showcased this photograph on all television stations in real time in an effort to stop the violence; and it worked (Mbeke, 2009).

Plate 4.1 Photo of Newspaper Joint-Headline " Save Our Beloved Country"



Source: <https://www.theguardian.com/journalismcompetition/making-peace-not-war>

Plate 4.2 This man holding a newspaper urges Kenyans to "Save our beloved country".



Source: <https://www.theguardian.com/journalismcompetition/making-peace-not-war>

4.2 Broadcast Media Peace Interventions Programs

Literature review and findings from interviews revealed that, the media and especially Broadcast Media, have a moral responsibility to report in a manner that does not champion warfare, but promotes peace. The Kenyan public trusts the media as custodians of truth and sincere advocates of positive change. Media is still looked upon as a credible source of information. The above findings are consistent with Galadima (2010), who inputs that the television media have important roles to play in braking down the stereotypes, misconceptions and misinterpretations that lead to community conflicts. Broadcasters who report on conflict situation must see themselves first and foremost as conflict interveners, they must cultivate the attitude of reporting what can unite rather than divide the people. Today, many people wake up to clock radios, drive to their work listening to car radios, and also spend some of their leisure time hearing their favorite radio programs. Tett (2010) avers that Community radio plays a vital role in building vibrant communities, in mobilizing groups to action by informing and empowering citizens, in giving voice to the marginalized groups of Society, and in bringing community needs to the attention of local and even national governments.

4.2.1 Broadcast Media Audience

The 30% (200) of the Middle Level Management staff (Directors, Managers, Producers, Investigators, Editors and Media Analysts), interviewed had this to say;

The Kenyan media has evolved over years. In the 1930's till the mid 1990's (which saw the rise of multiparty system) the ruling political party KANU suppressed the media. The era after this, that gave room for saw the rise and sudden expansion and suppression of the media especially through torture, imprisonments, and threats to the media that aimed to suppress it. Self-censorship was therefore entrenched into the media fraternity for fear of falling on the wrong books of the state,(Interview,15.01.2017).

When the Kenya became a democratic state and the ruling party since independence was defeated in the 2002 election. Press freedom was full actualized in 2002 when NARCK party took power and preached press freedom which gave way to cropping up of new radio and TV stations, issuance of more licenses, and expansion of frequencies. This move was a positive one but also had a negative move whose fruits were reaped in after the 2007 elections,(Interview,15.01.2017).

Table 4.3 Broadcast Media Audience

Response rate	Frequency	Percentage (%)
Ghetto FM	12	40%
Pamoja FM	15	50%
KBC Tv	3	10%
Totals	30	100%

Source: Researcher (2017)

4.2.2 Period of Broadcasting

Ghetto FM has been in existence for 10 years, Pamoja FM has been in existence for 10 years while KBC TV has been in existence since independence. In 1964, when Kenya became an independent country, the corporation's name was changed to Voice of Kenya. In 1989, the Kenyan parliament reverted the corporation's name from Voice of Kenya to Kenya Broadcasting Corporation,(Interview,15.01.2017).

These findings collaborate which Forges who implies that Community Radio FMs have been existence in quite good number of years but their influence has not been realized in Kenya vis-à-vis their influence in fostering Peace and Conflict Management in Kenya.

Also from the findings it's clear that the 2 FM Radio stations existed before and after PEV.

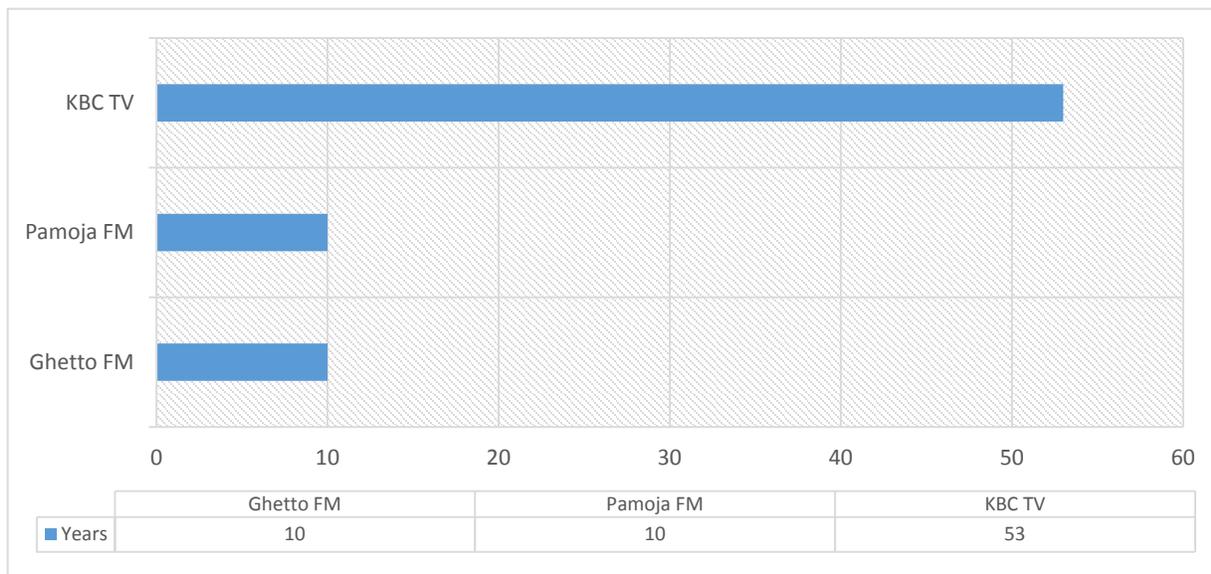
The study finding reveals that radio is the main source of disseminating conflict information in Kenya. This is due to their ability to reach even the most remote corners of state, inexpensive broadcasting and cheap to acquire as compared to other mass media, thus eliminating the barrier of illiteracy to spreading news, information or propaganda.

With an exceptionally high illiteracy rate, especially in rural areas, respondents' attitudes are influenced by the radio broadcasts appealing to them on the basis of their ethnic identities. These findings collaborate with the findings of the study by Forges (1999).

Forges (1999) study titled "Call to Genocide" showed that a large number of Rwandans could not read or write and, as a result radio was an important way for both the government and the rebels to deliver messages to the population. In addition, Bonior et al (1984) findings on the role of media in Vietnam War shows that roughly 50 million in the US watched television news each night and read newspapers on Vietnam War.

These findings are contrary to Kenyan situation where preferred media is radio. This can be explained by the fact that radios are cheaper and portable compared to televisions. Equally, batteries, which are used to power radios, are readily available in shops and are relatively cheap and affordable compared to electricity and solar power which is expensive. Figure 4.2 represents in summary the period of broadcasting of the three Broadcast Media under study.

Figure 4.4 Period of Broadcasting



Source: Researcher (2017)

4.2.3 Core Programming Content

From the findings from the 30% (200) of the Middle Level Management staff (Directors, Managers, Producers, Investigators, Editors and Media Analysts), revealed the following about the core programming content. 30% indicated news, 20% indicated music and entertainment, 13% indicated education as the core content, 14% said health issues and HIV Aids, 7% indicated security, 7% indicated women, while agriculture, religious issues and politics were represented by 3 % as indicated in Figure 4.4 below.

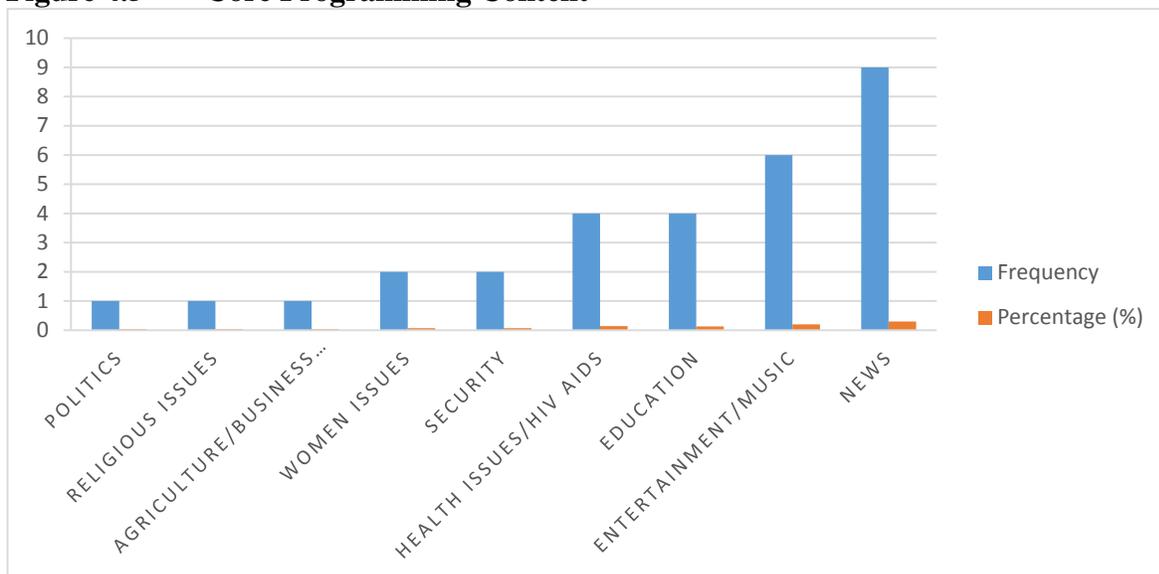
Various element of Programming Content is able to influence in fostering Peace and Conflict Management through objective reporting because they are packaged based on current issues of community and also information can be relayed quickly in times of crisis for example during the Kenya PEV period, (Interview,15.01.2017).

The above findings are consistent with Spitulnik (1996), who argues that radio today achieves what newspapers did in the colonial world. Drawing on Benedict Anderson’s (1983) concept of “imagined communities”, she writes that it creates a shared cognitive space, a community of listeners who incorporate its linguistic elements into their everyday lives in both the conscious and unconscious ways.

Radio in Kenya is the simplest yet, significant medium among audiences, its casual approach and conversational style has created “celebrity status” for announcers. The news writer frames ideas and opinions by means of information selection and dissemination to audiences. News reports can therefore offer a broad picture of social reality and promote social solidarity by reinforcing national identity and shared beliefs through language choices.

Today, many people wake up to clock radios, drive to their work listening to car radios especially to listen to the news and also spend some of their leisure time hearing their favorite radio programs. Without the Community Radio and also TV sets, most people would know little of events beyond their immediate neighborhood, (Dunaway, (2002). Alumuku (2006) adds that Radio Broadcasting is a voice, a resource and a tool for communities to work together towards development. Dunaway, (2002) stresses on the idea that, community radio aims to serve particular community with information, education and entertainment.

Figure 4.5 Core Programming Content



Source: Researcher (2017)

4.2.4 People Who Influence on Programming Content

Studying parts of the statistics related to who influences the programming content and they indicated that 40% is influenced by the listeners, 27% by the presenters, 23% by the producers and volunteers 10%. These were findings from The 30% (200) of the Middle Level Management staff (Directors, Managers, Producers, Investigators, Editors and Media Analysts) who were interviewed as indicated in Table 4.4.

A Media Producer affirms that listeners have an upper hand in influencing programming content because they are able to give feedback what they were to be aired through Radio/TV Talk shows/In-call Programs and music entertainment requests,(Interview,15.01.2017).

In situations of political uncertainty, the mass media are said to play a crucial role in the construction, articulation and reflection of reality where public opinion tends to become more media dependent (De Fleur and Ball- Rokeach, 1989).

In the Kenyan case, the media determined the mood of the nation by running headlines that held readers on tenterhooks. The literature review here collaborates with the above finding in that listeners have an upper hand in influencing programming content of the Broadcast Media. as indicated in Table 4.5 below.

Table: 4.4 People Who Influence on Programming Content

Response rate	Frequency	Percentage (%)
Producers	7	23%
Listeners	12	40%
Presenters	8	27%
Volunteers	3	10%
Totals	30	100%

Source: Researcher (2017)

4.2.5 Broadcast Media Peace Intervention Projects

The question sought to know whether Media stations organize community peace projects that influence your audience in living together, working together, conflicts/animosity reduction, sharing of information, during and after Kenya 2007/2008 PEV of which 80% indicated yes while the remaining 20% indicated No as indicated by Table 4.6, information derived from questionnaires given to the 30% (200) of the Middle Level Management staff (Directors, Managers, Producers, Investigators, Editors and Media Analysts).

The findings are In the last six decades, the influence of the Media in the global arena has increasingly been recognized, especially its power to either exacerbate or contain potential conflicts. The number of conflicts, however, that gets international attention is small. U.N (2005).

According to Westphal (2004), the Media have the power to defuse tensions before they even reach a critical point. By supplying credible information and reaching a large audience, the media help in managing conflicts and promote democratic principles. The above findings are consistent with various scholars below who have written widely on various Media intervention initiatives and projects in peace building. It is well known that the media set agendas McCombs, Shaw & Weaver 1997; Graber (2000), and use values such as prominence (journalists quoting renowned public figures when reporting news stories) to satisfy the interests of the public. Media can play a role in all of these categories. In fact, the United Nations classified the development of local media as a ‘cross-cutting’ peace-building concern, ‘transcending’ all types of activities (United Nations, 1996).

In Africa, there are positive examples where the Media has been useful in peace initiatives, albeit when violent conflicts have ended. Since 2002, Mega FM has promoted peace in Northern Uganda through encouraging dialogue between the Lord Resistance's Army (LRA) factions, government and civil society as a good step towards peace, (Oriarie 2009). Earlier on in 1995, Burundi's Search for Common Ground (SCG) initiative launched radio Ijambo ("wise words" in Kirundi) in the months ending the genocide in neighboring Rwanda, Gardner (2001). Search for Common Ground (SFCG), a US based NGO dealing with conflict resolution, launched Studio Ijambo at the height of ethnic and political violence in Burundi and neighboring Rwanda. The studio was established with the intention of promoting reconciliation, understanding and foster nonviolent conflict resolution, (SFCG 2004).

Since its inception, Studio Ijambo has had a significant positive impact in mitigating conflict by catching and holding the attention of the majority of the radio-listening population. It employed an ethnically balanced team of journalists to produce high-quality radio programs that promoted reconciliation, dialogue, and collaboration, in addition to its credible, unbiased programming which included news, special features, round-table discussions, telephone call-ins, music, and highly popular soap-opera series (Slachmuisjlder2005). In addition to providing quality standards for broadcasters and producers, Studio Ijambo also played a central role in the capacity building of radio professionals through training SFCG (2004). In February 2002, MONUC (the United Nations Mission in the Democratic Republic of Congo) and Hironde Foundation, a Swiss NGO, set up Radio Okapi as a means of promoting peace and reconciliation in DR Congo. Since its inception, Radio Okapi has enlightened listeners on the peace process its successes, failures and hopes. The Hironde Foundation²⁰ established radio Agatashya (little swallow), in Kinyarwanda to secure peace and dialogue among Rwandans coming from the genocide scourge, Dahinden (2007). Open Broadcast Network (OBN), a media network established in Bosnia two decades ago, is one of the most ambitious and earliest intentional Media attempts to reduce violent conflict. To this day, it remains the only television network established to promote peace and reconciliation. OBN was a product of the Dayton Peace Agreement reached in 1995, when the Serbs, Croats and Bosnians came under pressure to end their three-year-long violent conflict.

As a result, the new national television network Open Broadcast Network, (OBN) was launched in 1996 (Sadkovich (1998). Since then, OBN has promoted peace journalism by focusing on the efforts of community leaders to promote peace during violence. The programmes provided practical advice about reconciliation and repatriation, Sadkovich, (ibid). Media aided pacification, though from diverse motives. During the 2007/8 Kenyan PEV, the media played a significant role. There are many positive roles that the media played i.e. the role in the efforts to promote peace, stability and democracy, at the same time there are many negatives roles that that the media played i.e. that propelled the eruption of the PEV (Plaisance 2005). The media served as voice for those who could not be heard in the society. These was particularly true with the local language radio stations where they provided platforms where the listeners could call in and air their grievances allowing the message to be received by the targeted local and international authorities whilst protecting those who people at the grass-root level (Ogola, 2011).

The Kenyan media abandoned the notion of commercializing news content for the sake of profits, avoided naming either the victims or the perpetrators of the violence, employed investigative/critical journalism and chose to preach peace. This was a positive move, which was later to help reunify Kenya. This conduct demonstrates the maturity of the media and further proves that the Kenyan media uphold and respect their role in Kenyan society.

In this case, the Kenyan media seem to have understood that the right to peace outweighed the right of Kenyans to know (freedom to receive information) which tribe was killing which and in what manner; information that would only have aggravated the situation.

Table 4.5 Broadcast Media Peace Intervention Projects

Response	Frequency	Percentages
Yes	24	80%
No	6	20%
Total	30	100%

Source: Researcher (2017)

4.2.6 Forms of Broadcast Media Peace intervention Projects Influencing Peace

In relation to forms of Broadcast Media peace intervention projects influencing peace, the respondents from the 30% (200) of the Middle Level Management staff were asked which were some of these community TV/Radio Peace projects which influences audiences in living together, working together, conflicts/animosity reduction, sharing of information.

23% indicated TV/Radio Talk shows/in-call Programs, 50% indicated Peaceful Demonstration/Peace Caravans, 17% indicated Peace Sports/Tournaments and finally 10% indicated Donations as the key Community Radio Peace projects which were organized geared toward Peace process during Kenya 2007/2008 PEV and even after as represented by Figure 4.6. While some sections of the media, particularly ethnic language radio stations allegedly disseminated ethnic centered information, some media houses bridged gaps between warring ethnic groups. These findings collaborate with the findings from various scholars in the literature review. For instance, independent radio and television used interactive shows to engage audiences in peace dialogue, Klopp, Githinji and Keffa (2008).

Pamoja FM, located in Kibera slum one of the main centers of the post-election unrest in Nairobi played an especially courageous role. Pamoja FM insisted on providing a voice for different communities and worked to calm conflict. Through talk show tried to reach across ethnic barriers, and were actively curtailing calls that seem to be engaging in ethnic stereotypes and were calling for reconciliation. Over the past six years the radio station has campaigned tirelessly to “promote peace and stability in Kibera, Bwire (2013).

In Kibera minutes before the attack of Kikuyu and Kambas, Pamoja FM radio decided to call some of the Kikuyu, Kamba and Luo elders to the studio to discuss the implications of the rumour about the attack and they allowed the callers to call in and ask questions. People listened to the elders. They also played powerful music and the patriotic songs were helpful. The decision to spend an entire day talking about peace was very powerful,(Interview,15.01.2017).

Ghetto FM located in Pumwani is another example. The station prides itself as, Kenya's politically-neutral station at election time (2013). During the recent (2013) Kenya's election they continuously relayed this message that, "As a nation still trying to achieve national cohesion and integration, the 43rd tribe that is represented by Ghetto Radio is definitely what the Kenya needs in order to live as one, (Interview,15.01.2017).

Another example would be Kenya Musicians. There are several cases that were present in the Kenyan situation; first, famous Kenyan musicians from all tribes came together and released a peace song that was aired several times a day by the mainstream media houses (Shitemi, et. al, 2013). Media continued to play the peace building role many months following the reconciliation of Mwai Kibaki and Raila Odinga. There were peaceful songs played over radio stations, there were peace caravans in different corners of the country and other media events such as concerts and open forums that provided Kenyans at the grassroots to air their grievances (Shitemi, et. al, 2013).

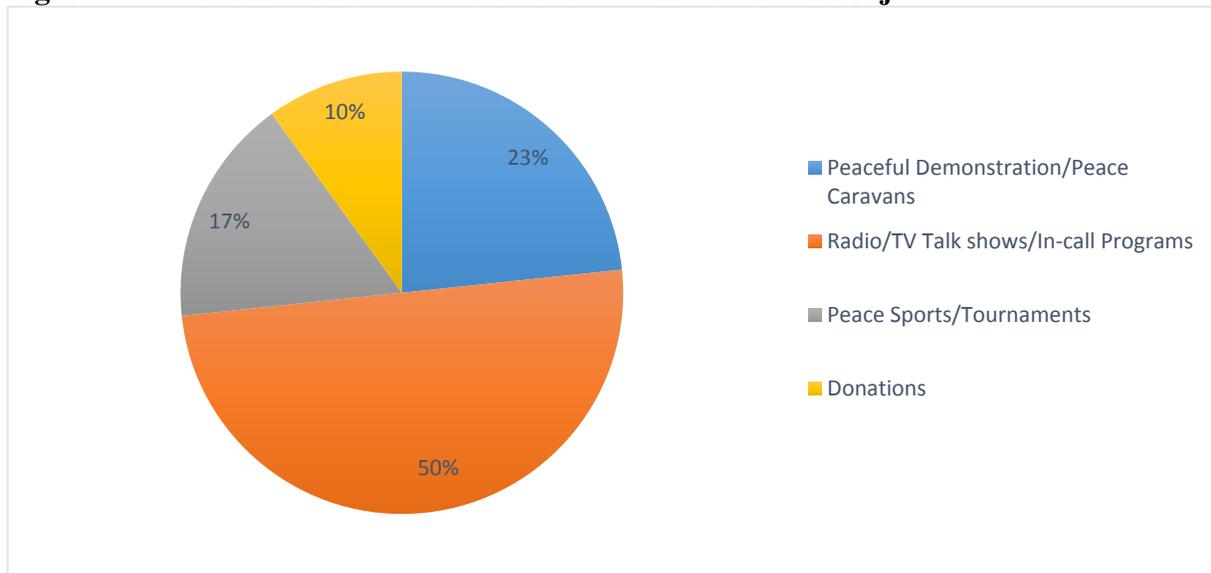
In addition, mainstream media houses got involved in settling the IDPs. The media also called out to the Kenyan public to donate what they have to help settle the IDPs in camps (Standard 13, 2013). During this time, Kenyans united and gave selflessly towards this plight. The media collaborated with big companies and institutions in the plight to settle the IDPs (Munyua, 2011). Secondly, there were peace caravans by the government in conjunction with private organizations that toured around the country preaching peace (Ibid). Thirdly, the main mobile service providers began sending texts with peace messages through their Short Message Media houses Mobile peace caravans, Kikuyu Elders, Kamba Elders and Luo Elders Radio Talk Programs interventions, Female journalists White Ribbon Peace Campaign, handbills and T-shirts with peace and reconciliation messages which were very effective in quenching the PEV.

The Swedish Embassy called senior women editors of the papers and encouraged them to report the voices of women and the impact of violence to ordinary people. Get the message out that 'Enough is enough!' and get ordinary women to speak on how they have suffered and how peace was paramount.

The impact was immense and it was called the "White Ribbon Peace Campaign. They also distributed handbills and T-shirts with peace and reconciliation messages (Bwire, 2013). The Media played its role to bring down the tensions when Media owners resolved to give a common voice. They agreed to find a common approach, common headlines, common DVDs being distributed to all Media houses that each Media house in a collective way was able to help bring down the passions. The Media finally stopped airing politicians, stopped inviting analysts, stopped talk shows for a while.

Things changed a lot when NGOs came in and set up Media programs that promoted peace. The Media especially the Broadcast Media aided greatly to bring back sanity back during 2007/08 PEV in Kenya.

Figure 4.6 Forms of Broadcast Media Peace Intervention Projects



Source: Researcher (2017)

4.2.7 Extent of influence of Broadcast Media Peace intervention Projects

From the literature review, Walters et al. (2011) claims that effective radio activities can make a significant change in a community's life. Through the activities of Community Radio, the people are encouraged to peacefully coexist at the family and community levels. The researcher agrees with the author because from the findings is that all the Community Projects organized by these Stations focuses towards peace building. When the respondents were asked to give their personal view on to what extent does these community projects influence their audience in living together, working together, conflicts/animosity reduction, sharing of information, job creation. The influence is that 67% indicated to a large extent, 20% moderate, 3% less extent and 10% indicated not all.

From questionnaires and interviews indicators of this influence is that 67% indicated that to a large extent projects Radio Talk shows/In-call Programs, Peaceful Demonstration/Peace Adverts, Peace Sports/Tournaments and Donations as the key Community Radio Peace projects which were organized geared toward Peace process during Kenya 2007/2008 PEV and even after. On the other extreme end 3% felt that influence of these peace interventions Projects is less extent by these Broadcast Media, as indicated in Table 4.7.

These findings are consistent with a scholar Loretta Hieber who points out in her article **Media as Intervention**, Media played a great deal in peace making in Kenya 2007/2008 PEV. For example, creation of programming for mass consumption inform of content stories, television and radio programs, songs, whereby the programs contained educating information on non-violent modes of conflict resolution (Hieber 2002).

Table 4.6 Extent of influence of Broadcast Media Peace intervention Projects

Response	Frequency	Percentages
Large Extent	20	67%
Moderate Extent	6	20%
Less Extent	1	3%
Not at All	3	10%
Total	30	100%

Source: Researcher (2017)

The question sought to know whether the respondents were satisfied with Broadcast Media Peace Interventions employed by the said Stations during and after Kenya 2007/2007 PEV to avert the recurrence of the same. 80% of the respondent indicated yes, 20% indicated No. Based from the above findings, we can see that the Broadcast Media helped and still do help people to come together, live together, share information and stay involved in these peace projects. The influence of these peace projects geared towards improving the Community’s livelihoods and in so doing fostering Peace in general. Figure 4.7 summarizes these findings.

The media have facilitated uniting Kenyans from all walks of life. The media initiated a campaign i.e. the “*I have no tribe; I am Kenyan*” campaign to re-unite Kenyans by humanizing their rivals. In this campaign, the media broadcasted religious leaders, political leaders, rival, men and women, young and old; people of every diversity come together to stand against violence and disunity (Oyungu, 2011). Along the same lines was the, there was a campaign dubbed, “*Mkenya mwenye nchi sio mwananchi*”(Karongo, 2012). This translated from the Swahili to English languages states “A Kenyan who owns the country, not a child of the country”. Mwananchi is the Swahili word for citizen (Kamusi.org, 2016). However, the Mwana is the Swahili word for child. Therefore, through creative wordplay, the founders; Kenya Private Sector Alliance (KEPSA) was able to provoke Kenyans to take accountability for their country thus fostering a feeling of loyalty and unity (Karongo, 2012). It is important to note that the “*Mkenya mwenye nchi sio mwananchi*” Campaign was the first part of a four-phase campaign aimed at peace-building before the 2013 presidential elections (*Ibid*).

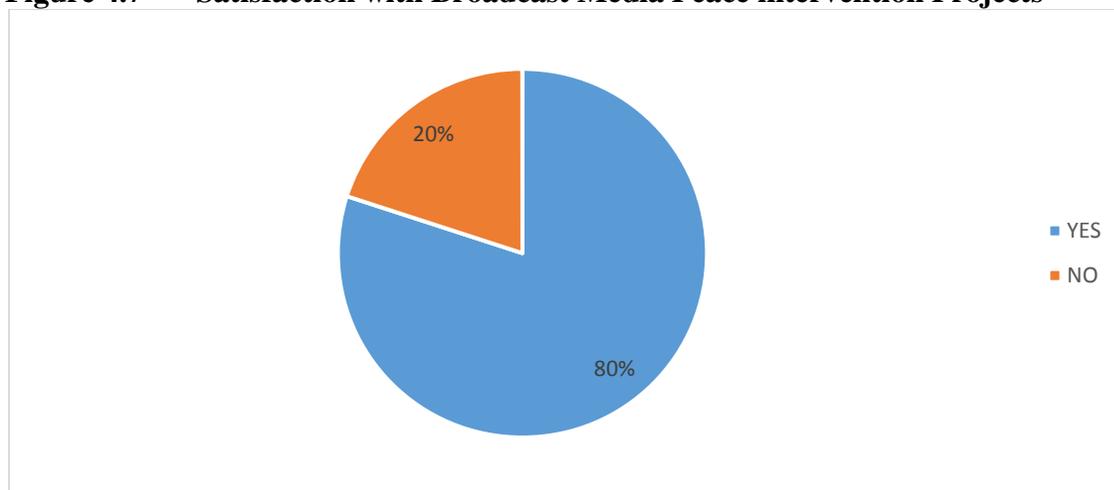
The second phase was dubbed “*Mkenya Daima*” which translates to Forever Kenyan (Karongo, 2012). The aim of this phase of the campaign was to deal with the negative conditions that facilitated the unrest in 2007. Phase three was the „Rights Come with Responsibilities“ Campaign where the media played both an educative and cautionary roles educating Kenyans on their rights whilst warning them of the consequences of negligence of the law (*Ibid*). The final phase „Conflict Mitigation“ ran concurrently with phase three and focus on conflict prone areas with the hope of resolving existing disputes before the elections (*Ibid*).

The signing of a peace agreement or any other event that marks the official end of war, signals the beginning of post-conflict reconstruction (Anderlini and El-Bushra, 2009). According to the former UN Secretary General Kofi Annan, post-conflict reconstruction refers to “ the comprehensive efforts to identify and support structures which will tend to consolidate peace and advance a sense of confidence and well-being among people” (Burke, 2010).

The highlighted humanitarian crisis following the 2007/2008 PEV by media made the international community to intervene. As a result, this led to ending the conflict. For example, several world personalities, including African eminent personalities, headed by Koffi Annan, the former UN Secretary General, were among prominent personalities who intervened to bring peace in Kenya. Additionally, the Media Council of Kenya (MCK) put out advertisements calling on Kenyans to shun violence and keep peace as well as calling journalists to adhere to ethical standards (Mbeke, 2009).

Comparing from the literature review, Prehn (2002) asserts that participation is the engine of democracy and Radio is a tool for participation. They work to strengthen their communities to promote community for social change, cultural development, and democratization. Public Forums by Community Radio serves as an avenue where people can Share information, Express their fears, Conflict and animosity reduction, for working together, for National Identity etc. Similarly, Bratic (2005) argues that in order to work for the public good, the media should convey messages in forms that contribute to the formation of positive attitudes and opinions and to the increase of knowledge and awareness. He concludes that the journalistic agenda of social responsibility could facilitate the agenda of peace building.

Figure 4.7 Satisfaction with Broadcast Media Peace intervention Projects



Source: Researcher (2017)

5.0 Conclusion

The study depicted that Media Peace Interventions Programs organized deliberately influencing peace building in Kenya, played a great impact to bring back sanity in Kenya. Media served to encourage dialogue, tolerance and interaction among communities hence reducing inherent conflicts and building lasting peace. For example, creation of programming for mass consumption inform of content stories, television and radio programs, songs, whereby the programs contained educating information on non-violent modes of conflict resolution. Moreover, production of documentaries, talk show programs exposing the dangers of conflict helped a lot. Media owners resolved, to find a common approach, common joint headlines, Joint broadcasts, common DVDs being distributed to all media houses; that each Media house in a collective way was able to help bring down the passions.

The Print and Broadcast Media houses organized Peace Intervention Programs such as Mobile peace caravans, Kikuyu Elders, Kamba Elders and Luo Elders Radio Talk Programs an initiative from Pamoja FM influenced in calming violence. In Kibera in minutes planning to attack the Kambas, Pamoja FM radio decided to call some of the Kikuyu elders, the Luo elders, the Kamba elders to the studio to discuss the implication of the rumor that was going on, and they allowed the callers to call in, ask questions. There was also an initiative of Female journalists "White Ribbon Peace Campaign", Media Houses distributed handbills and T-shirts with peace and reconciliation messages to the public. The media through patriotic music, arts, avenue of dialogue ensured the public had an avenue to express any pent up emotions. Kenyan Media finally stopped airing politicians stopped inviting analysts, stopped talk shows for a while.

6.0 Recommendations

Based on the findings the study recommends that Media houses should adopt a common Conflict Reporting Approach. This will help in mitigating the discrepancies in coverage to unearth areas of dispute and consensus objectively with a view of encouraging amicable solution to the matters at hand. They must cultivate the attitude of reporting what can unite rather than divide the people. Through Media interventions Projects, the people are encouraged to peacefully coexist at the family and community levels.

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Transient Response Analysis and Modelling of Elevating Screw for Radial Drilling Machine

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Abstract- The purpose of this study was to analyze the dynamic behavior of elevating screw subjected to time-varying excitation. Transient analysis is performed to know the response characteristics under the rated load of elevating screw. The effect of this vibration varies with time as the nut moves. This paper researched the elevating screw and built the elevating screw model with SolidWorks software. Modal analysis is carried out for identifying the natural frequencies and the transient analysis is applied for obtaining displacement, velocity and acceleration depend on time variation. The first step of this work is used to analyze the natural frequency and mode shapes of elevating screw in modal analysis utilizing ANSYS 17 software. After that, transient analysis is carried out to generate displacement, velocity and acceleration using step response function. Displacement, velocity and acceleration are important response parameters of any structural system. Theoretical calculation of displacement, velocity and acceleration in transient operation is solved using MATLAB software. Theoretical results of elevating screw are found maximum displacement 5.2×10^{-4} m, maximum velocity 0.045 m/s and maximum acceleration 8 m/s^2 using MATLAB. Numerical results from transient analysis are occurred maximum displacement 3.81×10^{-4} m, maximum velocity 0.035 m/s and maximum acceleration 6.59 m/s^2 using ANSYS software. The results from modal analysis, the structure is safe because initial frequencies are much higher than the working frequency 29.63 Hz. The results obtained from ANSYS are compared with theoretical results from MATLAB software. The simulated results are good agreement with theoretical results.

Index Terms- elevating screw, modal analysis, natural frequency, step response, transient response

I. INTRODUCTION

The radial drilling machine is a heavy precision machine. It consists of a heavy round vertical column supporting a horizontal arm that carries the drill head. The drill head is mounted on the radial arm and houses all mechanism for driving the drill at different speeds and at different feeds [1]. Radial arm can be raised or lowered on the column with the help of elevating screw and can also be swung around to any position over the work and can be locked in any position. These adjustments of arm and drilling head permit the operator to locate the drill quickly over any point on the work. The base is a large rectangular casting and is mounted on the floor of the shop. The column is mounted vertically at one end of the base [2].

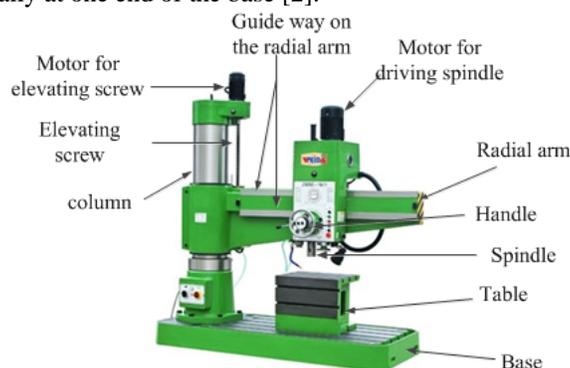


Figure.1 Radial Drilling Machine [3]

Elevating screw is used for the conversion of rotary motion to linear motion. Radial arm can be raised or lowered along the column with the help of the elevating screw [3]. All real physical structures behave dynamically when subjected to loads or displacements. If the forces or displacements are applied very slowly, the inertia forces can be neglected and a static analysis can be justified [4]. On the other hand, if the time scale of the excitation variation is in the range of characteristic time scales (vibration periods) of the system, inertia forces play a major role in system response. In such situations, dynamic analysis is required for response simulation. Dynamic calculations are important for most structural systems. Dynamic excitations such as wind loads, seismic loads, blast loads, and vibration-induced loads can impose unexpected demand on structures [5].

II. THEORETICAL CALCULATION OF ELEVATING SCREW FOR RADIAL DRILLING MACHINE

When considering the design of elevating screw, materials for screw design is firstly selected. After that, the natural frequency of elevating screw is considered to safe the elevating screw design. Moreover, determination of displacement, velocity and acceleration in transient condition of elevating screw are solved using MATLAB software. Table I shows the parameters considered for design elevating screw for radial drilling machine.

TABLE I
 DESIGN PARAMETERS CONSIDERED ELEVATING SCREW FOR RADIAL DRILLING MACHINE

Technical category	Dimension	Unit
Model No:	NAVIK Z3035	
Spindle motor power	2.2	kW
Spindle motor speed	1430	rpm
Elevating screw motor power	1.35	kW
Elevating screw motor speed	70	rpm
Engaged thread height	120	mm
Screw length	850	mm
Outside diameter of screw	36	mm
pitch	7	mm
Applied force	60602	N

2.1. Selection of Screw Material

First of all material properties are to be defined. Mild steel, AISI 1035 steel, and alloy steel are chosen for testing material. Among these materials, deformation of AISI 1035 steel is the lowest value than other two materials. So, AISI 1035 steel is suitable material for screw design. The AISI 1035 steel is widely used for manufacturing of screw due to its good machinability and resists heat treatment. The screw is made of AISI 1035 steel with material properties as defined below [6].

TABLE II
 PROPERTIES OF MILD STEEL, AISI 1035 STEEL AND ALLOY STEEL

Properties	Mild Steel	AISI 1035 steel	Alloy steel	Unit
Density	7800	7860	7700	Kg/m ³
Young modulus	200	210	205	GPa
Yield strength	180	282.68	241	MPa
Tensile strength	325	550	448	MPa

III. MODAL ANALYSIS OF ELEVATING SCREW

3.1. The Basics Theory of Modal Analysis

Modal analysis is determined by the characteristics of the material properties and structure of its own, which has nothing to do with the external excitations. Modal analysis is important in vibration point of view. i.e. Vibrations in body are calculated up to what frequency the elevating screw can sustain the load or Harmonic frequency of the body. It also can be a starting point for another, more detailed, dynamic analysis, such as a transient dynamic analysis, a harmonic response analysis, or a spectrum analysis. The natural frequencies and mode shapes are important parameters in the design of a structure for dynamic loading conditions [7].

Static deflection,

$$\delta_{st} = \frac{FL}{AE} \tag{1}$$

The working frequency,

$$f = \frac{1}{2\pi} \sqrt{\frac{g}{\delta_{st}}} \tag{2}$$

TABLE III
 CALCULATED RESULTS FOR MODAL ANALYSIS ON THE ELEVATING SCREW

Parameters	Symbol	Value	Unit
Static deflection	δ	0.283	mm
Working frequency	f	29.63	Hz

Table 3 shows theoretical results of modal analysis on the elevating screw for radial drilling machine.

3.2. Numerical Result of Modal Analysis on the Elevating Screw

A modal of elevating screw was imported to ANSYS 17 and setting up the boundary conditions for modal analysis. There is only one important boundary fixed support for modal analysis. A modal analysis determines the vibration characteristics (natural frequencies and corresponding mode shapes) of a structure or a machine component. The natural frequencies and mode shapes are used to obtain the transient response by superposition. The numerical results of natural frequencies for global mode shapes are compared with working frequency of elevating screw. The mode shapes obtained must be away from this frequency range so as to make that resonance does not occur.

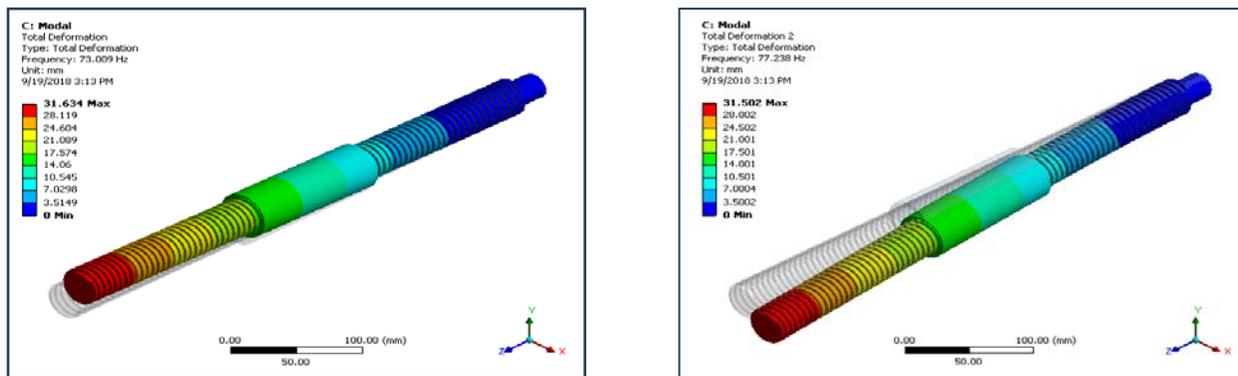


Figure 2. First Mode Shape and Second Mode Shape for Elevating Screw

Figure 2 shows the natural frequency of first mode shape and second mode shape at total deformation. From the results, the natural frequencies of the elevating screw at first and second mode shape are 73 Hz and 77.24 Hz.

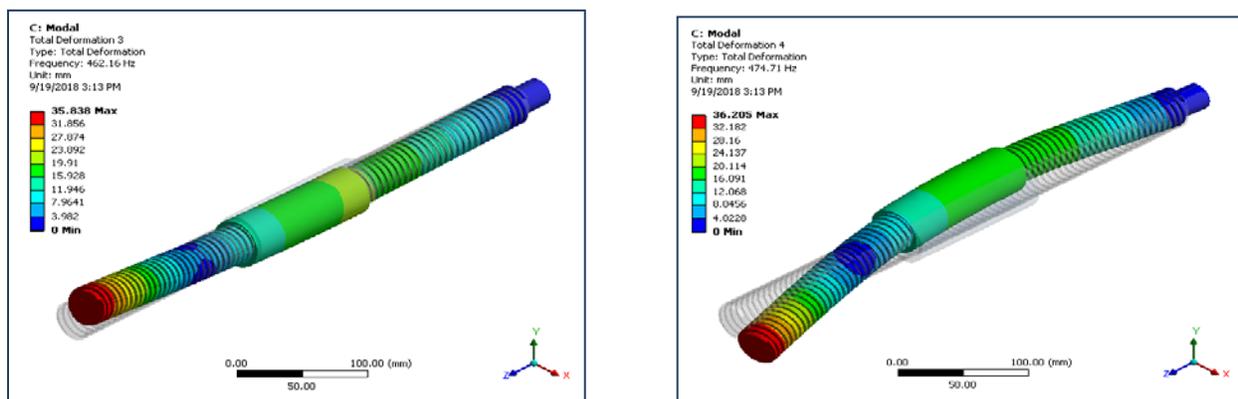


Figure 3. Third Mode Shape and Fourth Mode Shape for Elevating Screw

Figure 3 shows the natural frequency of third mode shape and fourth mode shape at total deformation. From the results, the natural frequencies of the designed elevating screw at third and fourth mode shape are 462.16 Hz and 474.71 Hz.

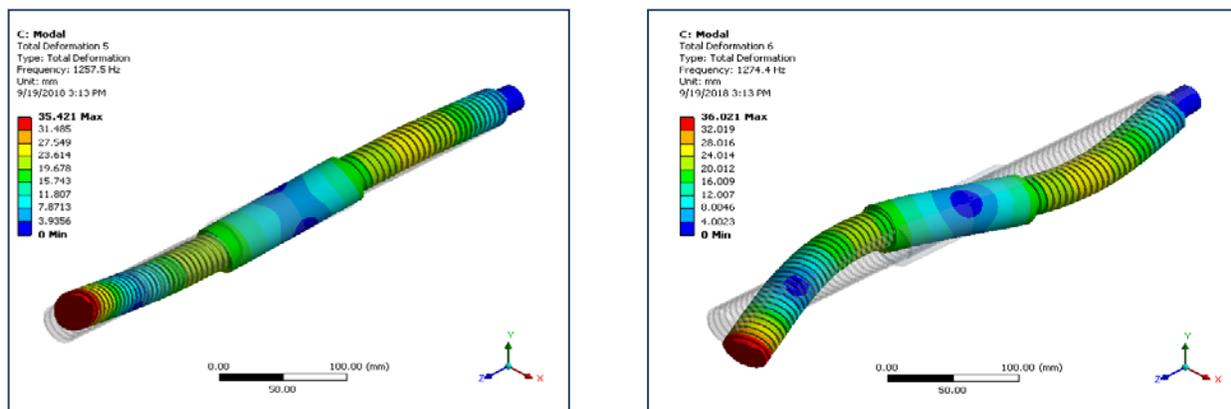


Figure 4. Fifth Mode Shape and Sixth Mode Shape for Elevating Screw

Figure 4 shows the natural frequency of fifth mode shape and sixth mode shape at total deformation. From the results, the natural frequencies of the designed elevating screw at fifth and sixth mode shape are 1257.50 Hz and 1274.40 Hz.

TABLE IV
 NUMERICAL RESULTS FOR MODAL ANALYSIS ON THE ELEVATING SCREW

No	Mode shapes	Natural frequency of Elevating Screw (Hz)
1	1 st Mode	73.00
2	2 nd Mode	77.24
3	3 rd Mode	462.16
4	4 th Mode	474.71
5	5 th Mode	1257.50
6	6 th Mode	1274.40

The present work aims to compare the minimum mode (first mode) frequency from the simulation result of elevating screw. Mode shapes describe the relative position of selected points on a structure for a given vibration mode. Each vibration mode has its unique mode shape, and if the structure is linear the mass normalized mode shapes are supposed to be orthogonal to each other. In first mode shape, the corresponding working frequency of elevating screw is 29.63 Hz and the natural frequency of the elevating screw is 73 Hz. As the working frequency of elevating screw and natural frequency of elevating screw do not match so the elevating screw structural has no tendency of resonance. In all mode shapes, the structure will survive without any deformation.

IV. TRANSIENT ANALYSIS OF ELEVATING SCREW

4.1. Theoretical calculation of transient condition on the elevating screw

All of the forces applied to the structure are known at each instant in time. This is also a time-response method. In transient analysis, both inertia and damping effects are important. There are three cases in this analysis

- (i) Over damped case ($\zeta > 1$)
- (ii) Critically damped case ($\zeta = 1$)
- (iii) Under damped case ($\zeta < 1$)

Damping ratio range for metal structure has 0.02 to 0.04 [12]. Therefore, the design of elevating screw is under damped case. Mode superposition transient dynamic analysis is a method of using the natural frequencies and mode shapes from modal analysis to characterize the dynamic response of a structure in terms of transient excitations. The equation of motion was expressed as follows:

$$m\ddot{x} + c\dot{x} + kx = f(t) \tag{3}$$

Where, $x(t)$, $\dot{x}(t)$, and $\ddot{x}(t)$ are, respectively, the displacement, velocity and acceleration in the n discretized points or degrees of freedom (DOF) in the time domain. m , c and k are mass, dampers and springs. $f(t)$ is a vector (with the same size than x) that expresses the force applied on each DOF in the time domain [2].

Mass of elevating screw,

$$m = \frac{W}{g} \tag{4}$$

Spring stiffness,

$$k = \frac{W}{\delta_{st}} \tag{5}$$

Natural frequency,

$$\omega_n = \sqrt{\frac{k}{m}} \tag{6}$$

Damped natural frequency,

$$\omega_d = \omega_n \sqrt{1 - \zeta^2} \tag{7}$$

Period of elevating screw,

$$\tau = \frac{2\pi}{\omega_n} \tag{8}$$

Logarithmic decrement,

$$\delta = \frac{2\pi \zeta}{\sqrt{1 - \zeta^2}} \tag{9}$$

Displacement of elevating screw,

$$x(t) = \frac{F_0}{k} \left[1 - \frac{1}{\sqrt{1-\xi^2}} e^{-\xi\omega_n t} \cos(\omega_d t - \varphi) \right] \quad (10)$$

Velocity of elevating screw,

$$\dot{x}(t) = \frac{F_0}{k} \left[\frac{\xi\omega_n}{\sqrt{1-\xi^2}} e^{-\xi\omega_n t} \cos(\omega_d t - \varphi) + \frac{\omega_d}{\sqrt{1-\xi^2}} e^{-\xi\omega_n t} \sin(\omega_d t - \varphi) \right] \quad (11)$$

Acceleration of elevating screw,

$$\ddot{x}(t) = \frac{F_0}{k} \left[-\frac{\zeta^2 \omega_n^2}{\sqrt{1-\zeta^2}} e^{-\zeta\omega_n t} \cos(\omega_d t - \varphi) - \frac{2\xi\xi_n \omega_d}{\sqrt{1-\xi^2}} e^{-\xi\omega_n t} \sin(\omega_d t - \varphi) + \frac{\omega_d^2}{\sqrt{1-\zeta^2}} e^{-\xi\omega_n t} \cos(\omega_d t - \varphi) \right] \quad (12)$$

MATLAB program

*****Theoretical Calculation of Transient Condition on the Elevating Screw*****

```

clc
F=60602;      % Applied force on the elevating screw
n=70;        % speed of elevating screw
E=210;       % young modulus
g=9.81;      % acceleration due to gravity
L=850;       % length of screw
dm=32.5;     % mean diameter of screw
zeta=.03     % damping ratio
deta=(u*L*10^-3*4)/(pi*(dm*10^-3)^2*E*10^9)
m=u/g
k=u/deta
wn=sqrt(k/m)
zwn=zeta*wn;
wd=wn*sqrt(1-zeta^2)
q=sqrt(1-zeta^2);
wd=wn*sqrt(1-zeta^2);
phi=atan(zeta/q)
r=zeta^2*wn^2
s=wd^2
v=zeta*wn*wd
t = 0:0.001:4;
x=(F/k).*(1-(1/q).*exp(-zwn.*t).*cos(wd.*t-phi))
plot(t,x)
xlabel('time.(s)')
ylabel('displacement, (m)')
title('Response for under damped system')
pause
t=0:0.001:3.999;
c=(F/k).*[(zwn/q).*exp(-zwn.*t).*cos(wd.*t-phi)+wd.*exp(-zwn.*t).*(1/q).*sin(wd.*t-phi)]
plot(t,c)
xlabel('time, (s)')
ylabel('velocity, (m/s)')
title('Response for under damped system')
pause
t=0:0.001:3.998;
a=(F/k).*[-(r/q).*exp(-zwn.*t).*cos(wd.*t-phi)-2*v.*exp(-zwn.*t).*(1/q).*sin(wd.*t-phi)+(s/q).*exp(-zwn.*t).*cos(wd.*t-phi)]
plot(t,a)
xlabel('time, (s)')
ylabel('acceleration, (m/s^2)')
title('Response for under damped system')

```

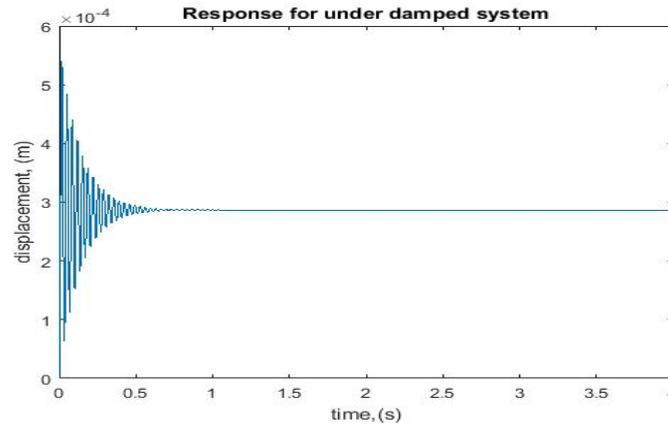


Figure 5. Displacement Versus Time Variation on the Elevating Screw Using MATLAB

Figure 5 shows displacement with time variation on the elevating screw using MATLAB software. The characteristic of displacement presents some oscillations around its balance position which is equal to 2.99×10^{-4} m corresponding to the elementary step displacement of the elevating screw. The distribution of displacement on the elevating screw changes from 0 to 0.7 s. The maximum displacement occurs between 0 s to 0.25 s. The maximum displacement 5.2×10^{-4} m is found during 0 s to 0.25 s. The value of displacement is steadily decreased from 0.26 s to 0.7 s. Displacement is convergence after 0.7 s due to damping effect.

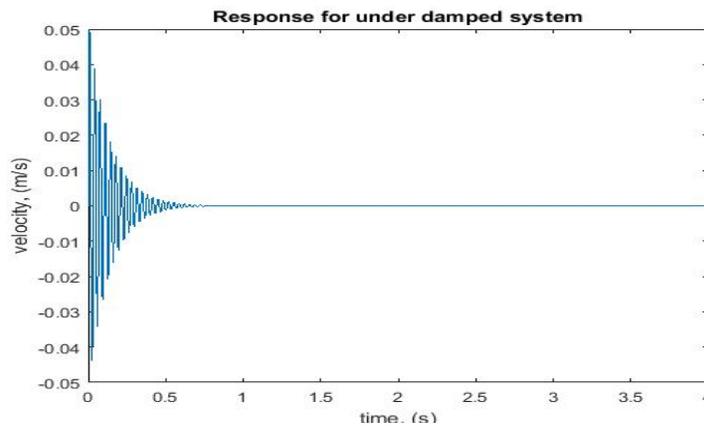


Figure 6. Velocity Versus Time Variation on the Elevating Screw Using MATLAB

Figure 6 describes velocity with time variation in transient calculation using MATLAB software. The elevating screw starts from zero velocity to reach maximum value of 0.045 m/s then it tends to zero value at 4 s where the elevating screw reaching at the rest position. The velocity distribution on the elevating screw changes from 0 to 0.7 s. The maximum velocity occurs between 0 s to 0.25 s. The velocity distribution is gradually decreased from 0.26 s to 0.7 s. The value of velocity is convergence after 0.7 s due to damping effect.

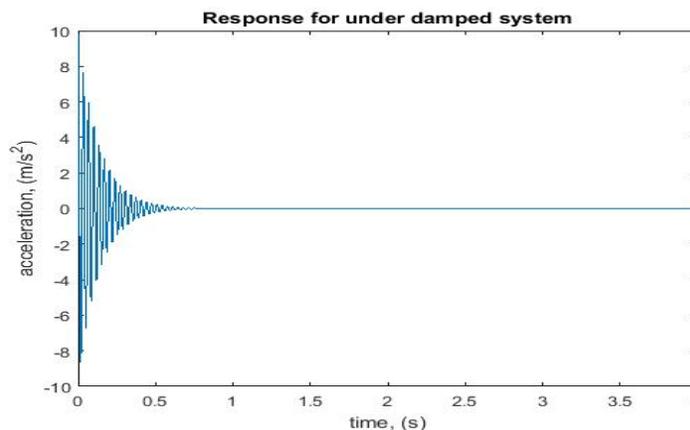


Figure 7. Acceleration Versus Time Variation in Transient Operation Using MATLAB

Figure 7 illustrates acceleration with time variation in transient calculation using MATLAB software. The elevating screw starts from zero acceleration to reach maximum value of 8 m/s^2 then it tends to zero value at 4s where the elevating screw reaching at the rest position. The acceleration on the elevating screw changes from 0 to 0.7 s. The maximum displacement occurs between 0 s to 0.25 s. The acceleration of elevating screw is steadily decreased from 0.26 s to 0.7 s. Acceleration of elevating screw is convergence after 0.7 s due to damping effect.

2.3.1. Numerical Results of Transient Structural Analysis on the Elevating Screw

The transient structural analysis is also called time-history analysis that specifically uses the ANSYS Mechanical solver. This type of analysis is used to determine the dynamic response of a structure under the action of any general time-dependent loads [2]. This type of analysis can also be used to determine the time-varying displacements, velocity and acceleration in a structure as it responds to any transient loads. The time scale of the loading is such that the inertia or damping effects are considered to be important. Table V shows input data used in simulation process.

TABLE V
 INPUT DATA USED IN SIMULATION PROCESS

No	Category	Input Data
1	Analysis type	Transient structural
2	Geometry	3D
3	Material Selection	AISI 1035 steel
4	Mesh Number of elements	132880
5	Boundary condition Applied load Fixed-Free Total Time Frequency Damping ratio	60602 N Upper end of screw 4 s 29.63 Hz 0.03
6	Output	Displacement Velocity Acceleration

The model of elevating screw is drawn in SOLIDWORKS software and is added to the geometry in ANSYS 17 software. This geometry model is meshed with high smoothing. Meshing is the process in which the mechanism geometry is spatially discretized into elements and nodes. The mesh model is imported to transient structural analysis.

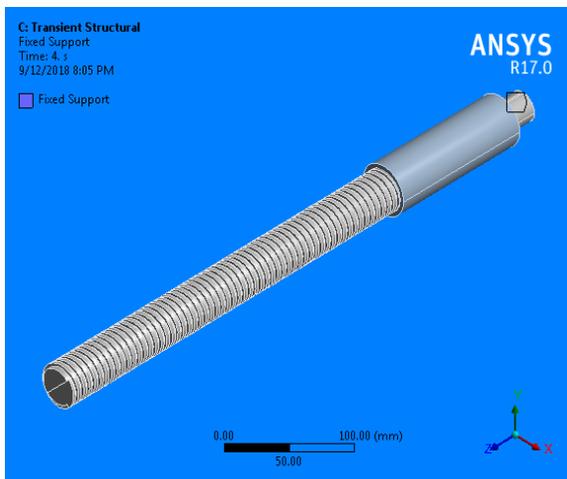


Figure.8. Fixed Support of the Elevating Screw



Figure.9. Force 60.6 kN Applied on the Elevating Screw

For the transient structural analysis in ANSYS, boundary condition is provided in the Figure 8 and 9. The upper end of the screw is applied as fixed support as shown in Figure 8. The input boundary of force 60.6 kN is applied at the mean diameter of the screw as shown in Figure 9. Moreover, other important boundary conditions in transient structural analysis are maximum step end time is 4s, damping ratio 0.03 and frequency 29.63 Hz. Figure 8 and 9 illustrate the primary boundary conditions applied on the elevating screw to be analyzed. The main output transient responses are displacement, velocity and acceleration with time variation.as shown in the following figures:

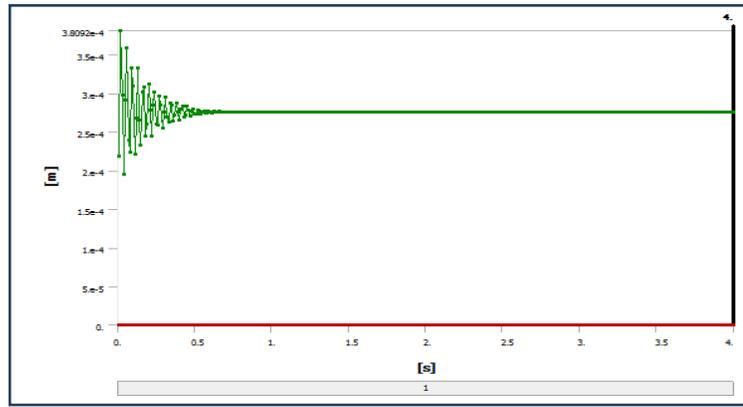


Figure 10. Displacement Versus Time Variation in Transient Analysis using ANSYS software

Figure 10 shows displacement with time variation in transient analysis using ANSYS software. The characteristic of displacement presents some oscillations around its balance position which is equal to 2.8×10^{-4} m corresponding to the elementary step displacement of the elevating screw. The displacement excitation was expected to generate the correct response spectra because ANSYS requires a displacement time history to generate it. The distribution of displacement on the elevating screw changes from 0 to 0.7 s. The maximum displacement is found between 0 s to 0.25 s. The maximum displacement 3.9×10^{-4} m is found from 0 s to 0.25 s. The value of displacement is gradually decreased from 0.26 s to 0.6 s. Displacement is convergence after 0.6 s due to damping effect.

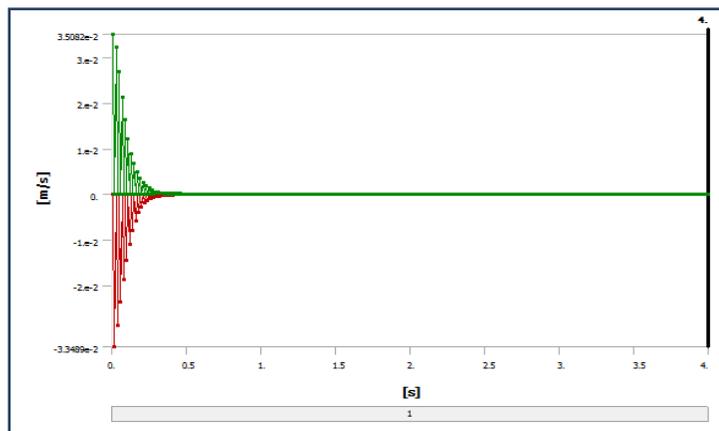


Figure 11. Velocity Versus Time Variation in Transient Analysis using ANSYS software

Figure 11 describes velocity with time variation in transient analysis using ANSYS software. The moving part starts from the zero velocity to reach a maximum of 0.035 m/s then it tends to the zero value at total time 4 s where the elevating screw reaching the rest position. The velocity distribution on the elevating screw changes from 0 to 0.6 s. The maximum velocity occurs between 0 s to 0.25 s. The velocity distribution is gradually decreased from 0.26 s to 0.6 s. The value of velocity is convergence after 0.6 s due to damping effect.

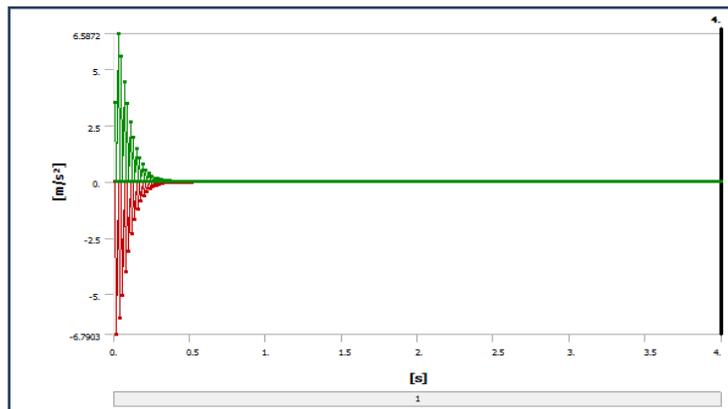


Figure 12. Acceleration Versus Time Variation on the Elevating Screw m using ANSYS software

Figure 12 shows acceleration with time variation in transient analysis using ANSYS software. The acceleration of elevating screw starts from the 0 m/s^2 to reach a maximum of 6.58 m/s^2 then it tends to the zero value at total time 4 s where the elevating screw reaching the rest position. The acceleration distribution on the elevating screw occurs from 0 to 0.6 s. The maximum acceleration distribution is found between 0 s to 0.25 s. The maximum value of acceleration is 5.8 m/s^2 during 0 s to 0.25 s. The acceleration of elevating screw is gradually declined from 0.26 s to 0.6 s. The value of velocity is convergence after 0.6 s due to damping effect.

CONCLUSIONS

Elevating screw is an essential part of the radial drilling machine. Every structure has its own natural frequency and logarithmic decrement or damping for each vibration mode. Generally, natural frequency is an important parameter in the structure and is related to the rigidity and density of the vibrating object. The modal analysis of elevating screw has been done to get the first 6 order frequencies and vibration modes. The natural frequency of first mode shape is less than other mode shape. The first mode shape of natural frequency on the elevating screw is 73 Hz, the maximum deformation occurs at the free position of the elevating screw. The working frequency of elevating screw is 29.63 Hz. If the first mode shape natural frequency is greater than the working frequency of elevating screw, the structure is safe. The dynamic behaviour of elevating screw system with a moving nut was calculated using step response function for a time step of duration 4 s. A computer program was written in MATLAB to generate displacement, velocity and acceleration time histories of the elevating screw. Theoretical calculation of maximum displacement $5.2 \times 10^{-4} \text{ m}$, velocity 0.045 m/s and acceleration 8 m/s^2 are occurred during 0 s to 0.25 s using MATLAB software. Numerical results of elevating screw are found maximum displacement $3.75 \times 10^{-4} \text{ m}$, velocity 0.035 m/s and acceleration 6.59 m/s^2 during 0 s to 0.25s using ANSYS software. Based on these results, the vibration response of elevating screw decrease with time increase and tends to the static response due to the dissipation of system energy.

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International Migration of *Adult Children* and '*Instant*' Problems of Elderly Parents in Kashmir with Special reference Srinagar District: A Sociological Study

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Abstract

International migration is an economic process which involves and affects individuals who move to other countries or choose to migrate and who stay behind (particularly elderly parents) left behind in origin country. It is considered as an increasingly global phenomenon. It is a well-accepted notion that overseas international migration along with different causes which have certain consequences and effects for those who particularly stay behind in origin countries. The focuses of attention in this study are elderly parents who are affected by their migrating adult children. The size, magnitude, composition and direction of the effects of this process of migration may differ and it needs to be further investigated and understood in a more enlightened manner and deeply studied. This is evident from the various studies carried out in the area of sociology of ageing. Based on a sample of 50 respondents and using an intensive approach through interview schedule, the study has been carried out in Srinagar district of the Kashmir valley and aimed to trace the problems faced by elderly parents in Srinagar city due to the international migration of their children and its impact on their health and psychological wellbeing. The author found that there has been a significant impact on various aspects of life of elderly people in Kashmir like, they feel loneliness, depression, isolation, lack of care love and support by their children. Further it has been found that elderly parents receive less time contribution from their migrating children.

Key words: (Inter National Migration, Impact, Elderly, Kashmir, Srinagar District)

1. Introduction

If we look at history and analysis on migration phenomenon or study mobility of people worldwide, people have been travelling from one place to another for different reasons, in search of better livelihoods and in terms of employment opportunities or escape persecution or displacements of people, largely most dominant prerequisite for mobility or migration of people has always been to better their economic condition for which people have been travelling within or across geographical boundaries. Migration can be termed as individuals in transition. It has is always been ingrained in individuals psyche. Some get chance to migrate where as others don't. There has always been a family decision behind migration of individual or individuals and as well as individuals own decision. Migration can be defined as mobility of individuals or people from one geographical area to another. It is movement of individuals who leave their country or society of origin, either for permanent or temporary residence in country of destination.¹

The increasingly emerging phenomenon of process of globalization, urbanization, employment opportunities elsewhere and settlement of persons in foreign countries have led to the expansion at both local and international migration of people from developing to developed countries. This has changed the living standards and patterns of the societies worldwide including change in familial settings which has posed many problems for both country of origin and country of destination. There has been a profound impact on who migrates and who stay behind be it spouse children or elderly parents. The main and increasingly striking impact has been on old age parents who stay behind when their children migrates to other countries that leads to health, emotional and psychological problems and challenges for them.²

International migration is a socio-economic process which involves and affects individuals who move to other country and who stay behind in origin country and the places where they choose to migrate. It is considered as an increasingly global phenomenon. It is a well-accepted notion that overseas international migration along with different causes has certain consequences on both on origin and destination countries .However the size, magnitude, composition and direction of the effects of this process of migration may differ and it needs to be further investigated and understood in a more enlightened manner and deeply analyzed and studied. The rapid increase in trends of adult children migration is raising the issue of sufferings of those who left behind (elderly parents stay behind particularly) and their reliance on the migrant children for support.³

The impact of migration on older people has been further compounded by the disruption of the welfare state, which used to provide extensive benefits to all sections of society. The fact lies that international migration can result in both positive and negative outcomes and the impact of migration on those left behind is likely to be specific in nature, depending on the local culture and the importance of kinship networks as well as the social and legal arrangements between sending and receiving states. The Remittances send back home by migrants children to their elderly parents left behind may also play a significant role in helping family members to meet their financially needs but other aspects of welfare such as practical and emotional support, social standing in the community and the coverage of formal systems of social protection may also be equally important for elderly parents.⁴

Although Children who had migrated may often make a phone call to lessen the loneliness of their elderly parents while elderly parents who are left behind at home country suffer many problems due to migration of their adult children and this aggravates there agony ,misery and suffering and they feel they are being isolated. Elderly Parents who at this stage of life when they are older and when their physical and mental capabilities is on decline, need love care, affection and emotional support and time from their children but due to increasing out migration of their children they live life of loneliness without their children and this makes them suffer in terms of social, psychological and health problems.⁵

Similarly, when adult children find suitable employment opportunities and earn a decent living they start getting settled in host country of destination. They send remittances to their elderly parents in terms of financial contributions so that they live happily and also take care of property which is usually looked after by elderly parents in home country. Elderly parents Instead of getting care and emotional support from their migrant children, they are left to take care of household chores and property. The adult children think that they have provided their ageing parents with all comforts and facilities but they are unaware in terms of true realities and ignore the sufferings which elderly parents face in the absence of their adult migrant children such as loneliness, missing their children on different social and religious events, neglect.⁶

Migration of adult children to other countries not on has economic implications and outcomes but it is also affecting the social apparatus, and family as one of the socializing unit and emotional bonding is also getting affected by international migration of

younger people. The intensity of effects may be of different kinds either like nuclear family separation from joint family in the host country of destination or Adult children migrating alone while their spouse and elderly parents are left behind at country of origin. There is a lot of research available on left behind children, wives but very little studies are available and explores the relationship between migration of adult children and elderly parents left behind when their children migrate.

The numerous studies conducted in developed countries have witnessed and explored the phenomenon of international migration of young people particularly with respect to left behind parents in home country. The present and evident studies show that there is profound impact of international migration of adult children on elderly left behind parents who are living without their children especially male children living in other countries. The present literature available has focused particularly on physical health of the elderly parents while other aspects related to their life like problems of mobility, feeling of sense loneliness and isolation, repression anxiety, emotional instability, attitude of relatives and people around them is given and paid lesser attention to. Most of the Parents in context of developing and developed countries traditionally rely and are dependent on their children in later stage when they attain ageing or become old enough rely for personal care needs, affection, Emotional and financial support like it is prevalent in every culture and such a similar situation is found in Kashmir valley especially in Srinagar city which has good number of concentration of elderly parents who are living alone and left behind by their adult children who had migrated to other countries. The parents have started living alone which has created different problems for them.⁷

2. Review of literature

Zachariah et. al. (2003) in his study reveals that Migration adult child affected the elderly parents in many ways. The adult children's absence may deprive older parents care or they may feel loneliness, but on the other hand, remittances send back home by their migrant children may improve their socio-economic and financial condition and security in old age, and may enhance their ability to access to better medical facilities. Migration has increased the old-age dependency in the state by increasing the number of the elderly persons and had decreased of the working age population of young people. Migration has increased the proportion of the elderly persons living alone without their adult children and has aggravated many problems that elderly persons face like anxiety, depression, loneliness and sometimes emotional instability of elderly parents. Migration of young adults increased proportion of the elderly who live alone by 50. The researchers further found that Anxiety is major problem among 15 percent of the elderly parents.⁸

Gupta et, al. (2003) in his study provides the evidence for the impact of the three emotional health indicators regarding the number of migrating sons. The results reveal that the depression indicator among elderly parents shows the strongest negative reaction whereas the level of happiness is not found to be significant and large in magnitude. This study further reports the impact of migration by the gender of the child, separately. It is considered that, mostly sons in all economies are found to be productive assets for their left behind family especially for support for elderly parents as they are more likely to remit money back to their elderly parents in higher amounts. These remittances can prove to function as a substitute for emotional proximity as it allows the elderly parents to be financially become well off. It has further been revealed in this study that the absence of a younger son significantly reduces the physical attendance that the elderly parents receive. The increasing frequency of contacts of elderly parents but the decreased likelihood of being in weekly contact with the sons is likely to leave the elderly parents in emotional distress and develop in them feelings of loneliness. This is emphasized by 6.4% higher levels of loneliness in the case of migrating sons. In this case elderly parents depend more strongly on a caretaker who is likely to be a poor substitute for the own child or the spouse. Such a situation could aggravate the emotional state caused by the absence of a child and is likely to lead to lower levels of satisfaction and could potentially explain the augmented probability of depression. The another significant reason for the more severe impact for migrant sons could be that traditionally, Chinese elderly parents (especially in rural areas) have a

preference for sons.⁹ **Xiang (2005)** in his study points out the basic problem faced by left behind elderly persons in rural economy in china. The researcher identified an emotional loneliness as the most aggravating problem of the left behind elderly persons because of migration of their children. The researcher further reveals but in general their situation was not much worse than those living with family members. Their problem could not be attributed to being left behind; instead the fundamental cause was that many rural communities as a whole had been left behind economically and socially by one or more of their children migration.¹⁰ **Silberstein et al (2006)** in this study has examined how migration of adult children and household composition has influenced the psychological well-being of elderly parents in rural China study further revealed in findings that financial transfers provided to elderly parents may serve as compensation for their custodial care of parents as part of a time for money exchange that exemplifies the functional integration between generations in the rural Chinese family.¹¹

3. Research Methodology

3.1. Universe of the study

Based on a sample of 50 respondents and using an intensive approach through structured and unstructured interview schedule, the study has been carried out in urban Srinagar district of Kashmir valley and aimed to trace the problems of elderly parents for enhancing objectives of the research both open ended and closed end interview schedule were framed along with participant observation method.

3.2 Sampling Plan of the study

The sampling plan of the present study is based on the sample of 50 respondents selected at random basis from Srinagar district of Kashmir valley. Exploratory research design was used to collect data from the field.

3.3 Hypotheses of the study

In the broader theoretical context an attempt was made to develop a proper and realistic sociological hypothesis regarding the topic of research. The main hypothesis in regard could be explained in a way that international migration of adult children has impacted on elderly people in Srinagar city. The elderly parents feel sense of distress, loneliness, alienation, lack of support and less time contributions from there migrant children.

3.4 Objectives of the study

1. To identify emerging problems of elderly parents in the study area;
2. To examine the health, emotional, psychological problems of elderly parents who are left behind by their migrating sons in the study area;

4. Findings of the Study

The findings of the study are as under:

In most of the countries children are viewed as sometimes as insurance against disability in old age and providing income after retirement for elderly parents, especially in terms of developing countries where there are limited markets for credit facilities and insurance. When the time comes that parents reach an age where they require assistance, security and are dependent on their children. Their children are considered as a form of social security at the time when parents reach old age. They need utmost care and affection when they are old and fragile and their physical and mental abilities start to decline. At this important stage of life it is children that are needed by their parents more than any other relatives. However, it should be their children that must decide to take on and shoulder responsibility of caring for their elderly parents.

This study has been taken in Srinagar district of Kashmir valley. In this study the older parents have been taken into consideration belonging to the age group of 50 to 80 years. In this study it has been found that out of 50.00 i.e. (100 percent); 20.00 elderly parents admitted that are suffering hypertension, diabetes and heart disease. Similarly, it has observed by the researcher that most of the older age parents had at least one son living and working abroad. Out of 50.00 respondents; 10.00 (10 percent) elderly parent respondents reveals that that they persuaded their son to migrate abroad because of lack of better employment opportunities and life style. Even if their children or their son was well qualified and had opportunities for getting job at native place but still their children choose and made the decision to go abroad.

Further, the study acclaimed that out of 50.00 elderly respondents 10.00 respondents (10 percent) admitted that the motivation for migration of their sons to live and work abroad was through their getting tempted by some of the relatives or cousins who were already settled in foreign land. This was also a key factor for their migration the young people migrate to abroad because of the pull and push factors which has tremendous impact on their elderly parents. It has been observed by the study that also that pull and push factors are and still remain dominant factors in the process of migration. And out of 50.00 respondents; 10.00 elderly parent respondents i.e. (10 percent) admitted that the motivating and leading factors behind the migration of their sons were the desire to earn more income and to seek better employment opportunities elsewhere. It has been observed that some old age couples reported that they had compelled their male children to migrate to United States of America and also towards Gulf countries because their relatives and even some of their friends or even cousins resided there and they enjoy luxurious life. Some of the old age parents acclaimed that they too motivated their sons to migrate because other of their relatives along with their families were living abroad so they also persuaded and wanted their children to go and get settled over there.

Some elderly parents said that motivation for the migration of their sons was to improve the financial condition of family and better life style for their sons as their sons could not get better employment here because of his higher qualification as well as the conflict situation and prevailing circumstances. We did not want our sons to work here earning but working in stressful conditions like their father had been doing since long which ultimately ruined his health. Thus, we decided to send our f son abroad for making his future better and live a free and prosperous life.

Similarly, sometimes older parents when asked about their son migration, they replied that we didn't want our son to work in such conflicting conditions as are currently prevalent here. But rather we wanted him to live a peaceful happy life which was only possible in foreign land. Money is not everything but the happiness and peace of mind of our children is most important. They further revealed that our son send us good amount of money which is very enough for us to lead a wealthy life but whenever we talk to our son on phone or make a video call seeing him happy while chatting with us make us both feel better. When asked about social relations of elderly parent respondents they replied that often they feel a sense of loneliness and alienation because they are living alone without their children and even their relatives don't come to them very often but our relations with our neighbors are better enough. They are the ones who help us in times when there is emergency or other kind of need arises like going to social functions i.e. marriage, funeral ceremony or even they sometimes accompany us to hospital. This is our case and situation we don't know about other elderly parents are they treated the same way or not.

The study depicts that majority of the respondents said that no matter our sons is living abroad from us but we have our daughter who is like our son and she take best care of us. But we often miss our son and it gives us a feeling that will our son be able to attend out funeral rites of not since he lives far away and has to spent lot of money to come back home. We are on mercy of God and our daughter who make all necessary arrangements for us and make us feel even better.

5. Conclusion

In the light of above findings it has been concluded that there are a number of studies that have found the problem and effects of adult children's out-migration on the left behind parents in home country, but very less and rare efforts have been taken into consideration in terms of left behind parents in Srinagar city whose male children have been migrated internationally and they are left alone to take care of themselves in absence of their adult son or sons. This problem of international migration of adult children to other countries is aggravating and an emerging sociological concern. This study conducted in Srinagar city of Kashmir valley has been taken into consideration to probe into the problems of elderly parents who are living alone and left to take care of themselves. The attempt in this study has been made to fill the gap in the research pertaining to old age parents and by focusing on day to day sufferings and experiences of left behind parents in Srinagar city. It is evident from the present study that out migration of adult children has brought many transformational changes in the life of elderly parents and increased their problems and sufferings be it in terms of positively or negatively. The gains from adult migration of children in terms of economic contributions and remittances had to some extent improved their life style which has resulted in respect and alleviating their social status within the social structure prevalent in society. On the other hand the elderly parents said that no matter financially sound but this financial contribution from their adult migrant son does not suffice enough and it's not everything that elderly parents want and need but also elderly parents in absence of their adult migrant son have developed the feelings of loneliness, less time, emotional and psychological support and sense of isolation which effects their health and aggravates their problem.

Further, the study reveals that this problem of elderly parents is genuine and well understood because of the cultural context prevalent in our country where presence of male member within households is considered the strength and bread winner of the family and the primary source of care giver and taker of older parents during the time of old age when they feel much dependent and are physically weak. Those Children weather staying with their elderly parents or not who do not shoulder this responsibility of taking care of their old age parents when parents want and need utmost physical care and emotional and psychological affection are looked down and disrespected within society. The elderly parents often had persuaded their adult sons to find employment opportunities elsewhere and some children had made the decision of migrating to other country by themselves. Some parents complain about their sons for migrating to other countries and leaving them behind at mercy of God but others did not complain for their sons because they knew and were well aware and understood that there young sons had migrated abroad to earn decent living and support and benefit for the family financially and they were still shouldering this responsibility in terms of providing financial contributions to raise the family incomes and to provide better facilities and high standard of living for their family particularly their elderly parents left behind but such contributions in terms remittances send back home does not suffice it is more than that since elderly parents have no control over the emotions when it comes to adult child absence and the strong desire to be able to be close to their children. In order to cope up to prevailing circumstances elderly parents find to multiple strategies to adapt themselves and get use to their problems and sufferings.

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Effective Questioning Strategies to aim at Cognitive and Metacognitive Learning English Language Skills for Technical Students of J.N.T.U.Kakinada.

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Abstract- Every teacher of English practices asking probing questions in the classroom interaction in five key areas instructional goals like lesson clarity, instructional variety, task orientation, student engagement and student success. Effective questions are the tools students actively respond and engage in the learning process. The purpose of questions getting students interest and attention, diagnosing and checking, recalling specific facts or information, encouraging analysing, generalizing, differentiating, expanding, applying, problem solving skills and synthesizing skills. The technique adopted in the study to apply convergent and divergent questions. The target group is the students of Technical English to develop E.L.T., E.S.P., E.A.P., skills and to empower them. Questioning sets the students brain storming, creates curiosity, interest, challenges the learning to be specific and encourage the English Proficiency in effective and efficient use of L.S.R.W. skills. The methodologies used in this paper are Extending, Extending and Lifting, Funneling, Sowing and Reaping, step-by-step up, step-by-step down, and Nose-divide to optimise the learning English language skills. Cognitive learning is a process of memory, attention, reasoning, problem-solving and decision making. Cognitive learning helps to generate new knowledge. Metacognitive learning is consciousness, self-awareness, social cognition and self-regulation. The main objective of this method to empower the students with English Language Proficiency and mastering the skills for the professional development.

Index Terms- Instructional goals. Student engagement. Convergent questioning. Divergent questioning. English Language Teaching. English for Specific Purpose. English for Academic Purpose. Cognitive learning. Metacognitive learning.

Hypothesis - Effective questioning creates instructional opportunities for the learners actively engaged in learning to empower successfully living their learning.

I. INTRODUCTION

The Teaching and Learning process is dynamic and progressive. The target learners are the students, who have completed their Intermediate education, are from rural background, and pursued in vernacular medium. The Jawaharlal

Technical University, Kakinada prescribed two books for Technical English 1. English for Engineers and Technologists by Orient Black Swan, 2.Panorama - a Course on Reading published by Oxford University Press for the First semester and two text books for Second semester 1. English Encounters by Maruthi Publishers, 2.The Great Indian Scientists by Cengage. English for Engineers and Technologists covers six key areas Human Resources, Energy, Transport, Environment and Safety and Training. The material is task-based and skill-oriented to suit the needs Technical Engineers. English Encounters focuses on the key areas Education as The Greatest Resources, A Dilemma - a Layman Looks at Science, Cultural Shock, The Health Threats due to Climate Change, and a biography of Bill Gates. and it has Soft skills section to develop life skills. The book is reader-friendly and activity based aimed at to develop communication skills in systematic manner.

The role of asking questions is crucial in the teaching and learning process by the teacher and the learner. The teacher ensures the learners have the clarity in understanding the basic lesson, variety of instructional strategies used in the classroom interaction, the learners orient their learning to assigned task, the learners engagement in the learning process and the students success. "In the context of a lively and fast-paced exchange in a classroom, questions are important to know what extent the learners learnt the facts, knowledge from the text. Effective questioning involve the students engaged in the learning process. Borich, 2008a: Chuska, 2003: Walsh & Sattes, 2004. The learners and teachers are to engage themselves in questioning is crucial so it should have lion share of classroom 30% - 40% of the instructional time. This will encourage the learners to think, analyze, recall the facts, generalize, differentiate, classify, and apply the facts in real life like situation. Early studies revealed that 70% to 80% questions deal only recalling and only 20% to 30% deal higher order thinking skills. But the recent studies in United States and UK the need for asking higher order thinking skills. Atwood & Wilen, 1991, Brown, 2001: Brown & Wragg, 1993: Wragg, 2001. The teachers need to be trained to ask higher order thinking skills involving analysis, synthesis, and evaluation. Chuska, 2003: Dantonio & Beisenherz, 200; Power & Hubbard, 1999: Wiske, 1997.

The questions are classified into the following categories.

1. Getting interest and attention;

The questions for getting and attention are what is the resources? What are the different kinds of the resources? What is the basic difference between Human resource and natural resource? It is to recall the facts. What do you know about Ramanujan? Who is Ramanujan? Who was his mentor? Where did Ramanujan work before going to UK? Why did Ramanujan return to India? What was Ramanujan's contribution to Mathematics? All these questions demand the factual information about the text. The learners require only memorizing the facts. This is to getting the attention of the learners.

2. Diagnosing and checking:

The Diagnosing and checking questions are Why did Ramanujan write to G.H. Hardy? Why was life in England was not easy for Ramanujan? Why did Ramanujan return to India in 1919? What are the five eligibility requirements for an H-1B Visa? This will stimulate the learners to recall specific facts or information.

3. Encouraging higher-level thought processes;

The Higher-level of thinking skills triggers the thought process. Why do you think Ramanujan is referred to Human Resource? What are the qualities of Ramanujan made him Father of Modern Mathematics? Write a Role-Play the interview between the newspaper reporter and US Immigration Department about the issues of visas by US government. Developing Hybrid Technology to find Green Energy Solutions. Exploring the animal life and Plant life to overcome the handicaps. How are the plants and animals conservation by adoption? These questions probe the learners to analyze, differentiate and synthesize the facts.

4. Structuring and redirecting learning:

Structuring and redirecting learning is to redefine the energy sources, alternative energy sources from seaweeds, Hydrogen-powered economy, Offshore Wind solutions, Solar powered vehicles, Biogas Plants, Wave Power Devices are a few. Making conscious attempt to reduce dependency on Non-renewable sources of energy to renewable Green Energy solutions.

5. Allowing expression of affect:

Allowing expressions of affect in the story of "The Compensation" where Mr. Paterson pays the compensation to the man for his car ran over the pet dog resulting in death of dog. Actually the man was taking his dog to the forest to shoot an end to its suffering. " But now that won't be necessary, since he is dead. In the story lottery by Shirley Jackson where Old man Mr. Warner observing "Lottery isn't fair, it isn't right." resulting the villages killing a person by pelting stones by believing in superstition the killing a person will result in the village prosperity.

The questions in the above categories will shape or set up the learners response. A well formulated questions serve as an advance organizer, providing the framework for the purpose for the response.

II. METHODOLOGY

The questions can be narrow or broad. They encourage either specific, limited response or a general, expansive response. There are two types of questions 1. Convergent questions 2. Divergent questions.

1. CONVERGENT QUESTIONING:

The Convergent questions are otherwise known as direct or closed question. The learner simply recalls certain facts from the previously read text. The learners respond in a limited manner bound by the text. The answers are easily judged right or wrong. Many convergent or closed questions are used in direct instruction. What is a skybus? What is solar cooker? What is solar energy? What is wind energy? What is the pedal energy? What is a Biogas plant? What is environment? Who is Salim Ali? What was the incident made Salim Ali interested in birds?

2. THE DIVERGENT QUESTIONING:

The Divergent questioning encourages a general or open response. The divergent questioning is known as indirect question or open question. There can't be one single best answer but it can't have wrong answers. The teacher can expect far more diverse responses from divergent questions. The teacher should be careful to determine appropriate responses from inappropriate responses. In this case the teachers are to provide more detail, more information, or encouragement. The divergent question is rich repository of lively, spontaneous, follow-up material makes teaching fresh and interesting. Ex; How does training help to increase the industrial productivity and economic prosperity? What is office Etiquette? What is the difference between Personal versus Professional Relations? Is it ethically right to use the animals for scientific experiments? What is the difference between Mass production and production by the masses? Compare the skybus with the metro railways? What are the problems of road safety and what are the possible solutions? What are advantages and limitations of the H1-B visa?

Convergent questions can turn into divergent questions when answer to a question demands simple recall. When the teacher introduces a new topic may ask a question for which the learner is not read and the learner guesses the answer through generalization and inductive reasoning. What are the problems faced by the commuters by bus or auto rickshaw?

The Research reveals about Convergent and Divergent questions. classroom researchers have studied the effects on student achievement of asking convergent questions Ceil,1995, Dillon,2004, Gall,1984 The rationales for using higher-level divergent-type questions .The rationales for using higher-level, questions encourage analysis, synthesis, evaluation .Audet & Jordan, 2005 Bransford Brown & Cocking , Chuska, 2003. There is large imbalance between convergent questioning and divergent questioning. The need of the hour is the paradigm shift from convergent to divergent questioning. The four factors are to be considered when looking at the results.

1. Tests of achievement and particularly tests of standardized achievement - use of multiple choice items tests the learners behavior at lower levels of cognitive complexity.

2. The diversity of responses are expected from divergent questions, the time needed to build and follow up responses may consume more class interaction time but it is worth spending.

3.The teachers are to be trained to develop divergent questioning skills, as it is leading higher order of thinking skills.

4.The critical thinking and the problem-solving are associated with the divergent questions. Writing process writing of Solar Energy, Wind Energy, Hydroenergy, Nuclear Energy, Tidal Energy, Biofuels, learning and building word power or vocabulary, derivatives, changing the functional unit of the word, The detection of toxic gasses, preservation and conservation of water, plant and animal life.

The convergent questioning is necessary for achieving higher-level behaviour . Buring, Norby & Ronning2004: Mayer, 2002. The Central Board of Secondary Education, NewDelhi encourages the students develop Higher Order Thinking Skills through Divergent questioning where as State Boards are still encourage Lower Order Thinking skills through Covergent questioning. The Indian Institute of Technology, Indian Institute of Science, and Indian Institute of Management studies adopt divergent questioning skills.

TOOLS

EXTENDING A string of questions of the same type and the same topic.

EXTENDING AND LIFTING Initial questions examples and instances of the same type followed by a leap to a different type of question .

FUNNELING Begins with open questions and proceeds to narrow down to simple deductions, recall, and problem solving.

SOWING AND REAPING Problem posed, open questions asked followed by more specific questions and testament of initial problem.

STEP-BY-STEP UP A sequence of questions moving systematically from recall to problem solving , elevation or open ended.

STEP-BY-STEP DOWN Begins with evaluation questions and moves systematically through problem solving toward direct recall.

NOSE - DIVE Begins with evaluation and problem solving and moves straight to simple recall.

Source From "Asking Questions" by G. Brown and R. Edmondson in Classroom Teaching Skills -pp. 97-119 edited by E.Wragg.1984 published by Nichols Publishing Company.

INTERVIEWING. The students are interviewed about their learning a language, expressing their views, their likes and dislikes. The teaching faculty are interviewed about the strategies adopting to make teaching and learning interesting and challenging.

PROCEDURE

Many teachers begin structuring - soliciting- reacting process by starting with an open question which leads to further structuring and asking subsequent questions involve recall or deduction. The general to specific approach can take different twists and turns. The teacher begins by encouraging speculative responses and then narrows the focus by asking a question require simple deduction.

Teachers frequently employ funneling : add conditions of increasing specificity to a question. This depends on the teaching goals, and the learning outcomes.

III. RESULTS

The basic classification of the cognitive domain six levels of complexity. 1. Knowledge 2.Comprehension 3. Analysis 4. Evaluation 5. Application 6. Sythesis.

KNOWLEDGE The learner recalls, describe, define, identify, and recognise the facts that already learnt. The facts are linked systematically, gradually, systematically and developed into a composition. The teacher is to rationalize the questions represent task-relevant prior knowledge for subsequent learning. It is always advisable to ask reflective question Are the facts I am about to teach relevant for attains the desired learning outcomes.

COMPREHENSION questions require some level of understanding of the facts. The learner can explain, summarize, paraphrase, rephrase, and elaborate the facts learnt. Explain in your own words the concept water conservation, animal conservation and plant conservation.

Use passive form in writing a Report about the Factual description of the detection of toxic gases used in the mines. Write a flow chart of the solar energy, hydal electric power generation, the wind energy, the pedal energy, the biofuels, the geothermal energy, and the nuclear energy.

The learner must actively think about the material , logical, systematically and encourages the learners to retention, understanding by mind mapping.

APPLICATION

Application questions uses the verbs apply, demonstrate, employ, operate, solve and demonstrate to extend the learners to the higher level of thinking. The learners apply the facts to a problem, context, or environment different from the learnt.

What is brain drain? What is reverse brain drain? Which is highly useful for India?

Will the use of helicopters solve the transport problem in Metro cities?

Will the use of bicycles solve the pollution, traffic, and health problems in educational institutions?

How are preserving, conserving the natural resources like water, plants and animal life?

Is Nature providing solutions to modern man's pernia problems?

How is technology solving the physically handicapped people?

The quality of the teachers' questions will determine how much the teacher change the problem, context, or environment. A small change will lead to a big invention. The learners apply their learning to think out of box to find new solutions. It develops the critical thinking and lateral thinking. Thinking differently leads doing things differently.

ANALYSIS

Analysis is breaking down a big problem into small parts. The teachers use the action verbs like breakdown, distinguish, differentiate, and point out.

Differentiate between Mass production Vs. Production by Masses.

Distinguish between Nactornal animals from diurnal animals.

How does the breader reactor use the chain reaction for the energy?

The teachers evaluate the ability the learners ability to probe deep into the components of the problem.

SYNTHESIS

The teachers provide ample opportunities for the learners to create something new This level is associate with directly creativity-Anderson & Karthwohl, 2001; Marzano & Kendal, 2006. The facts, rules and action sequences, limits, and directions are required. The teachers use action verbs like produce, create, predict, formulate for synthesis.

Write the factual description of process of preparing ice-cream.

Write the factual description of preparing a bouquet.

write the factual description of origami.

EVALUATION

The teachers ask the learners to judge and make decision. This is the highest order cognitive skill. The criteria is adopted objective, scientific evidence, procedures. The teachers use following verbs like appraise, justify, assess, defend, judge and decide.

How does training play a vital role for increasing the productivity of an industry?

Do you justify the use of animals for experimentation?

Appraise the tourism as an industry.

IV. USING METACOGNITION FOR LEARNING LANGUAGE

Metacognition is a strategy for self- directed learning. The learners reflect their thinking by internalizing, understanding, recalling the content learned. This include self-checking, self-monitoring, self- regulating, self-efficacy and self-awareness.

Metacognitive strategies are most conveyed to learners through process by mental modelling. -Boyles, 2004; Duffy, Rochler, & Herrman, 1988; Dunlosky & Metcalf, 2008. Mental modeling helps the students to internalize, recall, and generalize problem to provide solutions to different content at a later time. The teacher mediates, helps to solve problems. Each of the tasks pose challenge for learners that can be addressed through modeling ways for the learners to organize their thinking.-Keene, 2007, Rekrut, 1999. Mental modeling involves three important steps

1. Showing the students the reasoning involved.
- 2.Making students conscious of the reasoning involved.
- 3.Focusing students on applying the reasoning.

The teachers provide ample, variety and challenging opportunities to the learners like Role Play. The learners understand the situation, recall their learning, think of ideas, draft the script, practice dialogue, and enact their role with their direction.

The teachers may assign the learners team tasks like Power Point Presentation, Telephonic conversation, interviewing, compeering, demonstrating, Group Discussion, and Debate. The learners develop problem solving, sharing their ideas, convincing, persuading others, negotiating, and team building skills.

Research on what makes a good demonstration indicates the following skill demonstration like Focus learners' attention, talk

in conversational language, makes simple steps, helps learners remember the demonstration and stressed the value demonstration. The teachers role mediating learning.

INTERVIEWING

The researcher interviewed the four of the faculty to know their views about convergent questioning and divergent questioning to develop language skills. They expressed that convergent questions are easy to administer, evaluate the learning and it is time saving whereas the divergent questioning is important, needed, but it is time consuming. They expressed there is every need of the hour implementation of divergent questioning important as the university is setting the questions using divergent questioning. The testing and measuring is done at the end as well as continuous assessment are done. The end semester examination should have at least 50% divergent questioning and 50% convergent questioning to set the students to think beyond text, and real learning takes place.

The researcher interacted with 20 students to know their opinion about convergent questioning and divergent questioning. Eight students felt convergent questions are easy to answer but it mere memorization is not real learning. Twelve students they preferred divergent questioning really helps them to right learning. This is due to the shift in question paper setting and evaluation of the university from content based to skill and application based . The industry and governance is looking forward this welcome change.

V. RESULTS & FURTHER STUDY

The researcher observes the learners aware of the different questioning strategy. The teachers introduces both convergent questioning and divergent questioning. There is a change in the learners and realize the significance of divergent questioning leaders to higher order of thinking skills. The learners feel there is joy of learning. The examination or test are meant for realize their real potential or understanding and application of their learning. It must not scare the learners and create tension. The aim of questioning is to build confidence and faith in themselves. the right types question stimulates thinking, triggers their imagination and use their mind to find solution. Here the teachers and the learners are to work as team. The teachers act as team to establish teaching and learning happens in joyful atmosphere. The classroom interaction and questioning is the source for traction research, the teachers as researchers to find solutions for their day to day interactions, bridging the gap between teaching goals and learners outcomes. The teachers are tobe sympathetic, compassionate, encouraging, supporting the learners learning outcomes. There are different learning styles for different learners as the teachers have different teaching methods. The quality of learning empowers them to live their learning. The true purpose of education is liberation from fear, anxiety, depression, ignorance, weakness but lead the learners to happy, joyful, healthy, confident, bold, courageous, problem solving, assisting , supporting the society and building the future thought leaders who can make the world better place to live in peace, happiness and prosperity. The classroom interaction, teachers' questioning will make learning and teaching a happening place to transform

the classroom a microcosm to macrocosm, preparing for the challenges of professional life with confidence and faith.

VI. LIMITATIONS & AREAS FOR FURTHER STUDY

The present article is an attempt to use probing the questioning in Technical English language and developing L.S.R.W skills, English for Academic purpose. It does not cover literature, creative writing, scientific, business, writing, professional writing.

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Job Satisfaction among the Teachers of the Schools of District Ganderbal

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Abstract – School Education is the largest department of Jammu and Kashmir (J&K), after Police Department in terms of human resources. Female workforce is found to be greater than males who try to meet the educational needs of student right from early years which is regarded as a challenging job. In this backdrop an attempt is made through this paper to study how much satisfied are the teachers with their job in this sector. J&K has 22 districts out of which 12 districts fall in Kashmir province. Ganderbal is one of the districts of Kashmir province which came into existence in the financial year 2007-08. The study was carried in District Ganderbal wherein sample of 134 employees (Masters and Teachers) was taken. The result generated from the study was that the employees (Masters and Teachers) of District Ganderbal were mostly satisfied with their job in all respects and enjoyed to take challenge of teaching in early years. All the variables of Job studied indicate that the teachers are fairly satisfied.

Index Terms – Co-workers, Ganderbal, Job Satisfaction, School Education, Teachers.

1. INTRODUCTION

Educational institutions are viewed as drivers of innovation and shapers of human capital formation. In a rapid technologically-changing world, schools are at the forefront in formation of sound, inquisitive and healthy children so as to turn out to be highly skilled, technologically sophisticated citizens who could be employed successfully for the development of nation as a whole in all respects. This very fact has made the performance and effectiveness of schools extremely crucial for the economic development of any nation. Schools owe their success largely to the efforts of their employees including both academic and administrative staff. They primarily depend on their staff - human resources to provide quality services to their customers (students), achieve their strategic objectives and establish a competitive advantage. Therefore, schools must maintain high quality staff (human resources) to maintain the service quality of the school system. The challenge of maintaining the quality of staff resources can be met by choosing staff development and staff job satisfaction as the thrust areas for the Department of school education.

In the present study, an attempt has been made to evaluate the perception of the employees of the Schools falling under the jurisdiction of Chief Education Office, Ganderbal, J&K, with respect to the level of existing human resources climate and Job satisfaction with a view to :

a) study the extent of the satisfaction regarding the job of School teachers of district Ganderbal,

b) recommend measures that may result in improvement of job satisfaction of teachers in the light of the revealed results.

The sample constituted the respondents from the schools of all the four zones of district Ganderbal. There are about 600 schools in the district. Random sampling was carried out and questionnaires were distributed among the teachers to elicit information regarding their job satisfaction.

The research instrument/tool used in the paper is Job Satisfaction Survey (JSS) by Spector (1994) having 36 items. Nine variables, each comprising of four items, have been assessed while overall score is computed from all items. Rating scale with six choices per item ranging from "strongly disagree" to "strongly agree" has been utilized. The nine variables under study are Pay, Promotion, Supervision, Fringe Benefits, Rewards based on performance, Norms, Co-workers, Nature of Work, and Communication.

In consonance with the objectives of the study a suitable research approach and design was adopted. The data, whatsoever, collected from both primary and secondary sources was analysed and the results have been thoroughly discussed by making appropriate interpretations. In accordance with the research setting advised for the study, a summary of findings and conclusions in light of the results obtained in present study has been provided in the following paragraphs.

II RESEARCH ELABORATIONS

The research on the job satisfaction of the employees in education sector is quite rich. Ssesanga & Garrett (2005) examined the job satisfaction of academics from two universities of Uganda and reported that the co-worker behavior, supervision and autonomy of content taught are most predominant in stimulating job satisfaction among the academicians. The age was observed to be a significant factor in job satisfaction but independent with regard to gender. Okpara, Squillace & Erundu (2005) investigated the effects of gender on the job satisfaction of full-time college and university teachers from 80 universities of United States and observed apparent and significant gender differences as female faculty reported a lower overall job satisfaction than male counterparts. Toker (2011) conducted an empirical study to examine the effect of demographic variables on the job satisfaction of the academicians belonging to the eight universities of Turkey and reported that a moderately high level of overall job satisfaction. The study revealed that the rank of the academicians was positively correlated with the satisfaction, wherein professors recorded the highest satisfaction and research assistants showed the lowest. Gender was reported to have no significant impact on the job satisfaction of the appraised academicians. Byrne, Chughtai, Flood & Willis (2012) conducted an empirical study on the levels of job satisfaction of accounting and finance academicians working in Irish higher education institutions and observed that a high level of overall job satisfaction. Faculty reported dissatisfaction with promotion prospects and time available for research. Male teachers reported higher levels of satisfaction than their female counterparts with regards to job security whereas professors were most satisfied and the lecturers were least satisfied with promotion prospects. Vuong & Duong (2013) conducted an empirical study to determine the level of job satisfaction among the academic staff of Vietnamese universities and concluded that faculty were overall satisfied with the factors such as promotion, work autonomy, teaching support equipment etc. but dissatisfaction or neutral behavior was observed towards the factors such as salary, bonus and welfare etc. The overall job satisfaction of the male faculty was reported to be higher than the female ones. De Lourdes Machado-Taylor et al. (2016) examined the academic job satisfaction of academicians working in the higher education institutions of Portugal and found job satisfaction as above average among the surveyed faculty. Academic staff reported higher satisfaction with teaching climate and colleagues and dissatisfaction with research climate and conditions of employment. Gender was found to have no influence on job satisfaction of the academics surveyed. Oshagbemi (1997) examined the effect of demographic variables such as age, gender and rank on the job satisfaction of university teachers (UK) and observed that the rank has a direct, positive and significant effect on the job satisfaction of university teachers, but not age or gender. Lecturers were reported to be least satisfied with their jobs followed by senior lecturers, readers and professors in that order. Hickson & Oshagbemi (1999) conducted a study on university

teachers, to investigate the effect of age on the job satisfaction of academicians with teaching and research and revealed that the job satisfaction is inversely related to age in case of academic teaching staff but in case of academic research staff age affects job satisfaction positively.

III. RESULTS AND FINDINGS

The present research study was aimed to investigate and assess the extent of satisfaction with Job among the teaching faculty of the schools of district Ganderbal and subsequently evaluate the impact of the Job satisfaction of the employees in the context of School education sector of J&K.

The primary finding of this study indicated that a positive perception prevailed among the teaching faculty of the schools of Ganderbal district with respect to the Job satisfaction. The results obtained provided fairly strong evidence in support of the propounded idea that the employee perception regarding the improvement in level of existing human resource climate will ultimately lead to improved satisfaction among the teachers with regards to their job in the sample educational institutions. Hypotheses developed in the present study established causal linkages between the elements of Job satisfaction. A brief and consolidated view of the major variables of the present study is as follows.

The perception of the teaching faculty regarding the overall Job satisfaction and its nine variables is provided in Table 1. An overall mean score = 4.18 (% of mean score = 69.72 %) indicates that the employees of the sample district are fairly satisfied with their jobs. The standard deviation of 0.411 also supports that the result is reasonably trustworthy. Further, all the nine job variables that have been utilized to measure the of job satisfaction of teachers in the current study, have reported a mean score of above 4, indicating satisfaction of sample teachers with all the nine variables of their jobs. Mean scores of 4 or more represents satisfaction with the job and its various variables, whereas mean of 3 or less shows that the teachers are not satisfied with their job. Mean scores between 3 and 4 represents ambivalence among the employees regarding their jobs (Spector, 1994). Among the nine job variables, the academic staff of the sample district under study, appear to be most satisfied with the *Co-Workers* variable (mean score= 4.44; % of mean score=74.00%) of their job, whereas the *Communication* (mean score= 4.01; % of mean score= 66.83) variable reported the lowest satisfaction. The standard deviation figures reveal that the results are very much reliable in a sense that the responses of the sample teachers on different variables do not depict much variability. The perception of teachers of the district regarding Job Satisfaction and its various constructs is presented here under Table 1.

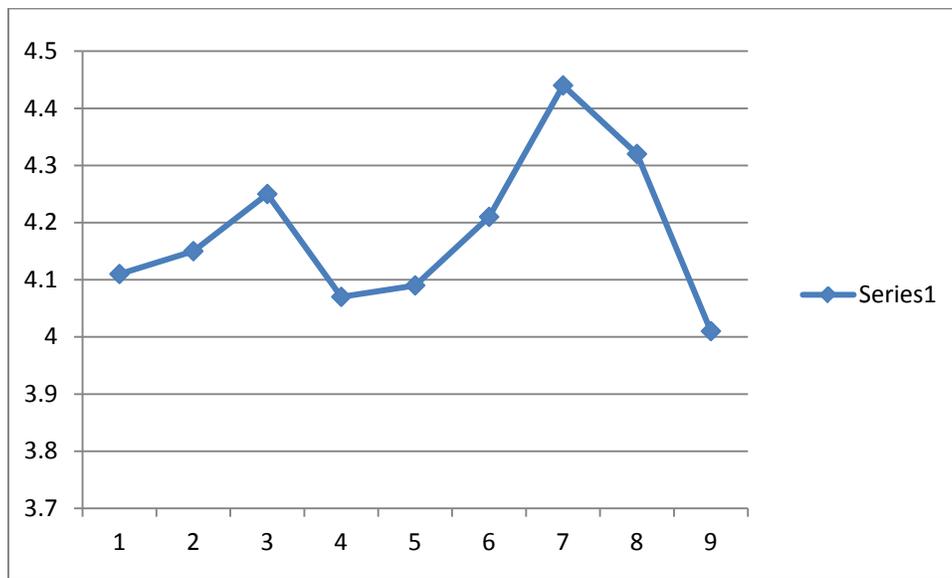
Table 1. Perception of employees/teaching faculty regarding Job satisfaction (N=134)

<i>Construct</i>	<i>Mean Score*</i>	<i>Standard Deviation</i>	<i>% of mean score</i>
1. <i>Pay</i>	4.11	0.453	68.50
2. <i>Promotion</i>	4.15	0.352	69.17
3. <i>Supervision</i>	4.25	0.364	70.83
4. <i>Fringe Benefits</i>	4.07	0.51	67.83
5. <i>Contingent Rewards</i>	4.09	0.347	68.17

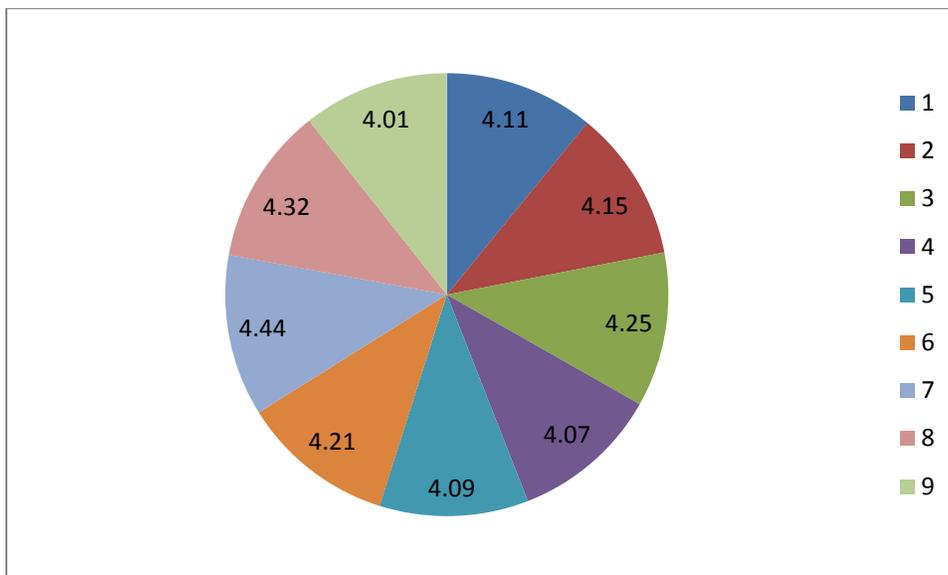
6. <i>Operating Conditions</i>	4.21	0.482	70.17
7. <i>Co-workers</i>	4.44	0.439	74.00
8. <i>Nature of Work</i>	4.32	0.318	72.00
9. <i>Communication</i>	4.01	0.43	66.83
Overall Job Satisfaction	4.18	0.411	69.72

Note: Scoring Scale: 1- Disagree very much 2- Disagree moderately 3- Disagree slightly 4- Agree slightly 5- Agree moderately 6- Agree very much.

Line Diagram of Table1



Pie Diagram of Table1

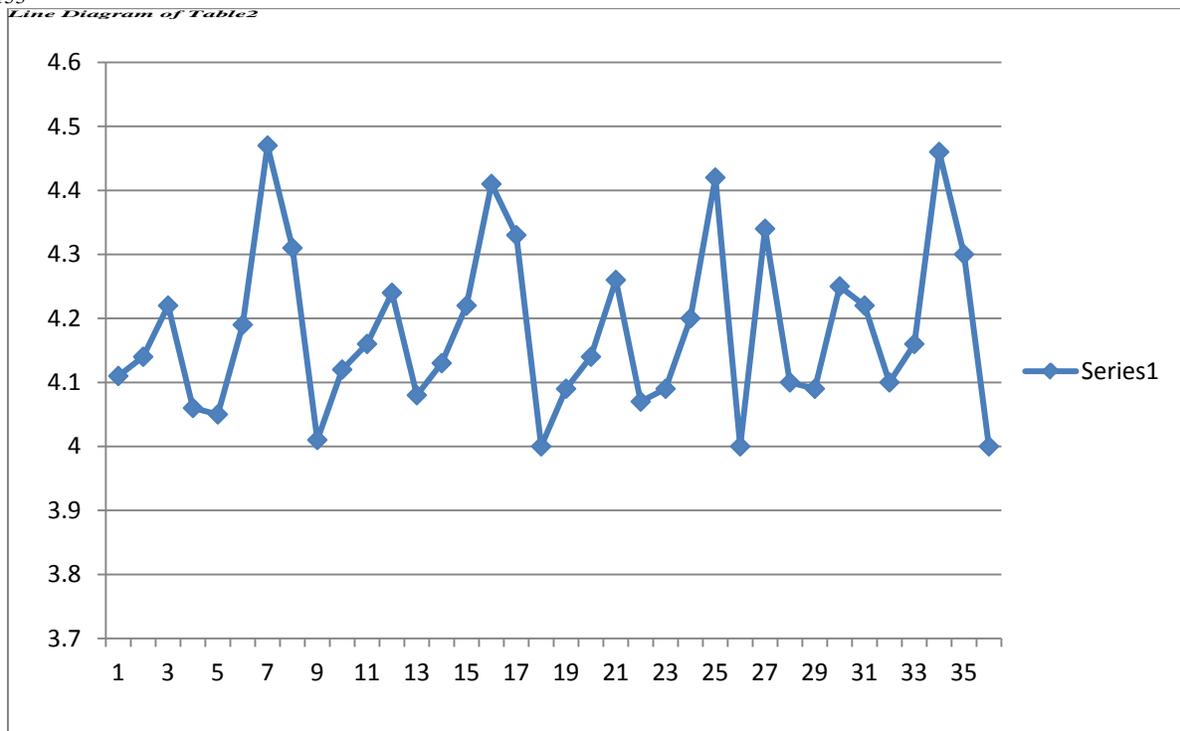


The satisfied perception of academic staff with respect to the various variables of their jobs is also vindicated by the fact that all of the 36 statements measuring the nine variables of Job satisfaction have reported a mean score higher than 4 and percentage of mean score above 65 percent. Statement wise analysis shows that the mean scores for all the 36 statements measuring Job satisfaction range between 4.00 and 4.47 where the highest mean score is reported by statement 7, followed by statements 34, 25 and 16 respectively. These four statements are intended to measure the Co-worker variable of the job, and thereby it can be interpreted that the employees of the district enjoy the company of the peers and cordial relationship exists between the teachers in the sample institutions. The lowest mean scores are marked for statements 9, 18, 26 and 36 relating to the communication variable of the jobs. The results indicate that employees are relatively dissatisfied with the communication process in the sample institutions and the administration needs to take proactive steps and be more careful so as to improve the communication in the institutions. The statement wise analysis of Job satisfaction is provided in Table 2.

Table 2. Statement wise analysis of Teachers Job Satisfaction

S.no.	Statement	Mean score*	S.D	% of Mean Score
1.	<i>I feel I am being paid a fair amount for the work I do.</i>	4.11	0.431	68.50
2.	<i>There is really too little chance for promotion on my job.</i>	4.14	0.422	69.00
3.	<i>My officer is quite competent in doing his/her job.</i>	4.22	0.456	70.33
4.	<i>I am not satisfied with the benefits I receive.</i>	4.06	0.479	67.67
5.	<i>When I do a good job, I receive the recognition for it that I should receive.</i>	4.05	0.343	67.50
6.	<i>Many of our rules and procedures make doing a good job difficult.</i>	4.19	0.324	69.83
7.	<i>I like the people I work with.</i>	4.47	0.564	74.50
8.	<i>I sometimes feel my job is meaningless.</i>	4.31	0.193	71.83

9.	<i>Communications seem good within this organization.</i>	4.01	0.523	66.83
10.	<i>Raises are too few and far between.</i>	4.12	0.342	68.67
11.	<i>Those who do well on the job stand a fair chance of being promoted.</i>	4.16	0.543	69.33
12.	<i>My officer is unfair to me.</i>	4.24	0.503	70.67
13.	<i>The benefits we receive are as good as most other organizations offer.</i>	4.08	0.429	68.00
14.	<i>I do not feel that the work I do is appreciated.</i>	4.13	0.345	68.83
15.	<i>My efforts to do a good job are seldom blocked by red tape.</i>	4.22	0.432	70.33
16.	<i>I find I have to work harder at my job because of the incompetence of people I work with.</i>	4.41	0.489	73.50
17.	<i>I like doing the things I do at work.</i>	4.33	0.409	72.17
18.	<i>The goals of this organization are not clear to me.</i>	4.00	0.320	66.67
19.	<i>I feel unappreciated by the organization when I think about what they pay me.</i>	4.09	0.364	68.17
20.	<i>People get ahead as fast here as they do in other places.</i>	4.14	0.431	69.00
21.	<i>My officer shows too little interest in the feelings of subordinates.</i>	4.26	0.398	71.00
22.	<i>The benefit package we have is equitable.</i>	4.07	0.312	67.83
23.	<i>There are few rewards for those who work here.</i>	4.09	0.365	68.17
24.	<i>I have too much to do at work.</i>	4.20	0.309	70.00
25.	<i>I enjoy my co-workers.</i>	4.42	0.415	73.67
26.	<i>I often feel that I do not know what is going on with the organization.</i>	4.00	0.590	66.67
27.	<i>I feel a sense of pride in doing my job.</i>	4.34	0.298	72.33
28.	<i>I feel satisfied with my chances for salary increases.</i>	4.10	0.396	68.33
29.	<i>There are benefits we do not have which we should have.</i>	4.09	0.234	68.17
30.	<i>I like my officer.</i>	4.25	0.567	70.83
31.	<i>I have too much paperwork.</i>	4.22	0.384	70.33
32.	<i>I don't feel my efforts are rewarded the way they should be.</i>	4.10	0.421	68.33
33.	<i>I am satisfied with my chances for promotion.</i>	4.16	0.435	69.33



Doughnut Diagram of Table2

The descriptive analysis of the data revealed that the teachers of Ganderbal district are fairly satisfied (mean score = 4.18; % of mean score = 69.72 %) with their respective jobs. Further, the reported mean score of above 4 on all the nine variables of Job namely, Pay, Promotion, Supervision, Fringe Benefits, Rewards based on performance, Operating Norms, Coworkers, Nature of Work, and Communication, studied in the present study indicates that the teachers are fairly satisfied with all the different variables of their jobs. Highest satisfaction has been reported against the *co-workers* variable of their job (mean score=4.44), whereas the employees seemed to be relatively less satisfied with the *communication* (mean score=4.01) variable of their jobs.

DIFFERENCE IN THE PERCEPTION OF EMPLOYEES REGARDING JOB SATISFACTION

The present study examines the difference in the perception of academic and administrative staff with respect to the Job satisfaction on the basis of three demographic variables namely gender, age and experience. Age and experience are classified into three groups each (*Age* → 1. 30-40 years, 2. 40 to 50 years, 3. 50 years and above. *Experience* → 1. ≤ 10 years, 2. 11 to 20 years, 3. > 20 years). Independent sample test and ANOVA is employed to evaluate the perceptual differences amongst the respondents regarding HRD climate and the elements of HRD climate. A brief and consolidated view of the results and findings are synopsised as follows:

OBSERVATIONS ACROSS GENDER

The female teachers of the Ganderbal district have reported a comparatively higher satisfaction with their jobs indicated by higher mean scores, towards all the nine variables of the job studied in the current study as well as regarding the overall Job (mean score= 4.23) as compared to the male employees (mean score= 4.13). Further, the results of Independent sample test indicated that the perceptual differences between the male and female respondent teachers are statistically significant as $p < .05$, indicating that the female teachers are significantly more satisfied with their jobs as compared to the male teachers.

OBSERVATIONS ACROSS AGE GROUPS

The employees of age 50 years and above recorded the highest mean score with respect to the construct of job satisfaction, which is followed by the employees of 30-40 years of age. This indicates that the oldest and the youngest respondent teachers are found to be more satisfied with their jobs as compared to the middle age group teachers. However, the results of *one way ANOVA test* indicated that the perceptual differences between the different respondent age groups about job satisfaction are statistically insignificant for $p > .05$, indicating age has no influence on the satisfaction of employees with respect to their jobs.

OBSERVATIONS ACROSS EXPERIENCE

The present study revealed that the most experienced employees reported the highest job satisfaction among the three teacher groups, followed by the least experienced group of the teachers. The results indicate that the experienced teachers i.e. teachers with an experience of more than 20 years and fresh teachers i.e. teachers having less than 10 years' experience were found to be more satisfied with their jobs as compared to the teachers who have an experience of 10-20 years. However, the results of *one way ANOVA test* indicated that the perceptual differences between the different respondent experience groups regarding Job satisfaction are statistically insignificant as $p > .05$.

IV. CONCLUSIONS

The results obtained from the present study have certain significant policy implications which, if properly addressed, can help organizations to concentrate their energy and resources in order to achieve desired performance outcomes. Specifically, in view of certain grey areas that require additional intervention as well as the causal linkages evidenced in the study, the following implications can be drawn for earnest attention, in order to improve the Job satisfaction of teachers in the schools of Ganderbal district:

1. The officers must be readily available to the teachers for any kind of assistance. They need to work as a team.
2. The officers need to develop a helping attitude for teachers and try to address their problems quickly.
3. The officers should hold regular formal/informal interactive sessions with the teachers of the district and encourage them to discuss the problems/issues related to the schools.
4. The officers should hold interactive sessions with their subordinates quite often so that it enhances communication between different teacher groups.
5. The officers must have a balanced approach in dealing with their juniors, so that a superior friendly environment is developed at the departmental level.
6. The officers need to spend more time with their juniors in order to know their problems in the sample district.
7. Job rotation among the teachers in the schools of the district needs to be implemented effectively through a well-designed policy mechanism.
8. The teacher welfare schemes need to be made effective for welfare of all the teachers.
9. While resource persons are concentrating on the development of the lecturers by organizing orientation courses in different subjects, there is a need to organize continuous short-duration developmental programmes/workshops for head of the institutions and officers as well. This will enable them to refresh and keep themselves updated with latest developments in their fields. However, the organization of these programmes should be based on more participative and self-learning methodology instead of lecturing only.
10. Special need-based training programmes in the area of Kangan, Hariganiwan, Lar and Gutlibagh should be conducted for teaching of Kashmiri in order to make them abreast of the proper reading and writing skills of the language.
11. The officers should focus on developing effective personnel policies, keeping in view the profile of the teachers.

12. The performance appraisal reports needs to be well defined and implemented effectively, and the feedbacks need to be given to the teachers regarding their performance with the objective to make appraisals free from biases, likes and dislikes, and human errors.
13. The officers need to show more concern towards teachers and their development. In fact, sufficient funds must be earmarked for training and development of the employees, and they must be encouraged to participate in training programmes/workshops organized by different institutions
14. After every training programme attended by the teachers, .head of the institutions and officers must seek report regarding the programme they attended and ensure that the same training is provided by the teacher who attended a particular programme to colleagues
15. The officers must focus on developing a culture of openness and trust where teachers feel free to discuss their ideas, activities and feelings among themselves. They should be trusted and allowed to enjoy freedom to work independently within the overall norms and statutes.

The officers of the School Education Department must visit each department frequently and discuss the issues/problems of the schools. This will enable the teachers to discuss problems and developmental issues of their schools. While the teachers will feel encouraged and motivated, the officers will get the feedback and can focus on the strategic issues effectively.

Moreover, the officers should constantly obtain feedback about the satisfaction of their teachers regarding opportunities for learning, job-related motivational factors, chances to accept responsibilities, promotional opportunities and teachers' helping attitude. Here, it is imperative to mention that effective change in the attitude of both academic and administrative staff towards work is possible by providing information about their job properties, making pragmatic policies and practices. Also, there is a need to create an environment where teachers are encouraged to do experiments and good work is appreciated and rewarded.

LIMITATIONS

The study has been conducted in accordance with the research approach and design used and suggested by previous relevant studies. However, there are still certain areas that potentially serve as limitations to the current research work. Since, the limitations of a study can be viewed as directions for future research in the field, it is deemed to be important to enlist the same so as to provide a perspective for conducting further research. In this context, the limitations of the study reported are:

First, the data for present study came only from one district which, therefore, may raise concerns about the generalization of results. It is, therefore, required that similar research may be replicated in wider geographical areas covering schools from all over J&K.

Second, all the variables in the present study are measured subjectively (using a questionnaire). Therefore, the shortcomings inherent in every questionnaire based survey where answers are dependent on respondents' perception could not be overcome. Therefore, future research works in the field need to focus on objective performance measurement wherein subjectivity has lesser effect on the validity of results.

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Toward Partnership for Government Construction Project in Indonesia

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Abstract- An increase of value in physical development of construction projects that sustain human life activities has been a major concern for many developing countries around the world, including Indonesia. The country faces an increasing value for project development which resulted in the increasing procurement for government goods and services. Meanwhile, some developed countries such as the United Kingdom (UK), the United States (US), and Hong Kong have successfully formulate an integrated policy for construction project partnerships to resolve the issue of project development and technologies value. Learning from the three countries, this study aims to explore the issue of the increasing of value of construction projects in Indonesia and identify the country's potentials that can be developed into approaches to successfully achieve project partnerships in sustainable development. It employs literature review in studies related to construction project partnerships particularly pertaining examples from the UK, the US, and Hong Kong as the basis of SWOT analysis. The study concludes that Indonesia needs to create an integrated project partnership policy construction in addressing sustainable development issues with respect to local cultural values that can strengthen the policy.

Index Terms- project development in Indonesia, procurement policy, partnership policy.

I. INTRODUCTION

Many countries continue to take advantage of private capital and industry expertise. The UK's National Audit Office reports over £4 billion (\$5.8 billion) a year on average in capital investment from Public Private Partnership (P3s), or Private Finance Initiative (PFIs) as they're called in the United Kingdom (UK), over the past fifteen years. In the United State (US), where the economy is more than six times bigger, only five P3 deals worth a total of \$2.4 billion closed in 2015. (PPP Forum, Current Questions about PFI, <http://www.PPPforum.com/current-questions> about-pfi, accessed June 21, 2016). Many government agencies lack experience with P3s. While 35 states, along with the District of Columbia and Puerto Rico, have legislation enabling P3s, only 18 states and Puerto Rico have ever reached financial close on a P3. (Colorado Department of Transportation, Update on the US 36 Public-Private Partnership: Understanding the Facts,

<https://www.codot.gov/projects/US36.ExpressLanes/update-on-us-36-public-private-partnership-understanding-the-facts>), accessed June 21, 2016).

National Audit Office 'Highways Agency: Procurement of the M25 private finance contract' November 2010: The recent National Audit Office (NAO) report on the £3.4bn M25 widening scheme has highlighted procurement on this PFI project as wasteful, primarily as the contract was too prescriptive and had little room for manoeuvre. In addition, the NAO states that the slowness of taking the project forward contributed heavily to the eventual 25% increase in cost.

Indonesian construction industry: market report (Published on 02/03/2016).

The Construction Industry Institute (CII, 1987) has conducted research on nearly 300 (three hundred) construction projects to the completion of project submissions applying partnering approaches, gaining significant benefits: reduction of total project cost by 10%, profits increased by 25 %, overall project completion time decreased by 20%, schedule change decreased 48%, number of claims decreased 83%, accidental loss of 1/83 of industry standard, change of order (CO) decreased 80%, job satisfaction increased 30%.

In general, construction project partnerships, especially in the supply chain approach, have a strategic role not yet developed in integrated collaborative design which involves three stages, namely: process management (identification); Supply Chain Management (SCM) is meaningful in the focus of design completion to provide better value; and facilitate the construction process (Austin et al, 2002).

The Indonesian government is planning to spend \$450 billion on infrastructure alone between now and 2020, with over \$22 billion of confirmed spending for 2016. But an even more promising area for investment and exporters exists-meeting the housing demands of Indonesia's enormous population.

Pricewaterhouse Coopers (PwC) International Limited, 2016.

The Indonesian government has in recent years put in place a robust institutional framework to support its infrastructure plans. In the last year it has announced 13 economic policy packages ("deregulation packages") focusing on the deregulation of investment and tax incentives. The government expects these deregulation packages to improve Indonesia's competitiveness and help to attract investment by cutting bureaucracy and providing greater legal and business certainty. Recommendations

for each infrastructure sector: Mining, Oil & Gas, Power, Water, Roads, Rail, Ports, Airports, Telecoms, Healthcare.

This paper is a study based on a literature review aimed at answering the question of how Indonesia faces construction project construction issues and what considerations should be considered in relation to the needs of construction project partnerships?

II. STUDY METHODS

To answer the research questions presented in this paper, we will examine the literature on the theory of partnerships in construction projects in developed countries that have experience in anticipating the problems of construction project partnerships that support the achievement of value for money. In this case, partnership applications in developed countries that achieve success is a reference related to how the developed countries succeeded in conducting construction project partnerships. On this basis, literature studies cannot be separated from the historical development of public service policies. To achieve the objectives of this study, the Strength Weakness Opportunity Thread (SWOT) approach will be used in the analysis process based on the literature review. With this approach can be concluded about the potential and steps that need to be done well in further studies and in determining the policy in order to make the partnership construction project so that there is continuous improvement.

III. RESULT AND DISCUSSION

A. The Construction Partnership Issues and Policies in the UK, USA, Hong Kong

3.1. Construction Partnership in the UK

Government of the United Kingdom, Her Majesty's Treasury.2006. Private Finance Initiative: Strengthening Long-Term Partnerships. London (March, p.15). Even in a mature market like the United Kingdom, PPPs (the United Kingdom uses the term "private finance initiative") play a small but important role in the government's investment in public services and represents about 10%–15% of overall public sector procurement. This represents more than £60 billion (\$100 billion) in capital value in 625 PPP deals from 1990/91 to 2005/06. Partnering construction projects from the process and product side can achieve things like: more efficient, cost effective, can be more optimum in planning, design and implementation. In this case the role of project manager is needed thoroughly (Schultzel and Unruh, 1996). Because the use of partnering on large-scale projects can save costs up to 30%; reducing implementation time to 50%. These things are done in the UK (Bennett and Jayes, 1998). According to Latham, partnering in the UK there is a cost savings of up to 30% and reduced the implementation time by 50% for several construction projects (Bennett and Jayes, 1998:4).

3.2. Construction Partnership in the USA

The concept of partnering was first introduced to the construction industry in United States in late 1980s and early

1990s. Warne (1994) indicated "in the late 1980s and early 1990s, some visionary leaders in the industry concluded that there had to be a better way.... If the owners and contractors could work together in a synergistic environment, then certainly everyone would benefit. Hence the concept of partnering was born..." Recently, the U.S. has shown the willingness to embrace large-scale projects again, making it a ripe P3 market. The U.S. Census Bureau announced late in 2012 that projected construction spending for the year is estimated to be \$851.6 billion, up 7.8% from the previous year. Today, private financing of public projects in the world's largest emerging P3 market is nearly nonexistent. Some experts estimate that U.S. private investments could reach 10% of the nation's total spend in construction. (US Census Bureau News, US Department of Commerce, Washington, DC, 1 November 2012).

Partnering is done to avoid conflict; reduce costs up to 10%; reducing implementation time up to 10%; reducing claims up to 87%. These things are done in the large-scale construction industry that collapsed then rose again in the USA (Loraine and Williams, 2000). According to Latham, partnering not only avoids conflicts but also for example reducing 10% fees, 10% schedules and 87% claims in the USA (Loraine and Williams, 2000: 13).

3.3. Construction Partnership in Hong Kong

In Hong Kong, project partnering usually refers to a one-off partnering arrangement for most construction project participants. It is interesting to note that clients usually initiate partnering strategy in project procurement. The general perception gained by the project participants is quite positive and most of them found that partnering has increased open communication and sharing of common goals among stakeholders. As a result, working relationship and productivity have been improved.

Large corporations and government authorities like the Mass Transit Railway Corporation (MTRC) and the Hong Kong Housing Authority (HKHA) have also started to introduce project partnering in their infrastructure and building projects. The application of project partnering (large-scale project partnerships) in Hong Kong can be classified into sectors: public, private, and infrastructure (Construction Industry Institute, Hong Kong / CII-HK, 2004).

The main problem in the implementation of project partnerships is in terms of culture related to large bureaucratic organizations where appropriate project culture with high trust so that developing open communication and maintaining partnership relationships should be carried out in the early stages of the project, namely the planning stage (Zuo and Ma, 2005). In the other hand, the main benefit in the implementation of project partnerships is Improved relationship amongst the project participants (Chan et al, 2004).

3.4. Summary

The building method is grouped into: Traditional or Design Bid Build (DBB), Design Build (DB), Engineering Procurement Construction (EPC). DBB has a design gap by consultants during the design process due to deficiencies, especially input constructability (Gransberg, et al, 2009), so that it is applied to projects not complex jobs. Furthermore, this method developed

into a DB method because there was a partnership of consultants and contractors during the design processes that were more appropriately applied to complex work (AIA, 2003). The latest development from the DB method to EPC was applied specifically to investment projects (Sarwono, 1993; Turner, 1995)

The development of partnering projects is then carried out on the sides of the partnering factor differentiator which is a series of steps with reference to the absolute requirements in general is a particular factor partnering, consist of: Top management support (Thompson and Sanders 1998, Black et al. 2000, Cheng and Li, 2001) and possible Adequate resources needed in all types of construction projects (Black et al. 2000, Cheng and Li 2001). Everything considered for the purpose of partnering is not only the study of the results. This leads to Continuous development (Naoum, 2003).

The criteria for the success of partnering construction projects have been carried out on the classification side, including AP Chan et al, 2004, that partnering success consists of factors: Support from Top Management, Adequate Resources, Mutual Trust, Long Term Commitment, Effective Communication, Efficient Coordination, Productive Conflict Resolution. Furthermore, the success of partnering in construction consists of: team culture, long-term focus quality, consistency of purpose, and sharing of resources. This is used as an effective strategy to achieve minimal conflict and efforts to improve project performance (Chan et al, 2004).

B. The Partnership Policy in Indonesia Related to the problem of construction

3.5. Development Policy in Indonesia

The policy of construction project development in Indonesia is oriented primarily to the success of the achievement of Value for Money (VfM) through the Total Quality Management (TQM) effort in the project partnership resulting in a planning and control process known as the respective development control for the local scope (districts), regional (provincial), and national levels. For the project using Design Bid Build (DBB's) method of building, its approach is to public procurement and International Best Practice. For projects with Design Build (DB) and Engineering Procurement Construction (EPC)-building methods, an approach is made to the Public Private Partnership (PPP) or Private Finance Initiative (PFI).

Projects in Indonesia by function can be grouped into: residential housing, public building, heavy construction, and industrial buildings / factories. From a technical point of view, all building activities are generally oriented towards policies issued by the Ministry of Minister for Public Works and Human Settlements (Kementerian Pekerjaan Umum dan Perumahan Rakyat/PUPR), including the Minister of Public Works Regulation No.45 / 2007 on the technical guidance of the construction of state buildings. For water resources development work is used reference Law No. 7/2004 on Water Resources, Department of Public Work (DPU). For road construction oriented to Government Regulation No. 34/2006 on Roads.

3.6. Partnership Policy in Indonesia

The construction project partnership policy in Indonesia has been declared into regulatory tools comprising: partnerships

between business entities, partnerships between individuals who will become individual consultants, group partnerships in multiple disciplines. In the application, it can be Joint Venture, Joint Operation, Build Operate Transfer, Public Private Partnership, Project Partnership, Partnership Consultant-Consultant, Partnership of Contractor- Consultant, Small Medium Micro Enterprise Partnership, Small and Non-Small Business Partnership. All kinds of partnerships are carried out method of building DBB with the character of non-investment projects has been packaged into Presidential Regulation No.54 / 2010 on procurement of goods and services government with all derivatives rules change.

Large cost projects are applied to the DB and EPC building methods. The DB method is applied to the project at a smaller cost than the EPC project application project which emphasizes the investment aspect of high technology. The partnership in both types is an inhouse team contractor contracting partnership. These two methods of development are packed into Presidential Decree no. 15/1987 on Partnership Cooperation between Government and Private Business (Public Private Partnership) and Presidential Decree No.7 / 1998 on Cooperation of Government and Private Enterprise in Development and or Infrastructure Management.

The development of government and private cooperation policies has entered various sectors, for example: Minister of Finance Decree No.518 / KMK.01 / 2005 concerning Establishment of Risk Management Committees on the Provision of Infrastructure; Guidelines for the Cooperation between the Government and Private Enterprises in the Implementation and / or Management of Drinking Water and Sanitation.

IV. FINDING AND DISCUSSION

This discussion examines the potential of Indonesia relating to the construction partnership as well as policies related to the SWOT analysis based on the literature review discussed earlier:

4.1. Strength (S)

The Government of Indonesia already has several policies related to construction project partnerships based on equality between service users and service providers. This equity consists of projects worth not more than two and a half billion rupiahs implemented by small and medium-sized micro enterprises, and projects worth over two and a half billion rupiahs implemented by non-small business. Regulation has been set to national, regional and local scale. Furthermore, it has been applied based on the building method: Design Bid Build/DBB or Traditional, Design Build/DB, and Engineering Procurement Construction/EPC (capital-intensive investment project). Construction project partnerships can be grouped internally: one project package includes more than one service user; and the external side: a project package of more than one service provider that is partnered in the form of, for example: Joint Venture, Joint Operation, Build Operation Transfer, and Public Private Partnership (specifically for infrastructure projects). Technical standards have been incorporated in the Indonesian National Standard (SNI) and use of ISO 9000, 14000, and 18000 standards and the national version of Health and Safety (K3) applications related to OHSAS. In the design phase has been

introduced the concept of Design Quality Indicator (DQI). Professional associations have grown and developed both for business entities and for individual experts.

Guidance and empowerment: At the national level, the central government has issued presidential regulation number 54/2010 concerning procurement of government goods and services as a legal basis for procurement applications in the field. Especially for the technical field, the Minister of Public Works number 45/2007 applies the Technical Guidelines for Building State Buildings. Both are a combination of guidance and empowerment of potential resources in national development. This is closely related to the Central Government's budget process which must be approved by the Republic of Indonesia's People's Representative Council for projects financed by the National Budget.

For the Regional Government, the development budget must be approved by the Regional House of Representatives.

4.2. Weakness (W)

In Indonesia, there are still many projects that have many deviations or corruption, construction failures, and building failures. This happens a lot on projects from small, medium to large (or so-called complex jobs) with the method of building a Design Bid Build (DBB). Human resources are still weak both from the business side (small business more than 60% total) and from the individual side with the most composition on the level of non-skilled (non-skilled labor). The deployment of construction engineering, electrical and mechanical engineering experts is uneven in Indonesia. Work experience to handle projects with medium and upper technology range (full industrialization) is still limited in both quality and quantity. This is due to the lack of aspects of guidance and empowerment of experts in a structured by the central government, regional, local area and professional associations.

Many construction projects of different sizes and levels of technology can be used as a gradual transfer of knowledge and technology and project management. Things like this have not been widely utilized by an educated workforce to become an educated expert. The result of this deficiency is a lot of design errors and / or construction errors in the project field. Thus, a construction project partnership is required in the form of project alliancing strategy and construction strategy in the application of construction project between project owner, consultant, and contractor so that there is continuous improvement in the project process.

4.3. Opportunities (O)

The future challenge for achieving a successful construction project partnership in Indonesia is how to reduce the monopoly and oligopoly aspects of small, medium and large-scale projects. Where it results in the value of the project being greater than the fair price that could have been achieved through the process mechanism of the project package auction or the direct appointment process of the project package.

Indonesia has made a national development policy plan whereby there are sources of funds from State Budget (Anggaran Pendapatan dan Belanja Negara/APBN), Regional Revenue and Expenditure Budget (Anggaran Pendapatan dan Belanja Daerah/APBD), private, investment and / or combinations that

apply to DBB, DB, and EPC development methods that are available every year in many work packages. Specifically the investment projects applied with EPC building methods have now been realized on infrastructure projects in all sectors: Mining, Oil & Gas, Power, Water, Roads, Rail, Ports, Airports, Telecoms, and Healthcare.

4.4. Threats (T)

A future challenge for achieving successful construction project partnerships in Indonesia is that there are many projects that have monopoly and oligopoly nuances on both: small, medium and large-scale projects. As a result the value of the project becomes greater than the price should be through either the work auction process mechanism or direct appointment process.

As one of the developing countries, Indonesia is still experiencing a lot of deviations from construction projects such as corruption in various forms that are still difficult to overcome by the Central Government and Local Government. This will be an obstacle to the application of construction project partnership as one aspect of the system integration of a sustainable development in the scope of national development plans. However, the coordination policy related to construction project partnership issues as already achieved by the developed countries will be an obstacle to the realization of an integrated national development program. The cultural shift of irregularities such as corruption into culture *gotong-royong* as indigenous culture of Indonesia is of concern because it is a social phenomenon that will affect the total system of national development plans.

• Conclusion

The world of construction projects is dealing with issues related to public policy in relation to the choice of needs of construction project partnerships. Developed countries have started construction project partnerships and achieve success. Meanwhile, the present Indonesia with an increase in the value of government projects per year is heading towards the success of construction project partnerships. Therefore, related to the above study then the things to note are:

- In general, there is the government's desire to address the problem by creating policies that are integrated into each other strategic partnerships and project partnerships. The current policies are globalized and made reference primarily to technical standards: ISO, safety and health: OHSAS considered from mid-stage of the design process to the end of the construction phase and applied in the project field.

- Indonesia with the existing potential and existing constraints, requirements and external forces influence towards the partnership of the construction project. This is done on the basis of cultural "equality" between service users and service providers. The partnership principle is between small and non-small entrepreneurs who work together in a large-scale construction project of which the worth over twenty-five billion rupiahs.

• Recommendations:

SWOT analysis is one of the strategic management that is able to determine the direction of national policies and strategies as leverage for project development based on the characteristics of potential and problems in Indonesia.

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Drug-Related Problems in South Indian Tertiary Care Hospital

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Abstract- INTRODUCTION: DRPs was defined as events or circumstances that involves a patient's drug treatment that actually or potentially interferes with the achievement of an optimal outcome. With respect to older patients with comorbidities and using multiple drugs, DRPs are associated with an increased risk of hospital readmissions, morbidity, and mortality. In Australia, an incidence of between 2.4% and 3.6% was found and in the US. DRPs include adverse drug reactions (ADRs), unnecessary drug therapy, untreated conditions, Wrong drug, and drug interactions and inappropriate choice of drugs.

OBJECTIVE: To identify various DRPs in a tertiary care hospital admitted to various departments, to make suitable drug therapy recommendations by clinical pharmacist interventions.

METHODS: The prospective interventional study was conducted in inpatients of various departments in a tertiary care hospital in 198 patients by considering the inclusion and exclusion criteria for a period of 6 months. The clinical pharmacist visited the patients and filled out the designed pharmacotherapy sheet for each patient. Then, the general pharmacist checked the patients' files and pharmacotherapy sheets and categorized DRPs using the modified method of "The Pharmaceutical Care Network Europe classification,

RESULTS: Out of 198 patients, a total of 922 DRPs were identified by the clinical pharmacist in the study patients. The amount of each DRP was as follows: Unnecessary drug therapy 51 (6%), Low dose 8 (1%), High dose 13(1%), Wrong drug (0%), inappropriate adherence 17(2%), adverse drug reactions (1%), needs for additional therapy (4%), and Drug Interactions (84%). Out of 922, 535 DRPs are noticed in the age group of 51-75 years. 664 DRPs (72%) are observed in males and 258 DRPs (28%) observed in females. By considering all the departments for DRPs, most of the DRPs are noticed in the cardiology department 489 (53%). Out of 198 patients, the intervention done by the clinical pharmacist to only 193 patients. Out of this, 93 (48.3%) cases are solved, 48 (24.8%) cases are partially solved and 52 (26.9%) cases are not solved.

CONCLUSION: DRPs occurred in the majority of the patients in all departments. The type of DRP differed markedly between the patient groups. Knowledge of these differences is clinically valuable by enabling us to guide efforts toward prevention of DRPs. The large number of interventions reported in several studies, as well as this study, revealed that clinical pharmacy

services could contribute to a rationalization of drug therapy and may eventually lead to more medication safety.

Index Terms- Adverse drug reactions, Drug interactions, Drug-related problems, Medication errors.

I. INTRODUCTION

As we know drug usage are increasing day by day due to the growing a number of diseases and comorbidities. Usage of drugs enhances health-related quality of life but inappropriate use of drugs may be harmful and lead to DRPs [1]. DRPs are defined as events or circumstances that involving a patient's drug therapy that actually or potentially interfere with the desired health outcome [1]. DRPs can occur at all stages of the medication usage process starting from prescribing to dispensing stage. Lack of follow-ups and reassessment of therapeutic outcomes may also contribute to DRPs. Most DRPs are avoidable and community Pharmacies are assuming an active role in preventing and solving DRPs [1]. In our study DRPs are classified into

Unnecessary drug therapy: This could occur when the patient has been placed on too many medications for their condition and the drug is simply not needed.

Low dose: This could occur when a patient is given medication that is not strong enough to get beneficial or therapeutic effects.

High dose: This could occur when a patient is given medication that is too strong and is causing detrimental effects or is simply not necessary.

Wrong drug: This could occur when a patient is given medication that does not treat the patient's condition.

E.g. A heart medication to treat an infection.

Inappropriate adherence: This could occur when a patient chooses not to or forgets to take a medication.

Adverse drug reaction: This could occur when a patient has an allergic response to a medication.

Need for additional drug therapy: This could occur when a patient needs more medication to treat their condition

Drug interactions: A drug interaction is a situation in which a substance (usually another drug) affects the activity of a drug when both are administered together. This action can be synergistic (when the drug's effect is increased) or antagonistic (when the drug's effect is decreased) or a new effect can be produced that neither produces on its own. DRPs

are associated with an increased risk of hospital readmission, morbidity, mortality, and increased health care cost^[2].

In Australia, an incidence of between 2.4% and 3.6% was found and in the US an incidence of between 3.1% and 6.2% was found. A study in India carried out in a tertiary referral center in South India showed that admissions due to ADRs accounted for 0.7% of total admissions and deaths due to ADRs accounted for 1.8% of total ADRs^[3].

DRPs include both actual and potential problems. An actual problem has resulted in clinical manifestations (e.g. a drug-related rash, an adverse drug reaction), or therapy failure due to incorrect dosage. A potential problem is not manifest, but if left unresolved, it may lead to drug-related harm to the patient. The identification and suggestions for interventions by clinical pharmacists on clinically significant DRPs, and further, the acceptance of the interventions by the prescribers, are evidence of the major contribution of clinical pharmacists in reducing the frequency of DRPs, thus implying better pharmacotherapy for the patient.

II. NEED OF THE STUDY

In order to develop effective interventions to identify and address these DRPs, it is very important to get more insight into the specific nature of DRPs in this specific patient group and determinants of their occurrence. Probably due to differences in setting, patient characteristics, and measures addressing possible DRPs, the results of these studies are also inconsistent^[4]. Policies and services should be developed to reduce and prevent drug-related morbidity and mortality. Purpose of the study was to investigate type, nature, and incidence of drug-related admissions in a tertiary care hospital in south India^[5].

It is useful to investigate which part of potential DRPs can be avoided by the intervention of the community pharmacist in collaboration with the prescriber and the patient. Hospital-based medication review by a clinical pharmacologist was not associated with reduced rates of re-hospitalization and/or death. The clinical relevance of DRPs might be overestimated as a risk for re-hospitalization or death. It is of great importance to clarify if and how DRPs can be prevented. In designing such studies, one should consider choosing inclusion criteria that accumulate risk^[6].

AIM:

To assess, monitor and report any of the drug-related problems (DRPs) in a tertiary care hospital

OBJECTIVES:

To assess toxic or overdose, sub-therapeutic dose, adverse drug reactions, medication errors or noncompliance, drug use without an indication, improper drug selection, drug interactions (DI), untreated indication and to improve the rational use of medicines

III. METHODOLOGY

This is a prospective study conducted for 6 months in the 250-bedded Viswabharathi super specialty Hospital. The study was carried out on 200 patients.

Data collection:

Patient data collected using a standardized data collection form (SDCF). SDCF of each patient consisting with regard to patients age, gender, past medical and surgical history, confirmatory diagnosis, duration of treatment, lifestyle modifications, questions about adherence of drugs, scales of ADRs were included^[7].

Patients included based on criteria like all age groups, all diseases except cancer, all classes of drugs are included patients who are coming for regular follow-ups and either gender is considered. Excluded patients who are under the therapy with chemotherapy drugs, radiation therapy and surgical therapy, pregnancy and breastfeeding patients, who are under dialysis, uncooperative patients, palliative patients, patients with incomplete data, patients under influence of alcohol and drugs, compromised patients with dementia and those who stayed less hours of stay in hospital.

IDENTIFICATION OF DRPs:

The assessment of DRPs was based on each research's clinical judgment with the support of established literature and standard guidelines of diseases. Information on drugs such as recommended dosages frequency and side effects was based on Drug Information Handbook whereas Naranjo, WHO scale were used to access causality of the ADRs^[1,11]. Based on the score type of ADR can be accessed. With exception of drug interactions data which was later identified using Micromedix outline software.^[1,9]

IV. DATA ANALYSIS:

All extracted data were pooled and analyzed. Results expressed in frequency percentage and with maximum and minimum value.

Ethical consideration:

Before data collection to conduct this study, ethical clearance was obtained from CESCOP of ethical committee. A letter was submitted to CESCOP referral hospital of managing director^[9]. From beginning to interventions of DRPs ethical conduct was maintained.

V. RESULTS:

Based on inclusion and exclusion criteria totally 200 cases were collected among these 198 cases were included.

Demographic characteristics: Among 198 subjects 127 were male and 71 were female subjects. Patient characteristics and DRPs were summarized in the Table No 1.

Clinical characteristics: Totally 922 DRPs were identified by the clinical pharmacist under the study patients. Total 1667 medicines were prescribed for the patients. Average of 8 drugs were prescribed per admitted patient. The percentages of each DRP were as follows: Unnecessary drug therapy 51

(6%), Low dose 8 (1%), High dose 13(1%), Wrong drug (0%), inappropriate adherence 17(2%), adverse drug reactions (1%), needs for additional therapy (4%), and Drug Interactions (84%). Types freq and percentage of DRPs were shown in table no 2. And fig no 1.

The department that was most likely to cause DRPs was Cardiology (53%), followed By General Medicine (15%), Neurology (12%), Gastroenterology (7%), Nephrology (7%), Endocrinology (5%), Psychiatry (1%).

Among these majorly prescribed were anti Hypertensive drugs i.e. 570 (16%) and least were NSAIDS i.e. 245 (7%). A total of 922 DRPs were identified in 198 patients. A total of 2.02% of patients (n=0) has no DRPs, 61.11% of patients (n=121) only had one type of DRP, 27.77% of patients (n=55) had two DRPs, 9.09% of patients (n=18) had 3 DRPs.

Drug interactions: Among 992 DRPs 776 were DI. Among these DI, major were 324(41.7%), moderate was 349

(45%), minor were 103 (13.3%). DIs were further classified into drug–drug interactions (DDI), drug–food interaction (DFI), drug-ethanol interaction (DEI). Distribution of DI was shown in Table No 3.

Adverse drug reactions: Among 992 DRPs 16 were ADRs. In our study ADRs were Antibiotics caused Steven Johnson's syndrome and erythematous patches, Diuretics cause electrolyte imbalance, Anticoagulants caused bleeding of gums, antipsychotics caused sedation slurred speech, decreased weight, antidiabetic drugs caused dilated cardiomyopathy and neurotropics caused constipation. The outcome of ADR evaluation and pharmacist intervention were shown in Table No .5

Table No. 1 Patient characteristics and DRPs

Patient demographics	Freq (%)
Age	
0-25	35(4)
26-50	301(33)
51-75	535(58)
>75	51(5)
Sex	
Male	664(72)
Female	258(28)
Alcoholism	
Alcoholic	332(36)
Non alcoholic	590(64)
Smoking	
Smokers	353(38)
Nonsmokers	569(62)
Departments	
Cardiology	489(53)
Endocrinology	44(5)
Gastroenterology	61(7)
General medicine	140(15)
Nephrology	61(7)
Neurology	115(12)
Psychiatry	10(1)

Table No. 2 Types freq and % of DRPs

Drug-related problems	Freq (%)
Unnecessary Drug therapy	51(6)
Duplicate therapy	7(13.7)
No medical indication	41(80.3)
Nondrug therapy indicated	2(3.9)
Treating available ADR	19(19)
Low Dose	8(1)
Wrong Dose	5(6.52)
Duration inappropriate	1(12.5)
Frequency inappropriate	2(5)
Drug interaction	0(0)

High Dose	13(0)
Wrong Dose	6(46.1)
Duration inappropriate	3(23)
Frequency inappropriate	3(23)
Drug interaction	17(79.)
Wrong drug	0(0)
Prescribed drug not available	0(0)
Dispensing error	0(0)
Prescribing error	0(0)
Inappropriate adherence	17(2)
Cannot administer	2(11.7)
Patient forgets to take	6(35.2)
Patient prefers not to take	9(52.9)
Needs for additional drug therapy	40(4)
Untreated indication	36(90)
Additional therapy	1(2.5)
Preventive	3(7.5)
Drug Interactions	776(84)
Drug-drug interactions	519(66.8)
Drug-food interactions	220(28.3)
Drug-ethanol interactions	37(4.7)
Adverse drug reactions	16(1)

Table No: 3 Distribution of Drug Interactions

Characteristics	No of prescriptions of DI	DDI	DFI	DEI	Total	% of interactions
Age						
0-25	23	18	9	0	27	3.479
26-50	61	167	67	17	251	32.345
51-75	103	303	132	20	455	58.63
>75	11	31	12	0	43	5.54
Sex						
Male	127	388	152	37	577	74.35
Female	71	131	68	0	199	25.65
Deparments						
Cardiology	61	59	32	0	91	11.74
Endocrinology	4	8	2	2	12	1.54
Gastroenterology	54	310	123	30	463	59.66
General medicine	24	70	24	2	96	12.37
Nephrology	17	26	13	2	41	5.29
Neurology	24	24	16	0	40	5.15
Psychiatry	14	22	10	1	33	4.25

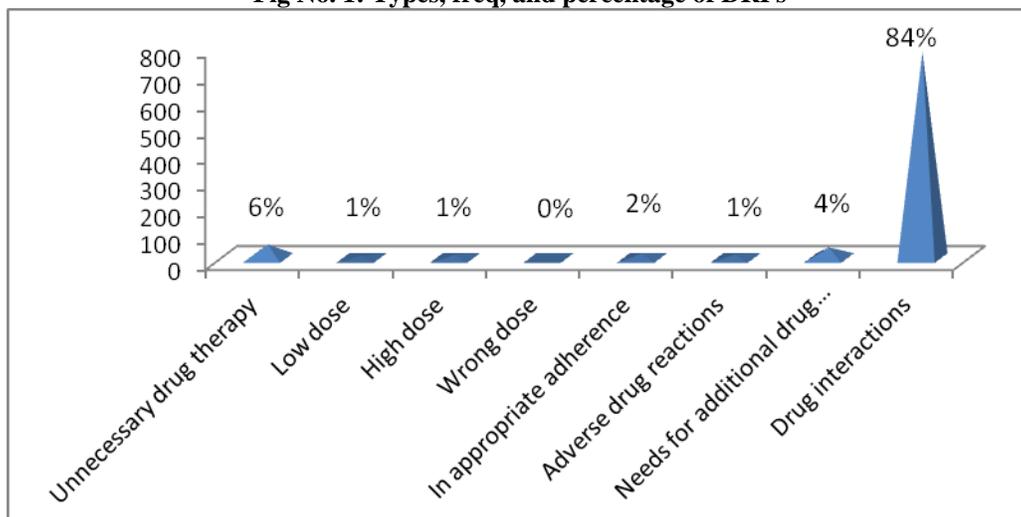
Table no 4: Assessment of ADRs

ADR	No of ADRs	% of ADRs
CASUALTY		
Naranjo		
Definite	2	12.5
Probable	12	75
possible	2	12.5
WHO Scale		
Certain	1	6.2
Possible	2	12.5
Probable	13	81.25

Table No 5: Outcome of ADR evaluation and pharmacist intervention

Outcome	Yes (%)	No (%)
Dechallenge	13(81%)	3(19%)
Rechallenge	1(6%)	15(94%)
Pharmacist intervention	193(97.47)	5(2.53)

Fig No. 1: Types, freq, and percentage of DRPs



VI. DISCUSSION

DRPs are very frequent in patients who are admitted to hospitals. These problems may lead to patient’s morbidity, mortality, increase in their hospitalization stay and cost. It has been shown that clinical pharmacist’s intervention can reduce the DRPs and total drug cost during hospitalization.^[6]

According to the findings, the average number of errors per patient was 4.6. The most common form of error in our study was DIs (776) 84.16 % of the total problems in which out of 198 cases 127 were male and 71 were female. Among these drug interactions 61 cases are from General medicine department, 4 cases from Psychiatry, 64 cases from Cardiology, 24 from Neurology, 17 from Nephrology, 24 from Gastroenterology and 14 from Endocrinology.

The percentages of each DRP were as follows: Unnecessary drug therapy (6%), Low dose (1%), High dose (1%), Wrong drug (0%), inappropriate adherence (2%), adverse drug reactions (1%), needs for additional therapy (4%), and Drug Interactions (84%).

In this present study, 922 DRPs were found, a previous study by Rijo Mary George et.al. Showed 598 DRPs, Another study by Mohammednur Hussein et al 452 DRPs identified.

In the detail classification of Drug-related problems, In the Unnecessary drug therapy (6%) in which no medical indication is high (80.3%) and treating available ADR is low (1.9%). In low dose (1%) in which the wrong dose is high (62.5%) and Duration inappropriate is low (12.5%). In high dose (1%) in which the wrong dose is high (46.1%) and Drug interaction is low (7.69%). In Inappropriate adherence (2%) in which patient the prefers not to take is high (52.9) and cannot administer is low (11.7%). In needs for additional therapy (4%) in which untreated indication is high (90%) and additional therapy is low (2.5%). Drug interactions (84%) in which DDIs were more (66.8%) and DEIs are less (4.7%).^[7]

ADRs were occurring in 1% (16) of the total samples in this study. The result is not in line with research done in East Ethiopia and India 42.7% and 10% respectively. In this study, electrolyte imbalance was the main ADR identified followed by Erythematous patches. While the research was done in East Ethiopia, the gastrointestinal disturbance is the main ADR.^[8]

The most common DRPs in this study are “drug Interactions (776) and unnecessary drug therapy (51) whereas “Potential interactions” and “drug not taken or administered at all” are the common DRPs in the study of DRPs in type 2 DM patients with dyslipidemia.^[9]

In the cardiology department, more DRPs were identified i.e. 53% and in Psychiatry low DRPs were found (1%). Based on the Class of drugs, Less number (245) of DRPs were found with the NSAIDs (7%) and more number of DRPs were found with the antihypertensives.

In our study drug interactions under moderate (45%) category were leading when compared to major (41.75%), while in other studies drug interactions under major category were leading when compared to moderate.

One of the main duties of a clinical pharmacist is to restrict the drug-related problems in medical wards. For 198 patients surveyed in this study 193 interventions were done by the clinical pharmacist with the mean of 0.97 interventions per patient.

More than 193(97%) interventions done by clinical pharmacists. Over that 93 (48.3%) are completely solved, 48 (24.8%) are partially solved and 52 (26.9%) are not solved

Previous studies showed that a pharmacist in collaboration team in hospitals reduces the adverse events by 30-86%.

The result is not constant with the results of research done in other tertiary care hospitals. These may be due to the difference in health worker accessibility and absence of drug interaction checker.^[10]

VII. CONCLUSION

DRPs occurred in the patients of all departments. The type of DRP differed markedly between the patient groups. Knowledge of these differences is clinically valuable by enabling us to guide efforts toward prevention of DRPs. The large number of interventions reported in several studies, as well as this study, revealed that clinical pharmacy services could contribute to a rationalization of drug therapy and may eventually lead to more medication safety.

Potential drug interactions, poor medication adherence and the lack of health consciousness were the three most common factors found in this study.

DRPs increases with an increase in the number of comorbidities. This may be because as comorbidity increase number of drugs patients using increases. This increase drug intersection which is the main DTP identified in our case, Drug therapy problem increases with age.

Since clinical pharmacist interventions are not known well to most of the physicians and medical students in our country, a better introduction of clinical pharmacy services and their achievements can improve patient care and reduce clinical risks. Regarding the current study outcomes, the health sector policymakers should consider to include clinical pharmacists in the hospital. The role of clinical pharmacists should also be geared to identify, solve, and prevent DRPs rather than overlapping on the already existing dispensing pharmacists

VIII. LIMITATIONS:

There are limitations were present for our study they were, because of the lack of awareness, patient is unable to identify the ADRs due to medications, limited no of patients, the study period was very less, we were unable to determine what would happen

to the patients if errors were left uncorrected, the study is conducted in the inpatient department of Viswabharathi super specialty hospital at the district level and this can't be used to represent the Indian population, so the robust prevalence studies have to be conducted in India by door to door survey which will give the overall prevalence of India and lack of national drug-related forms designed at national level was also the other limitation of the study.

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Identification of Writer's Gender using Handwriting Analysis

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I. Introduction

In the world we are living in today, many crimes such as robbery, rape, murder, genocide, suicides and other fatal activities are emerging resulting in high insecurity globally. The increased instability causes fear and panic to people making it hard to carry out their daily duties. Government and other private sectors have come up with ways to handle this disaster by producing various experts who investigate the causal effects of damage and harm. By use of a collection of tool, materials and scientific measure and theories, the experts can investigate and point out the criminals who then face penalties for their actions.

Graphology is the study of the art of handwriting and handwriting analysis which is currently applicable in the assessment of people in industries (Bogan & Roberts, 2011). The analysis is a valid indicator of behavior and personality and therefore a useful tool for many industrial activities such as recruitment, selection, canceling, interviewing, career planning and team building. The study of graphology makes use of three hundred distinct characteristics in its approach to the investigation (Bradley, 2006). Graphologist knowledge is in the comprehension of psychological art which blends with the scribbling features.

II. Handwriting theory

The script of a person is unique in the impulsive manner that is; the brain apparently sends impulses to the hand which then manipulate the writing tool. Investigating the script that helps the experts to recognize the features in the writing and their interaction (Found & Ganas, 2013). The traits and the relationship between them give information necessary for analysis keeping in mind that no sample can contain all the different features. A single feature does not prove anything but can help identify a trend. Combination of many elements brings about bright and full interpretation.

The current approach of handwriting evaluation came from a definition of the critical aspect of science which is still under investigation (Franke & Srihari, 2008). Qualified graphologists make use of the strict code of behavior, and their expertise is always in demand. Those who utilize it recognize the value for the purpose in which it is related to and helps them in understanding characters (Fisher et al., 2012). Therefore, the analysis is a very crucial tool necessary in identifying the capacity and quality of individual's potential and talents which aid in career guidance and enhancing the relationship. Nevertheless, graphology work becomes continuously used despite its difficulty. It becomes appreciated by many who understand how it works.

III. Introduction of handwriting features

There are many features some of which include;

Size; script occurs in three zones which are upper, middle and lower. A benchmark where one can judge the size per every zone is 3mm per zone making the non-remarkable height of 9mm. Handwriting of large size implies that the person is outgoing and extrovert, it can also mean the writer is trying to show confidence although it may not be present to strangers (Canter & Youngs, 2009). Small

size handwriting is logical but means the opposite indicating that the writer is a thinker and academic based on other features in the script. An excellent and little writing shows that the writer is a poor communicator and they do not socialize appropriately.

Slant; right slant shows communication response but not how it takes place. The author may wish to be responsive, friendly, manipulative, intrusive, loving, in control and supportive (Hennessy, 2013). Upright handwriting shows that the person is independent. On the other hand, a left slant shows reserve and emotion. The person requires being trustworthy to himself first before they can commit to others. They can also be resentful when other try to push them into the relationship.

Pressure; heavy pressure indicates taking the thing seriously and showing commitment, but an excessive application of force shows a quick reaction to what gets seen as a criticism even without the intention of doing so. They react first and ask questions later. Light pressure indicates sensitivity to atmosphere and empathy to others but can also mean lack of vitality or evenness.

Upper zones or cases include letters like i, t, h, and others. The great high stroke aims toward goals and ambitions, but when extended they mean trying to reach unrealistic expectation which the writers feel they must achieve. Reasonable upper zone loop show that the writer is imaginative in a sensible way and like to think things through wider upper region loops show the tendency to come up with ideas and then mull them over. When the up stroke goes up and then falls back on top of itself, the writer wants to get out of imagination and deal with things at hand physically (Wilk, 2013).

The lower zone includes y, p, g. Smaller loops vary and have a different meaning, for instance, a straight stroke indicates impatience of getting the job done. A lower cradle stroke suggests aggression and confrontation avoidance (Huo et al., 2008). A full loop with a heavy pressure applied show energy to make money and possibilities. An entire lower loop with light pressure illustrates the need for security. Lower zones with varied shapes indicate unsettled feeling or emotionally unfocused person.

Word spacing; wide or narrow spacing between words is the space between letters. Larger areas indicate the requirement for breathing space. Small areas, on the other hand, show the need to be with others. It may also mean lack of finesse in writing.

Line spacing; unlined papers are always the best for handwriting samples. Wide spaced lines show the person want to pause and gaze at other people. The lines indicate that the author is observing. A writer who does this especially those that have loose writing structure have the discipline to keep calm when pressured.

Page margin; is the sides of the page. The left side margin indicates the ground and the beginning. The right direction demonstrates others and the days to come. The upper one is the ambition and goals whereas the field margin indicates the strength and instinct, therefore, margins are very educational (Lewis et al., 2006). The writer with a wide left margin shows the interest of moving on, and if narrow he is cautious and avoiding being pushed before one is ready. Small light margin shows impatience and eagerness to leave the place. Finally, extensive light margin indicates the fear of the unknown.

Middle zone; include a, e, c. The letters can give some interesting information whereby they represent the ego from where we acquire knowledge of how the writer feels and behaves in public setting for instance what makes them parasite both at work and socially. Some people scribbles consist of a single style while other have mixed up styles in their writings and this is also necessary for the provision of useful information. These features can pose positive and negative connotations whereby the analysts can use them for interpretation (Szozkiewicz et al., 2007)

Arcade; means that the middle zone of the script is rounded and humped at the top like a arches series. The style is used in copy-book though not taught in schools. A writer who utilizes it is protective, trustworthy, loyal but negatively secretive and stubborn ore so hypocritical. They have solidarity against outcasts.

Garland; is an inverted arcade where the writer makes their m, n, and h in the opposite direction to form a trough or cup where people can pour their worries or relay information. This kind of writer enjoys helping and being part of something.

Angle; angled middle zone is a style used in the analysis whereby the shape points give the impression of probing, unlike the curves. The writer employ talents at work and other projects rather than nurturing it. The interpretation does not imply that the author requires preventing or categorizing from spreading their talents. The analysis can help show the strength.

Thread; the handwriting is like loose fur ready to be made a fresh. Here, the writers are adaptable, mentally attentive, elusive and have inadequate patience. The author develops a habit of being responders and not initiators. They can be creative at coming up with something new out of existing one. The authors are time cautious and make appropriate decisions (Sesa-Nogueras et al., 2012).

Wavy line; the writing is the most amalgam and is used by mature skillful people for a responsive purpose to suit the certain occasion, and for this reason, it is a way of coming up with the appropriate problem-solving mechanism. Finally, they are resourceful and easily adaptable.

The features and their explanation give a small but helpful lead of the way people behave and more so how they handle their social needs. Understanding individuality through handwriting is an essential way of producing best personal products for all to benefit. The reason behind the use of graphology should always be positive (Morgan, 2010). Interpretation should help the analyzed people to understand themselves and choose the satisfying ways to leave their lives. In a professional context, graphology can help the relationship to work by enhancing the quality of performance.

The more thorough the teams are when doing their jobs, the better the accuracy of the facts of the case. The worth of the evidence and its handling manner will impact the ability of judges in arguing the truth of the situation and coming up with a reasonable conclusion based on the innocence or guilt. Graphology interprets the writing of individuals basing the character form. Through writing the character of a person gets reflected. However, handwriting analysis does not foretell the future, the age or gender but can reveal phobia, leadership qualities, mood swings, ambitions, temperament and thinking clarity as well as the honesty of a person.

Handwriting reflects on the psychology of a population in the paper because it is a projection of what the brain contain (Thibault, 2007). Through graphology, our sub consciousness comes out revealing what we keep inside. It provides an insight of the personality of an individual. Just like there is no similar handwriting, also no individuality can become shared by two. Internal indifference can interfere with the handwriting of a person. This paper seeks to show how the experts can analyze the writing of the writer to determine the age and the sex.

Handwriting analysis is an important task that involves analyzing comprehensive comparison between a known suspect writer and a questioned document. A document is a material with legal markings which may become inscribed and used for different purposes. Analyzing the paper must consider its color, opacity, sheet size, thickness and weight, a fiber content, the grain direction, the water mark and the finish. These exhaustive file comparison of the foreign and domestic paper samples help identify most papers (Broeders, 2006). A typical low-grade kind will show no result to the owner except maybe his operation area. A rare and most expensive paper may trace to the limited category of people and the country.

Secret marking that exists in documents used by banks, government and other officials are also multiple on files along with some stock to aid in checking the quality of the official records. A document can be put into the category of a forged paper when it shows that it is not as old as expected to be. The composition of the journal can provide information about its age and so can the water mark. Often, it is crucial to measure the age effect of the paper's chemical content, fiber and color and the climatic condition under which we locate it. By use of a tint meter and chemical reagents for gorging color shades, the expert can determine the paper age accurately. A practice of forgery become tested easily by revealing the age of the journal.

The age of the ink can also become verified through the data on file by use of vegetable dye inks and other inks which show the chemical difference when used on papers revealing the age of the paper hence making it detectable. Magnification of the ink writing to more than fifteen times show tracks made by the pen which stand out clearer than the ink line between them. A new pen serves in

identifying its type through standard-band width. The use of a worn out pen show two tracks in width indicating that the user is either right or left handed. A badly worn-out pen may leave evidence of scratches that provide identification of the pen itself. A document written in pencil may get determined in the lab whether it gets used ten or fifteen days earlier. Unusual pencil may leave traces to the individual who used it.

Examination of similarities, qualities, and individualities of the documents takes place to discover the standard criteria and distinguishing characteristics between the writings. The known and unknown sample is put under analysis to reveal their differences such as identifying unusual words, letters, decoration formations and other qualities. They then get compared in such a way that grammar, spelling, and punctuation get examined, and so do the phraseology. Finally, the similarities between the unidentified and identified documents are well-thought-out for uniqueness and matching characters consideration. The writings undergo evaluation and judgment made. This analysis focuses on the fact that no two individuals can possess the same handwriting neither can a single person reproduce the same writing.

The hand writing is a physical activity carried out by adults signifies the quality of the writer. It, therefore, can be of use for identification of the author through differentiation of the two writing specimens' one of which is known and the other one unknown. The comparison includes other factors besides the letter forms include the pen position, line quality, movement, shading, connection, retrace, muscular habits, embellishments, and spacing. The obstacle which detects a disguise or forgery of his writing is hence, significant and money fold due to the constant repetition of the same writing over the years leading to a broad habit. For a forger to grow off his habits, he needs to assume a new one that is inherent, and that is virtually impossible.

[Understanding handwriting analysis](#)

When scientifically analyzing handwriting samples from a suspected person, they may try to disguise their handwriting though still there is similar characteristic identification in their grammar or punctuation. The writing instrument used can expose clues about the criminal. The scripting feature may include the form, which is the shape, the angle, the slant and the curves of letters. The lines, which shows how thick and the pressure applied when lettering. The layout, the letter arrangement and spacing of letters and words all over the page is crucial. Moreover, the content of the writing which includes the spelling, punctuation and the grammar can confirm if the samples are from the suspect.

[Disguise methods](#)

They vary with the imagination and the image of the writer. However, despite the many ways to conceal, a person may alter the handwriting. Only few range of disguise method can be of use by the writer that can affect originality of work. Experimental evidence shows that the overlying element that changes the appearance of handwriting are those likely to make disguise use positively. (Purdy, 2006) The theoretical idea that informs the opinion of the writers are generally under the belief that identification of handwriting occurs by its pictorial along and consequently, only superficial alteration require doing to the writing to impair it beyond comprehension.

Characteristic subjected to the first alteration are those that judge the handwriting appearance. Findings show that the most commonly altered script is as below;

[Handwriting slant alteration](#)

This alteration is one of the mostly used disguising features that makes the writing appear leaning or sloppy including any other element that alters the appearance. Being an unusual characteristic of writing slants is a favorite disguise target. Many commentators agree with the statement that use of sloppy writing is the most standard method as well as favorite one of disguise though not agree with it. Studies show that approximately those who participate in the habit of alteration as a mask process are a third of the total

(Mohammed et al., 2011). There is the most preferred direction of slant which alters the handwriting from leftward or backhand slope to one that is vertical or rightward sloping.

The most systematic slant method is from leftward to rightward direction. The first impulse of a lying writer avoids the right slope and changes it to the extreme backhand slope which frequently occurs in the altered writing (Lafone-Ward, 2014). The author aim is reversing their usual slant so that they are not convicted or found guilty. Every writer who alter their slant in the study change it from forehand slope to backhand.

Letter shape alteration

Uppercase alteration occurs more often than the lower case lettering because the capital letters are more suspicious than the small letter. Also because the uppercase occur with a higher degree of awareness. Alteration of these letters is hence easily more achievable. Most studies show that across many educational groups there is a change of capital letter formation especially in disguising signature which appears from slight additions or removal of strokes to new letter forms. Some participants involved the concealing of the upper case by changing the overall letters' design. Changing the uppercase letters from cursive to block letters is a most usable device that occurs in about ten percent of the disguise scribbles.

In other cases, small letters are likely to become interfered with, and such modification will only occur to the first or last letters of the word for it will cause immediate notification effect on the overall handwriting appearance. Some disguises use changes that camouflage the small letters whereby they create complete small letter forms than found in the document under investigation. Small letters that were subject to mask included e, r, s, t, and k such that t would appear stretched upward lowering its position or even increasing the final stroke by use of a cross-bar.

Other disguising letter form aims at embellishment or simplification of the original letters which they call superfluous ornamentation. Similar results show that those who use this type of disguise used the abbreviation in the written characters. Some masks used the unusual manner in the process of changing the slant of their scribbles (Daab, 2012). The particular letter forms show qualities of a naturally turned shaped of abnormal size hence inevitably result to suspicion in spite the use of the disguise version. On the other hand, smaller writing led to less embellishment unlike the use of larger ones which increased mask discovery.

Alteration of the letter size

Modification of the overall size of alphabets is a standard method of revision which is an element of natural handwriting to manipulate and change the features of the overall handwriting appearance. When the conceal size become compared to the standard one of the writer, the writing will automatically show that the size increases. There is a tendency observed where the text size increases the regular hand activity causing conflict among letters. Altering the size of writing increase the overall height of letters than the usual decreased size which directly indicate that cheating takes place. Other evidence contradicts the findings whereby, in disguising the handwriting the subject utilized a format change to eliminate the similarity in the known document.

Modification of Initial and terminal stroke

Presence or absence of strokes can affect the visual complexity of handwriting. In case of disguised signatures, the original approach all the final ones is a method used to alter the writing. Mostly, the writers use the last stroke than the initial one, and some even use both strokes. The strokes affected only t, b, h, and I letters making final stroke restricted to only small letters. Initial stroke became altered by either addition or deletion while the last strokes got added, extended or embellished or emitted entirely. The strokes alteration also included lengthening or shortening the letters in the mainly last stroke which revealed that the greater tendency affected the final stroke and not the initials ones. Use of initial and terminal stroke appeared to be a method disguising signature writing in most cases.

Alteration of connecting strokes

This modification was a disguising tactic only present in several disguises writing. The investigation occurred in only one study in great proposition engaged this alteration. It was typical for the connecting stroke to be converted from angular to rounded linking.

Angular stroke modification

Stroke altering can affect the striking aspect profoundly though rarely used by disguises. Only a few frequencies appeared in the disguised signatures and not necessarily the writing. Only a few affected the writing angularity. The study showed that it is possible to distinguish a clear trend including whether the writing will become more rounded or angular in alteration. In the study, thirty percent produced leaner than seventy percent which created the rounded book. Those who interfered with the angularity of the writing did so by increasing the size of the stroke apex angularity.

Upper and lower extensions modification

The ascenders or descenders in their lower cases include p, j, f, y, b and Q which are prominent making the susceptible to inspection to discover the intention of the deceiver. Almost half of the suspect reject their standard methods of forming the lower and upper loops and substitute alternative forms. A writer who habitually used loops extension would either change the size or omit the loops entirely. Altering the bottom extension in the disguise act is more significant unlike using above projections.

Unskilled or adopted careless writing

It is not possible for any human being to write in hand more technical than his usual handwriting. Although, despite the principle, it is possible for a skillful a hand to pretend to write in an unskilled manner by deliberately writing sloppily and carelessly. This awkward writing is a method of disguise whereby the writer introduces illegibly features with the aim of escaping the actual evidence. Altering the signature by use of sloppy handwriting with the intention of failing to be discovered was among the greatest ways of disguising. Only a few writers choose to change their signature making them suspect even more by producing dirty and challenging work to read. Writers can also try to disguise their writing by intruding artificial tremor with an impression that they will look as if they use drugs or alcohol. The use of this tremors the writer appear to distort the writing affecting the minor features by making them less apparent. It is doubtful that there will be the maintenance of consistency in writing. The smoothness area where tremors fail to exist may assist in providing identification and proof that there was the use of disguise. In reality, it is impossible to differentiate between real tremors of a fake one hence not possible to realize the mask process.

In other cases, there is speed alteration which is a very used method whereby the writer scribbles hastily or slowly as a way of hiding the identity. There is a weak conclusion that the speed used s the writers' way of scribbling typically. The overall writing appearance gets affected by the way writer arrangement or organizes their writing on a page or any other document. This activity alters the arrangement habit hence causing disguise. Space alteration occurs when the mask compresses or expand the letters or words with the aim to change the appearance of the writing. It is still an issue where authors space their work as a way of disguising or out of panic.

Mirror writing as a disguised method includes employing the non-dominant hand which runs in the opposite direction to the known pattern. On the contrary, pen pressure alteration is the degree in which the writer is cautious about his normal handwriting and therefore uses the right or increased pressure of the pen, as a consequence of increasing or reducing speed (Niels & Vuurpijl, 2005). Writers successively mask their writing by using thicker or thinner pens which affect the general book appearance. Deliberate letter omission as a disguised method is a form that successfully works for the disguises when creating the receptive signature and so the deliberate misspelling (Leung, 2014).

Disguising numerals as a rare of the occurrence in the real scenario which goes hand in hand with the observation made in the experimental literature. In other occasions, criminals take advantage of combined disguises to cheat and alter the writing. Therefore, making it hard for the investigators to identify the writing or the signature.

The Process of the crime scene activity for evidence evaluation, help in the determination of the sequence of the events. Documents that relate to the scene may include crime confessions, threatening notes or even suicidal information that resulted in the offense. The forensic scientists look for the handwriting, inscribed carbon papers, photocopies, diaries or even shredded papers (Murphy, 2008). The questioned document undergo comparative examination, and the sample that goes through future analysis may relate to the copy of the criminal. Significantly, the sample in its original form is better and purposive, unlike the duplicate. The more the document under investigation the better the comparison hence quality conclusion.

With the use of the microscope, both handwriting and signature matters amongst other parameters show the relationship and variation making it a precise method for examination. After a detailed study, there is a likelihood that the specimens were from a single person through the qualitative probability may vary significantly. Limitations to the investigation will show qualified findings. A well examined forensic work contains many facets and requires the use of multiple scientific methods and range of instruments in the laboratories.

Consequently, the clues in the letter help investigators in determining whether the subject is telling the truth or lying. The reaction of a writing originates from a subconscious mind which at times can provide the impression to the psychologist that the one who fears from the idea do so, for they do not want exposure. The writers who embrace the writing are the type that tries to pry and snoop. Whatever the reason the proposition is the right approach for commencing a disagreement. Handwriting analysis art has two division one of which is an established and the other respectable branch. One who seeks to identify individuals by their writing is a subject of the paper.

Character assessment is a distinct activity of the humanity itself hence difficult to carry out. A short article can provide an outline of the involved theory which psych the investigator to proceed with his study more precisely with the aim of getting the matter solved. Prior the writing the suspect may stop and think what he is writing leaving a space before returning to give false information. The sudden change in the writing slant mid-page is alerting the analyst where to focus. The shift of emotion indicates that the person is deceiving the explorers. The handwriting analysis applications may take place in law enforcement hence, taking the information from a suspect or victim can increase the truthfulness of the matter because the script exposes the writer's motives. Identification of the reasons can be of advantage to the investigator.

Every individual has a motivation in meeting the same needs which include water, food, air, security, love, esteem, and respect. Life experiences may cause one to desire some needs more than others. A quick involvement with the subject affairs helps in gaining their trust allowing them to be open easily and faster. A suspect motivated by the desire for respect will require a different approach, unlike a victim who needs love. The statement will show the areas requiring further pursuing. Handwritten papers produce better information unlike the text messages and therefore an in important tool for analysis.

Under forensic science handwriting analysis require experts called QDEs (Questioned Document Examiners) who look for alterations and forgeries and then compare the result with the original sample available. Each is unique and has a different style of lettering. The QDEs search for differences in the document instead of similarities to determine the presence of forgery. They, therefore, look into letter form, sentence form, and formatting. Simulation is the process of disguising a person's handwriting or the attempt to copy another's. It is a huge challenge for it make it harder or even impossible to determine the questioned document.

The simulation can follow some factors that lead to its identification, and they include shaky lines, lots of pen lift and dark, solid starts and finishes for the lettering. These elements are present in forming letters slowly and carefully rather than the usual, natural work which is done quickly without a second thought. Through replication handwriting analysis can make inaccurate though, other features of drug, illness, exhaustion and human errors can cause unviability of information conveyed.

Police are the first people to arrive at the crime scene. Where a crime involves a handwritten note, they may call the experts so that they can match the case with the criminal. In other situations, the note might be the only evidence that makes the suspect charged and even sentenced. Therefore, the analysis fruits are only available when the document found undergo some lab analysis. The questioning of the material is the obligation of the officer who first arrives and receives the document and finds out that it does not fit with the known case pattern. The duty to ask for assistance in analyzing the written material connected to a crime has often been a crucial decision made during the criminal investigation.

Protecting disputed document

People neglect paper after folding, stamping, marking and filing them. The neglected paper may be in such that it can no longer be of use due to the reduced storing condition and therefore, the disputed document should receive protection so that the writing is legible and maintains the original standard. A covering is put to protect and keep it safe until the analysis period. Guidelines followed in the maintenance of a document include the 'do's' and 'don's' which can help address complications and problems related to poor storage. They include;

DO'S

Keeping the document in a dry place, away from excessive light and heat that can affect the quality of the paper.

Keep the papers unfolded in cautious envelopes.

Take the papers to the examiner's lab when possible as the first activity.

DON'TS

Don't allow anybody except the specialist to carry out the test.

Do not mark the disputed document or point at them with a pen or a divider.

Do not carry the disputed papers for an extended period.

Do not damage the paper by refolding, tearing or punching for filing purposes.

The disputed material is relevant enough to undergo investigation hence deserves proper treatment care. The packaging of the evidence to avoid losses, contamination or breakage in transit is important. Forceps, tweezers, and other tools are necessary to collect large and small items into the containers. Use of rubber gloves when handling evidence is crucial (Gawda, 2008). Each document should occupy its package so that they do not interfere with the clarity of the information. Envelopes marking should take place before packing the specimen. Only the documents belonging to the same exhibit get put in the same container. For accuracy of comparison analysis, the sample collected get packaged in different containers to avoid any close contamination. Therefore, only thoroughly, cleaned and dried corrugated papers, containers, wrappings, sealing tape are essential for evidence transportation.

Guidelines for exhibit packing include packing safely to avoid damage, to prevent contamination, uniquely labeled to prevent confusion, sealing containers with an appropriate seal, fragile documents get put between cartons to prevent damages and breakage, packaging samples affect their integrity and should be appropriate. The results from the modified sample can be of great challenge in the law court. Marking of the evidence help in identifying it though it should not impair the quality of proof or restrict examination procedures. Therefore, suitably marked envelopes should be of significant contributions to the examiner or rather putting two covering letters to accompany the exhibit is preferable.

Individualization means the uniqueness of things which can, therefore, become separated from the rest. All crimes undergo individualization because they relate to a particular person or persons. Individualization implies that; that one identifies an object and compares it with the original one with the view of determining the uniqueness. Through comparison, the individualized sample can relate to a single person by uniqueness portrayed. Also, through individualization, a conclusion determination comes through whereby the experts get all the required feature that correlate between the characteristic found.

Handwriting as an individualization procedure

Each writing is unique based on the individual nature which must become recognized by the experts so that individualization takes place. The experts' knowledge of theories and practical experience determine the analytical method used to examine the document. Therefore, it is of great importance to comprehend that no handwriting in all aspect can be identical. When distinguishing writing elements like variation should be put in significant consideration to determine whether it is alien, abnormal or normal. Negligence of some factors may lead to a deductive conclusion which is improper.

One should be exclusive when proving the writer of the questioned document such that no further explanation can come from keeping in mind of the possibility of imitations and the resemblance. The fundamental principle that individual feature possession exists in every handwriting explains individualization (Batchelder et al., 2009). These essential characteristics provide distinct individuality in writing and must be detectable before individualization process occurs. Handwriting character occurs in the presence of different spacing, letter shape, stylistic errors and line quality. This uniqueness of writing that assists in determining the perpetrator's individualism. Therefore, it is crucial to check the letter sizes, spacing and the quality of each line the slope and slant of his writing style.

Handwriting in individualization process

The process has three stages that exist as follows;

Discriminating or analysis element determination; both known and unknown items undergo analysis study or examination to reduce the subject matter to its elements. These include the behavioral habits which differentiate between products that may be precisely measurable, observable, or perceptible item aspect.

Comparison: the element of the unknown object determined through the study must undergo comparison with known visible records of the specimen.

Evaluation: similarities or differences in each item show the particular value that helps in the distinction of the samples which aid in explaining the result.

Whether information is graphical, numerical, physical or chemical, the resultant comparison must be visible. Where a large population is high modern technology may apply. Comparison task is difficult hence require scientifically mature participant (Bozza et al., 2008). Consequently, comparing the elements must consider pen movement or other instances to produce accurate information. All crimes management should be in such a way that all valid evidence can be gathered from it to ensure successive conviction and prosecution. The integrity of the sample must remain intact through the maintenance process. The investigation should follow all law parameters. Gathered samples should be properly marked after collection and preserved appropriately to maintain the value of the necessary information.

Handwriting in crime investigation

The primary study purpose is to gather facts that provide evidence before the law court hence resulting to proving the accused participant guilty or innocent. The ability of the expert to acquire and collect the data and use it in his study to get the needed evidence a daily activity to determine their fruitfulness. The officer in charge of the investigation must possess varieties of skills and most importantly the ability to know where and how to find the necessary information to act as proof. Handwriting is a way of expressing words in the form of a language such as speech which leaves the long lasting effect. Handwriting specimen, therefore, is a compact set of authors experimental unit which when adequate contains the required information from a known source (Taroni et al., 2012).

A sample in forensic handwriting analysis, handwriting recognition, and signature verification refer to a handwriting specimen. Out of habit sub conscious pattern series forms scribble. Identifying lettering on documents of a particular person is possible. Again, the investigator may be able to recognize the handwriting on the document to be of the perpetrator previously examined which rarely

happens. A report includes letters, text, database and spreadsheet file or even any written piece of information produced or given to an organization or an individual. Handwriting specimen include collected and requested samples (LeBrun et al., 2012). Requested samples are signatures which aid in conduction of handwriting comparison. The example occurs when a person requests for the script service assistance from experts.

Letterings executed at the investigator's request get referred to the required standard. Collected standard preferably are the materials gathered for investigation work because of their natural or healthy products in most cases (Turvey, 2011). These rules are similar to the questioned writing in that they possess similar letters, letter location, and combination which may be difficult to find or may fail to exist in advance. Message construction, their connection, their stroke, and height together with the spacing of the words and letters include all the characteristics necessary for comparison. The shading, size, skill level and speed are also inclusive.

On the other hand, asked writing get influenced by conditions and know they are subjective to in some examination. If the author is the actual writer that request the copies, the alteration of the specimen may exist and if not circumstances may induce nervousness that may affect fluency of scribbles. For one to compare the handwriting samples requirement is necessary from individuals considered to be the writers meeting the following conditions;

There must be enough examples to show the habit in executing the questioned parts and also to rely on the consistency of execution of particular practice. The natural writing varies from one location to the next, and from one individual to the next unlike when using machines like photocopying device. The standard of writing must be sufficient to reveal the range of variables involved. For practice or skill hands six signatures extended in one or two pages may prove sufficient while we for other the necessity may increase.

The samples duplicate the nature of the questioned writing. Many obstacles may interfere with the handwriting of the individuals which include the temperament, age, circumstance as well as writing tool. The duplication of the standard extent varies based on the controllability of these variables. Therefore, the comparison will exist where materials are alike and similar age combination, words or phrases and also by use of the same paper and instrument. The similarity in the writing features may provide insufficient evidence hence cannot define the conclusion where the suspect become convicted.

The samples consist of both the requested and the collected ones. The obtained standard indicate the reliance degree placed on the required writing which may fail or get tampered. Connected standards are mostly the repeated habits in a regular book and can be more contemporaneous with the previous document. On the contrary requested document can give duplication of letter combination of the experimented materials.

The collected sample includes some original ink which has a three-dimensional letter ring to them in that the aspect of control of instrument especially pen pressure and position may become calculated or observed. Such characteristic of scribbling may be crucial in the studies.

IV. Purpose of writing

One may write to express many things which are happening in their lives or the plans to harm others. The reason behind the book may include: plotting to do harm or evil to others through threatening notes aiming at stealing, squandering and despise. Some devious intention may encourage the person to write their motives. Therefore, the person writes carefully and consciously like an imposing criminal threat on the script. Another reason for writing maybe due to impatience and agility hence it is a slow writing technique adequate only for the slow thinker to the individuals who are thinking ahead, the action becomes an irritating one.

The agile mind may act to the drug for example in a cruel manner tormenting them in the paper. Similarly, some may write to express the emotion and others fatigue. The impact will show in the journal which certainly will vary with this traits especially if the person is carrying out disagreeable chores that require a lot of output and concentration. Others do write to show their emotional disturbance

hidden from the active mind. A pen, therefore, becomes driven by the increasing emotions will move differently from that of a calm person.

A person intending to commit a rape murder case will reveal his intention in his writing. The shock of previous experience may show scarce and may lead to struggle when trying to indicate the kind of torture, game and other things that may remind the person of the past. Writing is also an act of docility and truculence in case certain standards do not succeed. In this case, individuals who like to make things harder for others can have a great chance of distorting their handwriting to make the reading impossible. Those who fail to conform can also cheat in their writing and so will the gentlemen who are afraid of being made accountable for what they wrote.

Writing can reveal some social attitude in the form of communication which may reach out to and influence many readers. How the writer points out his matter of common sense reflects his view. A courageous outgoing and trusting writer who is cheerful will always close to the next page differently unlike the person who hate and fear people. Some authors engage in writing to reveal their appearance and therefore, they tend to write in a manner in which they feel necessary. Moreover, his taste, the look will show in the script.

The work of the responsible officers is to bring back to life the dead files bring out their new identity necessary for comparison. Handwriting found on a certificate of ownership, a piece of paper collected at the scene, and offset of ink on a blotter, notices in a memo book or any other writing proof to be of use after analysis. Great care in the collection a preservation of documents submitted is necessary for maximum output. The uncontaminated material carries the highest quality evidence and anything below that, that is, a photocopy is better than nothing but has little-qualified yields.

The forensic analysis involves other factors such as DNA testing, crime scene investigation, voice identification, fiber analysis, narcotic analysis and fingerprint analysis. In the area of questioned notes, handwriting analysis is a fundamental part that involves examiners study for some alteration, faking of the available document. It is a repetitive activity that relies on broad knowledge of the way people shape their letters, identify the uniqueness of each letter formation as well as discovering of physiological processes behind the note.

As a science, handwriting analysis involved primary school learning of how to shape and style the letters. It involved students writing the same way, but over time each developed their style leading to distinction. The analyst undergoes training that enables them to distinguish individual characteristic from style features accurately. Personal virtue is most significant part of forensic analysis. Comparing to documents that relate to known and unknown authors starts by checking the differences and not the similarities since they are more. Therefore, after discovering the differences, it will tell if the same person wrote the two materials. Sufficient dissimilarities in the distinct characteristic without disguising the copy of the handwriting show that the documents were not from the same person. However, little differences with enough similarities in the traits of the two papers demonstrate the possibility of a single author.

V. Materials and Methods

Collecting specimen

Questioned materials may include wills, titles deed, contracts, identification cards, seals, stamps, checks and handwritten notes. Other documents originate from machines and include faxes, photocopies, and printed materials. In some cases, digital signatures and graffiti get put under examination. However, these documents cannot provide the type of quality evidence required. Documents that don't contain identifiable markings that are visible may provide quality impression when underneath under similar documents during the writing process. The reconstructed shredded material can be of great help. Moreover, rubber stamps, writing instruments, envelopes and other office equipment in possession by the suspect may be valuable when in the hands of an investigator. In digital

materials evidence may be hidden from the metadata of files, hence providing information that aid in the tracing of the suspect and the age of the script.

The known specimens collected by investigators is crucial in determining the comparison of information of the material in question. These samples may be from any source so long as it links to the evidence be it a machine or an ink manufacturer. Areas requiring handwritten samples are put into two categories that include; collected scribbled specimen, which involve document got from the scene and requested writing examples, which are materials from required by the specialists (Chapran et al., 2008). These specimens are carefully made under special conditions with the author get investigated. Sources of the sample may come from items like letters, canceled texts, diaries, medical records, and signed receipts, tax files, and other legal documents. Analysis of the writing materials requires qualified forensic examiner such as Senior Digital Forensic Examiner in Abu Dhabi.

Analyzing a sample

Evaluating the scribbles is an extended and careful procedure that consumes a lot of time, under appropriate circumstances, considering lots of comparison of samples. It is not a matter of looking a letter and concluding that there is a similarity rather it requires an extreme critical thinking to distinguish the shape, style, and format of a word structure (Risinger, 2010). There are real variation within a single document in a person's writing, for example, having eight questioned document and eight exemplars from a single suspect show that the letters and the words in both text have similarities if the person is the author. This profession deals with thoroughness and not guess work.

There is a use of a microscope or a magnifying glass in the comparison process where the analyst looks deeper into the individual's traits. The examined document require lots of magnification equipment whereby hand magnifier enlarges materials from two to ten times and may include some writing capabilities as well as brightening the field of view. Many types of microscope show details more carefully. A binocular microscope is efficient because it has two eye pieces and the viewer can focus on both eyes. Moreover, the microscope has a third viewing tube that allows a video camera attachment for videography or photography.

Digital microscopes can combine visuals for enlargement with digital capture technique that allows the viewer to see the enlarged image on the computer's monitor instead of using the eye pieces. Starting out with little power is ideal for the first examination of a document then zooming in closer to the inspection area required. A comparison microscope is the most crucial type of review of a record. Two scripts get viewed side by side after positioning the images closer to each other (Tilstone et al., 2006). Use of different filter color in each document by the examiner lead to viewing the two segmented areas overlapping each other.

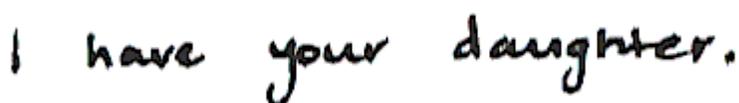
After a kidnapping scenario and a letter put near the door. It contains the following information that required the expert analysis.



I have your daughter.

The document under investigation.

The suspect under questioning gave a sample that related to the same message and included the copy below.



I have your daughter.

Suspect's document.

By the look of the two scribbles, they do not vary enough to declare that they got produced by two different people. But on closer glance, they appear quite similar and therefore require a table that shows the varied form of each letter present in the questioned copy. Discovering an "a" that looks similar to the "an" in the table, it becomes skipped since the interest comes in where distinction exists. Each letter copy gets taken by use of a digital camera in step by step process. Separate table's usage in differentiating upper and lower case letters is significant.

The comparison becomes shown below.

I have your daughter.

a	a a
d	d
e	e e
g	g
h	h h
I	I
o	e
r	r
t	t
u	u u
v	v

The same kind of the table follows showing the suspect script as shown below.

I have your daughter.

a	a a
d	d
e	e e
g	g
h	h h
I	I
o	e
r	r r
t	t
u	u u
v	v

The two tables get compared to find out if there is a match between them. Since it is a single sentence, there is a restriction of choices. Potential matches for every letter shape and structure under real circumstances would be present to discover a perfect match for the letters in the exemplary that occurs in the questioned document.

a	a a
d	d
e	e e
g	g
h	h h
I	I
o	e
r	r
t	t
u	u u
v	v

a	a a
d	d
e	e e
g	g
h	h h
I	I
o	e
r	r r
t	t
u	u u
v	v

The questioned and exemplar tables

For generalization purposes, the tables get put side by side for comparison of the initials tables. A match is evident in the two document hence the same person wrote both scripts. The issue comes in where the person discovered was trying to disguise the text. The results lead to incorrect data hence making it hard for determination of the actual kidnapper. Fortunately, there are ways in which investigators can recognize forgery from a script. They include the use of dark and thick starts, shaky lines and finishes that appear dull. Again, there is an identification of lots of pen lifts that result to a slowly and carefully letter forming rather than quick natural writing.

Gender and age analysis.

Handwriting analysis can provide little information concerning the personality, age, sex and intent of the writer. After analyzing many writing samples over several years back there are still seem no accurate telling of the age of the writer from the script (Harrison et al., 2009). Though, an experience can give one the ability to guess the author's age which can be wrong at times. Records show unavailability of research that determines the accuracy of factors like gender and age. The analysis reviews some trait and nature of a person in that a fifty-year-old woman can appear to be immature in her writing while an eighteen-year-old teenager may possess maturity. Therefore, it was difficult to predict that the age of the person based on scribbles.

The sex of the writer, whether male or the female cannot show evidence that the writing is from either of them. Though, the handwriting can still tell whether the writer has the feminine or masculine characteristic. The age of the person is not evident in the handwriting but can reveal the maturity or immaturity of the personal emotions.

Classifying handwriting into different groups include the following nationality, age and gender have several purposes. In forensic science the classification of writing aid the investigators in focusing on particular groups of the writers (Jiayan et al., 2005). However, the only little investigation got a chance to explore this filed due to limited understanding and its different characteristic. Classifying handwriting into demographic type get carried out in two steps that include classification and feature extraction. For a system to perform, there is a dependence on the step of feature extraction that helps in characterizing elements making it possible to differentiate.

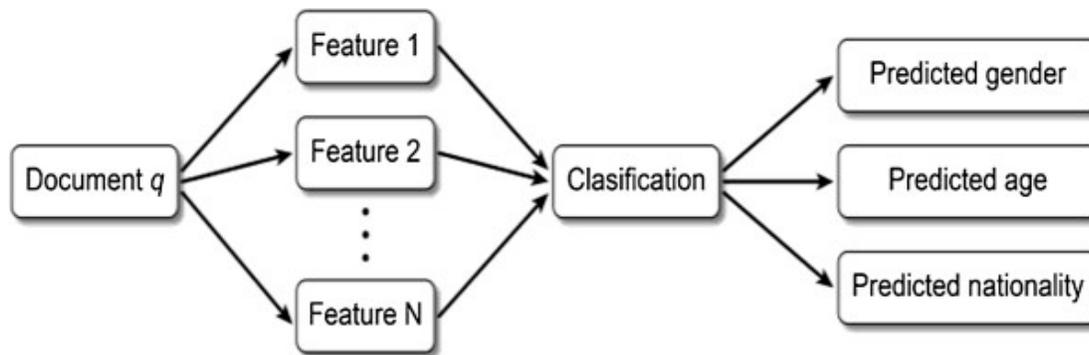
Several geometric elements in this study are necessary to propose characterized handwriting and take advantage of the element to carry out the grouping of handwriting about nationality, gender and age (Peterson & Leggett, 2006). Combination of this features uses an analysis method known as random forests and kernel discriminants. The rates of classification received from an individual dataset show that there is 55.76% for the range of age prediction, 74.05% for the prediction of gender. 53.66% for prediction of nationality when writers produce the same writing text and 47.98% for the prediction of citizenship, 73.59% for prediction of sex and 60.62% for the prediction of range age where the writers use different handwriting text.

Categorizing handwriting into handedness, age, gender, and nationality helps in the application of several classifications in the field of the forensic domain by use of classes of the script to investigate and categorize suspects based on their criminal activities. Also, taking each category separately and processing it would lead to better results in the discovery and verification of the writers (Sommer et al., 2008). Many experts made a proposition of a system which categorizes handwriting into social categories by use of macro-features introduced in the individualism of writing. The featured deal with items like paper movement, stroke formation, pen pressure and word spacing and proportion.

After investigation writer gave feedback that there was an increased classification accuracy of 86.6%, 77.5% and 74.3% for respective age, gender and handedness category. Unfortunately, in this case, the writers were to produce the same text which is not the case in many criminal activities around the world. Therefore, real forensic work becomes unreal. Moreover, the data include the study is not available in public. Other authors carried out handedness and gender in the internet system which provides temporal data about the

writing (Karki & Singh, 2014). These authors made use of twenty-nine features set which became extracted from both online and offline information where the offline representation and the applied assistance received from the Gaussian mixer and Vector machine model to carry out the classification. The report showed a performance of 84.866% for the handedness category and 69.06% for gender group.

Recent studies published by the author in separate cases that focused on the fulfillment of the internet mode and offline mode where the result for the offline system was slightly better than probability event by 55.39%. There is a proposition of a new technology that helps to detect the nationality, gender and the age range of the writer based on handwritten document (Mouly et al., 2007). A group of novel features become proposed and elaborated including the curvature, directions, tortuosity, edge-based directional feature and chain code. The features get mixed by use of different classifiers including the random forest and kernel discriminant. These methods become evaluated by use of QUWI database the only public dataset available; Theta contains annotations concerning age range, gender, and nationality.



General scheme

The procedure in use consists of two main steps that include classification and feature extraction.

2 Feature extraction

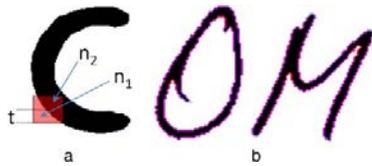
According to this step the characterizing elements get removed from the handwriting such that the pen is independent, images get first categorized into two whereby Otsu thresh holding algorithm is used to make the system (Nicolas et al., 2015). The subsections involved describe the features that are present in the study. The features do not agree with a single term but their definition gets based on PDF obtained from the writing pictures to give traits of the writer's personality. PDF explain the possibility of different features taking a given value. The developed elements and the equivalents are used in legal action by the document examiners and graphologist to give distinction between the various writers' categories.

Direction feature (f1)

The method is useful in the writers' identification. Its use closely looks like the one proposed by another author like Matas. First, there is a computation of Zhang skeleton of the binary image. The frame does not produce parasitic branches as other skeletons do. The structure undergoes segmentation at its connection pixels than the pixel become traversed by use of predefined order that favors the four neighbor of connectivity. For every pixel, there is a consideration of $2N+1$ that neighbors pixels that get positioned at the center p. There is a linear regression of the pixel that provides the proper estimation of the pixel p tangent. The N value becomes empirically set to five pixels found throughout the paper. The PDF of the resultant direction shows the random sector for which the empirical set value size is 10.

Curvature feature (f2)

In the examination of the forensic document, there is a shape acceptance as characterizing feature. The method gets adopted as follows where every pixel p that belongs to the contour, the experts consider it as a nearby window of size t . Inside the window computing the pixel number (n_2) and the number of the other pixel (n_1) that belong to the foreground and the background respectively. The difference (n_1-n_2) positive where the point on the contour is negative and convex at the point where the contour is concave making it a good indicator of the shape local curvature. Therefore, the curvature get estimated as $C = (n_1-n_2) \div (n_1+n_2)$. C occurs on the binary shape where t is 5. The PDF, on the other hand, is set to 100 making the computing curvature the novel in the offline fields of writer categorization and identification.



Computing curvature

On the curvature above the red color represents maximum curvature while blue color represents the minimum curvature.

Tortuosity feature (f3)

The feature aid in distinguishing between the smooth writer and the author who write slowly to produces a twisted writing. For the estimation of this curvature every pixel of the book, the longest line segment that cuts across p determination occur and gets included in the foreground as shown below;

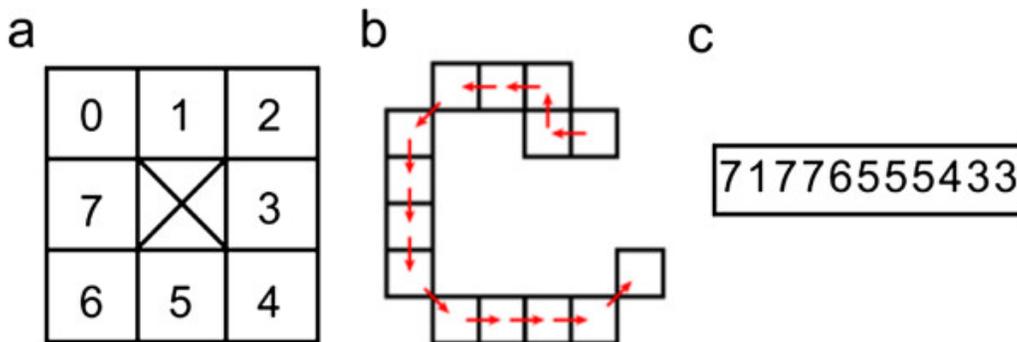


Tortuosity computation

a- represents the length of maximum crossing portion where red is the correspondent maximum length and b- blue the minimum one. The PDF or the longest traversing section of the angles become produced in the vector with of size 10.

Chain code feature (f4 to f7)

Through scanning of the text contour which generates chain code and assigns to each pixel a number that relates to its location concerning the other pixel.



a- Chain code generation order, b-shape, and c-corresponding chain code

These features make it easy to categorize a sufficiently detailed curvature distribution in the handwriting where the chain code occur at different orders as below;

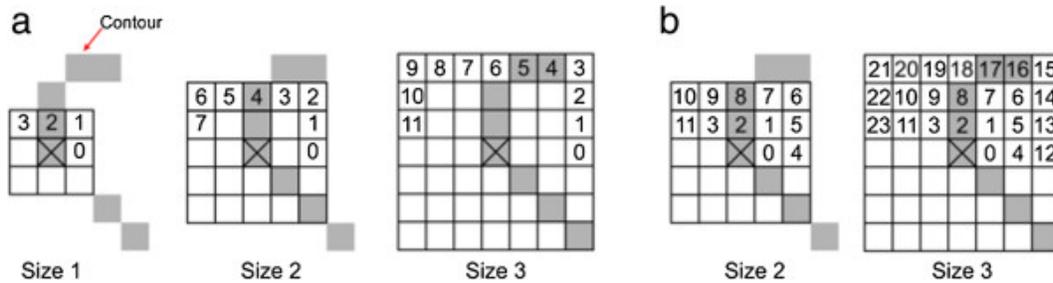
F4 is the PDF of I forms found in the list of string code in that I represent 0, 1,.....,7 of size 8.

F5 is the PDF of (I, j) forms found in the list where I, j represent 0, 1,.....,7 of size 64.

F6 is the PDF of I, j, k and f7 of I, j, k, l of sizes 512 and 4,096 respectively. Not all the forms of the succession of the chain code can get achieved such as the system from 1 and 5 and therefore, the PDF equal distribution is 0.

Features of edge-based direction (f8 to f26)

This features give a full delivery of the leadership and can occur in several sizes by positioning the window at each center of the contour pixel. Then, counting the number of occurrence of each direction.



The features get computed from size 1 of PDF 4, (f8), to 10 of PDF 40, (f17). There is an extension of these traits to include both the contour of the free window and the whole window computed from size 2(f18) of PDF 12 to size 10(f26) of PDF 220.

Classification

In this step, the features get used to deciding the category each scribble belongs. When carrying out the classification of each trait of the vectors get used as an individual input for the categorizer. For example, f1 is an input of element vector 10 for the classifier. The combined features when using the classifiers analysis with the help of spectral regression which becomes given as follow; application of the two classifiers become justified by their capability to train on massive databases and achieving higher rates of classification.

Random forest classifier

It is a method of classification that works by making a lot of decision trees during training time and producing a class which represents the mode of the classes. In this case, the classifiers use R forest library which is random.

Use of spectral regression in KDA (Kernel Discriminant Analysis)

SR-KDA requires solving a set of problems that involves regression where computation of eigenvector is not present. By so doing there is an improvement in the complexity of computation allowing large matrices to get handled.

$$f(x) = \sum_{i=1}^n \alpha_i K(x, x_i)$$

The resultant classifiers in the classification become presented on QUWI dataset

Evaluation

It involves describing QUWI database then analyzing the results as shown;

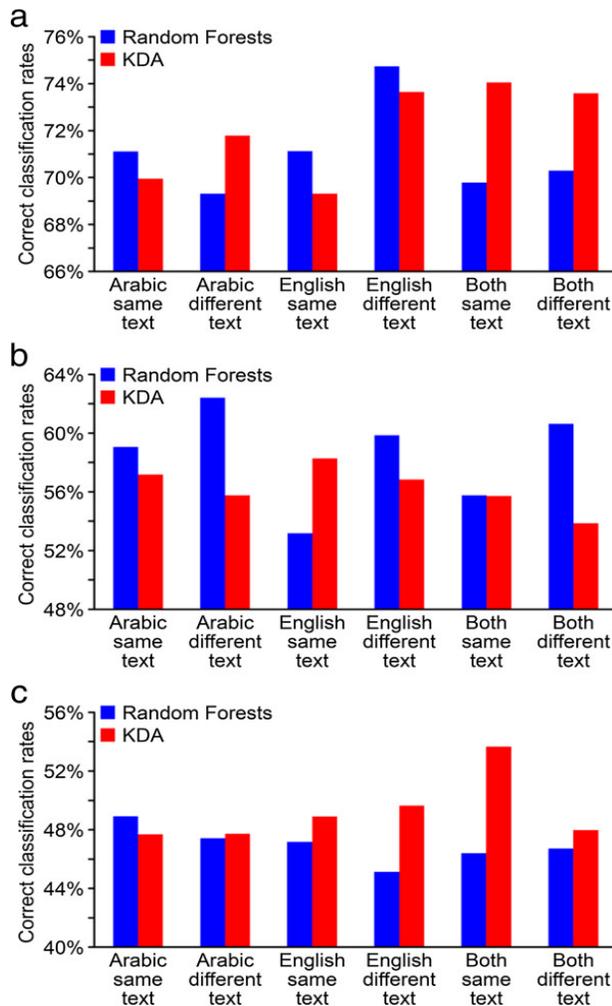
Dataset

The dataset represents the gender, age, and nationality of the writers who produce one text and another text that differs to all writers. The writers have different ages, genders and come from different countries. There exist only a few left handed writers useful for handedness detection. Seventy percent of the dataset become used for training and thirty percent for testing the analysis which gets completed in the data set involving 1017 writers. Each feature correlates to a PDF of several sizes which is a separate predictor

(Holekian et al., 2014). There is the combination of the predictor by use of random forest classifier used for the features category and as well use of spectral regression in the analysis of Kernel discriminants. From the dataset, three classification tasks become defined. Classification of the age range where seven varieties were used to avoid minimal patterns ranging from 1950-2012. Random classification represented 14% prediction. Prediction of nationality where eight countries were useful each representing more than 30 writers (Layton, 2011). The random grouping predicted approximately 12%. Finally, classification of the gender was the other task where after arbitrary classification it predicted about 50% since only two sexes got involved.

VI. Results and Discussion

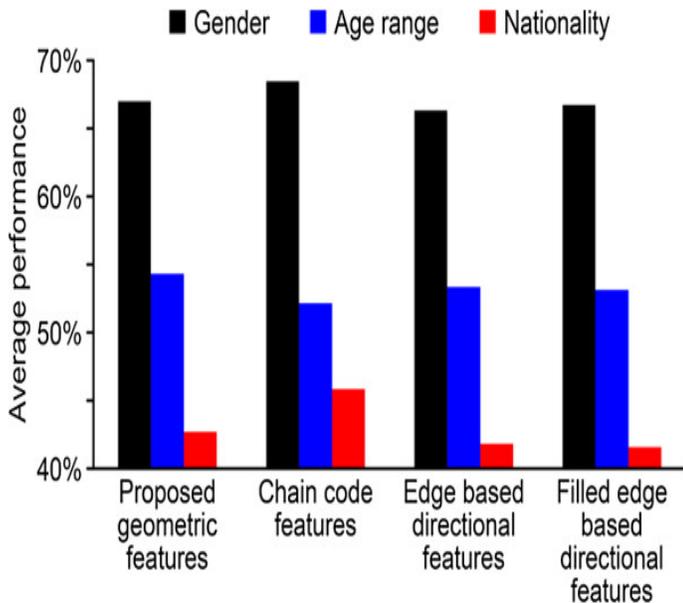
Correct rate of classification for every category of the feature that uses the random forest of 5,000 trees and the analysis for each age range, nationality, and gender classification. The first step is separately carried out, but in step two there is a joint activity. Results received for each similar text, and different text gets reported and summarized as per the graph a, b, c



Excellent classification rates by use of RF and KDA for (a) gender, (b) age, (c) nationality.

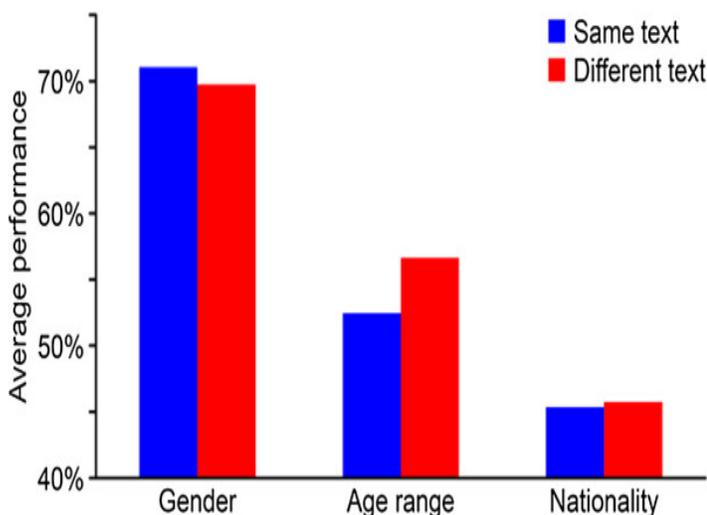
To test for optimal feature combination for every classification problem an average performance plot for the geometric features (f1-f3), functions of chain code (f4-f7), functions for edge-based directional (f8-f17) and filled features for edge-based directional (f18-f26). The results seem to be very high for the nationality, moderate for age range and lower for nationality detection (Pervouchine & Leedham, 2007). This result occurs because nationality prediction is a dual classification problem where by the random prediction would score 50%. The results for age range and nationality include seven and eight class classification problems where the classifier would only get 14% and 12% concerning each other.

Chain code-based features out do the rest when predicting nationality and gender. The result implies that the curvature distribution in the handwriting is of great importance in realizing citizenship and gender. The proposed geometric features perform more compared to others for age range prediction which suggest that all the curvatures, tortuosity and direction are crucial for determining the age through the handwriting (Selan, 2009). The average performance of KDA classifiers and random forest when joining all the features together (f1-f26) means that the random forest gets preferred for nationality and age range while us KDA is better for gender prediction making random forest preferable for many classes prediction and kDa for binary classification.

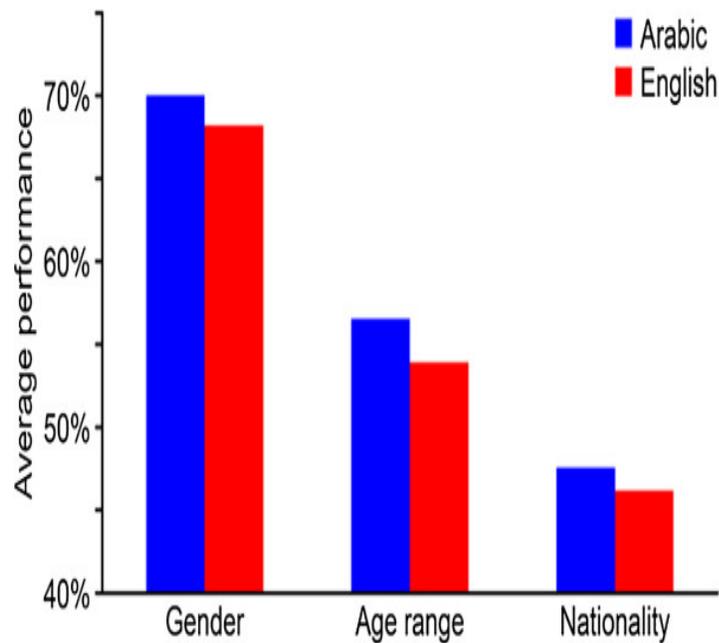


The average performance of RF and KDA categorizers for the prediction of nationality, age range, and gender.

It is crucial to note that handwriting produced by one individual give better results for gender prediction and not for nationality or the age range. Meaning that working on different or same texts do not have any importance in improving the outcome classification.



Average performance for different and similar text



Average performance for Arabic and English text

We combine all features to acquire the average performance of f1-f26 on English and Arabic text. More than English version Arabic handwriting produce better prediction results which become explained by the Arabic text complexity which aims at helping in classifying writers. Moreover, combining several features do regularly not provide the required yield. One feature in other cases may produce better returns unlike when using the many future combinations. Some features appear to be irrelevant hence need removal for better performance. The classification system is better compared to the first ones, but there is still more space for improvement of classification methods and using new features.

The dataset used in this methodology gives room for research purposes. Finally, for comparison activity, the average gender classification results are beyond 73 % which consists of 200 writers. The results can rhyme well with 77.5% for 800 individuals who write the same letter. For the age range classification results the accuracy is 86.6% that out performs the present 55% .however, the writers only include the category below 24 and above 45 years who in total accounted for 650 individuals.

In conclusion, this method uses geometric features for gender, age range, and nationality of the handwriting applicable for English and Arabic documents based on QUWI dataset. The results show both text-independent and the subject class category classification. Using chain code based characteristic usually outperforms other traits for gender and nationality predictions (Saks & Koehler, 2005). The proposed geometric attributes also out do others for carrying out age rage prediction. Random forest results are preferable in the prediction of nationality and age range, while KDA is better in gender prediction. Handwriting produced by the same person produce better results for gender prediction unlike for age range and nationality prediction. The KDA show better results for Arabic script hence reliable in UAE and other Arabic countries.

Based on the research two sample of the adult lettering for sex of the writer, their accuracy was better than the possibility and enhanced with practice. In another study, participants not cued for sex of the author gave their judgment as coded female and male scripts to be varying concerning qualities like carefulness, regularity, neatness, and speed of writing. The participant prompted for gender also based on the judgment for their stylistic features which included the slope and the roundness which showed carefulness against confidence. Individuals who prompted for writer's gender became affected by gender stereotype leading to incorrect data.

Several methodologies have come across from different forensic examiners who study the variation of letters focusing on the sex of the writer. The female hand writing is a more rounded compared to males. Sex dependent characteristic in handwriting includes determination of the ability of both skilled and unskilled person to come up with the writer's sex. Previously a study shows variation in males and females handwriting that facilitate forensic analysis. Data samples obtained from a hundred two hundred females and males of equal number show the difference in feminine and masculine writing.

The contribution of the writer help in gathering statistical information where the analysis showed rounded open counter parts in vowels, curves and gentle hooks which are of consistent size, inter-word space, slant, and angle became nicely upward flourished. These qualities get mostly found feminine handwriting. However, in masculine writing, there were observations of inconsistent letter size, inter-word space, slant which were cramped and tiny in their letters. Their letters would start with flourishes straight stems and narrow corners. These results show that given a large number of suspected people and information the level of accuracy and certainty would emerge making it possible to identify the suspect sex and age hence leading to his or her capture and therefore, reducing the number of unpunished criminals.

The Limitations process of handwriting analysis.

- Through simulation, forgery can be undetectable.
- There is difficulty in comparing lower case and upper case letters.
- The excellence of the suspect's note determines the worth of the comparison analysis, though it is hard to get one.
- A person under the influence of illness, drugs or the exhaustion can interfere with the writing.

The analysis has a major shortcoming of it being subjective meaning that it focuses on scientific community acceptance and the quote evidence which is undermining. Recently, analyst undergoing training to become more standardized and developed in their procedures. It is gaining the recognition more and more as it is becoming reproducible, and scientifically reviewable. Through the Forensic system, which allows experts to scan the written document and enhance digitalization in the comparison process may increase the process leading to its acceptance in the court.

Forgery

Through falsification of a material such as the manuscript or a historic letter and especially letters written by celebrities, duplication can exist. An important figure and famous theory or a recognized writer can get forged due to the insight it provides. Qualified forgers try to make a copy of the original document such that the material used is similar to that of the original document. Forgers do this by gathering old books, papers the cut them for their forgery activity (Eneh, 2010). Due to the change of paper, marking forgers use the aged paper to pass little evaluation test. The inks they use is the mixer of the links from the document they want to duplicate. Handwriting styles and tools become treated to make them look aged. Some chemical application, when put in the paper, indicates the age and the ink.

Various methods can be used to imitate document for examples use of computer and printers. Traced forgery is a kind of simulation said to undergo detection by the handwriting examiner. Signature forgery is hard to detect, unlike the handwriting. Tracing establishes familiarity of the letter, direction, and shape. It helps children to master the difficulties involved in manipulating writing instrument. Nevertheless, forgers carefully trace the written line creating a copy that resembles the original work regarding letter forms, size, spaces and other features that may be strange to the writer.

Traced simulation is similar to perpetrating forgery though rarely encountered. Recognition of the traced copy is problematic for it is almost perfect (Kore & Apte, 2012). If a victim exemplars show poor writing skills such that the normal range of variation, for example, irregular lifts, pen speed, and retouches are a poor chance of forgery increases. Reasons behind fraud include the inability to

determine presence of forgers, physical and mental stress forgers go through while tracing and finally, the tracing process itself is risky. Characteristic of determined writing include;

Regenerated line quality; forgers may at the time have poor line quality due to their failure to rhyme the document with the original document. The lines leave evidence that is then identified by the investigators. The forger's failure and ignorance to use quality line stroke ends and order results in lack of smoothness in the ink line hence capture.

Speed and pressure variation; traced signature and original signatures can vary if the speed and pressure used in making the writing similar. The degree difference of the pressure applied to the writing instrument result to the tracing faster than when the pressure applied is light. Time taken by the owner to sign their name is around 2-5 seconds. By use of the computer, the time of writing the signature by the forger is traceable. Traced signature will often differ from the actual writing by showing the visible signs of being produced slower than usual and applying more pressure.

Retouching and overwriting; a traced forgery tend to get repaired more often than any other type. Some retouching becomes involved while overwriting will be carelessly done. In this cases, patching and repairing is often made by the writer when the inline is moving towards the opposite direction is not the case in forgery.

Pen lifting; a traced writing will indicate its written line that there are a pause and pen lifting before continued fraud. In cases where there is an interruption, and then a resultant continuous flow of writing is genuinely observed .numerous pen lift in the questioned document may be an indication of traced forgery.

Blunt ends; High use of strokes with blunt ends occur in the determined signature. They assume a clubbed outlook although a fishtail shape may appear occasionally. Blunt ends occur on every stroke often and therefore a reliable indicator of forgery.

Tremor; a masked deterioration exhibition takes place in the writing line in the form of the challenge particularly when trace fraud occurs. These tremors are only visible when there is the use of a magnifying device such as a lens.

[Technique for gathering handwriting specimen](#)

The characteristics of the collected items become compared against the known standard. The investigator gathers enough samples for comparison purposes. Factors such as previous crowding and alteration, the presence of the eraser noticeable signature difference, noticeable handwriting differences as well as distinct ink usage in obtaining the necessary specimen required for individualization purposes. The explanation is as follows;

[Availability of remarkable eraser](#)

By erasing legal document one can get charged with forgery. Erasing cheque show some deceiving acts. By using mechanical or chemical method erasing can destroy handwriting partially or permanently resulting in distortion.

[Presence of alteration and apparent crowding](#)

The factor contributes to cheating in the document and the person caught after forensic investigation gets convicted of fraud, uttering or forgery. Investigators can determine the deceit regarding omissions, addition, easier or changing the meaning of the words.

[Identifiable handwriting differences](#)

The factor affects the normal subconscious pattern that exhibits the natural habit of writing. Sometimes it's hard to determine the suspect script used in the differing document that has undergone misrepresentation. In case of signatures forgery testifying would be hard especially in the court of law.

[Noticeable signature differences](#)

A signature is a product of the brain and is habitual. No single name can be similar to the other. Sometimes names contain elements that are not present in handwriting because they get written faster than writing due to their little text content. Where the signature element conquers with all the items in the comparison specimen, the agreement is that the name come from the same person.

Use of different inks

Different inks show distinct feature which under certain circumstances tell the investigator that the material used is evidence of alteration. The chemical composition of the ink is easily identifiable especially if different inks write the cheque. Ink difference can be distinguishable due to density, serials and color difference.

Identification categories

When carrying out an investigation, there is always one aim which is to find out someone or something. Identification of a criminal is crucial based on the fingerprint which is the most reliable method of identification. Other ways of identifying a suspect include the use of photos, unique qualities and documentation there exist varieties of identification which include: action identification, situation identification, victim identification, imprint identification, witness identification, cumulative identification, culprit identification and origin identification. Researchers do not concentrate on location identification for it refers to the acting discovery hence it is not under research discussion because it claims to acquire crime elements.

On the other hand, imprint discovery aims at achieving individualism by comparing controlled and disputed marks of an object. Victim identification focus on a person who has become affected by fraud. The victim may have the required information concerning the suspect especially from whom the document got received. In analyzing the complaint from the victim, they must include the note or the cheque wrote out by the suspect. This bank record links the suspect to the fraud and the transaction made and also the person who accepted the bank log. Contrary, if the cheque got stolen the accountant can identify the individual.

Witness identification involves getting the right person who was present during the act and can, therefore, provide a statement. The bank teller is a good witness in this case who can identify the suspect. The cashier passes over the cheque involved in fraud to the investigator hence aiding in the identification of the criminal. The fingerprint examined in the bank note could show who the suspect is as well as reveal other possible witnesses.

Origin identification focuses on organic and inorganic materials that tell whether the disputed sample and the specimen under investigation has a relationship. For example, if the cheque is the duplicate it may help in determining the printer's ink used on the bank statement. After locating the printer, connections can occur between the printer and the suspect computer. The finding could help in realizing the printer used to produce the cheque.

Action identification is discovering the behavior of human directly related to a crime. It contains crucial crime elements. Many criminals have a kind of trait that link them to their criminal conduct. Real evidence can aid in discovering characteristic that is if the same syndicate gets used in the crime. Culprit identification refers to positive recognition of a person without consideration of the unlawful participation in the offense. Determination of his identity is of great importance for the detection and clarification of the crime scenario. The collection of this facts determine whether the offense is the crux in the case of the offender. Both direct and indirect identification procedures can become used in the investigation. Identification of fingerprint at the crime scene is of no use until it becomes matched with the particular person. The characteristic of an ideal discovery medium is unique, invariable, classifiable, universal and easily reproducible.

Cumulative identification is where there is a collective contribution of various specialists in a crime situation. All categories identified during the forensic investigation assist in gathering enough evidence acceptable by the law court. Individualization process amount to enough proof Providence to prove a person guilty of the criminal activity in the court. Fraud is a deceit which aims at selfish gains with the intention to mislead a victim into agreeing to something that is untrue without his consent. Through fraud, various elements can be identified which agree with its definition and may include intention, prejudice, misrepresentation, and unlawfulness.

Misrepresentation is when a false message gets conveyed by a person to another. It is a distortion of the truth: a lie. In all crimes, there is intentional human conduct which reveals itself in either doing something or failing to do it. The first criteria the investigator

determine is whether there was a commission or an omission in the action of the suspect. Forgery, fraud, and altering are all misrepresentation acts.

Prejudice involves telling a lie to cause harm to another. It is also called potential bias for its result to fraud after misunderstanding result. Unlawfulness represents the violation of statutory donation which either prohibits or prescribes an action. It is most difficult to know the action or omission that would be unlawful since there are no hard rules as for how one can be unlawful. Finally, intention implies that both representation and prejudice recognition. An individual must have an intention to cheat and cause another person to act to his prejudice by misrepresenting him on the grounds.

On the contrary, the evidence is a truthful information based on the facts. Physical proof is a concern of material rather than the human being which is recognizable and or visible like any objects or print. Real evidence is measurable, analyzable and presentable in the court as a physical object. Materials used as real evidence include the photograph, weapons, handwriting and finger prints. Physical evidence (PE) is any material present at the crime scene which falls into two categories: testimonial and physical proof.

The investigator has a role to collect all the available evidence at the crime scene. The gathered information integrity get protected by the experts. Real proof can be of any form be it a large building or a small piece of fiber. The evidence value is as follow:

- a) PE can testify of a committed crime.
- b) The evidence can help in fighting for the innocent.
- c) It can support the testimony of the victim.
- d) Suspect evicted by proof can confess his mistake.
- e) They are reliable.
- f) It is crucial in determining court decisions.
- g) It can place the crime scene in contact with the suspect.

Therefore, the crime examination aims to show the suspect the crime he committed, gathering the proof, individualize the offender, and connect the criminal with the consequent crime thus he gets arrested. Also, there is tracing of the possible stolen property. Finally, the culprit gets involved with prosecution consequences. Here, the experts base their investigation on identifying the category important in the crime. The research efforts focus more on the known and unknown criminal. Concentrating on the unknown criminal helps one to focus on the trace proof or the eyewitness.

The offender examination requires the experts to have particular skills and knowledge on how to collect the evidence presented before the court of law. For successful prosecution and conviction processes, the crime management in gathering the proof become enhanced thus the culprit face the law. For this process to take place all the essential requirements concerning the integrity of the collected sample get attached to the investigation. Finally, the experts should ensure that the examination gets successfully done within the law factors.

VII. Conclusion

The best way to discover one's personality is through their handwriting which is distinct. Through graphology, one can find themselves after their writing become analyzed. Analyzing handwriting through scientific means help experts to identify a criminal based on the novel features. Known document traced in a crime scene can be carefully collected and take to the lab for analysis. It is through this analysis that hints of sex and age become revealed. Forensic analysis plays a key role in determination forgeries and disguises through comparison of the suspect handwriting and other evidence. The importance of identifying deception does not become underestimated because of the deceit, intent and lack of authority involved.

The experts improve the accuracy of their work when more copies of evidence are available. The texts help the investigators to dig deep to find the repelling factors among the documents. The similarity, in this case, is rarely considered, therefore, the more the

difference between the papers the better the accuracy. Given that there is minimal distinction after analyzing the article it is possible that the same person wrote the document. If not then, the chances are that the suspect is copying the handwriting, or he is not guilty. The use of random forest and kernel discriminant analysis the experts can be able to determine the gender, nationality, handedness and age range of known and unknown suspect hence an appropriate method.

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Monitoring and Evaluation Planning: An Integral Part of Dairy Primary Cooperative Societies' Performance in Murang'a County, Kenya.

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Abstract: A common hypothesis is that Monitoring & Evaluation is positively associated with project performance. Whereas the number of empirical studies conducted on this topic is remarkable, there is still no agreement on the most influencing Monitoring and Evaluation strategies on the performance of dairy primary cooperative societies (DPCS). In order to further advance knowledge in this field, an empirical study was conducted on M & E strategies influencing performance of Dairy Primary Cooperative Societies in Murang'a County, Kenya. This paper is an extract of the empirical study with a specific focus of M & E planning strategy and performance. A mixed method approach under the pragmatism paradigm was used making use of both cross-sectional and case study designs. The study targeted the dairy primary cooperative societies in Murang'a County through the dairy farmers, M & E team members and the Murang'a County Creameries' Board of management. To gather quantitative data, a structured questionnaire was used on the dairy farmers sampled through a proportionate simple random sampling technique from the target population. The Murang'a County Board of management and M & E team members were purposively sampled to provide qualitative data. The quantitative data were analyzed through descriptive and inferential statistics along with thematic analysis for qualitative data. The study established a positive and significant relationship between M & E planning strategy and performance of the dairy primary cooperative societies studied in Murang'a County. Based on the findings, the study recommends integration of M & E strategies in the development plans of dairy cooperative societies. The county government to observe timely planning for M & E activities at the county level, allocate budget for M & E activities and consider involving the dairy primary cooperative societies' beneficiaries in the M & E planning process. Further studies on M & E planning should be extended to varying context for knowledge expansion.

Key terms; Budget Allocation, Monitoring and Evaluation Planning Strategy, Stakeholder involvement, utilization of monitoring and evaluation results

I. INTRODUCTION

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In recent years there has been an expansion of monitoring and evaluation activities within community-based organizations. Monitoring and Evaluation is a management tool that can be used to help improve the performance level of projects and programs by reducing the cycle times (Barrett, 2008; Kirsten, 2010). Successful M & E process is dependent on effectual planning. The success of any program or project is associated with the initial planning process. However, most of the business managers make a mistake of not involving members of their projects team in the M & E planning process and in the conceptual meetings. It is at the planning stage of M & E where diverse stakeholders' interest is represented on the basis of their stake in the outcome of the M & E process. Therefore, project designers should align all the M & E activities into the project plan including persons to conduct the M & E, budget for the activities as well as the specification on how to report and use the findings.

Monitoring and evaluation planning strategy is recognized as one of the key apparatus undertaken to ensure effective monitoring operations. Gyorkos, (2003) commends for an effective monitoring and evaluation process, an initial planning detailing on M & E budget allocation, M & E resource types and sources, M & E technology, stakeholder representative and utilization of the M & E findings is required. It is critical to plan for M & E budget within the overall production cycle, set aside resources enough for M & E activities, develop M & E capacities and involve stakeholders' representatives in planning for M & E to enhance the leaning process for performance of any community-based development initiatives.

The dairy primary cooperative societies are among social development initiatives in Murang'a County. They are centrally managed by the County Government through the Murang'a County Creameries. Monitoring and evaluation of the dairy activities are done by an M & E team controlled by the board of management. This paper reports on the influence of the M & E planning on the performance of the Dairy primary cooperative societies in Murang'a County with a specific focus on M & E budget allocation, stake holders involvement and utilization of the M & E findings.

II. LITERATURE REVIEW

Planning for M & E entails definition of M & E activities, estimating project costs and required resources and deciding on the project stakeholders. The purpose of planning for M & E is to establish and maintain guidelines that define the M & E activities (Kahilu, 2010). This helps determine whether the M & E process is institutionalized within the overall planning and designing stages of the interventions (Crawford & Bryce, 2003). Gyorkos, (2003) advises that project planners should include a clearly delineated M & E plan as an integral part of the overall project plan that include M & E activities, persons to carry out the activities, frequency of activities, sufficient budget for activities and specification on the use of monitoring and evaluation findings. With reference to scholarly literature, performance of projects and programmes likewise, has been widely attributed to effective monitoring and evaluation.

Adequate resources at the initial planning stage should be set aside to ensure quality M & E. The required financial and human resources for M & E should be considered within the overall costs of delivering the agreed results and not as additional costs (Marangu, 2012). Kohli and Chitkara, (2008) suggest that planning for M & E should be done just at the very point of project or program initial planning. It is therefore crucial for monitoring and evaluation professionals to assess the monitoring and evaluation needs when designing and planning for the project in order to allocate funds to the implementation of key monitoring and evaluation tasks. This demonstrates that planning for monitoring and evaluation takes care of all aspects that need to be in place so that there is early detection of progress or lack thereof.

Stakeholder participation throughout the monitoring and evaluation cycle ensures ownership, learning and sustainability of results. Therefore, an effective M & E should be based on participatory approach in budgetary planning, allocation and review (Khake & Worku, 2013). Vanessa and Gala, (2011) argue that involving persons tasked with M & E function in the planning process promotes ownership and improves delivery of project results. In practice the concerned should be cautious in M & E budget allocation plans so that the budget is not too little as to give results that are not accurate and credible, or so big that it interferes with the program. Therefore, planning for monitoring and evaluation strategies should be based on stakeholder needs and expectations to ensure stakeholders' understanding, ownership and utilization of M & E information towards improving performance of their interventions.

Involvement of the program beneficiaries in the M & E planning process opens an avenue for ownership of the results. Hauge, (2010) asserts that involving stakeholders in the M & E process gains them confidence and consequently utilize the findings for learning and subsequent improvement of the overall performance. Similarly, Hassan, (2013) contends that a member of a project is seen to be more receptive to the M & E findings in which s/he has participated actively rather on the reported M & E findings. In support of this, a study by Osterberg and Nilsson, (2009) found a significantly higher member disloyalty when members were dissatisfied with their cooperatives' management and decision making process. The stakeholders involved in the planning process for M & E have the idea on how the findings would continue to be relevant to the programs and therefore they should be retained in the M & E process to the end to realize results.

Empirical findings indicate that M & E planning strategy focusing on M & E budgeting, stakeholders' involvement and result utilization is recognized in improving performance of interventions. Much of the reviewed literature has focused on diverse contexts with positive and significant correlations between M & E related variables and performance and therefore, the paper articulates M & E planning strategy for performance of the dairy primary cooperative societies in Murang'a County.

III. METHODOLOGY

The study employed a mixed method approach under pragmatism paradigm. The integration of qualitative and quantitative approaches allowed data and source triangulation for increased data validity. A blend of cross sectional survey and case study designs were used to investigate the influence of M & E planning strategy on performance of the dairy primary cooperative societies in Murang'a County. The study target population was 39,441 DPCS' stakeholders. Based on Naissuma's sample size formula, (2000), a sample size of 270 dairy farmers was selected using a proportionate simple random sampling technique. Three management officials and six M & E team members were purposively selected as the study key informants to reflect diversity and to obtain valuable data through an in-depth interview and focus group discussion respectively.

The study sample size from each of the study target population category is shown in Table 1

Table 1: sample Grid

DPCs stakeholders categories	Target Population	Sample size
Dairy farmers	39,439	270
Management officials	3	3
M & E Team members	6	6
Total	39,441	279

The primary quantitative data was collected using a structured questionnaire. For primary qualitative data, multiple instruments were used including, an interview, focus group discussion and observation guides together with document analysis for the secondary qualitative data. For accuracy of the qualitative findings, various strategies in line with Creswell and Miller, (2000) were applied; triangulating different data sources of complementary evidence, spending prolonged time in the field and use of a peer debriefer to review the qualitative questions. The reliability of the Likert scale items in the questionnaire was determined using Cronbach Alpha (α) which was used to measure the internal consistency based on the average correlation among the items on the scale.

IV. DATA ANALYSIS AND FINDINGS

A total of 261 usable questionnaires were returned from a total of 270 issued to the dairy farmers during data collection, translating to 96.7 % average return rate. The data on the study variables were analyzed using both descriptive and inferential analyses. A paired sample t test was used to confirm the study hypothesis and also to add meaning to the quantitative data.

4.1 Descriptive data analysis on the performance of Dairy Primary Cooperative Societies in Murang’a County

Performance of the dairy primary cooperative societies (DPCS) in Murang’a County was based on four performance measurement dimensions; consistence in milk delivery, increased dairy farmers’ income, increased membership, and satisfaction of the dairy farmers with the operations of the DPCS. The data of the respondents’ perception on the DPCS performance were collected from the twelve items under the performance theme based on the 5-point likert scale. Table 3 summaries the frequencies of the respondents’ responses.

Table 3: Frequency Distributions of Dairy Farmers’ Responses on the Performance of the DPCS

Likert-Scale	Frequency	Percentage
Strongly disagree	0	0.0
Disagree	4	1.5
Neutral	52	19.9
Agree	191	73.2
Strongly agree	13	5.0
Total	261	100.0

Table 3 shows that a total of 78.2 % of the sampled dairy farmers were in agreement with the DPCS performance statements. Among the sampled dairy farmers, 19.9 % remained neutral to the DPCS performance statements, with only 1.5 % in the disagreeing option. Being in agreement with the DPCS performance statements support the fact that the dairy primary cooperative societies were performing as per their laid targets based on the selected performance indicators. Nevertheless, the neutrality of the dairy farmers to the DPCS performance was not by chance or random and therefore could not be ignored. Cowley, (2000) suggests that neutral perception may be an indication that the respondents are less inclined to express their opinion or are without experience of the topic in discussion. For clarity, a further telephone interview with some simple randomly selected dairy farmers was later conducted. Table 4 presents the DPCS descriptive statistics.

Table 4. Dairy primary cooperative societies’ performance statistics

	N	Minimum	Maximum	Mean	Std	Std. Deviation
	Statistic	Statistic	Statistic	Statistic	Error	Statistic
M & E Planning	261	30.00	60.00	44.27	.244	3.938

With reference to Table 4, the DPCS performance mean score was 44.27 with a standard deviation of 3.938 and a standard error of .224. The standard deviation obtained was relatively small indicating that the respondents response values were clustered around the performance mean.

The qualitative data from the in-depth interview and focus group discussion cross- validated the survey quantitative data. From the management officials, most of the DPCS performance objectives had been notably achieved. However, the dairy farmers through the telephone interview expressed their dissatisfaction with the milk collection and delivery challenges especially in rainy seasons. Their dissatisfaction was also directed to the persistent delays in monthly payments for the milk sold to the cooperative societies.

4.2 Regression analysis of Monitoring and Evaluation planning strategy and performance variables

The relationship, direction, strength and the predictive power of M & E planning strategy of performance were determined through linear correlation and regression analyses at a significant level of 95%. The change in the M & E planning strategy and the percentage variation in the DPCS performance variable explained by the predictor variable were determined using a statistical regression model.

Regression Model: $Y=b_0+b_1X_1 + \epsilon$, **Where:**

Y is the dependent variable (dairy primary cooperative societies’ performance)

b₀ and **b₁** are constant/ regression parameters

X₁ is the predictor variable (M & E Planning strategy) and **ε** is the error term

The regression outputs are indicated in Table 5.

Table 5: Regression outputs of M & E planning strategy and performance of the DPCS

Model Summary	R	R²	Adjusted R²	Un-standardized coefficients		Sig.
				B	Std error	
Constant	.309	0.095	0.092	31.555	2.452	0.000
M&E planning				.330	.063	0.000
F change = (1/260) =21.142; <i>p</i> < 0.05			(t (260) = 12.871, <i>p</i> < 0.05)			

The Pearson correlation coefficient of ($r= 0.309, p < 0.05$) at 95% significance level was realized, indicating an existence of a statistical significant positive relationship of a medium strength in a two tailed test. The F value of $(1/260) = 21.142; p < 0.05$ indicate that a significance of M & E planning strategy model occurred over the dependent variable. The F-ratio was 21.246, which was very unlikely to have happened by chance. This showed that the coefficient of M & E planning strategy was not equal to zero, a proof of an existence of a significant relationship between the two variables. The t-statistic ($t (260) = 12.871, p < 0.05$) was associated with a significance level of 0.000 which was lower than the chosen level of significance of 0.05. The null hypothesis ($H_0: \beta = 0$) that M & E planning strategy regression coefficient was zero when all other predictor coefficients were fixed to zero was therefore rejected. By substituting the beta value to the initial regression model, the following model was obtained.

$$Y = 31.555 + 0.330 X_1 + \epsilon$$

Where X_1 is the M & E Planning strategy

The resulting regression model explained that a unit increase in M & E planning would result to 33.0 % increase in DPCS' performance (y); withholding other M & E influencing factors not of this study interest.

The null hypothesis predicting the relationship between M & E planning strategy and performance of DPCS was tested using a paired-sample t test statistic.. The research hypothesis predicted that there was a significant influence between M & E planning and DPCS in Murang'a County Kenya. The output of the paired-sample t test is displayed in Table 6.

Table 6: Paired Sample T-Test Results for study Hypothesis

	<u>Paired difference</u>				t	df	Sig.(2-tailed)	
	Mean	SD	S.E	95% confidence				
				lower				upper
DPCS performance	5.488	4.491	.279	5.240	6.337	20.784	260	.000
M&E-Planning strategy								

The output of Table 6 shows that there was a significant relationship between M & E Planning strategy and performance of the dairy primary cooperative societies of Murang'a County. The t statistics, $t (260) = 4.479$ and its associated significance level ($p < 0.05$) indicated an existence of a significant correlation between M & E Planning strategy and DPCS' performance. These results to led the rejection of the null hypothesis ($H_0: \beta = 0$) stating that there was no significant relationship between M & E planning strategy and performance of the dairy primary cooperative societies. The alternative hypothesis ($H_1: \beta \neq 0$) stating that M & E planning strategy had a significant influence on the performance of dairy primary cooperative societies in Murang'a County, Kenya was subsequently accepted.

Similarly, the relationship between M & E planning and performance was confirmed by the key informants who asserted that M & E was regarded with equal weight with other management activities and that the M & E findings were frequently used in decision making in presence of stakeholders' representatives. However, the in-depth interview results revealed some loopholes in budget allocation for the M & E activities and in particular inadequacy of finances and delayed subsidies from the County Government. In

addition, the M & E team members through the focus group discussion displayed their concern on the need to improve the M & E capacity for quality, complete and timely communicated data. Generally, the studied respondents posted a similar acknowledgement on the importance of planning and more so on monitoring and evaluation activities which seem to have significance in the performance of the dairy primary cooperative societies in Murang'a County.

According to the sampled M & E team members, M & E planning strategy contributes to the performance of the DPCS in Murang'a County. In particular, involving stakeholders in the planning for M & E activities gained their confidence and attracting more membership in the DPCS; an indicator of improved performance of the dairy primary cooperative societies in Murang'a County. In support of these findings, William, (2010) observed that M & E planning and coordination enhance knowledge on the measurements of projects' attainments thus improving the work performance. Similarly, Horton, MacKay, Anderson and Dupleich, (2000) study findings on dairying projects in Netherlands, indicated that planning for M & E financial resource and skilled personnel enhances dairy projects' performance. Jacobs, Barnett, and Ponsford, (2010) advice that beneficiaries should actively participate in M & E activities in order to influence the project process based on their needs and their analysis. The authors reiterate that when participants are involved in the M & E planning process, they gain skills which strengthen their local capacities for planning, problem solving and decision making for improved performance. It is with empirical evidence that a well planned M & E of projects yields results for improved performance.

Monitoring and evaluation planning strategy as an integral part of project performance is supported widely in the literature. Muchelule, Mbawi, and Saada, (2017) studied monitoring and evaluation planning strategy as one of their study predictor variables which correlated positively and significantly with the performance of development projects with a correlation coefficient of 0.562 and *p* value of less than 0.05 at a significant level of 95%. Likewise, a study by Jabaar, (2003) on M & E mechanism was found to correlate positively and significantly with the performance of the sampled dairy cooperatives in Bangladesh. Similar to what has been reported by Ling and Chan, (2002), this study revealed that M & E planning is a key strategy that should be used by the stakeholders to ensure success in their initiatives. The dairy primary cooperative societies should therefore regard M & E planning strategy as one among other established performance contributors with support from the results of the previous empirical studies on related study variables.

V. Discussion

The measurement indicators of the M & E planning strategy variable adopted by the present study have been empirically studied as individual independent variables on performance as noted in the literature reviewed. Most of the results obtained are in consistence with the findings of the current study. (Hwang and Lim, (2013); Gyorkos, (2003); Marangu, (2012); Zaltsman, (2014); Koffi-Tessio, (2002). These scholars among others found a positive significant correlation of M & E budget allocation with performance of studied interventions. In addition, Khake and Worku, (2013) conclude that involving staff tasked with M & E function in project planning and budgeting increases their outcome towards organizational performance. Similarly, Katharine, and John, (2011) confirmed a positive and significance relationship between M&E practices and organizational performance which closely concur with the findings of the present study.

On the other hand, some findings from the reviewed literature were in conflict with the findings of the present study. The results of a study analysis by Muchelule, Mbawi and Saada, (2017) revealed a negative significant relationship between M & E planning strategy and performance of projects in Kenya State Corporations. The context of these studies, the methodology used and the tools of analysis

used may have contributed to the difference in the findings. However, monitoring and evaluation on the progress of interventions has widely been found in literature to support performance and therefore the need for the DPCS in Murang'a County to plan for M & E activities along with other dairying activities. The involvement of the dairy cooperative societies' stakeholders should be encouraged in the planning process and more so in the monitoring and evaluation of the DPCS' activities. From the findings, involvement of the dairy farmers in the planning process would enhance membership enrolment and retention and also increase ownership and loyalty for support and consistent delivery of milk to the DPCS.

Furthermore, allocation of financial resources for monitoring and evaluation process has been found basic to enable adequate and timely collection of quality and complete data which when appropriately utilized translates to improved performance of the DPCS. Consequently, involving persons tasked with M & E function in the M & E budgeting process increases ownership of findings for informed decisions which in total increases performance. It is therefore of much essence to budget for M & E within the overall production cycle, set aside resources enough for M & E activities, involve representative stakeholders in the entire planning process of the DPCS operations and guarantee utilization of the M & E findings for improvement of DPCS' performance.

VI. Recommendation for policy and practice

There is need for the dairy primary cooperative societies to continue sensitizing the dairy farmers within Murang'a County on the benefits of having common milk markets through dairy cooperative societies. The Murang'a County Creameries board of management should ensure adequate and early planning for M & E activities on the operations of the dairy primary cooperative societies and involve the stakeholders in the planning process.

VII. Recommendation for future studies

Considering that the situation of dairy primary cooperative societies in Murang'a County may be different from those of other counties in Kenya, future similar studies should be extended which would also be valuable in broadening understandings of DPCS' monitoring and evaluation strategies and in determining their influence on performance. Further studies in different contexts other than dairy cooperative societies would reveal new insights into the influence of the studied M & E strategies on performance. Extended studies should be conducted to examine how M & E strategies are being conducted in other cooperatives with a view of unearthing of the best M & E practices.

From the study findings, most of the respondents supported the study construct's statements based on the adopted measurement indicators. The study constructs were therefore confirmed to have a positive significant relationship with the performance of DPCS. Some of these measurement indicators include budget allocation, stakeholders' involvement and utilization of M & E findings. There is therefore need to conduct future researches on individual indicators to examine the magnitude of their individual influence on the performance of the dairy primary cooperative societies in Murang'a County.

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Service Quality in Northern Region Tourism Industry: A Case Study of Hotels in Tamale Metropolis in the Northern Region of Ghana

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Abstract- The study investigates the quality of service and related factors in hotels in Tamale metropolis in the Northern Region of Ghana. Primary and secondary sources of data were used to seek information for the research. Close ended questionnaires were used in the collection of the data. A cross sectional descriptive survey design was adapted for the study. Quantitative approach was adopted to analyze the data. The study revealed that Tangible, Reliability, responsiveness and assurance, are good predictors of guest satisfaction with quality service in Tamale Metropolis. However, in comparing guest perception of service quality dimension of the hotels, it was realized that that all guest are satisfied with the level of quality service provided to them by the hotels to some extent if not all the dimension. The results showed that respondents agreed that leadership styles used is a factor affecting the operation in the tourism and hotel industry in the Tamale metropolis, respondents agreed that there was working equipment which affects quality service provision, respondents agreed with schedule of work is a factor affecting the tourism and hotel industry, respondents agreed that there was not motivation, respondents agreed that there was no training and development for staff to improve on their service delivery which is affecting the provision of service quality in the tourism and hotel industry. Thus, it is recommended that leadership training should be organized managers of hotel in the Tamale Metropolis to enhance their leadership style and for productivity, management should organize in service training for their staff to improve on their human relation with their guest, house keeper should be encouraged to always clean the hotel rooms to make it hygienic for their guest, efficient, effective and un-interrupted supply of electricity to the hotels should be encouraged by the Tamale Metro Assembly, hotel managers should make sure that the environment of the hotel looks clean and nice to attract more guest.

Key words; Tangibility, Reliability, Responsiveness, Assurance, Empathy, Hotels

INTRODUCTION

Tourism has become the largest industry and most important export sector in the world. Expenditure on tourism has risen fivefold, corresponding to an annual growth rate of about 8% and that it accounts for 12 % of the world's Gross National Product (UNWTO, 2010). Tourism is important to African economy and this has been a result of the continued growth of tourism as an economic sector. Tourism plays a major role in the economy of South Africa as it currently contributes more than 8% to the country's gross domestic product (Keppler, 2003). In 2003, the tourism industry in South Africa was viewed as the fastest growing in the world (Keppler, 2003). The hospitality industry has also grown at a rapid rate since 2001. Demand from business and leisure tourists has provided the impetus (Kloppers, 2005). The growing number of tourists to South Africa, and the money that they spend, is creating investment opportunities for organizations both in tourism and its related industries (Saayman & Olivier, 2005).

In Botswana tourism is one of the key sectors that help diversify the economy beyond diamond mining in the last two National Development Plans. The Government has pursued low-volume-high-cost tourism. This is elaborated in the Botswana Tourism Master Plan (2000) and the Botswana Department of Tourism (2004). Apart from the outstanding wildlife and wilderness in the north of Botswana, the country offers undiversified natural tourist attractions. The limited level of development of the tourism sector suggests that there may be under-utilized potential (BDT, 2004).

Ghana is one of several Sub-Saharan African countries where tourism has moved to the centre stage of government policy and the industry is being promoted for socio-economic development at district, national and international levels. Since 1989, tourism has

received a great deal of attention in government's policy initiatives, including the 15-year National Tourism Development Plan among others. As a result, the country is said to have attracted the highest number of business travelers to Africa. Ghana as a country possesses a number of tourist attractions such as pristine beaches, rich traditional culture, castles and the national Parks. Tourist arrivals increased from 53,000 in 2002 to 803,000 in 2010 (Ghana Tourist Board, 2010). The tourism industry has become one of the most important players in the growth of economies worldwide. This important industry has considerable infrastructure with service institutions among which the most prominent feature is the hotel industry.

Globally, there is an increasing demand for better quality products and services including hotel services. Hotel customers are becoming much more discerning and demanding, making the delivery of quality service one of the challenges facing the tourism industry especially the hotel sub-sector. As such tourist satisfaction is a key ingredient for the survival and success of the hotel industry. Therefore, hotels need to differentiate their service offerings by meeting the needs of their customers better, improving customer satisfaction and delivering service quality that is higher than that provided by competitors (Reichheld, & Sasser, 1990 and Jamal, & Anastasiadou, 2009). Customer satisfaction and service quality have received much attention from practitioners and researchers. However, studies have been concentrated on developed countries with limited empirical studies in peripheral areas like Tamale metropolis in the Northern Region of Ghana. A number of studies have identified a positive relationship between customer satisfaction with service quality (Dimitriadis, 2006, Chi, & Qu, 2008, Faullant, & Matzler, 2008, Markovi'c, & Raspor, 2010). Consequently, one of the key strategies for customer-focused firms is to measure and monitor service quality and customer satisfaction. In measuring service quality and tourist satisfaction, it is important to understand the different issues involved in service quality, tourist satisfaction and revisits intentions and the interactions of these issues (Olorunniwo, et al, 2006). Also, to provide customer satisfaction with service, organizations must identify customers' needs, desires and expectations (King, & Cichy, 2006).

Statement of the Problem

The tourism industry has seen tremendous change over the last decade. Tourism today is an integral part of the human life whether in a commercial scale or in small scale. Although, the tourism industry is seen to be booming as new structures are being put up every day, it is yet to strike a major impact in the Ghana as compared to other tourism industry in different African countries (Berman, 2002). The tourism industry forms a sector in the economy that do not undermine the integrity of their customers in service delivery and therefore seek to always provide satisfaction now and in the future to maintain customers and even add more through quality services (Turkson, 2012).

But as Ghana initially ignored the tourist sector by not paying attention to service delivery in the industry, authorities failed to monitor the code of ethics governing the tourism industry. Thus, as a result, most of the hotels in the hospitality industry are not meeting the standards expected of them in terms of service delivery such as adequate facilities, excellent customer relationship, knowledge of product or service offerings, trained personnel and provision of confidence and trust of services offered which is not different from the tourism industry in the Tamale metropolis (Berman, 2002). This has led to customers complaining of poor quality of service, loss of confidence and dissatisfaction. Lack of these factors, presently have resulted in hotels in Ghana losing their touch of excellence, sense of focus and as a result do not consider the customer as their central focus of their operation and also the cause for the existence of their business (Ghana Tourist Board, 2010). This experience above suggests a possible existence of weakness in the services administered to customers of the tourist industry in Ghana. Studies by Turkson (2012), on the quality assurance in the hospitality industry, Sekajja (2006), also study customer service quality strategy in the tourism and leisure industry in Mkabati Nature Reserve, Mbise (2012), study quality of service standards and related factors in Hotels. Amissah (2013), study tourist satisfaction with hotel services in Cape Coast and Elmina, Ghana and revealed that; understaffing, inefficient operational procedures, lack of training and management not understanding customer desires are factors affecting tourist satisfaction. Eric (2014), study the satisfaction of hotel

services of hotel in Kumasi Metropolis, revealed that the relationship between tourists' characteristics and the various measures of service delivery (safety and security, courtesy of staff and physical facilities) revealed in addition that tourists' gender, age, marital status, country of origin and number of visits to Ghana are significantly related to safety and security. These characteristics were also found to be significantly related to staff courtesy and physical facilities of the hotel. In a similar vein a study by Yeleduor (2009), study of tourist satisfaction in the Northern Region, argues that Tamale metropolis has setting challenges that are not attracting new tourist such as poor service delivery, bad behavior of service staff, lack of experience and qualify staff, unhygienic environment among others. Its therefore under this condition that the study investigated the quality of services provided to guest by hotels in the Tamale Metropolis in the Northern Region of Ghana.

Methodology

The study adopted descriptive survey design. The research design enables the researcher to collect data with minimal expenditure of effort time and money (Orodho, 2008). This type of design allows collected data to make inference about a surveyed population at one point in time (Hall, 2011). The study populations were tourists who visit the hotels in Tamale metropolis at the time of the study. The population can be defined as the entire group of individuals, events, or objects having common observable characteristics (Mugenda & Mugenda, 2003). The researcher used convenient sampling technique in the selection of the respondents. Convenient sampling procedure was used because the researcher believes it is convenient and time saving. Convenient sampling techniques were used in the sample selection in order to enable the researcher pick hotels. The Hotels were conveniently selected depending on their location and nearness to the researcher and the acceptability of the management to be part of the survey. Purposive sampling technique was used to select the tourist because they have some experience with the service of the hotels and are in the position to express their views with regards to the quality of services they provide to them as guest.

According to Keller (2009), a sample is a set drawn from the population. Therefore, smaller chunks of a unit sample are chosen to represent the relevant attributes of the whole of the units (Graziano & Raulin, 1997). However, the study purposively selected 120 foreign and local tourist who visit the selected hotels at the time of the survey through non-probability sampling methods with the use of convenient and purposive sampling techniques. Therefore, the total sample size for the study is 120 respondents.

The data collected was processed and analysed using SPSS version 23. This involved data coding, editing and tabulation especially quantitative data. The purpose of all these is to make the information clear and understandable for other people. The study also adopted the regression model bellow to determine customer quality expectation with the service dimension. Below is the leaner regression model;

$$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \varepsilon$$

Where X_1, X_2, X_3, X_4 are the independent variables for the equation

Y , is the dependent variable

β_0 is the intercept,

ε is the error term

RESULT AND DISCUSSION

This section discusses demographic data such as age, sex, marital status and educational level. It further examines service quality issues of hotels and final identify factors affecting service quality in hotel in the Tamale Metropolis in Northern Region of Ghana. The study involved both male and female, with males representing 53 thus 40.6 percent of the respondents and females representing 77 thus 59.4 percent. The results also showed that 28 respondents representing 21.9 percent were within the ages of 20-29 years, 49 respondents representing 37.5 percent were within the ages of 30-39 years, 37.5 percent were also within the ages of 40-49 years and 4 respondents representing 3.1 percent was within the ages of 50-59 years. Also, on educational level the study revealed that 50.0%

respondents were Diploma/HND holders, 34.4% respondents were First degree holders, 9.4% respondents were Masters Holders and 6.3 respondents were PhD holders as shown in Table 1 bellow.

Table 1 Socio demographic information of respondents

Variable	Frequency	Percentage
Age		
20-29 years	28	21.9
30-39 years	49	37.5
40-49 years	49	37.5
50-59 years	4	3.1
Total	130	100
Sex		
Male	53	40.6
Female	77	59.4
Total	130	100
Educational level		
Diploma/HND	65	50.1
First degree	45	34.2
Masters	12	9.4
PhD	8	6.3
Total	130	100

Source: Field Survey, 2018

Customer Quality Expectation

The study investigated customer quality expectation in the tourism and hotel industry of the Tamale metropolis in the Northern region of Ghana. The results showed that majority of respondent with the mean value of 4.31 which is equivalent to 4 means that respondent agreed that there are modern looking equipment's in the hotels. The results also showed a mean value 4.60 which is equivalent to 5 which means that respondent strongly agreed that there are visually appealing facilities in the tourism and hotel industry. The mean value of 4.26 which represent 4 means that respondents agreed that there is need appearing employees. The results also showed that the mean value of 4.26 which is equivalent to 4 which means that respondent agreed that there are visually appealing materials associated with service in the tourism and hotel industry in the Tamale Metropolis.

The study further established that the mean value of 3.86 which is equivalent to 4 means that respondent agreed that the tourism and hotel industry kept their promise to do something by a certain time. Majority of the the respondent with a mean value of 4.20, which is equivalent to 4 means that respondents agreed that they showed sincere interest in solving customer problem. The result also showed a mean value of 3.97 which represent 4 means that respondents agreed that the industry performed service correctly for the first time. The results showed a men value of 3.77 which is equivalent to 4 means that the respondent, agreed that the hotels in the tamale metropolis provided the service at the time that the service was promised. The result showed a mean value of 4.66 which is 5 means that majority of respondent strongly agreed that there is insisting on error free records in the tourism and hotel industry in the Tamale metropolis.

Also, the mean value of 4.29 which is equivalent to 4 means that the respondents agree that employees tells customers exactly what service will be performed. The results showed the mean value of 4.29 which represent 4 means that respondents agreed that employee's gives prompt service to customers. Data from the study also revealed a mean value of 4.21 which indicate 4 shows that respondents agreed that employees are always willing to help customers in the hotels in the Tamale metropolis. The result also showed the mean value of 4.11 which represent 4 means that respondents agreed that employees are never too busy to respond to customer request.

Additionally, data from the study revealed a mean value of 4.23 which is equivalent 4 means that respondents agreed that the behaviours of employees instill confidence in their customers. Majority of the respondents which represent a mean value of 4.6 which is equivalent to 5 means those respondents strongly agreed that customers feel safe in transactions in the tourism and hotel industry in the tamale metropolis. The results showed a mean value of 4.23 which represent 4 meaning respondents agreed that employees have been consistently courteous with their customers. Also, the study revealed that the mean value of 4.49 which is 5 indicates that majority of respondents strongly agreed that employees have the knowledge to answer customer questions in the tourism and hotel industry in the Tamale Metropolis.

The study further shows the mean value of 4.33 which is equivalent to 4 which means respondents agreed that they were giving customer individual attention. The results showed the mean value of 4.21 which represent 5 which means that respondents agreed that the operating hours was convenient to all customers in the tourism and hotel industry in the Tamale metropolis. Again, the mean value of 4.06 which represent 4 means respondents agreed that employees gave customers personal attention. The result shows a mean value 4.38 which is equivalent to 4 which means that respondent agreed that the employees have the customers best interest at hart. From the data the mean value of 4.50 which is equivalent to5 means that respondents strongly agreed that employees understand the specific needs of the customers in the tourism and hotel industry in the Tamale Metropolis.

Key: 1=Strongly disagree, 2= Disagree 3=Not sure, 4=Agree, 5=Strongly agree

Table 4.2 Customer Quality Expectation

Statements	N	Mean
Tangibility		
Modern looking equipment	120	4.41
Visually appealing physical facility	120	4.53
Need appearing employees	120	4.53
Visually appealing materials associated with service	120	4.56
Reliability		
Keeping promise to do something by a certain time	120	3.85
Showing sincere interest in solving customer problem	120	4.38
Performing service correctly the first time	120	4.21
Providing the service at the time the service was promised	120	4.12
Insisting on error-free records	120	4.06
Responsiveness		
Employees telling customers exactly what service will be performed	120	4.32
Employees giving prompt service to customers	120	4.29
Employees always willing to help customers	120	4.32
Employees are never too busy to respond to customers request	120	4.44
Assurance		
The behaviour of employees instilling confident in their customers	120	4.37
Customers feeling safe in their transaction.	120	4.43
Employees been consistently courteous with their customers	120	4.32
Employees having the knowledge to answer customers questions	120	4.34
Empathy		
Giving customers individual attention	120	4.34
Operating hours convenient to all their customers	120	5.29
Employees giving customers personal attention	120	4.26
Having the customers best interest at hart	120	4.49
The employees understanding the specific needs of customers	120	4.4

Source: Field Survey, 2018

Regression Analysis of customer quality expectation

The study further looked at the analysis of regression and correlation based on dependent and independent variables to determine their relationship based on customer quality expectation in the tourism and hotel industry of the Tamale metropolis in the Northern region of Ghana. The variables which are in the form of dependent and independent variables are as follows;

CQE, Customer Quality Expectation

TA, Tangibility

RE, Reliability

RS, Responsiveness

AS, Assurance

EM, Empathy

The study adopted the linear regression equation with the model bellow;

$$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \epsilon$$

With regression equation bellow;

$$CQE = b_0 + TAx_1 + REx_2 + RSx_3 + ASx_4 + EMx_5 + \epsilon$$

Where

CQE, Customer Quality Expectation

b₀ = Constant

a= correlation coefficient

X₁ = Tangibility, X₂ = Reliability, X₃ = Responsiveness, X₄ = Assurance, X₅ = Empathy

Table 3 Factor Correlation Matrix

	TA	RE	RS	AS	EM
TA	1				
RE	.690**	1			
RS	.463**	.555**	1		
AS	.269**	0.119	.474**	1	
EM	.616**	.398**	.652**	.536**	1

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Table 4 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.553 ^a	.306	.264	1.000	.306	7.324	5	83	.000

a. Predictors: (Constant), EM, RE, AS, RS, TA

Table 5 ANOVA^a

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	36.627	5	7.325	7.324	.000 ^b
Residual	83.014	83	1.000		
Total	119.640	88			

a. Dependent Variable: CQE

b. Predictors: (Constant), EM, RE, AS, RS, TA

The predictive effect of the five dimensions of service quality was determine using the multiple linear regression model analysis. The analysis shows a significant value of (p value < 0.000) as shown with the predictor’s relation in Table 5. The analysis further revealed a regression R value of 0.553 shown in Table 4 which implies that customers quality expectation and the predictors variables very well by 55.3% explained that customer quality expectation can be predicted by the combination of all the independent variables. The test result from the ANOVA Table 5 shows that the model is fits since the significant value (P value <0.000) less than the critical value of (0.05) which implies that 5% type I error rate or at 95% confidence interval, hence the explanation of the relationship that exist among the factors through the model. Consequently, apart from empathy, all the remaining four variables were good predictors of guest satisfaction with service quality with positive association as shown in the regression equation above.

The variable combination of the dependent and independent variables in the regress model is used to explain customer quality expectation and satisfaction in the Tamale Metropolis in the Northern Region of Ghana are shown in the regression equation bellow.

$$CQE = 0.246 + 0.342x1 + 0.142x2 + 0.513x3 + 0.058x4 - 0.286x5 + \epsilon$$

From the regression equation the various relationships are explain either by positive or negative coefficient of correlation. The variation which is positive coefficient correlation is as follows; Tangibility, Reliability, Responsiveness, Assurance. The positive correlation implies that for every increase in Tangibility, Reliability, Responsiveness, Assurance will prompt an equal improvement in guest satisfaction of quality of service of hotels in Tamale Metropolis. The variation with negative coefficient correlation is empathy. The negative correlation implies that for every increase in empathy will prompt a reduction in guest satisfaction of quality of service provide by hotels in the Tamale Metropolis in the Northern Region of Ghana.

Table 6 Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	.246	.515		.478	.634	-.778	1.270
1 TA	.342	.170	.319	2.011	.048	.004	.680
RE	.142	.159	.133	.891	.375	-.175	.458
RS	.513	.184	.389	2.789	.007	.147	.879
AS	.058	.155	.043	.376	.708	-.250	.367
EM	-.286	.132	-.323	-2.167	.033	-.549	-.023

a. Dependent Variable: CQE

Factors Affecting the Provision of Service Quality

The study goes on to examine the factors affecting the provision of quality of service in the tourism and hotel industry in the Tamale Metropolis in the Northern region of Ghana. The results showed the mean value of 4.31 which is equivalent to 4 means respondents agreed with the leadership styles used in operating in the tourism and hotel industry in the Tamale Metropolis. The study showed the mean value of 4.40 which is 4 means respondents agreed that there was working equipment which affects quality service provision in the tourism hotel industry in the Tamale metropolis, the mean value of 4.43 which is 4 means respondents agreed with schedule of work of these tourism and hotel industry in the Tamale Metropolis and the study showed a mean value of 4.23 which is 4 means respondents agreed that there was motivation. The results further showed the mean value of 4.15 which is 4 which means respondents agreed that there was training and development which has contributed to the factors affecting the provision of service quality in the tourism and hotel industry in the Tamale Metropolis.

Also, the study showed a mean value of 4.17 which represent 4 means respondents agreed that there was communication at all level in this industry. The study showed the mean value of 4.15 which is equivalent to 4 means the respondents agreed with that the rewarding style of these tourist and hotel industry has gone a long way contribute to factors that affecting the provision of service quality in the tourism and hotel industry in the Tamale Metropolis. The study further shows a mean value of 3.91 which is equivalent to 4 means respondents agreed that there was job satisfaction. Majority of the respondent with the mean value of 4.56 which is 5 mean respondents strongly agreed that distance from home to work place in kilometres affects the provision of service quality in the tourism and hotel industry in the Tamale Metropolis. Also, with the mean value of 4.09 which is 4 the respondents also agreed that provision of company transport to and from work affects the service quality provision.

Further, data from the study showed a mean value of 4.31 which equivalent to 4 means that respondent agreed that employee age group contribute to factors affecting provision of service quality. The study also shows a mean value of 4.03 which is 4 means that respondents agreed that the gender of employees play a role in factors that affect the provision of service quality in the tourism and hotel industry in the Tamale metropolis. The results further show the mean value 4.21 which is 4 means respondents agreed that employee's marital status is also a factor that affects the provision of service quality. Majority of respondents with the mean value of 4.57 which is 5 means respondent strongly agreed that employee's professional qualification contribute to factors affecting the quality service provision in the tourism and hotel industry in the Tamale Metropolis.

Additionally, the study reveals a mean value of 4.49 which is equivalent to 5 means that majority of respondent strongly agreed that employees professional experience plays a huge role in the factors affecting quality service provision in the tourism and hotel industry in the Tamale Metropolis. The study shows the mean value 4.43 which is 4 means the respondent agreed that employees understands the concept of quality service which also a factor that affects quality service provision. Majority of respondent with the mean value of 4.77 which is 5 means that respondent strongly agreed that on job training of employee contributes to factors affecting quality service provision in the tourism and hotel in the Tamale Metropolis in the Northern region of Ghana as shown in Table 7 below.

Key: 1=Strongly disagree, 2= Disagree 3=Not sure, 4=Agree, 5=Strongly agree

Table 7 Factors Affecting the Provision of Service Quality

Variable	N	Mean
Leadership style	120	4.31
Working equipment	120	4.40
Schedule of work	120	4.43
Motivation	120	4.23
Training and development	120	4.15
Communication at all level	120	4.17
Rewarding style	120	4.62
Job satisfaction	120	3.91
Distance from home to work place in kilometres	120	4.56
Provision of company transport to and from work	120	4.09
Employee age group	120	4.31
Employee gender	120	4.71
Employee marital status	120	4.21
Employee professional qualification	120	4.52
Employees professional experience	120	4.49
Employees understanding the concept of quality of service	120	4.43
On job training of employee	120	4.77

Source: Field Survey, 2018

Discussion

Findings from the study indicate that females largely utilized the hotels in Tamale Metropolis. This means that majority of the tourist who visit the hotels are women. This finding confirms studies by Adu-Gyamfi, and Abane (2013), who also observed that utilization of hotels services was mostly by women. Again, the result reveals that tourist with tertiary education are the most dominant who uses the services of the hotels in Tamale Metropolis. This finding is in line with Maurer, Weyand, Fischer, & Stocklin, (2006) and Nurminen, (2007), which show that there is a significant relationship between education level and the utilization of hotels. This implies that highly educated persons in societies uses the service of the hotels in Tamale Metropolis. Furthermore, 37.5 percent of the guest were between 30 and 49 years as indication of the young generation who are actively engage with economic activities and also very active in productive ventures. This result is a clear indication that age is a significant determinant in the utilization of hotels as observed in previous studies (Adu-Gyamfi & Abane, 2013).

Predictors of service quality on Satisfaction level of Guest

The multiple linear regression model gives adequate and significant results, indicating tangible, reliability, responsiveness, and assurance are the significant predictors of Guest satisfaction with service quality in Hotels in Tamale Metropolis. However, empathy is not good predictor of quality of service among hotels in the Tamale Metropolis. This is to examine the best predictors of perceived service quality dimensions on guest satisfaction.

Tangibles

Tangibles are component of the hotels that deals with the physical surrounding of the hotels; the services of the hotels should have up-to-date facilities, modern-looking equipment as well as adequate seating for guests. These facilities in one way or the other influence the judgment of guest to perceive that quality of service delivery is of a quality standard and satisfactorily. The study revealed that physical facilities in relation to equipment and logistics like the modern looking equipment, visually appealing physical facility, need appearing employees, visually appealing materials associated with service in the hotels in Tamale Metropolis. This finding is similar to the finding of Senarath et al., (2014) that tangibility in terms of physical environment, cleanliness, seating and modern clinical equipment has a larger effect on perception of quality service of hospital in Jordan and Turkey. Sofi et al., (2014), study also

supported the finding where they examined examines service quality and tourist satisfaction in Gulmarg, and their finding revealed that facilities and infrastructure were vital components of service quality influencing tourist satisfaction.

Reliability

The most important predictor of guest service quality satisfaction in this study was the dimension reliability, which indicates how guest receive adequate information and explanations about the services the staff provides had to trusted and relay on by guest. Moreover, staff especially service providers, managers give elaborate information on services for guest. Reliability is a key determinant of quality service, since guest are able to relay on staff and effectively discuss personal matters that affect their needs in the hotels. Through this approach hotel staffs are able to provides service on scheduled time, service staff and managers are professional and competent in dealing with guest demands in terms of quality service, keeping promise to do something by a certain time,

showing sincere interest in solving customer problem, performing service correctly the first time, providing the service at the time the service was promised, insisting on error-free records in the hotels in Tamale Metropolis. The regression analysis indicates that a unit increase in reliability will increase the guest satisfaction with quality of service delivered in hotels in Tamale Metropolis in Ghana. Service quality perceptions in hotels could be improved through improving reliability between guest and service providers in the hotels Nurminen, M. (2007).

Responsiveness

Responsiveness of hotels can be improved through the provision of detailed and truthful information about service condition expectations, and by providing fast and well-organized services to the guest visiting the hotels. Staff need to focus on the needs of the guest and act on these needs in a prompt and keen manner.

The contact of the guest with the service quality of the facility also extends to other personnel, and includes receptionists, managers, service providers and security. The guest expected well-trained personnel that are knowledgeable and efficient. A further dimension to this is that hotel employees telling customers exactly what service will be performed, employees giving prompt service to customers, employees always willing to help customers, employees are never too busy to respond to customers request,

Again, a unit increase in responsiveness will increase guest satisfaction with service quality; this is thus a relevant factor that the management of hotels in the Tamale Metropolis needs to capitalize on this dimension to provide an excellent service to their guest. Therefore, responsiveness is a significant predictor of guest satisfaction with service quality as based on the linear regression model.

Assurance

Assurance is an act of given guest confidence on the service provision of hotel. This is thus an indication that the hotels are currently able to instill confidence, are consistently courteous and able to perform the promised service accurately and dependently. These benefits could be used to the hotels advantage as competitive advantages like the hotels had skilled staff to provide quality service delivery, the hotels staffs treat guest with dignity and respect, the behaviour of employees instilling confident in their customers, customers feeling safe in their transaction, employees been consistently courteous with their customers, employees having the knowledge to answer customers questions. Guest perceive that assurance in quality service delivery a significant for service delivery, which is supported by Andersen (1994). Thus, he is of the view that quality service is delivered to them since the staff also understand the core mandate of the hotels of which all are workers. The study further reveals that a unit increase in assurance will increase guest satisfaction with quality service.

Empathy

Empathy creates a feeling of understanding in tough times and could improve the outcome of a client's treatment (Sim, Mak, & Jones (2006). The empathy factor can be further enhanced by providing the clients with personal attention as well as understanding the

needs of the clients. Furthermore, giving customers individual attention, operating hours convenient to all their customers, employees giving customers personal attention, having the customers best interest at heart, the employees understanding the specific needs of customers.

This dimension clearly spells out how staff responds to guest needs and promptly deliver services on time. Again, it further defines how caring staff are to guest and have the guest interests at heart. Guest perceived that empathy is a key determinant for guest satisfaction with quality of service, thus guests are very sensitive to how staff treat them and care for their security. This finding confirms studies by Nurminen (2007), who indicate that empathy is a significant service quality measure of guest satisfaction with service delivery at hotels in Turkey. The regression model revealed that a unit increase in empathy by management of hotels in Tamale Metropolis will reduce the guest satisfaction with quality service.

CONCLUSION

The study concluded that females are the majority who utilize hotels services in Tamale Metropolis, guest accessing services of the hotels are educated to the tertiary levels. The study also concluded that apart from empathy, Tangible. Reliability, responsiveness and assurance, are good predictors of guest satisfaction with quality of service of hotels in Tamale Metropolis, all guest who patronize hotels services are satisfied with the level of quality service provided to them by the hotels if not all the dimension.

The study further concluded on the following factors affecting the provision of quality of service in the hotel industry in the Tamale Metropolis in the Northern region of Ghana; leadership styles used is a factor affecting the operation in the hotel industry, some working equipment affects quality service provision, schedule of work is a factor affecting the tourism and hotel industry, motivation of staff is also a factor affecting the operation of the hotels, no training and development for staff to improve on their service delivery, communication at all level was a problem which affect the operation of hotels, no provision of company transport to and from work affects the service quality provision.

RECOMMENDATION

The following are recommendation for managers and stakeholders in the hotel industry in the Tamale Metropolis should considered to improve on their quality of service;

Housekeepers should be trained to know that customers are always right”

1. House keeper should build good relation with their guest
2. House keeper should be encouraged to always clean the hotel rooms to make it hygienic for their guest
3. Security in the Tamale Metropolis should be tired to protect strangers and for other people who want to stay in the hotels
4. Management should organize in service training for their staff to improve on their human relation with their guest.
5. Efficient, effective and un-interrupted supply of electricity to the hotels should be encourage by the Tamale Metro Assembly
6. Hotel managers should make sure that the environment of the hotel looks clean and nice to attract more guest
7. Management of hotels should motivate their staff to work hard to attract more guest to the hotels
8. Leadership training should be organized managers of hotel in the Tamale Metropolis to enhance their leadership style and for productivity.

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The Effect of Natural Bioactivators on Growth and Nutrient Content of Taiwan Grass (*Pennisetum purpureum schumach*) in Marginal Soil

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Abstract- The aim of this study is to know the effect of natural bioactivator of noni fruit in liquid organic fertilizer in different level. Parameters of this research are fresh content, tiller number, plant height, dry weight, organic matter, water content, crude protein, crude fat, extract material without nitrogen, nitrogen, and ash of Taiwan grass (*Pennisetum purpureum schumach*) with 4 treatments i.e T-1, T-2, T-3 and T-4 and three groups of liquid organic fertilizer level i.e 5 ml; 10 ml; 15 ml and 20 ml. The results showed that the treatment had not significantly affected ($P > 0,05$) on the production and nutrient content of *Pennisetum purpureum schumach* in range of 5 ml to 20 ml. However, organic liquid fertilizer with the addition of natural bioactivator of noni fruit has better nutrient content than other fruit that is $N = 1,84\%$ $P_2O_5 = 2,29\%$, $K_2O = 2,5\%$ and $pH = 5,04$.

Keywords: Bioactivator, Growth, Marginal Soil, Nutrition Content

I. INTRODUCTION

The role of fertilizer in productivity of agricultural land is alternative because fertilizer is important substance (nutrient elements) that must be given to the plant in order to grow and produce as well as other living things. Hasan et al (2016) revealed that plants need to provide maximum biomass production and reduce susceptibility to plant diseases.

On the other hand, development of ruminant livestock industry should be supported by the availability of forage in terms of quality, quantity and continuity throughout all year. Basically, the availability of forage feed comes from the 3rd to 8th land levels soil with poor nutrients and marginal soil (Hasan, 2015). Therefore we need to solve those problems by providing high production with high quality and palatability. One of the appropriate solutions is chemical fertilizer (inorganic) or organic fertilizer. Fertilizers, especially chemical fertilizers, are undoubtedly useful to increase the production/biomass of forage If used continually Goenadi, 2006; Hasan and Natsir, 2012). It was further reported that The use of N-fertilizer leads to soil hardening and glueing effect of urea compounds, As a result recently chemical fertilizer has been changed into organic fertilizer.

There are several ways to utilize liquid organic fertilizer, one of which is using natural bioactivator derived from abundant waste noni fruit, tomato, pineapple and banana, However, there is not enough study that provides how far the effects of these waste in forage production. Amlording to Noor (2003), bioactivators are Mixture of compounds that can stimulate bacteria to decompose hydrocarbons. Several studies report that bioactivator from cow urine that is fermented anerobally for 7 days has significantly affected growth and production of elephant grass biomass rather than other fertilizers (Singh and Amberger, 1997).

II. RESEARCH METHODS

A. Material Research

The bioactivator matter in this study were collected by pinapple, noni fruit, tomato and banana waste which is obtained from the waste of Lakessi Market of Pare-Pare the amount of 200 kg/day waste fruit. Each type of the waste is collected separately.

B. Sample Preparation and Collection

Each bioactivator matter was put into prepared fermented tube bucket (volume of 15 litres). 400 millilitres of molasses and 10 litre cattle urine were added and homogenized anaerobically. After that, all matters were fermented for 1 week. Add 1 litre of H₂O into the liquid fertilizer produced before being sprayed to experimental plants.

C. Site Description

Field research was conducted in Field Laboratory at Muhammadiyah University of Pare-Pare on marginal soil. Land used is 5000 m² In large which was that divided by 12 plots sized 10 x5 meter/plot. The land was processed by hoe, that was rested for 1 week before planting so that with the aim that the mineralization process of organic materials could work quickly. The type of grass used to test liquid organic fertilizer is *Pennisetum purpureum schumach*. Plant material used is 3 segments of cuttings, 20 cuttings were planted on each plot each plot planted 20 cuttings with spacing of 50 x 50 cm.

D. Statistical Analysis

The fieldwork was designed by using a randomized block design (RBD), four (4) treatments, T-1, T-2, T-3 and T-4 with three (3) groups with liquid organic fertilizer levels; are 5 ml; 10 ml; 15 ml and 20 ml and was assessed by using SPSS 16

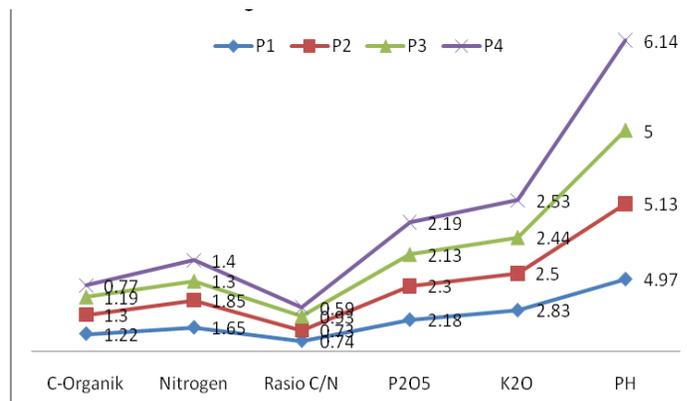
E. Research Parameters

Fresh weight, number of tillers, plant height, dry weight, organic matter, water content, crude protein, crude fat, extract material without nitrogen, nitrogen, ash, Ca and P

III. RESULTS AND DISCUSSION

A. Nutrients of Natural Bioactivator

The average nutrient content of each natural bioactivator extraction is presented in figure 1. Figure 1. The average nutrient content of of natural bioactivators



Description: The Influence is very significant (P <0.01).

P1 = Tomato + Cow urine. P2 = Noni + Cow urine.

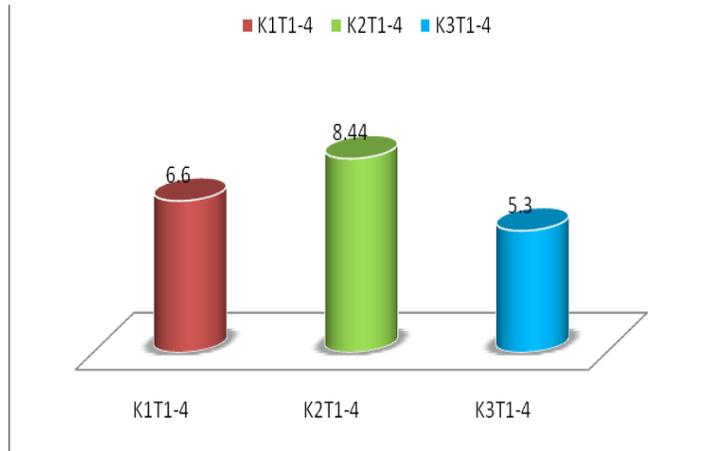
P3 = Pineapple + Cow urine. P4 = Banana peel + Cow urine

Analysis of variance indicated that the type of natural biactivator had significantly affected (P <0.01) on C-Organic, Nitrogen, C/N, P₂O₅, K₂O, and pH. The best nutrient content (Figure 1) is presented in the treatment of P2 among all treatments. This is caused by material contained in the fruit used as the bioactivator, in which the Noni fruit contains nutrients and high nutritional value two of which are nitrogen and protein. Waites et al revealed that (2001) biactivators contain scopoletin, routine, polysamharide, ascorbic acid, β-carotene, I-arginine, proxironin, proxeroninase, iridoid, asperolusid, antidiabile iridoid, fatty acids, calcium, vitamin B, amino acids, glycosides and glucose. In addition, Potterat and Hamburger (2007) stated that the extract of noni fruit contains calcium, sodium, potassium, nitrogen, protein, fat, carbohydrate and high calories.

B. Dry Matter Ingredients

Average contents of dry matter of *Pennisetum purpureum schumach* that were given Bioactivators is presented in figure 2:

Figure 2. Average contents of dry matter of Taiwan *Pennisetum purpureum schumach*



Description: Significant effect ($P < 0.05$)

K1T1-4 = 95% *Pennisetum purpureum schumach* + 5% concentrate + Liquid organic fertilizer 5, 10, 15 and 20 ml

K2T1-4 = 90% *Pennisetum purpureum schumach* + 10% concentrate + Liquid organic fertilizer 5, 10, 15 and 20 ml

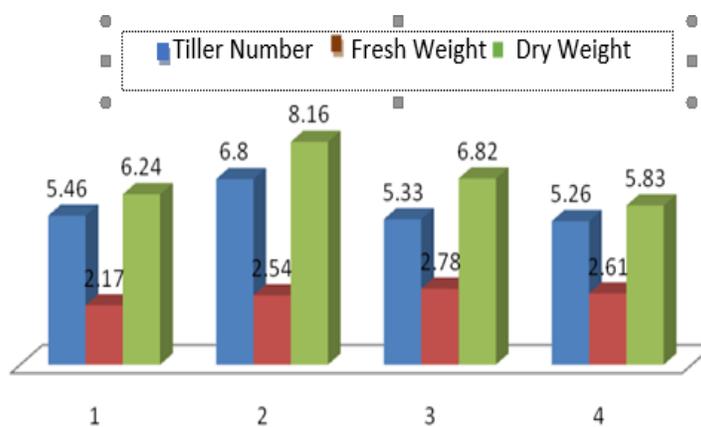
K3T1-4 = 85% *Pennisetum purpureum schumach* + 15% concentrate + Liquid organic fertilizer 5, 10, 15 and 20 ml

Analysis of variance showed that the use of bioactivator in *Pennisetum purpureum schumach* had significantly affected ($P < 0.05$) content of dry matter of *Pennisetum purpureum schumach*. Figure 2 showed that the K2T1-4 treatment has the highest content of dry matter. K2T1-4 treatment has high content of dry matter because both the material used in bioactivator as liquid fertilizer and the content of dry matter of *Pennisetum purpureum schumach* have high dry matter content. A study conducted by Safatri (2015) indicates the same result, suggesting that There is an increase of dry matter in *Pennisetum purpureum schumach* that used liquid organic fertilizers, obtained at treatment level of 400 gr natural bioactivator of noni skin.

C. Forage Production

The average forage production given a natural bioactivator of noni fruit waste in liquid fertilizer to *Pennisetum purpureum schumach* production is presented in figure 3

Figure 3. Average number of Tillers, Fresh Weight and dry Weight of *Pennisetum purpureum schumach*



The effect is not significantly different due to the availability of N, P and K elements required by the plant for growth in nearly equal amounts (T1) 5 ml, (T2) 10 ml, (T3) 15 ml and (T4) 20 ml. Nutrient analysis contained in liquid fertilizer with natural bioactivator of noni fruit waste is 1.84% N total; 2.29% P₂O₅ and 2.5% K₂O respectively. Applying the liquid fertilizer 2 times in seven days has not been able to increase *Pennisetum purpureum schumach*. While the availability of soil nutrients greatly affect the growth of *Pennisetum purpureum*. Kavanova and Glozer (2004) stated that the optimal supply of nutrients especially nitrogen (N), phosphorus (P), and potassium (K) in the soil for plants can increase crop production. The presence of N is enough to enlargement and prolongation of plant cells that affect the growth of plants while the phosphor is an element of preparation of cell nuclei and is very important in the process of cell division that will amlelerate plant growth.

Fresh grass-weight production of *Pennisetum purpureum schumach* had not significantly affected on each treatment level. It is known that the production is caused by the increase in plant height and number of seedlings in plant height and number of seedlings. The production of this plant is strongly influenced by the absorption of nutrients. Although not significantly different, the 5 ml (T3) treatment had the highest fresh weight production compared with T1, T2 and T4 treatments. This difference omlured because by the treatment of liquid fertilizer contains a number of nutritional elements that can be utilized by *Pennisetum purpureum schumach* o produce fresh weight. Onyeonagu and Asiaghbu. (2012) stated that fertilization can increase the production of fresh weight of a plant because fertilization means adding food substances to plants that are useful for the growth of itself.

The dry weight of the plant is a reflection of the quality of the plant. No water is contained in dry weight and there are only protein, fat and carbohydrates.. In Figure 1, there was no significant difference ($P > 0.05$) to dry matter content. Flores et al (2005) stated that *Pennisetum purpureum schumach* will grow well if desired conditions are met such as soil fertility, water sources and climate. However, it cannot be guaranteed that more doses given to the plant will further increase the growth of plant.

D. Nutrition Content

The data of natural bioactivator utilization of Noni fruit waste in liquid fertilizer to crude protein, crude fat, coarse fiber, extract material without nitrogen, and ash *Pennisetum purpureum schumach* is presented in Figure 4

Figure 4. The average of ash, crude protein, crude fat, crude fiber and extract material without nitrogen

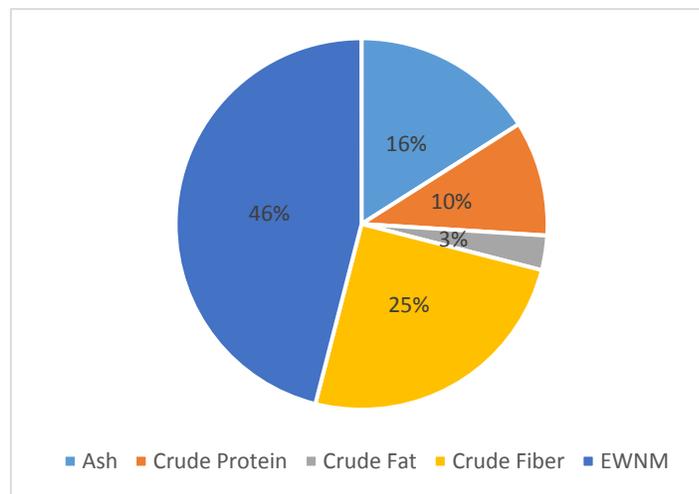


Figure 4 shows no significant difference Which is caused by the availability of elements N, P and K required by plants for growth in almost the same amount. One of the causes is the dose given in each treatment has not been able to produce optimal nutritional value. Lestienne et al (2006). stated that the provision of fertilizers containing N elements will increase vegetative growth of plants, which can also encourage metabolism of other elements such as P and K vice versa. Complete and balanced liquid fertilizers can increase plant growth and production activities well. Elements N, P and K are closely related to plant growth, since N, P and K serve to stimulate overall plant growth. The main role of nitrogen for plants is to stimulate overall plant growth, especially stems, branches and leaves. It also plays an important role in the formation of forages that are useful in the process of photosynthesis, forming proteins, fats, and various other organic compounds.

Rough protein content of *Pennisetum purpureum schumach* showed no difference ($P > 0.05$) from crude protein content. The average of grain protein content of *Pennisetum purpureum schumach* at each treatment ranged from 9.88% to 10.64% the lowest average is obtained in Taiwan grass treatment (T4) while the highest one is obtained in Taiwan treatment grass (T1) The difference omlured because the availability of nutrients given is still lacking so that the needs of the plants are not met properly. Amlording to Minson (1990), the content and composition of crude protein in forage is influenced by the availability of nitrogen in the soil, the result can inhibit the process of synthesis in plants. The content of N organic liquid fertilizer cannot be completely converted into amino acids to be assimilated into ammonium. The role of N for plants is very large because N is one of the elements of crude protein formation. Tisdale et al (1990) stated that the better the vegetative growth of a plant, the higher the production and nutrient content of the plant. The low nutrient element in the soil will cause less optimal plant growth.

IV. CONCLUSION

Adding biactivator of noni fruit in liquid fertilizer can improve nutrient content more than other fruits until N = 1,84% P2O5 = 2,29%, K2O = 2,5% and pH = 5,04.

Giving liquid fertilizer in the range of 5 ml to 20 ml has not been able to give effect the production and nutritional content of *Pennisetum purpureum schumach.*

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Environmental Sanitation Practices Among Traders of Kofar Wambai Market-Kano State of Nigeria

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ABSTRACT

This study investigated Environmental Sanitation Practices among Traders of Kofar Wambai Market, Kano State of Nigeria. Descriptive survey design was used for the study. Descriptive survey is the one in which a group of people or items are studied by collecting and analyzing data from only few people or items considered to be the representative of the entire group. The researchers adopted descriptive survey method for this study because it enables specific issues to be investigated through information on people's opinion and beliefs. The population of this study comprised all traders of Kofar Wambai Market, Kano State, estimated to be 20,000, (Tax and Revenue Collection office, 2015). Simple Random Sampling Technique was used and 250 samples were selected to represent the whole population of the market traders. Five (5) research assistants were invited to have assisted in administering the questionnaires, each research assistant was given 50 questionnaires in order to collect data for analysis. Data collected was analyzed using simple frequency counts and percentage for organization and description of the demographic characteristics of respondents, it was also used in analyzing the respondents' practical opinions as well as the government supports in providing sanitation infrastructures toward achieving the purpose of sanitation program. The instrument for data collection was closed-ended questionnaire designed by the researchers, titled "Environmental Sanitation Practice among Traders of Kofar Wambai Market Kano State, Nigeria". The questionnaire contained two (2) sections; (I) and (II). Section (I) consists of questions on Demographic Information of the Respondents, (i.e. Gender, Age and Educational Qualification), while section (II) consists of questions on practical participation of traders and government funding supports toward achieving predetermined objectives of environmental sanitation in market. Based on the findings of this study it was concluded that practices of environmental sanitation among the traders of Kofar Wambai market were relatively poor, hence there is need for improvement. It was also recommended among others that the market authority has to provide all-round the market places in order to improve current and existing sanitation practices of the market users, this will help to prevent indiscriminate disposal of waste and facilitate sanitized waste disposal all over the markets. Revenue generated by government officials in the market should be properly used to provide sanitation related facilities and equipment in the market. There is need for re-

design system and improvement of the local markets as well as creation of new and modern markets to reduce the high numbers of street-sellers in the state, which will surely decrease the amount of solid waste in the study area.

Keywords: Environment; Sanitation; Environmental Sanitation Practices; Market Traders; Kofar Wambai Market Kano.

INTRODUCTION

The term environment has been defined by different personalities with different views. Uchegbu, S. N., 2000 views the environment in terms of ecology and defines it as the science of the organism in relation to other organisms of different species, and to those of its own kind. It was also reported that the Oxford Advanced Learners English Dictionary however, defines the environment as conditions, circumstances etc. affecting people lives (Uchegbu, S. N., 2000). In another development, environment has been defined as the sum total of all conditions that surround man at any point in time on the earth's surface (Uchegbu, S. N., 2000). Environment has been categorized by Canter (1975) as air environment; water environment; noise environment; biological environment; cultural environment; and socio-economic environment. The environment is normally viewed in the physical sense as explained by Holderness & Lambert (1982), who stated that environment is made up of air, water and land (Holderness & Lambert, 1982). Therefore, environment refers to the natural environment in which man, animals and plants live and interact, it includes basically the land, water and air. It is upon this natural surrounding that all creatures depend for their existence and sustenance (Uchegbu, S. N., 2000). However, living components of creation are found in all facets of the physical environment. Under a normal condition, the living things interact symbolically among themselves and with lite physical environment, it has been noted that before man came to (he scene), the physical environment was as pure as the spring water, Uchegbu, S.N. added.

Uchegbu, S.N. (2000) also, stated that man's activities on the environment has tended to degrade and make the

environment untidy/unneatened and unlit for human habitation because of its poor sanitation nature.

However, sanitation is said to be the state of cleanliness. It is a broad concept and connotes the process of keeping something clean. According to Kpatriok K. (1980), sanitation is the arrangement for protecting the health, especially the removal of the human, industrial and domestic wastes. Sanitation is also a process embarked upon to keep the total of man's environment hazard free, as added by Kpatriok, (1980).

According to Uchehgbu, S.N. (2000) Sanitation is aimed at protection and promotion of public health which is meant for the improvement of environment. Thus, the three concepts such as environment, sanitation and public health are inter-related because each one of them affects the other. Public health was viewed as a state of individuals' well-being due to the influences and impacts of the physical environment and sanitation practices of the community. Good health is part of the overall development of a community. The issue of public health is a concern to the citizen and everybody or organization, it is the science and art of preventing diseases; prolonging life; promoting physical and mental health and efficiency through organized community efforts such as proper sanitization of the environment; the control of community infection; all of which will ensure a standard of living for every individual in the community, this will adequately maintain healthy conditions (Uchehgbu, S.N. 2000).

Public health however, has been defined as a science and art that deals with the protection and improvement of community health by organized community's efforts, this include: preventive medicine, sanitary and social services (Uchehgbu, S.N. 2000) Accordingly, public health is an effort organized by society to protect, promote and restore people's health, it is the combination of sciences, skill and beliefs that are directed to the maintenance and improvement of health through collective and social actions. Public health emphasizes the prevention of diseases and this can be achieved through proper sanitation. Sanitation whether in the urban or rural area protects and/or enhances the environment and by extension the health of the citizens. Sanitation is thus, the aspect of environment which may affect the health of the citizen Uchehgbu, S.N. (2000) added.

According to (Worlanyo, E.K., 2013) One of the crucial, unsolved, or even unresolved problems for those concerned with the quality of life in the world, especially the developing world is that of adequate, accessible and acceptable basic sanitation. It was reported that human right to sanitation is directly linked to other human rights. Moreover, the right to sanitation involves explicit requirements in terms of accessibility, affordability, availability, quality and acceptability (Worlanyo, E.K., 2013). Based on this Mulama (2008) argues that sanitation is more important than political independence. It is a commonly held view, that developing countries would follow the development path forged ahead by industrialised countries, these developing countries Nigeria inclusive need to be aided by the developed countries before they move forward in terms of sanitation progress (McGranahan, Pedro, Songsore, Surjadi, & Marianne, 2001).

According to McGranahan et al (2001) urban sanitary practices of industrialised countries, have helped contribute to the dignity, health and wealth of people in those countries, and thus have great bearing on the practices and the aspirations of

developing countries. Markets, municipalities, cities and towns need to grapple with the problem of Solid Waste Management, especially plastic waste, which inclusively the Kofar Wambai Market of Kano suffers (Amankwah, 2005). The issue of improved sanitation has to be given priority in Kofar Wambai market Kano, since sanitation benefits connect between environment and health (Harvey, 2008). Sanitation program has to do with solid waste management, specifically the plastic waste menace/danger.

The enormous and huge amounts of plastic waste generated throughout the world are the most crucially posed challenges lead to raised questions on how to manage wastes efficiently and effectively to save the environment and the continuous existence of mankind (Uchehgbu, S.N., 2000). A solid waste is any material which comes from domestic, commercial, and industrial sources arising from human activities which has no value to people who possess it and is discarded as useless (Freduah, 2004; 2007). However, the population densities in urbanised areas and per capita waste generation increased, the available land for waste disposal decreased proportionately (Shafiul & Mansoor, 2003). Sanitation thus emerged as an essential, specialised sector for keeping cities healthy and liveable (Fobil, 2000). Hunter (2000) predicts that in the foreseeable future more than half of the world's population will live in urban areas, and that the developing countries, including Nigeria will be the worst hit by sanitation problems if care is not taken.

The contribution of trading activities to the livelihoods of the population, particularly in the informal sector cannot be overemphasized (Aryeetey & Nyanteng, 2006). The market place as an important structural part of the local economy which facilitates the exchange of commodities, transfer of monies, traffic generation, information flow and other forms of spatial and social interactions also leads to waste generation especially, plastic waste (Worlanyo, E.K., 2013). This issue has the potential for environmental pollution with its attendant public health implications (Aryeetey & Nyanteng, 2006; Mwanza, 2001). Inadequate environmental sanitation has been recognized as a public health hazard worldwide (Ekong, Ibanga Eyo, 2015).

Public health problems associated with lack of effective environmental sanitation can be reduced/eliminated favourably if proper sanitary activities are performed by market traders. Thus, actions that threaten lifestyle or take up personal time (spending more time to do sorting of waste for example could have economic costs on market users and would not be widely supported (Fortner, et al., 2000; O'Connor et al., 2002). However, behaviour change strategies that are consistent with the public's awareness and understanding of improved environmental sanitation are therefore necessary in order for sustainable policy to be developed (Plotnikoff, et al., 2004).

People defecate in public if they have poor access to sanitation that would enable them to eliminate their human excrement Worlanyo, E.K., (2013). According to the latest report on the United Nations Millennium Development Goals, eighteen percent of the world population defecates in the open. This was about 1.2 billion people out of the already 2.5 billion people in the developing countries including Nigeria without access to basic sanitation (Worlanyo, E.K., 2013) added.

The possible causes of increase in flood severity around cities in Nigeria, Kano inclusive ranged from inadequate flood

management practices to poor waste management and lack of proper drainage system. However, urban floods occurred when drainage system, gutters and other storm control devices spilt to its plains/areas of land and over flow to flood control devices during heavy rains. Drains, as well as rivers and streams near the urban centres were often choked with refuse or silted up, this resulted in reduced capacity of river and stream channels causing flooding (Worlanyo, E.K., 2013).

According to Domfeh (1999), Environmental pollution could be ascribed to the uncontrolled disposal of both industrial and domestic waste which created problems in the collection and disposal of human waste in the metropolis. The spread of diseases through food was common problem which resulted in appreciable morbidity and occasional mortality. Traders played important roles in ensuring food safety throughout the chain of production, processing, storage and preparation (Abanobi, Dozie, Ukaga et al., 2009) added. Thus, the researchers recognized the importance of market traders with regard to healthy sanitation practices, hence the development of this research work to objectively investigate the Environmental Sanitation Practices Among Traders of Kofar Wambai Market, Kano State of Nigeria. This led to the preliminary observations, investigation as well as documentation to in order to find the possible solutions to the environmental sanitation problems in the study area.

The issue of environmental sanitation in Nigeria Kano State in particular faces major challenges such as waste disposal especially, plastic waste which has become a major problem of several markets in the state as a result of highest business-related activities. Sheikh Nasiru Kabara Market, popularly known as (Kofar Wambai Market) which this study focused on, is facing environmental sanitation challenges as well, this is closely related to plastic wastes and other human wastes generated which have the potential to destroy the natural environment in which human and natural resources in the state and the country inhabit. The status of the local and traditional markets in the state. Kofar Wambai Market and Kurmi Market is in hard, bad, nasty and deteriorated condition in which the heaps of refuse and other solid wastes might have turn to be a fuel when there is fire outbreak. The market places face challenges of environmental sanitation, such as improper drainage system; lack of good refuse disposal systems; inadequate number of toilets and bathrooms; blockage of essential routines and exits that will be used for emergency purposes; lack of health facilities; absence of health personnel, to mention few are the common problems in the market.

It is based on these problems that the researchers intend to investigate whether the factors therein such as gender, age and education level; lack of sanitation practices by the market traders with regard to sanitation programs; traders' personal cleanliness; or the government supporting negligence that have contributed to the problems observed by the researchers in study area (i.e. Kofar Wambai Market, Kano State). Thus, this study was developed to answer the following questions;

Research Questions

- i. Do the demographic factors (i.e. gender, age and education level) affect sanitation program in the market?
- ii. Do traders in Kofar Wambai Market participate in monthly environmental sanitation program in the market?
- iii. Do the market traders clean their business area regularly?

- iv. Do the Kano state government provided sanitation related facilities and equipment in the market towards achieving the purpose of environmental sanitation program?

Purpose of the Study

The study aimed at investigating the Environmental Sanitation Practices Among Traders of Kofar Wambai market, Kano State of Nigeria, with specific objectives such as:

- i. To identify the improvement of sanitation practices among Traders of Kofar Wambai Market, Kano State of Nigeria.
- ii. To determine the promotion and maintenance of healthy living environment through the healthy practices of traders in the state.
- iii. To determine whether Kano state government provide sanitary facilities and equipment in the Kofar Wambai market toward achieving the purpose of sanitation program in the market and the Kano state environment.
- iv. To report the lapses with regard to sanitation as a result of poor sanitation practices exhibited by traders with the intention to facilitating healthy sanitation practices among market users, other community members in the state and Nigerian society at large, and with a view to find the possible solutions to the problems detected.

Significance of the Study

This study is of immense benefit in the following ways:

- i. The study explores appropriate strategies and recommendations to facilitate good sanitation practices in all market places of Kano.
- ii. The study will serve as a reference point to the Ministry of Health, Ministry of Environment, Kano State Refuse Management and Sanitation Board (REMASAB) and other concerned bodies for sustainable development of sanitation programs in Kofar Wambai Market and other market places of the state with similar problems.
- iii. It will also give an in-depth understanding of what the problems of poor sanitation practices are and the strategies to tackle the problems in the market area, Kano state and other Nigerian states as well.
- iv. The study will also contribute to the existing body of knowledge with regard to sanitation practices among market traders of Kofar Wambai Market toward achieving effective as well as efficient environmental sanitation in the state.
- v. The study will also stimulate further research on the subject in the area and other market places with similar problems in the state and the country in general.

Delimitation of the Study

This study is delimited to Sheikh Nasiru Kabara Market (popularly, known as Kofar Wambai Market), the Kano State of Nigeria. It is also delimited to market traders that buy and sell items in the market.

METHODOLOGY

Research Design

Descriptive survey research design was used for this study. Descriptive survey is the one in which a group of people or items are studied by collecting and analyzing data from only few people or items considered to be the representative of the

entire group. The researchers adopted descriptive survey method for this study because it enables specific issues to be investigated through information on people's opinion and beliefs.

Population of the Study

The population of this study consists all traders of Kofar Wambai Market-Kano State, estimated to be 20,000, (Tax and Revenue Collection office, 2015).

Sample and Sampling Technique

Simple Random Sampling Technique was used and 250 respondents were selected among the traders as the sample for the study. According to Amburg (2004), in any population above 2500, a sample of 250 is sufficient enough to use as a sample for the study. However, five (5) research assistants were invited and trained on how to administer the questionnaires, each research assistant was given 50 questionnaires to assist the researchers in administering the questionnaires for data collection.

Data Collection Instrument

Closed ended questionnaire was designed by the researchers, it was used as the instrument for data collection, the questionnaire was titled "Environmental Sanitation Practices among Traders of Kofar Wambai Market-Kano State, Nigeria". The questionnaire contained two (2) sections; I and II.

Section (I) consists of questions on Demographic Information of the Respondents, (i.e. Gender, Age and Educational Qualification), while section (II) consists of questions on environmental sanitation practices among the market traders, traders' personal cleanliness as well as questions on government supports in providing sanitary facilities and equipment toward achieving the purpose of sanitation in the market and the state in general.

Data Collection Procedure

Two hundred and fifty (250) questionnaires were distributed to the market traders, although 235 questionnaires were retrieved back to the researchers for analysis. The distribution has been done based demographic information of the respondents (gender, age and educational qualifications). The exercise was done with the help of (5) research assistants. They assisted the researchers in distributing, administering and retrieving the questionnaires. This was done within a period of three (4) weeks.

Data Analysis

Data collected was analyzed using frequency counts and percentage for organization and description of the demographic characteristics of respondents, it was also used in analyzing the respondents' opinions on environmental sanitation practices and that of government supports in terms of provision and distribution of sanitary facilities and equipment in the market toward achieving the purpose of sanitation.

RESULTS

Table (I) Demographic Information of the Respondents

S/N	Variables	Frequency	Percentage%
1. Gender:	Male	169	72%
	Female	66	28%
	Total	235	100%
2. Age:	18-22 years	27	11%

23-27 years	46	20%
28-32 years	47	20%
33-37 years	52	22%
38years & above	63	27%
Total	235	100%

3. Educational

Qualification:		
WEAC/NECO/TCH/GCE	145	62%
Diploma	57	24%
B.Sc./B.A./HND	31	13%
PGD/PGDE/PDPA/PDPM/		
M.A/M.Sc./PhD	02	01%
Total	235	100%

Table (I) shows the demographic characteristics of the respondents on the gender side, it revealed that 169 (72%) were male while 66 (28%) were female, this showed that majority of the respondents were male counterparts.

From the age dimensions of the respondents the table revealed that 27 (11%) of the respondents aged 18-22 years, 46 (20%) of the respondents were aged 23-27 years, respondents with the age 28-32 years have 47 (20%), respondents aged 33-37 years were 52 (22%), while 63 (27%) of the respondents were aged 38 and above (this is the group majority group among the respondents).

The table also shows Educational Qualifications, it revealed that respondents with WAEC/NECO/TCH/GCE qualifications were 145 (62%), those with Diploma were 57 (24%). B. Sc. / B.A /HND holders were 31 (13%), PGD/PGDE/PDPA/PDPM/ M.A /M. Sc. /PhD holders were only 2 (1%). This showed that respondents with WAEC/NECO/TCH/GCE were the majority.

Table (II) Traders' Practices of Environmental Sanitation

S/N	Statement	Responses	Frequency Percentage
1. I participate in monthly environmental sanitation program	Yes	79	34%
	No	156	66%
	Total	235	100%
2. I clean my business area regularly	Yes	60	25%
	No	175	75%
	Total	235	100%
3. Government provide sanitary facilities and equipment in the market to facilitate achieving the purpose of sanitation program	Yes	35	15%
	No	200	85%
	Total	235	100%

Table (II) shows Traders' Practices of Environmental Sanitation. It revealed that 79 (34%) of the respondents participate in monthly environmental sanitation program, 156 (66%) of the respondents who were the majority do not participate in the program.

It was also revealed that 60 (25%) of the respondents clean their business areas regularly, while respondents 175 (75%) do not clean their business areas, this means that the latter are the majority.

However, 200 (85%) of the respondents, do not agree that environmental sanitation among the traders of Kofar Wambai government provide sanitary facilities and equipment available market were relatively poor and there is need for improvement in the market, whereas only 35 (15%) of the respondents agreed, this showed that the former is the majority.

DISCUSSION

The study investigated the Environmental Sanitation Practices Among Traders of Kofar Wambai Market, Kano-Nigeria. The (I) that showed the demographic information of the respondents, revealed that males were the large proportion gender with 169 (72%), respondents aged 38 years & above 63 (27%) were the majority, further more, the large percentage of the respondents were the holders of WAEC/NECO/TCH/GCE with 145 (62%).

Table (II) above revealed that most of the respondents proportionately 156 (66%) do not participate in environmental sanitation program in the market. Also, 175 (75%) respondents do not clean their business areas. Thus, Environmental sanitation practice among the Traders of Kofar Wambai Market was very low, this result is supported with (Chukwuma et al, 2017) report which stated that the proportion of residents of Communities of Nigeria with practice towards environmental sanitation was (20.8%) out of hundred, in other words, the practice was very low.

However, according to the result on the table (II) above, 200 (85%) of the respondents (the majority group) believed that government do not provide sanitary facilities and equipment in the market. Hence, there is need for provisions of modern sanitation infrastructures, this is supported by (Chukwuma et al, 2017) who reported that a lot of attention is still required in the development of basic sanitation infrastructure and there need in the promotion of strategies or interventions that influence behavioral change towards environmental sanitation especially in developing countries like Nigeria.

CONCLUSION

Based on the findings of this study, it was investigated and concluded that:

Table (I) showed demographic information of respondents, it revealed that majority of the market traders in Kofar Wambai were men and their age ranged were 38 and above, most of the traders in the market were holders of WAEC/NECO/TCH/GCE as their educational qualifications.

The table (II) above revealed environmental sanitation practices among the traders, it is hereby concluded that majority of the market traders do not participate in monthly environmental sanitation programme.

It was also investigated and concluded that most of the traders in Kofar Wambai Market do not regularly clean their business areas.

Majority of the traders do not agree that government provide sanitary facilities and equipment available in the market.

Therefore, based on the aforementioned conclusions, the researchers are hereby concluded that the practices of

RECOMMENDATIONS

Based upon findings of this study, the following recommendations were made;

1. The market traders need to be enlightened about the implications of poor sanitation practices to their health, their customers, as well as that of the community and society at large. There is also need to implement periodic public education programs to inform market users about negative effects of waste in order to change their attitudes toward the maintenance of proper sanitary activities in the market places of the State, also seminars/workshops should be organized periodically on the importance of sanitation in the market places to the society as a whole.
2. The government should put waste management and sanitation under the Ministry of Health and Ministry of Environment respectively, so that a close eye would be kept on the program implementation by experts who have the ability, skills and adequate knowledge to cast their operational duties, rather than leaving it in the hands of local authorities that for the most part, do not have the expertise to handle the issue of sanitation and health related to environmental implications. Sufficient budget should be made available by the government for the sustainability of the program.
3. In order to improve current practices in the market, the market authority has to provide bins/containers all-round the market, so as to prevent indiscriminate disposal of waste, facilitate sanitation practices of the market traders toward sanitized waste disposal all over the markets.
4. Revenue generated by the government officials from the market users should be properly utilized in providing sanitation related facilities and equipment in the market. There is need for re-design system and improvement of the local markets as well as creation of new and modern markets to reduce the high numbers of street-sellers in the state, which will surely decrease the amount of solid waste in the study area.
5. Provision of reasonable fine by the government will be essential, so as to promote and maintain public order towards sanitation as a way to facilitate effective, and sustainable sanitation practices among the traders, community and the society.

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A Survey of Supply Chain Management Practice and Performance in Bangladesh

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Abstract: Supply chain management (SCM) is new idea including the combination of all the esteem making components in the supply, assembling, and distribution forms, from raw material extraction, through the change procedure, to end-client utilization. The reason for this paper is to investigate the SCM exercises did by manufacturing organizations in Bangladesh. A postal review was completed to distinguish the status of SCM in Bangladesh and decide the issues in SCM that are critical for Bangladesh producers. The paper presents primer discoveries from this study.

Keyword: Supply Chain Management, Service Supply Chain Management Practices, Supply Chain Key Performance etc.

INTRODUCTION

Supply chain management (SCM) is a new theory with the combination of all the value-creating backgrounds in the supply, manufacturing, and distribution developments, from raw material concluded the alteration process to end user consumption. SCM exercises are roused by the objectives of client benefit, pressure of lead time, and stock decrease. SCM is encouraged extraordinarily by the latest in correspondence innovations, for example, the electronic data interchange (EDI) and the web [1]. This grants snappy correspondence of end-shopper request to the upstream phases of the supply chain.

Various articles have been distributed in the research literature pushing the standards of SCM [2-6]. Many case analyses [7-12] have been distributed, confirming the benefits of SCM. The inquiry emerges regarding the sum of this message has achieved the professionals. The exploration portrayed in this article was completed to evaluate the choice of SCM practices in Bangladesh. A short literature review is exhibited in the following segment. This is followed by primary outcomes of the investigation. In the last area, some finishing up comments are displayed.

LITERATURE REVIEW

New and Payne [13] have defined an experimental examination exploring the power interaction in supply chain (SC) partnerships. They found that the connections were deviated; contingent upon whether it was with upstream or downstream associations. Watts and Hahn [14] described on a study conceded out to evaluate the level and achievement of supplier progress programs. They observed these projects to be wide in scope and very pervasive (63%), particularly among the bigger firms reviewed. The main point of these projects was more to enhance the purchased items than to enhance the capacity of the supplier. Krause [15] completed a survey of firms on the level of supplier improvement exercises and on the advantages collected from the exercises. The reacting firms partook all the more regularly in constrained inclusion, for example, supplier assessment and comment, site visits, demands from enhanced execution, and guarantees of expanded present or future business than in broad association, for example, preparing/instruction of suppliers' work force or interest in suppliers' tasks. While the suppliers' advancement endeavors were for the most part productive, the purchasing firms were not exceptionally happy with the outcomes. From this examination, Krause [15] recommended a three-pronged way to deal with competition, business motivating forces, and direct association in supplier's operations.

Galt and Dale [16] examined ten associations in the U.K. and found that they were attempting to diminish their supplier base, and to enhance their interchanges with the supplier desperately. Fernie [17] completed a global examination of SCM in basic supply retailing businesses. He discovered critical contrasts in stock held in the SC by the U.S. and European basic need retailers, which could be clarified by their SCM acceptance. In a comparative

vein, Tan et al.[18] looked for a connection between firms' SCM practice and their acts. They could demonstrate a positive and significant correlation between sure SCM practices and acts of their respondent firms. Kwan [19] examined the utilization of information technology (IT) in SCM in Singapore hardware and compound businesses, and found that the main two SCM methodologies were: 1) to position coordination as one of the center capabilities inside the organization, 2) to create to demand as opposed to forecast. The top obstruction to its utilization was an absence of education and training.

Despite the fact that there is a lot of distributed literature that clarifies or lectures SCM, there is a relative absence of exact investigations looking at SCM practices and their effects. As far as anyone is concerned, there is no distributed investigation of SCM practices in Bangladesh. There is some investigation regarding GSCM impact and practices [20, 21]. Notwithstanding, past investigations [22] have discovered that Bangladesh producers were by and large lingering behind in the use of new ideas in assembling. Chowdhury, Alam and Habib [23] explored SCM practices in the services industry of Bangladesh which incorporates the service industry's training idea, job and factors may constrain the acts of SCM. They discover, Internal SCM impacted the reaction most and the services firms confront the serious difficulties to satisfy the responsibility of the customers because of astonishing political conflict, sudden work distress, port carelessness, custom improvidence, bureaucratic issues, absence of utilization of innovation, import reliance for raw materials, less work efficiency estimation and so forth. From these investigations, the predominance of SCM in Bangladesh isn't exceptionally encouraging, yet it is surely important to look at how well Bangladesh firms are doing here.

SURVEY

The essential objective of the research reported in this paper was to benchmark SCM practices in Bangladesh. A survey methodology was received.

THE RESPONDENTS

A survey questionnaire was sent in May 2017 to the 357 biggest Bangladesh manufacturing associations with a demand to forward it to the individual responsible for coordination in that association. In the end 97 usable reactions were gotten (27.17% response rate). Half (47%) of the respondents were territorial/national business tasks contending essentially in Bangladesh. Worldwide business activities contending overall constituted 44% of the sample. The leftovers (9%) were nearby/city business activities contending among just local organizations. As far as their situation in the supply chain, the dispersion of the respondents is given in Table 1. The extent of the respondents claiming to practice some type of SCM was 87%. These respondents announced including the accompanying parts of the SC in their SCM exercises as given in Table 2. The most elevated extent is included with final products manufacturers. Predictable with the biggest group of the respondents (final product manufacturing), the vast majority of our respondents are associated with SC exercises instantly upstream or downstream of their situation in SC. Not very many of the respondents are engaged with recycling.

Table 1. Supply Chain Arranging of the Respondents

Position in the SC	Percentage
Natural Resource Manufacturing	9%
Component Manufacturing	13%
Ending Produce Manufacturing	51%
Distribution	27%

Table 2. SCM Activities of the Respondents

Supply Chain Modules	Percentage
Final Produce manufacturers	85%
Corporal distribution	81%
Wholesalers	69%
Component manufacturers	63%
Retailers	57%
Raw material manufacturers	46%

Final consumers	35%
Recycling	18%
Miners/raw material extractors	13%
Extraction from the Earth	5%

SURVEY FINDINGS

The respondents utilized a Likert scale (1 = Low, 5 = High) to assess the majority of the things in the survey. The average responses and discussions are presented below.

Corporate strategy and SCM issues

The respondents were given 25 issues in SCM exercises and requested to assess their significance. The best ten issues recognized by the respondents are given in Table 3. It creates the impression that time pressure and between firm correspondences parts of SCM are of the most vital to the respondents.

Table 3. Top Ten Issues in Supply Chain Management Activities

SCM Issue	Average Importance Rating
On-time delivery of the association's items directly to the clients' purposes of utilization	4.65
On-time delivery of the purchased materials straightforwardly to the company's purposes of utilization	4.56
Deciding clients' future needs	4.51
Increasing the firm's Just-In-Time (JIT) capabilities	4.01
Enhancing the integration of exercises over the supply chain	4.01
Contacting the end clients of possessing items to get criticism on execution and client benefit	3.91
Lessening reaction time over the supply chain	3.89
Setting up more successive contact with individuals from possess of own supply chain	3.88
Making a more prominent level of trust among the SC individuals	3.85
Conveying the company's future vital requirements to the providers	3.83

The seven issues of the most bottom significance are introduced in Table 4. Clearly, there isn't much want to move to encourage SCM. SCM endeavors likewise seem constrained to the promptly close individuals from the supply chain.

Table 4. Issues of Least Importance in SCM Activities

SCM Issue	Average Importance Rating
Expecting providers to find nearer to possess firm	1.71
Use of a third-party SCM specialist	1.93
Locating closer to own customers	2.21
Stretching out possess SC to incorporate individuals past quick providers and clients	2.55
Making SCM groups that incorporate individuals from various organizations	2.72
Taking an interest in the sourcing choices of claim providers	2.78
Including all individuals from claim company's SC in possess item/benefit/marketing plans	3.15

Table 5 demonstrates respondents' view of the obstructions to accomplishing the maximum capacity or advantage of SCM in the respondent's organizations. As can be normal, Bangladesh's isolation from whatever is left of the world is viewed as the best obstruction in accomplishing SCM.

Table 5. Issues Obstructing Supply Chain Management

Interference to SCM	Average Rating	Importance
Providers' geographical distance from company's offices	3.05	
Absence of refined data framework for data sharing among SC individuals	3.01	
Absence of capacity in overseeing inventories all through the whole SC	2.98	
Company's absence of use inside the SC	2.87	
Absence of trust among SC part	2.71	
Trouble among SC individuals	2.66	
Absence of enthusiasm among claim providers or clients to take an interest in the SC	2.59	
Rivalry from other SC	2.51	
Clients' geological separation from possess offices	2.47	

Supply/Materials management issues

The level of the respondents who outsource essential materials, parts, sub- assemblies, and services is 51%. In average, there has been a 12% expansion in outsourcing exercises over the most recent three years. Additionally, the level of respondents associated with the outsourcing of maintenance, repair and operating supplies (MRO) remains at 41%, with just a 8% expansion over the most recent three years. Outsourcing does not appear to have grabbed hold yet in Bangladesh.

51% of the respondents had a partnership or vital union with their suppliers, and these respondents detailed an average of 35% expansion in the quantity of strategic alliance programs over the most recent 3 years. The level of respondents with a supplier certification program is 47%: 12% certifying the suppliers' items, 1% certifying the suppliers, and 35% certifying both the items and the processes. In certifying the suppliers, the suppliers ' own particular self-accreditation was utilized by 9% of the respondents, ISO 9000 quality standards were utilized by 38%, and 29% of the respondents utilized their organizations' own in-house certification program. The main ten issues recognized by the respondents in assuring that their suppliers ' items and services conform in with the details are given in Table 6.

Table 6. Top Ten Requirements for Suppliers

Supplier Conformance Issue	Average Importance Rating
Consistency with all necessities of the obtaining firm	4.27
Examining reasons for non-conformance and taking restorative activities	4.21
Guaranteeing that the providers' acquired item and materials fit in with their details	4.01
Guaranteeing that their quality strategy is comprehended, executed and kept up	3.99
Upkeep of sufficient records of all investigations and tests performed	3.95
Guaranteeing that critical procedures are completed under controlled conditions	3.87
Keeping up strategies to control and check the plan of the item	3.85
Keeping up satisfactory measuring and testing gadgets for investigation and testing	3.80
Setting up and archiving their quality framework	3.63
Furnishing their workforce with a composed investigation and testing directions	3.49

The respondents assessed 30 factors for their significance in the determination of a key/recognized supplier. The main ten components and their average significance rating is given in Table 7.

Table 7. Top Ten Factors in the Selection of Key Suppliers

Supplier Selection Issue	Average Rating	Importance
Capacity to meet conveyance due dates	4.71	
Pledge to quality	4.65	
Cost of materials, parts and administrations	4.29	
Cost of materials, parts and administrations	4.25	
Fair and successive correspondences	4.13	
Industry knowledge	4.07	
Promise to persistent enhancement in item and process	4.03	
Ethical standards	4.01	
Financial stability and staying power	3.97	
Provider has vital significance to the firm	3.93	

Internal operations

81% of the respondents had particular written quality designs and policies, with 54% being ISO 9000 certified. Nine percent had ISO 14000 (Environmental Management Standards) confirmation. None of the respondents were utilizing process capacity list (Cpk) for quality confirmation. The normal significance evaluations of eight item outline and advancement issues for the respondents are appeared in Table 8. Clearly, the respondents are unconcerned with the most recent item plan and advancement procedures, including early supplier involvement.

Table 8. Average Rating of Product Design Issues

Product Design and Improvement Issue	Average Rating	Importance
Use of quick product development and introduction time	3.27	
Standardization of component parts (trying to use more standard parts)	3.15	
Early Supplier Involvement (in your firm's design efforts)	3.01	
Simplification of component parts (trying to use fewer parts)	2.79	
Use of Value Analysis/Value Engineering (deleting product parts and materials which don't add value to the product)	2.73	
Use of concurrent engineering (concurrent design of prod./process)	2.69	
The use of Quality Function Deployment (the House of Quality model)	2.49	
Modular design of parts (for use in multiple product applications)	2.43	

Table 9 shows the significance put by the respondents on in just-in-time standards. The supplier- related standards are consigned to the base of the rundown.

Table 9. Significance of Just-In-Time Values

JIT Principle	Average Rating	Importance
Lessening stock, which thus opens up capital venture	4.35	
Lessening setup time	3.69	
Expanding delivery frequencies	3.49	
Lessening lot estimate	3.41	
Preventive upkeep	3.39	
Decreasing stock to uncover assembling and booking issues	3.37	
Diminishing provider base	3.27	
Purchasing from JIT providers	3.11	

The more specialized quality confirmation strategies, for example, statistical process control and particular outline of the items are not utilized much by Bangladesh firms, as prove in Table 10.

Table 10. Significance of Quality Practices

Quality Practice	Average Rating	Importance
Process enhancement (alteration of process)	4.14	
Top management correspondence of value objectives to the association	4.07	
Planning quality into the item	4.01	
Accentuation on quality rather than cost in the provider choice process	3.87	
Representative preparing in quality management and control	3.85	
Strengthening of shop operators to redress quality issues	3.85	
Review	3.83	
Utilizing benchmark information	3.45	
Considering manufacturability and get together in item structure	3.31	
Factual process control	3.06	
Utilizing standard segment parts	3.03	
Disentangling the item	3.01	
Particular plan of segment parts	2.57	

With regards to their own relationship with clients, our respondents' significance rating of the best ten (out of 24) issues is as given in Table 11. Conventional ideas of conveyance, delivery, quality, and customer handling are given the top billing.

Table 11. Significance of Top Ten Customer Service Issues

Customer Service Issue	Average Rating	Importance
The association's capacity to meet delivery due dates	4.81	
Nature of the items and services	4.73	
Fruitful goals of client objections	4.53	
Legitimate and frequent interchanges	4.41	
Being adaptable to meet the clients' changing necessities	4.34	
The firm's moral models	4.31	
Making it simpler for clients to look for help	4.27	
Assurance of future client desires	4.13	
Seeing how the clients utilize items and services	4.08	
Utilizing routine follow-up methodology for client request or dissensions	4.01	

Table 12 displays the five client service issues apparent as the slightest essential by the respondents. The thoughts in this rundown are regularly unequivocally supported by SCM intellectuals, yet unmistakably, they have not gotten a thoughtful hearing in Bangladesh.

Table 12. Least Important Customer Service Issues

Customer Service Issue	Average Rating	Importance
ISO 9000 confirmation	2.47	
The association's geographical proximity to possess provider's office	2.69	
Utilization of Electronic Data Interchange (EDI) correspondences	2.75	
Sharing of classified data	2.81	
Going into long term contract arrangements	3.35	

CONCLUSION

The extent of the respondents in our overview declaring to practice some type of SCM was very high (85%), mostly, it appears, with a view to enhancing time delivery. Data imparting to the suppliers, relocating nearer to providers/clients, or including all individuals from own firm's SC in item/benefit/promoting plans does not appear to be high on the motivation. As could be normal, the geological isolation of Bangladesh is viewed as the greatest barrier to SCM implementation.

About half portion of the respondents revealed utilizing outsourcing, strategic alliance with providers, or supplier certification programs. Measurable quality control isn't practiced particularly by the respondents, and is certifiably not a high prerequisite for the suppliers. In choosing suppliers, delivery and quality were high on the rundown of criteria, yet their eagerness or capacity to take after SCM practices were not high on the rundown. The different SC parts like suppliers, manufacturers, warehouses and stores ought to be coordinated in a solitary framework, which makes SCM more compelling. The group engaged with the operational side on taking care of the SC ought to be exceptionally prepared in SCM work. The visibility should be enhanced if supply can't be straight forwardly controlled. The coordinated effort with local partners, over the business and with universities is urgent to effectively overseeing social duty in supply chains. This segment should keep in a circumstance of political steadiness and a harmonious business condition. Political unrest and the unsettling influence are terrible for this sort of enterprises. Along these lines, Proper advances ought to be taken by the legislature to keep this part free from any sorts of aggravation. It is likewise important to enhance the customer relationship and organizational environment however it is giving great association condition.

It shows up from this review Bangladesh manufacturers are following a large number of the SCM ideas, predominantly where it impacts the capacity to meet delivery dates. In any case, there has not been much advancement with regards to further developed thoughts, for example SC teams, or information sharing, or use of EDI and so on.

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