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Table of Contents

Analysis of TRMM Precipitation Radar.....	1
Munya F. Al-Zuhairi, Kais J. AL-Jumaily, Ali M. AL-Salihi.....	1
Biotechnological Approaches for Conservation of Rare, Endangered and Threatened Plants.....	10
Rakesh Singh Chauhan.....	10
Correlation of ureteric jet characteristics with the degree of hydro-nephrosis and serum creatinine.....	15
AUB Pethiyagoda, K Pethiyagoda.....	15
Impact of Domestic Violence on Nursing Collegians Behavior.....	19
Mansour Abdullah Falah.....	19
Risk Factors of Infertility Among Young Women at Al-Najaf City.....	21
Abeer Miri Abdullah, Shukriya Shadhan Chyad Al- Ogaili.....	21
Assessment of Mother's Knowledge toward Breastfeeding at AL-Najaf City.....	31
Noora Farhan Hassan AL-Abedi, Dr. Kafi Mohammed Nasir Al-Asadi.....	31
A Conceptual Model for E-Government Success Factors in Developing Countries.....	39
Anas Ghassan Kanaan, Shahizan Bin Hassan, Arfan Shahzad.....	39
On total regularity of the join of two interval valued fuzzy graphs.....	45
Souriar Sebastian and Ann Mary Philip.....	45
Effect of Macroeconomic Indicators toward Government Bonds Price in the Secondary Market.....	56
Miftahul Masyhuri, Muhammad Firdaus, Tubagus Nur Ahmad Maulana.....	56
Frequentist Comparison of the Bayesian Credible and Maximum Likelihood Confidence interval for the Median of the Lognormal Distribution for the Censored Data.....	61
Juliet Gratia D’Cunha, K. Aruna Rao.....	61
Sorption Characteristics of Polished Rice in a Fluidized Bed.....	67
Kariyawasam H.K.P.P., Amaratunga K.S.P., Bandara D.M.S.P., Dissanayake T.M.R.....	67
Microcontroller Based Remote Bill Board Control with SMS Access.....	73
Prof C.Cokezie , Prof H.C Inyama, Engr. Lotanna Onuchukwu.....	73
Complex Dielectric Behavior of Soil from Nasik Region at X-Band Microwave Frequency.....	77
M.D.Dhiware, S. B. Nahire, Sushant Deshmukh.....	77
Multicultural Education towards Harmonious Life and Avoided Social Conflict Society of Makassar City.....	90
Iskandar.....	90

MERIT SYSTEM IMPLEMENTATION IN THE RECRUITMENT OF CIVIL SERVANTS ECHELON II AND ECHELON III GOVERNMENT OF PAPUA.....	95
Yan Hendrik Bonsafia, Sangkala, Asang Sulaiman, Baharuddin.....	95
QUALITY OF HEALTH CARE PATIENT SATISFACTION IN HEALTH-KASSI KASSI IN MAKASSAR.....	105
Dynastin Since Pakita,Zulkarnain Umar.....	105
STUDY TANGIBLES ASPECTS OF THE QUALITY CERTIFICATE OF LAND TITLE LAND DISTRICT OFFICE AND KEEROM REGENCY JAYAPURA PAPUA.....	109
Hiskia C.M. Sapioper, Sulaiman Asang, Baharuddin, Muhammad Yunus.....	109
SHADES OF MYSTICISM IN TRADITION RELIGIOUS CEREMONY.....	118
Mashadi, Yamin Sani, Supriadi Hamdat, Basir Said.....	118
Non patentability Inventions under the Patent Act, 1970 – An analysis.....	124
Nirmal Singh Heera ., M.A., M.L., N. Prabhavathi ., M.L.....	124
“Keongan” Ventilation Roof on Local Houses in Semarang City Indonesia.....	130
Sukawi, Agung Dwiyanto, Suzanna Ratih Sari, Gagoek Hardiman.....	130
Role of Depositories in Indian Capital Market – A Comparative Study between NSDL and CDSL.....	135
Mr.B.Hari Babu, Prof.B.K.Surya Prakasha Rao, Dr.B.Srinivasa Rao.....	135
Sunlight- mediated synthesis of silver and gold nanoparticles using Active Manuka Honey 20+ UMF against wound infection causing bacteria.....	142
Meenakshi Choudhary, Dr. (Prof.) O. P. Jangir.....	142
Workplace Design and Job Performance: A Study of Operational Level Employees in the Apparel Industry of Sri Lanka.....	148
M.V.S. Mendis.....	148
Cytological evaluation of thyroid swellings in tribal population of Jharkhand.....	154
Shailendra Nath Paul, Anjana Kumari, Saket Kumar.....	154
Study of the Impact on Morphological Features of <i>Abelmoschus esculentus</i> var. Ankur 41, irrigated by the Waste Water from Amanishah Nallah, Sanganer Town, Jaipur, Rajasthan.....	159
Chetna Pradhan; Dr. Surendra Singh Chauhan.....	159
Contribution of Umwalimu Savings and Credit Cooperative (Umwalimu Sacco) On Socio –Economic Development of Teachers in Rwanda.....	167
Aimé Muyombano and Mbabazi Mbabazize.....	167
Can virtual space become the Zone of Proximal Development ? Online architecture optimization of ES courses through Learning Analytics.....	181
Professor. Rohini Chandrica Widyalandara.....	181

Impact of Uncontrolled Asthmatic Disease upon Functional Performance of Patients at Respiratory and Allergy Care Centers in Baghdad City.....	194
Mohammed Shaboot Hawal, Dr. Suad Jassim Mohammed.....	194
Production of Biogas Fuel from Alcohol Distillery Plant.....	202
M. Ravi Kumar, Ermias Girma Aklilu.....	202
Musculo-skeletal Problems of Women Weavers in Handloom Industry of Lakhimpur District, Assam.....	207
GeetashreeBori.....	207
Photophysical Investigation of Coumarin – A Study of the Effect of Substituents in Fluorescence.....	212
S.Bakkialakshmi, M. Shakthi & K.B.Renuga Devi.....	212
Coping Strategies of the Small-Scale Fishing Communities in the Midst of Marine Protective Policies in the Lake Victoria: The Power of Agency in Creating Own Life Trajectories.....	215
Nelson M. Ishengoma.....	215
A Critique on the Ban on Romantic Relationships between Academic Staff and Students in the Higher Learning Institutions.....	227
Nelson M. Ishengoma.....	227
Kinetics of oxidation of o-toluidine by potassium dichromate.....	234
Ritu Singh.....	234
Strategic policy of the Government of Indonesia In the Field of Maritime and Fisheries Affairs.....	238
Abd. Asis, Muhadar, Slamet Sampurno S, Amir Ilyas, Kadarudin.....	238
The Impact of Job Characteristics and Role Stressors on Cyberloafing: The Case of Pakistan.....	244
Madiha Arshad, Muhammad Aftab, Hifza Bukhari.....	244
An Insight into Naipaul’s Africa in A Bend in the River.....	253
Dr. NEETA PANDEY.....	253
Re – Thinking Pastoral Resource Conflict Persistence Through the Lens of Marginalization: The Case of the Pokot and Karamojong Since 1894.....	256
Jacob Adipo Ogalo, Dr. Carrey Francis Onyango.....	256
ICP determination of Pb,Mn, Cu, Zn,Fe, K, Na, P, Mgand Cain edible wild mushroom.....	266
L. K. Dospatliev, M. T. Ivanova.....	266
Constructing a mean-variance portfolio of four assets.....	270
M. T. Ivanova.....	270
Quaternions and Rotation Sequences.....	279
M. T. Ivanova.....	279
Using Agile Methodology in Data Warehouse.....	282
Rahul Gupta.....	282

Maintaining Data Quality in Data Warehouse.....	283
Rahul Gupta.....	283
Calliandracalythorsus leaves as tanniferous fodder for ruminant animals.....	286
Muhammad Rusdy.....	286
Yield of Oyster Mushroom (Pleurotus Ostreatus) Influenced by Different Sawdust Substrate.....	291
Prince Biswas, Arif Ahmad, Kamal Uddin Ahmed, Md. Abir Hossain, Md. Amir Hamja, Mominul Haque Rabin.....	291
Measuring Copywriting Impact on Brand Identification.....	297
Saima Akhter, Kamran Khan, Syed Karamatullah Hussainy, Eesar Khan.....	297
Nano Carbon Filled Polyester Gradient Composites and their dc conductivity studies.....	305
Archana Nigrawal, Arun Kumar Sharma and Ekta Agarwal.....	305
Analysis of Fundamental and Technical Factors to Stock Price on Residential Property Sector Companies Listed in Indonesia Stock Exchange.....	315
AisyahHusnaZulkarnaen, Muhammad Syamsun, Tb Nur Ahmad Maulana.....	315
“Positive Living” among women infected with HIV.....	320
Prof.N.Meenakumari, Dr.C.Susila RN.RM.....	320
Chemical composition of Camel Fore-Stomach Digesta (FSD) ensiled with urea and graded levels of Rice milling Waste (RMW).....	328
Aishatu Aliyu Kwaido, Aminu Nasiru, Third Author.....	328
Evaluation of Phytotoxicity of Mung Bean genotypes against Salinity Stress.....	333
Sen, S.K, Jha, S, Mandal, P.....	333
Finite element analysis of beam having crack at various locations.....	341
C.Ramachandran, Dr.R.Ponnudurai.....	341
Use of Creative Models and Presentation to Encounter the Problems While Studying Chemistry in Diploma College.....	347
Priya Radhakrishnan Pillai.....	347
Contamination of Arsenic In Relation to Soil Properties of Mymensingh and Chuadanga Districts.....	350
Arif Ahmad, Abu Rayhan Siddique, Dr. Mohosin Ali, Mominul Haque Robin, Prof Dr. Md. Aslam Ali, Prof Dr. M. A. Sattar.....	350
An algorithm for MAX2SAT.....	360
Cristian Dumitrescu.....	360
Quality of Health Care Services Provided for Patients with Burn in AL-Sadder Medical City at Burn Unit in AL-Najaf AL-Ashraf City.....	365
ZahraaAbdullAbbassTaher Al- Khafajy, Dergham M. Hameed.....	365

Factors Affecting Organizational and Professional Commitments of Internal Auditors.....	375
Bayu Triastoto, Syamsul Ma'arif, Sadikin Kuswanto.....	375
Response of GA3 tomorphological characteristics of tuberoseincorporated with organic manures.....	384
Salma Sultana, Md. Ruhul Amin, Md. Ismail Hossain and Md. Dulal Sarkar.....	384
Importance of cultural tourism in the core area of Chowk, Lucknow.....	389
Arun Kapur, Dr. Rekha Jain.....	389
Automatic Interesting Object Extraction from Images based on Edge Information and Texture Analysis.....	395
Adiljon Djurayev , Guzal Primova.....	395
Determinants of Poverty Among Internally Displaced People in Puntland.....	400
Mohamed Abdulkadir Yousuf, Dr: Hellen K. Mberia.....	400
Investigation of Strain energy release rate and Stress intensity factors in Slant edge pre-cracked Aluminium Plate.....	404
Mr.R.Karthikraja, Dr.R.Ponnudurai.....	404
A performance study of Vapour compression refrigeration system using ZrO2 Nano particle with R134a and R152a.....	410
V.P.SURESH KUMAR, A. BASKARAN, K. MANIKANDAN SUBARAMANIAN.....	410
Performance Status of Public Elementary and Secondary Schools in the District of San Simon, Pampanga: An Analysis.....	422
Dr. Elmer L. Meneses.....	422
Assessment of Arsenic Contamination in Relation to Soil Properties of Kustia and Rangpur Districts.....	430
Arif Ahmad, Abu Rayhan Siddique, Prince Biswas, Mominul Haque Robin, Prof Dr. Md. Aslam Ali, Prof Dr. M. A. Sattar.....	430
Rural Infrastructural Investment and Rice Production in Pakistan.....	436
Mary Kashif, Samreen Munnawar.....	436
Physico-chemical Characteristics of Three Mango (Mangifera indica L.) Cultivars in Central Sudan.....	447
Rasha A. Siddig, Mohamed S. Osman, Arafat M. Goj and Elfatih A., M. Elsiddig.....	447
Impact of Dietary Habits Upon Nutrition-related Factors of Secondary Schools Female Students at AL- Rusafa District in Baghdad City.....	452
Sarah K. Eraby, Hala S. Abdul-Wahahid.....	452
Quality of life for Patients with Cholelithiasis in Baghdad Teaching Hospitals.....	459
Mohammed J. Swayeh AL Aqeeli, Halema Yousif Kadhim.....	459
Home Automation System Using Android Application.....	467
Saptarshi Bhowmik, Sudipa Biswas, Karan Vishwakarma, Subhankar Chatteraj, Parami Roy.....	467

Use of Artificial Intelligence to save energy.....	471
Suyash Malthankar.....	471
Historical Bankline Shifting Since 1760s: A GIS and Remote Sensing Based Case Study of Meghna River Plate of Rennell’s Atlas.....	473
Md. Rejaun Nabi, Dr. Md. Shahedur Rashid, Mohammad Ismail Hossain.....	473
Evaluation of the maintenance and operational dependability of small hydropower plant.....	484
Miroslav Spano, Jaromir Riha, Ales Drab.....	484
Association between Type of Delivery and Newborn Apgar Score Results.....	490
Mohammed Baqer Hassan.....	490
REMOVAL OF METHYLENE BLUE DYE FROM AQUEOUS SOLUTION BY ADSORPTION USING LOW COST ADSORBENT OBTAINED FROM centella asiatica LEAVES.....	503
S.NIRMALA, A.PASUPATHY, M.RAJA.....	503
REMOVAL OF RHODAMINE B DYE FROM AQUEOUS SOLUTION BY ADSORPTION USING LOW COST ADSORBENT OBTAINED FROM Centella asiatica LEAVES.....	508
S.NIRMALA, A.PASUPATHY, M.RAJA.....	508
Impact of Technology on Employee Relations.....	514
Vipul Bali, Vishrut Bali, Riya Choudhary.....	514
An Assessment on the Effects of Power Culture on Service Delivery among the Employees of Eldoret Water and Sanitation Company, Kenya.....	518
Robert Onyango, Benedict Otieno, Joan Bii, Joseph Otieno.....	518
A New Multi Kernel Hybrid Support Vector Machine Data Classification Algorithm.....	525
R.Anusha, Dr.(Mrs) N.Rama.....	525
Conspectus of Ethno-medicinally novel plant species of Breng valley in Kashmir Himalaya, India.....	528
Nadeem Salam, Ayaz Bashir, Mohd Shafi Parrey.....	528

Analysis of TRMM Precipitation Radar Measurements over Iraq

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Abstract- ‘Tropical Rainfall Measuring Mission’ (TRMM) satellite was launched in 1997 as a joint mission between the National Aeronautics and Space Administration (NASA) and the Japan Aerospace Exploration Agency (JAXA) to gather rain statistics across the tropics. To date, TRMM has produced a nearly continuous tropical rainfall dataset utilizing several onboard instruments including the TRMM Precipitation Radar (PR), a first-of-its-kind space borne Ku-band (13.8 GHz) meteorological radar based on phased array technology. The aim of this research is to analyze PR measurements over Iraq. Data were downloaded from the University of Utah site of TRMM measurements. Analysis of monthly means of precipitation measurements over Iraq for the period 1998-2011. The results showed that most precipitation falls over Iraq during winter season and it is characterized by very light to light rain and mostly falls over north part of the country. The highest area of precipitation happens during the months of April. The results also indicated that the variations and activities precipitation occur mostly during afternoon and evening times. The vertical structure for diurnal variation showed that the highest contribution of the 20 dBz reflectivity occurred in altitudes between 0.5 and 5 km while for seasonal variation the maximum contribution occurred in altitude from 1.5 to 5 km during rainy season over the zone. The vertical structure for 40 dBz reflectivity showed the maximum contribution for diurnal variation occurred in altitude between 1.5 and 2.5 km for most times of the day, and for the seasonal variation, the month of April showed the highest contribution of 40 dBz reflectivity and occurred in altitude between 1.5 and 3.5 km over the zone.

Index Terms- TRMM, Precipitation, Radar, Iraq.

I. INTRODUCTION

Rainfall comprise the main source of water for the terrestrial hydrological processes, exact measurement and prediction of the spatial and temporal distribution of rainfall is a basic goal in hydrology [1]. Rainfall is measured using rain gages, radar and satellites. The rain gauge networks and ground-based weather radar are covered a limited places and are available only over land. Radar covered areas are larger than when rain gauge covered it, the maximum range of radars coverage is about 300 km. Only satellite instruments are able to make rainfall measurements over remote areas of land or water where data is difficult or impossible to collect [1]. The use of satellite-derived products to estimate precipitation over land is important for monitoring the spatial and temporal distributions of precipitation [2]. The Tropical Rainfall Measuring Mission (TRMM) was launched in November 1997 to understand the global water cycle and for investigation of atmospheric convective systems, cyclonic storms and precipitation processes by observing from space over tropical and subtropical regions [2]. TRMM is the first satellite including the first radar designed specifically for rainfall monitoring to operate from space [3]. There are several researchers are interested with studies and researches about precipitation by using TRMM PR data. Schumacher (2000) [4] explored limitations in the sensitivity and sampling of the TRMM precipitation radar (PR) in tropics. The results showed the regions with very high monthly rainfall have a larger stratiform component and occur at less than maximum sea surface temperature (SST). De Marchi (2006) [5] used methodology for estimating precipitation using information from the satellite-borne precipitation radar of TRMM for Lake Victoria for period 1996-1998. This study showed that precipitation estimate exhibit much lower bias and better correlation with ground data than commonly used methods. Fenta (2010) [6] assess the diurnal cycle of rainfall using TRMM satellite observations, validated TRMM estimates using ground observations and evaluated the spatial pattern of rainfall over Guiana and Blue Nile basin. She found that TRMM estimates showed significant correlation with the ground observations and the spatial pattern showed varying diurnal cycle owing to the high topographic variability of the basin. Prasetia (2010) [7] evaluated the validation and accuracy of prediction of monthly rainfall over

Indonesia based on TRMM PR data. The results showed good agreement of satellite data with rain gauge data on monthly average rainfall. Takahashi et al. (2010) [8] study the diurnal cycle of rainfall during the summer monsoon around the Indochina peninsula by using TRMM PR. They found that nearly half of the total rainfall occurred in the early morning rainfall which indicated that early morning rainfall significantly contributes to the climatological rainfall pattern. Hamada et al. (2014) [9] studied characteristics and global distribution of regional extreme rainfall for 12 years of the TRMM PR measurements. They found good correlations for extreme rainfall rates with corresponding rain-top heights and event sizes over oceans but marginal or no correlation over land. Rapp et al. (2014) [10] analyzed TRMM PR features to understand the role of storm characteristics on the seasonal and diurnal cycles in Costa Rica. They found that the relative importance of convective precipitation increases on the Caribbean side during wintertime cold air surges, but for the coastal Caribbean domain, most regions showed a strong diurnal cycle with an afternoon peak in convection followed by an evening increase in stratiform rain. Yang and Nesbitt (2014) [11] revealed the statistical properties of tropics-subtropics precipitation for 13 years of TRMM PR measurements. They showed that the contributions from large rain intensity events are very important in total precipitation, especially over land. In addition, the results showed that the statistical properties of precipitation could be utilized as a baseline in the assessment of precipitation from operational numerical weather prediction and climate models.

II. MATERIALS AND METHOD

a) Study area

Iraq lies in the world's dry belt. It is bounded between 29°5' to 37°15' N latitudes and 38°45' to 48°45' E longitude. Iraq is a country in Western Asia spanning most of the northwestern end of the Zagros mountain range, the eastern part of the Syrian Desert and the northern part of the Arabian Desert. Most of rainfall occurs over the northern part of Iraq while central and southern parts of the country receive low rainfall. Rain falls in October to May but roughly 90 percent of the annual rainfall occurs between November and April, most of it in the winter months from December through March. The remaining six months, particularly the hottest ones of June, July, and August, are dry. Except in the north and northeast, mean annual rainfall ranges between ten and seventeen centimeters. Thunderstorms sometimes accompany the rain, particularly in the spring and they are frequently evening events. Rainfall over Iraq is mainly produced by the depressions travelling from north of Africa and south and east of Mediterranean Sea across the Middle East and southwest of Asia during winter and spring. Sudanese low-pressure thermal systems, which originate from the Red Sea, sometimes combine with Mediterranean troughs in cold seasons, and absorbing more humidity from the Red Sea, and when they reach the south of Iraq they result in heavy rainfalls.

b) Data and Methodology

The Tropical Rainfall Measuring Mission (TRMM) is a joint effort of the National Aeronautics and Space Administration (NASA) of the United States and the Japan Aerospace Exploration Agency (JAXA) of Japan to understand the global water cycle and for investigation of atmospheric convective systems, cyclonic storms and precipitation processes by observing from space over tropical and subtropical regions [2]. Among many observing instruments, TRMM satellite borne a Ku band radar (13.8 GHz). The TRMM precipitation radar (PR) is the first spaceborne rain radar and the only instrument on TRMM that can directly observe vertical distributions of rain. The data used in this study was downloaded from University of Utah TRMM database for a zone bounded by longitude 38-50°E and latitude 28-36°N. The data set covers the period from 1998 to 2011. The domain of Utah TRMM database is 36°S – 36°N and -180° – 180°. Data extracted include monthly and annual means of precipitation, precipitation area, radar echo top, and precipitation contribution from 20, 30, and 40 dBz radar reflectivity.

III. RESULTS AND DISCUSSION

Figure 1 shows the diurnal distribution of precipitation over the zone. The left side plot illustrates precipitation area, and the right side plot gives radar echo top. It is clear that precipitation between 0.5 and 1.8 mm/hr occupied relatively larger areas (between 104 -105 km²) than areas of smaller amount of precipitation. This is an indication that the majority of precipitation over the zone is between 0.5 to 1.8 mm/hr. The right side plot indicates that the precipitation radar echo top ranging between 6-12 km for almost the same range of precipitation (0.5-1.8 mm/hr). The radar echo top in the afternoon and evening times is higher than that during other times of the day, this is expected since strong convection usually occurs in the afternoon over the zone under consideration.

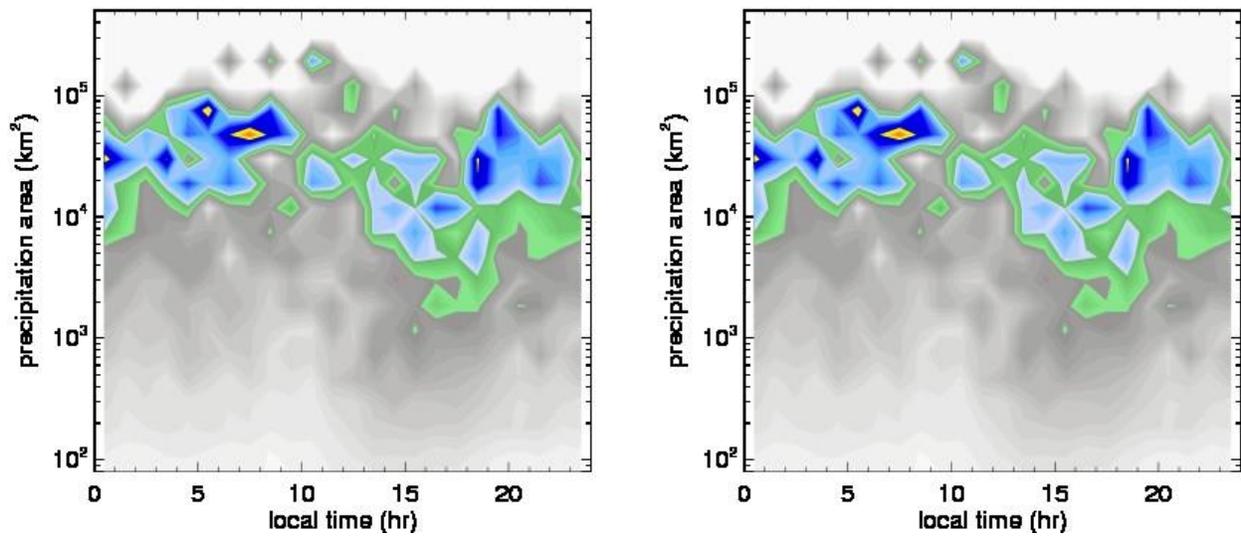


Figure 1. Distribution of hourly precipitation (mm/hr). Left plot represents precipitation area (km²), Right plot represents radar echo top (km) over zone of Lon 38-50oE, Lat 28-36oN for period 1998-2011.

Figure 2 illustrates the seasonal distribution of precipitation over the zone. It is obvious that the precipitation occurred over Iraq concentrated in north, and east parts of the country. The amount of precipitation during winter season (Dec to Feb) is more than that during other seasons. The maximum amount of precipitation over Iraq was 224 mm/season in the north eastern part of the country. The maximum value of precipitation occurred in the spring season (Mar to May) over Iraq is located in the north eastern part. Summer season (Jun-Aug) has no precipitation activities over the zone. Autumn season (Sep-Nov) is characterized by an amount of precipitation less than 100 mm/season in the north and eastern part of Iraq. An area near the northern border of Iraq with Iran may receive more than 100 mm/season precipitation.

Figure 3 shows the monthly distribution of precipitation, left side plot indicates the precipitation area and the right side plot indicates the radar echo top over the zone. The left side plot illustrates that the area of more than 1 mm/month is between 103-105 km² during the rainy season over the zone (Oct-May). It is clear that more than 5 mm/month occurred during the month of Apr. The right side plot shows that the radar echo top of more than 1 mm/month precipitation is between 4-12 km and occurs during the rainy season. The highest echo top occurred in the months of Feb and Apr due to the strong convection during these months. In addition, it is notable that in both of plots there was no precipitation activities during the months of Jun to Sep.

Figure 4 gives the distribution of annual hourly precipitation over the zone. It is seen that higher intensity of precipitation occurs in the northern, and eastern regions of Iraq during all times of the day. It is notable that the times of 6-9, 12-15, 15-18, and 18-21 hr have intensity of precipitation more than the other times and the maximum value of precipitation was approximately 5 mm/day occurred in time of 15-18 hr in the north of Iraq.

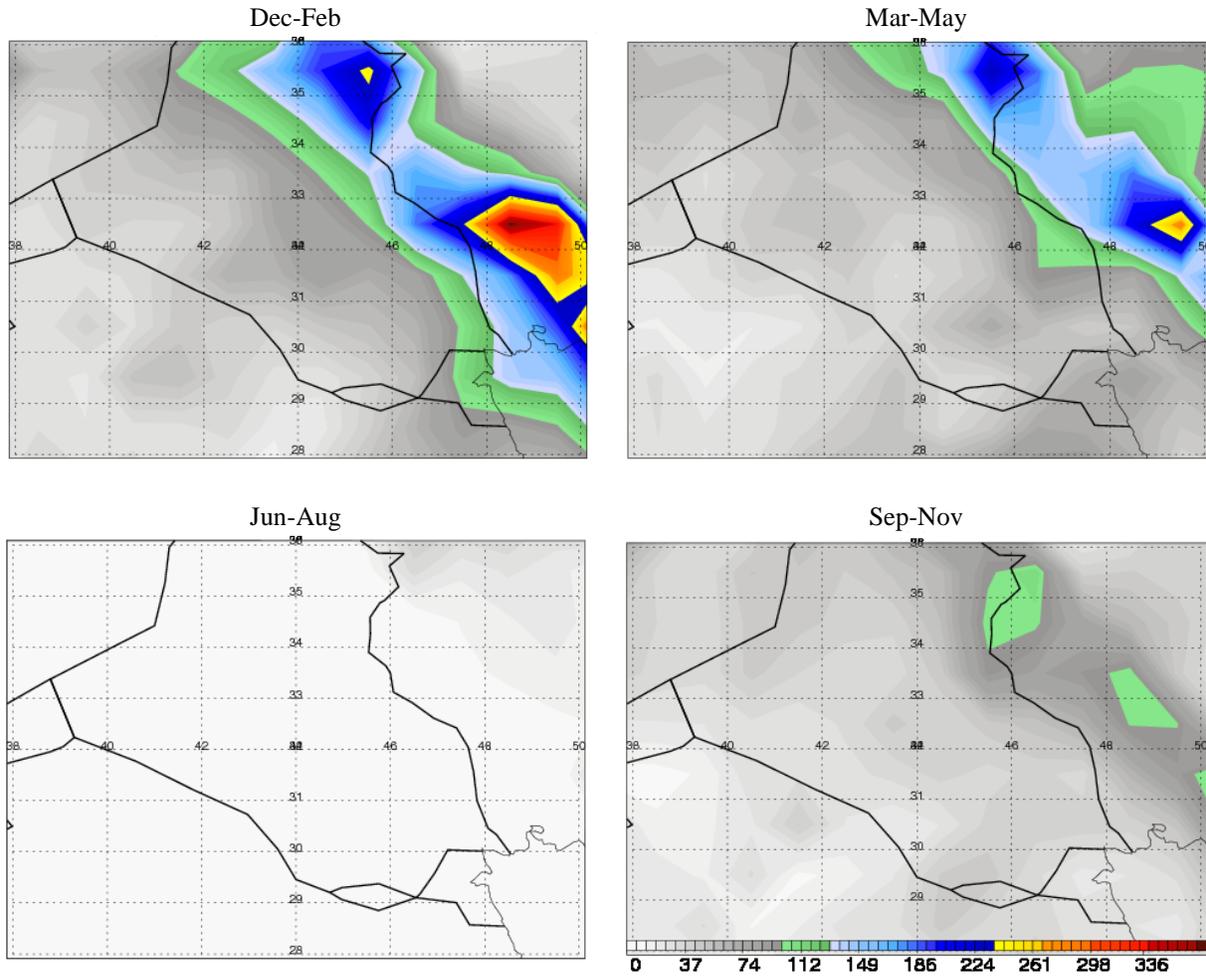


Figure 2. Seasonal distribution of precipitation (mm/season) over zone of Lon 38-50°E, Lat 28-36°N for period 1998-2011.

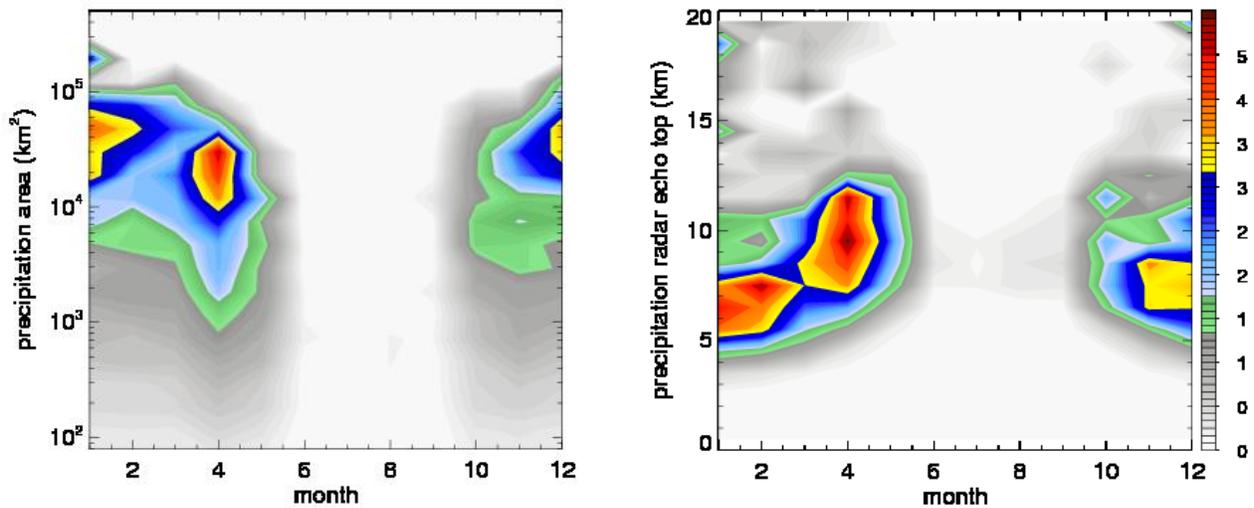


Figure 3. Distribution of monthly precipitation (mm/month). Left plot represents precipitation area (km²), Right plot represents radar echo top (km) over zone of Lon 38-50°E, Lat 28-36°N for period 1998-2011.

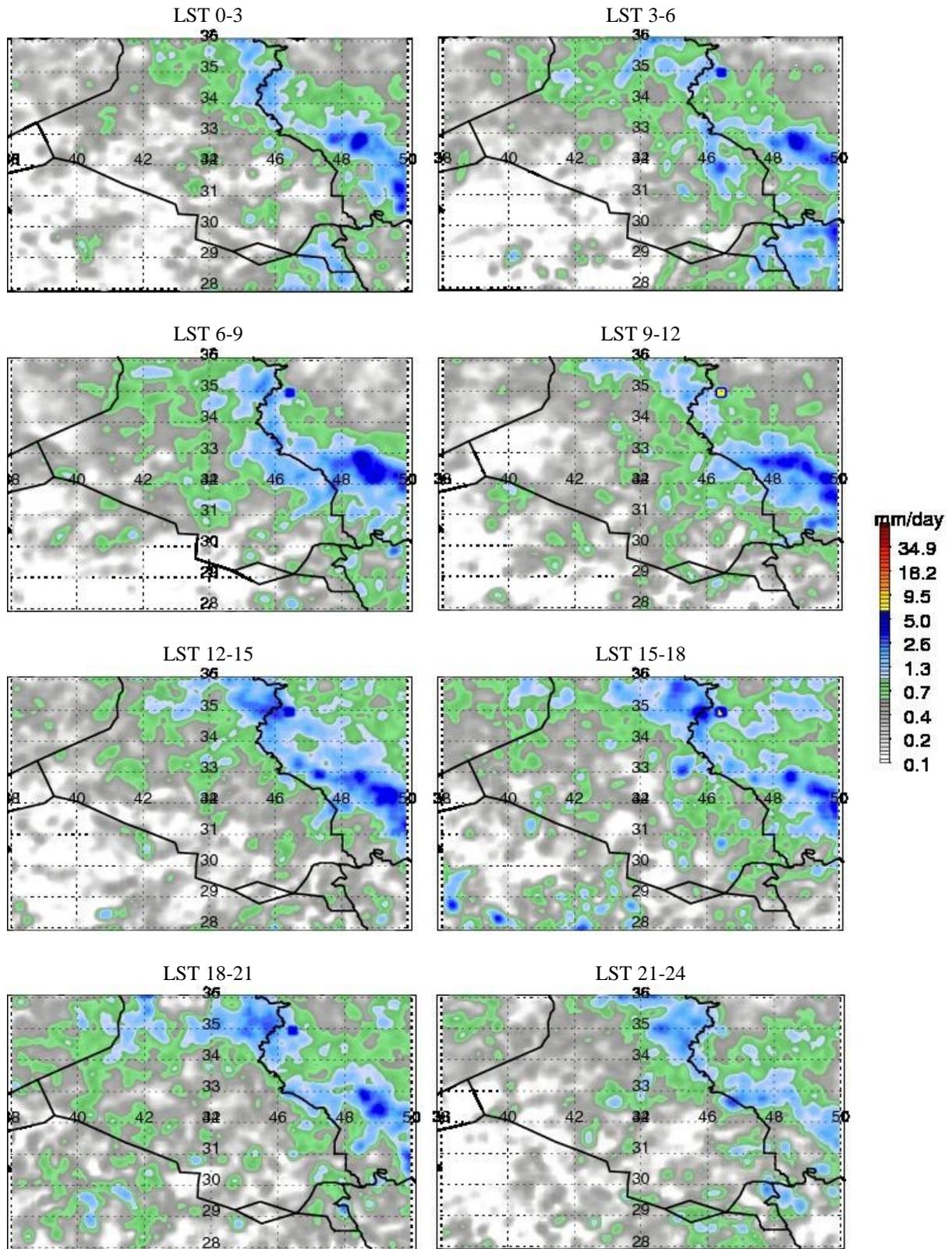


Figure 4. Annual hourly distribution of precipitation mm/day over zone of Lon 38- 50°E, Lat 28-36°N for period 1998-2011.

Figure 5, and 6 illustrate the annual diurnal and seasonal variations of precipitation over the zone. Figure 5 shows that the behavior of diurnal variation of precipitation distribution. It is seen that the lowest precipitation, less than 7 mm/year occurs in the times 2-3 and 9-10 LTC while highest precipitation, more than 10 mm/year, occurs in the times 15-16 and 18-19 LTC and less than 9 mm/year occurs during other times of the day. Figure 6 indicates that the major contribution of annual precipitation, more than 30 mm/month, comes from the storms occurring during the months of Dec, Jan, Mar, and Apr. It is also seen than months of Jun to Sep are characterized by almost close to 0 mm/month.

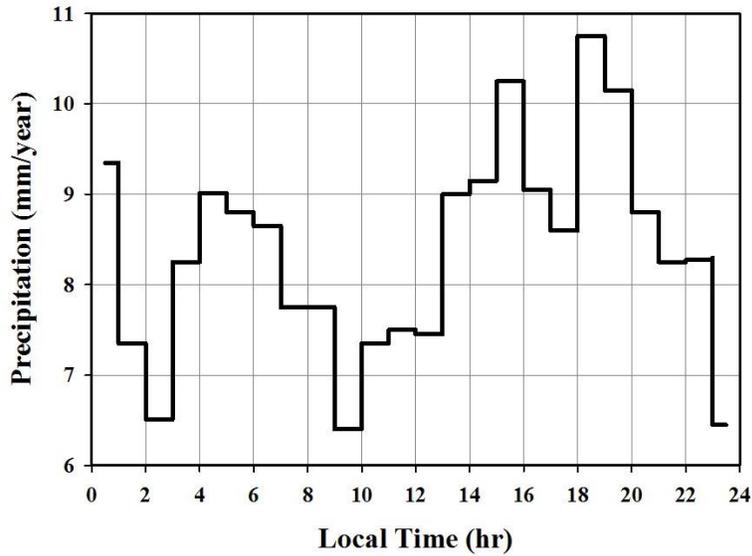


Figure 5. Annual diurnal variations of precipitation (mm/year) over zone of Lon 38-50oE, Lat 28-36oN for period 1998-2011.

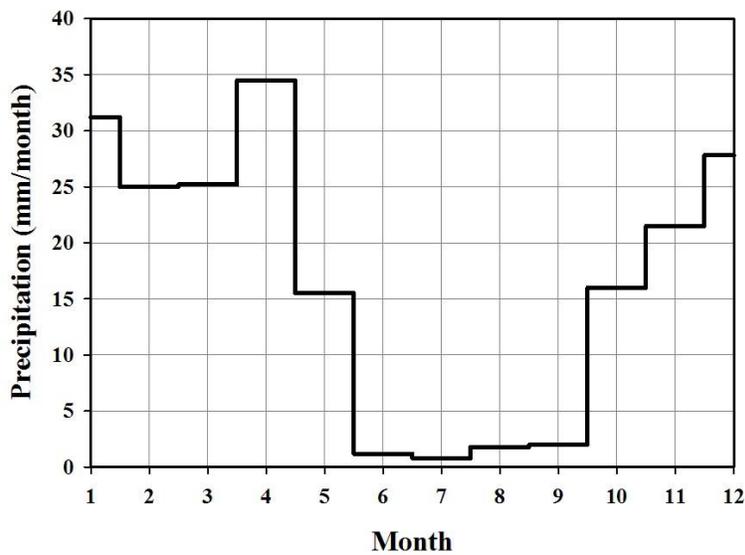


Figure 6. Annual seasonal variations of precipitation (mm/month) over zone of Lon 38-50oE, Lat 28-36oN for period 1998-2011.

Figure 7 displays the mean annual distribution of precipitation over the zone. It is clear that the north part of Iraq and a strip along the eastern borders with Iran receives larger annual precipitation, more than 400 mm. The annual precipitation is gradually decreasing as one goes from north and north-east towards west and south-west areas, i.e. moving from mountains areas towards desert areas. Deserts are caused by the shortage of rain. It is seen that the maximum value of precipitation, more than 583 mm/year occurs over two distinct areas, one in the north-eastern part of Iraq just near the city of Sulymaniyah and the other area in Iran just close to the Iranian city of Kerminsha.

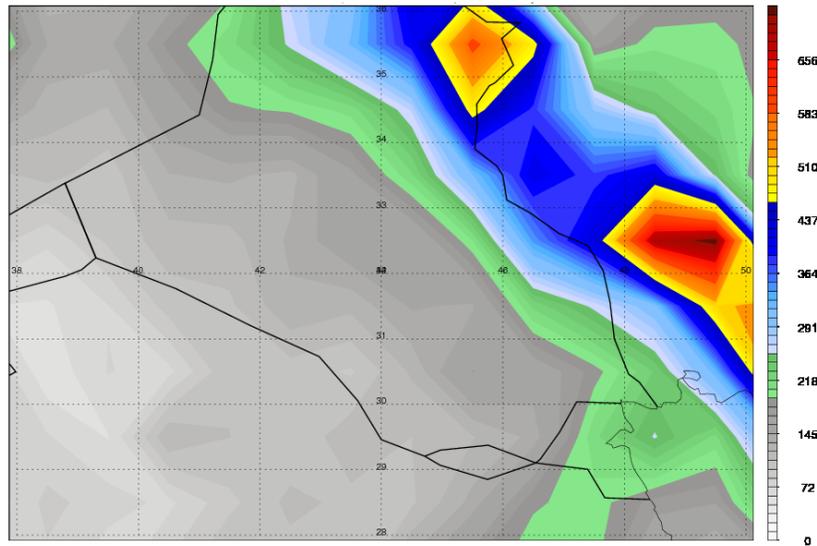


Figure 7. Mean annual distribution of precipitation (mm/year) over zone of Lon 38-50oE, Lat 28-36oN for period 1998-2011.

Figure 8 gives the diurnal (left diagram), and seasonal (right diagram) variations of 20 dBz precipitation reflectivity fractional occurrences for different altitudes over the zone. It is clear that for all times of the day and for altitudes between 0.5 and 5 km, the highest contribution of the 20 dBz reflectivity lays between 1 to 2% and outside these altitudes, the contribution is less than 1%. For the seasonal variations, it is obvious that the maximum contribution of precipitation 20 dBz reflectivity was more than 2% in the altitudes from 1.5 to 5 km during the months from Oct to May, while the other months the contribution 20 dBz reflectivity less than 0.4%. It is also noted that the 20 dBz contribute by less than 0.1% at altitudes higher than 10 km.

Figure 9 reflects the diurnal, and seasonal variations of precipitation 40 dBz reflectivity fractional occurrences for different altitudes over the zone. It is seen that the maximum value of precipitation 40 dBz reflectivity contribution was 0.04% and laid in altitudes between 1.5 and 2.5 km from most times of the day. During the time 15 to 20 LTC the contribution extends to 3.5 km. Just above and below this layer the contribution of the 40 dBz reflectivity is about 0.01%. Above 5 km height, the contribution decreases with increasing height. The seasonal variation of the contribution of precipitation 40 dBz reflectivity. It is clear that the contribution of 40 dBz was about 0.04 within a layer of 1.5 to 2.5 km during rainy season. It is notable that contribution in Apr is relatively higher than that during other months and the layer extends to 3.5 km. During the months from June to Sep the contribution of 40 dBz reflectivity is less than 0.01%.

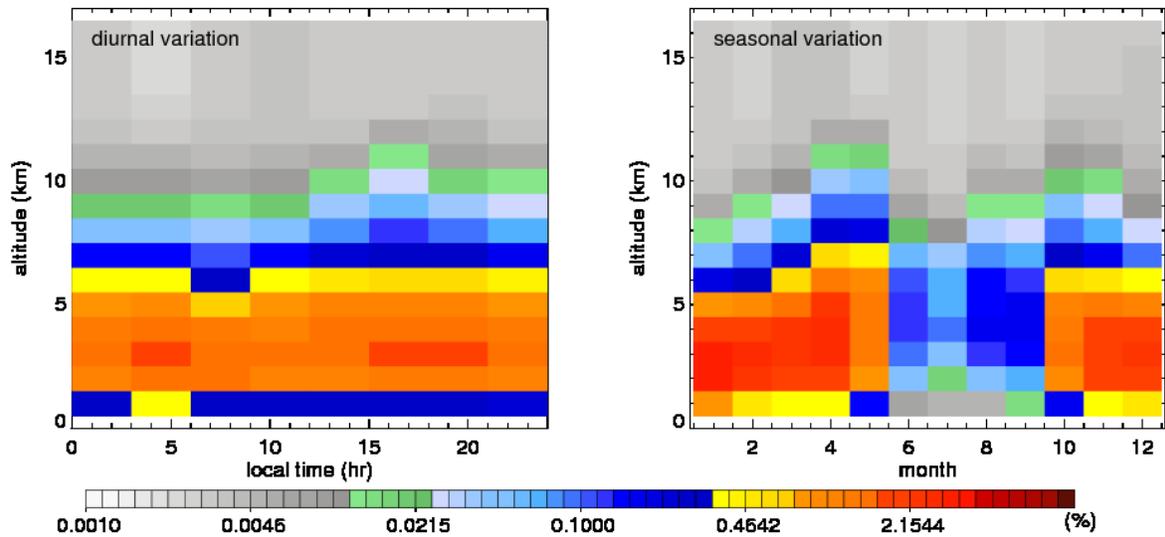


Figure 8. Diurnal and seasonal variations of precipitation reflectivity contribution 20 dBz at different latitudes over zone of Lon 38-50oE, Lat 28-36oN for period 1998-2011.

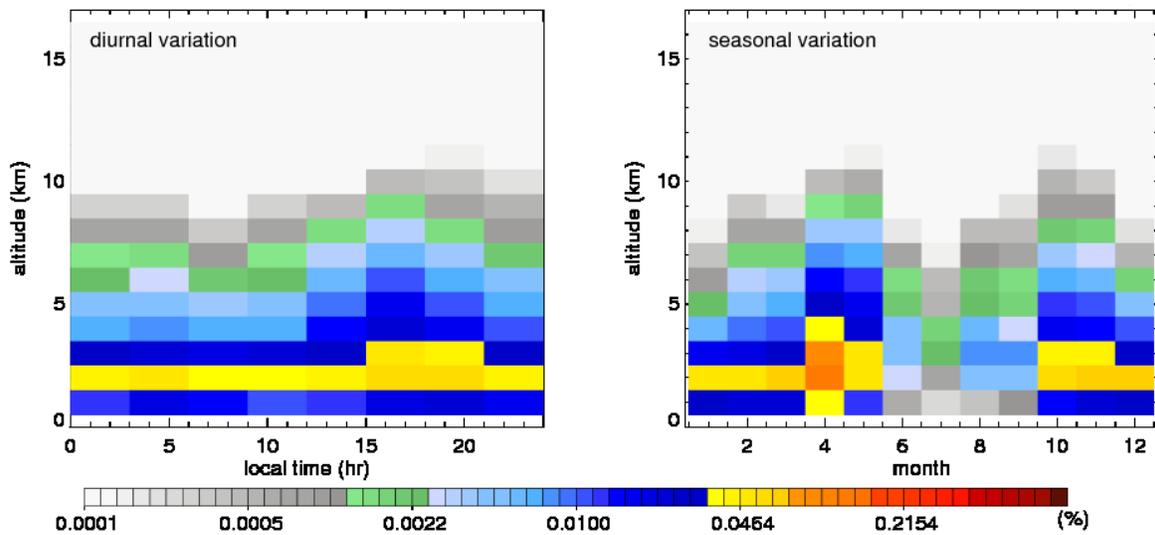


Figure 9. Diurnal and seasonal variations of precipitation reflectivity contribution 40 dBz at different latitudes over zone of Lon 38-50oE, Lat 28-36oN for period 1998-2011.

IV. Conclusion

In this research, TRMM Precipitation radar data were analyzed over Iraq. Analysis of 14 years' monthly means of precipitation suggested that precipitation activities over Iraq occur during the months of October through May and mostly fall over northern and north eastern parts of the country. The majority of precipitation lies between 0.5 to 1.8 mm/hr and the highest area receives monthly precipitation of these amount is between 104-105 km² during the month of April. Diurnal variations indicated that the maximum value of precipitation occurred in the afternoon time and the diurnal variation of precipitation in the morning times was lowest than that during the night time. The vertical profile of radar reflectivity factor showed the contribution to total precipitation from 20 dBz is higher than that from 40 dBz.

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Biotechnological Approaches for Conservation of Rare, Endangered and Threatened Plants

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Abstract- This article discusses the in vitro tools and methods used to conserve the genetic diversity of rare and threatened plant species from around the world. Species that are on the brink of extinction because of the rapid loss of genetic diversity and habitat come mainly from resource-poor areas of the world and from global biodiversity hotspots and island countries. These species are unique because they are endemic, and only a few small populations or sometimes only a few individuals remain in the wild. This compilation of articles describes the efforts in the diverse regions toward saving plants from extinction, and details the direct application of in vitro and cryopreservation methods. In addition, these contributions provide guidance on propagation of rare plants, including techniques for large-scale propagation, storage, and reintroduction. The in vitro techniques for conserving plant biodiversity include shoot apical or axillary-meristem based micropropagation, somatic embryogenesis, cell culture technologies and embryo rescue techniques, as well as a range of in vitro cold storage and cryopreservation protocols, and they are discussed in depth in this article.

Index Terms- global biodiversity hot spots, conservation, cryopreservation, micropropagation.

I. INTRODUCTION

Worldwide, many plant species are threatened with extinction because of the gradual disappearance of the terrestrial natural ecosystems for various human activities. Often, this is due to the clearing of indigenous vegetation for agriculture and the resulting erosion, salinization, and invasion of alien species, but more recently climate change is looming as a significant new threat. More than 50% of the world's plant species are endemic to 34 global biodiversity hotspots (GBH), which once covered 15.7% of the earth's land surface and which are now reduced to 2.3%. These areas include large numbers of endemic species, which face an increasing threat of extinction, The International Union for Conservation of Nature Red List of Threatened Plants, first published in 1998 (IUCN 1998), lists more than 8,000 species currently (IUCN 2010). In situ conservation alone is not sufficient to meet the challenges of saving endangered species. While seed banking can be utilized for ex situ conservation of the majority of endangered species, there are a significant number of species for which seed banking is not an option. Conserving the genetic diversity of species and populations is highly important in these situations, and micropropagation can provide large numbers of propagules from a cross-section of the genetic diversity of a region (Rogers 2003). Initiatives developed and directed by international agencies for the integrated conservation of rare and threatened plant species both in situ and ex situ are needed. Botanical gardens are increasingly charged with collecting and maintaining endangered species, although funding is often scarce. The Global Strategy for Plant Conservation (GSPC 2010), signed by more than 180 countries in 2002, aims to stem this loss by setting targets for understanding and conserving plant diversity, promoting sustainable use, providing education and building capacity to support plant conservation. Target 8 of the GSPC, updated for 2020 in Nagoya, Japan, in 2010, calls for "at least 75% of threatened plant species in ex situ collections...and at least 20% available for recovery and restoration programmes" as noted by the United Nations Development Program (UNDP 2010a). Another initiative

developed by the United Nations member states and more than 20 international organizations is that of The Millennium Development Goals (MDGs; UNDP 2010b). Of the eight MDG targets, Target 7 Goal e (UNDP 2010a) is aimed at significantly reducing the rate of loss of biodiversity by 2015. While plant conservation is progressing through the use of in situ protection and ex situ preservation in botanical gardens and seed banks, additional approaches are needed for some of the most endangered species. Complementary strategies of in situ conservation combined with ex situ seed, in vitro and cryopreserved storage can be important for preserving the biodiversity of many endangered habitats.

II. IN VITRO TOOLS

In vitro seed germination, vegetative propagation, and acclimatization methods contribute to propagule production, both for cryopreservation and for translocation or reintroduction projects. In addition, in vitro culture techniques are being used to study the growth habits of plants, as well as the ecological factors that influence their growth and development (i.e., in vitro ecology). Although standard in vitro propagation methods are available, endangered species may have unusual growth requirements and thus may require modified procedures for in vitro culture. In addition, the limited amount of plant material available from rare species poses major challenges in the application of in vitro methods to endangered species (Sarasan et al. 2006). In vitro methods provide tools that can be used in a variety of ways, depending on the need of the species. Collecting cuttings of plants and seeds is generally the most cost-effective method for providing material for ex situ conservation. However, there are many instances in which seeds are sterile or not available, or so few plants remain that collecting whole plants would negatively impact the population. In vitro collecting of tissues is less invasive than removing whole plants and allows for an efficient sampling of a large number of plants when seeds are not available.

In addition, many tropical species have seeds that die when dried or frozen (recalcitrant seeds), and thus they cannot be stored using conventional seed-banking technologies (Chin 1996). Established cultures can comprise a medium-term ex situ collection, but these cultures can also provide tissues for cryopreservation and long-term storage. The importance of in vitro culture for medium-term (1–5 yr) and cryopreservation for long-term conservation (>5 yr) is well established (Ashmore 1997; Reed et al. 2005; Reed 2008). In vitro techniques provide the option of cryopreserving embryos or vegetative tissues for longterm storage as an alternative to seed banking, for a number of tropical timber and fruit resources. Providing long-term storage for many of these recalcitrant seed species is especially challenging, as they do not respond well to traditional in vitro or cryopreservation protocols, thus requiring new approaches to tackle these problems (Normah and Makeen 2008). The use of in vitro-propagated plants for reintroduction or restoration of rare species is also finding application, and this relies on the development of successful methods for acclimatizing plants from culture to in situ conditions. Further, as we learn more about the metabolic requirements of diverse plants, design of better growing conditions and nutrient media to fit the specific needs of rare plants should ease the difficulty of growing threatened and endangered species. The range of in vitro tools available for plant conservation is highlighted in this issue by Engelmann. In addition, Kaczmarczyk et al. discuss the need to focus on new technologies for cryopreservation and long-term storage of rare and endangered plants.

III. THE NEED FOR IN VITRO TOOLS

Biodiversity hotspots around the globe are at risk, and in vitro and cryopreservation research on endangered plants is in progress in many countries, including in Australia (Ashmore et al. 2011), Malaysia (Normah et al. 2008) and South Africa (Berjak et al. 2011). This issue highlights these ongoing efforts and the need for additional attention to neglected and endangered tropical plant species.

Unfortunately, compared to animal conservation, plant conservation is not adequately supported worldwide (Pennisi 2010). Logging in tropical biodiversity hotspot areas to provide timber and land for crops such as rubber, sugarcane and oil palm is on the increase, and this is contributing to massive losses of biodiversity (e.g., Amazon basin; Papua, New Guinea; Indonesian forests). Complimentary conservation strategies of in situ seed storage and in vitro or cryopreserved storage are important to many endangered habitats, such as those found in Brazil and noted in this issue (Pilatti et al. 2011). Temperate forests also require protection, both for lumber species as well as for the diverse endemic members of these ecosystems (Pijut, 2011). Biodiversity hotspots in temperate and sub-tropical zones are less publicized than their tropical counterparts, but they similarly contain many threatened and endangered plants. These hotspots are being addressed with a range of in vitro conservation techniques in projects on several continents noted in this issue (Ashmore et al. 2011; Krishnan et al. 2011; Martín and González-Benito 2011; Munoz-Concha and Davey 2011). Conservation of lower plants is considered a priority subject worldwide, and in vitro conservation of European bryophytes and endangered ferns is used to complement in situ activities (Rowntree et al. 2011; Barnicoat et al. 2011). More than 50,000 species are used globally as sources of medicine, food, cleaning, personal care and perfumery, and these are collectively known as medicinal and aromatic plants. Such species are often collected illegally or unsustainably from the wild and, as a result, may lose genetic diversity and face the threat of extinction. Improving propagation and availability of these plants could protect those remaining in the wild and provide revenue for resource-poor areas. In vitro methods can often be the most efficient way to clonally propagate a species without depleting wild resources and can be an important part of an integrated program for the conservation of medicinal and aromatic plants worldwide. A description of in vitro techniques used in one biodiversity hotspot, the tropical and subtropical Western Ghats region of India, shows how these techniques are used to conserve medicinal plants of this region of biodiversity (Krishnan et al., 2011). Orchids, one of the largest and most diverse families of flowering plants, face an uncertain future through unscrupulous collection, the impacts of climate change and habitat loss (Swarts and Dixon 2009). The complex requirements for pollination, seed germination, and many other biotic and abiotic factors contribute to loss of plants in the wild when these requirements are not met. In vitro orchid seed germination, cryopreservation and reintroduction studies are discussed in this issue in the context of Australian and US orchid conservation projects (Ashmore et al. 2011; Kauth et al. 2011). These studies shed light on the need for more work on orchid conservation, especially those species that are terrestrial and require more complex interactions with mycorrhizal partners. More detailed study to understand mycorrhizal associations in terrestrial orchids is urgently needed to improve in vitro orchid seed germination for recovery, storage and restoration activities. Likewise, a major limitation of current orchid conservation efforts has been the focus on single aspects of orchid conservation biology (i.e., propagation, pollination biology, etc.). Orchid conservation practices must integrate an understanding of existing and future threats, population fluctuation, pollination and reproductive biology, in vitro and in situ propagation, and maintenance of population genetic diversity as tools in species conservation and recovery. Interest is growing worldwide in restoration ecology projects that lead to species or ecosystem conservation. Reintroduction and translocation projects aimed at the restoration of damaged ecosystems all need genetically diverse, high quality propagules.

IV. CONCLUSIONS

For species threatened with extinction, in situ conservation may be the best option; however, this alone may not always be sufficient to insure the survival of a species. In addition to standard methods such as seed banking and development of living collections, in vitro tools can provide additional backup collections and provide alternative propagation and conservation of species. Seeds or vegetative material from genetically diverse wild populations can be difficult to obtain, and methods should be in place for the propagation, storage, sustainable utilization, and storage of these genetic resources in liquid nitrogen. In vitro techniques are well developed for the

collection, propagation and cryopreservation of many species. In addition, the tools of molecular biology and molecular genetics can aid in the development of more effective propagation and storage technologies. As extinction pressures are increasing, it is important that priority species are identified and that integrated conservation measures are undertaken, utilizing all the tools available including the in vitro methods.

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Correlation of ureteric jet characteristics with the degree of hydro-nephrosis and serum creatinine

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Abstract- Acute ureteric colic caused by ureteric calculus disease is a commonly encountered clinical problem. Ultrasonography is one of the treatment modality available in the evaluation of patients with acute urologic disorders. Color Doppler Ultrasonography is an advancement of the conventional ultrasonography in which the Doppler Effect is employed. It can be used to visualize "ureteric jets". The purpose of this study is to describe the usefulness of color Doppler ultrasound and serum creatinine in evaluation of patients with ureteric calculi. This descriptive study was conducted using 83 patients with calculus disease, aged 20-60 years. All the patients underwent X-ray KUB and color Doppler sonography with ureteral jet assessments and their serum creatinine levels were obtained. The frequency of jets, peak ureteric jet velocity and the duration of the ureteric jet in seconds was measured. According to the results, there were no significant differences in mean serum creatinine values among various degrees of hydronephrosis ($p=0.510$). There was a significant association between the ureteric jet status with the degree of hydronephrosis ($p=0.001$). Hence the assessment of ureteric jet on ultrasound, along with serum creatinine, is useful in the assessment of the degree of hydronephrosis in evaluation of patients with ureteric calculi.

Index Terms- hydronephrosis, X-ray KUB, Color Doppler Ultrasonography, ureteric jets, serum creatinine levels,

I. INTRODUCTION

Acute ureteric colic caused by ureteric calculus disease is a commonly encountered clinical problem; its prevalence is estimated to be 12% in USA [1], about 2%-5% of life time risk is present for the Asian population [2].

A ureteric calculus can have various outcomes. Most ureteric stones can be managed under adequate analgesia for uneventful stone passage [3]. Some stones may obstruct the ureter leading to acute obstructive hydro nephrosis. If not correctly treated and persisted for long enough it can result in shutdown of the affected kidney. The management of the urolithiasis depends on the stone location, size, and degree of obstruction of the ureter, patient factors, anatomical considerations and surgeon preference. There are multiple treatment modalities that the surgeon can choose from including, watchful waiting and medical expulsion therapy, ureteroscopy, shock wave lithotripsy (SWL), open surgical interventions like ureterolithotomy and/or combinations of these methods depending on the above factors [4].

Ultrasonography is one of the several imaging modalities (Intravenous urogram, CT KUB, CT urogram, MR urogram) available to the physician in the evaluation of patients with acute urologic disorders. Color Doppler Ultrasonography is an advancement of the conventional ultrasonography in which the Doppler Effect is employed. It can be used to visualize "ureteric jets". The ureteric jet creates when the bolus of urine being transmitted through the ureter reaches the terminal portion; it is ejected forcefully in to the bladder through the vesicoureteric junction (VUJ). Many studies have shown that there is an association between ureteric obstruction and the ureteric jets [5, 6, 7, 8, and 9].

Color Doppler Ultrasonography is an advancement of the conventional ultrasonography in which the Doppler Effect is employed. In Doppler Ultrasonography measurements and visual records are made of the shift in frequency of a continuous ultrasonic wave proportional to the blood flow velocity in underlying vessels. The energy of the returning echo is displayed as an assigned color; by convention echoes representing flow towards the transducer is seen as shades of red, and those representing flow away from the transducer is seen as shades of blue.

The color display is usually superimposed on the B-mode image, thus allowing simultaneous visualization of anatomy and flow dynamics. It can be used to visualize "ureteric jets". The ureteric jet creates when the bolus of urine being transmitted through the ureter reaches the terminal portion; it is ejected forcefully in to the bladder through the vesicoureteric junction (VUJ).

Usually lasts for a few seconds but is sufficient enough to produce a frequency shift which can be demonstrated by color Doppler Ultrasound. Color Doppler Ultrasound is in fact the easiest method for demonstrating the jet and it is also amenable for further characterization using a pulse-wave Doppler waveform. Many studies have shown that there is an association between ureteric obstruction and the ureteric jets.[10]

The purpose of this study is to describe the usefulness of colour Doppler ultrasound and serum creatinine in evaluation of patients with ureteric calculi.

II. MATERIALS AND METHODS

This descriptive study was conducted using 83 patients with calculus disease, aged 20-60 years, who presented to Teaching Hospital, Peradeniya, from July 2015 to July 2016. All the patients underwent-ray KUB and color Doppler sonography with ureteral jet assessments and their serum creatinine levels

were obtained. Patients who had more than one ureteric calculus, ureteric calculus size more than 10mm, bilateral calculi of the ureters, abnormal serum creatinine level (more than 1.2mg/dl in men and 1.0mg/dl in women,) hydronephrosis due to causes other than calculus disease, history of renal or urological surgical interventions and pregnancy were excluded from the study.

All the subjects underwent an ultrasound- KUB examination on the same day. Kidneys, ureters and bladder were scanned. Data on the length and the degree of hydronephrosis were recorded by grey-scale ultrasound. The degree of hydronephrosis was graded as none, mild, moderate, or severe according to standard definitions. Ten minutes of continuous real-time observation and simultaneous recording of both obstructed and non-obstructed ureterovesical orifices in axial plane at the trigone level was evaluated by means of Colour Doppler ultrasonography to visualize ureteric jets as an additional procedure. The frequency of jets was recorded for each ureteric meatus in every patient. The peak ureteric jet velocity and the duration of the ureteric jet in seconds was measured by using a standard software in the scan machine.

III. RESULTS

The mean creatinine level was 89.51 ± 30.43 mmol/L. The percentage of patients with mild, moderate, severe and no hydronephrosis was 72.7%, 4.0%, 3.9% and 19.5% respectively.

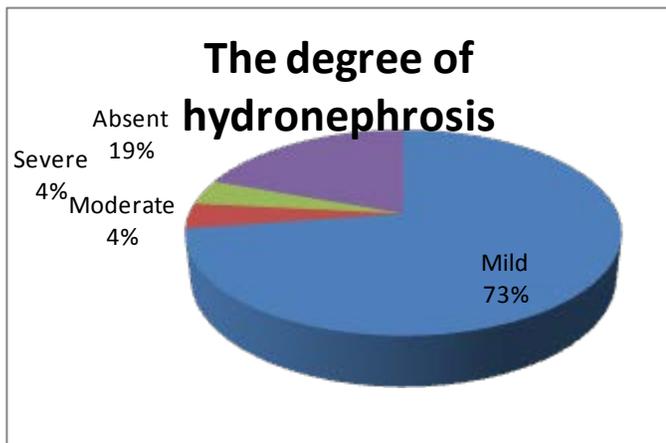


Figure 01; The percentage of patients with mild, moderate, severe and no hydronephrosis

Ipsilateral jet was absent in 44.6% of patients while jet was present in 55.4%. Serum creatinine was elevated in 22.6% of patients with absent ureteric jet, and in 3.6% of patients with normal jets. Patients with absent ipsilateral ureteric jet had significantly higher mean serum creatinine levels (mean=103.2 mmol/L) compared to the patients with observable jet (mean=75.9 mmol/L) ($p=0.001$). There were no significant differences in mean serum creatinine values among various degrees of hydronephrosis ($p=0.510$). There was a significant association between the ureteric jet status with the degree of hydronephrosis ($p=0.001$)

IV. DISCUSSION

Out of the medical imaging methods available color Doppler ultrasonography of the ureteric jet is a valuable tool in detecting obstructive uropathy because it yields real time functional information than plain radiography and B-mode ultrasonography. It demonstrates the degree of ureteric obstruction, without exposing the patient to ionizing radiation as in other imaging modalities such as IVU or CT [11]. This is undoubtedly beneficial in the management of obstructive uropathy caused by a ureteric stone. By determining an association between the degree of hydronephrosis and the ureteric jet characteristics, it is possible to ascertain the degree of obstruction.

A study done using 25 healthy men in Japan, showed that the detection of the jet phenomenon by Doppler color flow mapping is a promising new way of examining renal or ureteric function non-invasively [9]. Then a study done in 1997 concluded that the analysis of ureteric jets with color Doppler enable detection and qualitative determination of the degree of ureteric obstruction in many patients with unilateral calculi [13].

Another study done with 46 patients in Iran compared the ureteric jet characteristics in obstructed ureter with the non-obstructed side and showed that the ureteric jet characteristics in obstructed ureter showed low frequency, shorter duration and lower peak velocity. Hence, they concluded that Doppler ultrasound examination is a useful adjunct to the normal grey-scale ultrasound in diagnosis of ureteric obstruction considering the safety of this study and the significance difference in ureteric jet characteristics between the obstructed and the unobstructed ureters. [14].

A study done on 100 patients presenting with renal colic in Catania, Italy where they underwent colour-Doppler ultrasonographical evaluation of their urinary tracts showed that colour-Doppler ultrasonography (CDU) improves the diagnostic accuracy of ultrasound in differentiating the obstructive and non-obstructive dilatation. They went on to say that when combined with CT, CDU has 100% sensitivity and specificity [15]. Doppler visualization of ureteric jets in unilateral hydronephrosis in children and adolescents was done in one study where they could show that the absence of jets in patients with acute obstruction due to ureteric calculus strongly correlates with high-grade obstruction [16].

Considering the management of ureteric stones, they can be managed with multiple methods including observation and medical expulsion therapy, ureteroscopy, shock wave lithotripsy (SWL), open surgical interventions like ureterolithotomy and/or combinations of these methods. The choice of the method depends on stone location, size, patient factors, anatomical considerations and surgeon preference [17]. Commonly applied method for evaluating patients with acute flank pain is a radiography film of kidneys, ureter and bladder (X ray-KUB) which is mostly combined with ultrasonography [12]. Most ureteric stones can be observed under adequate analgesia for uneventful stone passage. This is a less costly and less invasive method compared to other interventions [18].

Spontaneous passage of ureteric stones is mainly dependent on stone size and location amongst other factors. One study done in United States using unenhanced computed tomography showed that ureteric stones < 5 mm had a greater than 75%

chance of spontaneous passage regardless of location. Larger stones were less likely to pass (for stones 5-7 mm, 60%; for stones 7-9 mm, 48%; and for stones larger than 9 mm, 25%). Stone location regardless of size was also a significant factor; spontaneous passage rates were 48% for stones in the proximal ureter, 60% for mid ureteric stones, 75% for distal stones, and 79% for ureterovesical junction stones [19]. Another study revealed that the time to stone passage can take greater than a month but can be as high as 95% in stones < 5 mm in size [18]. It has been recommended that the time allowed for spontaneous stone passage should not exceed four to six weeks due to the risk of renal damage [20].

In those patients with no evidence of an infection, adequately controlled symptoms, and smaller ureteric stones, observation for spontaneous passage is an excellent option. It has been shown that attempts at spontaneous passage of stones can save a patient from invasive surgical interventions as well as significant cost [21].

Conservative expectant management is not appropriate in patients with persisting or recurrent pain, persistent ureteric obstruction, urinary tract infection, solitary kidney or renal insufficiency.

Several studies have been conducted to assess the predicting factors of success rates in medical expulsion therapy. In 2012, a study was done to investigate stone passage with tamsulosin-based medical expulsion therapy and they noted that transverse stone diameter, longitudinal stone diameter, ureteric diameter (proximal to stone), and ureter-to-stone diameter ratio which are parameters on CT imaging were inversely associated with successful stone passage, of stone position within the ureter ($P < 0.001$). Only longitudinal stone diameter (maximal stone diameter on coronal reconstruction) was significantly associated with stone passage on logistic regression analysis. Rates of stone expulsion appeared to drastically decrease at the 5 mm mark measured longitudinally with 70% and 84.3% passage of 4-5 mm upper and lower ureteric stones, respectively and 42.9% and 44.8% passage of 5-6 mm upper and lower ureteric stones, respectively [22].

Active stone removal should be the option for stones with a diameter ≥ 7 mm and when adequate pain relief cannot be achieved, ureteric obstruction is associated with infection; there is a risk of urosepsis in solitary kidneys with obstruction or in cases of bilateral obstruction, without going for medical expulsion therapy. [26]. When active removal of the ureteric stone treatment is needed, the choice of intervention is dependent on several factors apart from stone size and location, including surgeon's preference, patient's preference, cost and availability of equipment [23].

The standard first-line approach in the management of symptomatic ureteric stone is relief of obstruction by insertion of a nephrostomy tube or a double-J stent and fragmentation of the stone later. If there is evidence of sepsis at the time of presentation, Insertion of a nephrostomy tube under local anaesthetics is considered to be better as it is also relatively less invasive. However, it's likely disadvantages are leakage, dislodgement of the tube and the need to manage the stoma [18]. Insertion of a double-J stent, can give rise to complications such as perforation of the ureter and failure to pass the stent in some cases, and increased the risk of urosepsis[24].

Shock-wave lithotripsy (SWL) was introduced to clinical practice as a treatment for ureteric stones in the early 1980s. The lithotripter attempts to break up the stone with minimal collateral damage by using an externally applied, high-energy shock waves or high-intensity acoustic pulse. Today, even with presence of newer methods for stone removal such as ureteroscopy, SWL remains the primary treatment for most uncomplicated upper urinary tract calculi. The meta-analysis published by the American urological association nephrolithiasis Guideline Panel in 1997 documented that the stone-free rate for SWL for proximal ureteral stones overall was 83% (78 studies, 17,742 patients) [25]. The current meta-analysis analyzed stone-free rates following SWL for three locations in the ureter (proximal, mid, distal). They are 82% in the proximal ureter (41 studies, 6,428 patients), 73% in the mid ureter (31 studies, 1,607 patients), and 74% in the distal ureter (50 studies, 6,981 patients) [25].

Ureteroscopy(URS) is another treatment option for ureteric stones, it is as upper urinary tract endoscopy performed most commonly with an endoscope passed through the urethra, bladder, and then directly into the upper urinary tract. Overall stone-free rates are remarkably high at 81% to 94% depending on stone location, with the vast majority of patients rendered stone free in a single procedure [25]

Shock-wave lithotripsy and URScan achieve success for most cases of ureteric calculi [25]. In extreme situations or in cases of simultaneous open surgery for another purpose, open surgical ureterolithotomy might rarely be considered. For most cases with very large, impacted, and/or multiple ureteric stones in which SWL and URS have either failed or are unlikely to succeed, laparoscopic ureterolithotomy is a better alternative than open surgery if expertise in laparoscopic techniques is available. Although highly effective, laparoscopic ureterolithotomy is not a first-line therapy in most cases because of its invasiveness, longer recovery time, and the greater risk of associated complications compared to SWL and URS [25].

The use of ureteric jet characteristics by colour ultrasonography may provide an immediate radiologically less costly solution to this acute agonizing condition to decide on the patient management.

V. CONCLUSION

Assessment of ureteric jet on ultrasound, along with serum creatinine, is useful in the assessment of the degree of obstruction in evaluation of patients with ureteric calculi.

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Impact of Domestic Violence on Nursing Collegians Behavior

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Abstract- Domestic violence and its impact on human behavior of the most important problems facing the people at this time because of the pressures of life and the health problems and the many wars, news and frequent scenes of violence a day is considered.

Descriptive study was conducted for the students of the relationship the College of Nursing of the four stages of the study the morning and both sexes were taken prying composed of 200 students from all 50 students' stage.

The study begin from December 2015 to March 2016 were chosen disproportional stratified sample, where information was collected by questionnaire designed and composed of three axes the first axes included demographic data (10 items) second axis included data about violence included (20 item) and last one data about the behavior included (30 items).

The study showed that the rate of violence among students is less (57%) and in concerning behavior study showed that (90.5%) is a good behavior and finally, with concern to the relationship between violence and behavior the study shows there is a significant relationship between them.

The study recommended to presentation educational lectures on domestic violence and what of negative influence on behavior and relationships between humans and find out the reasons and factors affecting that considered source of violence and to Planning appropriate successful solutions.

Index Terms- Impact, Domestic Violence, Behavior

I. INTRODUCTION

Domestic violence is a major public health problem around the world and in the United States. It is a crime in all 50 states.

Domestic violence refers to physical, verbal, psychological, sexual, or economic abuse (e.g., withholding money, lying about assets) used to exert power or control over someone or to prevent someone from making a free choice. According to the U.S. Department of Justice (2010), "This includes any behaviors that intimidate, manipulate, humiliate, isolate, frighten, terrorize, coerce, threaten, blame, hurt, injure, or wound someone." Rape, incest, and dating violence are all considered to be forms of domestic violence.

Domestic violence in Florida is^b defined as any assault, aggravated assault, battery or aggravated battery, sexual assault or battery, stalking, aggravated stalking, kidnapping, false imprisonment, or any criminal offense resulting in physical^b injury or death of one family or household member by another family or household member. Florida defines family or

household member as current or former spouses, persons related by blood or marriage, persons who currently reside together or resided together in the past as if a family, parents of a child in common regardless of whether married or not. With the exception of those who have a child in common, the family or household members must currently reside or have in the past resided together in the same single dwelling unit (6).

Importance of the study;

Approximately 9% of high school students reported being hit, slapped, or physically, hurt deliberately by a boyfriend or girlfriend (3).

-Victims of domestic violence are usually women (22% - 25%) and children (6)

_Among adult victims of Domestic violence 22.4 % of women and 15% of men have a history of some sort of partner violence between the ages of 11 and 17 (1)

_Domestic violence among older adult estimated that 90% of elder abuse occurs at the hands of family member and that females are abused at a higher rate than male (11)

-One in 4 women and 1 in 7 men age 18 and older in United States have been the victim of severe physical violence by an intimate partner in their life time nearly 15% of women and 4% of men have been injured as a result of acts of domestic violence that include rape, physical violence and stalking by an intimate partner in their life time (1)

37.3% of women with a disability reported experiencing some form of domestic violence during their life time as compared to 20.6% of women without a disability (3)

II. METHODOLOGY

Design of study:

Descriptive correlation analytic study was conducted to identify impact of domestic violence on nursing collegians behavior, including (200) student in university of kufa nursing faculty. (December 2015 to March 2016)

Administrative arrangement:

Prior to actual collection data, formal administrative approval was obtained to conduct the study from following: -

A- An official arrangement paper was obtained from the faculty of nursing.

Setting of the study:

The study was conducted at the Faculty of Nursing University of Kufa

Sampling and sample selection:

Disproportional stratify sample technique was used, a purposive sample of (200) student of university of kufa faculty nursing

Methods of data collection and tools:

Data were collected through the use of questionnaire from data were collected in the following sequences: -

Interviewing of study sample:

The investigator collected data from study by using an interviewing questionnaire form, the questionnaire included demographic data (10 items), violence data (20 items). behavior data (30 items).

Statistically analysis:

A descriptive statistical method (parametric method for percentages, frequency and mean), and inferential statistical method (chi-square, correlation coefficient and P value) were used to analyze the data.

Results of the Study

This chapter presents the findings of the data analysis systematically in tables as they correspond with the objectives of the study as follows:

Table (1) Statistical Distribution of the Study Sample by their Demographic Data

Demographic Data	Rating	Frequency	Percent
Residency	Urban	172	86.0
	Rural	28	14.0
Gender	Male	42	21.0
	Female	158	79.0
Age / Years	20 And More	153	76.5
	Less Than 20	47	23.5
Level Of Education	First	50	25.0
	Second	50	25.0
	Third	50	25.0
	Fourth	50	25.0
Father levels of education	Illiterate	6	3.0
	Primary School Graduated	32	16.0
	Intermediate School Graduated	45	22.5
	Secondary School Graduated	44	22.0
Mother levels of education	College And More	73	36.5
	Illiterate	13	6.5
	Primary School Graduated	64	32.0
	Intermediate School Graduated	47	23.5
	Secondary School Graduated	45	22.5
Father profession	Employee	93	46.5
	Jobless	62	31.0
	Retired	45	22.5
Mother profession	Employee	27	13.5
	Housewife	170	85.0
	Retired	3	1.5
Monthly income	Enough	75	37.5
	Enough To What Limit	100	50.0
	Not Enough	25	12.5

This table shows that the study sample in residence show that urban areas are the largest (86%) of the rural area, as well as the gender that the vast majority of women (79%) than men, and also at the age of 20 and more are more largest percentage (76.5%) ,as well as the level of education students are equal (25%) for all grade levels, and in the same context, the

educational level of the father are for college and above (36.5%), and also the educational level of the mother is a primary school (32%) is the largest percentage, as well as the profession of the father that Employee (46.5%) and mother profession majority of housewife (85.0%), as well as for the biggest monthly income

ratio is Enough to what Limit (50%) and finally the family members was 7.9 (57%).

Table (3) Statistical Distribution of the Study Sample overall responses to the violence domain items

Main domain	Rating	Frequency	Percent	m.s.	Assessment
Overall violence	High	86	43.0	1.93	Low
	Low	114	57.0		
	Total	200	100.0		

This table shows that (57%) of the study sample are exhibit low violence, while (43%) of them are exhibit a high violence.

Table (5) Statistical Distribution of the Study Sample overall responses to the behavior domain items

Main domain	Rating	Frequency	Percent	m.s.	Assessment
Overall students' behaviors	Bad	19	9.5	1.80	Good
	Good	181	90.5		
	Total	200	100.0		

This table shows that (90.5%) of the study sample are exhibit good behaviors, while (9.5%) of them are exhibit a bad behavior.

Table (6) relationship between the study sample violence and their behaviors

Main Domains	Rating	Overall Violence		Chi-square value	d.f	p-value
		High	Low			
Overall Students Behaviors	Bad	13	6	5.535a	1	0.018
	Good	73	108			
Total		86	114			

This table shows that there is a significant relationship between the violence and the study sample behaviors at p-value less than 0.05.

III. DISCUSSION OF THE RESULTS

A methodically arranged understanding and rationally derived discussion of study results will be presented in this chapter with the support of the available literatures and related studies.

The data were analyzed through the application of descriptive and inferential statistics in order to meet the study objectives.

The vast majority in table (3) that (57%) of the study sample are show low violence, while (43%) of them are show a high violence.

A study conducted by (Jewkes R, etal.2010) has shown that college students tend to be less violent than their peers who did not arrive at the university level. ⁽⁸⁾

The largest in table (5) that (90.5%) of the study sample are exhibit good behaviors, while (9.5%) of them are exhibit a bad behavior.

The study has shown (Bryant, S and Spencer, G 2009) that the students at the undergraduate level are a good behavior and what it receives from the science and knowledge through their

studies and reflections that university surrounding them requires them to show good behavior. ⁽²⁾

The vast majority in table (6) that there is a significant relationship between the violence and the study sample behaviors at p-value less than 0.05.

A study carried out by the (Natan, M. & Rais, I. 2010) showed that there is an inverse relationship where the lower the level of behavior has increased the level of violence and this is what happens when you increase the level of good behavior and therefore less level of violence of the individual. ⁽¹⁰⁾

IV. CONCLUSIONS AND RECOMMENDATIONS

Conclusions:

According to the present study findings, we can make the following conclusions:

1. The vast majority in table (3) that (57%) of the study sample are exhibit low violence, while (43%) of them are exhibit a high violence.

2. The vast majority in table (5) that (90.5%) of the study sample are exhibit good behaviors, while (9.5%) of them are exhibit a bad behavior.

3. The vast majority in table (6) that there is a significant relationship between the violence and the study sample behaviors at p-value less than 0.05.

V. RECOMMENDATIONS

1. To do a workshop for students to clarify the causes of domestic violence, its consequences and repercussions and solutions.

2. To form a committee in the faculty for the diagnosis and Counseling and guidance and treatment students who have behavior was violent.

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Risk Factors of Infertility Among Young Women at Al-Najaf City

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Abstract- Objective: this study aimed to identify risk factors of infertility among young women and to find out relationship between demographic and reproductive data with infertility. **Methodology:** A descriptive case-control study was adopted in order to achieve the stated objectives. The study began from November 2nd, 2015 until August, 18th, 2016. A Non-Probability (Purposive Sample) of (100) infertile women as case group who were selected from fertility center, and (100) healthy women as control group those who visit primary health care center, both infertile and healthy women are involved in the sample of study. Reliability of instrument is determined via the use of test and re-test technique, and the instrument validity is determined via a panel of experts. Data was analyzed by using descriptive and Inferential data analysis. **Results:** the results found that the most common type of infertility is primary infertility. The majority of infertile women are from urban residential area while the majority of fertile women are from rural area, also infertile women had got married early as compared with fertile women. Most women have menarche ≤ 15 , many women from study group have menstrual cycle irregularities polycystic ovarian syndrome, problems of egg quality and tubules occlusion. **Conclusion:** The study concludes that among the risk factors of female infertility: residency, previous births by caesarean section (for cases of secondary infertility), and polycystic ovaries syndrome, family history of infertility. **Recommendation:** The study recommends that a population-based study should be conducted to increase the women awareness about the risk factors of infertility especially among young girls and how to avoid such factors.

Index Terms- Risk factor, Infertility, Youngwomen.

I. INTRODUCTION

Infertility is a global public health issue⁽¹⁾. Infertility is a common condition affecting one of six couples during their reproductive lifetime⁽²⁾. Infertility affects approximately 60-80 million couples around the world and is still increasing. A demographic study done in 2002 by the World Health Organization (WHO) on developing countries (except China) indicated that 186 million women have been infertile^{(3),(4)}. The prevalence of current infertility in developed and less developed countries, based on a systematic review, was between 3.5-16.7% and 6.9-9.3% respectively. Also it is 9% in China, in America 10-15%, in Siberia about 16% and in Australia 19%. Infertility is not merely a health difficulty but also a social and emotional difficulty, especially in some cultures and sometimes it leads to

divorce⁽⁴⁾. The WHO has suggested the definition of infertility as failure of a couple to conceive within two years of unprotected sexual intercourse. Clinical studies commonly use a one-year period for defining infertility, while, other studies use a period of 5 years. Global, an predictable 580 million people (about 5-8% of couples) suffer from infertility, approximately 372 millions of people exist in low- and middle-income nations, with the exception of China. So, infertility is more widespread in low-income than in high-income countries. There is in Africa, a high percentage of infertility (about 10.1% of people) have infertility with increasing rate about 32% in some region within Africa⁽⁵⁾. Reproduction and raising of children are very important happenings in every individual's life and are powerfully connected with the eventual aims of fullness, pleasure and family incorporation. It is extensively recognized that human presence reaches wholeness through a child and accomplishes the person's need for childbearing⁽⁶⁾. For numerous couples, failure to have a baby is a catastrophe. The gathering of personal, interpersonal, social, and religious prospects brings a feeling of failure, loss, and prohibiting to those who are childless. Dealings between couples can become very stressed when children are not upcoming. Socially, most societies are systematized, particularly in the undeveloped countries, such that children are needed for care and looking after for parents when they become elderly. Even in an advanced countries with social support systems, children and family are needed to offer much of the attention for the elderly. Infertile couples are also omitted from taking principal roles in an essential family jobs and events such as birthdays and marriages of their children. Moreover, many religions assign important formal responsibilities to the couple's children⁽⁷⁾. Infertile women are often branded, resulting in loneliness, carelessness, domestic violence and bigamy⁽⁸⁾.

II. METHODOLOGY

Design of the Study: A descriptive case-control study was adopted in order to achieve the stated objectives. The study began from November 2nd, 2015 until August, 18th, 2016. A Non-Probability (Purposive Sample) of (100) infertile women as case group who were selected from fertility center, and (100) healthy women as control group those who visit primary health care center, both infertile and healthy women are involved in the sample of study. The researcher apply the following criteria in selecting the study sample:

- The age of the all participants between (17-24) years old.
- In case group only female factor infertility is selected.

- In control group include women who have one or two child but without using any assistance reproductive technologies.

The study instrument is constructed by the researcher to assess the risk factors of infertility. The complete instrument of study consists of (3) parts:

Part 1: Sociodemographic Data :

This part consists of (5) items, which includes age, residency, level of education, occupational status and socioeconomic status .

Part 2: Medical and Surgical History:

This part consists of (3) items, include family history of infertility, chronic disease and history of previous surgery .

Part 3: Reproductive History:

This part consists of (12) items, including the duration of infertility, type of infertility, previous history of abortion, ectopic pregnancy, age of menarche, age at marriage, regularity of menstrual cycle, history of using family planning, sexual activity at fertility days of ovulation cycle, using of ovarian inducer

medication, using of reproductive technologies, gynecological disease.

Statistical Analysis

The following statistical data analysis approaches used in order to analyze the data of the study under application of the statistical package (SPSS) ver. (19), and the Microsoft excel (2010):**Adescriptive data analysis** includes a-Tables (Frequencies, Percentages), b Summary Statistics tables including Mean, and Standard Deviation (SD), c- Pearson's Correlation Coefficients to determine the reliability of the study instrument, and **Inferential Data Analysis includes** Independent sample t-test to determine the mean difference between the case and control groups.

Objective of the study:

This study aimed to identify risk factors of Infertility among young women, To identify demographic and reproductive variables related to women's infertility and To find out relationship between demographic and reproductive data with infertility.

III. RESULTS

Table (1): Statistically Distribution of the Study Sample by their Socio-Demographic Data

Items	Rating and Intervals	Study group		Control group	
		Freq.	%	Freq.	%
Age / Years	<= 20.00	20	20	30	30
	21.00+	80	80	70	70
Residency	Rural	28	28	64	64
	Urban	72	72	36	36
Levels of Education	Illiterate	22	22	22	22
	read and write	18	18	30	30
	Primary school graduated	24	24	12	12
	Secondary school graduated	26	26	24	24
Institute or above		10	10	12	12
Occupation Status	Housewife	92	92	98	98
	employee	8	8	2	2
Socio-Economic Status	Sufficient	26	26	22	22
	Sufficient to what limits	44	44	54	54
	insufficient	30	30	24	24
Passive Smoking	Yes	76	76	60	60
	No	24	24	40	40
BMI	Underweight	4	4	42	42
	Normal Weight	26	26	0	0
	Overweight	32	32	24	24
	Obese	38	38	34	34
Taking of Caffeine	Yes	82	82	84	84
	No	18	18	16	16
Number of Cups / day	1	38	38	36	36
	2	22	22	18	18

	3	10	10	18	18
	4	4	4	10	10
	5	4	4	0	0

Table (1) shows that the majority of the study group are 21 years old and more (80%). Urban residents (72%), secondary school graduated (26%), housewives (92%), socio-economically are sufficient to what limits (44%), passive smokers (76%), obese (38%), taking a caffeine (82%), and taking about 1 cup daily (38%). While for the control group, the study results

indicate that the majority of the control group are (21) years old and more (70%). Rural residents (64%), read and write (30%), housewives (98%), moderate socio-economic status (54%), passive smokers (60%), underweight (42%), taking a caffeine (84%), and taking about 1 cup daily (36%).

Table (2): Statistically Distribution of the Study Sample according to Medical and Surgical History for Women

Items	Rating And Intervals	Study Group		Control Group	
		Freq.	%	Freq.	%
Family history of infertility	Positive	20	20	4	4
	Negative	80	80	96	96
Previous Diseases					
Diabetes mellitus	No	100	100	100	100
Hypertension	No	100	100	100	100
Thyroid diseases	No	100	100	100	100
Tuberculosis	No	98	98	100	100
	Yes	2	2	0	0
Previous Surgeries					
Previous surgeries	Yes	28	28	44	44
	No	72	72	56	56
Site of surgeries	Abdomen	28	28	44	44
Duration since surgeries	1-2	12	12	36	36
	3-4	16	16	8	8
Appendectomy	Yes	4	4	8	8
	No	96	96	92	92
Caesarian section	Yes	16	16	38	38
	No	84	84	62	62
Fallopian tubules surgeries	Yes	4	4	0	0
	No	96	96	100	100

Table (2) shows that both study and control groups have no positive family history of infertility (80% and 96%) respectively. In addition, the entire study and control groups participants (100%) have no diabetes mellitus, hypertension, thyroid diseases,

and only (2%) of the study group have tuberculosis. Regarding to the previous surgeries, the study results indicate that there is a no previous surgeries at the majority of the study and control groups' participants (72 % and 56 %) respectively.

Table (3): Statistically Distribution of the Study Sample according to Reproductive characteristics

Factors	Rating And Intervals	Study Group		Control Group	
		Freq.	%	Freq.	%
Age of marriage	12-15	40	40	22	22
	16-19	48	48	54	54
	20 and more	12	12	24	24
Menarche	10-15	94	94	98	98
	16 and more	6	6	2	2
Cycle	Regular	58	58	92	92

	Irregular	42	42	8	8
Type of infertility	No infertility	0	0	100	100
	Primary	60	60	0	0
	secondary	40	40	0	0
Duration infertility	No infertility	0	0	100	100
	1-3	38	38	0	0
	4-6	44	44	0	0
	7 and more	18	18	0	0
Abortion	Yes	32	32	42	42
	No	68	68	58	58
Ectopic	Yes	4	4	0	0
	No	96	96	100	100
Contraceptive	Yes	4	4	22	22
	No	96	96	78	78
Sexual relationship	Yes	58	58	28	28
	No	42	42	72	72
Use of Inducer ovulation medication	Yes	90	90	26	26
	No	10	10	74	74
IVF	Yes	24	24	0	0
	No	76	76	100	100
Results	NO	76	76	100	100
	Positive	10	10	0	0
	Negative	14	14	0	0
IUI	Yes	28	28	0	0
	No	72	72	100	100
Results	No	72	72	100	100
	Positive	4	4	0	0
	Negative	24	24	0	0
Endometriosis	Yes	2	2	0	0
	No	98	98	100	100
PCOS	Yes	56	56	2	2
	No	44	44	98	98
Genitourinary infection	Yes	74	74	84	84
	No	26	26	16	16
Congenital Malformation	Yes	4	4	0	0
	No	96	96	100	100
Genital Viral infection	Yes	2	2	0	0
	No	98	98	100	100
Genital Fungal infection	Yes	60	60	48	48
	No	40	40	52	52
Problems of Quality of Egg	Yes	70	70	28	28
	No	30	30	72	72
Problems of Quality of Cervical mucosa	Yes	2	2	0	0
	No	98	98	100	100
Prolactin hormone elevation	Yes	56	56	0	0
	No	44	44	100	100
Tubular occlusion	Yes	18	18	0	0
	No	82	82	100	100

Table (3) shows that the age of menarche is 10-15 years in both study and control groups (94% and 98%) respectively. Regarding menstrual cycle, the study results indicate that (58%) is for regular menstrual cycle among study group, and (92%) at the control group. In addition, (16-19 years old) is the dominant age of marriage group between both study and control groups (48 % and 54 %) respectively. In addition, the study results indicate that (60%) is for primary infertility among the study group, and (44%) is for 4-6 years as a duration of infertility. Concerning abortion, the study results indicate that there is no abortion between both study and control groups (68 % and 58 %) respectively, also for ectopic pregnancy, the study results show that there is no ectopic pregnancies in both study and control groups (96% and 100%) respectively. Furthermore, in both study and control groups there is no use of contraceptive (96% and 78%) respectively. In addition, the study results indicate that (58%) of the study group perform the sexual relationship with the ovulation time, while (72%) of the control group did not perform the sexual relationship. Regarding use of inducer medications, the study results indicate that (90%) of the study

group use these medications, while (74%) of the control group did not use these medications. Concerning IVF and IUI, the study results indicate that the study and control groups did not perform these techniques. Regarding endometriosis, the study results indicate that the majority of the study and control groups subjects have no endometriosis (98% and 100%) respectively. In addition, the study results indicate that (56%) of the study group have PCOS, while (98%) of the control group have no PCOS. Also the study results indicate that both study and control group have genitourinary infection (74% and 84%) respectively, while both study and control groups have no congenital malformation (96% and 100%) respectively. In addition, the majority of the study and control groups have no genital viral infections (98% and 100%) respectively. In addition, the study results indicate that the majority of the study and control groups have no problems with cervical mucosa (82% and 100%) respectively, have no tubular occlusion (82% and 100%) respectively. While the majority of study group have problems with quality of eggs (70%) and elevation in prolactin hormone (56%).

Table (4): Comparison significant between study and control groups regarding infertility risk factors

Factors	Grouping	Mean	Std. Deviation	t-value	p-value
Age / years	study	22.06	1.82287	0.524	0.601
	control	21.86	1.98987		
Occupation	study	1.18	0.6289	1.436	0.154
	control	1.04	0.28284		
Levels of education	study	2.84	1.307	0.530	0.575
	control	2.74	1.363		
Socio-economic status	study	2.04	0.759	0.197	0.844
	control	2.02	0.688		
Passive smoking	study	1.24	0.43142	1.723	0.088
	control	1.4	0.49487		
BMI	study	28.0482	4.76331	0.977	0.331
	control	27.142	4.50393		
Caffeine	study	1.18	0.38809	0.264	0.793
	control	1.16	0.37033		
How many Cups	study	1.74	1.58835	.135	0.893
	control	1.78	1.37455		
Previous Surgeries	study	1.72	0.45356	1.673	0.097
	control	1.56	0.50143		
Sites of surgeries	study	0.28	0.45356	1.673	0.097
	control	0.44	0.50143		
Appendectomy	study	1.96	0.19795	0.837	0.405

	control	1.92	0.27405		
Tubular surgeries	study	1.96	0.19795	1.429	0.156
	control	2	0		
Abortion	study	1.68	0.47121	1.031	0.305
	control	1.58	0.49857		
Ectopic pregnancy	study	1.96	0.19795	1.429	0.156
	control	2	0		
Use of Contraceptive	study	1.96	0.19795	0.264	0.793
	control	1.78	0.41845		
Age at Menarche	study	12.86	1.42871	.817	0.416
	control	13.08	1.25909		
Age at Marriage	study	16.6	2.40747	1.447	0.151
	control	17.32	2.56698		
Endometriosis	study	1.98	0.14142	1.000	0.32
	control	2	0		
G. Infection	study	1.26	0.44309	1.224	0.224
	control	1.16	0.37033		
Malformation	study	1.96	0.19795	1.429	0.156
	control	2	0		
G. Viral infections	study	1.98	0.14142	1.000	0.32
	control	2	0		
G. Fungal infections	study	1.4	0.49487	1.200	0.233
	control	1.52	0.50467		
Cervical mucosa	study	1.98	0.14142	1.000	0.32
	control	2	0		
Sexual relationship	study	1.72	0.49857	0.937	0.08
	control	1.42	0.45356		

The table above shows that there is a non-significant difference between the study and control groups regarding to their (age, occupation, passive smoking, BMI, , caffeine, number cups, previous surgeries, sites of surgeries, appendectomy,

tubular surgeries, abortion, ectopic pregnancy, Use of Contraceptive, age at menarche, age at marriage, endometriosis, G. infection, malformation, G. viral infections G. fungal infections cervical mucosa and sexual relationship

Table (5): Factors associated with infertility

Factors	Grouping	Mean	Std. Deviation	t-value	p-value
Residency	study	1.72	0.45356	3.834	0.001
	control	1.36	0.48487		
Family history of infertility	study	1.96	0.40406	2.514	0.014
	control	1.80	0.19795		
Duration since surgeries	study	9.66	0.76024	3.181	0.002
	control	0.44	20.47957		
Cesarean section	study	1.84	0.37033	2.532	0.013
	control	1.62	0.49031		
Menstrual Cycle	study	1.42	0.49857	4.226	0.001
	control	1.08	0.27405		
PCOS	study	1.98	0.50143	7.329	0.001
	control	1.44	0.14142		
Quality of Egg	study	1.72	0.46291	4.583	0.001
	control	1.03	0.45356		

Tubular occlusion	study	2	0.38809	3.280	0.001
	control	1.82	0		

The results in table (5) show that there is a significant difference between the study and control groups regarding to family history of infertility and cesarean section .

In addition, the study results indicate that there is a high significant difference between the study and control groups regarding other variables.

IV. DISCUSSION

According to (table 1), the results of the study show that the majority of study and control group age is between (21-24) years. This result comes along with the result of a study done by **Omu and Alexander (2010)** conducted in Kuwait, where it showed that the age of 20-29 years old is the dominant age . This results may come because women in this age are more likely to be pregnant and this age group is a preferable for pregnancy, so they seeking for medical help.⁽⁹⁾

Relative to the residency, the present study shows that the majority of study group are living in urban residential area, while the majority of control group are from rural area. This result matches with the result of **Saoji (2014)** who mentioned that most study group are living in urban residential area , while most control group are from rural area. This result may come due to women who live in urban more vulnerable to pollutants and chemicals such as; polluted air from factories, vehicles and electric generators. In addition, frequent use of detergents, cosmetic and pesticides.⁽¹⁰⁾

About educational level, the present study indicates that the highest percentage of the study group graduated from secondary school, while in control group the highest percentage of sample able to read and write. This results are in agreement with **Shamila and Sasikala (2011)** in their study, they mentioned that there is high percentage of study sample with secondary school education⁽¹¹⁾. Also they reported that " Women with secondary school education and above had markedly lower average fertility than the less educated".

In related to occupation the majority of study and control groups were housewives . This result comes along with **Mokhtar, et al., (2006)** in their study that the majority of study and control groups were housewives. Relative to the socio-economic status, high percentage of both study and control groups are with moderate socio-economic status⁽¹²⁾. This result supported by **Jumayev, et al. (2012)** in their study which indicated that the highest percentage of both groups have moderate socio-economic status⁽¹³⁾. Regarding to passive smoking, the majority of study and control groups were exposed to passive smoking .This result agrees with **Amirkhani, et al. (2014)** who reported that "High percentage of case and control group were passive smokers".⁽¹⁴⁾

Concerning to body mass index, the highest percentage of study group are obese. This result agree with **Zeidan (2015)** in her study who mentioned that the majority of study group are obese⁽¹⁵⁾. While the majority of control group are underweight which agree with **Saoji (2014)** in their study which indicated that the majority of control groups are not obese⁽¹⁰⁾. Relative to

taking of caffeine, the study result shows that the highest percentage of both groups are drinking caffeine one cup daily which agree with **Homan, et al. (2007)** who mentioned that "The majority of study sample drinking caffeine about (1-2) cups daily". Also the results may related to the Iraqis life style, so they like to drink caffeine daily especially at morning⁽¹⁶⁾.

Regarding to (table 2) The results of the present study show that the majority of both study and control groups are with no family history of infertility and no previous diseases (DM, HTN, thyroid disease) except few number of study group have TB. This result comes along with **Mokhtar, et al. (2006); Elkhwsky and Ben Khaial (2009)** who mentioned that the majority of study and control group are with no family history of infertility and no previous diseases^{(12), (17)}. The result of no having previous diseases was due to all study sample of young age ,and these diseases rarely affected young age.

Also the study results show that the majority of both groups have no surgeries, but high percentage of study and control group have abdominal surgery with duration between (3-4), (1-2) years respectively. This result agrees with **Mokhtar, et al (2006)** in their study who stated that " Most of study samples do not have any pelvic or abdominal surgeries but there is high percentage of both groups have abdominal surgery."⁽¹²⁾

In addition ,the control group have caesarian section more than study group. This result comes along with **Torres - Sánchez, et al. (2004)** in their study reported that" The distribution of caesareans were significantly lower among the cases, compared with controls." This result might be due to most Iraqi women now in this country preferred delivery by CS rather than vaginal to avoid the painful parturition.⁽¹⁸⁾

The present study in (table 3) indicates that the majority of both groups have menarche between (10-15) years, regular cycle (but high percentage of study group have irregular cycle), age at marriage between (16-19) . Also the majority of study group have primary infertility with duration between (4-6) years, these results are supported by **Mokhtar, et al. (2006); Saoji (2014) ; Mallikarjuna and Rajeshwari (2015)** in their study they mentioned that " The majority of study samples have menarche (≤15 years) , primary infertility, regular cycle but the highest proportion of case group have irregular cycle"^{(12); (10)}. Furthermore, the majority of both groups have no abortion ,ectopic pregnancy which disagree with **Torres - Sánchez, et al. (2004)** who stated in their study that " A history of ectopic pregnancy were more frequent among study group while, a history of abortion were lower among the cases, compared with controls".⁽¹⁸⁾

The present study shows that the majority of study group have Polycystic ovarian syndrome which is in agreement with **Elkhwsky and Ben Khaial (2009)** who demonstrated that" Polycystic ovarian syndrome (PCOS) was more frequent in case group compared to the controls".⁽¹⁷⁾

Similarly the majority of both groups have genitourinary and fungal infection which come along with **Mokhtar, et al. (2006) ;Saoji (2014)** who reported in their study that "Episodes of genital infection (irrespective of the type of micro-organisms

causing the infection) and its sequelae as tubal fibrosis and obstruction are more frequent in an infertile women than healthy, which had a 10 fold risk of subsequent tubal infertility".^{(12),(10)}

Also the present study shows that the majority of study group have no endometriosis and do not use contraceptive methods which in consistency with **Elkhwsky and Ben Khaial (2009)** in their study who mentioned that most of study sample had no endometriosis and they did not use any contraceptive methods⁽¹⁷⁾. Furthermore, high percentage of both groups are perform sexual relationship at fertile days. This result agrees with **Mallikarjuna and Rajeshwari (2015)** in their study they stated that high percentage of both group perform sexual relationship at fertile days.⁽¹⁰⁾

In addition, this table shows that the highest percentage of study group have problems of egg quality. This result is due to most study group have PCOS that lead to decreased ovarian reserve and even decrease the quality of the egg cell. Also the majority of study sample have no problem of cervical mucus quality which agrees with **Masoumi, et al. (2015)** who stated that high proportion of study sample is with no problems of cervical mucus quality.⁽¹⁹⁾

In addition, the majority of study sample have prolactin hormone elevation that comes along with **Mallikarjuna and Rajeshwari (2015)** in their study, they found that high percentage of study sample have prolactin hormone elevation⁽¹⁰⁾. Also the study group have high percentage of tubal occlusion that comes along with **Famurewa, et al. (2013)** who found that the majority of study group have tubal occlusion.⁽²⁰⁾

Concerning the result in table (4.4) the present study shows that no significant differences between study and control groups regarding age and level of education. This result comes along with **Mallikarjuna and Rajeshwari (2015)** in their study, they found that the age and educational level have no association with female infertility.⁽¹⁰⁾

About occupation, the relationship between occupation and infertility is insignificant which agree with **Mokhtar, et al. (2006)** in their study they mentioned that no relationship between occupation and infertility⁽¹²⁾. Relative to socio economic status, no relationship between both groups regarding socio economic status and infertility that comes along with **Aflatoonian, et al. (2009)** in their study, they reported that the relationship between socio economic status and infertility is insignificant.⁽²¹⁾

Regarding to passive smoking, there is no significant difference between study and control group about passive smoking and infertility. This result disagrees with **Amirkhani, et al. (2014)** in their study they found that passive smoking increases the risk of infertility⁽¹⁴⁾. Relative to body mass index, no relationship between both groups regarding BMI and infertility which disagrees with **Saoji (2014)** who found that " Unhealthy weight gain can negatively impact the reproductive system, leading to difficulties in conceiving ".⁽¹⁰⁾

Regarding to drinking caffeine, the relationship between both groups is insignificant, this result agrees with **Pham, et al. (2002)** in their study, they reported that "Caffeine consumption was not associated with infertility"⁽²²⁾. Regarding to the previous surgeries, sites of surgeries, there is no relationship between study and control group regarding previous surgeries, sites of surgeries. This result agrees with **Elkhwsky and Ben Khaial**

(2009) who mentioned in their study that, there is no relationship between previous surgeries, sites of surgeries and infertility.⁽¹⁷⁾ Relative to abortion and ectopic pregnancy, there is no relationship between the two groups and these variables, which disagree with **Torres - Sánchez, et al. (2004)** who mentioned in their study that " The relationship between both groups regarding ectopic pregnancy and abortion were significant"⁽¹⁸⁾. Concerning age at menarche, no significant association between the study groups and age at menarche that comes along with **Mallikarjuna and Rajeshwari (2015)** who stated in their study " The relation between age of menarche and female infertility is insignificant"⁽¹⁰⁾. Also there is no relationship between two group regarding age at marriage which disagree with **Mokhtar, et al. (2006)** in their study that " The age of marriage is a significant predictor for primary infertility". This result may be due to all study sample are at young age.⁽¹²⁾

Relative to endometriosis, no association between study and control regarding endometriosis and infertility which disagrees with **Saoji (2014)** who found that endometriosis is a risk factor for primary infertility⁽¹⁰⁾. Regarding to G. infection (viral infections and fungal infections), no significant difference between study and control groups relative to infection which disagree with **Elkhwsky and Ben Khaial (2009)** who found that " Genital infection irrespective to the causative agents is strongly associated with infertility".⁽¹⁷⁾

In table (5) the present study indicates that there is a high significant of infertility among women who lived in urban area compared with control group, this result agrees with **Saoji (2014)** in their study as they reported " Living in urban areas was significantly associated with infertility"⁽¹⁰⁾. This result might come due to women who live in urban more vulnerable to pollutants and chemicals such as; polluted air from factories ,vehicles and electric generators, in addition frequent use of detergents, cosmetic and pesticides.

Furthermore there is a significant difference between the study and control groups regarding family history and cesarean section with its duration which is supported by **Mallikarjuna and Rajeshwari (2015); Mokhtar et al. (2006)** " There was significant association between study and control group regarding history of previous surgical operations such as abdominal surgery and positive family history of infertility with occurrence of infertility".^{(10),(12)}

In addition, the study results indicate that there is a high significant difference between the study and control groups regarding menstrual cycle irregularity and PCOS which is in agreement with **Shamila and Sasikala (2010)** who mentioned in their study that " there was a high association between PCOS ,irregular cycle and infertility. Also there is high significant difference about egg quality problems between study and control groups, this result is due to most study group have PCOS that result in poor egg quality".⁽¹¹⁾

In addition, this table shows strong association between both study groups for tubular occlusion and infertility that comes along with **Famurewa, et al. (2013)** who found that "There was strong association between fallopian tubes obstruction and infertility"⁽²⁰⁾. Also highly significant difference for prolactin hormone, which is supported with **Mallikarjuna and Rajeshwari (2015)** who mentioned that " Prolactin hormone

elevation is a significant risk factor contributing to infertility"⁽¹⁰⁾

V. ETHICAL CONSIDERATION

This is one of the most basic principles before gathering the data, to keep the patient's values and self-respect. The researcher achieved this agreement from the Ethical committee at the Faculty of Nursing / University of Kufa (Appendix-B). The researcher promised to keep the patient's information confidential, and use these data for this study only then he explained the purpose of this study to each participant without affecting the routine visiting and care. In addition to above the researcher told each participant that this is voluntary work, and they can leave any time even the interview process is not completed.

VI. CONCLUSIONS

According to the study findings and discussion, the study concluded the following:

1. Women from urban residential areas are more risky for infertility as compared with rural residents.
2. Family history is one of the risk factors for infertility.
3. The study indicates that most women have menarch ≤ 15 .
4. The most common type of infertility is Primary infertility.
5. The study concludes that the study group have a significant higher duration since surgeries as compared with those in control group.
6. Infertile women are marry early as compared with fertile women.

VII. RECOMMENDATIONS

Based on the study results discussion and conclusions the study recommended that:

1. A population-based study should be conducted to increase women's awareness about the risk factors of infertility especially among young girls.
2. Ministry of Health should employ a mass media to increase women' awareness about the risk factors of infertility and how to avoid such factors.
3. Further studies should be made to find the national prevalence of the risk factors of infertility among Iraqi women.

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Assessment of Mother's Knowledge toward Breastfeeding at AL-Najaf City

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Abstract- Background: Breastfeeding is an important source of infant's nutrition in the first six months of their life. Breast milk is considered the first vaccine to infants, contains antibodies providing immunologic protection against death from infectious diseases.

Objective: to assess mother's knowledge toward breastfeeding, to find out relationship between mother's knowledge toward breastfeeding and their demographic data.

Material and methods: Across-sectional descriptive study is carried out in (6) primary health care centers at AL-Najaf city, from November 1st, 2015 until July, 21th, 2016. A non-probability (purposive sample) from 150 lactating mother.

Results: The study results reveal there is a significant relationship between mother's knowledge about breastfeeding with mother's age, method of delivery, educational status of the mother and husband.

Conclusion and Recommendation: Majority of the studied mothers have good knowledge about breastfeeding. The study recommends that educational programs for pregnant women and mothers to increase their knowledge and interest about breastfeeding; encourage mothers for exclusive breastfeeding within first six months of infant's life.

Index Terms- Mothers, Knowledge, Breastfeeding.

I. INTRODUCTION

World Health Organization (WHO) considered that breastfeeding as important source of nutrition for infants in the first 6 months of life, and emphasized on mothers to practice breastfeeding as an only source of feeding. Between 6 months and 2 years of child age, suggested that mothers can use supplemental food to feed their children along with breastfeeding⁽¹⁾.

Breast milk is one of the healthiest methods of infant's feeding and has various benefits for mother and children. It contains nutrients which provide the best nutritional combination for the child at least up to 6 months. Breast milk also has a special importance due to it contains known materials especially essential fatty acids for brain growth and nerves development⁽²⁾.⁽³⁾ ⁽⁴⁾.

Islam clearly emphasizes on breastfeeding until a child is two years of age as mentioned in the Holy Qur'an "The mothers shall give suck to their offspring for two whole years, for him who desires to complete the term"⁽⁵⁾.

Beneficial effects of breastfeeding are determined by many factors. These factors are: initiation, duration, and the age at

which the child is weaned⁽⁶⁾. WHO recommended that the breastfeeding should be initiated within the first hour of birth in case there is no any medical problems that prevent it, because colostrum has contain high in protein, fat-soluble vitamins and antibodies that protect the infant from bacterial and viral illnesses⁽²⁾.

A human baby is susceptible to infectious diseases due to the immaturity of immune system as well as of the major organs, according to that, it needs the additional protection of the bioactive factors in breast milk that strengthen host defense mechanisms against infection and other foreign agents and improve the immature immunologic system of the neonate⁽⁷⁾. According to World Health Organization, 220,000 babies could be saved every year if they were initially breastfeeding within the first hour and exclusively continuing breastfeeding for 6 months, and breastfeeding at appropriate age till the age of 2 years⁽¹⁾.

Breastfeeding initiation rate in Iraq, distributed in 2006 from 25.1% to 43% in 2011. But representing significantly increased and will remain very insufficient to ensure good initial in life for all Iraqi children. Actually, that almost six children of ten do not receive breast milk in the first hour of their life. In Erbil city, a published research in 2010 showed that 17.5% of mother's aware breastfeeding should be started during the first hour after birth⁽⁸⁾.

In Iraq, the Ministry of Health was reported that the prevalence of breastfeeding for infants within age six months was 41% in 2014, whereas in 2013 was 44%. Indeed, the report show that the prevalence of breastfeeding for infants within age six months in AL-Najaf city was 25% in 2015 while in 2014 was 37%. There were wide variations between governorates percentages of children who are exclusively breastfed. The percentage of adequately breastfed infants different between Najaf and Karbala (37% and 59 %) respectively⁽⁹⁾.

Objectives of the study:

This study aimed to assess mother's knowledge toward breastfeeding, to find out the relationship between mother's knowledge toward breastfeeding and their demographic data.

METHODOLOGY:

Across-sectional descriptive study is carried out in (6) primary health care centers at AL-Najaf city, from November 1st, 2015 until July, 21th, 2016. A formal agreement was acquired from Ministry of Planning/Central Council for statistic. Also an official permission obtained from Al-Najaf Al-Ashraf Health Directorate/ Northern and southern sectors of AL-Najaf City for getting sample from primary health care centers. A non-probability (purposive sample) of 150 lactating mothers were

selected and the criteria of the sample are: Mothers registered in primary health care centers and lived in al-Najaf city. All mothers were Iraqi Nationality. Babies were free from any congenital anomalies. Lactating mothers should have children within 2 years age. The questionnaire format consisted from (2) parts:

Part 1: Socio demographic data:

This part consists from four sections categorized as:

Section 1: Mother's demographic data:

This includes (age, education, occupation, type and place of delivery for recent child) and a question regarding resources of breastfeeding education there or not.

Section 2: Husband's demographic data:

This includes (education and occupation).

Section 3: Infant's demographic data:

This includes (age and gender).

Section 4: Socio-economic Status:

Socio-economic status scale obtained after the calculation of socioeconomic information about mother's occupation and education; husband occupation and education; crowding index, family type and family properties (house expenses), type of housing, household asset, possession of a car & other house excess). The calculated score help in classified the family level of socioeconomic as high or moderate or low level. These levels represented as following: high SES (80-100), middle SES (60-79), and low SES (59 and less).

Part 2: Mother's Knowledge about Breastfeeding: This part of the questionnaire is included 8 items that clarify mother's knowledge regarding breastfeeding which measures by multiple choices question.

The knowledge of mothers toward breastfeeding questionnaire items were rated and scored according to the following patterns:

a) Multiple choice questions used for rating the knowledge items.

The scoring is as following: (2) for correct answer, (1) for incorrect answer.

Statistical Analysis:

The Statistical Package SPSS (Statistical Package for Social Science) version (20) and Microsoft Excel application was used for data processing and statistical analysis. Data analyzed through the application of two statistical approaches. **A descriptive data analysis** includes: a- Tables (Frequencies, Percentages, and Mean of scores), b- Cutoff point (0.66), c- Statistical figure (Bar and Pie Charts) and d- Pearson's Correlation Coefficients (Reliability), and **Inferential Data Analysis includes** a- Chi-Square test.

II. RESULTS

Table 1: Socio-Demographic Characteristics of the Studied Families.

Socio-Demographic data	Rating and intervals	Frequency	Percent
Mother's age (Years)	≤ 20	22	14.6
	21 - 25	41	27.3
	26 - 30	46	30.7
	31 - 35	28	18.7
	36 and above	13	8.7
Mother's education	Illiterate	24	16.0
	Able to read and write	22	14.7
	Primary school graduated	43	28.7
	Intermediate school graduated	29	19.3
	Secondary school graduated	12	8.0
	Institute graduated	8	5.3
	College graduated	11	7.3
	Postgraduate	1	.7
Mother's occupation	High professional and managerial jobs	3	2.0
	Lower professional jobs	6	4.0
	Unskilled workers	141	94.0
Husband's education	Illiterate	17	11.3
	Able to read and write	21	14.0
	Primary school graduated	33	22.0
	Intermediate school graduated	32	21.3

	Secondary school graduated	14	9.3
	Institute graduated	8	5.3
	College graduated	25	16.7
Husband's occupation	Lower professional jobs	53	35.3
	Unskilled workers	97	64.7
Type of family	Nuclear Family	60	40.0
	Extended Family	90	60.0
Method of delivery	Normal delivery	111	74.0
	Cesarean sections	39	26.0
Place of delivery	Home (midwife)	22	14.7
	Hospital	128	85.3
Socio-economic status	Low	62	41.3
	Moderate	81	54.0
	High	7	4.7
Infant's age (Months)	≤ 5	79	52.7
	5 - 10	34	22.7
	10 - 15	18	12.0
	15 and above	19	12.6
Infant's gender	Male	90	60.0
	Female	60	40.0
Total		150	100.0

Table (1) shows that the socio-demographic characteristics of the studied families. The majority of study sample are (30.7%) within age group (26-30) years old. Concerning the mother's occupation, the study indicates that majority of mothers (28.7%) graduated from primary school. Regarding to mother's occupation, (94%) of them housewife. Concerning husband's education, (22%) of them was graduated from primary school, as well as the husband's occupation, (64.7%) are unskilled workers.

Regarding to family type, (60%) of them from extended families. In regard to method of delivery, (74%) are gives birth by normal delivery. Concerning to the place of delivery (85.3%) of mothers have given birth in the hospital. Regarding to socio-economic status, the majority of the study sample (54%) of them are from moderate socio-economic status. Concerning the infant's age, higher percentage of infants are within age ≤ 5 months, as well as the infant's gender, (60%) of them are males.

Table 2: Sources of mother education about breastfeeding

Items	Rating and intervals	Frequency	Percent
Are you receiving education about breastfeeding?	Yes	106	70.6
	No	44	29.4
Total		150	100.0
Sources of education	None	44	29.3
	Physician	8	5.3
	Health Workers	5	3.3
	Family	70	46.7
	physician, and Health Worker	4	2.7
	Physician, and Family	2	1.3
	Family, and Health Worker	5	3.3
	Family, Mass Media	4	2.7
Mass Media	8	5.3	
Total		150	100.0

Table (2) reveals that the (70.6 %) of mothers receive **education** about breastfeeding. The family is the main source of **education** about breastfeeding.

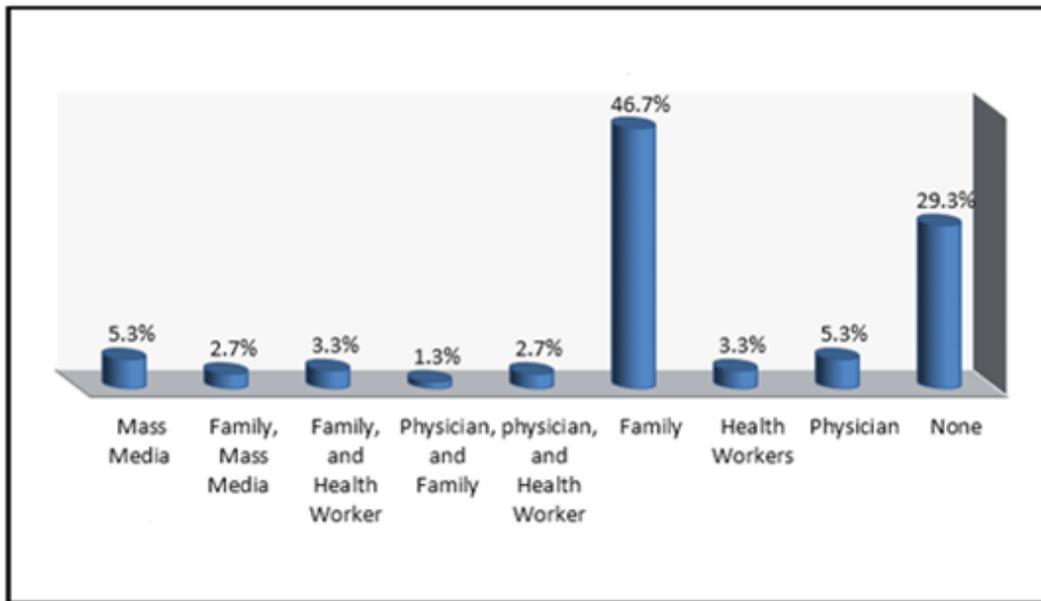


Figure 1: Distribution the sources of education about breastfeeding.

Table 3: Distribution the study sample responding to the knowledge items.

Items	Correct		Incorrect		M.S	Assessment
	Freq.	%	Freq.	%		
1. Ideal time for initiation of breastfeeding ½-1 hour after delivery.	69	46%	81	54%	1.46	Poor
2. Benefits of colostrum for newborn is considers the first vaccine for newborn.	127	85%	23	15%	1.85	Good
3. Meaning of exclusive breastfeeding is giving breast milk only for first 6 months.	36	24%	114	76%	1.24	Poor
4. Ideal duration of each breastfeeding two years	116	77%	34	23%	1.77	Good
5. Sign of effective breastfeeding for your baby will gain weight	102	68%	48	32%	1.68	Good
6. Benefit of breastfeeding to baby contains antibodies which protect a baby against infection	142	95%	8	5%	1.95	Good
7. Benefit of breastfeeding to mother is decrease incidence of breast and ovarian cancer	96	64%	54	36%	1.64	Good
8. Frequent breastfeeding is increases breast milk production.	113	75%	37	25%	1.75	Good

(Mean of score < 1.5 poor, Mean of score ≥ 1.5 Good).

Table (3) shows that the majority of mother's responses to the knowledge items about breastfeeding are good to all items, except the items as numbered: (1 and 3) their responses are poor.

Table 4: Distribution the overall assessment of mother's knowledge about breastfeeding

Main Domain	Incorrect		Correct		M.S	Assessment
	Freq.	%	Freq.	%		
Overall Mother's Knowledge	44	29 %	106	71 %	1.66	Good

N(150), poor (Mean of score < 1.5), Good (Mean of score ≥ 1.5).

Table (4) shows that the overall assessment of mother's knowledge about breastfeeding is good.

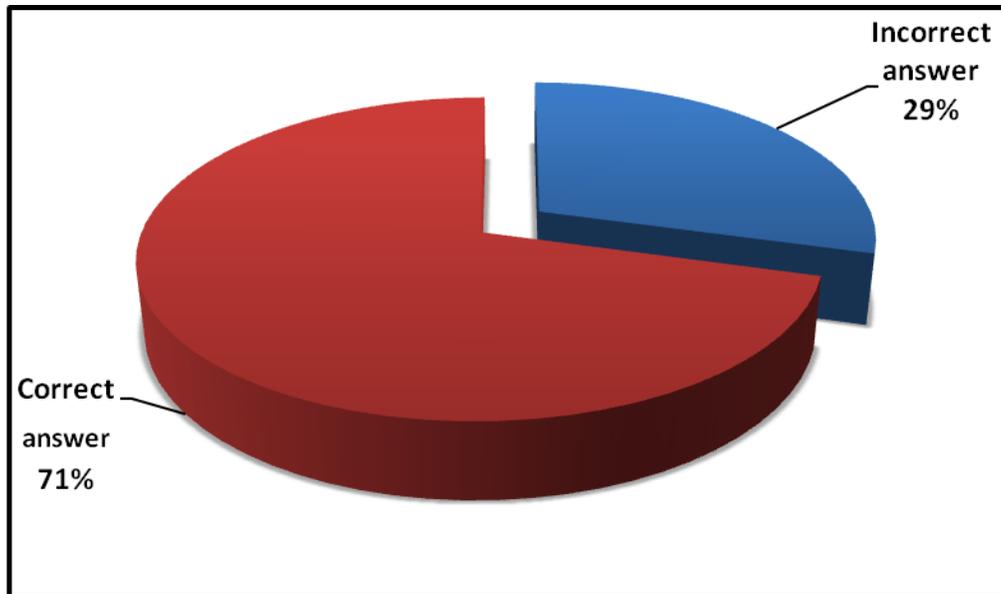


Figure 2: Distribution the study sample according to overall assessment of mother's knowledge about breastfeeding.

Table 5: Relationship between mother's knowledge about breastfeeding and their demographic data

Demographic data	Chi-square (X ²)	d.f	P-value (Sig.)
Mother's age (Years)	7.268	4	0.012 (S)
Mother's education	15.453	7	0.031 (S)
Mother's occupation	0.502	2	0.778 (NS)
Husband's education	16.820	6	0.010 (S)
Husband's occupation	1.771	1	0.183 (NS)
Type of family	0.906	1	0.341 (NS)
Method of delivery	4.947	1	0.026 (S)
Place of delivery	0.077	1	0.782 (NS)
Socio-economic status	0.442	2	0.802 (NS)

Table (5) reveals that there is a significant relationship between mother's knowledge about breastfeeding and some their demographic data such as mother's age, level of education for mother and husband, method of delivery at (p-value > 0.05), while there is a non-significant relationship between mother's knowledge with remaining demographic data.

III. DISCUSSION

According to (Table1) in regards to age, the majority of study samples are within age-group (26-30) years old. This result is supported by Ayed, (2014), who reported that the age 26 years old is dominant age for the study sample⁽¹⁰⁾. Concerning mother's education, there is a highest percentage of study sample graduated from primary schools. This result is in agreement with

other studies Jha, (2015), in their studies found that the majority of the study subjects are primary school graduated that effects on knowledge of mothers about breastfeeding⁽¹¹⁾.

In regard to mother's occupation, the highest percentage of mother's is housewife. This result is supported with Al-Hreashy, *et al.*, (2008); Al-Anazi, *et al.*, (2013), stated that most of the study participants are housewives. So, the breastfeeding is one of housewives priorities due to their ability to devote sufficient time to their children^{(4), (12)}. According to husband educational level, the highest percentage of husband graduated from primary schools. This results supported by Shaker, *et al.*, (2014), reported that the highest percentage of husband's educational level are primary school graduated⁽⁸⁾.

Concerning the husband's occupation, the majority of them are unskilled workers (non-professional work). This result agrees with Ouchi, *et al.*, (2013), reported that there is a highest percentage of husband's occupation is non-professional work. Regarding to type of family, the highest percentage of the participant from extended family⁽¹³⁾. This result is supported with Hassan, (2015), who reported that the highest percentage of participant from extended family⁽¹⁴⁾.

Regarding to method of delivery, the majority of study sample gives birth by normal delivery. This result agrees with Abu Shosha, (2015), who stated that the majority of mothers gave birth by normal delivery⁽¹⁵⁾. That means the mothers have given birth by normal delivery are more likely to breastfeed than those who have given birth by caesarean section. Concerning the place of delivery, the present study indicates that majority of mothers given birth in the hospital. This result approved with Ravi, *et al.*, (2015), they mentioned that highest percentage of mothers have given birth⁽¹⁶⁾.

Regarding to socio-economic status, the majority of study sample from moderate socio-economic status. This result is supported by Shommo & Al-Shubrumi, (2014), stated that the most of study sample are with moderate socio-economic status⁽¹⁷⁾. According to age of children, the study result indicates that the highest percentage of children age with ≤ 5 months. This result is supported by Chatterjee and Saha, (2007), reported that the age of the child ≤ 5 months is the dominant age⁽¹⁸⁾. Concerning the child's gender, the result indicates that male infant has a highest percentage in mothers attending primary health care centers. This result comes along with Atrushi and Mahmood (2014), they mentioned that the dominant gender is male infant for mothers who attending primary health care centers⁽¹⁹⁾.

According to the results show in (Table 2 and Figure 1) the study indicates that the highest percentage of mothers received education about breastfeeding. This result approved with the result done by Kadhum, (2013), who stated that the majority of study sample received education about breastfeeding⁽²⁰⁾.

Mothers with low educational levels make them incapable to understand and comprehend the educational information in pamphlet, poster and advanced media. So, they need to be educated about breastfeeding directly from family, friends or health workers. This means that the family plays an important role for successful breastfeeding.

The study results reveal that the family is the main source of mother's education about breastfeeding. This is similar to the reports of Dallak, *et al.*, (2016); mentioned that majority of the

study sample received education toward breastfeeding from their families⁽²¹⁾.

In (Table 3) shows that mothers have efficient knowledge regarding to the items: (benefits of colostrum for newborn is considers first vaccine for newborn; ideal duration of each breastfeeding is two years; sign of effective breastfeeding for baby will gain weight; benefit of breastfeeding to baby contains antibodies which protect a baby against infection; benefit of breastfeeding to mother is to decrease the incidence of breast and ovarian cancer; frequent breastfeeding is increases breast milk production). While, mothers have deficient knowledge concerning the items: (ideal time of breastfeeding initiation is 1/2-1 hour after delivery and meaning of exclusive breastfeeding is giving breast milk only for first six months).

The study results (Table 4) reveal that the overall assessment of mother's knowledge about breastfeeding is good.

These results mean that the involve mothers of this study have good knowledge about breastfeeding. This result is agreement with the study done by Mbada, *et al.*, (2013), they reported that the overall assessment of mother's knowledge about breastfeeding is good⁽²²⁾.

In regards to the result in (Table 5) indicates that there is a significant relationship between mother's knowledge about breastfeeding with mother's age, educational status of the mother and husband, and method of delivery. While, there is a non-significant relationship between remaining demographic variables including occupational status of the mother and husband, type of family, place of delivery and socio-economic status.

AL-Azzawi, *et al.*, (2010), they stated that a significant relationship between mother's age and knowledge about breastfeeding⁽³⁾. This result match with the result of the study done by Al-Hially, (2010), who reported that there is a significant relationship between mother's education and knowledge about breastfeeding. This might be that the educated mother has better knowledge about breastfeeding more than uneducated mother⁽²³⁾.

Tamiru and Mohammed, (2013), reported that there is a significant relationship between husband's education and mother's knowledge about breastfeeding⁽²⁴⁾. This result agree with Hanafi, *et al.*, (2014), indicate that there is a significant correlation between mother's knowledge and method of delivery⁽²⁵⁾. Maryam, *et al.*, (2014); Mahmud, (2011); Al-Asadi, (2011), all of them stated that a non-significant differences among mother's occupation and knowledge about breastfeeding^{(26), (27), (28)}. This result are supported by Pushpa and Chowti, (2012), mentions that there is a non-significant relationship between place of delivery and mother's knowledge about breastfeeding⁽²⁹⁾.

Ghaffari, *et al.*, (2007), revealed that a non-significant relationship among socioeconomic status and mother's knowledge about breastfeeding⁽³⁰⁾. This result comes along with Ekambaram, *et al.*, (2010), reported that a non-significant relationship between mother's knowledge and type of family⁽³¹⁾. This result is agree with Ayed, (2014), stated that a non-significant relationship between husband's occupation and mother's knowledge about breastfeeding⁽¹⁰⁾.

IV. CONCLUSION

According to the study findings and discussion, the study concluded the following: The family is the main source of mother's education regarding breastfeeding. Majority of the studied mothers have good knowledge about breastfeeding. There is a significant relationship between mother's (age, education, type of delivery) and husband's education with mother's knowledge about breastfeeding.

V. RECOMMENDATION

According to present results and conclusions, the researcher recommends that:

- 1- Educational programs for pregnant women and mothers to increase their knowledge and interest about breastfeeding.
- 2- Encouraging mothers for exclusive breastfeeding within first six months of infant's life.
- 3- Promoting mother's knowledge about the importance of breastfeeding in assessing domains (ideal time for initiation of breastfeeding and meaning of exclusive breastfeeding).
- 4- Emphasizing audio-visual mass media programs about breastfeeding.

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A Conceptual Model for E-Government Success Factors in Developing Countries

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Abstract- This paper presents a study which examines several e-government success factors in developing countries. Developing countries in the Middle East have a history of commitment to good governance and ICT-related initiatives. But still there is very little research that examines what businesses use in terms of e-government and issues and constraints that they face, plus that e-government projects failure cases mostly happen in developing countries, hence there is a need to give a great deal of attention to these countries to make e-government projects successful. For a better understanding of e-government and its influence on the society as all and on the business society in particular the researchers carried out a study to propose a conceptual model for e-government success and to identify the success factors which affect e-government success from a business perspective in developing countries, and to investigate the factors that determine business organization satisfaction towards e-government in developing countries. In this paper the researchers will discuss four factors that affect the success of e-government services from businesses perspective in developing countries as followed: information quality, perceived ease of use, personalization and trust.

Index Terms- E-government success, information quality, personalization, perceived ease of use, trust, developing countries e-government

Information and communication technologies (ICT) have revolutionized the processes, operations and structures of public sectors in both developed and developing countries (Alshibly & Al-Dmour, 2011; Rana et al. 2015). Nowadays, the e-government plays an important role in serving societies and businesses by providing to them different kinds of transactions and services at anytime and anywhere using a device that is capable to be connected to the internet (Meftah, Gharleghi, & Samadi, 2015). This paper thus intends to examine several success factors of e-government application adoption for business organizations in developing countries and propose a conceptual model for e-government success. Several scholars addressed that e-government projects failure cases belong to developing countries and there is a need to give a great deal of attention to these countries to make e-government projects successful. For a better understanding of e-government and its influence on the society as all and on the business society in particular the researchers carried out this study to identify the success factors which affect e-government application adoption in developing countries, also to investigate the factors that determine business organization satisfaction towards e-government adoption in developing countries. In this paper the researchers will discuss four factors that affect the success of e-government services from businesses perspective in developing countries as followed: information quality, perceived ease of use, personalization and trust.

I. INTRODUCTION

E-government phenomenon began in the 1990s and refers to the use of information and communication technologies (ICT) to improve the activities of public sector organizations. ICT has revolutionized the way governments, organizations and individuals used to carry out their work. Due to the important position of the government, it has implemented ICT and information systems for serving the citizens and businesses efficiently and effectively, when the concept of e-government was born at that time (Meftah et al. 2015). Over time services through internet have become the primary interfaces between government and stakeholders (citizens, business and with other government (Karkin & Janssen, 2014). Nowadays rather using traditional services governments are serving to the citizens, business organizations and other stakeholders through the internet. Serving through the internet governments have taken several initiatives to enhance the effectiveness and efficiency of the services providing through the introduction of e-Government (Alanezi, Kamil & Basri, 2010).

II. PROBLEM STATEMENT

It is suggested by the literature that many initiatives of the e-government have not been completed successfully, especially in the developing countries. Nearly 60% to 80% of e-government projects fail or do not reach their objectives (Heeks, 2003; UN, 2008; Mkude & Wimmer, 2013; UN, 2012; Rabaai, 2015). Thus there is very little research that examines what businesses use in terms of e-government and the issues and constraints that they face (Reddick, & Roy, 2013). As Alawneh *et al.* (2013) declared that, in order to increase citizen satisfaction, the e-government authorities in developing countries need to develop e-government portals with good accessibility capabilities, awareness aspects, and service quality measures; this will influence usage behavior, satisfaction evaluation and their positive feelings towards adopting the e-government portals. Komba and Ngulube, (2014) asserted that in order for e-government adoption to succeed; a high level of satisfaction with the online service provided by the government is required.

III. SUCCESS FACTORS OF E-GOVERNMENT

Information Quality as a Success Measure

In the Internet environment, Information Quality measures some aspects that are related to Information Quality such as timeliness, accuracy of the information generated by an information system and the relevance (DeLone & McLean, 2003; 2004). Several quality assessment aspects are essential, including the comprehensiveness of the output information content, the correctness of the output information, and the availability of the output information at a time suitable for its use (Bailey & Pearson, 1983). It is also important to consider issues such as relatedness, clearness, and goodness of the information (McKinney et al., 2002).

User satisfaction is affected by both information quality and system quality (DeLone & McLean, 1992; 2004; McKinney et al., 2002; Seddon, 1997; Seddon & Kiew, 1996; Molla & Licker, 2001). Szymanski and Hise (2000) found that, product information aspects and website design issues are important for determining customer satisfaction. Information quality and system quality are related positively with satisfaction. That indicates the higher information quality and system quality are perceived by users, the more satisfaction is gained out of them towards the system (DeLone & McLean, 2004).

Personalization as a Success Measure

Within the e-government context, the lack of physical contact inherent in the online experience causes customers to depend greatly on information technology (IT) behind the e-government system. IS researchers generally regarded personalization to be a highly important characteristic of all web-based ISs (Komiak and Benbasat 2006), independent of the specific application a system was designed to support. In the e-commerce context, Komiak and Benbasat (2006) found that personalization influences trust in a positive way by facilitating the perceived competence of the IT artifact and the user. In turn, this study suggests that the greater the extent to which an e-government website understands and represents the personal needs of the user and the degree to which information is tailored to meet the needs of an individual user, the higher is the customer's trust. However, there has been little empirical research about the impact of personalization provided by e-government websites on trust. Therefore, this work contributes to the current knowledge about the impact of personalization on trust. In the context of studying e-government success, a critical issue has hampered empirical investigations of the impact of customer trust on e-government success: the confusion between interpersonal trust and system trust. With interpersonal trust, trust is with a person or business, whereas system trust is about the reliability and security of the system (Alshibly & Chiong, 2015). Successful use of (ICT) creates the chance for governments to increase citizen satisfaction through government delivery of e-services. Citizen satisfaction with e-government service is related to the use of an e-government website, and citizen satisfaction is positively associated with trust in government. So by the increasing of citizen trust in their government that will lead to citizen satisfaction in government e-service delivery (Alshibly & Chiong, 2015; Welch et al., 2004). Citizens perceived quality of public service delivery increases citizen satisfaction, so business

users' satisfaction is strongly connected and related to trust in government service delivery (Bouckaert et al., 2002).

Perceived Ease of Use as a Success Measure

It has also been claimed that system quality can influence the perceived ease of use, and that is by the factors behind the system quality can lessen the effort users have to make in their usage of information technology. Personalization is the process of customizing an IS's functionalities, interfaces, and contents to a user's demand based on knowledge obtained through services and user interactions (Sundar & Marathe, 2010; Park, 2014; Pappas et al. 2014). It is also widely known that personalization benefits users with more suitable added value offerings (Kwon & Kim, 2012). Thus, perceived ease of use has effect on personalization of the IS and lead to the better usefulness to users. Accessibility is related to how the system is available, if the user wants to access the site; whether there are fewer impediments towards the user using the system as needed. This takes the user to use the system to perceive usage to be easier. Lucas and Spittler (1999) found that the system quality has an influence on the perceived usefulness and perceived ease of use. Rai et al., (2002), extended the Seddon model and identified perceived usefulness and perceived ease of use as antecedents of satisfaction. According to Davis et al., (1989), defined perceived ease of use "refers to the degree to which a person believes that using a particular system would be free of effort" (Davis 1989, p. 320). They also stated that perceived ease of use is an antecedent of perceived usefulness. Other researchers have offered the same finding that "perceived usefulness is influenced by perceived ease of use (Igbaria et al., 1996; Gefen & Keil, 1998).

Trust as a Success measure

Another area of research that has received a lot of attention is business' use of e-government and trust and confidence in government (Morgeson, VanAmburg, & Mithas, 2010). Trust in government has long been studied in the political science literature. Trust essentially means that citizens have confidence that their government will make the right decisions. The role of government is normally and traditionally that of protector and provider of services to its citizens. Citizen satisfaction is developed in terms of the quality of this protection by the government, and this also applies in the context of e-government systems. On the government side, its ability to perform its service as a protector, depends on their ability to gather intelligence or information on the needs of citizens, and based on such information; provide services that can help citizens in their activities. However, this requires that citizens are willing to be told by the government, receive instructions and exchange information on the e-government system. The proper functioning of these steps can ensure the success of e-government. Thus, trust becomes one of key components in enabling citizens to become willing to receive information and provide information to the e-government system in return (Lee and Rao, 2003).

Shapiro (1987) identified two types of institutions based trust; the normality of the situation, which is the belief that when situations are normal, success is likely to follow; and structural assurances which, is the belief that the presence of promises, contracts, regulations, or possible solutions to increase the chances of success guarantees. The third type of trust,

knowledge based trust, is identified as familiarity with the e-vendor (Gefen, Karahanna, Straub, 2003). They argue that familiarity increases the understanding of present actions. They further state that knowledge based trust reduces the uncertainty and risk in online transactions and reduce any confusion on the use of procedures within a Web page. Trust that is invested in the website can be increased by perceived ease of use (Gefen, Karahanna & Straub 2003; Holsapple & Sasidharan, 2005). Four items will be used to measure trust that measure knowledge based trust. Relying on the different trust categorizations discussed in the literature, it will be decided that knowledge based trust best reflects the context of this research in the view of the organization.

IV. E-GOVERNMENT

“Electronic Government” refers to the use by government agencies of information technologies (such as Wide Area Network (WAN), Internet and mobile computing) that has the ability to transform relations with citizens, businesses and other branches of the government (Meftah *et al.*, 2015).

Santos *et al.* (2013) refer that the function of an Electronic Government is to restructure the organization of public services, adopting mechanisms that promote communication among different entities, thus simplifying processes. The characteristics of good public governance include improved transparency and accountability. The promise of greater government transparency and accountability is often the reason for developing countries to take part in e-government service (Chatfield & Alanazi, 2015; Chen, Jubilado, Capistrano, & Yen, 2015).

V. INFORMATION AND COMMUNICATION TECHNOLOGY IN DEVELOPING COUNTRIES

The context for this research is the business organizations in developing countries. A revolution in ICT has changed the way of interaction between government and their citizens. These changes have turned into a new form of government called e-government. E-government is defined as: The use of ICT and internet to enhance the access to and delivery of all facets of government services and operations for the benefits of its stakeholder groups which includes citizens, businesses, and government itself (Srivastava & Teo, 2008; 2009; 2010).

As Abdalla (2012), stated that some suggest that the gap between the context and the (economic, political or technical) goals and values could easily lead to failure, there is a lack of a model based on the context to better adopt the best developed e-government solution and identify the challenges and factors that influence the adoption process, as part of the context of key developing countries.

VI. DEVELOPING COUNTRIES AND E-GOVERNMENT

As Abdalla (2012), stated in his study that some suggest that the gap between the context and the (economic, political or technical) goals and values could easily lead to failure in developing countries, there is a lack of a model based on the context to better adopt the best developed e-government solution

and identify the challenges and factors that influence the adoption process, as part of the context of key developing countries. After the study that was carried out by Alawneh *et al.* (2013), in the area of e-government adoption in Jordan which is considered a developing country, they recommended for a more comprehensive study for future work, future researchers should focus on using more than the number of variables that they have used in their study, plus to increase the sample size and ensure the respondents constitute a balanced demographic, as to get a full explanation on the factors that influences developing countries citizens in general and Jordanian citizens in particular to adopt the e-government services and satisfaction of the provided services. A study carried out by Zakaria, (2012), in the area of e-government that was held in Egypt as a developing country to assess the practicality of the ESI model, he mentioned that an e-government program of a developing country is needed where there is an enormous opportunity for enhancement and change. Additionally, one of the objectives of such e-government program is to be citizen centric and been evaluated using an international accepted model that belongs to the family of normative models and shows improvement.

As for a study that was held by Furuhoft & Matotay (2013), they said that one of the main contributions in order to create development in poor countries is to give people access to information and communication. Most people in poor countries cannot afford to buy their own computer equipment, and access has therefore to be facilitated by arrangements for public use. Today, Internet cafes and tele-centres are the two main sources of public Internet access in developing countries. One area where information technology and public Internet access can be particularly useful for the development of poor countries is as a tool for promoting good governance through e-government systems. Generally, developing countries are lagging behind in e-government adoption

Relying on the previous literature review the presented research model was built. See Figure(1.0)

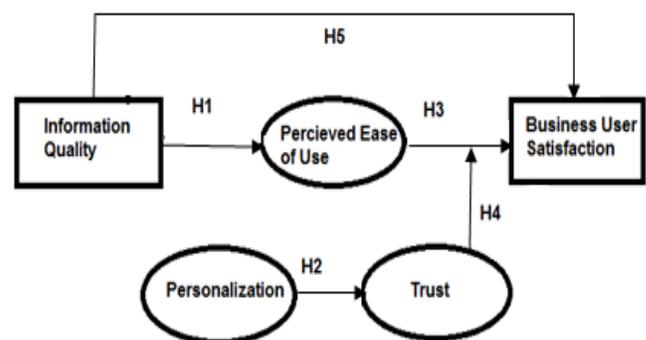


Figure 1.0: Presented Research Model

VII. METHODOLOGY

Research Goal

In this study, we aim to examine the effect of (Information Quality, Perceived ease of use, Personalization and Trust) on Business User Satisfaction in e-government by business users. A

structured questionnaire will be used in order to gather the data to develop the e-government service quality scale.

Sample and Data Collection

In the current study, the sample of this study will be the business companies that use e-government services. The data will be collected via the researchers. The questionnaire which is meant to measure the overall perceived service quality in e-government will be distributed to the targeted respondents. Based on a comprehensive review of previous literature in the area of e-government in developing countries, that have used the IS success model of DeLone and Mclean plus the TAM theory using also Trust, and Personalization as success factors. The present study proposed a model of e-government adoption for business organizations in developing countries. In this model, which also includes the relationships between information quality and other significant constructs, it is proposed that a study should be done to test the model empirically.

In the process of developing this model, much attention is given to the measurement model of service quality in Information Systems based on the well-known DeLone and Mclean IS success model, and the theory of Technology Acceptance Model. Nonetheless, the proposed model is developed based only on a theoretical perspective. The model will have to be tested empirically in order to measure its practicality and robustness. Henceforth, the model will be more conclusive and the contribution to the research area will be much more significant. Despite its limitation, this study provides understanding, specifically to the organizations, companies, and their respective clients, of the strengths and benefits of e-government service quality. Thus, it will help to create awareness and new knowledge regarding the importance of using e-government services through the business organizations in developing countries for the purposes among customers and vendors, hence serving as a long-term benefit to them. A better understanding and practice of e-government would increase ability in the adoption power of organizations usage and the efficiency of businesses. Moreover, this study could increase the understanding of the determinants of e-government service quality by customers and vendors, so that users' behavioral intention can benefit the e-government system. The users could also benefit from the research by knowing how to select the appropriate e-government service which can provide the e-government service quality that they seek. Other than this, the study can assist top management to develop and provide appropriate strategies to support e-government.

VIII. FINDINGS

DeLone and McLean Success Model

For the measurement of Information System Success, a model that was developed by DeLone and McLean (1992) that was a success measurement framework known as an IS success model. Thus, in their model, user satisfaction, system quality and information quality were identified as success criteria. The study of the IS (information system) efficiency is strongly influenced by DeLone and McLean (1992) IS success model. The model presented six key variables for success of the information system: Information Quality, User satisfaction, System Quality,

Information System use, Organizational Impact Use and Individual Impact. System quality and information quality, individually and jointly affect both use and user satisfaction.

In addition, the amount of use can affect positively or negatively the degree of User Satisfaction and the opposite is also true. The use and user satisfaction are direct precursors of the individual effects; Moreover, this influence should be based on individual performance may affect the organization (DeLone and Maclean, 1992). In the DeLone & McLean IS Success model "System Quality" measures technical success, "Information Quality" measures semantic success and "Use, User satisfaction, Individual Impact and Organizational Impact" measures effectiveness success. DeLone and McLean updated their model and included service quality as a success measure, in the context of e-commerce based on support provided by (Pitt et al., 1995). Thus the researchers used factors from this model to carry out the study with the proper tools, the updated model for DeLone and Mclean is shown in the followed figure (2.0).

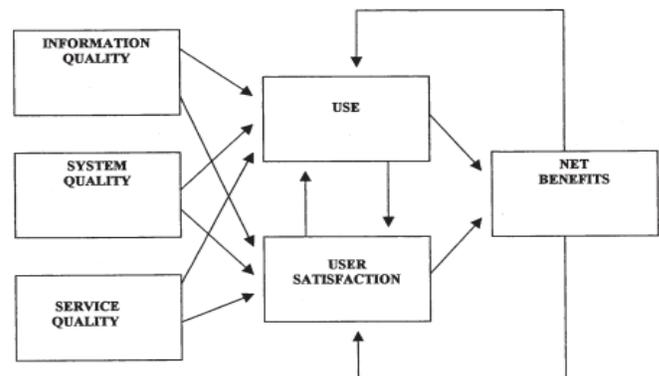


Figure 2.0: Updated IS success Model of DeLone&McLean

Source: DeLone&McLean(2003).

Technology Acceptance Model (TAM)

TAM (Davis, 1989) focuses in (on) the relationship between the causes and consequences of system design, demonstrates the usefulness, demonstrates comfort to use, attitude towards usage and the actual use behavior (Davis, Bagozzi, & Warshaw, 1989). TAM is widely used to identify and investigate the factors of user acceptance (Yaghoubi, et al., 2010). According to Davis et al. (1989), the goal of this model is to provide insights on the determinants of acceptance of computer technology by users. Furthermore, this model is able to explain user behavior across various populations and standard space for using computer technology through theoretical justification (Davis, et al., 1989). Use of TAM has been widely supported in empirical studies (Ajzen, 1991; Davis et al., 1989; Suki & Ramayah, 2010; Yaghoubi, et al., 2010). In summary, this model provides information on a mechanism in which the selection of the design can affect the user acceptance and it also serves to be applied in the context of forecasting and evaluation of a user acceptance of IT.

A study carried out by (Park, 2009), cited the development stages of the TAM theory, as during the years TAM has proven to be a theoretical model in helping to explain and predict user behavior when IT gets included in the research, TAM is considered an influential extension of the theory of reasoned action (TRA), it was also proposed that TAM can be included in a research where an explanation is needed to identify why a user accepts or rejects information technology by adapting TRA. TAM provides a basis with which one traces how external variables like attitude, intention to use, and influence belief. Two cognitive beliefs are posited by TAM: perceived usefulness and perceived ease of use. According to TAM, a users' actual use of a technology system is influenced either indirectly or directly by the users' perceived ease of use of the system, behavioral intentions, perceived usefulness of the system, and attitude. TAM also proposes that external factors affect intention and actual use through mediated effects on perceived usefulness and perceived ease of use. The researcher is going to choose the suitable factors to carry out this investigation, the TAM model shall be produced in the following figure (3.0).

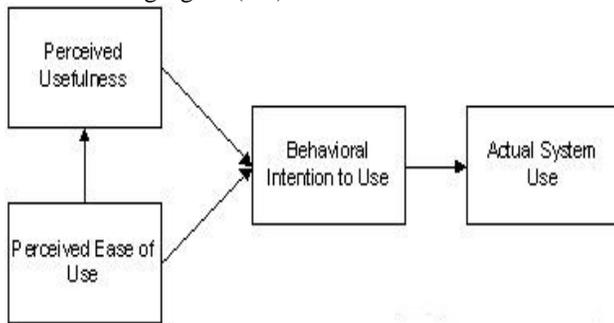


Figure 3.0: Theory of Technology Acceptance Model

Source: Davis et al. (1989)

IX. DISCUSSION AND CONCLUSION

The main purpose of the study is proposing a conceptual model for e-government success that leads the business organizations in developing countries to adopt the e-government services. The results would help authorities and business organizations to understand the key issues that influence business need and satisfaction with the presented services and they can use these criteria to judge their services delivery process to achieve the goal of making the business organizations' adopt the e-government technology. After the comprehensive view of the study a future study must be carried out in order to test the model empirically, the government e-service website has offered users what technology has made possible to deliver, rather than first asking what is it the users want delivered to them. Therefore, the researchers has stressed the need to focus on what makes the user as a customer satisfied in obtaining the service, and the need to measure such satisfaction. In view of this, service quality of electronic government could bridge the gap in communication between users and governments. As e-government portals provide the users the ability to access its services despite the location and time, plus it satisfies their needs by allowing them to achieve their goals. In addition e-government allows flexibility in delivering institution services.

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On total regularity of the join of two interval valued fuzzy graphs

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Abstract- In this paper, we define the total degree (TD) of a vertex in the join of two interval valued fuzzy graphs (IVFGs) and investigate their totally regular property (TRP). In general, the join of two totally regular IVFGs need not be a totally regular interval valued fuzzy graph (TRIVFG). We obtain some necessary and sufficient conditions for the join of two TRIVFGs to be totally regular.

Index Terms- Interval valued fuzzy graph, total regularity, join

I. INTRODUCTION

Fuzzy graph theory is finding an increasing number of applications in modeling real time systems where the level of information inherent in the system varies with different levels of precision. In the applied field, the success of the use of fuzzy set theory depends on the choice of the membership function that we make. However, there are applications in which experts do not have precise knowledge of the function that should be taken. In these cases, it is appropriate to represent the membership degree of each element of the fuzzy set by means of an interval. From these considerations arises the extension of fuzzy sets called the theory of interval valued fuzzy sets. That is, fuzzy sets such that the membership degree of each element of the fuzzy set is given by a closed subinterval of the interval [0,1]. Replacing the membership functions of vertices and edges in fuzzy graphs by interval valued fuzzy sets such that they satisfy some particular conditions, *interval valued fuzzy graphs (IVFGs)* were defined. Thus IVFGs provide a better description of vagueness and uncertainty within the specific interval than the traditional fuzzy graph. The basic concepts of fuzzy sets, interval valued fuzzy sets and fuzzy graph theory can be found in [8], [19] and [18] to [23].

In 2009, Hongmei and Lianhua[6] introduced the definition of IVFG. Muhammad Akram and Wieslaw A. Dudek[1], defined the operations of cartesian product, composition, union and join on IVFGs and investigated some properties. They also introduced the notion of interval valued fuzzy complete graphs and obtained some properties of self complementary and self weak complementary interval valued fuzzy complete graphs. Muhammad Akram [2] also introduced interval valued fuzzy line graphs. A. A. Talebi and H. Rashmanlou [20] studied on isomorphism of IVFGs. H. Rashmanlou and Young Bae Jun[13] defined the three new operations, direct product, semi strong product and strong product of IVFGs and discussed their properties on complete IVFGs. Pradip Debnath[11] introduced domination in IVFGs. H. Rashmanlou and Madhumangal Pal defined irregular IVFG[9], balanced IVFG[14] and antipodal IVFG[15] and studied their properties. They also studied on the properties of highly irregular IVFG[17] and defined isometry on IVFG[16]. Muhammad Akram, Noura Omair Alshehri and W.A Dudek [3] introduced certain types of IVFG such as balanced IVFGs, neighbourly irregular IVFGs, neighbourly total irregular IVFGs, highly irregular IVFGs, highly total irregular IVFGs. Again Muhammad Akram, M. Murtaza Yousaf and W A Dudek [4] studied the properties of self centered IVFGs. Madhumangal Pal, Sovan Samanta and H. Rashmanlou [10] defined the degree and total degree of an edge in the cartesian product and composition of two IVFG and obtained some results. Basheer Ahammed Mohideen [5] studied on strong and regular IVFGs. S. Ravi Narayanan and N. R. Santhi Maheswari [18] introduced strongly edge irregular and strongly edge totally irregular IVFG and made a comparative study between the two. A. A. Talebi, H. Rashmanlou and Reza Ameri [21] discussed product IVFGs. K. Radha and M. Vijaya [12] discussed the totally regular property of the join of two fuzzy graphs.

In this paper, we introduce and analyse the notion of TRIVFGs. Also we obtain some necessary and sufficient conditions for total regularity of IVFGs.

II. BASIC CONCEPTS

Graph theoretic terms and results used in this work are either standard or are explained as and when they first appear.

2.1. Definition (Fuzzy graph) [8]. Let V be a non empty set. A *fuzzy graph* is a pair of functions $G: (\sigma, \mu)$ where σ is a fuzzy subset of V and μ is a symmetric fuzzy relation on σ . That is, $\sigma: V \rightarrow [0,1]$ and $\mu: V \times V \rightarrow [0,1]$ such that $\mu(u, v) \leq \sigma(u) \wedge \sigma(v)$ for all u, v in V .

2.2. Definition (Interval number) [1]. An *interval number* D is an interval $[a^-, a^+]$ with $0 \leq a^- \leq a^+ \leq 1$.

2.3. Remark. (i) The interval number $[a, a]$ is identified with the number $a \in [0,1]$.

(ii) $D[0,1]$ denotes the set of all interval numbers.

2.4. Definition (Some operations on $D[0,1]$) [1]. For interval numbers $D_1 = [a_1^-, b_1^+]$ and $D_2 = [a_2^-, b_2^+]$

- $rmin(D_1, D_2) = [\min\{a_1^-, a_2^-\}, \min\{b_1^+, b_2^+\}]$
- $rmax(D_1, D_2) = [\max\{a_1^-, a_2^-\}, \max\{b_1^+, b_2^+\}]$
- $D_1 + D_2 = [a_1^- + a_2^- - a_1^- \cdot a_2^-, b_1^+ + b_2^+ - b_1^+ \cdot b_2^+]$
- $D_1 \leq D_2 \Leftrightarrow a_1^- \leq a_2^- \text{ and } b_1^+ \leq b_2^+$
- $D_1 = D_2 \Leftrightarrow a_1^- = a_2^- \text{ and } b_1^+ = b_2^+$
- $D_1 < D_2 \Leftrightarrow D_1 \leq D_2 \text{ and } D_1 \neq D_2$
- $kD = k[a_1^-, b_1^+] = [ka_1^-, kb_1^+]$ where $0 \leq k \leq 1$.

Then $(D[0,1], \leq, \vee, \wedge)$ is a complete lattice with $[0,0]$ as the least element and $[1,1]$ as the greatest.

2.5. Definition (Interval valued fuzzy set (IVFS)) [1]. The *interval valued fuzzy set* A in V is defined by $A = \{(x, [\mu_A^-(x), \mu_A^+(x)]) : x \in V\}$ where $\mu_A^-(x)$ and $\mu_A^+(x)$ are fuzzy subsets of V such that $\mu_A^-(x) \leq \mu_A^+(x)$ for all $x \in V$. We shall sometimes denote the IVFS A by $[\mu_A^-(x), \mu_A^+(x)]$.

For any two IVFSs $A = [\mu_A^-(x), \mu_A^+(x)]$ and $B = [\mu_B^-(x), \mu_B^+(x)]$ in V , we define

- $A \cup B = \{(x, \max(\mu_A^-(x), \mu_B^-(x)), \max(\mu_A^+(x), \mu_B^+(x))) : x \in V\}$
- $A \cap B = \{(x, \min(\mu_A^-(x), \mu_B^-(x)), \min(\mu_A^+(x), \mu_B^+(x))) : x \in V\}$

2.6. Definition (Interval valued fuzzy relation (IVFR)) [1]. If $G^* = (V, E)$ is a graph, then by an *interval valued fuzzy relation* B on the set E we mean an IVFS such that $\mu_B^-(xy) \leq \min(\mu_A^-(x), \mu_A^-(y))$ and $\mu_B^+(xy) \leq \min(\mu_A^+(x), \mu_A^+(y))$ for all $xy \in E$.

2.7. Definition (Interval valued fuzzy graph (IVFG)) [1]. By an *interval valued fuzzy graph* of a graph $G^* = (V, E)$, we mean a pair $G = (A, B)$, where $A = [\mu_A^-(x), \mu_A^+(x)]$ is an IVFS on V and $B = [\mu_B^-(x), \mu_B^+(x)]$ is an IVFR on E . In what follows, $G = (A, B)$ denotes such an IVFG of a graph $G^* = (V, E)$ where V is a non-empty finite set and $E \subseteq V \times V$.

2.8. Definition (Order of an IVFG) [9]. The *order* of G denoted by $O(G)$ is defined by $O(G) = [O^-(G), O^+(G)]$ where $O^-(G) = \sum_{u \in V} \mu_A^-(u)$ and $O^+(G) = \sum_{u \in V} \mu_A^+(u)$.

2.9. Definition (Degree of a vertex) [9]. The *negative degree* of a vertex $u \in V$ is defined by $d^-(u) = \sum_{uv \in E} \mu_B^-(uv)$. Similarly, *positive degree* of a vertex $u \in V$ is defined by $d^+(u) = \sum_{uv \in E} \mu_B^+(uv)$. Then the *degree* of the vertex $u \in V$ is defined as $d(u) = [d^-(u), d^+(u)]$.

2.10. Definition (Total degree (TD) of a vertex) [9]. The *total degree* of the vertex $u \in V$ is defined as $td(u) = [td^-(u), td^+(u)]$ where,

$$td^-(u) = \sum_{uv \in E} \mu_B^-(uv) + \mu_A^-(u) = d^-(u) + \mu_A^-(u) \text{ and}$$

$$td^+(u) = \sum_{uv \in E} \mu_B^+(uv) + \mu_A^+(u) = d^+(u) + \mu_A^+(u).$$

2.11. Definition (Totally regular IVFG (TRIVFG)[9]. If each vertex of G has the same total degree $[k_1, k_2]$ then the graph G is called a *TRIVFG of degree $[k_1, k_2]$ or $[k_1, k_2]$ -TRIVFG.*

2.12. Definition (Join of two IVFGs) [1]. The *join* $G_1 + G_2 = (A_1 + A_2, B_1 + B_2)$ of two IVFG $G_1 = (A_1, B_1)$ and $G_2 = (A_2, B_2)$ of $G_1^* = (V_1, E_1)$ and $G_2^* = (V_2, E_2)$ is defined as follows:

$$\begin{aligned}
 & \text{i.} \quad \begin{cases} (\mu_{A_1}^- + \mu_{A_2}^-)(x) = \mu_{A_1}^-(x) \text{ if } x \in V_1 \\ \phantom{(\mu_{A_1}^- + \mu_{A_2}^-)(x)} = \mu_{A_2}^-(x) \text{ if } x \in V_2 \\ (\mu_{A_1}^+ + \mu_{A_2}^+)(x) = \mu_{A_1}^+(x) \text{ if } x \in V_1 \\ \phantom{(\mu_{A_1}^- + \mu_{A_2}^-)(x)} = \mu_{A_2}^+(x) \text{ if } x \in V_2 \end{cases} \\
 & \text{ii.} \quad \begin{cases} (\mu_{B_1}^- + \mu_{B_2}^-)(xy) = \mu_{B_1}^-(xy) \text{ if } xy \in E_1 \\ \phantom{(\mu_{B_1}^- + \mu_{B_2}^-)(xy)} = \mu_{B_2}^-(xy) \text{ if } xy \in E_2 \\ (\mu_{B_1}^+ + \mu_{B_2}^+)(xy) = \mu_{B_1}^+(xy) \text{ if } xy \in E_1 \\ \phantom{(\mu_{B_1}^- + \mu_{B_2}^-)(xy)} = \mu_{B_2}^+(xy) \text{ if } xy \in E_2 \end{cases} \\
 & \text{iii.} \quad \begin{cases} (\mu_{B_1}^- + \mu_{B_2}^-)(xy) = \min(\mu_{A_1}^-(x), \mu_{A_2}^-(y)) \\ (\mu_{B_1}^+ + \mu_{B_2}^+)(xy) = \min(\mu_{A_1}^+(x), \mu_{A_2}^+(y)) \text{ if } xy \in E' \end{cases}
 \end{aligned}$$

where E' is the set of all edges joining the nodes of V_1 and V_2 .

It is assumed that both V_1 and V_2 are finite and $V_1 \cap V_2 = \emptyset$.

III. TOTALLY REGULAR PROPERTY OF THE JOIN

3.1. Remark. Since $V_1 \cap V_2 = \emptyset$, we have $E_1 \cap E_2 = \emptyset$. Hence by definition 2.10,

$$td_{G_1+G_2}^-(u) = \sum_{uv \in E_1 \cup E_2} (\mu_{B_1}^- + \mu_{B_2}^-)(uv) + \sum_{uv \in E'} \min(\mu_{A_1}^-(u), \mu_{A_2}^-(v)) + (\mu_{A_1}^- + \mu_{A_2}^-)(u)$$

$$td_{G_1+G_2}^+(u) = \sum_{uv \in E_1 \cup E_2} (\mu_{B_1}^+ + \mu_{B_2}^+)(uv) + \sum_{uv \in E'} \min(\mu_{A_1}^+(u), \mu_{A_2}^+(v)) + (\mu_{A_1}^+ + \mu_{A_2}^+)(u)$$

For any $u \in V_1$, $td_{G_1+G_2}^-(u) = \sum_{uv \in E_1} (\mu_{B_1}^-)(uv) + \sum_{uv \in E'} \min(\mu_{A_1}^-(u), \mu_{A_2}^-(v)) + (\mu_{A_1}^-)(u)$

$$= d_{G_1}^-(u) + (\mu_{A_1}^-)(u) + \sum_{uv \in E'} \min(\mu_{A_1}^-(u), \mu_{A_2}^-(v))$$

$$= td_{G_1}^-(u) + \sum_{uv \in E'} \min(\mu_{A_1}^-(u), \mu_{A_2}^-(v))$$

Similarly, $td_{G_1+G_2}^+(u) = td_{G_1}^+(u) + \sum_{uv \in E'} \min(\mu_{A_1}^+(u), \mu_{A_2}^+(v))$

Also, if $u \in V_2$, $td_{G_1+G_2}^-(u) = td_{G_2}^-(u) + \sum_{uv \in E'} \min(\mu_{A_1}^-(u), \mu_{A_2}^-(v))$

$$td_{G_1+G_2}^+(u) = td_{G_2}^+(u) + \sum_{uv \in E'} \min(\mu_{A_1}^+(u), \mu_{A_2}^+(v))$$

In what follows, the number of vertices in G_1 and G_2 are denoted as p_1 and p_2 respectively. The proof of the following lemma is straight forward and so is omitted.

3.2. Lemma. Let $G_1 = (A_1, B_1)$ and $G_2 = (A_2, B_2)$ be two IVFGs.

- 1) If $A_1 \geq A_2$, then $td_{G_1+G_2}(u) = td_{G_1}(u) + O(G_2)$ if $u \in V_1$
 $= td_{G_2}(u) + p_1[\mu_{A_2}^-(u), \mu_{A_2}^+(u)]$ if $u \in V_2$

2) If $A_2 \geq A_1$, then $td_{G_1+G_2}(u) = td_{G_1}(u) + p_2[\mu_{A_1}^-(u), \mu_{A_1}^+(u)]$ if $u \in V_1$
 $= td_{G_2}(u) + O(G_1)$ if $u \in V_2$ ■

3.3. Remark. If G_1 and G_2 are TRIVFGs, then $G_1 + G_2$ need not be a TRIVFG which is clear from the following examples.

3.4. Example. The following diagram presents two TRIVFGs G_1 and G_2 and their join $G_1 + G_2$ which is not a TRIVFG.

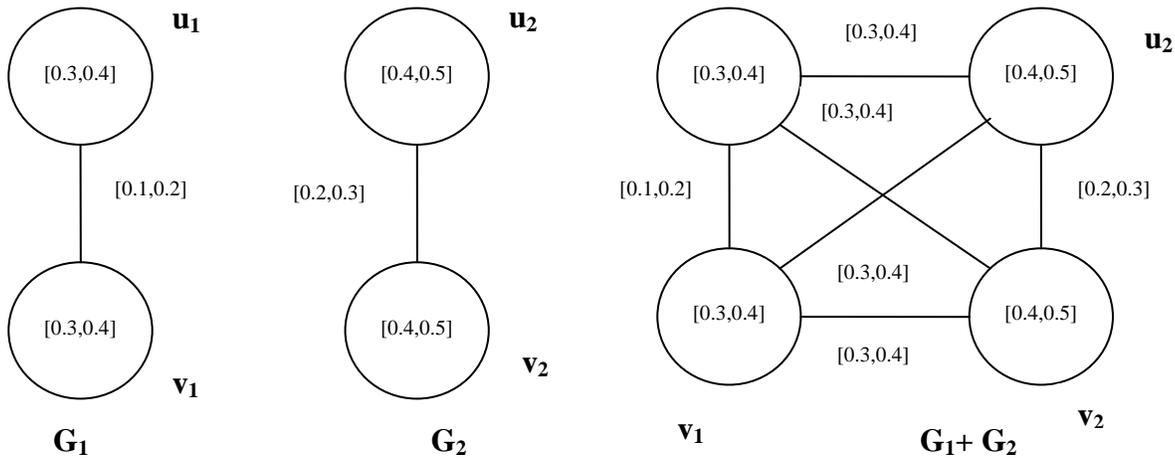


Fig 3.1: An example to show that TRP is not carried over to joins.

3.5. Example. We give below another example to show that join of two TRIVFGs need not be a TRIVFG.

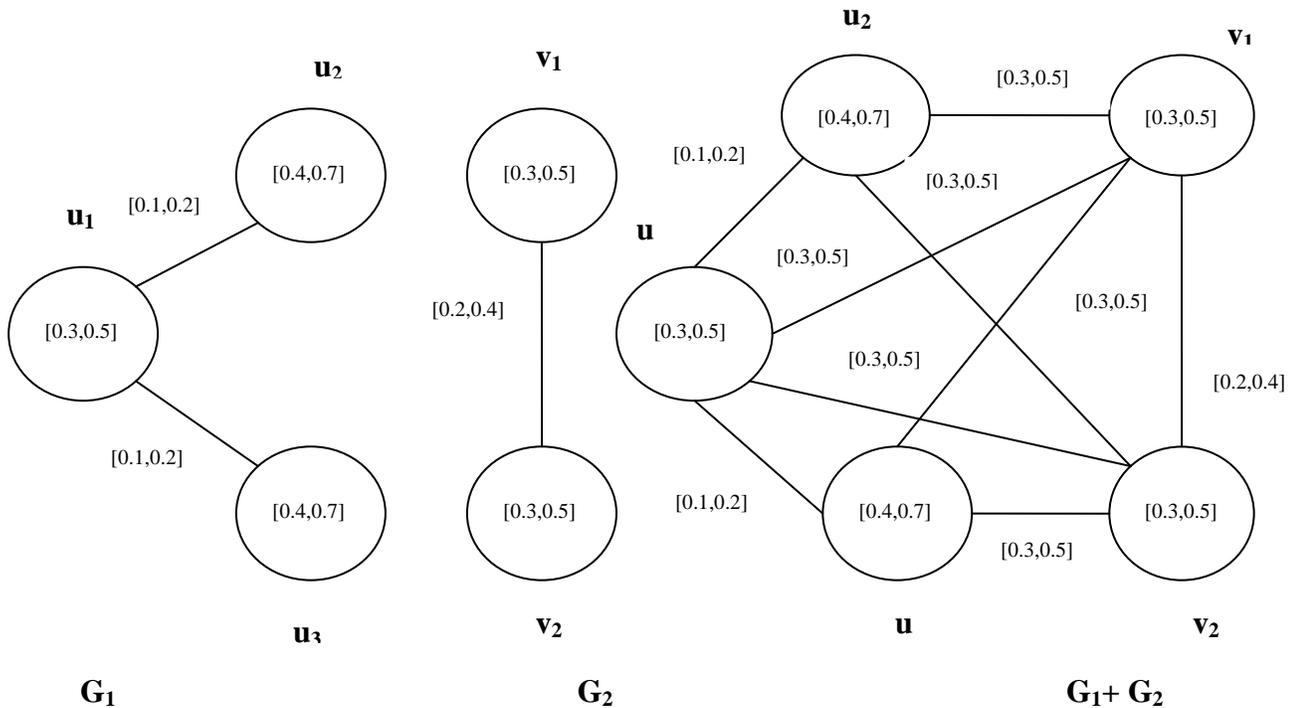


Fig 3.2: Another example to show that TRP is not carried over to joins.

3.6. Example. In the following example, G_1 and G_2 are totally regular and $G_1 + G_2$ is also totally regular.

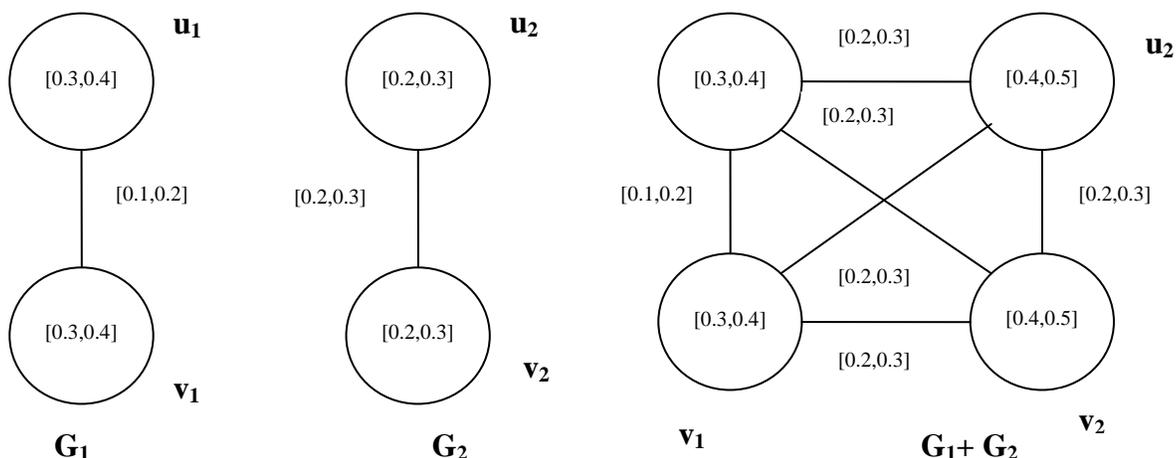


Fig 3.3: An example to show that TRP is sometimes carried over to joins.

Now, we proceed to obtain some necessary and sufficient conditions for the join of two IVFGs to be totally regular.

Theorem 3.7. Let $G_1 = (A_1, B_1)$ and $G_2 = (A_2, B_2)$ be two TRIVFGs of the same degree such that $\text{rmin}(A_1, A_2)$ is a constant function. Then the join $G_1 + G_2$ is a TRIVFG if and only if $p_1 = p_2$.

Proof: Let $G_1 = (A_1, B_1)$ and $G_2 = (A_2, B_2)$ be two $[k_1, k_2]$ -TRIVFGs. Also let $\text{rmin}(A_1, A_2) = [c_1, c_2]$ for all $u \in V_1$ and $v \in V_2$ where c_1, c_2 are constants. Then

$$\text{rmin}(A_1, A_2) = [\min(\mu_{A_1}^-, \mu_{A_2}^-), \min(\mu_{A_1}^+, \mu_{A_2}^+)] = [c_1, c_2] \text{ so that } \min(\mu_{A_1}^-, \mu_{A_2}^-) = c_1 \text{ and } \min(\mu_{A_1}^+, \mu_{A_2}^+) = c_2$$

$$\begin{aligned} \text{For any } u \in V_1, \quad td_{G_1+G_2}^-(u) &= td_{G_1}^-(u) + \sum_{uv \in E'} \min(\mu_{A_1}^-(u), \mu_{A_2}^-(v)) \\ &= k_1 + \sum_{uv \in E'} c_1 \\ &= k_1 + c_1 p_2. \end{aligned}$$

$$\text{Similarly, } \quad td_{G_1+G_2}^+(u) = k_2 + c_2 p_2$$

$$\text{Hence, } \quad td_{G_1+G_2}(u) = [k_1 + c_1 p_2, k_2 + c_2 p_2]$$

$$\text{For any } v \in V_2, \quad td_{G_1+G_2}(v) = [k_1 + c_1 p_1, k_2 + c_2 p_1]$$

Thus $G_1 + G_2$ is a TRIVFG

$$\begin{aligned} &\Leftrightarrow k_1 + c_1 p_2 = k_1 + c_1 p_1 \text{ and } k_2 + c_2 p_2 = k_2 + c_2 p_1 \\ &\Leftrightarrow c_1 p_2 = c_1 p_1 \text{ and } c_2 p_2 = c_2 p_1 \\ &\Leftrightarrow p_1 = p_2 \quad \blacksquare \end{aligned}$$

Remark 3.8. Theorem 3.7 says that the join of two TRIVFGs of the same total degree is a TRIVFG if and only if the number of vertices of the two graphs are same. In Fig 3.2, both G_1 and G_2 are TRIVFGs of the same total degree, but $G_1 + G_2$ is not a TRIVFG. This is because the number of vertices of G_1 and G_2 are distinct. In Fig 3.3, both G_1 and G_2 are TRIVFGs with the same total degree and same number of vertices and we can see that $G_1 + G_2$ is a TRIVFG.

Corollary 3.9. Let $G_1 = (A_1, B_1)$ and $G_2 = (A_2, B_2)$ be two $[k_1, k_2]$ -TRIVFGs such that $A_1 \geq A_2$ (or $A_2 \geq A_1$) and A_2 (or A_1) is a constant function. Then the join $G_1 + G_2$ is a TRIVFG if and only if $p_1 = p_2$.

Proof: Since $A_1 \geq A_2$, $\mu_{A_1}^- \geq \mu_{A_2}^-$ and $\mu_{A_1}^+ \geq \mu_{A_2}^+$. Again since A_2 is a constant function, $\mu_{A_2}^-$ and $\mu_{A_2}^+$ are constant functions. Hence, $\text{rmin}(A_1, A_2) = [\mu_{A_2}^-, \mu_{A_2}^+]$ is a constant. Similar is the case when $A_2 \geq A_1$. Hence the result follows from theorem 3.7 ■

Theorem 3.10. Let $G_1 = (A_1, B_1)$ and $G_2 = (A_2, B_2)$ be two IVFGs such that $p_1 = p_2$ and $\text{rmin}(A_1, A_2)$ is a constant function. Then the join $G_1 + G_2$ is a TRIVFG if and only if both G_1 and G_2 are both TRIVFGs of the same degree.

Proof: Let $p_1 = p_2 = p$ and let $\text{rmin}(A_1, A_2) = [c_1, c_2]$ for all $u \in V_1$ and $v \in V_2$ where c_1, c_2 are constants.

For any $u \in V_1$, $td_{G_1+G_2}^-(u) = td_{G_1}^-(u) + \sum_{uv \in E'} \min(\mu_{A_1}^-(u), \mu_{A_2}^-(v)) = td_{G_1}^-(u) + c_1p$

and $td_{G_1+G_2}^+(u) = td_{G_1}^+(u) + \sum_{uv \in E'} \min(\mu_{A_1}^+(u), \mu_{A_2}^+(v)) = td_{G_1}^+(u) + c_2p$

Hence, $td_{G_1+G_2}(u) = [td_{G_1}^-(u) + c_1p, td_{G_1}^+(u) + c_2p]$ Similarly, for any $v \in V_2$,

$td_{G_1+G_2}(v) = [td_{G_2}^-(v) + c_1p, td_{G_2}^+(v) + c_2p]$

Thus $G_1 + G_2$ is a TRIVFG

$\Leftrightarrow td_{G_1}^-(u) + c_1p = td_{G_2}^-(v) + c_1p$ and $td_{G_1}^+(u) + c_2p = td_{G_2}^+(v) + c_2p$

$\Leftrightarrow td_{G_1}^-(u) = td_{G_2}^-(v)$ and $td_{G_1}^+(u) = td_{G_2}^+(v)$

$\Leftrightarrow td_{G_1}(u) = td_{G_2}(v)$ where $u \in V_1$ and $v \in V_2$ are arbitrary. Hence the theorem ■

Remark 3.11. Theorems 3.7 and 3.10 fail to hold if $\text{rmin}(A_1, A_2)$ is not a constant function which is clear from the following example.

Example 3.12. Here, both G_1 and G_2 are TRIVFGs with the same total degree and same number of vertices. But $\text{rmin}(A_1, A_2)$ is not a constant function. We can observe from the figure that $G_1 + G_2$ is not a TRIVFG

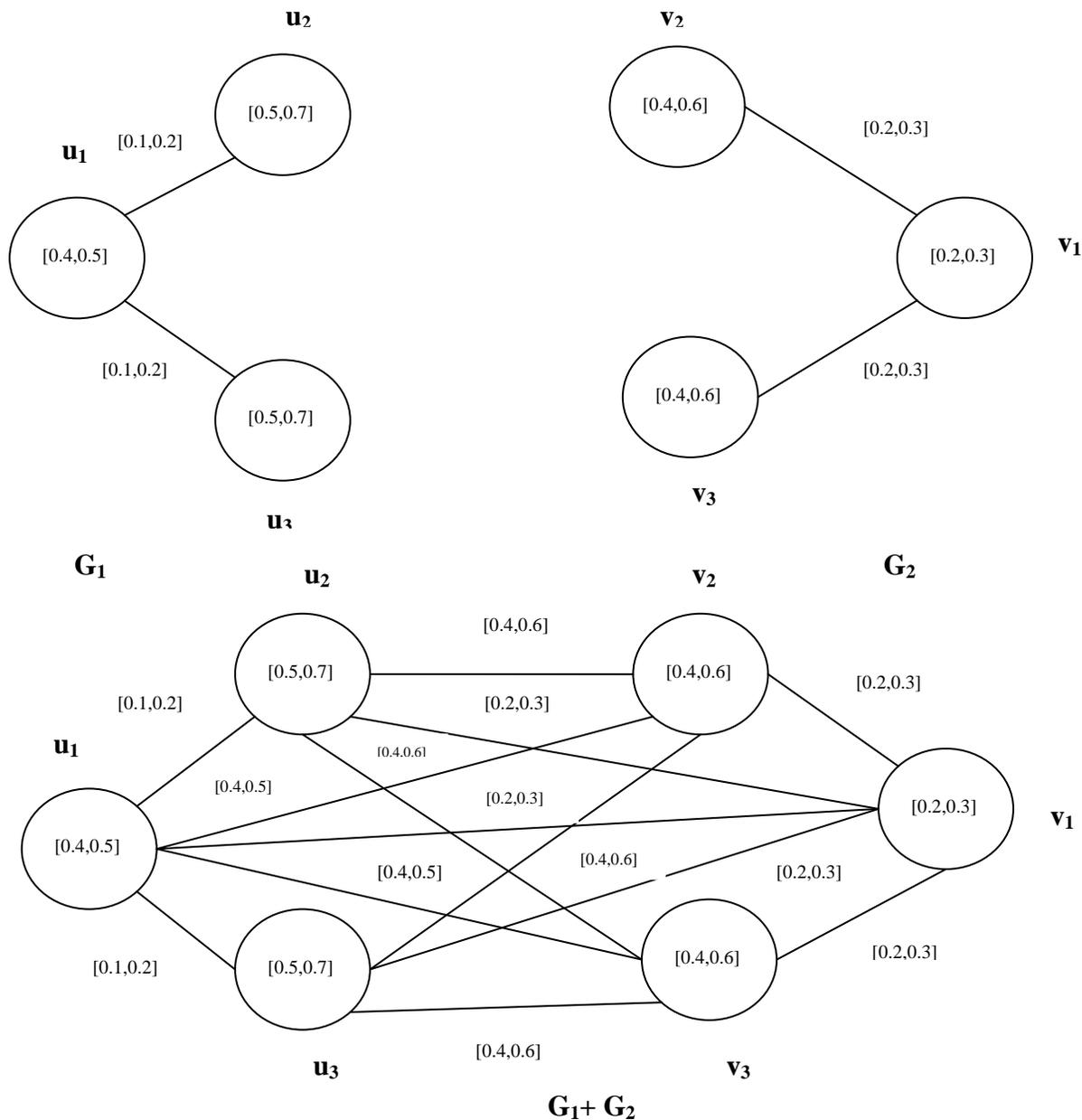


Fig 3.4 : An example to show that the condition $rmin = constant$ is essential for TRP of $G_1 + G_2$

Remark 3.13. Theorem 3.10 says that the join of two TRIVFGs with the same number of vertices is a TRIVFG if and only if they have the same total degree. In Fig 3.1, both G_1 and G_2 are TRIVFGs and have the same number of vertices, but $G_1 + G_2$ is not a TRIVFG. This is because they have distinct total degrees.

Corollary 3.14. Let $G_1 = (A_1, B_1)$ and $G_2 = (A_2, B_2)$ be two IVFGs such that $p_1 = p_2, A_1 \geq A_2$ (or $A_2 \geq A_1$) and A_2 (or A_1) is a constant function. Then the join $G_1 + G_2$ is a TRIVFG if and only if both G_1 and G_2 are TRIVFG of the same degree.

Proof: Proof is similar to Corollary 3.9 ■

Theorem 3.15. Let $G_1 = (A_1, B_1)$ and $G_2 = (A_2, B_2)$ be two TRIVFGs such that $A_1 \geq A_2$ (or $A_2 \geq A_1$). If $G_1 + G_2$ is a TRIVFG, then A_2 (or A_1) is a constant function.

Proof. Let $G_1 = (A_1, B_1)$ and $G_2 = (A_2, B_2)$ be two TRIVFGs of total degrees $[k_1, k_2]$ and $[k'_1, k'_2]$ respectively. Also let $A_1 \geq A_2$.

$$\begin{aligned} \text{For any } u \in V_1, \quad td_{G_1+G_2}^-(u) &= td_{G_1}^-(u) + \sum_{uv \in E'} \min(\mu_{A_1}^-(u), \mu_{A_2}^-(v)) \\ &= td_{G_1}^-(u) + \sum_{v \in V_2} \mu_{A_2}^-(v) \\ &= k_1 + \sum_{v \in V_2} \mu_{A_2}^-(v) \\ &= k_1 + O^-(G_2) \end{aligned}$$

Similarly, $td_{G_1+G_2}^+(u) = k_2 + O^+(G_2)$

Hence, $td_{G_1+G_2}(u) = [k_1 + O^-(G_2), k_2 + O^+(G_2)]$

$$\begin{aligned} \text{For any } v \in V_2, \quad td_{G_1+G_2}^-(v) &= td_{G_2}^-(v) + \sum_{uv \in E'} \min(\mu_{A_1}^-(u), \mu_{A_2}^-(v)) \\ &= td_{G_2}^-(v) + \sum_{u \in V_1} \mu_{A_2}^-(v) \\ &= k'_1 + p_1 \mu_{A_2}^-(v) \end{aligned}$$

Similarly, $td_{G_1+G_2}^+(v) = k'_2 + p_1 \mu_{A_2}^+(v)$

Hence, $td_{G_1+G_2}(v) = [k'_1 + p_1 \mu_{A_2}^-(v), k'_2 + p_1 \mu_{A_2}^+(v)]$

Thus $G_1 + G_2$ is a TRIVFG

$$\begin{aligned} \Rightarrow td_{G_1+G_2}(u) &= td_{G_1+G_2}(v) \\ \Rightarrow [k_1 + O^-(G_2), k_2 + O^+(G_2)] &= [k'_1 + p_1 \mu_{A_2}^-(v), k'_2 + p_1 \mu_{A_2}^+(v)] \\ \Rightarrow k_1 + O^-(G_2) = k'_1 + p_1 \mu_{A_2}^-(v) \text{ and } k_2 + O^+(G_2) &= k'_2 + p_1 \mu_{A_2}^+(v) \\ \Rightarrow k_1 - k'_1 = p_1 \mu_{A_2}^-(v) - O^-(G_2) \text{ and } k_2 - k'_2 &= p_1 \mu_{A_2}^+(v) - O^+(G_2) \end{aligned}$$

For any $v, w \in V_2$, $p_1 \mu_{A_2}^-(v) - O^-(G_2) = k_1 - k'_1 = p_1 \mu_{A_2}^-(w) - O^-(G_2)$ and

$$\begin{aligned} p_1 \mu_{A_2}^+(v) - O^+(G_2) &= k_2 - k'_2 = p_1 \mu_{A_2}^+(w) - O^+(G_2) \\ \Rightarrow p_1 \mu_{A_2}^-(v) &= p_1 \mu_{A_2}^-(w) \text{ and } p_1 \mu_{A_2}^+(v) = p_1 \mu_{A_2}^+(w) \\ \Rightarrow \mu_{A_2}^-(v) &= \mu_{A_2}^-(w) \text{ and } \mu_{A_2}^+(v) = \mu_{A_2}^+(w) \\ \Rightarrow [\mu_{A_2}^-, \mu_{A_2}^+] &\text{ is a constant function.} \end{aligned}$$

$\Rightarrow A_2$ is a constant function ■

The following example shows that the converse of the above theorem is not true.

Example 3.16. Here G_1 and G_2 are TRIVFGs such that $A_1 \geq A_2$ and A_2 is a constant function. But, $G_1 + G_2$ is not a TRIVFG.

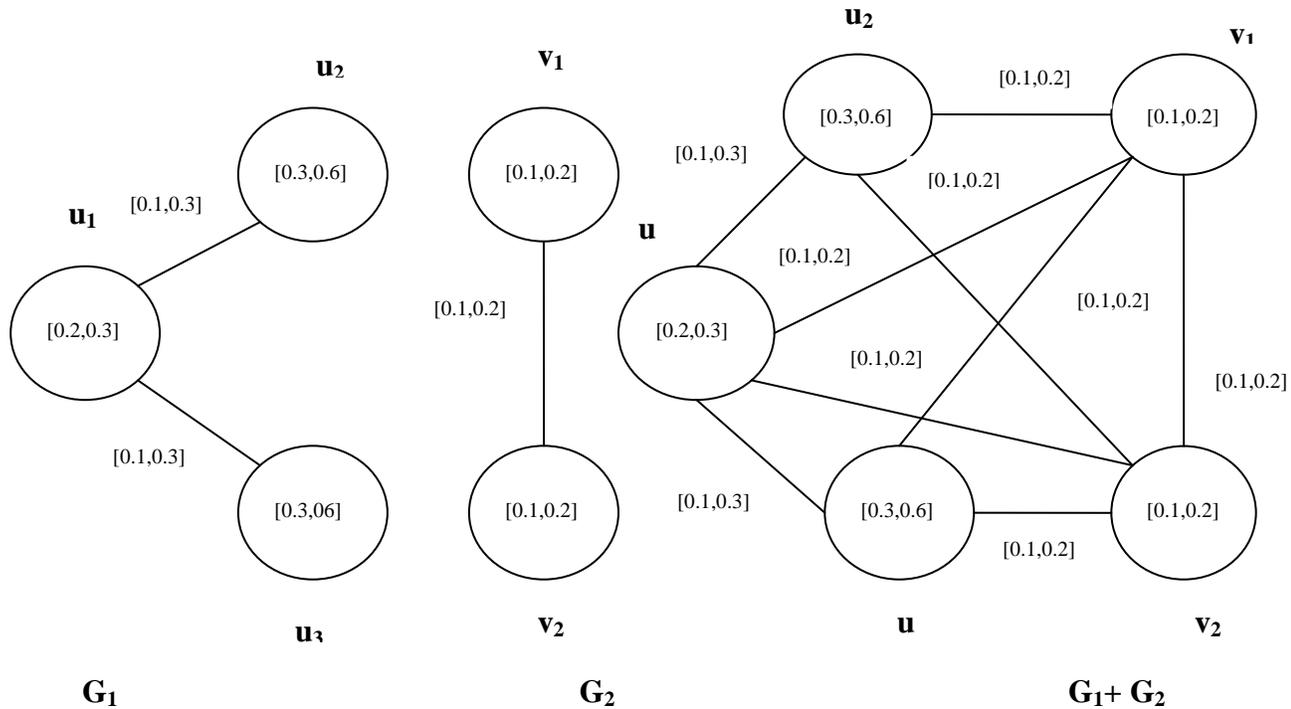


Fig 3.5 : Example to show that converse of theorem 3.15 is not true

In the next theorem, we give a necessary and sufficient condition for the join of two TRIVFGs with distinct total degrees and distinct number of vertices to be a TRIVFG.

Theorem 3.17. Let $G_1 = (A_1, B_1)$ and $G_2 = (A_2, B_2)$ be two TRIVFGs of total degrees $[k_1, k_2]$ and $[k'_1, k'_2]$ respectively and let $\text{rmin}(A_1, A_2)$ be a constant function. Then the join $G_1 + G_2$ is a TRIVFG if and only if $[k_1 - k'_1, k_2 - k'_2] = [c_1, c_2](p_1 - p_2)$ where $[c_1, c_2]$ is the constant value of $\text{rmin}(A_1, A_2)$.

Proof: For any $u \in V_1$, $td_{G_1+G_2}^-(u) = td_{G_1}^-(u) + \sum_{uv \in E'} \min(\mu_{A_1}^-(u), \mu_{A_2}^-(v)) = k_1 + c_1 p_2$ and
 $td_{G_1+G_2}^+(u) = td_{G_1}^+(u) + \sum_{uv \in E'} \min(\mu_{A_1}^+(u), \mu_{A_2}^+(v)) = k_2 + c_2 p_2$ Hence,
 $td_{G_1+G_2}(u) = [k_1 + c_1 p_2, k_2 + c_2 p_2]$. Similarly, for any $v \in V_2$, $td_{G_1+G_2}(v) = [k'_1 + c_1 p_1, k'_2 + c_2 p_1]$.

Thus $G_1 + G_2$ is a TRIVFG
 $\Leftrightarrow k_1 + c_1 p_2 = k'_1 + c_1 p_1$ and $k_2 + c_2 p_2 = k'_2 + c_2 p_1$
 $\Leftrightarrow k_1 - k'_1 = c_1 p_1 - c_1 p_2$ and $k_2 - k'_2 = c_2 p_1 - c_2 p_2$
 $\Leftrightarrow k_1 - k'_1 = c_1(p_1 - p_2)$ and $k_2 - k'_2 = c_2(p_1 - p_2)$
 $\Leftrightarrow [k_1 - k'_1, k_2 - k'_2] = [c_1, c_2](p_1 - p_2)$ ■

Corollary 3.18. Let $G_1 = (A_1, B_1)$ and $G_2 = (A_2, B_2)$ be two TRIVFGs such that $A_1 \geq A_2$ (or $A_2 \geq A_1$) and A_2 (or A_1) is a constant function. Then the join $G_1 + G_2$ is a TRIVFG if and only if $[k_1 - k'_1, k_2 - k'_2] = [c_1, c_2](p_1 - p_2)$ where $[c_1, c_2]$ is the constant value of $\text{rmin}(A_1, A_2)$ ■

Example 3.19

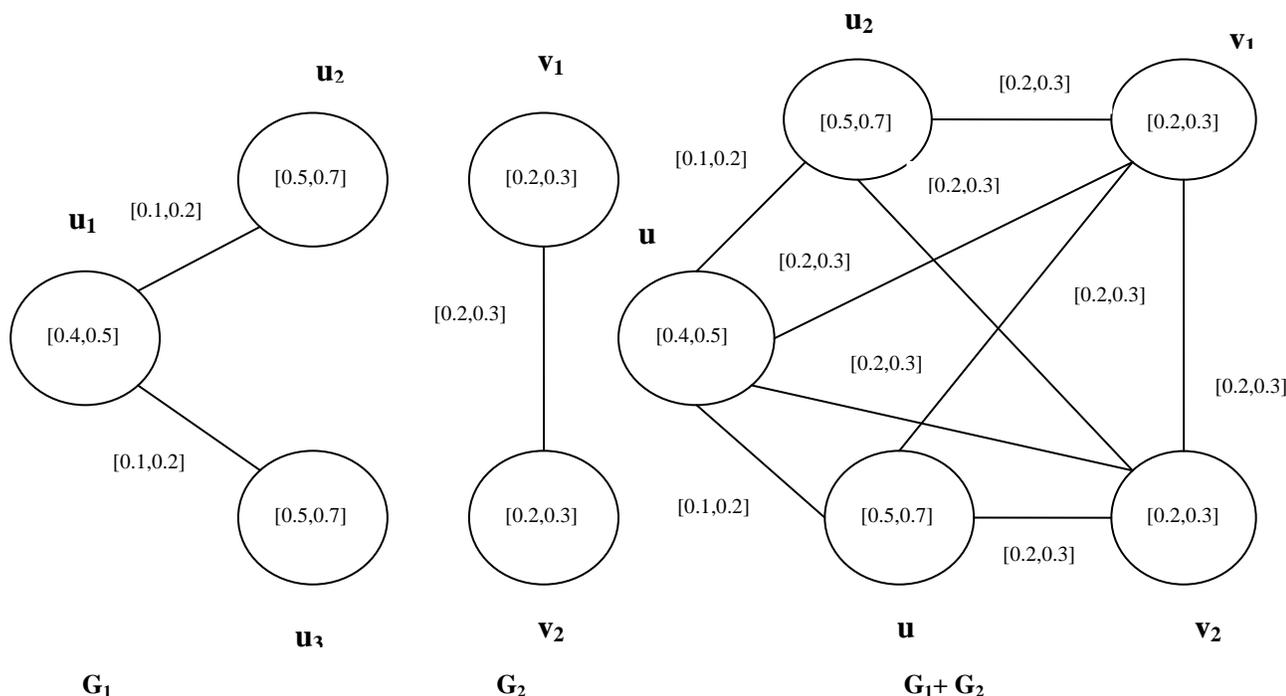


Fig 3.6 : An example to verify theorem 3.17

Here $td_{G_1} = [k_1, k_2] = [0.6, 0.9]$ and $td_{G_2} = [k'_1, k'_2] = [0.4, 0.6]$.
 $rmin(A_1, A_2) = [c_1, c_2] = [0.2, 0.3], p_1 = 3, p_2 = 2$.
 $\therefore [k_1 - k'_1, k_2 - k'_2] = [0.2, 0.3] = [0.2, 0.3](3 - 2) = [c_1, c_2](p_1 - p_2)$. Hence G_1 and G_2 satisfy the condition given in theorem 3.17 and so $G_1 + G_2$ is a TRIVFG which is also clear from the figure.

IV. CONCLUSION

In this paper, we have introduced the notion of TRIVFGs. We have observed that the join of two TRIVFGs need not be a TRIVFG. Also, we have derived some necessary and sufficient conditions for the join of two IVFGs to be a TRIVFG.

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Effect of Macroeconomic Indicators toward Government Bonds Price in the Secondary Market

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Abstract- This study aims to know price movement of government bond compared to some other investment instruments, and analyze the influence of macro-economic indicators (BI Rate, stock index, exchange rate and international indicators in this case is the US Treasury to government bond in the secondary market. Through panel regression and also ordinary least square method obtained several points in order to keep government bond prices remained stable on secondary market as follows : maintaining the stability of the rupiah exchange rate, keeping the spread of inflation rate with the bank rate, formulating the government policies that impact on people's purchasing power, BI Rate negatively affectsthe price of government bonds.

Index Terms- government bond, Fixed Rate Instrument, Panel RegressionMethod, Ordinary Least SquareMethod

I. INTRODUCTION

One of the alternatives taken by the government to fulfill the budget needs to run the state budget besides from tax-income and non-tax state income is by issuing Government Securities (SBN). In general, SBN can be divided into Government Bonds (Surat Utang Negara, SUN) and Sharia Government Bonds (Sertifikat Berharga Syariah Negara, SBSN) (IBPA, 2011). According to the Directorate General of Debt Management (Direktorat Jenderal Pengelolaan Utang, DJPU), by August 2015, the outstanding SUN rupiah of Indonesia Government reached Rp 1,220 trillion with each instrument outstanding of Zero Coupon of Rp 43.2 trillion, Fixed Rate of Rp 1,028 trillion and Variable Rate of Rp104 trillion. Until July 2015, there were 41 Fixed Rate Series in circulation on the secondary market, thus this instrument will be discussed further in this research. The issuance in each period tended to show an increase. However, by 2014 and 2015 they were likely to decline. If seen from coupon side, the Fixed Rate instrument on Primary Market tended to decline. However, in mid-2012 up to this moment, the coupon needed to be paid by the governments experienced an increase on each issuance.

In general, the State Securities are issued in the form of SPN and SUN, in which they are distinguished by the securities period. SPN is a SBN with less than one year period, while SUN is of more than one year period. In SUN issuance, the government can generate SUN product diversification into four types of instruments, i.e. Fix Rate, Variable Rate, Zero Coupon and ORI. On the primary market, the four instruments are traded

to the market at par price (100%) except Zero Coupon, and once they are sold in the primary market there will be securities price changes to be at premium or at discount.

The SUN price change in the secondary market is basically influenced by several macroeconomic indicators and it will be discussed further on what kind of impact does these macroeconomic indicators has caused and how big its impact towards the SUN price on secondary market.

II. RESEARCH METHODOLOGY

The method used in this research is panel regression and was equipped with the smallest squares method (Ordinary Least Square). According to Hsiao (2004) in Firdaus (2011), panel data can provide informative data, reduce colinierity among variables as well as increase the independent level which means it increases the efficiency..

The panel regression model used in this research is as follows:

$$FR_{it} = f(SBI_{it}, IHSG_{it}, ER_{it}, UT_{it}) \dots \dots \dots (1)$$

It was then formed in the Econometrics model with multiple linier regression equation:

$$FR_{it} = a + b_1 SBI_{it} + b_2 IHSG_{it} + b_3 ER_{it} + b_4 UT_{it} + \epsilon_{it} \dots \dots \dots (2)$$

In which: FR = Government Bonds/ Fixed Rate Instrument

a = Constanta

bi = Coefficient Regression

SBI= BI rate (%)

IHSG = IDX Composite

ER= Rupiah Exchange Rate (Rp/USD)

UT= US Treasury

ε = Error term

The OLS model that will be used is the Government Bonds that is used as dependent variable. The employed equation function is as follows:

$$FR = f(SBI, IHSG, ER, UT) \dots \dots \dots (1)$$

It was then formed in the Econometrics model with multiple linier regression equation:

$$FR = a + b_1 SBI_{it} + b_2 IHSG_{it} + b_3 ER_{it} + b_4 UT_{it} + \epsilon_{it} \dots \dots \dots (2)$$

In which: FR = Government Bonds/ Fixed Rate Instrument

a = Constanta

bi = Coefficient Regression
 SBI= BI rate (%)
 IHSG = IDX Composite
 ER= Rupiah Exchange Rate (Rp/USD)
 UT= US Treasury
 ε = Error term

III. RESULTS AND DISCUSSIONS

The Influence of Macro Indicators towards Fixed Rate Instruments in the Secondary Market

Panel Model

The results of the panel data with Eviews for research model as presented in Table 1,

Table1. Effect of macroeconomic indicators on government bonds price in the secondary market.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
IHSG	26.58	6.939561	3.830704	0.0002
ER	-37.84	9.817729	-3.854317	0.0002
SBI	-1.528	0.164194	-9.308324	0.0000
UST	1.44	0.255101	5.658952	0.0000
C	98.43	7.228741	13.61759	0.0000
AR(1)	0.864	0.013874	62.30528	0.0000

Based on the estimation result presented in Table 1, the result of the regression equation is formulated as follows:

$$FR_{it} = 98,43 - 1,53SBI_{it} + 26,58IHSG_{it} - 37,84ER_{it} + 1,44UT_{it} + \epsilon$$

Research results as shown in Table 1 can be interpreted as follows :

1. The Impact of BI Rates (SBI, Suku Bunga Acuan BI). It can be seen that based on the estimation results that the prob value is less than alpha 5% which means that SBI value shares a significant impact and the SBI coefficient variable shows a negative value of 1.53 which means that the SBI increase was able to significantly lower the bonds price to the FR of 1.53%, ceteris paribus. This is in accordance with the research conducted by M. K. Aswan Rambe in 2012 that measured and analyzed the influence of macroeconomic variables to the issuance of government bonds.
2. The Impact of IDX Composite (IHSG). Based on the estimation results, it is shown that the prob value is less than alpha 5% which indicates that IDX Composite shares a significant impact and the IDX Composite coefficient shows a positive value of 26.58 which indicates that the increase of the IDX Composite value was able to significantly increase the bond prices towards FR of 26.58%, ceteris paribus.
3. The Exchange Rate (ER). Based on the estimation result it is shown that the prob value is less than alpha 5% which indicates that the exchange rate coefficient shows a negative value of 37.84 that indicates that the

strengthening of the US Dollar value or the weaken of the rupiah exchange rate was able to significantly lower the bond price towards FR of 37.84%, ceteris paribus.

4. The Impact of the U.S. Treasury (UST). Based on the estimation result it is shown that the prob value is less than alpha 5% which indicates that the U.S. Treasury shares a significant impact and US Treasury coefficient variable shows a positive value of 1.44 which indicates that the increase of the US Treasury value was able to significantly increase the bond prices towards FR of 1.44%, ceteris paribus.

On the research conducted by Suhaimi in 2011 it is shown that the Deposits Interest Rates Variable, the BI Rate and IDX Composite shares a significant impact towards ORI prices in the secondary market and it is in accordance with this research results. In addition, it is in accordance with the opinion addressed by Jogiyanto (2010), namely the relationship between the interest rate with bonds prices is negative, if the interest rates increase, then it will be more profitable to invest in bank deposits, thus the bonds prices in the market will decline.

The Selection of Panel Model

Chow test is used to select both models between Pooled Least Square and Fixed Effect Model. The hypothesis created in this testing are as follows:

- H0 : PLS Model
 H1 : FEM Model

The Chow test result is presented as follows:

Effects Test	Statistic	d.f.	Prob.
Cross-section F	3.625205	(2,150)	0.0290
Cross-section Chi-square	7.505469	2	0.0235

Based on the test results on the table presented, it is shown that the prob value of (0.0235) < alpha 5% alpha indicates H0 rejection which means that the selected model is Fixed Effects Model.

The Statistical Test Result of OLS

The multiple regression results with Eviews for research model FR0053 is presented in Table 2.

Table 2. The Influence of macroeconomic indicators on FR0053 price in the secondary market.

Variabel	Coefficient	t-Statistic	Prob.
SBI	-0.02	-1.8068	0.0773
IHSG	0.23	4.1944	0.0001
ER	-0.31	-4.6155	0.0000
UT	0.92	4.9656	0.0000
C	0.38	2.5332	0.0148

The research results as presented on Table 2 can be interpreted as follows :

1. The BI Rates (SBI) Influence. Based on the estimation results it is shown that the prob value is smaller than 10% which indicates that SBI value shares a significant impact and SBI variable coefficient shows a negative value of 0.02 which indicates that the SBI increase was able to significantly lower the bond price towards FR0053 of 0.02%, ceteris paribus.
2. The IDX Composite Impact. Based on the estimation results it is shown that prob value is less than alpha 5% which indicates that IDX Composite shares a significant impact and the IDX Composite coefficient shows a positive values of 0.23 which indicates that the IDX Composite increase was able to significantly increase the bond prices towards FR0053 of 0.23%, ceteris paribus.
3. The Exchange Rate (ER) Impact. Based on the estimation results it is shown that prob value is less than alpha 5% which indicates that IDX Composite shares a significant impact and the IDX Composite coefficient

shows a positive values of 0.31 which indicates that the strengthening of US Dollar or the weaken of Rupiah exchange rate was able to significantly decline the bond prices towards FR0053 of 0.31%, ceteris paribus.

4. The US Treasury Impact. Based on the estimation result it is shown that prob value is less than alpha 5% which indicates that US Treasury shares a significant impact and the US Treasury coefficient shows a positive values of 0.92 which indicates that the US Treasury increase was able to significantly increase the bond prices towards FR0053 of 0.92%, ceteris paribus.

In the estimation result it is shown that the overall independent variables in the equation shows significant number at the level of $\alpha = 5\%$ except the SBI in which it shows a significant number of $\alpha = 10\%$. Based on the research model estimation as presented on Table 2, the estimation of the regression equation can be formulated as follows :

$$FR0053_t = 0,38 - 0,02SBI_t + 0,23IHSG_t - 0,31ER_t + 0,92UT_t$$

Multiple regression results with Eviews for research model FR0054 is presented on Table 3.

Table 3. The Influence of macroeconomic indicators on FR0054 price in the secondary market

Variabel	Coefficient	t-Statistic	Prob.
SBI	-0.03	-1.69	0.0973
IHSG	0.35	4.52	0.0000
ER	-0.30	-3.02	0.0041
UT	1.58	5.89	0.0000
C	0.36	2.34	0.0236

Research results as presented on Table 3 can be interpreted as follows :

1. The BI Rates (SBI) Influence. Based on the estimation results it is shown that the prob value is smaller than 10% which indicates that SBI value shares a significant impact and SBI variable coefficient shows a negative value of 0.03 which indicates that the SBI increase was able to significantly lower the bond price towards FR0053 of 0.03%, ceteris paribus.

2. The IDX Composite Impact. Based on the estimation results it is shown that prob value is less than alpha 5% which indicates that IDX Composite shares a significant impact and the IDX Composite coefficient shows a positive values of 0.35 which indicates that the IDX Composite increase was able to significantly increase the bond prices towards FR0053 of 0.35%, ceteris paribus.

3. The Exchange Rate (ER) Impact. Based on the estimation results it is shown that prob value is less than alpha 5% which indicates that IDX Composite shares a significant impact and the IDX Composite coefficient shows a positive values of 0.3 which indicates that the strengthening of US Dollar or the weaken of Rupiah exchange rate was able to significantly decline the bond prices towards FR0053 of 0.3%, ceteris paribus.
4. The US Treasury Impact. Based on the estimation result it is shown that prob value is less than alpha 5% which indicates that US Treasury shares a significant impact and the US Treasury coefficient shows a positive values of 1.58 which indicates that the US

Treasury increase was able to significantly increase the bond prices towards FR0053 of 1.58 %, ceteris paribus.

In the estimation result it is shown that the overall independent variables in the equation shows a significant number at the level of $\alpha = 5\%$ except the SBI in which it shows a significant number of $\alpha = 10\%$. Based on the research model estimation as presented on Table 3, the estimation of the regression equation can be formulated as follows :

$FR0054_t = 0,36 - 0,03SBI_t + 0,35IHSG_t - 0,30ER_t + 1,58UT_t$.
 Multiple regression results with Eviews for research model FR0055 is presented on Table 4.

Table 4. The Influence of Macro Indicators towards FR0055 on the Secondary Market

Variabel	Koefisien	t-Statistic	Prob.
SBI	-0.02	-1.86	0.0682
IHSG	0.11	3.39	0.0014
ER	-0.12	-2.39	0.0210
UT	0.83	2.99	0.0043
C	0.77	6.48	0.0000

Research results as presented on Table 4 can be interpreted as follows:

1. The BI Rates (SBI) Influence. Based on the estimation results it is shown that the prob value is smaller than 10% which indicates that SBI value shares a significant impact and SBI variable coefficient shows a negative value of 0.02 which indicates that the SBI increase was able to significantly lower the bond price towards FR0055 of 0.02%, ceteris paribus.
2. The IDX Composite Impact. Based on the estimation results it is shown that prob value is less than alpha 5% which indicates that IDX Composite shares a significant impact and the IDX Composite coefficient shows a positive values of 0.11 which indicates that the IDX Composite increase was able to significantly increase the bond prices towards FR0053 of 0.11%, ceteris paribus.
3. The Exchange Rate (ER) Impact. Based on the estimation results it is shown that prob value is less than alpha 5% which indicates that IDX Composite shares a significant impact and the IDX Composite coefficient shows a positive values of 0.12 which indicates that the strengthening of US Dollar or the weaken of Rupiah exchange rate was able to significantly decline the bond prices towards FR0053 of 0.12%, ceteris paribus.
4. The US Treasury Impact. Based on the estimation result it is shown that prob value is less than alpha 5% which indicates that US Treasury shares a significant impact and the US Treasury coefficient

shows a positive values of 0.83 which indicates that the US Treasury increase was able to significantly increase the bond prices towards FR0053 of 0.83%, ceteris paribus.

In the estimation result it is shown that the overall independent variables in the equation shows a significant number at the level of $\alpha = 5\%$ except the SBI in which it shows a significant number of $\alpha = 10\%$. Based on the research model estimation as presented on Table 4, the estimation of the regression equation can be formulated as follows :
 $FR0055_t = 0,77 - 0,02SBI_t + 0,11IHSG_t - 0,12ER_t + 0,83UT_t$.

Managerial Implications

The results showed that there was a significant positive influence of the IDX Composite variable towards the government bonds prices on the secondary market. This gives the understanding that the rise of IDX Composite tends to impact to the rise of the government bond. Therefore, it is important to continually accomplish the increase of IDX Composite by keeping the good business climate, for example by conducting investment promotions in the domestic and international capital markets. In addition, the government also needs to maintain political stability because it is the crucial point that becomes the investors' consideration before investing in Indonesia.

There are several points needed to be taken notice by the government so that Indonesia capital market does not show fluctuating movements. First, the rupiah exchange rates stability towards the currencies of other countries, especially the US dollar, is strongly influenced by the global conditions. Second, the range (spread) between inflation rates with the banking

interest rates that is too wide, whereas other countries apply negative spread by pushing the banking interest rates to spur its economic growth. Third is the government policy that shares a significant impact towards the purchasing power of the Indonesian society. If the purchasing power of the Indonesia improves, it indirectly shares a positive impact towards the issuers profit of Indonesia Stock Exchange, thus it will dampen the fluctuations of the movement of the IDX Composite.

In addition, this study also shows that there is a positive significant influence of the exchange rate variable against the government bonds price on the secondary market. Therefore, both the governments and Bank of Indonesia should be able to create policies that have an impact on Rupiah strengthening by, one of which, maintaining the society's purchasing power and keeping the inflation rate. Other things needed to be noted so that the government bonds prices does not experience a decline is by keeping the interest rate, in this case BI Rate. In another study, Ibrahim (2008) and Nasher (2011) stated that the Interest Rate (SBI) shares a positive impact towards Yield To Maturity in which it clarifies that it shares negative impact towards the price. The relationship between the interest rate with the bond price is negative and the relationship between the bonds prices with Yield To Maturity is also negative (Jogiyanto 2010).

This study also explains that the increase of the BI Rate will lead to the declining of government bond prices and there will be a tendency that the society is not interested with the bonds instruments and divert their investments to other instruments. BI Rate shares a negative impact towards the fixed rate of government bonds prices. This suggests that the higher the interest rates prevailing then many investors would prefer to invest their funds in the banking sector. Thus, it will cause the bonds prices in the capital market became down.

IV. CONCLUSIONS

Macroeconomic variables, in this case Composite Stock Price Index, Rupiah exchange rates, Bank of Indonesia interest rates and US Treasury share a significant impact towards the government bonds prices on the secondary market. Variables that share a positive impact towards the price changes in the secondary market is the Composite Stock Price Index and US Treasury, while variables that shares a negative impact towards the price changes on secondary market are the Exchange Rate and BI Rate. The government bonds issuance is one of the financing sources to close the budget deficit, thus the right

policies are needed so that the bond prices can be maintained. In addition, prior to the issuance, the government should still continue to do deep analysis on the development of macroeconomic indicators. This is in line with the results of the research that indicate that there is significant influence of macroeconomic indicators towards government bonds price changes in the secondary market.

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Frequentist Comparison of the Bayesian Credible and Maximum Likelihood Confidence interval for the Median of the Lognormal Distribution for the Censored Data

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Abstract- Lognormal Distribution is widely used in scientific investigation. Rao and D'Cunha (2016) reported that the Bayes credible intervals are also confidence intervals when the sample size is moderate to large. In this paper we have investigated whether the same conclusion holds for the censored data under random censoring. Extensive Monte Carlo simulation indicates that the result does not hold under random censoring. Leukemia free survival time for Allogeneic transplant patients reported in Klein and Moeschberger (2003) is reanalyzed and the results indicate that Bayes estimate of the median survival time is close to the Kaplan Meier estimator.

Keywords- Lognormal distribution, complete sample, credible interval, random censoring, Monte Carlo simulation.

I. INTRODUCTION

For the last 50 years, lognormal distribution is widely used in scientific investigation. In the reliability studies, lognormal distribution is one of the life time distributions that are widely used. Standard textbooks on analysis of failure time data (Kalbfleisch & Prentice (2002), Lawless (2003)) discuss the properties of the lognormal distribution. A seminal paper on the use of lognormal distribution is due to Nelson (1980) who used the distribution to develop step stress reliability model. Mullen (1998) used lognormal distribution to study software reliability. Lognormal distribution is also used in the analysis of stock market data (Antonioni et al. (2004), D'Cunha & Rao (2014)). Length biased lognormal distribution is used in the analysis of data from oil field exploration studies (Ratnaparkhi & Naik-Nimbalkar (2012) and also see the reference cited therein). Although Cox's (1972) Proportional Hazard model is widely used for the analysis of survival time in clinical studies, a recent application of the lognormal distribution for the cancer patients is given by Royston (2001). Textbooks and monographs on lognormal distributions are due to Kalbfleisch and Prentice (2002), Lawless (2003) and Aitchison and Brown (1957).

Although Kendall and Stuart (1989) discuss the maximum likelihood and Bayesian estimation of parameters of the mean and median of the lognormal distribution, a rigorous investigation of this on the parameter estimation is due to Nelson (1980). The recent applications on the Bayes estimators of the parameters of the lognormal distribution are due to Zellner (1971), Padgett and Wei (1977), Padgett and Johnson (1983), Sarabia et al. (2005) and Harvey and Merwe (2012), D'Cunha and Rao (2014 a, 2014 b, 2015, 2016 a, 2016 b), Rao and D'Cunha (2016).

In the analysis of failure time data, censoring is very common. For the censored observations, median can be obtained easily rather than mean, and in reliability and clinical studies, median survival time is often reported. Bayesian procedures are computationally tedious. Barring the computational difficulty, from the frequentist view point Bayesian credible intervals are acceptable when they are also confidence intervals. In the past, several papers have appeared to check whether Bayesian credible intervals are also confidence intervals; not necessarily for lognormal distribution. Some of the references in this area are Bartholomew (1965), Woodroffe (1976), Hulting and Harville (1991), Severini (1993), Sweeting (2001), Genovese and Wasserman (2002), Stern and Zacks (2002), Agresti and Min (2005) and Moon and Schorfheide (2012). The focus of this paper is to check whether Bayesian credible intervals for the median of the lognormal distribution are also confidence interval. For the censored data, analytic computation of the coverage probability of the credible interval is algebraically prohibitive and is not attempted in this paper. On the other hand, extensive Monte Carlo simulation is used to compute this coverage probability. The simulation is extensive in terms of objective priors, sample size and the values of the coefficient of variation (CV) of the lognormal distribution. The results indicate that Bayesian credible intervals do not maintain the confidence level and thus are not the confidence interval from the frequentist view point. The conclusion differs from the uncensored case where Bayesian credible intervals are also confidence intervals (Rao and D'Cunha (2016)).

The paper unfolds in six sections. Section 2 discusses the various priors and the associated Bayes estimator for the median of the lognormal distribution. The details of the simulation experiment are given in section 3. Section 4 presents the numerical results. A real life data is analysed in section 5. And the paper concludes in section 6.

II. CREDIBLE AND CONFIDENCE INTERVAL FOR THE MEDIAN OF THE LOGNORMAL DISTRIBUTION

Given a random sample $X = \{X_1, X_2, \dots, X_n\}$ from a lognormal distribution with density

$$f(x; \mu, \sigma) = \frac{1}{\sqrt{2\pi}\sigma x} e^{-\frac{(\log x - \mu)^2}{2\sigma^2}}, \quad x > 0, \quad -\infty < \mu < \infty, \sigma > 0 \quad (1)$$

Then likelihood $L(\mu, \sigma|x)$ under random censoring is given by

$$L(\mu, \sigma|x_i) = \prod_{i=1}^n \left(\frac{1}{\sqrt{2\pi}\sigma x_i} e^{-\frac{(\log x_i - \mu)^2}{2\sigma^2}} \right)^{\delta_i} (S(x_i; \mu, \sigma))^{1-\delta_i}, \quad x > 0, \quad -\infty < \mu < \infty, \sigma > 0 \quad (2)$$

where, $S(\cdot)$ is the survival function of the lognormal distribution. The function normfit in Matlab version 7.0 gives maximum likelihood estimator of μ and σ along with $(1 - \alpha)\%$ confidence interval. For this purpose, the transformed variable $Y = \log X$ is used, where Y follows normal distribution with parameters μ and σ^2 . Since maximum likelihood estimator of μ is invariant (Kale (1999)) for a continuous function $g(\mu)$, the confidence interval for e^μ is given by $(e^{\hat{\mu}_L}, e^{\hat{\mu}_U})$, where $\hat{\mu}_L$ and $\hat{\mu}_U$ denote the lower and upper confidence interval for μ .

The Bayes estimator of e^μ exists under the following mild regularity conditions; $0 < \mu < B$, where B is some positive real number. For any prior $\pi(\mu, \sigma)$, the Bayes estimator of e^μ is given by

$$BE(e^{\hat{\mu}^B}) = \frac{\int e^\mu L(\mu, \sigma|x) \pi(\mu, \sigma) d\sigma d\mu}{\int L(\mu, \sigma|x) \pi(\mu, \sigma) d\sigma d\mu} \quad (3)$$

Analytical expression for the above integral is not tractable and we have used importance sampling approach to compute the numerical value of the Bayes estimator. Equitailed credible interval for e^μ corresponds to $\alpha/2^{th}$ and $(1 - \alpha/2)^{th}$ percentile value of the simulated posterior distribution of e^μ . Four objective priors are used in the investigation. They are (1) Uniform prior $\pi(\mu, \sigma) = 1$ (2) Right invariant prior $\pi(\mu, \sigma) = \frac{1}{\sigma}$ (3) Left invariant Jeffreys prior $\pi(\mu, \sigma) = \frac{1}{\sigma^2}$ and (4) Jeffreys rule prior $\pi(\mu, \sigma) = \frac{1}{\sigma^3}$ (Harvey and Merwe (2012)).

III. SIMULATION EXPERIMENT

In order to compare the coverage probability and the length of the confidence/credible interval, a simulation experiment is carried out. For each sample size n , observations X are generated from lognormal distribution with parameter μ and σ . The censoring distribution is assumed to be Uniform $U(0, \theta)$. Let δ denote the censoring indicator, which takes the value $\delta = 1$ if $x \leq u$ and $\delta = 0$ if $x > u$. For each sample size n , the confidence interval for the median of the normal distribution is computed using the function normfit in Matlab software and from which the confidence interval for the lognormal distribution is obtained. The coverage probability and length of the confidence interval is obtained using 1000 simulations.

The Bayes estimator of the median of the lognormal distribution and the credible interval for e^μ is computed using the procedure developed by Chen and Shao (1999). A detailed algorithm in another context is given in Kundu and Howlader (2010). The procedure involves the derivation of the posterior density $\pi(\mu, \sigma|data)$ for the uncensored observations. The posterior density is the product of independent gamma distribution for $\eta = \frac{1}{\sigma^2}$ and conditional normal distribution for μ . For details see D'Cunha and Rao (2016). Using 10,000 observations of (μ, σ) , the Bayes estimator of e^μ is given by

$$\frac{\sum_i e^{\mu_i} S(x_i, \mu_i, \sigma_i)}{\sum_i S(x_i, \mu_i, \sigma_i)} \quad (4)$$

For estimating the CDF of the posterior density $\pi(\mu, data)$, the duplet (μ, σ) is arranged in ascending order of magnitude of μ along with the values of σ . The estimated $\alpha/2^{th}$ and $(1 - \alpha/2)^{th}$ percentile values corresponds to the lower and upper credible interval for μ , from which the lower and upper credible interval for e^μ is obtained. Using 1000 simulations we determine the proportion of times the median of the lognormal distribution lies in this interval. This gives us the estimated coverage probability.

The value θ in Uniform $U(0, \theta)$ distribution is determined such that the percentage of censoring corresponds to 10% and 20%. Since closed form solution does not exist for the survival probability of the lognormal distribution, we have used Monte Carlo integration to determine the value of θ .

The simulation is extensive in the sense that it covers 128 configurations. When the sample size is moderate to large, the average computational time for the Bayesian credible interval exceeds 6 hours using a PC with Intel core i5 processor.

IV. NUMERICAL RESULTS

Table 1a) and 1b) presents the number of times coverage probability is maintained by the credible/confidence interval for 8 combinations of CV across sample sizes for 10% and 20% censoring, respectively. We say that a credible/confidence interval maintains credible/confidence level of $(1 - \alpha) = 0.95$ if the coverage probability is in the interval of 0.940 to 0.960, such a criterion has been used in Guddattu and Rao (2010).

Table 1a). Coverage probability of the credible and confidence interval for the Median across sample sizes for 8 combinations of specified values of CV for 10% censoring

n	Bayes Procedure (Equitailed)								MLE(Equitailed)	
	No. of times Cov prob is maintained				Average Length				No. of times Cov prob is maintained	Average length
	U	R	L	JR	U	R	L	JR		
10	0	0	0	0	*	*	*	*	0	*
20	0	0	0	0	*	*	*	*	4	731.66
40	0	0	0	1	*	*	*	*	3	683.48
60	0	0	0	0	*	*	*	*	8	398.81
80	0	0	0	0	*	*	*	*	8	344.91
100	0	0	0	0	*	*	*	*	5	380.39
150	0	0	0	0	*	*	*	*	7	247.49
200	0	0	0	0	*	*	*	*	6	192.81
overall	0	0	0	0	*	*	*	*	41	2979.54

Note: Whenever coverage probability is not maintained average length has not been calculated. U-Uniform prior, R-Right invariant prior, L-Left invariant prior, JR-Jeffreys rule prior.

Table 1b). Coverage probability of the credible and confidence interval for the Median across sample sizes for 8 combinations of specified values of CV for 20% censoring

n	Bayes Procedure (Equitailed)								MLE(Equitailed)	
	No. of times Cov prob is maintained				Average Length				No. of times Cov prob is maintained	Average length
	U	R	L	JR	U	R	L	JR		
10	0	0	0	0	*	*	*	*	0	*
20	0	0	0	0	*	*	*	*	1	1433.80
40	0	0	0	1	*	*	*	*	5	551.19
60	0	0	0	0	*	*	*	*	5	423.95
80	0	0	0	0	*	*	*	*	5	488.10
100	0	0	0	0	*	*	*	*	5	375.87
150	0	0	0	0	*	*	*	*	5	212.95
200	0	0	0	0	*	*	*	*	8	224.06
overall	0	0	0	0	*	*	*	*	34	3709.91

Note: Whenever coverage probability is not maintained average length has not been calculated. U-Uniform prior, R-Right invariant prior, L-Left invariant prior, JR-Jeffreys rule prior.

Rao and D’Cunha (2016) have compared the confidence and credible intervals for the median of the lognormal distribution for the same set of configurations for the complete sample. Their results indicate that the credible interval maintains confidence level $(1 - \alpha) = 0.95$ for the sample size $n \geq 80$ and for the sample size $n \geq 60$ for the confidence interval based on MLE. For 20% censoring the confidence level is maintained for the confidence interval based on MLE for smaller samples of size $n=40$. We have checked the numerical computation and it is not clear why the confidence interval maintains confidence level for smaller sample size of $n=40$ for the case of 20% censoring. The conclusion is the same for all the 4 priors and thus the choice of the prior distribution does not affect the coverage probability (Table not shown here).

Table 2a) and 2b) presents the coverage probability for the confidence interval as well as the credible interval for various values of CV across different priors for sample size $n=100$, under 10% and 20% censoring, respectively.

Table 2 a). Length of the confidence/credible interval for various values of CV when sample size=100, under 10% censoring.
 V.

Sample size	Conf/cred interval based on	Length(Coverage probability) when CV equal to							
		0.1	0.3	0.5	0.7	1	1.5	2	2.5
100	MLE	40.69 (0.937)	119.24 (0.942)	190.82 (0.938)	255.50 (0.951)	335.77 (0.937)	438.24 (0.943)	513.49 (0.943)	575.48 (0.944)
	Uniform	39.14 (1)	113.63 (1)	178.79 (1)	232.63 (0.999)	292.86 (1)	356.76 (1)	396.88 (1)	419.95 (0.987)
	Right	38.94 (1)	113.05 (1)	177.87 (1)	231.27 (0.999)	291.37 (1)	354.94 (1)	394.89 (1)	417.44 (0.985)
	Left	38.75 (1)	112.49 (1)	176.99 (1)	230.05 (0.999)	289.89 (1)	353.12 (1)	392.84 (1)	415.21 (0.985)
	Jeffreys Rule	38.55 (1)	111.92 (1)	176.09 (1)	228.97 (0.999)	288.34 (1)	351.08 (1)	390.46 (1)	412.85 (0.985)

Table 2 b). Length of the confidence/credible interval for various values of CV when sample size=100, under 20% censoring.
 VI.

Sample size	Conf/cred interval based on	Length(Coverage probability) when CV equal to							
		0.1	0.3	0.5	0.7	1	1.5	2	2.5
100	MLE	42.94 (0.951)	124.24 (0.935)	198.49 (0.939)	264.44 (0.952)	347.05 (0.936)	451.58 (0.950)	534.69 (0.954)	585.72 (0.950)
	Uniform	39.12 (1)	11.54 (1)	169.73 (1)	211.20 (0.984)	254.60 (0.088)	293.01 (0.002)	316.03 (0.002)	323.36 (0)
	Right	38.89 (1)	110.99 (1)	168.89 (1)	209.95 (0.984)	253.11 (0.080)	291.57 (0.002)	314.46 (0.002)	321.68 (0)
	Left	38.69 (1)	110.43 (1)	168.04 (1)	208.84 (0.984)	252.02 (0.081)	289.98 (0.003)	312.70 (0.002)	319.90 (0)
	Jeffreys Rule	38.55 (1)	109.87 (1)	167.15 (1)	207.87 (0.984)	250.29 (0.048)	287.86 (0.001)	310.20 (0.002)	317.14 (0)

When we compare the results for 10% and 20% censoring the coverage probability is closer to the nominal level $(1 - \alpha) = 0.95$ for 20% censoring rather than 10% censoring. The result is true for various values of CV.

VII. EXAMPLE

We have reanalyzed the data set on Leukemia free survival times (in months), for the 50 Allogeneic transplant patients available in the text book authored by Klein and Moeschberger (2003). The original data consists of 28 censored and 22 uncensored observations. From this data set we have randomly selected the censored and uncensored observations for the 2 scenarios of 10% and 20% censoring. The data set for 10% censored observations consists of 2 censored observations and the data set for 20% censored observations consists of 5 censored observations. The data is given below.

10% censored data: 0.030, 0.493, 0.855, 1.184, 1.480, 1.776, 2.138, 2.763, 2.993, 3.224, 3.421, 4.178, 5.691, 6.941, 8.882, 11.480, 12.105⁺, 12.796, 20.066, 34.211⁺.

20% censored data: 0.030, 0.493, 0.855, 1.184, 1.283, 1.480, 1.776, 2.138, 2.500, 2.993, 3.224, 3.421, 4.178, 5.691, 6.941, 8.882, 9.145⁺, 11.480, 11.513, 12.796, 20.066, 20.329⁺, 28.717⁺, 34.211⁺, 46.941⁺.

Table 3 a) and 3 b) gives the maximum likelihood estimator (MLE) and Bayes estimator of the median of Leukemia free survival times along with 95% confidence/credible interval for 10% and 20% censoring, respectively.

Table 3 a). Credible/confidence interval and length of the credible/confidence interval for 4 priors under Bayes and Maximum Likelihood estimation for Leukemia data with 10% censoring.

Procedure	Prior	Estimate	Credible/confidence interval	Length of the Credible/confidence interval
Bayes	Uniform	3.07	(1.58,5.49)	3.91
	Right	3.07	(1.61,5.42)	3.81
	Left	3.05	(1.64,5.26)	3.62
	Jeffreys Rule	2.95	(1.63,5.01)	3.38

MLE	-	3.50	(1.69,7.24)	5.55
Kaplan Meier	-	2.99	(1.52,4.47)	2.95

Table 3 b). Credible/confidence interval and length of the credible/confidence interval for 4 priors under Bayes and Maximum Likelihood estimation for Leukemia data with 20% censoring.

Procedure	Prior	Estimate	Credible/confidence interval	Length of the Credible/confidence interval
Bayes	Uniform	3.50	(2.00,5.91)	3.91
	Right	3.47	(1.99,5.68)	3.68
	Left	3.48	(2.04,5.77)	3.74
	Jeffreys Rule	3.40	(1.98,5.64)	3.67
MLE	-	5.19	(2.44,11.06)	8.62
Kaplan Meier	-	4.18	(0.15,8.20)	8.05

For 10% censoring, the Bayes estimator of the median disease free survival time ranges from 2.95 to 3.07 months. The MLE of the median of disease free survival time is 3.50 months, while the Kaplan Meier estimate is 2.99 months. The Kaplan Meier estimator is close to the Bayes estimator for the Jeffreys rule prior. The length of the confidence interval based on MLE is 5.55 months while the length of the credible interval ranges from 3.38 to 3.91 months. And the length of the Kaplan Meier confidence interval is 2.95 months.

Under 20% censoring although the pattern is same the values of the median survival time and length of the confidence interval increases for the Bayes estimator, MLE and Kaplan Meier estimator. In the presence of large number of censored observations, it is difficult to check whether the underlined distribution is lognormal. For comparison of the MLE and Bayes estimator, the Kaplan Meier estimator may be treated as standard. It is worthy to note that Bayes estimators are close to the Kaplan Meier estimator.

VIII. CONCLUSION

In this paper we have compared the performance of the Bayesian credible interval and the confidence interval based on maximum likelihood estimator for the censored data for estimating the median of the lognormal distribution. The performance is measured in terms of coverage probability and length of the interval. Frequentist accept the credible interval if they maintain confidence level. Rao and D’Cunha (2016) made this comparison for the complete data and arrived at the conclusion that Bayesian credible interval is also a confidence interval for moderate to large sample sizes. From the present investigation it follows that this conclusion does not hold for the censored data. Therefore we advocate the use of confidence interval for analyzing data in industrial engineering and clinical studies when lognormal distribution is considered. The program is written in Matlab software version 7.0 for the computation of credible and confidence interval and interested readers can obtain the same from the first author.

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Sorption Characteristics of Polished Rice in a Fluidized Bed

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Abstract- Applicability of fluidization methods in rewetting low moisture polished rice was investigated using a recirculating fluidized bed. The sphericity of polished rice was calculated using Ergun's equation to determine the effective diameter. The calculated frictional pressure drop agreed well with the observed data. The sorption characteristics were investigated under fluidizing conditions at different air temperatures and relative humidities. Sorption data were fitted to the first falling rate period drying equation with a standard error of estimate of the moisture content of polished rice ranging from 0.06 to 0.14% d.b. and the sorption coefficient followed the Arrhenius type temperature dependency. The results showed that the fluidization techniques could be effectively used for rewetting low moisture polished rice.

Index Terms- Adsorption, fluidized bed, polished rice, moisture

I. INTRODUCTION

Moisture content of paddy after harvest may vary from 18 to 30% d.b. and it is necessary to lower the moisture content down to 13 to 14% d.b. for safe storage [1]. Hulling and polishing operations reduce certain amount of moisture due to heat generation. This type of normal processing operations produce polished rice containing moisture less than 16% d.b. Moisturizing rice can have a substantial positive effect on the cooking and eating qualities of milled rice [2]. The moisture content of polished rice can be increased by rewetting. The absorption characteristics of polished rice has recently gained interest in rice processing research. The present major constraint in rewetting in commercial scale is the difficulty of achieving sorption uniformity in bulk. The other concerns are the complexity of the equipment, length of the process, and the cost. This study focuses on the fluidization technique as a possible mean of circumventing the above difficulties.

Fluidization is the operation by which solid particles are transformed into fluid like state through suspension in a gas or liquid. Fluidization can be carried out by liquids or gases and different forms of fluidization occur depending on the fluidizing medium and the properties of the particulate materials. Fluidized beds are extensively used in a wide variety of industries because of its larger capacity, low construction cost, easy operability, and high thermal efficiency [3]. There are number of food specific applications of fluidization, such as freezing, blanching and cooking [4, 5]. Shilton and Niranjana [8] have reviewed the use of fluidization in food industry. Rios et al. [7] reported the use of fluidized bed for roasting of coffee beans, resulting in improved quality compared to traditional drum roasting method.

The fluidizing characteristics of the bed facilitate smooth solid handling, especially in continuous operation. Kunii and Levenspiel [3] define a dense phase bed as one in which there is reasonably clearly defined bed surface whether the fluidizing medium is gas or liquid. Geldart [8] classified four clearly recognizable types of particle behavior from smallest to largest; cohesive, aeratable, sandlike, spoutable. The relationship between terminal velocity and the solid hold up has discussed by Joshi [9] and Lali et al. [10]. At velocities above bubbling fluidization occur, the nature of contact between gas and solids changes significantly [11]. Although, bubbling may cause passing of gas, it also causes intensive solid mixing with nearly homogenous bed temperature and relative humidity. This helps to control the temperature and relative humidity of the bed.

Compared with other sorption techniques fluidized bed sorption of granular solids offer many advantages. High heat and mass transfer rates are possible because of very good contact between particle and gas [12]. In gas fluidized beds rapid and vigorous mixing takes place in the area just above the distributor facilitating easy exchange of heat and mass between the fluid and the solid [13]. In case the sorption rate is limited by diffusion inside the particles, long residence time of solids are required, which can be achieved easily in a fluidized bed; the apparatus still remains relatively small, because of its large hold-up of solids. The apparatus is rather simple as there are no moving parts. Due to abrasion and friction between rice grains the surface of grain becomes smooth improving the appearance. In this study, fluidizing and sorption characteristics of polished rice under fluidized conditions were studied.

MATERIALS AND METHOD

Sri Lankan rice variety BG 1111 was used for the study. Paddy was hulled and polished to a polishing degree of 90%. In order to widen the range of moisture adsorption characteristic curve, the initial moisture content was selected as 14% d.b. The moisture content of the bulk of 25 kg polished rice was reduced to the desired moisture content of 14% d.b. by slow drying (temperature of the polished rice surface was not more than 30 °C). After drying, polished rice was placed in an air sealed container and stored at 5 °C until time for the tests. Figure 1 shows the experimental apparatus. The exhaust air was recirculated to keep the desired relative humidity (70% and 80%) at high air flow rate. The exhaust air from the bed was sucked by a turbo blower and the temperature and relative humidity of air was controlled at desired values. Relative humidity was achieved by adding water vapor to the inlet air by using an ultrasonic humidifier (Mammy, MUH 4400, Japan). The method was capable of maintaining relative humidity to an accuracy of ±2% at the bottom of the sample. Temperature was controlled to an accuracy of ±0.5 °C. Temperature and relative humidity of air just below the sample and just above the sample were measured by T-type thermo-couples and relative humidity sensors (VAISALA HMP115Y, USA) respectively. The flow rate of air was measured by an orifice meter (FLC-OP, WIKA, Germany). The height of the fluidizing chamber was 0.3 m and was made of transparent plastic. The diameter of the vessel was 0.19 m and it was large enough to avoid flat slugging.

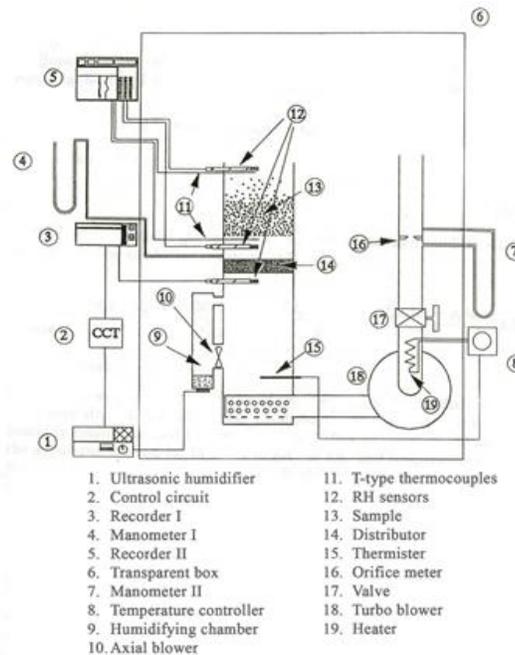


Figure 1: The experimental apparatus

Fluidizing characteristics

Prior to the sorption test, fluidizing characteristics of polished rice was investigated. In this test 2 kg of polished rice was placed in the fluidizing chamber and pressure drop and the flow rate data were collected. The tests were conducted separately for increasing and decreasing flow rates. Though polished rice is non-spherical in shape, it is possible to represent a bed of rice by a bed of spheres of diameter d_{eff} , then the two beds (rice and the spheres of diameter d_{eff}) have the same total surface area and same void fraction. The resistance to flow in the two beds are same. The following equation was used to estimate the effective particle diameter (d_{eff}) [3].

$$d_{eff} = \varnothing_{s,eff} \cdot d_p \quad (1)$$

Where d_p , the intermediate particle is size by screen analysis and $\varnothing_{s,eff}$ is the effective sphericity of a particle. Many food substances are non-spherical, for such cases an equation based on the force balance at incipient fluidization can be used. For calculating the pressure drop at incipient fluidization, McKay and McLain [14] recommend the use of Ergun's [15] equation which has modified to account for the shape of the particles. Also an extension of the Ergun's equation for fluidized beds has discussed by Akgiray and Saatci [16] to calculate the pressure drop in a given reactor. Therefore the effective sphericity of the particle, $\varnothing_{s,eff}$ was calculated using Ergun's equation as follows.

$$\frac{\Delta p_{fr}}{L_m g_c} = 150 \frac{(1 - \varepsilon_m)^2}{\varepsilon_m^3} \frac{\mu u_0}{(\varnothing_{s,eff} d_p)^2} + 1.75 \frac{1 - \varepsilon_m}{\varepsilon_m^3} \frac{\rho_g u_0^2}{\varnothing_{s,eff} d_p} \quad (2)$$

For gases operating under low pressure, frictional pressure drop (Δp_{fr}) can be taken as $\Delta p_{measured}$. The density (ρ_g) and viscosity (μ) of air used in the equation 2 were calculated using the procedures given in Chronological Scientific Tables [17]. The superficial gas velocity at minimum fluidizing condition was calculated equating the drag force by upward moving gas to the weight of the particles.

$$\Delta p_b A_t = W = A_t L_{mf} (1 - \epsilon_{mf}) \left[(\rho_s - \rho_g) \frac{g}{g_c} \right] \quad (3)$$

By rearranging the equation 3, the following expression was obtained.

$$\frac{\Delta p_b}{L_{mf}} = (1 - \epsilon_{mf}) (\rho_s - \rho_g) \frac{g}{g_c} \quad (4)$$

Then the superficial gas velocity at minimum fluidizing conditions u_{mf} was obtained by combining equations 4 and 2 as given below.

$$\frac{1.75}{\epsilon_{mf}^3 \phi_{s,eff}} \left(\frac{d_p u_{mf} \rho_g}{\mu} \right)^2 + \frac{150(1 - \epsilon_{mf})}{\epsilon_{mf}^3 \phi_{s,eff}^2} \left(\frac{d_p u_{mf} \rho_g}{\mu} \right) = \frac{d_p^3 \rho_g (\rho_s - \rho_g) g}{\mu^2} \quad (5)$$

Sorption test

In this trial, sorption characteristics of polished rice under fluidized conditions were studied in detail. Table 1 shows the temperature and relative humidity conditions used for sorption test. Before introducing the sample, the apparatus was run for 15 hours to get the stable relative humidity and temperature. For each test 2 kg sample was used making 0.08 m thick layer in the fluidizing chamber. Moisture content measurements were carried out using 10g samples drawn at 0, 1, 2, 3, 5, 7, 9, 12, 15, 19 and 24th hour for the first 24 hours and thereafter at 12 hour intervals till 72 hours. Weight of the samples were measured using an electronic balance (METLER PC2000). All reported moisture contents were calculated using 10 g samples by air-oven method (135 °C for 24 hours) [18]. Simmonds et al. [19] found that thin layer drying curves of wheat were well represented by an exponential equation, which assumed that all the resistance to moisture transfer was at the outer surface of the kernel. This equation is analogous to Newton's law of cooling and widely used in the first falling rate period of drying, given by the following expression.

$$M = (M_0 - M_e) e^{-kt} + M_e \quad (6)$$

The observed moisture content data were fitted to this equation using a method of least squares. The accuracy of the equation was expressed by the standard error of the estimate. The Arrhenius equation (equation 7) was used to express the temperature dependency of sorption coefficient (k).

$$k = d e^{-f/T} \quad (7)$$

Table 1: The air conditions used to collect the sorption data

Relative Humidity (%)	Temperature (°C)		
	20	25	30
70	•	•	•
80	•	—	—

RESULTS AND DISCUSSION

Fluidizing Characteristics

The frictional pressure drop (Δp_{fr}) versus superficial gas velocity (u_0) diagram is particularly useful as a rough indication of the quality of fluidization. Fluidization mainly depends on the liquid and solid properties used in the system. Figure 2 shows the pressure drop versus flow rate characteristic for polished rice. The solid line represents the calculated values by Ergun's equation and the standard error of the estimate was 16.3 Pa. For relatively low flow rates in a fixed bed, the pressure drop was approximately proportional to the gas velocity and reached a maximum and that was slightly higher than the static pressure of the bed. With further increase in gas velocity, the fixed bed 'unlocked' in other words axial slugging started resulting in non-homogeneity. In the case of fine solid powders increasing the gas velocity beyond the maximum pressure point results in increasing bed height and bed voidage. Then the pressure drop decreases to static pressure of the bed. But for polished rice, slugging starts just after minimum fluidization. So there is no smooth fluidization phase in polished rice when fluidized by air. The diameter of the bed was selected to avoid flat slugs, therefore only axial slugging was observed.

According to the screen analysis rice used for the test was -6+8 mesh size particles. The intermediate particle size (d_p) was 0.00285 m. The effective sphericity of polished rice ($\phi_{s,eff}$) calculated using equation 1 was 0.39. For this calculation the measured pressure drop ($\Delta p_{measured}$) was used as frictional pressure drop (Δp_{fr}). The bed height (L_m) was constant at 0.08 m. The particle density measured by pycnometer using toluene was 1418 kg·m⁻³. Bulk density was 872.2 kg·m⁻³. The void fraction (ϵ) of the fixed bed was 0.385. The

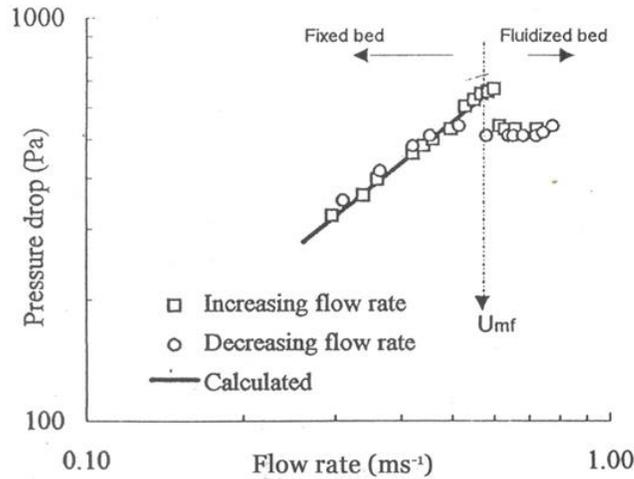


Figure 2: Pressure drop versus flow rate of polished rice fluidized in air

calculated density and viscosity of air were 0.012 kg·m⁻³ and 1.8×10⁻⁵kg·ms⁻¹ respectively. The calculated effective particle diameter (d_{eff}) for the particle size 0.00285 m was 0.0012 m. The value of effective sphericity of polished rice ($\phi_{s,eff}$) can be used with the measured screen size (d_p) to predict frictional losses in beds of any size and for wide size distribution. This method is the most reliable measure of particle size for pressure drop purposes. The calculated minimum fluidizing gas velocity was 0.59 ms⁻¹. The value is only 0.03 ms⁻¹ above the experimentally reported value. Thus the calculated effective sphericity is applicable for pressure drop calculations.

Adsorption characteristics

The Figure 3 shows the sorption curves of polished rice. The used moisture transfer equation well represented the sorption characteristics. The sorption coefficient and the standard error at each air condition are listed in Table 2. The Figure 4 shows the Arrhenius plot of sorption coefficient (k). The Arrhenius parameters for 70% relative humidity were $f = 0.5976 \times 10^4 K$, $d = 0.1585 \times 10^9 h^{-1}$ and the standard error of estimate was 0.06187 h⁻¹.

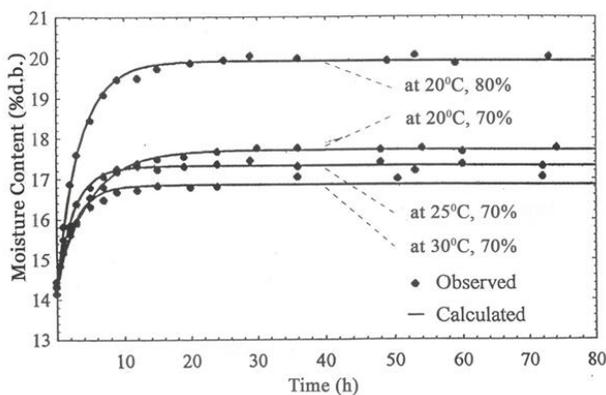


Figure 3: Water adsorption characteristics of polished rice under fluidizing conditions

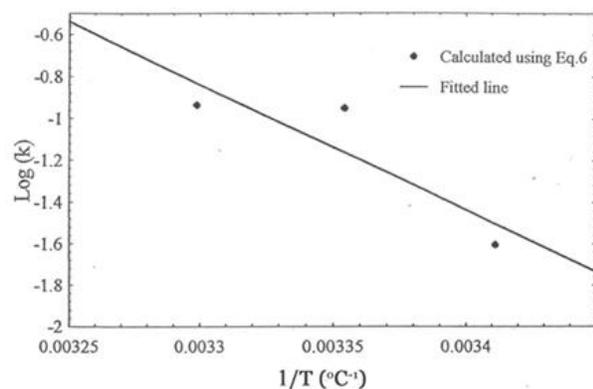


Figure 4: Arrhenius plot of sorption coefficient (k) at 70% relative humidity

Table 2: Initial moisture (M_0), sorption coefficient (k), calculated equilibrium moisture (M_e) and the standard error of estimate at each temperature and relative humidity condition

Temperature (°C)	Relative Humidity (%)	M_0 (% d.b.)	K (h ⁻¹)	M_e (% d.b.)	Standard Error of Estimate
20	70	14.442	0.2009	17.703	0.0649
20	80	14.308	0.2849	19.910	0.1042
25	70	14.329	0.3858	17.317	0.1825
30	70	14.141	0.3921	16.851	0.3172

CONCLUSION

Considerably large amount of gas was needed to fluidize polished rice. Polished rice does not have a smooth fluidizing period. Just after minimum fluidization, it starts turbulent-churning and slugging. The diameter of the vessel should be carefully selected to avoid flat slugs. According to the fluidizing characteristics, polished rice can be categorized as Geldart D particle, the particle diameter is greater than 500µm, spoutable, difficult to fluidize and behaves erratically giving large exploding bubbles. Therefore, spouted beds would be more suitable which need much less gas. Even though, the shallow bed with sufficient diameter and gas velocities not more than the minimum fluidizing velocity would produce solid mixing effectively. Slugging can be avoided using vessels having larger-diameter upper section.

Fluidized bed sorption of polished rice well followed the first falling rate period drying equation, and the sorption coefficient followed the Arrhenius type temperature dependency. The calculated sorption coefficients can be used to predict the moisture contents at respective air conditions. The effective sphericity and effective particle diameter is applicable for pressure drop calculations. It can be concluded that fluidizing polished rice with moist air can be effectively adopted for rewetting low moisture polished rice.

Nomenclature

- A_t cross-sectional area of bed, m²
- d parameter, h⁻¹
- d_{eff} effective particle diameter, m
- d_p intermediate particle size by screen analysis, m
- f parameter, K.
- g acceleration of gravity, 9.8 ms⁻²
- g_c conversion factor, 1kg·m·N⁻¹·s⁻¹
- k sorption coefficient, h⁻¹
- L_m height of fixed bed, m
- L_{mf} height of bed at minimum fluidization, m
- M moisture content at time t, % d.b.
- M_e equilibrium moisture content, % d.b.
- M_0 initial moisture content, % d.b.
- T absolute temperature, K
- t time, h
- W mass of solids, kg
- u_{mf} superficial gas velocity at minimum fluidizing conditions, ms⁻¹
- u_0 superficial gas velocity, ms⁻¹

Greek symbols

- μ viscosity of gas, kg·m⁻¹·s⁻¹
- ρ_g gass density, kg·m⁻³
- ρ_s density of solids, kg·m⁻³
- Δp_b pressure drop across the bed, Pa
- Δp_{fr} Frictional pressure drop, Pa
- ϵ_m void fraction in the fixed bed
- ϵ_{mf} void fraction in the bed at minimum fluidizing conditions
- $\phi_{s,eff}$ effective sphericity of a particle

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Microcontroller Based Remote Bill Board Control with SMS Access

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Abstract- Many state of the art and cutting edge universities in the world rely on wooden notice board hanging on the wall to display announcements. The overreliance of this practice in a university is still not enough to pass relevant information around as many problems are encountered. We consider the case study of professional Colleges, where information is a vital key for knowing the updates of the campus. This work presents an innovative and interesting manner of intimating the message to the people using a wireless electronic display board which was achieved using technology of GSM SMS. Designing such a digital notice board system with remote access requires a high reliability measure, more so when that display systems is used for real time information broadcasts then the system has to be always available and accurate. The work proposed here is Microcontroller based remote bill board control with SMS access. First off, a Microcontroller and a GSM modem were used to implement a digital notice board which can be accessed remotely through SMS. A method to increase the reliability of the proposed system was later developed and achieved using the web technology. Data performance test was conducted on the system to determine the reliability of GSM services for implementing such systems. The result of the test based on over 757 data transmissions shows that GSM services which is ubiquitous can be used as communication channel for controlling the system with 97% accuracy and the internet is a good back up for such system with 100% accuracy.

Index Terms- Personal Computer (PC), GSM, Internet, Modem, MySQL, AT Command, Connector, C-Language, C# Language, PHP

I. INTRODUCTION

The notice board is an indispensable part of many communities, found in neighborhoods, workplaces and other forms of social network. Thousands of notice boards exist on many offices and institutions providing a valuable opportunity for low expense, high visibility communication. Many of these displays are spontaneous and self-organizing; any surface can become a noticeboard and any window, a display case [1]. Large digital displays are now commonly seen in our everyday, with increasing need for information in modern times, Notice boards provides an easy way to broadcast important information across a group of people and ensure that it's read [2]. This paper is about the implementation of a digital notice board for colleges, offices, etc. it acts as a support system and improvement to the method by which information are being posted on notice boards. It is a digital display device that displays information that is fed to it through SMS or HTML. Thus, the challenge which this paper

seeks to address, is on designing a public display board that delivers information timely, visibly clear, relevant and clear on action, such system can be used to deliver real time notices, in office and institutions by using two communication channels which are GSM and Internet. Remote control of electronic billboard has been a subject of growing interest. In recent years, apart from voice calls on a mobile phone, sending of text messages using GSM has become very popular among mobile phone users, it is possible that we can use this SMS to control devices and to display data. This paper proposes an industrial application that will utilize the distinct advantages of the GSM.SMS system in controlling a message display board.

Conversely, With the growing popularity of internet and development of embedded technology, Web technology has been extended to the development and application of embedded system. The Internet is a global network of computer networks. Although this basic definition may seem rather simple, its implications are enormous. One of the main features of the Internet is its ability to allow dissimilar computer systems, and even networks of dissimilar systems, to communicate with each other by means of the common Transmission Control Protocol/Internet Protocol (TCP/IP). This technology is used here to control a notice board remotely. This channel acts as a backup for the GSM channel in case of failure of the GSM network. As these new proposed display models become available, older models become virtually worthless, with this in mind; this thesis seeks to design the remote billboard display with SIM 900 GSM modem, LPC2148 microcontroller and PC Server. In this research, SIM 900 GSM modem serves as the main receiver of the messages for the notice board, and LED dot matrix is used to display the received messages.

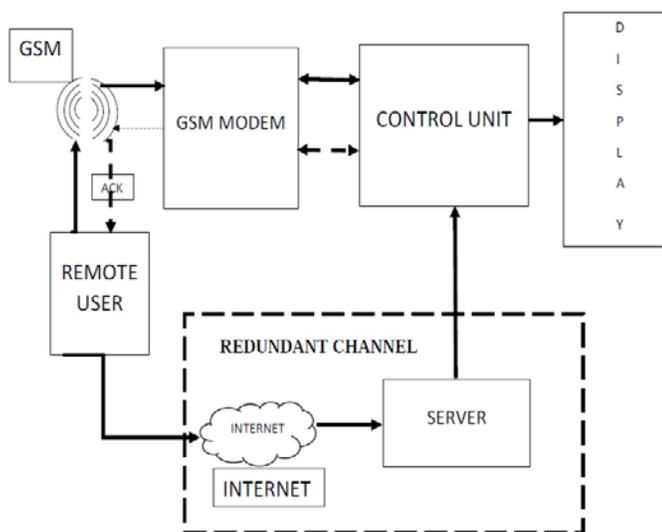
II. RELATED WORKS

The idea of using SMS to establish routes in communication networks between transmitters and receivers for the purposes of safety and guaranty of services is not new, but design method, the application, and reliability of the system varies, F. H. Fahmy el talin [3] presented and designed a textual display system, based on a light emitting diode (LED) dot matrix array powered by solar energy. A web based technology is deployed in [4] for the control of notice board. The works in [5], [6], [7], and [8] were all based on use of wireless sensor networks to control a public display board. Wireless Sensor Networks (WSN) is formed by a large number of networked sensing nodes. The main goal of a WSN is to produce meaningful information from raw local data collected by individual sensors. A similar work of WSN is the work in [8] in which proposed model consists of two

modules; one or more Transmitter and one Receiver module. The transmitter module consists of interfacing computer through serial interface to the Zigbee module. The receiver module placed at the remote end consists of Zigbee module interfaced with a microcontroller for displaying messages on LCD. All the works so far has been mainly focused on proffering methods on the design of a real time display board with little consideration of the reliability study. This work proposes the design of a real time display system with a high degree of reliability, the proposed system uses the technology of GSM SMS which is ubiquitous and easy to use. Thus, GSM is the default channel for the proposed system and finally to increase the channel availability, the work developed a backup channel for message update which is based on internet technology.

III. DESIGN APPROACH

A good design methodology can help to verify the system for functionality thus, an accurate design method must be chosen for the system. The block diagram of the system is given in figure 3.1. From the diagram a user types in a message using a mobile phone from any remote location in the world and the message is transmitted to the system through GSM network, the SIM 900 GSM Module in the system receives the message and the microcontroller interfaced to the SIM 900 module reads the message and writes it to the Dot Matrix which is the display board. A buzzer connected to the Microcontroller produces an audible alarm whenever the message is to be displayed. The system sends an acknowledgement message which is an SMS to the user on successful display of the message. On failure to receive the acknowledgement message, the user resends the message using internet channel by login in to the web address of the web page and updating the same message, the PC server on the receiver side, monitors for the new message on the web and updates the board through the microcontroller interface. This redundant channel ensures that the system is always available. The diagram of the system is shown in fig 3.1



SIM 900 GSM Modem and LPC2148 Microcontroller is used to implement the system for the GSM channel while for the internet channel, a good windows PC can be used.

IV. COMPONENT DESCRIPTION

A. MICROCONTROLLER (LPC2148)

The LPC2148 microcontroller is based on a 16-bit/32-bit ARM7TDMI-S CPU with real-time emulation and embedded trace support, that combine the microcontroller with embedded high-speed flash memory ranging from 32 kB to 512 kB. A 128-bit wide memory interface and a unique accelerator architecture enable 32-bit code execution at the maximum clock rate [9]. It has Multiple serial interfaces including two UARTs (16C550), two Fast I2C-bus (400 Kbit/s), which is optimal for our work.

B. GSM MODULE (SIM 900)

The SIM900 is a complete Quad-band GSM/GPRS solution in a SMT module which can be embedded in the customer applications. Featuring an industry-standard interface, the SIM900 delivers GSM/GPRS 850/900/1800/1900MHz performance for voice, SMS, Data, and Fax in a small form factor and with low power consumption [10]. SIM 900 has AT cellular command interface. Figure 4.1 shows the internal circuitry of SIM 900 GSM modem. Computers use AT commands to control modems. Both GSM modems and dial-up modems support a common set of standard AT commands. GSM modem can be used just like a dial-up modem. In addition to the standard AT commands, GSM modems support an extended set of AT commands. These extended AT commands are defined in the GSM standards. With the extended AT commands, various things can be done:

- Reading, writing and deleting SMS messages.
- Sending SMS messages.
- Monitoring the signal strength.
- Monitoring the charging status and charge level of the battery.
- Reading, writing and searching phone book entries.



Fig 4.1 SIM900 GSM Modem

C. LED DISPLAY

Easy Matrix is used for the display. It is an easily cascadable 8x8 monochromatic LED dot matrix display module with onboard MAXIM's MAX7219 LED driver chip. The MAX7219 allows you to drive the LED matrix using only three I/O pins of any microcontroller. The LED matrix module used in Easy Matrix has a bigger dot size (5mm) and has the overall display dimensions of 60.2mm x 60.2mm (2.4"x2.4"). It is easily cascadable in series with the help of precisely aligned male and female header pairs located on the left and right sides of the display module. The Easy Matrix PCB dimensions are 60.5mm (2.4") x 75.0mm (2.95") and has 3.5mm mounting holes at its

four corners. It uses a male (J1) and female (J2) headers for cascading multiple modules in series.

V. SOFTWARES USED

A. KEIL μ vision 4 IDE

Keil μ Vision 4 IDE (integrated development environment) is the windows based front end for the C- Compiler and Assembler. KEIL μ vision 4 is used for writing embedded C programs. The μ Vision IDE combines project management, run-time environment, build facilities, source code editing, and program debugging in a single powerful environment. μ Vision is easy-to-use and accelerates your embedded software development.

B. MySQL Connector

A Software is required to provide the API that the PHP application will use, and also handle the communication between the application and the database server, possibly using other intermediate libraries where necessary. This software is known generically as a Connector, as it allows your application to connect to a database server. MySQL provides standards based drivers for .Net enabling developers to build database applications in their language of choice. In addition, a native C library allows developers to embed MySQL directly into their applications.

VI. IMPLEMENTATION

PROGRAM FLOW CHART

The system is based on two channels, the Internet and the GSM. When one channel goes down the traffic turn to the other channel. The basic communication media is the GSM the messages are transferred through GSM channel. When any failure is detected on the GSM communication media, the backup media will be activated to send the message through internet instead of GSM. The sender transmits the message and waits for the acknowledgement. After specified reasonable time, the transmitter creates a new connection if the acknowledgement not received. The transmitter repeats this loop until an acknowledgement is received by the receiver or until the user cancels the control message.

The first connection is initially the GSM by default, and the new connection will be the internet communication network. When a recognizable message received, the receiver will acknowledge the message and the message will be displayed. There are two Sections; The user side, and the controller side. Two flowcharts described the system operation; the sender flow chart and the receiver flowchart.

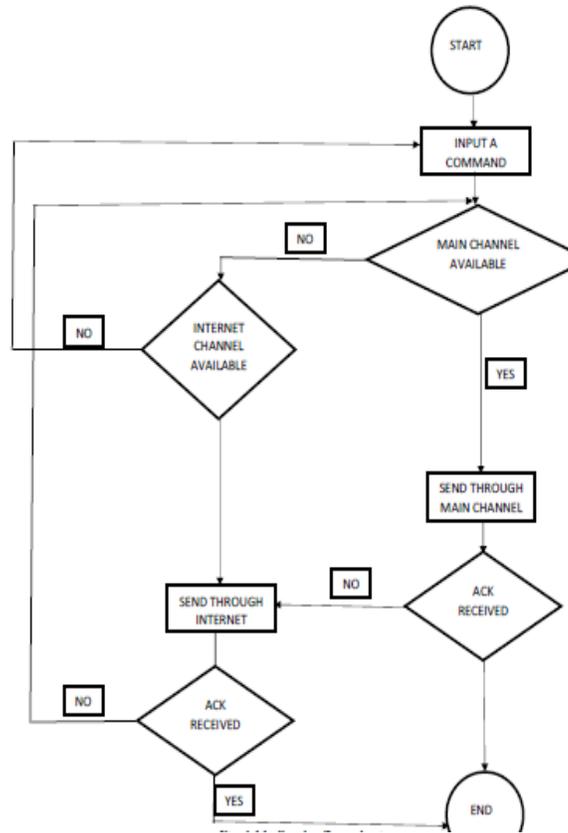


Fig 5.1 The Sender Flow Chart

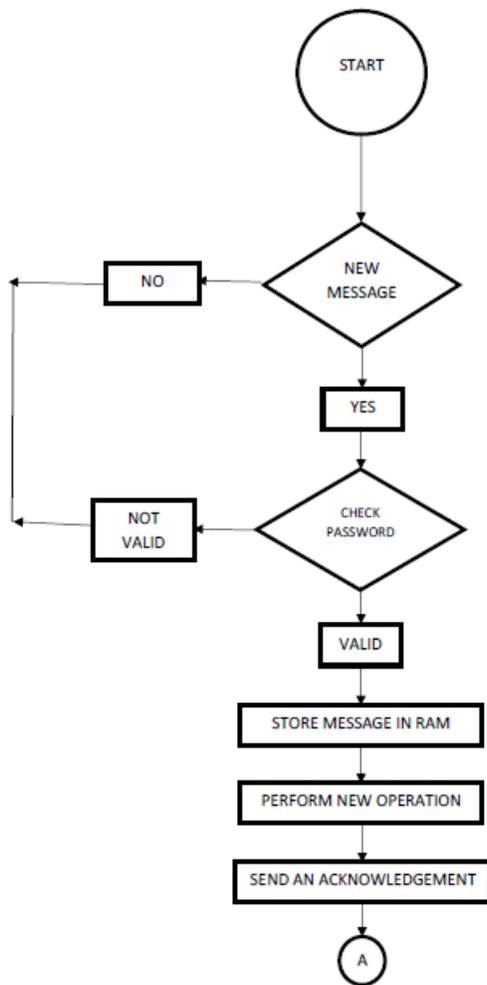


Fig 5.2 The receiver flow chart

VII. CONCLUSION

In summary, Microcontroller based remote billboard display with SMS access presents an improved method for using GSM mobile device to transmit SMS to public display board through a microcontroller and also implements a method to improve on the reliability of the system by introducing redundancy to the system. Based on the prototype system developed, it can be seen that GSM-SMS technology can be used to send data to the display system from any location and internet is a very good backup in case of GSM service down time with a very low latency as well, Since the transmission delays in these

channels are tolerable, we conclude that GSM–SMS and internet technology can be adopted as the backup communication channels to provide a flexible and remote means of updating the notice board system when integrated with the backend control systems for real time display of information.

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Complex Dielectric Behavior of Soil from Nasik Region at X-Band Microwave Frequency

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ABSTRACT

Electrical properties such as dielectric constant, dielectric loss of soils has been measured at an automated x band microwave set-up in TE₁₀ mode operating at 10 GHz. It is measured for different moisture content. Soil samples are collected from agricultural land of Nasik region. Soil samples were analyzed for physical and chemical properties for the status of available micro nutrients. Correlations between electrical and physical properties of soil samples were reported. It is observed that dielectric constant increases with increase in moisture content slowly up to transition moisture then it increases rapidly with increase in moisture content. Also dielectric loss is directly proportional to the ac microwave conductivity and transition temperature. It has been found that emissivity decreases with increase in moisture content. In the field of remote sensing and agriculture, results obtained are useful.

KEYWORD

Dielectric constant, moisture content, emissivity, relaxation time

I. INTRODUCTION

The dielectric constant of soil is a measure of the response of a soil to electromagnetic waves. This response is composed of two parts, real & imaginary, which determine wave velocity and energy losses respectively [1]. The dielectric constant of soil is a function of its moisture content [2]. Knowledge of the dielectric constant properties such as emissivity and permittivity of the soil is useful for the efficient use of soil and for sensor design in microwave remote sensing [3]. In microwave soil moisture remote sensing, determining the soil moisture by measuring the value of dielectric constant is important. The base for microwave remote sensing of soil moisture is strongly dependence on its water content due to the large contrast between the dielectric constant of air, water and dry soil. The dielectric constant of soil is the physical property being very sensitive on water content. Soil moisture plays a key role in hydrological and climate studies.

When microwaves are directed towards a material, energy gets reflected or transmitted through the surface or absorbed by it. The proportions of energy, which fall into these three categories, have been defined in terms of material properties. Permittivity ϵ and permeability μ are the key parameters describing the interaction of materials with electromagnetic fields [4]. Soils are composed of solids, liquids and gases mixed together in variable proportions. Various percentages of soil-water mixtures give rise to a large dielectric constant variation. So the knowledge of dielectric properties of different soils is necessary for efficient use of microwave sensing techniques for soil moisture estimation.

Emissivity is the important parameter, which provides information about soil. The emissivity of soil also varies with different moisture content. Knowledge of emissivity of soil is useful for the efficient use of soil [5].

THEORY

Basic theory of wave-guide cell method/von-Hipple wave-guide method

The method consists of reflecting microwaves at normal incidence in TE₁₀ mode from a dielectric sample placed against a perfectly reflecting surface. The reflection sets up standing waves in space in front of the sample. The separation of the first minimum from the face of the sample will depend upon wavelength of the EM wave in the sample and on sample dimensions [thickness]. and hence on dielectric constant. Further, the change in wavelength shall cause shift in the minima and in turn a change in half power width of the standing wave pattern. Also, losses in the dielectric shall decrease to VSWR [E_{max}/E_{min}]. and so tan δ may be related to this decrease in VSWR.

To proceed, consider that an EM wave travelling through medium 1 [air]. strikes normally to the medium 2 [dielectric]., a part of it is reflected and the rest gets transmitted. A standing wave pattern is thus produced in medium 1. The transverse electric field component in this partial reflection case is given by

$$E_y = [E_0 e^{j\omega t - \gamma_1 x}] [1 + \Gamma_0 e^{2\gamma_1 x}] \dots (1)$$

Where γ_1 is the propagation constant in medium 1 and is the sum of attenuation constant α_1 and phase shift constant β_1 .

$$\gamma_1 = \alpha_1 + j \beta_1 \dots (2)$$

The reflection coefficient Γ_0 is given by

$$\Gamma_0 = |\Gamma_0| e^{-j\psi}, \dots (3)$$

Where ψ is the phase of reflection coefficient.

The input impedance $Z_{(0)}$ at the boundary [x = 0]. is given by

$$Z_{(0)} = Z_1 \frac{1 + \Gamma_0}{1 - \Gamma_0} \dots (4)$$

Z_1 is the impedance of medium 1

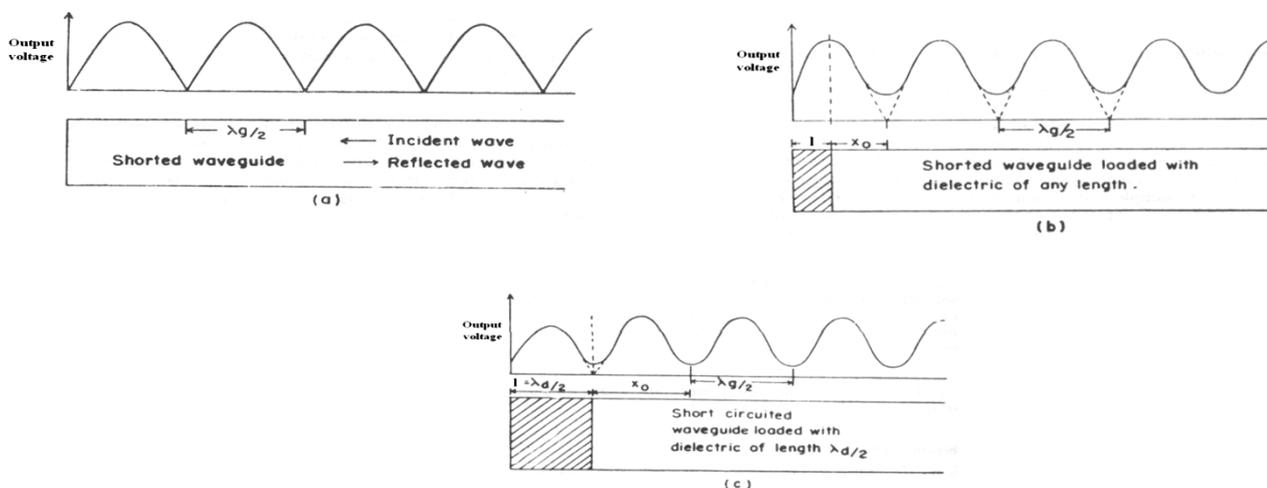


Fig.1 Standing Waves in a waveguide [a]. without dielectric [b]. loaded with dielectric of any length [c]. loaded with dielectric of length $\lambda_d/2$ [λ_d is the wavelength of microwaves in the dielectric].

Loss-less dielectric

Consider a solid sample [oven-dry black soil]. of length l_e loaded in a rectangular waveguide against short circuit that touches it well. In Fig. 2 (b) and (c), D and D_R are respectively the positions of first minimum of the standing wave pattern when waveguide is loaded and unloaded with the dielectric sample. The respective distances from the short circuit will be $[l + l_e]$. and $[l_R + l_e]$.. Now looking from A towards right and left, the impedances are equal, so

$$Z_0 \tan \beta l = - Z_e \tan \beta_e l_e \quad \dots \quad (5)$$

Where, Z_0 and Z_e are respectively the characteristic impedance of empty and dielectric-filled waveguides. Also, the β and β_e are their respective propagation constants. Similarly from Fig. 2 (b),

$$Z_0 \tan \beta (l_R + l_e) = 0 \quad \dots \quad (6)$$

Now, consider the expression

$$\begin{aligned} \tan \beta (D_R - D + l_e) &= \tan \beta \{(l_R + l_e) - (l + l_e) + l_e\} \\ &= \tan \beta \{(l_R + l_e) - l\} \end{aligned}$$

Expanding the tangent sum angle and making use of Eq(6), we get,

$$Z_0 \tan \beta (D_R - D + l_e) = Z_e \tan \beta_e l_e \quad \dots \quad (7)$$

Again recalling the relation

$$\frac{\tan \beta (D_R - D + l_e)}{\beta l_e} = \frac{\tan \beta_e l_e}{\beta_e l_e} \quad \dots \dots \dots (8)$$

Eq(1) suggests a method for measuring dielectric constant. Quantities on the LHS are all experimentally measurable [$\beta = 2\pi/\lambda_g$]. Thus value of $\tan \beta_e l_e / \beta_e l_e$ is known and hence value of $\beta_e l_e$ can be known from the standard tables. Since $\tan [\beta_e l_e] / [\beta_e l_e]$ is a multivalued function, so correct value has to be selected. This is done in two ways.

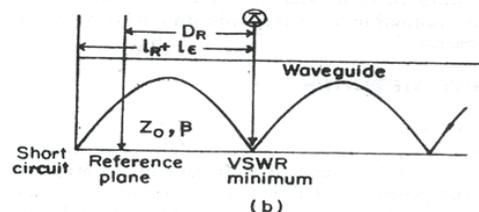
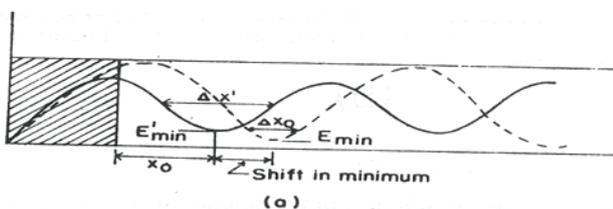
- (i) When approximate value of dielectric constant is known, select that value, say β_e , and compute dielectric constant from the relation

$$\beta_e = \frac{2\pi}{\lambda_0} \left\{ \epsilon' \mu_r - \frac{(\lambda_0)^2}{(\lambda_c)^2} \right\}^{1/2} = \frac{2\pi}{\lambda_d} \quad \dots \dots \dots (9)$$

Where $\lambda_c = 2a$ is cut-off wavelength, λ_0 is free-space wavelength, λ_d is guide wavelength when it is filled with the dielectric. ϵ' is relative dielectric constant and μ_r is the relative permeability.

$$\epsilon' = \frac{\left(\frac{2a}{\lambda_0}\right)^2 \left(\frac{\beta_e l_e}{l_e}\right)^2 + 1}{\left(\frac{2a}{\lambda_d}\right)^2 + 1} \quad \dots \dots \dots (10)$$

If this value is close to the approximately known value, then the value obtained is true value, otherwise try another solution and so on.



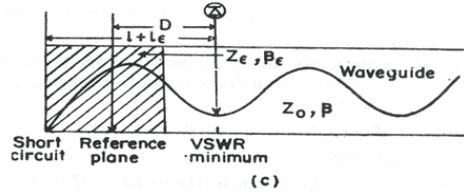


Fig 2 Illustration of Wave-Guide Cell Method for measuring dielectric constant [a]. Double minimum width [b]. Position of minimum with shorted waveguide without dielectric [c]. Position of minimum with shorted waveguide with dielectric sample.

- [ii]. If approximate value of the dielectric constant is not known, a second identical experiment is to be performed with the sample of a different length. The proper solution of the transcendental Eq(7) is common to the two sets of solutions and is thus the point of intersection of the two curves drawn for each sample between dielectric constant ϵ' and the solutions for $\beta_\epsilon l_\epsilon$. Eq (8) is used to find out the values of dielectric constant of oven-dry soil samples.

For lossy dielectrics

Eq(7) can be modified for lossy [complex]. dielectrics. In these cases, we determine voltage standing wave ratio and compute reflection coefficient in complex form. The phase difference $[\Phi]$. in the waves travelling in the guide with and without dielectric is

$$\Phi = 2\beta (\Delta x - l_e) \dots (11)$$

Δx is the shift in minimum. Now reflection coefficient is given by

$$|r| = \frac{S-1}{S+1} \dots (12)$$

Where S is VSWR. Further, if we define

$$C = \frac{1}{j\beta l_e} \frac{1 - |r|e^{i\Phi}}{1 + |r|e^{i\Phi}} = \frac{\tan X \angle \theta}{X \angle \theta} \dots (13)$$

Then admittance is given by

$$Y_\epsilon = \frac{(X)^2 \angle 2(\theta - 90^\circ)}{(\beta l_e)^2} = g_\epsilon + j\beta_\epsilon \text{ (say)} \dots (14)$$

g_ϵ and β_ϵ are related to ϵ' and ϵ'' as

$$\epsilon' = \frac{g_\epsilon + (\lambda_g / 2a)^2}{1 + (\lambda_g / 2a)^2} \dots (15)$$

and

$$\epsilon'' = - \frac{\beta_\epsilon}{1 + (\lambda_g / 2a)^2} \dots (16)$$

However, it is to be noted that quantities ψ , θ and $[X / \beta l_e]^2$ fall into ranges $0 < \psi < 180^\circ$, $45^\circ < \theta < 90^\circ$, $[X / \beta l_e]^2 > 1$, proper values of $X \angle \theta$ is that value which yields the same value of Y_ϵ for the two samples. Eq(15) and (16) are mainly used to determine the values of dielectric constant and dielectric loss of the black soils. By knowing these two dielectric parameters, the other parameters can easily be estimated.

2. EXPERIMENTAL DETAILS

2.1. Materials

Soil samples were collected from ten different agricultural land of Sinnar Tahsil, Nasik, Maharashtra. Soil samples were collected in the depth of 0-20cm from desired location. Soil samples were completely air dried and passed through 2mm sieve and stored in properly labeled cloth bags as per the standard procedures. Quartering technique was used for the preparation of soil samples.

The details of the land are given below.

No.	Name of Farmer	Survey No.	Area	Location	
1	Anil Warungse	790	Dubare	N 19° 46' 21.3204"	E 73° 58' 2.3736"
2	Sakubai Warugse	667	Dubare	N 19° 46' 25.0896"	E 73° 58' 8.0256"
3	Sudam Shinde	29	Thangaon	N 19° 41' 38.4612"	E 73° 56' 32.5464"
4	Bhimaji Shinde	1442	Thangaon	N 19° 42' 34.6752"	E 73° 56' 2.6880"
5	Narayan Pawar	907	Sonambe	N 19° 46' 32.178"	E 73° 56' 11.418"
6	Ravindra Kanadi	199	Komalwadi	N 19° 57' 52.8804"	E 74° 8' 3.5628"
7	Mandakini Thorat	107	Panchale	N 19° 53' 47.8176"	E 74° 12' 17.73"
8	Jagannath Gadakh	165	Deopur	N 19° 52' 28.2504"	E 74° 9' 26.7588"
9	Balkrishna Kanadi	177	Sinnar	N 19° 57' 29.8908"	E 73° 50' 12.0264"
10	Chandrakant Zagade	50/2	Lonarwadi	N 19° 51' 15.5052"	E 74° 0' 35.9172"

2.2. Sample Preparation

These soil samples are sieved by sieve shaker to remove the coarse particles. This fine particles are then oven dried for several hours to remove moisture. Soil samples of various moisture are prepared by adding an exact amount of distilled water to dry soil. The gravimetric soil moisture content in percentage W_c [%], is calculated using wet $[W_1]$, and dry $[W_2]$, soil masses using the following relation

$$W_c (\%) = \frac{W_1 - W_2}{W_2} \times 100 \dots\dots\dots(1)$$

Physical and Chemical characteristics of the soil were measured at Soil Analysis Laboratory, Department of Agriculture, Government of Agriculture Pune. The wilting point $[W_p]$, have been calculated using the Wang and Schmutge Model [Wang and Schmutge, 1980], as

$$W_p = 0.06774 - 0.00064 \times \text{sand} + 0.00478 \times \text{clay} \dots\dots\dots(2)$$

$$W_i = 0.49 \times W_p + 0.165 \dots\dots\dots(3)$$

where sand and clay stand for the sand and the clay content in percentage by dry weight of the soil.

2.3. Dielectric Measurements

The experimental technique used to measure the dielectric constant and water content is credited to Roberts and Von Hippel [6]. There are different methods for the measurement of dielectric constant at microwave frequency. At microwave frequencies, the effect of ionic conductivity gets negligible as compared to dielectric losses [7]. The choices of measurement technique,

equipment, and sample holder design depend upon the dielectric materials to be measured, and the frequency or frequency range of interest [8].

In the present paper, Two Point Method has been used to measure the dielectric constant of the soil. The waveguide cell method is used to determine dielectric constant of the soil samples. The X band microwave bench is set up in TE₁₀ mode with Gunn Source operating at X band frequencies at room temperature. The dielectric cell shorted with matched load is connected at load end. The reflected wave combined with incidental wave to give standing wave pattern. These standing wave patterns are used to determine the values of shift in minima resulted due to before and after inserting the sample. In this measurement the technique used is the infinite sample method [9]. An X band microwave bench operating at 9 GHz in the TE₁₀ mode with slotted section and crystal detector are used for measurement of VSWR and the shift of minima is needed in this technique.

Table no.1 PHYSICAL PROPERTIE

Sample No.	Sand [%]	Silt [%]	Clay [%]	Textural class	Bulk density [mgm-3]	Particle density [mgm-3]	Maximum water holding capacity [%]	porosity	Wilting point	Transition moistue	Field capacity	T
1	28.75	37.5	32.75	Clay loam	1.14	2.54	34.27	55.11811024	0.481	0.40069	26.2675	0.20683
2	23.25	55.25	20.75	Silt loam	1.14	2.55	47.14	55.23411765	0.152045	0.23950205	24.7825	0.394334
3	21.5	63.75	14	Silt loam	1.37	2.64	39.35	48.10606061	0.1209	0.224241	23.665	0.412087
4	43.22	23.85	32.35	Clay loam	1.19	2.57	40.15	53.69649805	0.194712	0.260408978	23.1408	0.370014
5	35.4	50.8	13.4	Silt loam	1.29	2.62	33.19	50.75335878	0.109136	0.21847664	20.614	0.418792
6	40.6	51.09	7.8	Silt loam	1.34	2.63	35.49	49.04942966	0.07904	0.2037296	18.29	0.435947
7	41.4	52	6.2	Silt loam	1.33	2.61	38.8	49.04214559	0.07088	0.1997312	17.77	0.440598
8	23.75	36.5	38.75	Clay loam	1.25	2.59	37.57	51.35135135	0.237765	0.28150485	28.6375	0.345474
9	42	25.5	31.75	Clay loam	1.19	2.57	48.01	53.69649805	0.192625	0.25938625	23.265	0.371204
10	39.5	32	28	Clay loam	1.27	2.59	44.17	50.95525097	0.1763	0.251387	22.905	0.380509

Table no.2 CHEMICAL PROPERTIES

Sample No.	PH[1:2.5]	E.C [dSm-1]	Organic Carbon [%]	Calcium carbonate [%]	Available nitrogen [Kg/ha]	Available phosphorous [Kg/ha]	Available Potassium [Kg/ha]	Available iron [ppm]	Available manganese [ppm]	Available zinc [ppm]	Available copper[ppm]
1.	7.6	0.13	0.46	2	56	11.64	333	5.84	7.34	0.37	1.34
	Midly alkaline	Normal	Medium	Slightly calcareous	Very Low	Low	Very High	High	High	Low	High
2.	6.5	0.13	0.31	2.5	203	38.53	339	5.04	7.35	0.45	2.45
	Slightly acidic	Normal	Low	Moderately calcareous	Low	Very High	Very High	High	High	Low	High
3.	6.9	0.12	0.42	1.5	158	16.08	343	4.9	7.35	0.45	1.85
	Neutral	Normal	Low	Slightly calcareous	Low	Medium	Very High	High	High	Low	High
4.	6.7	0.13	0.43	0.75	158	13.58	240	6.03	5.72	0.37	2.93
	Neutral	Normal	Medium	Barely calcareous	Low	Low	Moderately High	High	High	Low	High
5.	7.1	0.1	0.53	0.75	147	10.81	221	8.3	5.21	0.24	1.6
	Neutral	Normal	Medium	Slightly calcareous	Low	Low	Moderately High	High	High	Low	High
6.	6.7	0.2	0.45	2.75	169	31.88	355	11.65	7.35	0.41	1.71
	Neutral	Normal	Medium	Moderately calcareous	Low	High	Very High	High	High	Low	High
7.	8.3	0.25	0.55	22.75	158	2.22	185	0.18	2.3	0.15	1.04
	Moderately alkaline	Normal	Medium	Highly calcareous	Low	Very Low	Medium	Low	High	Low	High
8.	8.4	0.25	1.86	23	169	7.76	228	0.64	0.95	0.22	0.96
	Moderately alkaline	Normal	Very High	Highly calcareous	Low	Low	Moderately High	Low	Low	Low	High
9.	8.5	0.2	1.18	22.75	158	25.23	375	1.27	3.56	0.19	2.28
	Strongly alkaline	Normal	Very High	Highly calcareous	Low	Moderately High	Very High	Low	High	Low	High
10.	8.5	0.19	1.71	22	158	3.33	286	0.66	2.11	0.11	1.49
	Strongly alkaline	Normal	Very High	Highly calcareous	Low	Very Low	High	Low	High	Low	High

RESULT AND DISCUSSION

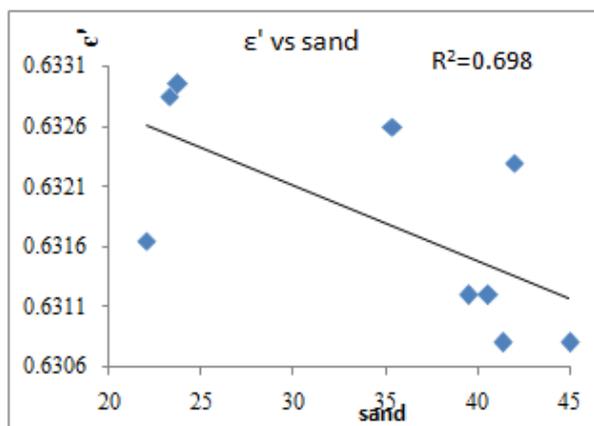


Figure 1: variation of dielectric constant with % of sand in soil

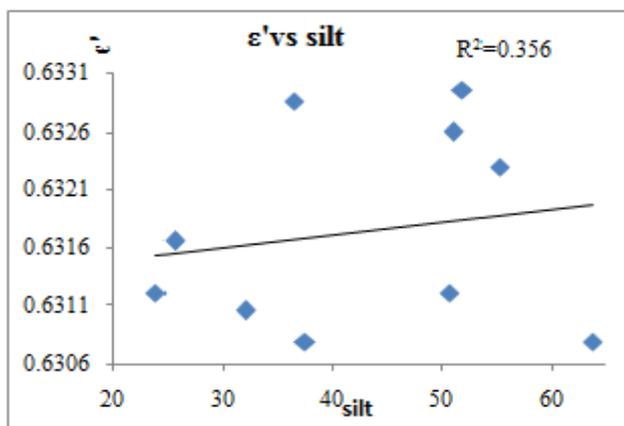


Figure 2: variation of dielectric constant with % of silt in soil

Soil texture can be expressed significantly by its electrical conductivity and dielectric constant. Clay textured soil is highly conductive while sandy soils are poor conductors; reported by Marx et al [10]. Kumar M. and Babel A.L.[11] reported that the availability of micronutrients increased significantly with increase in finer fractions that is silt and clay. From graph 1, 2 and 3, it is observed that dielectric constant decreases with increase of sand percentages whereas it increases with the increase in percentage of silt and clay in soil.

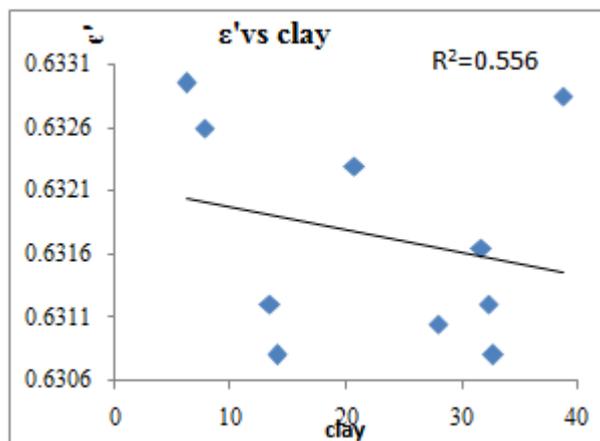


Figure 3: variation of dielectric constant with % of clay in soil

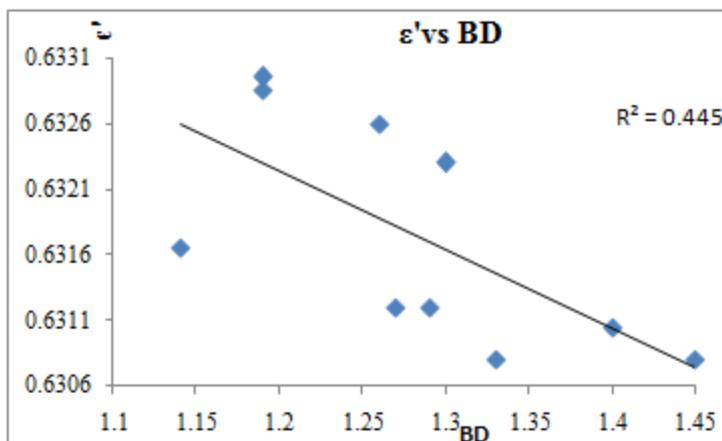


Figure 4: variation of dielectric constant with bulk density of soil

Dielectric constant was found to be dependent on bulk density of soil. From graph 4, it is observed that dielectric constant has positive correlation with bulk density. Similar results were reported by Wagner et al.[12] in which dielectric constant was evaluated at different moisture conditions.

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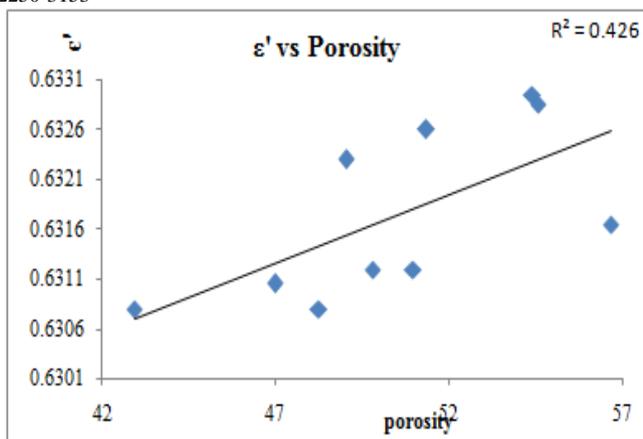


Figure 5: variation of dielectric constant with porosity of soil

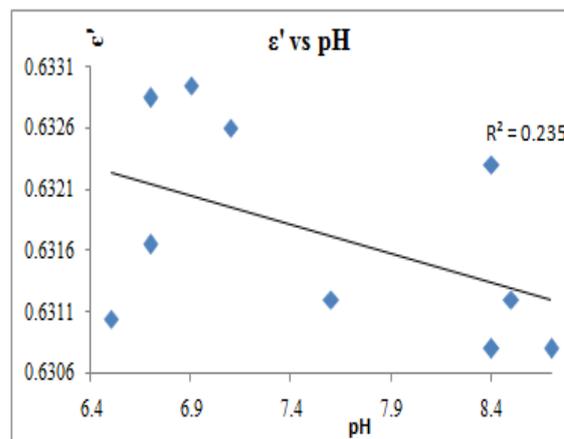


Figure 6: variation of dielectric constant with pH of soil

From graph 5, it is observed that dielectric constant has positive correlation with porosity. Most of the crops grow best in the soil which is neutral (pH =6 to7.5), very few crops prefer acidic or alkaline soils.

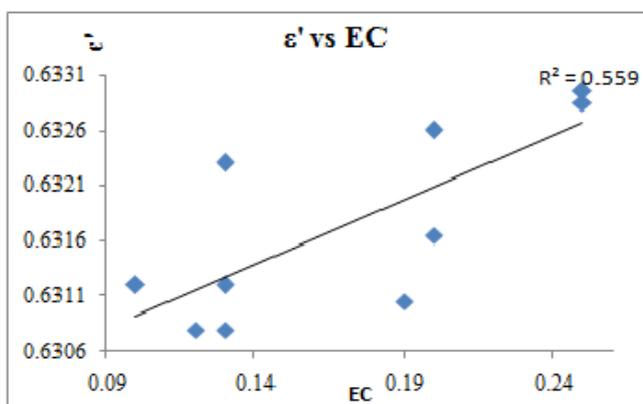


Figure7: variation of dielectric constant with electrical conductivity of soil

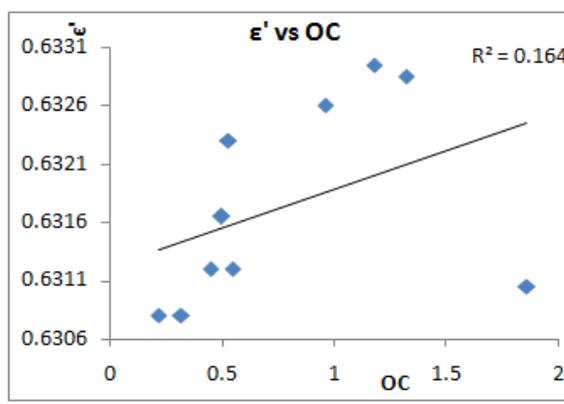


Figure 8: variation of dielectric constant with organic carbon in soil

From graph 7, it is observed that dielectric constant has positive correlation with electrical conductivity. These experimental results are found to agree with theoretical models developed by investigators working in this field [13]. From graph 8, it is observed that dielectric constant has positive correlation with organic carbon.

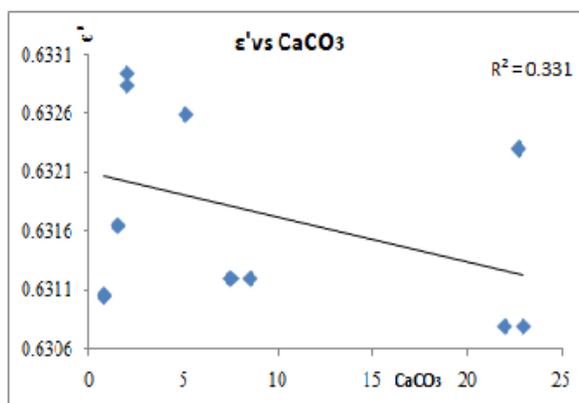


Figure 9: variation of dielectric constant with calcium carbonate in soil

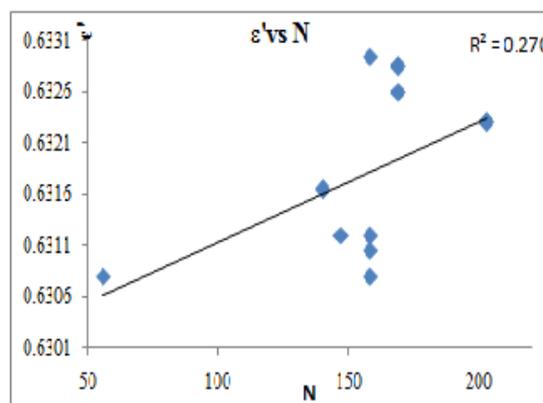


Figure 10: variation of dielectric constant with nitrogen in soil

From graph 9, it is observed that dielectric constant has negative correlation with calcium carbonate. Also from graph 10, dielectric constant has positive correlation with nitrogen available in soil.

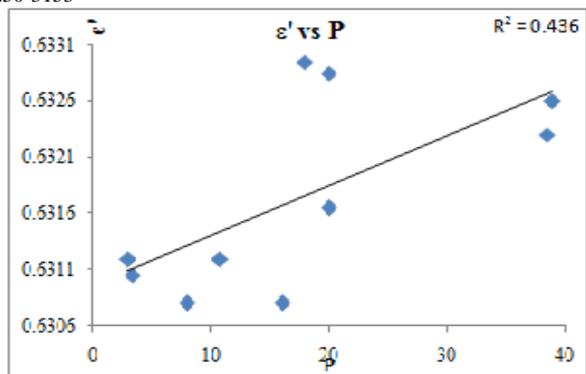


Figure 11: variation of dielectric constant with phosphorous in soil

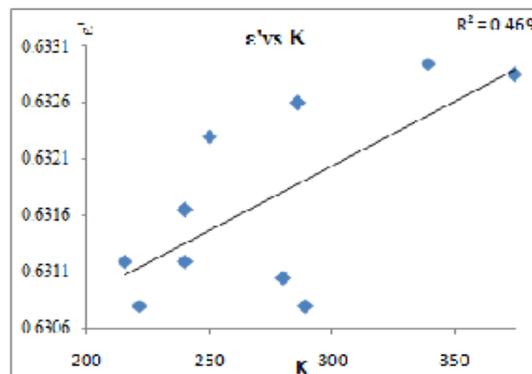


Figure 12: variation of dielectric constant with potassium in soil

From graph 11 and 12, it is observed that dielectric constant has positive correlation with nitrogen phosphorous and potassium. These results have good agreement with results of earlier investigators [14].

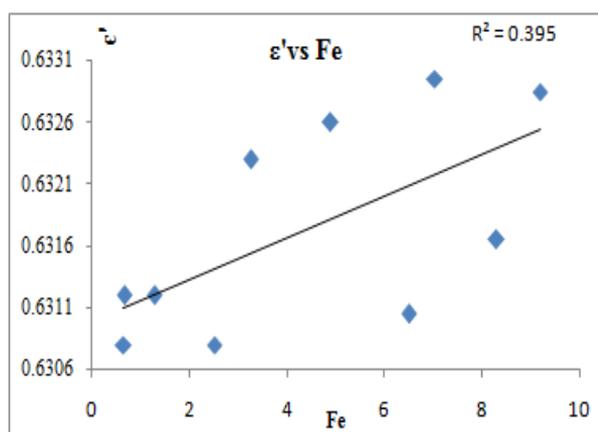


Figure 13: variation of dielectric constant with iron in soil

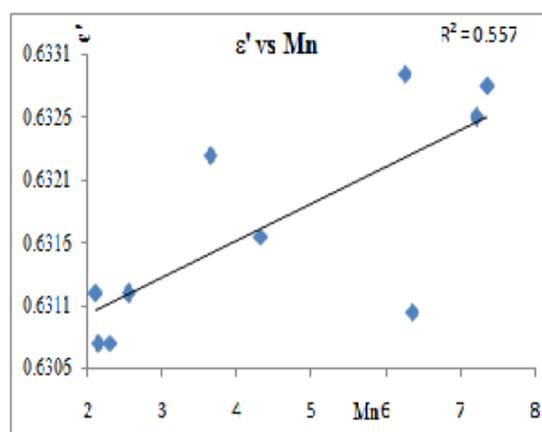


Figure 14: variation of dielectric constant with manganese in soil

From graph 13, dielectric constant has positive correlation with iron available in soil. Also from graph 14, dielectric constant has positive correlation with manganese available in soil.

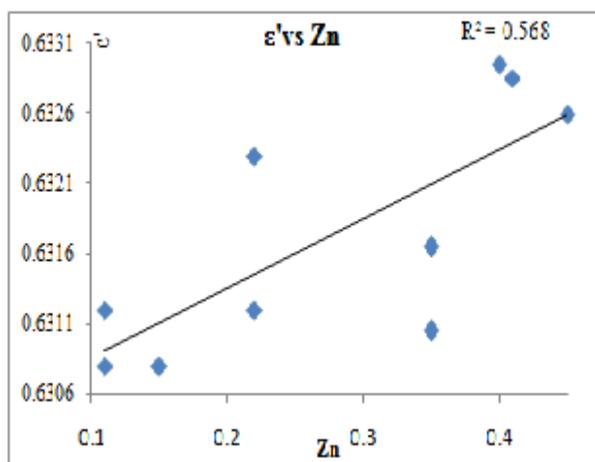


Figure 15: variation of dielectric constant with zinc in soil

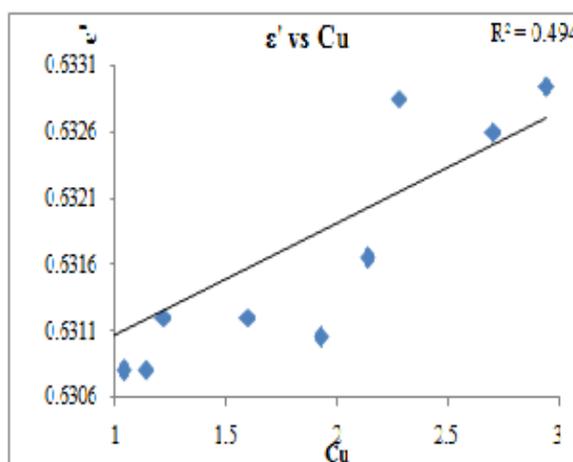


Figure 16: variation of dielectric constant with copper in soil

From graph 15, dielectric constant has positive correlation with zinc available in soil. Also from graph 16, dielectric constant has positive correlation with copper available in soil. Thus we see that the dielectric constant of soils depends on many factors like moisture content and its physical and chemical composition.

From graph 5, it is observed that dielectric constant has positive correlation with porosity. Most of the crops grow best in the soil which is neutral (pH = 6 to 7.5), very few crops prefer acidic or alkaline soils.

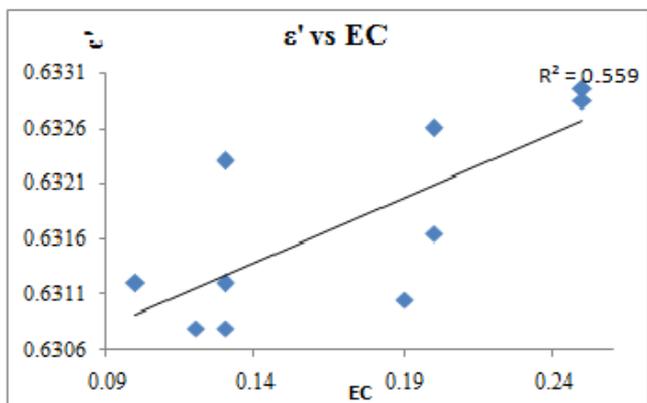


Figure 7: variation of dielectric constant with electrical conductivity of soil

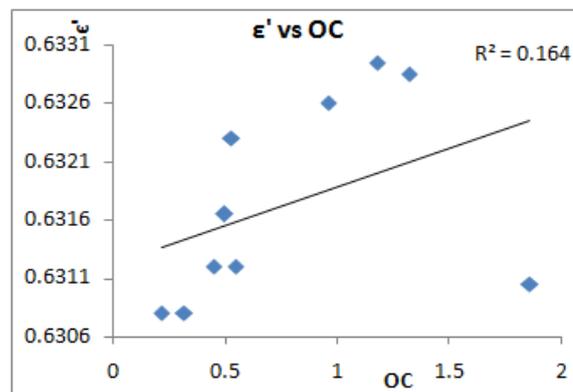


Figure 8: variation of dielectric constant with organic carbon in soil

From graph 7, it is observed that dielectric constant has positive correlation with electrical conductivity. These experimental results are found to agree with theoretical models developed by investigators working in this field [13]. From graph 8, it is observed that dielectric constant has positive correlation with organic carbon.

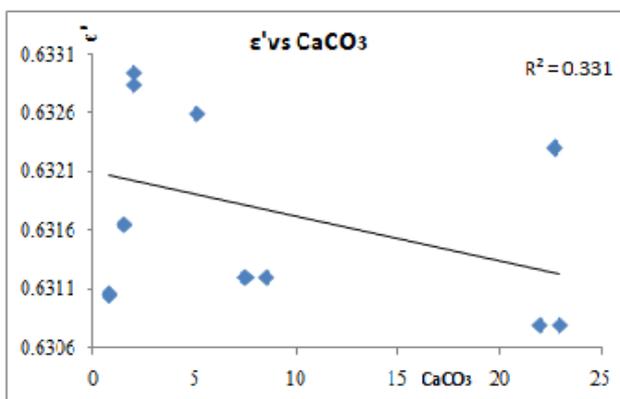


Figure 9: variation of dielectric constant with calcium carbonate in soil

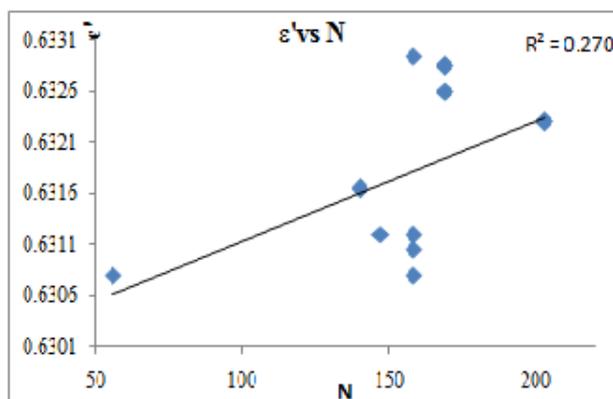


Figure 10: variation of dielectric constant with nitrogen in soil

From graph 9, it is observed that dielectric constant has negative correlation with calcium carbonate. Also from graph 10, dielectric constant has positive correlation with nitrogen available in soil.

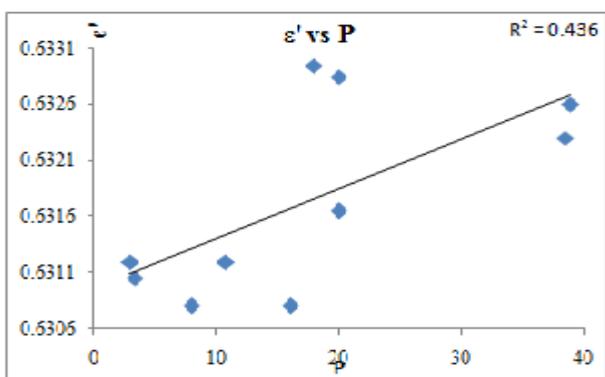


Figure 11: variation of dielectric constant with phosphorous in soil

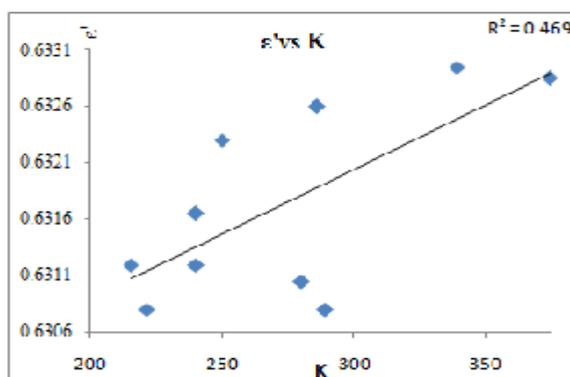


Figure 12: variation of dielectric constant with potassium in soil

From graph 11 and 12, it is observed that dielectric constant has positive correlation with nitrogen phosphorous and potassium. These results have good agreement with results of earlier investigators [14].

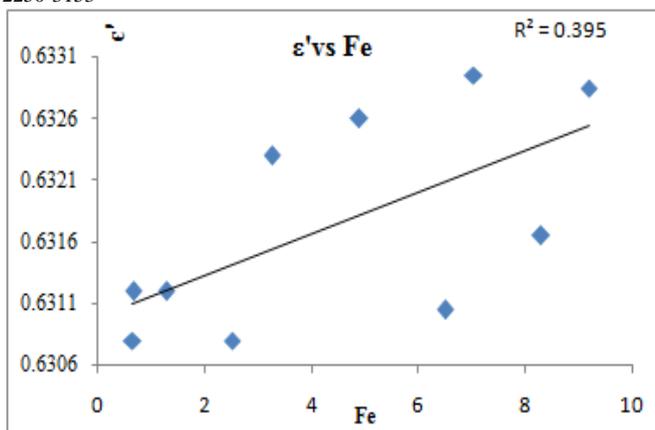


Figure 13: variation of dielectric constant with iron in soil

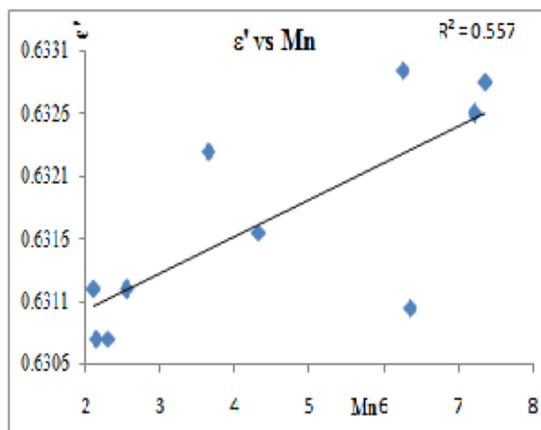


Figure 14: variation of dielectric constant with manganese in soil

From graph 13, dielectric constant has positive correlation with iron available in soil. Also from graph 14, dielectric constant has positive correlation with manganese available in soil.

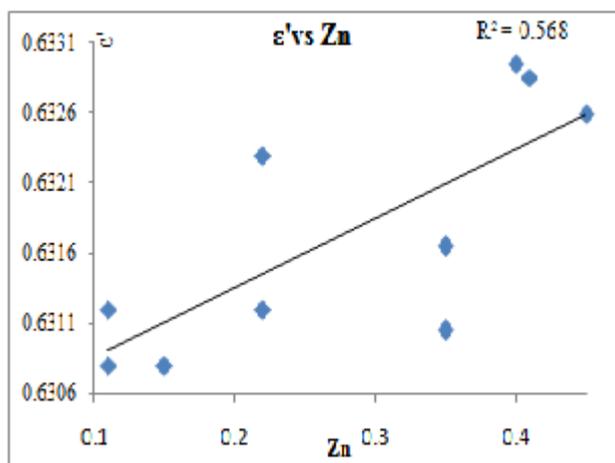


Figure 15: variation of dielectric constant with zinc in soil

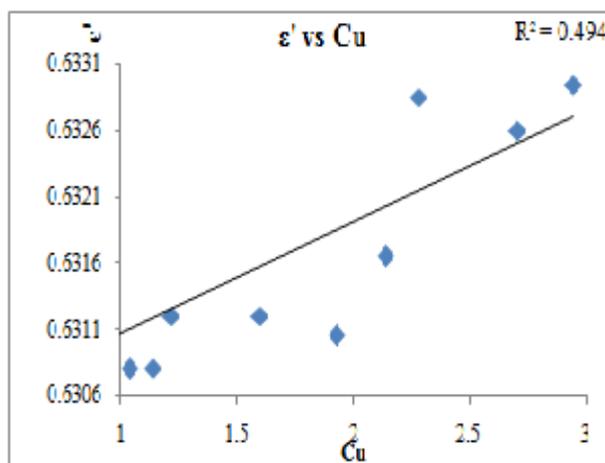


Figure 16: variation of dielectric constant with copper in soil

From graph 15, dielectric constant has positive correlation with zinc available in soil. Also from graph 16, dielectric constant has positive correlation with copper available in soil. Thus we see that the dielectric constant of soils depends on many factors like moisture content and its physical and chemical composition.

The soil parameters like pH and EC are determined by using Digital Soil Testing kit. The detailed soil analysis reports for the remaining parameters of the soil samples used in this study were obtained from Soil Science Division, College of Agriculture, Pune. Important physical properties such as soil texture, bulk and particle density and chemical properties such as pH, EC, OC, CaCO₃ available macronutrients N, P, K, Ca, Mg, micronutrients Fe, Mn, Zn, Cu, etc. of the soil samples are determined.

The variations of dielectric constant and dielectric loss of dry soil samples of ten different lands of sinner tehsil have been measured. Also other electrical properties such as ac microwave conductivity, relaxation time, tangent loss, wilting point, transition moisture and field capacity are reported. Dielectric constant represents the ability of a material to store electric energy, while the loss factor represents the loss of electric field energy in the material. The loss tangent is defined as the ratio of loss factor to the dielectric constant.

$$\text{Tan} = \frac{\epsilon''}{\epsilon'}$$

The ac conductivity and relaxation time are obtained . [15-16].

$$\sigma = \omega \epsilon_0 \epsilon'' \quad \text{and} \quad \tau = \frac{\epsilon''}{\omega \epsilon'}$$

Soil texture is characterized by percentage of sand, silt and clay in it [17]. Depending upon the percentage of constituents, soils are classified into twelve types and they are arranged in a triangular form which is known as soil texture classification triangle [18-19]. The variation of dielectric constant and dielectric loss respectively as a function of sand content in the soil, the value of dielectric constant increases with increase in content of sand in the soil. It is in good agreement with the earlier work [1].

From our observations, the relation between the dielectric constant and the moisture content is non linear. Because for moist soil, dielectric constant is not a function of individual components. The value of dielectric constant is roughly proportional to sand content and inversely proportional to clay content.

4. CONCLUSION

The behavior of dielectric constant and the percentage of moisture content is non linear. The dielectric constant varies with the status of nutrients available in soil. The ac electrical conductivity, relaxation time and tangent loss are directly proportional to dielectric loss. The dielectric constant of soil at lower moisture content is low. As the moisture content increases above transition moisture in the soil, dielectric constant increases rapidly. The results have importance not only for better understanding of soil physics but also microwave remote sensing application.

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Multicultural Education towards Harmonious Life and Avoided Social Conflict Society of Makassar City

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Abstract : This study aims to answer multicultural education into a life of harmonization in order to avoid social conflicts diverse communities Makassar city we know as Indonesia, which is composed from various ethnic, racial, religious, groups and classes and the problem of integrating these groups is a problem this complex shows that the potential conflicts that exist in the community in various fields, therefore it is necessary to encourage the simultaneous done so that these conflicts can be resolved. This study was a qualitative research, in addition to the types of research that are relevant include: case studies and ethnography. A qualitative approach aims to describe the risk of conflict in society, the need for an understanding of education towards harmony in order to avoid conflicts Qualitative methods easier when dealing with multiple facts, to explain the nature of the relationship phenomenon. therefore, to avoid conflict, the need for implanted education in order to understand and to know that social conflict is one that occurs in the community, to the local government of Makassar and the police as law enforcement and community leaders and communities involved in the conflict in order to avoid such conflicts because can be against themselves as well as with groups involved in the conflict.

Keywords: Education harmonious avoid conflict social in Makassar

1. INTRODUCTION

Society is a group of people who live together geographically, work together, and bound in a system of a possessed characteristics and have common goals. In a developing society will continue to generate culture in such a way so as to form a perfection. Various forms of culture that produced it will become increasingly apparent difference between communities with other communities. In each society will certainly accentuate any mutually owned, continues to produce a new pattern that pose a significant difference. Various forms of the symptoms that occur in the community in assessing the differences of being owned and subsequently give rise to a dispute, or known as conflict.

The conflicts that occur in the community is a translation of the ignorance of the public in assessing a difference, and an outburst of uncontrolled. In a diverse society it is certainly becoming a familiar sight to be seen, heard, or even that we also can feel in our own neighborhood. If we examine a diversity of community or society of pluralism, it will indicate the types of people who are very clear in terms of the differences (culture / customs, social system, religion / belief, economic, etc.). Here we say that in the diversity of the community it will cause a fluctuation or collisions between communities. Much study about the clashes that happened, then it is very closely at all that the most prominent religious problems. As a nation pluralistic society, Indonesia consist of various ethnicities, races, customs, class, and religious groups and social strata.

The conditions and situations like this is a reasonable so far as the difference-the difference is unwitting and internalized. But when such differences arose, and subsequently became a threat to the harmony of life, the difference becomes a problem to be solved. Some of the events mass rioting in several regions in Indonesia, the trigger is clearly visible these differences, one of which is the difference of religion. As the riots in Lampung, 1989; unrest in East Timor, in 1985, riots in Rengas dengkllok, 1997; unrest in makassar, 1997, riots in Ambon, 1998 in Poso, Ketapang riots and Kupang as well as some other areas. Social changes that occurred in Indonesia today, allowing all to conflict between religions or religious conflicts. Although the actual latent conflicts have existed long before the era of reform blowing. Lots of events nuanced religious differences occur. As the burning Monitor Tabloid office in Jakarta, which was supposed to discredit the Prophet Muhammad, as well as Great Tabloid. Other than that, brochures, leaflets discredit certain religions, as well as propaganda materials that trigger and stimulate the possibility of inter-religious conflicts are also often the case. Many religious leaders under the pretext of consolidating the people, they are willing and dare to discredit the people of other religion. Last Issues about religious education in schools that require each school to provide religious teachers for students who are certain.

Conflict religiously tinged strongly correlated with non-religious factors. Some conflicts prove it, including Ketapang conflict. Religion is usually a factor triggering the riots, which are preceded by a conflict of an economic, such as park land seizure, seizure of territories and other factors are more economic than political. In other words, in fact, small conflicts often occur. In looking at the conflicts and potential conflicts between groups, and religious groups in Indonesia, should be understood as a dynamic thing. Social and political changes occurring in Indonesia is so fast, especially after the reform era, also helped reinforce the polarization of social conflicts, including conflicts among religious communities.

The gap is growing regard among social groups and social groups usually also often attached to the religious majority. Underdevelopment and simultaneous updates are not able to disturb the atmosphere of disharmony, and can damage the social order or the order of relations between social groups and between religious communities. Indonesian society is a multicultural, multi-racial and multi-religious, have great potential for conflict between groups, races, religions and ethnicities. Indications that

direction seen from the growing proliferation of various community organizations, professions, and other organizations. Examples such as the FPI, Laskar Jihad, FBR and other groups that fight and act on behalf of the interests of the group or other interests. Other than that it appears also a wide variety of religious denominations. These groups are socially diverse causes growth and development of new values through various processes which require the institutionalization of interest. But it also may be the emergence of new conflicts, because other groups, other groups, other religions, feel that their presence posed a threat to the existing order of society and the steady-as well as the interests of other groups. Growing is the attitude of ethnocentrism, which considers only the group alone, class course the most good and perfect, while others are bad, wrong, and various other deficiencies (Zastrow, 2000); and stereotypes, which develops an overview of the types of specific people with specific characteristics. For example, the Batak was rude; Padang man is crafty, Sundanese was slow and others. Differences of interests, views, values will give rise to differences in perception of something big possibilities will cause a reaction based on the perception of something that. This can lead to conflict and that might lead to the riots. Some events conflict between groups, class, race and religion, show these things. Look at Ketapang conflict which later widened to some places in Jakarta, Bekasi even Ambon, Kupang and Poso. It shows that excessive sentiment and confidence of the public's trust in one group, class or religion will lead to conflict, both nuanced Social-economic, political and religious.

2. RESEARCH METHODS

This study was a qualitative research, in addition to the types of research that are relevant include: case studies and ethnography. A qualitative approach aims to describe the risk of conflict in society, the need for an understanding of education towards harmony order to avoid a conflict of Qualitative Methods is easier when dealing with multiple facts, to explain the nature of the relationship phenomenon. In this case, the data and information in the form of empirical facts, then analyzed based on the interpretation to be able to comprehensively explain social phenomena, namely social conflict to avoid further social conflict then need to be held simultaneously with persuasive. Basic consideration qualitative research approach in this study, because the researchers can expect to get an idea (description), understanding (insight), holistic (whole), and complete (exhaustive), the issues discussed. Explains According Moleong (1999), qualitative research is to study the natural background (in context) of a wholeness (entity). Ontology naturally want their reality as a whole that can not be understood if separated from its context. A qualitative approach is not simply defined as the selection of methods focused on the type and qualitative analysis, but has a philosophical foundation underlying the birth of the paradigms of this method. Qualitative research has made the rail itself not to use the natural science approach in studying the society. Data obtained, classified according to type (primary data and secondary data). The primary data obtained through observations and interviews of the target object (conflict in society) and informants have been determined. Observations carried out to examine the attitude and behavior of the communities studied. In-depth interviews (in-depth interview) with key informants to get information about education and community conflict Makassar Based on the research objectives, the secondary data is still needed but not too substantive and significant. Secondary data be taken into account to support the primary data in the analysis and discussion. The data in this study did not separate the data collection. In this connection, the primary data obtained can be processed by first giving category or elaborating between the data with the data of the other, according to the data types and proportions have been determined. Analysis of the data used is "Contents Analysis", ie data analysis conducted during the study. It is intended to give focus to the issues discussed. Moreover, a descriptive analysis to elucidate the interaction between one variable with another variable in this study. Related data analysis consists of three main stages, namely data reduction, exposure data, and drawing conclusions. Data reduction is the process of selecting the relevant data, important, meaningful, and useful to explain on what the goals of the analysis. The steps are already simplified by creating a focused, classification, and data abstraction roughly into meaningful data for analysis. Reduced data presented in a manner hereinafter described.

3. RESULTS AND DISCUSSION

A. Between the Multicultural Education and Community Based Education

A pluralistic society therein will be contained various groups of people who have a background in customs, culture, religion and interests. As presented by Furnival that a plural society (plural societies) is a society consisting of two or more elements that live on their own without any intermingling with one another in a political entity (Nasikun, 1986). Diverse communities typically face the challenge of disharmony and constant change. Meanwhile, according to Pierre L. van Berghe, pluralistic society has the following basic properties (Nasikun, 1986, Nitibaskara, 2002): a) There is a segment in the form of groups-groups that often have a culture, or more precise sub-cultures, which differ from one another; b) Have a social structure that is divided into institutions that are non-complementary; c) Among the members of the public is less develop a consensus on the basic social values; d) In the reactive often conflicts between one group to another group; e) In the reactive social integration grew on coercion (coercion) and interdependence in the economic field; f) The existence of political domination by one group over another.

Law of National Education of correspondence on community-based education (Community Based Education, see Soedijarto, (2000), which also stated that the Community based Education are: The education system is based on the peculiarities of religious, social, cultural, aspirations and potential public as realization of education of , by and for the community. Further, in Part Two of Article 55 of the community-based education described: 1) People eligible to provide community-based education in

formal and non-formal education in accordance with the particularities of religious, social environment, and culture for the benefit of society; 2) community-based education provider to develop and implement educational curriculum and evaluation, as well as management and financing in accordance with national standards of education; 3) Fund the implementation of community-based education can be sourced from the organizers, the community, government, local government and / or other sources that do not conflict with the legislation in force; 4) community-based educational institutions can obtain technical assistance, subsidized funds, and other resources fairly and equitably from the Government and / or the local authorities; 5) The provisions concerning public participation as referred to in paragraph (1), paragraph (2), (3) and (4) further stipulated by government regulation.

Of the procedure laid down in Law No. 20 of 2003 on National Education System shown that community-based education aimed at obtaining the output of education to act in accordance with the needs of the community. However, the authors worry, the existence of this community-based education will only sharpen friction plurality of the peoples of Indonesia, due to the implementation of education held by the characteristics of the region, social and cultural Indonesian community, the ego of regionalism will be higher and this is very dangerous. But if the community-based education intended to resolve the economic crisis in Indonesia, which then affects the ability state to provide funding for education, this is acceptable. But if education models will continue to be, I am sure will continue to be developed because legitimacy in Law No. 20 of 2003. So that should be anticipated is the possibility of the diversity in the quality of education, which on the one hand it will support regional autonomy and educational autonomy, but on the other hand have a greater chance to threaten national integration as well as influencing the success of the development of human character Indonesia, Other than that seen also the possibility of the state, removing the responsibility for financing the provision of education in the respective region of the organizers, it would be contrary to the Constitution of 1945, the fourth amendment of d state provides education funds of at least 20% of the total budget of the State and Local budget (APBN and APBD). As seen in the improvement of article 31 and 32, among other roomates (Soedijarto,2003) : obligates the government to fully finance compulsory education (Oasal 31 paragraph (2), requires that the state provides education budget at least 20% of the state budget and budget (article 31 paragraph (4) allegation was indeed not wrong, because the main purpose of the implementation of community-based education is to overcome the impact of the economic crisis on education (Soedijarto, 2003).

While educational multi-cultural explicitly in some chapter of the National Education Act, among others, Article 3 of which states that: national education serves to develop the ability and character development and civilization of the nation's dignity in the context of the intellectual life of the nation, is aimed at developing students' potentials to become a man faithful and devoted to God Almighty, have a start, a healthy, knowledgeable, skilled, creative, independent, and become citizens of a democratic and accountable. Sentences become citizens of a democratic and responsible show their determination to implement multicultural education. Further in the article 4 of this Act outlined that: 1) Education held in a democratic and fair and not discriminatory to uphold human rights, religious values, cultural values and diversity of the nation; 2) Education held as a systemic unit with an open system and the systemic. The second verse in the fourth chapter of the correspondence and implies the importance of multicultural education in order to support the process of democratization and integration in order to create the national. Multicultural education (multicultural education)? There are a lot of understanding about this, which are: 1) Multicultural education is a process through the which individuals' development ways of perceiving, evaluation in behaving within cultural systems, are different from their own (Gibson, 1984, in Hernadez, 2001 in Semiawan,(2003); 2) we may define multicultural education as the process whereby a person "develops competencies in multiple systems of standards for perceiving, evaluating, believeing and doing" ; 3) Muticultural education is a progressive approach for transforming education that holistically critiques and addresses current shortcomings, failings, and discriminatory practices in education. It is grounded in ideals of social justice, education equity, and a dedication to facilitating educational experiences in the which all students reach Reviews their full potential as learners and as socially aware and active beings, locally, national, and globally. Multicultural education acknowledges that schools are essential to laying the foundation foor transformation of society and the elimination off oppression and justice. (Budianta, 2003); 4) Multicultural education as' a philosophy, a methodology for educational reform "or" just a set of teaching materials with pedagogical programs. "(Budianta, 2003).

From the definition of multicultural education is seen that highly relevant multi cultural education implemented in supporting the democratization process, in which the recognition of human rights, non-discrimination and social justice begun all. Besides, with the multicultural education is possible one can live in peace in an environment different cultures with which it has. As explained in advance that our society is a pluralistic society and even the most diverse in the world. Therefore that this plurality does not develop into a threat of disintegration should be sought to manage. Education management Howone of the main answers. The process of learning about human Indonesia should be a compulsory subject at all levels of education. Teachers, curriculum, infrastructure facilities, GBPP and what is needed for a process of learning that supports multiculturalism must be provided by the state. Why the State, the State is the highest authority in education. Indonesia's human form characterized by Indonesian needed uniformity in several subjects of a general nature such as Indonesian, social, cultural-Indonesia, Pancasila and Citizenship Education (PPKn), Comparative Religion. These subjects are subjects that absolutely must be given to shape human character Indonesia. Besides of course the subjects of sports and art. During this learning process is more likely to seek uniformity, and less attention to the diversity of the peoples of Indonesia. In contrast to the community-based education, where this model will be more raises friction -friction in the community because it will find regional traits that actually different from other regions. This model will also cause a lot of problems when we talk about quality standards. Although it is mentioned that the quality standard that is used is the national standard, but with the possibility of organizing its own evaluation and the determination of their own curriculum, facilities and own learning infrastructure and well-being of teachers themselves, the authors are very worried that the education of this model will only further complicate the realization of national integration and at the same time will complicates the realization Indonesia fully human, with the characteristics of a cultured Indonesia and live in a social and political system of Indonesia. This is a challenge for education where education is given the context of

decentralization and national integration, which requires careful thought in determining education strategy in order to build national character tinged with pluralism.

B. Four Pillars of Education and Multicultural Issues

In the book report to UNESCO, Jacques Delors, et. al. (1996) suggests that there are four for joints / pillar of education, namely: 1). Learning to know (learning to know); 2). Learning to do (learning to do); 3). Learning to live together, learning to live with others (learning to live together); 4). Learning to be (learning to be a person). In Pointers and Recommendations, Delors et al., (1996) argues that: Learning to know, by combining general knowledge is quite extensive with a chance to study in depth on a small number of subjects. This pillar also means also learning to learn (learning to learn), so as to benefit from educational opportunities provided lifelong Learning to do, in order to acquire not only an occupational skill but also broader in nature, the competence to deal with many situations and work in teams. It is also learned to do in the context of the experience of young people in various social activities and work that may be informal, as a result of local or national context, or formal involve courses, the program alternates between study and work. Learning to live together, learning to live with others, by developing an understanding of other people and appreciation for the interdependence of carrying out joint projects and learning conflicts in the spirit of respecting the values of pluralism, mutual understanding and peace. Learning to be, so it can develop a better personality and able to act independently, make a judgment and a sense of personal responsibility is greater, memory, reasoning, aesthetic sense, physical ability, and communication skills. Of the four pillars of education above that together pillars of learning to live, learning to live with others, in the context of pluralism is a very important pillar. The pillar is simultaneously a justification of the importance of multicultural education that seeks to condition so that students have the ability to be tolerant of others, respect for others, respect for others and at the same time concerned has borne responsibility for himself and others. So that when the learning process is directed not only at learning to know, learning to do and learning to be, but is also directed to learning to live together, the problem of pluralism will be resolved by the management of conflict and thus will also be followed by the growth of national culture not forgetting the local culture, language national growth not forgetting the local language, the growth of the national political system without ignoring the local political system, (the regional government). In general will grow and develop Social Systems Indonesia, which is different from the American Social Systems, Social Systems Japan, The Social System of other countries. It is Indonesia so we are Indonesians.

4. CONCLUSION

1. The need for the public is aware of the study because it is one to unite people toward a multicultural society in the life of harmonization to Makassar city;
2. Government of the city of Makassar and security forces, community leaders held socialization to provide an understanding to avoid conflicts in society.

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MERIT SYSTEM IMPLEMENTATION IN THE RECRUITMENT OF CIVIL SERVANTS ECHELON II AND ECHELON III GOVERNMENT OF PAPUA

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Abstract: This study was intended to obtain information and clarity on the application of the effectiveness of activities of members of Aceh recruitment civil governance in office. As the target to be achieved in this research is a merit system employee placement Explaining the Civil Echelon II and III in the Papua provincial government. The approach in this study using a qualitative approach to the type of explanatory research. This study was conducted to explain the merit system in the recruitment of structural officials in the era of special autonomy.

Keywords: Recruitment, Government employees, Papua

1. INTRODUCTION

Bureaucracy is often seen as a form of organization that has negative stereotypes, such as often develop stiffness (rigidity), lack lithe rules (inflexibility of rules), adherence to routine, unimaginative, risk avoidance, reluctance to take responsibility, and resist change, (Lane, 1995; Crozie, 1964; Dwiyanto 2011: 32). The treatment of the government against the bureaucracy often has nothing to do the performance of the bureaucracy, because the aim of the mission of public bureaucracy is often not only vague, but also multidimensional. Bureaucracy that has many *stakeholders* and interests are often at odds with one another making it difficult to formulate Bureaucracy clear mission, (Dwiyanto; et al, 2006).

As with any bureaucracy Papua Provincial Government, based on Law No. 32 of 2004 has set democracy is based on Election where each region in the province of Papua in 2005 had a large enough authority to make decisions that are considered in accordance with the election of regional leader directly. It is indirectly create elected regional heads get legitimacy is stronger, than when elected by members of parliament. The regional head election direct result on the one hand led to high hopes for the community, that justice and prosperity will be felt more felt. Even more so in personnel resources employee empowerment of people of Papua as a principal determinant of the implementation of the government bureaucracy. On the other hand a local chief also has a responsibility to put personnel resources employee qualified Papuans are : Moral good (*good morality*), leadership skills (*leadership*), managerial capabilities (*managerial skills*), and technical capabilities (*technical skills*), various levels of structural positions

Morale is good in the special autonomy law a major prerequisite. Because without good morals, all policies, systems, programs and activities that are designed to be effective. Good moral will produce a government that is clean of corruption, collusion and nepotism, of competitive personal or group. But moral good is not enough, must be balanced with competence is the ability in the areas of leadership, managerial, and technical. To achieve the necessary competence, not in spite of the staffing system is implemented, the model of Human Resource management based on competency, including compensation system adequate attention should be. The change of paradigm, that of mental rulers become servants of the people become the main pattern. Including work culture that is proactive and responsive to the problems faced by the community.

Formally, the policy needs to be poured into the local regulations (regulations) as well as regional head regulation. Chief among the other regions must have the concept of sustainable and equitable development, the management concept of effective governance and efficient to accommodate all the interests of related parties, as well as various other policy concept. This is so since the inauguration of development up to five years into the future into focus.

System of government will be strong and walk by the system *and* not depend on the figure. One of the systems should be built in order to run both the government personnel system as mandated in the Special Autonomy Law in 2001. In the special autonomy law government bureaucracy province holds Rights, Privileges and Obligations Autonomous Region. Namely to set up, administer governmental affairs and public interests in accordance with the legislation. That regional autonomy would yield positive results *Good Governance*; democratic governance, public participation, efficient administration, better services, *responsible government*, (M. Mas'ud Said, 2004).

Weak governance system includes planning decisions, employee management, screening and selection of partners, resulting in Papua Provincial Government bureaucracy becomes ineffective and inefficient. And only rely on the figure. Risk of this system is the possibility of full control by elite area (see, eg, Bardhan and Mookherjee, 2002, Martinez- Vasquez and Nab, 1997, Prud'homme, 1995, Tanzi, 2000, and Wihana Kirana Jaya, 2010). Some researchers say that the lack of success the policy

of decentralization and regional autonomy because of the design institutional (*Institutions design*) made inefficient, lack of success is for example in the form of uncertainty rules (*Rules of the game*).

Demetouw (2009), states granting authority to local governments, of course, on the one hand provided an opportunity and an opportunity for local governments to plan and utilize human and natural resources available in the region for the benefit and fulfillment of public welfare as much as possible. the other side of the authority granted by the central government to local governments has become a threat and a burden for local governments, because the huge authority should be supported or managed by the quantity and quality of human resources is great, but if the human resources capacity is small, then avoid waste and diversion of resources, Timothy J. Demetouw (2009: 1).

In addition to the government system, and the role important its human resource management is the second most important demands of the special autonomy. if not sustained Model HR management based on competency seems to be a necessity. Miner and Crane in Rachmawati (2008: 5) state human resource management is a central factor in an organization, such as the shape and purpose organization made based on various visions for the benefit of man and, in doing mission is then administered. More Jhon. B. Miner and Donald P. Crane declaring mankind is a strategic factor in all activities of the organization based on the vision of the organization so that organizational goals can be achieved optimally.

The large amount of government employees with higher growth rates, poor quality and incompatibility of their competence, misplaced, it is not clear to a career path that must be taken. Causes policies in the field of personnel into less direction. Vision manager staffing becomes unclear. Pola-pattern developed in the recruitment and selection of the placement office is also misleading, (Sulistiyani in Achmad Akmaluddin, 2008: 43). Changes in the structure and authority of government in Papua Special Autonomy would be meaningless if it is not supported by the performance of civil servants who are reliable, that is moral and commitment, integrity, and loyalty, dedication and supported by the quality of work and quality of work, including the quality of faith and piety, (Musa'ad, 2010: 197).

Good human resource and whether it is generated depends on HR management Bureaucratic Autonomy Era Papua Province. The Special Autonomy Law that stipulated in Chapter VI of the device and staffing, specifically Article 27, namely, (1) The Provincial Government sets policy based on the provincial civil service norms, standards and procedures for the implementation of the Civil Service management in accordance with legislation. (2) In the case of the provisions referred to in paragraph (1) is not fulfilled, the provincial government and district / city can establish an employment policy according to the needs and interests of the local area. (3) Implementation of the provisions referred to in paragraph (2) shall be regulated by Perdasai.

The law of employment is a key element in a Bureaucratic System Papua Province. This means that the employment aspect of determining the existence of the bureaucracy in a system of government included in the Era of special autonomy in Papua. Special Autonomy Law shows that in *normative* Act has provided a space for the implementation of civil service reform in Papua, especially on the dimensions of the structure and authority. But it is precisely by Rivo, (2011) in his observations:

Lots of local talent, which potentially can not then be utilized evenly throughout the province of Papua, there is a sense of injustice among the people against the government. For the implementation of Act 21 of 2001 section 27 in the end the principle utilization be used by the regional head as the staff development to determine the pattern of career officials Papuan people. But in practice it would be a boomerang for the empowerment of local talent itself. Because of the strong understanding and practice of employment based on the expansion of the Law on Special Autonomy Otda not.

There is still a lack of representation of indigenous Papuans in the bureaucracy and the institutions representing the people both locally and nationally assumed as important problems until before introduction Law No.21 of 2001, (Solossa, 2005). Actually when implementation of the special autonomy legislation can used in the best and fairest, will be able to compensate for the advantages that exist that are owned by employees of the apparatus of Papua. according Gainau, (2012: 217) expressed strong political pressure from elites Papuan people against bureaucracy to implement a policy of *affirmative action* for indigenous Papuans which resulted in low quality of human resources bureaucratic apparatus especially indigenous Papuans. Further Aldrin Watson Gainau, controlling as a form of partiality to the Papuan people to get positions would bring the bureaucracy on issues of the strengthening ego tribal and ethnic bureaucracy that bore the symptoms of the creation of a bureaucracy primordial and character ethnocentrism Papua native as the negative impact of the implementation of the policy of *affirmative action* is not patterned as far away from the juridical rules of operation also resulted in the bureaucracy led by the indigenous people of Papua are only oriented position and the material and not the function of government to serve, build and empower communities.

Appointment/removal of a structural official bureaucracy in the ranks not solely on the carrier system, but tend to be based embrace spoil system, which support a political party or a successful team be decisive. Placement of an official in the structural position has been more on the direction and the intervention of political authorities alone, which puts people who are similar to them, so that the top leadership more apparent stable and help to perpetuate and institutionalize his power as an officer bureaucrats (Boone et al, 2003). Although the facts prove that these placements more effectively ignored and ineffective bureaucratic organization. Resulting in employee creativity to less innovation, and just do the work routines for the inability of the leadership to make new breakthroughs. Flourish in environment bureaucrat, mentality primordial, consumptive, feudalistic, tend to be asked to be served instead of serving, giving priority to social status, working for the pursuit of prestige is not an achievement, the tendency oriented up has spawned a culture system that is multi-layered, which ultimately leads to the attitude of the boss happy or She was happy (Musa'ad 2010: 181).

With a variety of problems that occur would invite a number of issues among the public how the actual implementation of the principle of merit system in the administration of the province. because of the implementation of the special autonomy law has been running 15 years (until the remaining 5 years), Papua provincial government has not had a grand disaind placement planning service positions. Almost all staffing in the office of the appointment/removal of Trustees Personnel Officer, regardless of the needs of the organizational structure of the conventional *bureaucratic* or *hierarchical organization*. Resulting patterns of merit system in the office staffing still controversy.

Therefore, here the provincial government needs to implement a merit system of personnel placement employee recruitment of people of Papua as the first determinant of management and human resource development in Papua. Click recruitment applied in the Papua provincial government needs to raise the capability and knowledge of the actual employees. Priority and measure employee competency apparatus Papuans must be put forward, so that *skill* is useful for the future development of the organization. Papua provincial government should also ensure that in the conduct recruitment office placement based on the abilities and skills of employees of the apparatus, namely *the right man in the right place and the right man in the right job*.

2. RESEARCH METHODS

The approach in this study using a qualitative approach to the type of explanatory research. This study was conducted to explain the merit system in the recruitment of structural officials in the era of special autonomy. As a strategy in this study the authors use the type of case studies in the provincial government of Papua Year 2013/2014, the placement of Echelon II Head of Governance, Head of Sports and Youth, Department of Education and Culture, Head of the Civil Service Agency, and the echelon III Director Abepura District General Hospital, Hospital Director and Chief Doc 2 Regional Health Laboratory, the case study here is the method performed by examining, comparing in-depth application of the merit principle in the system of governance positions after a period of time specified by using methods that are systematic observation, collection of data , analysis of information, and reporting the results. This study seeks to describe *the real condition*, and *s* sa result will be obtained a thorough understanding of the inhibiting factors affecting the ineffectiveness of the merit system.

3. RESULTS AND DISCUSSION

Application of Merit System In Civil Servant Recruitment placement Echelon II and III in the Government of Papua province.

The application of merit system in the recruitment of civil servants Placement is the selection and deployment of staff in the echelon II and III by the process of recruitment of officials. Application of placement here is based on a rational plan needs based on the classification positions, job descriptions and competency standards that have been set previously. So as to create the principle of *the right man in the right place* or put the right person in the right place. As the basis of the implementation of the Civil Service management overall in improving the efficiency, effectiveness and degree of professionalism. On the subject of this sub will interview the authors describe the results and conclusions of the placement of civil servants covers (1) education and training, (2) experience, (3) skills, (4) ethics, and (5) performance. As part of the assessment objectivity in the recruitment of civil servants at SKPD Government of Papua Province.

1. Education and Training

Education and training in the placement of employees is an employee distribution in accordance with the learning abilities that are followed in order to improve the ability covers the knowledge, expertise, skills, and attitudes to be able to perform tasks in a professional office based on : Personality and ethics, creating an apparatus that is capable of acting as an adhesive renewal and unity of the nation, has the spirit of dedication and service to the community, and create a common vision and dynamics of mindset in the task of governance and development, for the realization of good governance. In connection with the placement of structural officials based education and training, an informant study stated:

Supposedly occupying echelon II and III should be through the career ladder from the lowest to the highest echelon so that these officials have adequate career. but their implementation for the second echelon group VIb can occupy the post of class VIc. in the third tier group can occupy Class IIIa IIIb. Trickmen who always used to lift the VIB officials and IIIa as PLT's duty VIc class officials and IIIc, after a lapse of one year later the newly appointed officials definitive. (FP, interview dated 13 May 2016).

Data informant above illustrates that training positions in the placement of Echelon II and III in government less applicable province. Appointed officials in higher positions must pass through positions as acting for a year ago defenitif newly appointed officials. Based on the same question when I confirmation to 6th SKPD, according to research informants echelon II said:

The new head of the Bureau was appointed recently as during the follow Training leadership II became head of the division. Government and Law in Puncak Jaya, the candidate still echelon IIIb. In the conditions and rules can not be appointed instead echelon II must participate PIM II's newly appointed first, but since the proposed CO can inducted through the system of rank selection. (Bureau of Governance, interview dated May 24, 2016)

PIM or not is not a guarantee to be appointed in the echelon II, because usually a new job following the PIM, the same as department heads P and K are now. When follow the rules in question may not be removed because it is still echelon IIIa, pursuant LAN can not follow the training PIM. (Department of Education and Culture, interview dated May 26, 2016)

Emplacement objectivity removal new chief not a necessity. Because there is no relation at all to the position Head of education and sport. And we question it is perhaps less successful Officials had previously served or too long, there is not one in a matter of months transferred, as there is no concern and interest in advancing the education and sports department. By rank officials also were served not eligible. It official roomates now still Echelon IIIb echelon IIa positions. something that is actually enforced by the KDP. But what can we do That is the decision to sit as an echelon II does not have to come first training, (Department of Sports and youth, interview dated May 27, 2016)

Even had served as Head of Human Resources and Regional Training Puncak Jaya does not mean not participate PIM II training. Because training PIM II attached to the ability and competency required in the new position as head of the Provincial Employment Agency. As a high offices are generally much needed managerial skills rather than technical ability. (Regional Employment Board, interview dated May 30, 2016)

Data informant above illustrates the placement of employees by education and training less suitability for the position. It is characterized by education and training followed adequate employees yet to be appointed on a higher office. the ability of employees covers the knowledge, expertise, skills, and attitudes acquired through education and training less according to the demands and needs of stints at higher positions. In connection with the placement of structural officials based education and training, research echelon III informant also stated:

When basic competency as a doctor doubt beliauw people, but if a position in structural, not meet criteria. Because a person who sits as a director has a minimum standard of competency, fields, and specifically the structural position. As a director Abepura Hospital has full responsibility for the health problems in their area. That's why the relevant authorities have to follow the training PIM III and II before being appointed as a director. (Abepura Hospital, interview dated June 2, 2016)

There is no verification of the data that show the echelon III Head Labkesda new yan meet the competencies, the minimum as required. Here, hard work, dealing with human waste, just for the sake of service on community. without competence, competence field, special competency in office may not reach success. Actually, if they understand that as a head Labkesda it authority on specific health issues / areas of service / UPT Labkesda environmental education in the province of Papua. Which can not be equated with politics. (UPT Labkesda, interview dated June 6, 2016)

Data informant above illustrates the placement of the echelon III is not much different from the second echelon. Education and training of officials less suitability for the position. So the effect on competency areas, special competency when performing its duties and responsibilities of the job. In addition to education and training, placement of civil servants based on formal education greatly influence the office. Staffing based on formal education for the purpose of distributing the level of education and science in accordance with education officials adopted any formal schooling. Resulting in a single unit led by officers who have highly educated and have a background in science as needed in the office. So also with the placement of structural officers by formal education, according to FP research informant stated:

Many also echelon that we see does not work as field science has often made it difficult officials concerned took the decision actual terms and conditions are clear we can know. For the head of the Bureau of Governance is based on job description pretty when the terms of the educational background of the set that scholars State Administration/Public, and Political Science or Management. However the implementation of the task will be even better when the educational requirement is a bachelor of Government / IPDN. At the Department of Education and Culture of the terms and conditions that undergraduate Education Management. For the Department of Sports and Youth terms and conditions scholar sport science or physical education. As for the Regional Employment Board of undergraduate education requirements of the State Administration / Public Management. UPTD Labkesda Doctor, Specialist Doctor, Dentist, Dentist Specialist. But due to the circumstances of the provincial government who always get political intervention, setting the terms scholar not in its competence, resulting in each work unit heavier load. (FP, interview dated 13 May 2016)

The data above illustrates the research informants formal educational background in the placement of Echelon II and III less be applicable. Officials placed incompatible with science. So that only adds to the burden for the relevant authorities in the course of his employment. Based on a survey of research on the level of formal education in all six official SKPD provincial government of Papua, can be seen in the following tabel 1:

Table 1. Education Level Echelon II and III in six SKPD Government of Papua Province Year 2013/2014

NO	Position SKPD	Level of Education and Educational Background		Information
		S 1	S 2	

1.	Bureau Chief Governance	Law	Master Humanyora	Background competency Not Available
2.	Head of Education and Culture	Bachelor of Education	Master Humanyora	Background competency Not Available
3.	Head of Sports and Youth	Bachelor of Social	Master of Public Administration	Background competency Not Available
4.	Head of the Regional Employment Board	Bachelor of Education	-	Background competencies and level of education Bachelor S1 not Match
5.	Director of Hospital Abepura	General practitioners	-	Undergraduate education level S1 does not match
6.	Head UPTD Labkesda	General practitioners	-	Undergraduate education level S1 does not match

Data Sources: Bureau of Governance, Office of P & K, Diaspora, BKD, hospitals, Abepura, UPTD Labkesda year 2013/2014 (prepared in 2016)

From 6th SKPD provincial government of Papua studied, echelon II officials who educated graduate (S2), namely governance bureau chief, head of education and culture, and the head of sport and youth, undergraduate (S1) head of staffing agency. While the echelon III officials Abepura Hospital Director and Chief Labkesda both still educated to degree (S1).

Data informants and survey above, when the author asked the 6th SKPD based educational background in placement officials, according to research informants echelon II states:

For that I look more to the consideration of the leadership, so that anyone with different educational backgrounds can occupy positions. Governance Bureau, interview dated May 24, 2016)

Necessary so that the knowledge gained can be applied in accordance with his position, if the problem is not the appropriate background knowledge often affect an influence on decision-making. (Department of Education and Culture, interview dated May 26, 2016)

From each appointed officials, not all officials understand his work, although placed based on educational background. (Sports and Youth Department, May 27, 2016 Interview)

Placements in the right place according to the field of sound science will allow officials to make decisions as to understand the intent and purpose of any problems encountered in the field of work. (Provincial Employment Board, interview dated May 30, 2016)

Data informant above illustrates the placement of officials by education level is appropriate. But seen from an educational background and knowledge among officials less suitable positions. So the impact of influence on decision-making. In connection with the placement of structural officials by formal education, research echelon III informant also stated:

Because many officials are not in accordance with the educational background shaded positions. see the situation the condition of the field with an educational background is actually easier for officials to understand the work (Abepura Hospital, interview dated June 2, 2016)

Educational background actually describes mastery basic tasks and functions of the officials, because it is not possible that different functional employee or officer who previously served in other units with different educational backgrounds sign sitting in the office is not the field of science. (UPT Labkesda, Interview, dated June 6, 2016)

Data informant above illustrates the placement of the echelon III inversely. Based on educational background is appropriate. But seen from the level of education are less appropriate. This has resulted in inequality with a lower education officials leading the subordinate higher education.

2. Experience

Experience in the distribution of employee staffing the appropriate level of mastery of knowledge and skills possessed into work. Measured from the start was first appointed as civil servants, sitting as the leadership level down to the top. With the maturity of experience, foresight natinya employees can work with full energy, improving the shaded organization's development. Resulting in the renewal work, leadership, achievement, Traffic socializing at the new office tasks. Appropriate behavioral maturity, and understanding they have. In connection with the placement of structural officials based on experience, research informants stated:

Appointment in office has not fully taking into account the experience of career officers so appointed officials are less able to answer in office tasks carried optimally. Placement which is conducted not because experience, as if by experience mutation should open, consideration to the requirements done right. True if you want to turn a maximum of five years, a minimum of 2-3 years has served recently moved it's not, the new officials replaced six months, one year has been replaced. Yes no bisalah we measure the experience as Echelon II and III. Still mending served on duties and responsibilities, that it's more in different positions with different competencies. (FP, interview dated 13 May 2016)

Data informant above illustrates that the experience of Echelon II and III in less appropriate placement. Because too frequent change of officials. Nearly every officer who is turned echelon II and III have office experience less than 5 years. So it does not comply with the requirements of legislation in the mutation positions. From the above, when the author questioned the informant officers experience on the 6th SKPD, according to the informant echelon II said:

Should follow the experience of the background work because there basicnya. Lifting officials from other agencies field or high risk, which is again necessary adjustments. B M any job targets are not in accordance with achievement. Because stuck with the duties and responsibilities in the new position. (Bureau of Governance, interview dated May 24, 2016)

Seniority so it should work experience placements aspect consideration, if we want to talk about professionalism, competency, and interpretation work. Because of something that already exists, and has been tested. The problem is they put the officials did not use standard experience as it existed in the rules in measure job competency. There is still more work backup at the head of the field, because the head is still necessary adjustments. (Department of Education and Culture, interview dated May 26, 2016)

Not according to the standard because in my opinion if it has a background field of work is not important if the horse has never positions elsewhere. If experience should he have the benefits associated with the achievements in the field of sport and youth. What we see officials think the context is still common, unskilled do the job, no new breakthroughs. (Department of Sports and Youth, interview dated May 27, 2016).

The problems we BKD we do not have the personnel information system is complete, there is still a lack of data year after year from employees in various SKPD uncovered here. I think this is a serious problem and must be addressed by the new officials. But there has been no new official settlement related to this issue. In it we know there is no flexibility to change the structure of the new officials and managerial processes to implement changes. (Personnel Agency major region, interview dated May 30, 2016)

Data informant above illustrates the placement of echelon II based on the experience less in line with the position. Standardisation of office experience less applied to the placement office. so b many job targets are not in accordance with the achievements. Officials resulting Often get stuck in the duties and responsibilities in his new one. In connection with the placement of structural officials by formal education, research informants in echelon III states:

In PERMENKES No. 971 / Menkes / PER / XI / 2009 as our hospitals class B, then automatically experience directorships preferably once led hospital grade C and / or has served as deputy director of the hospital of Class B at least 3 (three) years , Or work experience level of mastery of knowledge and skills possessed measured from the time of employment, since its first appointed as civil servants, sitting as head of the clinic, the head of section, head sub-Section and, Head of the directors. While this has long beliauw not carry out their duties as civil servants, and more involved in political parties since 2009. (Abepura Hospital, interview dated June 2, 2016)

Placement of new officials should be implemented in order to maintain the quality of service and international lesion already acquired Labkesda Jayapura. And for that we need the experience leaders who can guide and direct the staff to work hard and energetically. Can affect subordinate to determine the attitude to the service of humanity. For this we had to question all provincial health authorities to provide an explanation regarding the turnover, but none of the officials or delegates are present. (UPT Labkesda, interview dated June 6, 2016).

Data informant above illustrates placement echelon III officials based experience not much different from the second echelon. experience less employee suitability for the position. Experiences of various opinions logically is a matter staregis development and empowerment of officials. Weak policy planning the placement of officials who are not supported by the information system of adequate human resources in terms of experience in office. Result in the need and the distribution of human resources in SKPD unfocused.

3. Skills

Skills in the distribution of employee staffing is appropriate engineering skills, using equipment, using procedures solve the problems, barriers of knowledge and professional manner. In short an employee's skills in diagnostic quickly causes the right of a situation particular problem and provide appropriate solutions in solving the problem. Which is received through education institutional or through training according to the needs of the skill positions. In connection with the placement based on skills, research informants in echelon II states:

Agreed to keep the aspect of administrative skills such as the ability to support, lead, responsible, able to work together, disciplined handling of the work according to time, and use of technology though is relative to these aspects. With the standardization of education mentioned above, for some officials in the district / city is not an obstacle that is so meaningful, but for areas of districts / cities in Papua are still isolated mountains the biggest hurdle. While the local officials who are the majority of graduates in the District / City Parent, (FP, interview dated 13 May 2016).

Data informant above skill in the placement of Echelon II and III less applied. It is seen official involvement in the education or training. Besides the lack of employees have administrative skills, lead, working together. To know the truth of the above, the author also asks skill in the placement officer at the 6th SPKD, according to research informants echelon II said.

We can understand, especially if the officials originating from the mountain region, an opportunity they get education, improve through the training areas are very less. because the condition of the situational geography and demographics facing away from the mountain region officials is difficult, so the chance of it if there is a reply to the town. That is why it is often berpengaruh also on the quantity and quality in carrying out the duties, functions and responsibilities in institutional governance. We're talking like this for evaluation only. Because in the past year taken official policy strategy, not the right staffing Trustees and one-sided, which promoted more officials from the mountain (Bureau of Governance, interview dated May 24, 2016)

If we have an officer who has skills in technology, lead, responsibility, cooperation, handle the work, we are happy to subordinates. Do not fall up for work. if there are one or shortage surely we were told, encouraged the leadership to correct the deficiency. Unfortunately, we have not experienced situasi like that of the management, there is an atmosphere that routine, bosana, as there is no enthusiasm and excitement in the work. Look at that hour this employee should be in place. These officials if not in their places began to disappear with their own affairs. (Department of Education and Culture, interview dated May 26, 2016)

We are here still tend to be oriented to a routine activity, it is important there is work, there is activity. I think we have officials can not make new breakthroughs, of administrative affairs, leadership, responsibility, cooperation, discipline, handling employee jobs decreased noticeably. Members of Aceh more often complain because of discontent and political influence in the affairs of a job. (Department of Sports and Youth, interview dated May 27, 2016)

I think this is something that must be present in an official Provincial Employment Board in accordance development technological age, especially employee data now using the technology. We want to know the number of active employees and not, rank, years of service, has the education, skills definitely need the technology to be able to present it quickly. and if he can understand love the opportunity to finish . IT employees work part first. It's not finished was about to be replaced again. We already dispose of superfluous small cost to purchase software and employee training charging continues suddenly concerned officials on the move. We only focus on the same job, which was never completed-finished. (Provincial Employment Board, interview dated May 30, 2016)

Data informant above draw, placement officer by less skill suitability for the position. Officials placed less capable to overcome the problems and obstacles in jobs in SKPD. Less gain new breakthrough in the conduct of administrative affairs, leadership, responsibility, cooperation, discipline and handling work in the office. In connection with the placement based on skills, research echelon III informant also stated:

If hospitals have recruited dozens of medical skill could not have medical personnel local general hospitals (Hospital): nurses, paramedics, midwives and doctors, protested in front of Abepura Hospital Administration Office, the problem is there are rights that have not been paid for months. That's because the director is unable to perform the duties and functions, management and leadership. being too authoritarian and create policies that do not comply with the rules and conditions of the existing estate in Abepura Hospital. (Abepura Hospital, interview dated June 2, 2016)

Echelon must have the skills, administrative ability, lead, responsible, and work together. Without it resulting in anxiety on subordinates. Never until the event of a strike two days do Labkesda staff, and the complaint letter addressed to Ombusman, because of the demands as a form of dissatisfaction turnover of officials. Due to the change of the head of the long lead level of enthusiasm and excitement staff work will go down. Because we feel that the placement made as a political force not because the skills of officials. (UPT.Labkesda, interview dated June 6, 2016)

4. Ethics

Ethics in the distribution of employee staffing is appropriate normative values in the placement of official regulations, common and acceptable by other employees as interaction with the working environment. Officials placed can transmit the principles of discipline, abide by the obligations and avoid prohibitions prescribed by official regulations and legislation. Neutral,

not involved in politics or the interests of a particular political system. Which lead to mutual suspicion and injustice in the civil service. In connection with the placement based on ethics, an informant research in echelon II states:

Ethics PNS need for officials as reactive or responsive attitude of officials towards the problem in the course of his employment, but also as responsive or concern for officials in consistently responded to the job duties. because almost every official involved in practical politics, whereas practical politics is prohibited. placement in each SKPD must conform to ethics. Although some are not following the rules in the placement, placed because of politics. From Echelon II to the echelon III officials. This problem of who can best places, such as bureau chief, head of department, head of the Agency, etc. No employee of the placement match, there is not, there were placed because like people to longer, because he knows a lot and know very well work in his SKPD. There also are like because it can defend the interests of officials above. But back to the correct placement rules, need people who understand the vision and mission are not people instantly, but that really has ranks, competencies adequate. (FP, interview dated May 13, 2016)

Data informant above illustrates that ethics in the placement of Echelon II and III less applied. Placement of the employees tend to subjectively preferred, namely in the officials that come into play in practical politics above leadership. And less oriented to the vision and mission to be accomplished in the office. Based on the informant statements authors also ask this question in all six SKPD, according to the informant echelon II said:

Not a secret if officials with all the minimum requirements to be appointed as head of the bureau, I was having this conversation ade could definitely know what I mean, if it was not a political issue, what for achievement, He one of the people closest governor. and understand how the rules, but when the choice has fallen on the officials concerned, we are only here to thank, with all its consequences. (Bureau of Governance, interview dated May 24, 2016)

Fact will no consideration of the terms placement officer concerned, if you want to be honest, there is never a place to perform the task as secretary of Education and Teaching in glorious peak, He more here in the city, until recently when Mr. Gub beliau appointed. If it's like this because the employees involved in practical politics, there are rules in the transfer-ratification of the appointment head office (Department of Education and Culture, interview dated May 26, 2016)

That's because certain interests recently transferred here as a head of department of sports and youth. if it's like this it is clear that the appointment of officials in these offices are not in accordance with the terms of placement. Qualifications cuisine can occupy different positions. Placement was because of practical politics, let alone is still continuing into the next period. This strategy will be played continuously. (Department of Sports and Youth, interview dated May 27, 2016)

It is impossible if the placement agency heads do because of the requirement, there must be other elements as reinforcement. Because beliau never told me when I was a secretary Provincial Employment Board; that has long been involved with the Governor, previously only a high school teacher in Adhuluhur Nabire, moved to the top so the staff appointed head officialdom field in Puncak Jaya, at the time of his regent. Now after becoming governor spoke again kejayapura so the head of the provincial civil service. (Provincial Employment Board, interview dated May 30, 2016).

Data informant above illustrates the placement based on ethics echelon II less in accordance with occupational requirements. Placement here is based on the employee involvement in practical politics. Thus resulting in suspicion and injustice in the civil service. In connection with the placement based on skills, research echelon III informant also stated:

If we look at PNS're not performing their duties for several days, several months, so many years will take firm action, with regard to his hospital admission, placement Head Hospital is a right of the Governor to put my head on education, we have not asked the Governor about the status of civil servants of the Head of the Hospital, whether he had become civil again. (Abepura Hospital Interview dated June 2, 2016)

KDP is an official who has the authority to appoint, dismiss, and mutates officials, including lifting the new head of UPT and disable former head job,even for no apparent reason. today many officials find positions with politics. If only expect that the career system is not going to possibly be served. (UPT.Labkesda, interview dated June 6, 2016)

Data informant above illustrates the placement of the echelon III by ethics not far different with the echelon II. Officials placed less ethics office placement. Resulting in suspicion and injustice among officials.

5. Work performance

Job performance in the placement of the distribution of employees at higher positions corresponding labor productivity that have been achieved. This is in order to motivate workers and increase the ability of SKPD new. What is meant by achievement of satisfactory results here the appropriate standards of work performance in office. In order to ensure that the civil servants actually have work performance, requiring List of Employee Performance Assessment (DP3) as amended into Employee Job Performance Assessment (PPKP). DP3 an employee performance appraisal covers skills, skills, experience and sincerity. With the scoring system described above, professionalism of civil servants can be met. Related placement performance-based officials, an informant studies suggest

Priority promotion for outstanding officers who excel and or perform discovery, a new innovation with the creation of high lift his organization essential for preferred. Due to the achievement of its officials concerned may give new developments and breakthroughs in the SKPD that he led. So every officer must fulfill eight principles on DP3 as a condition of occupying votes echelon II and III at a minimum. But really unfortunate virtually every officer does not have a valid assessment data DP3, because ratings DP3 we did not walk far. Existing and used in the assessment of the staffing agency that only LAKIP, to how to make him eligible placements. If you want a true and accurate based DP3 duly issued on a regular basis, based on the working conditions with the relevant authorities (FP, interview dated May 13, 2016)

From the data above illustrates informant less applied employee job performance in the placement of Echelon II and III. It is seen from employee appraisal achievement system DP3, which is not run well. Placement performance is based LAKIP officials. From the same question authors also ask job performance in the placement of officials in all six SKPD, according to the informant echelon II said:

DP3 it should be, to be proposed structural positions echelon II officials at least have the good value that the show with proof of loyalty and discipline over the last two years. With conditions such as the mountains of the region are not easy to apply DP3, because there are differences in working hours with us in the city, if we here enter 8:00 wit, wit there 10-11 hours for very cold weather conditions. Sometimes officials do not come to the office. We work here if there are guests until 18:00 to 19:00 hours wit, there erratic depending mute. So that officials could occupy positions one using LAKIP. (Bureau of Governance, interview dated May 24, 2016)

Need for DP3 was showing that echelon II is feasible or not appointed in that position, so it is not just or formality. Appointed to obtain a value of an echelon II should really have obedience behaviors. Habits officials above that if not a lot of activities like go down to the town, could be weeks, months. The offices above the deserted just seen a few employees who are doing the work activities. Steps that can be used as yes votes LAKIP. (Department of Education and Culture, interview dated May 26, 2016)

DP3 important as the individual assessment echelon II as explained on performance, behavior, and moral. These officials tend to when it needs a new take care to complete the requirements. That's why many are filled with second-guessing roughing it, the existing format replaces the values DP3 stay 2 years previous course. So stay visible if SKP default value of 60% live in upgrate important either. Likewise PKP concerning quality and quantity of the standard 40%. (Department of Sports and Youth, interview dated May 27, 2016)

DP3 was written evidence of performance assessment. To occupy echelon II must have good ratings DP3. But why have the same interests, the issue of the official ratings can be adjusted as needed, just ask your appraisal made execution of the work based on the data available, the authorities'll make as objectively as possible to adjust to the needs of its officials. (Provincial Employment Board, Interview dated June 30, 2016).

From the data above illustrates placement informant echelon II was not relevant to job performance in the placement office. It is characterized by still used LAKIP and DP3 / PPKP only as a formality requirements in the placement, without being accompanied by an objective assessment of the work of officials. In connection with the placement of performance-based, research echelon III informant also stated:

In the Government Regulation No. 10 of 1979 using still using behavioral assessment visits if there is still a shortage of work-related goals. But since 2014 and above the target behavior assessment directed at the work, so the emphasis is more on performance. That means officials who will be appointed only having a good performance. And to ensure that work performance should be of instasi each based DP3. What we are questioning here after so many years of not performing the task, how the performance appraisal of the beliauw was given, officials in authority is? People party's impossible. There, we see the placement of officials concerned is not based on an objective assessment. (Abepura Hospital, interview dated June 2, 2016)

They can recommend people to sit in the position of head of the berpretasi Labkesda but should work according DP3 assessment. When we questioned why the change was no response and the response provided by the provincial health bureau. If the person recommended is really professional and able to work optimally in supporting the ministry in Labkesda, they should love our know how work performance of the officials. That's why we feel it is not clear official placement, that placement because the interest alone. of people who have an interest certain. (UPT.Labkesda, interview dated June 6, 2016)

From the data above illustrates placement informant echelon III is not much different from the second echelon. Job performance is less appropriate officials with the office. Performance appraisal through DP3 / PPKP employees less used as a track that practicable in the placement of officials. Assessors work performance of employees, still using LAKIP as the basis for the placement Placement officials more based on the interests of certain political

4. CONCLUSION

1. Placement echelon III inversely, of the level of education are less appropriate. This has resulted in inequality with a lower education officials leading the subordinate higher education.
2. Placement echelon III is based on the experience is not much different from the second echelon. experience less employee suitability for the position. Experiences of various opinions logically is a matter staregis development and empowerment of officials. Weak policy planning the placement of officials who are not supported by the information system of adequate human resources in terms of experience in office. Result in the need and the distribution of human resources in SKPD unfocused.
3. Placement echelon III is based on skill not unlike the echelon II. skills possessed less official suitability for the position. Officials placed over the approach of the political forces. resulting officials are not able to perform the duties and functions, management leadership well.
4. Placement echelon III by ethics not far berberda with the echelon II. Officials placed less ethics office placement. Resulting in suspicion and injustice among officials.
5. Placement echelon III is not much different from the second echelon. Job performance is less appropriate officials with the office. Performance appraisal through DP3 / PPKP employees less used as a *track* that *practicable* in the placement of officials. Assessors work performance of employees, still using LAKIP as the basis for the placement Placement officials more based on certain political interests.

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QUALITY OF HEALTH CARE PATIENT SATISFACTION IN HEALTH-KASSI KASSI IN MAKASSAR

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Abstract: This study aims to determine the quality of health services by health centers-Kassi Kassi to patients, especially for poor people. PHC is expected to provide a guarantee for the citizens of surrounding communities to get necessary health care. Goals to be achieved in this research is to describe the quality of health center services-Kassi Kassi in Makassar. The results showed quality-Kassi Kassi health center services ranging from reliability dimension (reliability of the service), responsiveness (quick response) assurance (hospitality), empathy (attention) and tangible (physical infrastructure) is very good. Existence of PHC-Kassi Kassi Makassar city communities need. The results of this study are expected to provide input to the local government of Makassar in this case the manager of health care (PHC) in formulating policy decisions about health services to be provided to the public.

Keywords: Quality of Health Care patients

1. INTRODUCTION

One important element of the quality of life in national development to realize the complete Indonesian man is health. Health development aims to provide the widest possible opportunity for citizens to obtain optimal health status is manifested among other things by building health centers throughout Indonesia. In order to improve public health are many things to do, one of them with health service delivery. Health care is any organized effort alone or together in an organization for maintaining and increasing the health of individuals, families, groups and or society (Azrul Azwar, 1996).

During this development and health services is still understood as a technical issue alone, where medical services only involves physicians, nurses and other medical personnel. Construction and health services deemed to have been able to make changes automatically and responsive to any changes. From these circumstances it should be our duty to take care to public health services. One paradigm is quite grounded, namely: health for all "Health for All" is the public services that should be accessible to all people of all kinds of layers that exist, so that the health services provided by the government may be one measure to assess the performance of government the area to the public. Health services that directly touch on the bottom layers of society and is required by the public is very important, this is because the health service conducted by the health center will provide health protection to citizens, especially for the less fortunate citizens. PHC is expected to provide a guarantee for the citizens of surrounding communities to get necessary health care.

Governments have an obligation to drinks provide health services are needed by his people. For providers of health care principles that must be followed in providing health services to the community is how people feel satisfied and comfortable in receiving health services provided and the existence of health centers as a medium for the delivery of health services should be run so well that the quality of services provided in accordance with what is desired by community. PHC a technical unit DHO / State responsible for organizing the development of health sector in the work area (the Basic Policy Health Center, MOH 2004). The existence of health centers in the community is important because health centers are the spearhead of the health services provided by local governments. Good health services provided by the government administration would indirectly ease the burden on the government. Health is the key factor of all human activities carried out, therefore, the public must obtain a guarantee from the government that they will always get the health services needed.

Problem Formulation: 1) How is the quality of health care to patients in health centers-Kassi Kassi In Makassar; 2) How is the Quality of Service-Kassi Kassi health center staff on the patient.

2. RESEARCH METHODS

The type of research is to obtain answers to problems that are taken and in accordance with the purpose of this study, the types of research that are considered appropriate is a descriptive study using qualitative data analysis, because the object of this study is a phenomenon or social reality. That's according to what is said by Sanapiah Faisal (1999: 20) that the descriptive studies or research on the taxonomic or exploratory research for the purpose of exploration and clarification of a phenomenon or social reality, the way to describe a number of variables relating to the problem and the unit examined without questioning building relationships between variables that exist. Therefore, in a descriptive study was not done hypothesis testing to establish and develop vocabulary theory.

Types and Sources of Data

Primary data is data obtained directly at the time we did the research, data sources obtained directly from the people or informants were intentionally selected to obtain data or relevant information with research problems. As for the primary data in the study are: The informant is, if according Moleong (2000: 90) "The informant is a person who is used to provide a description and information about the situation and condition of the background research. The sources or informants will be selected to be the primary data source is or Informant: Head of PHC 1; 5 health center staff; 15 People.

Data Collection Techniques Data collection techniques used in this study were: 1) Interviews; 2). Observation; 3). Documentation;

3.RESULTS AND DISCUSSION

Discussion on Health Care Performance

The quality or the quality of health services is multi-dimensional, ie according to the quality of health care services (patients and families), according to health care providers (the institutions and attendant health care providers) as well as by funding the health service providers (Azrul Azwar, 1996).

To find out how much the performance of the Service of Health Center-Kassi Kassi, the researchers used Agus Dharma theory that suggests three dimensions to assess performance in an organization that is on the dimension of quantity, quality, and accuracy of this exposure you time. Here Service Performance in the Health Center-Kassi Kassi, a healthy society it will make them productive and community productivity will grow the regional economy which will indirectly increase local revenue. Another benefit gained by the people to health services is the assurance from the government that they will get good health care they need at a relatively low cost and distance to services and are relatively close. PHC is expected to provide basic health services as well as being pioneers of development in their working area. PHC required to provide quality services both in terms of management, resources, facilities and infrastructure so that services are provided in accordance with standard operating procedures (SOP) and give satisfaction to the PHC services. These demands have to find a way out, in the hope the quality of services provided by the clinic to a more optimal and satisfactory for the citizens.

Quantity Service

Through interviews with the head of the health center Kassi Kassi-dr. Mariaty Jasin, Kes: according to the data that is the number of employees in the health center-Kassi Kassi amounted to 32 people. activities at the health center Kassi-Kassi start checking patients and determine diagnosis, provide therapy and counseling, referring patients (External / Internal), giving of illness, provide a health certificate, providing services P3K, and documenting patient visits, the primary duty of a PHC Kassi-Kassi held every day to all the people who reside in PHC Kassi. On the drug, from the results also showed that all the activities of the drug section undone by 100%, while services activity prescription, dispensing medicine and drug distribution, the primary duty of the Sub-Section of Pharmacy. Services that provide prescription drugs to patients in accordance with physician referral. Dispensing medicine that makes the medicine according to the needs. While the distribution of drugs intended to distribute the drug to units of health center services-Kassi Kassi is Health Center (*Pustu*), general care, maternity homes, mobile health clinics, injecting rooms, and a dental clinic.

Drug counseling activities intended for patients in health centers and patients *Posyandu (Integrated Service Post)* to provide counseling to patients about drugs, this activity is also carried out in accordance with the request. The next activity of subsections pharmacy is Drug Information Service, this service aims to provide information to patients and health workers at the health center Kassi-Kassi so that they can be aware of the importance of understanding the medicine, so as to improve the quality of pharmaceutical services. From the research and interviews the view that all the activities and work programs PHC-Kassi Kassi done well. In terms of quantity, performance-Kassi Kassi Health Center has been good, although the number of available human resources, yet they can complete their task.

Service quality

The second dimension for assessing performance in the Services-Kassi Kassi PHC is quality. The quality of the resulting quality concerns in a job that has been done. In this case reflects the measurement of patient satisfaction with services provided by other service providers in this case the employee nurses and doctors.

According Goetsh and Davis (1994), the quality is a dynamic condition related to products, services, people, processes and environments that meet or exceed expectations. Quality of care will be closely linked to the direct relationship between providers of services to customers, both individually and organizationally. It requires excellent service (service excellence) of provider services. Tjiptono (1998: 58-59) quotes Elhaitammy (1990) revealed that service excellence itself is an attitude or the way employees serving customers in a satisfactory manner. Broadly speaking, there are four key elements in the concept of service excellence, namely: 1) The speed; 2) Accuracy; 3) hospitality; 4) Convenience. The fourth component is an integrated component so that when any one of these elements does not exist, can not be considered as service excellence.

As agencies that deal directly with the public (patients), the health center services-Kassi Kassi must satisfy the community. To measure the performance of the health center Kassi Kassi-dimensional quality that can be measured from Tangible (physical evidence) in PHC-Kassi Kassi :

1. The response of Tangible (Physical Evidence) PHC-Kassi Kassi

Tangible (physical evidence) is one form of service which involves the appearance of physical facilities, cleanliness, completeness in service delivery. To know the PHC Service Performance-Kassi Kassi seen from the dimensions of quality, can be measured by physical evidence possessed, namely in terms of: 1) Hygiene; 2) the availability of medical equipment; 3) availability of drugs.

a. Feedback About Hygiene Health Center-Kassi Kassi

Over the researchers looked at the health center-Kassi Kassi researchers viewed each day if all patients had returned, the nurse immediately clean up any room in the Health Center-Kassi Kassi. However, there are still some plastic waste food from some of the patients that researchers find because of lack of awareness of patients to dispose of waste in place, in which the patient eats garbage disposed therein.

b. Availability of Medical Equipment

Availability of medical equipment in health centers-Kassi Kassi. Medical equipment should be owned by every health clinic to examine patients. To find out how complete medical equipment owned by PHC-Kassi Kassi, then interviewing informants such as the people who've checked into the clinic. The results of interviews with mothers. Mother. Rabiah who've checked out in the clinic said medical equipment PHC-Kassi Kassi is complete because every time I came for treatment of medical equipment is always available so I did not have to wait long in the examination room. This is reinforced by the statement of the mother. Sitti Saleha he said: In addition to a complete medical equipment, in-Kassi Kassi health center is also equipped with laboratory facilities which, although not complete in the hospital Provincial Hospital Wahidin Sudirohusodo however we were grateful for the existing laboratory. From several interviews indicate that the availability of medical equipment in health centers-Kassi Kassi has been good. Adequate equipment can simplify and speed up service for patients.

c. Availability of Drugs

Availability of medicines in health centers-Kassi Kassi. To find out how full availability of drugs in health centers-Kassi Kassi, investigators interviewed the informant people ever seek treatment at health centers-Kassi Kassi. From interviews with Mr Ambo, who had received care at the health center Kassi-Kassi, he said: the availability of medicines in health centers Kassi-Kassi I feel pretty good, drugs are standard in health centers has been provided, it is because at the time I drove my mother treatment, doctors at health centers provide drugs that are complete. Furthermore, the authors also interviewed Mother. Ria who had also been treated at the clinic, he said: The services provided at the health center Kassi-Kassi, I think is pretty good, especially in terms of availability of medicines, I think although not as complete as the hospital in Regional house, but for classmates community health centers, community health centers-Kassi Kassi can already be said to be good. My experience of treatment, there was sufficient availability of the drug.

d. Timeliness of Care

As for the dimensions of quality, which is the time queuing in the administration of the research looks pretty quickly, when a patient is in the examination room, the patient is immediately treated by a doctor, also when the patient is in the prescription, the patients directly served by the officer in charge of providing drugs to patients, The number of health care workers in health centers-Kassi Kassi does little, however, they can complete the task and their work on time.

4. CONCLUSION

1. The quantity of health center services-Kassi Kassi has been good in terms of quantity in which the work program and activities can all be realized, in fact there are two activities that achievements exceed planned targets, namely, examination of pregnant women and K4;
2. Tangible job quality (Physical evidence), according to the patient satisfactory views of cleanliness, availability of medical equipment, and the availability of drugs;
3. Timeliness in terms of timeliness also been good, judging from the discipline that comes just in time so that they may be accomplishing the work on time. The work program at the health center-Kassi Kassi be realized on time due to high employee discipline.

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STUDY TANGIBLES ASPECTS OF THE QUALITY CERTIFICATE OF LAND TITLE LAND DISTRICT OFFICE AND KEEROM REGENCY JAYAPURA PAPUA

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Abstract : *The purpose of this study was to clarify the application of the dimensions of quality of public services based on the concept Parasuraman, Zeithamal, Berry in the ministry of land certificates in accordance with the standard of care required in the District Land Office Jayapura and Keerom. This study used a qualitative approach that is comparative by using the procedure of collecting data through observation, documentation studies and in-depth interviews (depth interview). The technical analysis of the data used is through the procedure of data reduction, data presentation, and conclusions. The results showed that the dimension Tangibles (physical evidence) Jayapura District Land Office in providing services to the public land certificates based on the dimensions of the physical evidence supporting facilities as required in the standard of service and administration of land in accordance with the Regulation of the National Land Agency Number 1 Year 2010, has been implemented but not yet fully implemented well, as expected. ,*

Keywords: quality, public services

1.INTRODUCTION

The provision of quality service to the public is one of the obligations that must be done by each organizing country. It can be said that the success of the government in providing public services to the community is the success of governance. So that the provision of quality public services to the demands that must be met by the government.

As we know that the image of government service at present is still considered not satisfy the community. Various complaints against service delivery continues to color the public service. Reluctant and negative images in the service process to be faced, still continues to be perceived by the public when they have to deal with government agencies in a particular ministry affairs so for those who have money, prefers to use a service bureau to settle his affairs. (Institute of Public Administration, Public Service Quality Improvement Strategy, 2006: 1-2).

For the improvement of services that satisfy the community has become imperative for the government to provide and deliver quality service to the community. It is one of the main tasks of government is to provide services (service delivery) besides the construction (development) and empowerment (empowerment) (Rashid 1997: 71),

Public service until recently known as the bureaucratic character and a lot of complaints from the public clientele, partly because they do not consider the interests of the user community. This is because the paradigm used the managers of public services tends to be more directive that only pay attention / priority to the interests of the leadership of any organization. Users society as such does not have any ability to be creative, like it or not, like it or not, they should be subject to the organizer. Supposedly, the public services that are managed with supportive paradigm which is more focused on the interests of the community, service managers must be able to be a servant-conscious to serve and not be served.

Public Service become increasingly strategic policy issue because the implications are broad among others, include the economic, political, social, cultural and others. In economic life, and deteriorating public services often become the dominant variable influencing the decline in investment that results in termination of employment. With the improvement of public services will be able to improve the investment climate of the nation's very necessary to get out of the prolonged economic crisis. In political life, improvement of public services is also very important implications, especially in improving the level of confidence in the government. Poor public services have become one of the important variables that drive the emergence of the crisis of confidence to the government.

Meanwhile, in the social and cultural life, poor public service resulted in disruption of community psychology, as indicated by reduced sense of mutual respect among communities, the emergence of mutual suspicion, increasing exclusivism excessive nature, which eventually led to the government's indifference to the public good and for others.

Public services selected as the prime mover in encouraging changes in governance practices for the realization of the values which have characterized the practice of good governance in the public service could be more obvious and easy. Values such as efficiency, transparency, accountability, and participation can be interpreted relatively easily in public service delivery. Develop a sound public service system of good governance can be made relatively easier than institutionalize these values in all aspects of government activities. Because public officials, elements in civil society, and businesses alike have an interest in the improvement of public service performance. (Dwiyanto, 2008: 3).

In line with the development of the state government management, and in an effort to realize the excellent service and quality, the paradigm of public service on customer satisfaction (customer-driven government) having the following characteristics evolve with the focus-oriented management:

1. More focus on the regulatory function, through a variety of policies that facilitate later development conditions conducive for community service activities;
2. More focus on community empowerment, so that the public, have a high sense of the service facilities that have been built together;
3. Implement the system of competition in the provision of certain public services, so that people obtain a quality service;
4. Focus on the achievement of the vision, mission, objectives, and goals oriented towards results (outcomes) corresponding to the input used;
5. More prioritize what is desired by the community;
6. In certain cases, the government also acts to obtain the opinion of the services performed;
7. More emphasis anticipation of service issues;
8. More priority to decentralization in service delivery;
9. Apply a market system of providing services. (Larasati Endang, 2007: 36-37)

Thus the power and authority of the government comes from the people, so advanced or resignation, the strength or weakness of a government determined by the people. Because of this reason, the importance of popular support, the government should strive to provide a good service to them.

In connection with this, the government should always be people-oriented, by applying the concept of service-minded community (community-based service). In order to realize the welfare of the community in accordance with the demands of the reform, the government that embraces modern democracy is a government that is trying to satisfy and improve the public service. The principal task of modern government by Rashid (in LAN, 2000: 11) is essentially a service to the community, in other words not held to serve themselves but serve the community and develop conditions that allow every member of the community to develop the ability and creativity to achieve a common goal.

The government's ability to achieve a common goal depends on the quality of governance in the interaction with the community so that people can adjust its economic, institutional and political resources for development. Embodiment of good governance, solid and responsible and capable of interacting with the community to be able to regulate the economic, institutional and political resources for development can be achieved through the concept of good governance.

The values in the understanding as well as the characteristics of good governance are universal values and in accordance with the demands of reform and development goals in Indonesia, namely the welfare of all people. The impact of the reform when viewed in terms of political and state structure is a paradigm shift and a system of government patterned centralized to decentralized. Changes in the system of government be decentralize now is a manifestation of democracy at the local level (the area) because the central government can not claim to be the sole source of power in the fulfillment of services to the community through development.

Changes in service culture, the mindset of officials who seem arrogant and as the holder of power, rulers who would not turn to smile as a waiter. Changing the indifferent became friendly practices to be taught although difficult. Similarly, talking to people to find out their wishes. Ongoing democratization process provides a valuable lesson for the bureaucracy on the one hand, and citizens (citizens) on the other. The extent of government intervention in the sector of public life making increasingly complex bureaucratic services. High cost of public activity, mainly in the sectors of economic activity. This is due to the complexity of the bureaucracy, too many steps to go through when dealing with any government institution.

For that in the improvement of bureaucracy, policy and public services including public participation is required. Various problems mentioned above can be avoided as early as possible is slowly recovering public trust in government as a public servant. The paradigm of public service reform should be selected and the government, by rethinking and redefining the role of government in accordance with its context, the role of markets and greater community in the formulation and implementation of public policy.

Regulatory functions must be implemented effectively established with absolute bureaucracy. Regulations are needed to regulate the presence and service procedures. Clear and transparent procedures are important not only for the bureaucracy, but for the community as users of services of bureaucracy. One of the key of a quality management policy is the high intensity of public participation. Because the validity / legitimacy of any public policy of the government is located there. Dialogue with the public is the truth of a policy and a major means for policy is ready for use. Participation evolve in line with changes to the political structure of the democratic system. Where the democratic system that is wide enough to give space for the community to actively participate in the implementation of the country so that civil society can be realized. The concept of participation in decision-making can be explained that, participation (participation) shows a process between two or more parties (individuals or groups) who influence one another in making plans, policies and decisions. That decision is something that will take effect at a later date for the decision makers, the target group and often for the environment.

Efforts to improve the quality of public services the government has done a lot, both from the aspect settings or refinement of policy, policy implementation, as well as from the aspect of increasing the professionalism of the human resources (HR) of his, but so far it seems the policies mentioned above have not been fully able to overcome various problems service. The focus of the service is not yet fully to customers, so brokering practices are still rampant, discrimination and paternalistic culture still tightly coloring services, the lack of consumer protection is weak, the apparatus tend to position themselves as the person to be served rather than providing services, and other issues -Problem , It required many efforts in service management that aims to strengthen the various policies that have been issued by the government at the top so that the quality of public services could be upgraded soon.

Referring to the concept of the New Public Service, the underlying factors that need to be considered in the provision of services is a public service performed by government is not to serve the customers, but the service is carried out to serve the public (citizen). In this case, one of the services provided by the public bureaucratic apparatus is land certification services. The right to own land is one of the rights of human beings. Soil plays an important role in human life, as such as the soil can be used as an asset or an asset for the future. A major function of the soil in human life is as a place to live and preserve their lives. Indonesia is a country that has a large population and dense. As a developing country with a population large enough then the population problems often afflict people of Indonesia, especially relating to land. There are still many complaints people continue to color the provision of services in the land sector. Reluctant and negative images are still felt by the public if it has to deal with the Land Office.

People still think that the services in the land sector is still too difficult and convoluted in the procedure, the length of processing time and costs are high. The reason could be due to the land office services are less than optimal. This points to the need for public demands transparency in the implementation of tasks, simple payment procedure, the certainty of the time and cost to be paid by the people in the settlement of the affairs of their land rights, as well as various facilities in the service and protection of the rights and interests of the community.

Based on observations conducted at the National Land Agency Jayapura District as the principal district and autonomous regions such as Keerom and Sarmi, published by some local newspapers or the media obtained information that the uncertainty of the time and expense often people complain. As stated by one resident named Angela flassy one reporter who reported the matter to Ombusman Republic of Indonesia (ORI) of Papua Province complained about his land certificate. I've been waiting three years but long in the measurement. (Tabloid jubi.com). In fact there are people who wait for 9 years taking care of a certificate but not yet finalized.

Besides the delay also found several fake certificates. This was conveyed by Head of the National Defense Agency (BPN) of the Republic of Indonesia Hendarman Supandji through the Head of BPN Regional Office of Papua Province Niko Wanenda. He explained again, until September 2013 has been completed as many as 2,383 cases of land. But there are land disputes as many as 2,335 cases, resulting in up to September 2013 are the remaining 2,857 cases.

Besides, when the author visited the representatives of the Ombudsman of the Republic of Indonesia province of Papua, which is based in Jayapura to get the data and information that is relevant to this study, there was information about the land issues are reported or brought public in the period from 2013 to July 2015, as many as 24 (twenty-four) cases. The twenty-four such cases have a variety of problems that can be identified as a violation of "mal administration". The forms of the offense as described above, we can identify the first is:

- a. Protracted delay the issuance of certificates of land as many as 15 (fifteen) cases.
- b. Abuse of authority by 9 cases.**

Especially for the District Jayapura and Keerom including the last two categories. Keerom allegedly delay the process of issuing land certificates protracted and abuse of authority against the demand for money and goods. As for the alleged Jayapura regency not given adequate services related to the loss of land titles to residents created the new. The above condition is a limited number of new citizens who understand and report their cases to the Representative of the Ombudsman, because most of the people we feel reluctant to deal with the consideration takes time, costs, and energy and thoughts, so that they sometimes just resigned or follow established procedures.

This phenomenon is also evident in the implementation of services in the District Land Office Jayapura and Keerom which among other things is also about service procedures, where ease stages of service provided to the community in terms of the simplicity of the service flow is less simple. Likewise, the speed of service, as well as the target service time could not be completed within the time specified by the District Land Office Jayapura and Keerom.

This can be seen in the implementation of the existing services in both the office was hard to keep as well as the number of procedures that many so either the executive services and service users is difficult to understand, and also what often happens is the lack of awareness, understanding and participation in conditions that must be fulfilled in service delivery. Likewise, Human Resources does not fully mastered the procedures of existing services and are aware of how to provide good service.

In order to meet the demands of the community to provide good service and timely, government officials in the District Land Office Jayapura and Keerom District Land Office need to improve their knowledge and skills so that they can master the duties with full sense of responsibility. With the development of information and communication technology and the progress of science and technology that require the services of a computer to master, because all service applications using a computer. While the availability of human resources can be said to be inadequate because of their level of computer literacy is still low. In addition to those mentioned above, facilities and infrastructure owned by a public organization is important in supporting the provision of services to the community. With the conditions that existed at the District Land Office Jayapura and Keerom as described above, satisfactory service to the public will be difficult to overcome without involving the community, employee empowerment and the fulfillment of the existing facilities and infrastructure. In connection with the things that have been presented the above as well as to see the phenomenon appears or problems that arise in the District Land Office Jayapura and Keerom motivate authors to conduct research to raise the issue of title Study Tangibles Aspects Of The Quality Certificate Of Land Title Land District Office And Keerom Regency Jayapura Papua

RESEARCH PURPOSES

To find out if there are differences and similarities of the service quality aspect of tangibles (physical evidence) between the District Land Office Jayapura Keerom District Land Office.

BENEFITS OF RESEARCH

The benefit or usefulness of this research

Practical Implications. Through this research may provide practical implications, especially in the quality of service of the process to obtain the certificate of land private property rights, and as an establishment of policies that need to be taken and measures that need to be done by both the District Land Office in Jayapura and the District Land Office Keerom in an effort to give land certificates best service to the public or the residents who live in both the Regency area within their standard of care and administration of land.

2. RESEARCH METHODS

This study uses a qualitative approach by conducting observations and in-depth interviews to find out directly and compare the public service performed by the Office of the National Land and Keerom district Jayapura district. This study is a comparative namely Jayapura district initially as principal district and Keerom as a fraction of the principal district of Jayapura. So that the location this research covers two distinct areas namely at the District Land Office Jayapura and Keerom District Land Office in Papua province. Techniques of Data Collection In this study, data collection techniques were used namely Documentation, Depth Interviews (in-depth interview, Triangulation Data Analysis Techniques: Data analysis in qualitative research conducted since before entering the field, while in the field, and after its completion in the field.

3. RESULTS AND DISCUSSION

1. Tangibles (Physical Evidence)

This indicator which includes physical facilities, equipment, personnel and means of communication and so on. Which when linked with the standard of service and administration of land based Perkaban 1. In 2010, is concerned with facilities and infrastructure owned by the District Land Office Jayapura and Keerom District Land Office. These facilities shall include:

- a. Counters Standardization Services (located at the front, is known to the public, no information counter, administration, complaints and either separate or combined financial).
- b. Standardize the design and layout of the room service (equipped with: table service counter, waiting room, a table for filling blangka and form, user information panels / digital which contains: a flow chart of services, requirements, costs and timeframes)
- c. Standardization of service equipment. (Equipment technology / computerization, archival storage, security equipment, fire extinguishers and a complaints box).

A. Jayapura District

Quality of service in Jayapura District Land Office will instantly feel good when direct evidence is concerned, since it is also associated with the first assessment of the community towards facilities and infrastructure owned by the District Land Office Jayapura. Means and infrastructure here is related to the building and all the amenities belongs to help support the service process of land titles in the land Office. People who will come to take care of his land certificate will be directly confronted with the assessment of existing facilities, the alertness of officers who serve well as the cleanliness and comfort of the office. Convenience of the public will immediately feel and it is necessary for the arrangement of the reception area better. In addition it should also be noted is the arrangement or provision of information boards / brochures / leaflets on display to be viewed by the public and also to assist and facilitate the community in the management of their land certificate process.

From the observation and secondary data the authors obtained at the District Land Office administration Jayapura, can be known about the facilities and infrastructure used in support of land certificate service process is as follows:

Tabel.1. Utilization Facilities Jayapura District Land Office Building

No	1st floor	
	Utilization	Luas (M ²)
1.	Loket Services	36
2.	Head of Office Space	36
3.	Section Head Space Measurement Survey and Mapping	21
4.	Space the regulation and Land Planning.....	12
5.	FIELD space Control and Empowerment	12
6.	FIELD space Conflict Dispute Case	12
7.	Space Land Rights and Land Registration	12
8.	Head space. TU	12

9.	space Finance	24
10.	toilet man	3
11.	toilet women	3
12.	Employee Work Space	129

Source: The Land TU.Kantor Kab Jayapura

In table 1, as shown above is the use of a means of building Office in Jayapura District Land Office, in addition to the Jayapura District Land Office also has other supporting infrastructure such as the following information:

Table. 2. Utilization of supporting infrastructure Jayapura District Land Office

No	Utilization	Information
1.	Archives building	200 Size (M ²)
2.	Computers and the Internet	Available
3.	server	1 unit
4.	Electrical power	1.700 VA
5.	Generator	1 unit

Source: The Tu District. Jayapura

Then, to discover whether the indicators of infrastructure and facilities that have been described above have been provided or fulfilled by the office of the District Land Jayapura, the following authors propose several research questions and also the opinion expressed as follows: According to Mr. / Ms, in providing services to the public, whether office / institution where the work has been noticed Mr. and comply with the provisions concerning facilities and infrastructure, which involves: standardization counters, standardize the design and layout of the room service, as well as standardization of equipment services, please explanation (interview questions).

Here is the opinion or explanation of one informant or apparatus initials (ID) of the following: "Standards counters: in general service infrastructure to meet the standard of service. Layout information counter, the administration and the complaint is in the front and easily recognized as well as to finance placed separately. Special to standardize the design and layout of the room service: service counter has been designed and the layout of the room good service and lounge facilities. While servicing equipment Standards: For computerized technology equipment is adequate to perform the service. archive storage in general have done well (news, books kept separately ground). (Interview Date 08/08/2014). When the author tries to explore further related to the use of the facilities available and utilized, information obtained from the same informant (ID) which tells the following statement:

"But need to be managed better, especially in terms of order in storage or in use there should be a special officer, which controls the entry and exit of the use of archives and the creation of orderly administration. Concerning safety equipment such as fire extinguishers is not adequate, necessitating special attention on this case for example to hold the procurement of fire extinguishers or procurement of storage archives (scrip land book) flame resistant (more safety) for the state of preventive. (Interview dated 8 / 8/2014).

Similar feelings were expressed by one informant initials (M: S) The following is his statement: "Regarding standardization counters: I think it is appropriate, the counter is in the front and easily recognized, and then for the administration and complaints there are special officers who prepared and separate financial section. To standardize the design and layout of the room service: It, it is appropriate standardization and the design and layout of a room full service. Then there is also the service equipment Standardization of equipment or computerized technology is adequate, sufficient archival storage (space warkah and TV archives, land book, separately), as well as fire extinguishers we do not have "(interview dated 24/08/14).

Furthermore, the above information was confirmed by one of the informants initials (B.A) which gives the following statement:

"I think standardization counters: Visible Jayapura District Land Office has standardized counters well and the layout of the space and equipment, too." (Interview dated 03/09/14).

From some of the information that the authors obtained on several key informants as has been presented above, it appears that the District Land Office Jayapura began to realize how important to organize and customize the standardization of facilities and infrastructure that they have to at least provide the best service for citizens or people who take care of their land certificates. Standardize the service counter, room layout design services, and equipment service authors observe little by little have been met. although the service counter and other counters are in one room separated by one table to another table, but at least it had already indicated that this office has begun to organize and follow existing standards. Although the office space was cramped but their employees have set the flow counter based on the sequence of a table to another table, and it is understandable because they adjust to the cramped office conditions.

But precisely the opposite different opinion stated by one informant initials (I.D), who expressed his opinion like this:

"To counter the standardization of facilities and infrastructure is still inadequate also involves the standardization of the design and layout of the room service is not maximized because the room is still very narrow as well as with standardization of equipment is still inadequate" (Interview date 06/09/14) When the writer is trying to dig up more information on the above explanation emphasized the same thing again by one of our informants initials (MS) who served as Section Head of Conflict and Dispute Case, who expressed their opinions to the author as he advised not to mention his name.

"Standardization service counter: That the existing infrastructure in Jayapura district land office, there has been inadequate, and still far from the expected community, inadequate as a public service office. Besides cramped office (as you see yourself) may also have an office can be made to counter plots criss community service for office situation is inadequate." (Interview dated 23/09/14).

Regarding the standardization of the design and layout of the room service, further confirmed again by a key informant (M: S) said:

"Yes, I think for Standardization of the design and layout of the room service: Jayapura District Land Office is not adequate to serve as a public service office, because the infrastructure is still very limited in the office setting and supporting tools have not all available. Then also involves a flow chart of service, terms of cost or time period. It also can not we do the maximum, given the condition of the room, and our infrastructure is still very limited, standardization of service equipment: relating to standardization of equipment / computer technology has been relatively adequate, including the operators who run these activities have been somewhat tolerable met. Related to archive storage, security equipment and fire extinguishing complaint box should we say everything is still very poor and no reply yet available (interview dated 09/23/14).

In general, equipment and infrastructure is a process tool supporting the success of the efforts made in the public service, because if these two things are not available then all activities that do not will be able to achieve the expected results in accordance with the plan.

Moenir (1992: 119) argues that the means are all the tools, equipment and facilities that serve as a major tool / helpers in the execution of the work, and also to the interests that are related to the organization of work. Understanding proposed by Moenir, clearly gave directions that infrastructure is a set of tools used in a process of either of these tools is an auxiliary equipment as well as major appliances, both of which serve to realize the objectives to be achieved.

Based on the above understanding, the infrastructure basically has the following main functions:

- a. Accelerate the process of implementation of the work so as to save time.
- b. Increase productivity of both goods and services.
- c. The work of higher quality and guaranteed.
- d. Make it easier / simpler in motion the users / actors.
- e. The accuracy of the composition of labor stability is more assured.
- f. Cause a sense of comfort for those who are interested.
- g. Creates a feeling of satisfaction to people who use them interested

Furthermore, the authors tried to confront the same questions to the community or residents of Jayapura District in connection with the maintenance service process of land titles that they see or encounter from their own experiences related to facilities and infrastructure facilities as a support in the service process land titles.

The following can be traced from the various opinions or statements: What do you think Mr. / Ms, in providing services to Br, whether the District Land Office Jayapura, it has been noticed and comply with the provisions concerning facilities and infrastructure, which involves: standardization counters, standardize the design and layout of the room service, as well as standardization of equipment services, please explanation. (Author interview questions).

Furthermore, it can be traced series of answers or statements submitted by the public or the residents of Jayapura District, with respect to infrastructure, the following is an excerpt of their statement: One informant author initials (H.M), private employment is located at Dunlop Hawai Sentani, said the following opinion. "In my opinion Standards counters: If it's already good infrastructure and already facilitate the public in accessing information to get information back from the land. Then for Standardization of the design and layout of the room service I think is also available and meet the national standards, while for Standardization service equipment: For a computer available and technology (internet), archive storage has not been arranged neatly with a computer, but still recorded manually, the other not yet available". (Interview date 10/03/14).

Next was also by one informant author initials (M.C) Private jobs at Jl. Yowanibi Doyo Baru, Waibu Sentani, remarks were the following:

"He, I suppose to standardize the service counter: To counter the service was appropriate, and the rooms apart, but booth ministry rarely visited because it is more practical and fast straight into the land department. As for the Standardization of the design and layout of the room service: For the layout of the room service is already available, but for the cost of maintenance and the time period does not exist. Because of the cost and the time frame given incorrect or frequently misses the promise given. And to standardize service equipment: For computerized equipment and archival storage is already available, while the safety equipment and a complaints box does not exist." (Interview dated 12/10/14).

A similar statement was also delivered by one of the authors initials (R.B) private jobs addressable Gang Melati II 97 Waena, said the following:

"For the standard counter service has been good, easy to see, it is not hard to make the process in counter and hours of service are already standard PNS / ASN, design and layout are already standards and have been well ordered, an employee or

officer is also there and ready to serve, and to standardize service equipment: Standardization of equipment is already available at a good while for the suggestion or complaint box is not visible ". (Interview dated 19/10/14).

Then affirmed again by an informant author initials (J.T), a retired civil servant, is located at Yahim Sentani, delivered the following statement:

"Standardization counters: I think it's gone quite well, looks is located in front of the entrance and then standardize the design and layout of the room service seems all there, from table to table that is open and can be seen there is nothing hidden, while for equipment seems but not all such as fire extinguishers, and a suggestion box or complaint ".

Based on the information or statements from informants delivered by personnel office of the District Land Jayapura and the people who served in the process to obtain the service certificate of the land, it can be concluded that the dimension of tangibles (physical evidence) about the facilities and infrastructure are not fully provide hope in accordance with the standards service required.

This is in line with the opinion of Moenir (1992: 119) who argued that the means are all the tools, equipment and facilities that serve as a major tool / helpers in the execution of the work, and also to the interests that are related to the organization of work. Understanding proposed by Moenir, clearly gave directions that infrastructure is a set of tools used in a process of either of these tools is an auxiliary equipment as well as major appliances, both of which serve to realize the objectives to be achieved.

B. Keerom District

This indicator is direct evidence in this case is the ability of physical infrastructure of an organization or company to the surrounding environment as one proof of the Services Provided By The Service Provider. Likewise With Keerom District Land Office, In Terms Of Providing Services Can Not Be Separated From The Reference That Has Been Set Up For Standardization Of Services Required By PERKABAN (Rule Head Bpn Ri). Year 2010 on the standard of service and administration of land that is applied nationally.

From the observation and secondary data the authors obtained at the Administration Keerom District Land Office regarding facilities and infrastructure used in support of land certificate service process is as follows:

Table 3. Utilization Facilities Keerom District Land Office Building

No	1st floor	
	Utilization	Size (M ²)
1.	Loket Services	36
2.	Head of Office Space	36
3.	Section Head Space Measurement Survey and Mapping	12
4.	FIELD room Setting and Planning Land	12
5.	Space Control Section and Empowerment	12
6.	Sexy Space Conflict Dispute Case	12
7.	Space Land Rights and Land Registration	12
8.	Head space. TU	12
9.	space Finance	12
10	Employee Work Space	132
11	Public toilet	3

Source: The TU Keerom 2015

Means of buildings owned by the District Land Office Keerom, as has been described above also has a building design and the same picture, it is also because it involves structurer same organization and applied nationally. In table 4.13. as shown above is the utilization of facilities Office buildings Keerom District Land Office, in addition to have the infrastructure to support the following:

Tabel.4 Utilization of Building Infrastructure support

No	Utilization	Information
1.	space Archive	available
2.	Computers and the Internet	disturbance signals
3.	server	1 unit
4.	Electrical power	1.700 VA

5.	Generator	1 unit
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Source: The TU Keerom District 2015

Then, to discover whether the indicators of infrastructure and facilities that have been described above have been provided or met by Keerom District Land Office, the following authors propose several research questions and also the opinion expressed as follows:

"According to Mr. / Ms, in terms of providing the service certificate of the land to the community, whether offices / agencies have been paying attention and fulfill the provisions regarding infrastructure, which involves: standardization counters, standardize the design and layout of the room service, and equipment standardization of service? beg explanation. (interview questions).

Here is the opinion or explanation of one of the key informants who are also officers in Keerom District Land Office initials (P.W). Kasi Measurement Survey and Mapping said the following statement: "To standardize the service counter: counter of the service has not been made, up to now there is no budget of BPN Centre for the procurement for the counter question. Then the design and layout of the room service: Up to now there is no service counter, and a lounge area and a table for filling the form is blank and there, including user information panel / digital not done there. While the standardization of equipment services: Technology / computerization, and archival storage have also been there. For applications (Computerized service activities), but this new CTF run in 2015 ". (Interview dated 04/11/14)

Similar feelings were expressed by other informants initials (H.M), the following is his statement: "Standardization counters: Counter service yet because there is no budget of BPN Centre for procurement of facilities and infrastructure. Likewise, the standardization of the design and layout of the room service: no, for our equipment has also been put on computerized systems and archival storage as well, while supplies last security outs "(Interview dated 11/07/14)

Likewise with another informant initials (MS) said the same thing anyway: "Standardization counters: For facilities and infrastructure can not say one hundred percent can be and has been done. Likewise, the design and layout of the rooms have not been fully met. For our equipment has also been using a computer, while archiving is done manually "(interview dated 10/11/14)

While the other informant initials (H.M), precisely to give a statement to the contrary. "Standardization counters: Counter service has been provided and its location clearly visible, easy to find and service processes smoothly. Instead the design and layout of the room service is good enough for the equipment while I think we also have to use the computer as well as the archives is done manually "(Interview dated 14/11/14).

Then the author tries to confront the same question to the community or Keerom in connection with the service process management of land certificates from experience that they see or face associated with infrastructure facilities and infrastructure as a support service of the maintenance of the land certificate. Furthermore, it can be traced from the various opinions or statements:

"What do you think Mr. / Ms, in providing services to Br, whether the Land Office Keerom District, it has been noticed and comply with the provisions concerning facilities and infrastructure, which involves: standardization counters, standardize the design and layout of the room service, and equipment standardization of services, beg explanation. (Author interview questions).

One informant author initials (p.m) provide a statement with respect to infrastructure Keerom District land office, the following statement:

"In my opinion to standardize the service counter in case they serve their own follow established procedures as well as the design and layout of the room service according to my own standards, for the equipment services already exist in the office except the suggestion box or complaint has been no" (interviews dated 11/17/14). An informant more initials (B.S), express an opinion with respect to infrastructure Keerom District land office, such as the following statement:

"Standardization counters: He, infrastructure is good enough for all the lies neatly in accordance with those rules, from the information counter at the front, the administration, complaints, and also finances separate. To standardize the design and layout of the room service: He was, it appears there are also tables, counters, waiting rooms are in the office. Then the equipment standardization of service: He, I see the office also contained items such as computer technology, archive storage, while there has been no fire extinguishers and complaint box, as well as the flow chart. (Interview dated 11/25/14).

Then confirmed again by an informant initials (JE.) To give a statement as follows: "Standardization counters: Counters seems pretty there in the front, and I think good. Administration room, a complaint, a separate financial to standardize the design and layout of the room service: Yes, well because when I take care of the land certificate I saw all asked my recollection is there, as well as the standardization of equipment servicing: Yes, all the equipment was available in the office except a suggestion box or complaint seems yet. (Interview dated 28/11/14)..

4. CONCLUSION

Dimensions Tangibles (physical evidence) Jayapura District Land Office in providing services to the public land certificates based on the dimensions of physical evidence that facilities and infrastructure as required have been implemented but not yet fully implemented well, as expected.

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SHADES OF MYSTICISM IN TRADITION RELIGIOUS CEREMONY

(Anthropological Studies against Islamic Phenomenon In The City Of Gorontalo)

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Abstract: Various ways a Muslim in appreciating and actualize the Islamic values which he believed. Similarly, different ways to approach a Muslim, in the context of the process of the worship of his Lord. Context has become necessary in view of Islam as a belief system was believed variously by his people, even since the beginning of the Islamic presence in this world. It can be understood that in Islam there is some way to / approach God, namely by shari'ah, congregations, and gnosis. In Gorontalo, Islam appreciated by the society in the context and paradigms that upholds the values of the local culture, in which the religious context is a value that has been inherited from Gorontalo still an empire in the past. Gorontalo Islam is a religion that spread out from the land of Ternate, which has historically had a common thread in rites and rituals, including those relating to the mystical elements that are present in each of rites and rituals of Islamic governance.

Keywords: Mysticism, Tradition, Islamic

1. INTRODUCTION

Talk about concept of Islam vis a vis the tradition in the discipline of anthropology is divided into two parts that is often called the "great tradition" (grand tradition) with little tradition (little tradition). This concept was introduced by Jacques Duchesne Guillemin stating that there will always be a dialogue between the foundations of religion into a religious ideals of religion with local cultural values. A convergence of the creative dialectic between the universal values of religion with the local culture has presented the style of Islamic teachings in spiritual union with the diverse cultural pattern (unity and diversity). A reading of Islam in Indonesia by using a framework for understanding as above, not only will find links historically with the reality of historical Islam, but also will find one of the crucial points of the beginning of the process of transformation of Islamic intellectual opposite of the values of universalism of Islam which is categorized as a tradition great with the values in the cultural and structural setting certain prescribed pattern before. (Syamsul Arifin et al, 1996). Culture system consisting of cultural values in the form of ideas that are valuable to the process of life. Therefore, cultural values can determine the characteristics of a cultural environment, where the value is adopted. Cultural value directly or indirectly will be colored by the actions of communities and cultural products was material. According Koentjarajakti, culture consists of two basic components, namely component content and form components.

Components consist of a cultural manifestation of the cultural system in the form of ideas and the ideas and social system in the form of behavior and action. The components of the content consists of seven universal elements, namely language, technology systems, economic systems, social organizations, science, religion, and the arts.

Islam is a humanist concept of religious teachings, the religion that emphasizes the human being as the central goal by basing on the concept of "humanism theocentri" that Islam is tauhidullah shaft directed to create the benefit of life and civilization of mankind. The principle of this theocentri humanism that would be transferred as a value understood and implemented in the context of the cultural community. Theocentric humanism of this system appear symbols that are formed because of the dialectical process between religious values with the values of culture (Kuntowijoyo, 1996).

According to Akbar S. Ahmed, religions including Islam should be viewed from a sociological perspective, as was done by Marx Weber, Emile Durkheim, and Freud. Therefore, the concept of "the science of al-'umran" or social science in Islam is a perspective view of the world (world view) that man is the centrality of personal morality (moral person). During a vision of moral conceptions derived from the Qur'an and the Sunnah, then the anthropological discourse of Islam began to examine the originality of the concepts of the Koran (M. Sirozi, 1992).

Various ways a Muslim in appreciating and actualize the Islamic values which he believed. Similarly, different ways to approach a Muslim, in the context of the process of the worship of his Lord. Context has become necessary in view of Islam as a belief system was believed variously by his people, even since the beginning of the Islamic presence in this world. It can be understood that in Islam there is some way to / approach God, namely by shari'ah, congregations, and gnosis.

law in Islam is the way to God through the implementation of the law established by the Quran and hadith. Implementation of the law is manifested in every form of the command (al-amr) God to His servant, and every form of prohibition (al-nahyi) Lord to His servant. While the congregation is a second path that can be taken by a Muslim in towards his Lord after he Islamic Shari'a. Tarekat which means "road", is the effort toward truth (God) with the approach of the heart (spirit / soul) or with the knowledge and experience of other mystical. While the third way is ma'rifat which generally can be understood as a specific path for the servants of God who has been so close to know God, through the efforts and approaches maximum and continuous, so much of his life dedicated only to remember God in the form of worship and other rituals are commensurate. In Gorontalo, Islam

appreciated by the society in the context and paradigms that upholds the values of the local culture, in which the religious context is a value that has been inherited from Gorontalo still an empire in the past. Gorontalo Islam is a religion that spread out from the land of Ternate, which has historically had a common thread in rites and rituals, including those relating to the mystical elements that are present in each of rites and rituals of Islamic governance.

2. RESEARCH METHODOLOGY

a. Model approach

Objects in this study is a religious phenomenon in Gorontalo society that includes the theoretical foundation, cultural perspective and the perspective of spirituality, by observing the religious phenomenon in the city of Gorontalo. In these discussions, the approach is the approach to the study of Anthropology of Religion. Socio-cultural approach is the approach taken by considering the reality of a society and culture that are the subject once the object of religious phenomenon, it will be used in the context of theories of Anthropology of Religion as a tool of analysis. Theories of anthropology, especially the anthropology of religions use "approach from within" or verstehen approach in uncovering the cultural phenomenon. Cultural phenomenon generated by religion understood by adherents own interpretation, not according to researchers glasses. To understand the meaning of a religious symbol, asked directly to people's own adherents. As anthropological studies, religious man wants to be studied in depth, until the fundamental underpinnings of religious life and the human origins of religion. (Bustanuddin Agus, 2006).

Socio-cultural approach is the approach taken by considering the reality of a society and culture that are the subject once the object of religious phenomenon, it will be used in the context of theories of Anthropology of Religion as a tool of analysis. Theories of anthropology, especially the anthropology of religions use "approach from within" or verstehen approach in uncovering the cultural phenomenon. Cultural phenomenon generated by religion understood by adherents own interpretation, not according to researchers glasses. To understand the meaning of a religious symbol, asked directly to people's own adherents. As anthropological studies, religious man wants to be studied in depth, until the fundamental underpinnings of religious life and the human origins of religion. (Bustanuddin Agus, 2006).

b. Types of research

This study is a qualitative research that seeks to produce data that is descriptive, systematic description, factual and accurate information on the facts, nature and the relationship between the observed phenomenon and analysis with a qualitative approach. The results of this analysis will be described with descriptive sentences, as far as possible to provide clarity about the object and subject of research.

c. Research sites

This research is located in the city of Gorontalo, Gorontalo city chosen as the location of the study, because of several reasons, among others:

1. The city of Gorontalo is one of the urban areas in Gorontalo Province which has a religious phenomenon that is quite unique and interesting.
2. In the religious city of Gorontalo has the majority of the population adheres to Islam, which in terms of displaying religious phenomenon in the Islamic context, is quite diverse.
3. Scientifically religious phenomenon in the city of Gorontalo yet many become the object of study and scientific research among intellectuals and academics.

d. Selection of informants / Engineering Sample

Goal of this research is a religious phenomenon in the city of Gorontalo to the analysis unit of society as agents of religion and culture, religious leaders, traditional leaders / humanists and academics, with the following criteria:

- a. Have or have had a procession or a religious ritual which is influenced by the local culture.
- b. Understanding and knowing the context studied.
- c. Furthermore, expert informants determined based on the instructions of the key informants had known before, such as traditional leaders Gorontalo, Gorontalo city or other public figures.

e. Method of collecting data

1. Observation partisipatif

Observation partisipatif or participant observation, which is observed by way of social interaction with the object of research for data collection takes place. It is expected with this method, the reality of the context of the research will be understood in depth.

2. Interview.

Interviews were conducted in informal talks were carried out based on natural background, and the relationship between the interviewer to interviewee are in regular and fair atmosphere. The question posed depends on the interviewer, which appeared spontaneously or has been prepared in advance.

3. Study Documents

Studies document that the data collection by viewing and studying the written documents regarding religious phenomena that are still prevailing in society Gorontalo. Likewise, the documents that provide data on geographic, demographic, and social conditions of the religious city of Gorontalo.

4. Method of Data Analysis

According to Bogdan and Taylor (Lexy J. Moleong, 1991), that the data analysis is a process that breaks down formal effort to find themes and formulate a hypothesis (idea) as suggested by the data and in an effort to provide assistance to the theme and the hypothesis. Meanwhile, according to Patton, data analysis is the process of arranging the order of the data, organize them into a pattern, category, and description of the basic unit. Of the two formulas above can be underlined that the analysis of the data is intended for; first of all organizing data. Data has been collected lots, consisting of field notes, comments the researcher, the results informant interviews, document data in the form of reports, biographies, articles, and so on. Employment data analysis in this case is set, sorting, classifying, coding and categorizing. Organizing and data management aims to find a theme and a working hypothesis which eventually promoted to substantive theory.

3.RESULTS AND DISCUSSION

1. Paradigm Public Islamic tradition Gorontalo

Based on the existing demographic data, Gorontalo town is an area in Gorontalo province inhabited by the Muslim majority. Since the dawn of Islam as a religion and belief officially among the people of Gorontalo, since it was also the Islam the support and reference for the overall activities of community life gorontalo, whether it is related to rituals or sharia, as well as those activities related to customs and daily habits. This is understandable, that Gorontalo is known for its philosophy of "Traditional hula-hulaa to Saraa, Saraa hula-hulaa to Kur'ani" which translates as "custom syarak jointed, jointed syarak Kitabullah". The context which subsequently became the frame of Islamic tradition Gorontalo identifier.

The moral values of society Gorontalo is a philosophy of life that has been formulated since the king Amai the concept of experience improvements for three times until the king Eyato with the concept as we know it today. Gorontalo local wisdom as inferred in the philosophy Indigenous Syara jointed, jointed Syara Kitabullah-be color and pattern of its own for the execution and implementation of religious values on earth Gorontalo. The values of this wisdom has been giving spirit for the whole activity of life Gorontalo even since it was first recognized by the people of Gorontalo Islam through marriage with the daughter of the king Amai Owutango princess Palasa.

In a variety of perspectives on local wisdom Traditional hula-hulaa to Saraa, Saraa hula-hulaa to qur'ani, responded to and perceived by many as being decisive for travel and cultural construction Gorontalo people in the past to the future based civilize (civilized). The context can be read in a variety of literary works in the intellectual and cultural experts Gorontalo, both of which have berusia elderly (even among them there are already deceased) and young scholars are increasingly emerging. Some of them for example Elnino (Elnino, 2006) who managed to provide a mapping honors (ilomata) against the three characters that play a role in the thinking of the formulation of the concept of indigenous people of Gorontalo since the early formulations of olongia (king) Amai up concept plenary Olongia Eyato hitherto upheld high as the indigenous people of Gorontalo. According to him, apart from the king of kings Amai Matolodulakiki (son of the king Amai) and king Eyato managed predicate ilomata through the recognition of all the people, because of his services in spreading Islamic teachings diseantero Gorontalo country at the time. In addition, the legal position of Islam successfully synchronized with the customary law prevailing at the time, with the principle of "Aadati-huloA to Syara'a Hulo, Hulo Syara'a-hulo'A to Aadati. In this era of royal power Matolodulakiki official Islam became the religion of the kingdom, the kings Matolodulakiki also successfully campaigned for equal rights and obligations of every human being. To him the difference of one's status is primarily measured from the depth of knowledge and altitude akhlakul karimah. Concerning the descent and the number of properties owned be the last consideration in determining social status. Predicate ilomata achieved king Matolodulakiki a second after the first ilomata achieved by MatolodulaA king, king of kings Amai predecessor who claimed to be the leader of the many pre-Islamic Gorontalo creating works Great.

Post-era king Matolodulakiki, progressive changes and the acquisition of predicate ilomata next is obtained by the king Eyato (progressors king Matolodulakiki), which successfully initiated the oath "Uduwuwo Lo Ulimo Lo Pohalaa", the oath which managed to unite Gorontalo and Limboto after fighting for more than 200 years, In addition, he was also instrumental in making Islam as the supreme law of the kingdom with the implementation of the principle of "Aadati-huloA to Syara'A Hulo, Hulo Syara'A-huloA to kuru'ani" (Indigenous bersendikan Personality, Personality Qur'an). (Elnino,2006).

In another view Alim S. Niode argued that the principle of "Traditional hula-hulaa to Saraa, Saraa hula-hulaa to kuru'ani" (in Minang "Indigenous syarak jointed, jointed syarak Qur'aan), the formulation of local values Gorontalo, which by external factors and internal social change, making these principles into a mosaic of culture, so that the necessary strategic steps in finding and recognizing customary and religious harmony, which is the reconstruction of culture. (Alim S. Niode, 2007).

Apart from the several views, the formulation of the principle of wisdom embodied in the philosophy of indigenous jointed Personality, Personality jointed Kitabullah (aadati hula-hulaa to Personality, Personality hula-hulaa to kuru'ani), which is in the conception of history is a formulation of the king Eyato, it exudes style of religiosity once a society of people of Gorontalo, even since the formulation of the first of the king (sultan) Amai namely "Saraa topa-topangi to aadati" Syarak rests on custom, which is followed by the formulation of both the king Matolodulakiki that reads "aadati hula-hulaa to sara, sara hula -hulaa to aadati "to the formulation of the third plenary considered perfect and gives radiance religious values and social value for the community universally Gorontalo.

Since the formulation of the first by Sultan Amai (1532-1550), has been formed patterned indigenous religious paradigm, the paradigm which succeeded in forming the character of Islamic culture that comes from centrifugal theory, which gave birth to the Islamic version. That version has spawned two wisdom as a parameter in the development of Islamic culture in Gorontalo kingdom. The wisdom include :

1. Wisdom Values; As soon as the king arrived from Palasa Amai entourage dhuhur is praying in congregation in an open field in Hunto Kel. Biawu, after which they plan and hasten to build mosques, and facilitate the construction of mosques, for the next three days have arrived on Friday (S.R. Nur, 1996).
2. Wisdom Pattern Shari'a; In order to develop three kinds of value over the Islamic Republic, as a source of culture in the Islamic civilization in the kingdom of Gorontalo, was composed of 185 kinds of patterns based on the principles of sharia Islamic custom version.. This principle is a starting point for the king Amai introduce and develop the Islamic religion in this kingdom. To complete our understanding of Shari'ah in the customary pattern, here are some examples based on the resolution of indigenous seminar, among others: (a) Motolobalango; which means making a proposal, is the pattern of customary law is implemented in the system of marriage Gorontalo society. (B) Review; lift, as well as aspects of the law implemented by custom, traditional dress, indigenous language, customs and gestures.

In the second formulation by the king Matolodulaa Kiki (1550-1585) in customs jointed Personality, Personality custom jointed. Shari'a pattern developed in the paradigm of indigenous people of Gorontalo covering funeral Shari'a patterns, ranging from bathing to the burial process, a pattern of sharia is implemented based on traditional patterns. Furthermore, it is customary in social communication, which in the context of Gorontalo prioritizes good moral

Similarly, prevailing in a third formulation, the formulation proposed by the king Eyato (1673-1679), which overall supports the principle jointed Indigenous Personality, Personality jointed Qur'aan, both directly related to religious principles as well as with regard to the principles of social and civic , In the reign of Eyatolah change the system of government, where the government is composed of three parts: (1) Maharaja or Sultan became chairman of the board Three Threads Government, Buatulo Tolalu, led the two parts of government and indigenous (Baate already under Maharaja). (2) Buatulo Bala; Security headed Apitalao (sea captain), (3) a new thread that Buatulo Saraa (Thread syareat) headed by a Kadhi in charge of religious issues. Kadhi in detail the duties consist of:

- a. Teaching religion to society
- b. Build and maintain mosques and waqf-waqf
- c. Organize religious ceremonies in mosques and in the royal palace and elsewhere.

In the present context, the principle or philosophy of "customs jointed Personality ', Personality' jointed Kitabullah" which has been inherited by Gorontalo people since hundreds of years ago, and has now become a pattern for the wisdom of their religiosity. As people born and raised in Gorontalo and ancestry citizens Gorontalo, Erwin Y. Thaib Gorontalo people perceive religious phenomena as:

"... The fact of diversity that has been so from the beginning, so anyone Gorontalo people would not want to accept this reality. Religious characteristics are colored by shades customary in practice, for the people of Gorontalo is an absolute life choices ".

Furthermore he also revealed that the actual execution of religious rituals performed by the pattern of customs in addition to a pengejewentahan of indigenous knowledge jointed sara, sara jointed Kitabullah as desired and handed down by ancestors Gorontalo people, is also a manifestation of the desire of people of Gorontalo through a pattern of customs that have been institutionalized , Context is reflected in the local wisdom that is understood by public figures Gorontalo, that; "Traditional Madilidiloto Bolomopoitito" (Adat it has a pattern / pattern-we just stringing only).

In another perspective Madina Agus revealed that: "... whose name is customary in Gorontalo with religion that he's like a coin has two sides, one side is indigenous and the other side are the things that arise of the religious. This means that the religious life symbolized by the principles of customary jointed sara, sara jointed Kitabullah covet a condition that the execution of customary or otherwise be mutually coloring or give each pattern, in terms of custom implementation should be symbolized by religiosity, such as religion must also be symbolized through customs ... "

Meanwhile Lukman Katili appreciation rather different about the phenomenon, the principle of custom jointed Personality ', Personality' jointed Qur'aan, namely that philosophy that the realization is still looking for a form, whether these principles are just looking for atmosphere or indeed any application, as we see in Gorontalo customs it does have the feel of Islam (religion), but when there are violations of the law is that there is no penalty. However, customarily the person will feel alienated life in society.

2. The style of Islamic Mysticism in the Tradition of Religious Ceremonies in Gorontalo

If we probe deeper into the reality of religious life Gorontalo people, it will be found a fact that their religious practice is a religious practice that are colored by the practice of the congregation in the form of a mystical ceremony rituals patterned. Form the rituals and traditions manifested in various religious ceremonies are backed by religious culture and social culture. Context and constructs practice religious ceremonies as an implication of the Islamic heritage past, which has historically been geographically, style Islam that is practiced in the earth Gorontalo is prone to Islam practiced by people of Ternate and Makassar (Hasanuddin & Sri Suharjo, 2001), Context thus necessitates a pattern of diversity and the unique characteristic, which appreciation of Allahu Ahad manifested in the form of texts and prayers wurd salvation to ancestors and thanksgiving to all the sustenance and the gifts given to His Divine Rabbi. The presence of the people of Ternate and Gowa in the past were backed by the conflict, even members of color or pattern of its own against the treasury and the model of the Islamic people of Gorontalo at that time, even until now, that a strong suspicion that these people have to practice and live a typical pattern based tarekat flow figures (stream) such as Qadiriyyah, Khalwatiyyah, and Naqsyabandiyah, both derived from Ternate as well as from Makassar. For context Ternate itself, the source of her congregation is derived from the relationship between Islam Ternate-Bantam-Makassar,

while for Makassar, the teachings of the congregation, they practice allegedly derived from the teachings of scholars Minangkabau (Dato Ditiro, Dato Rabandang, and Dato Patimang), which became the main motor disseminator of Islam in South Sulawesi and Ulama kingdom had studied Islam to the Middle East (Mecca) as Sheikh Yusuf al-Makassari. (Abu Hamid, 2005) in accordance with a diploma which is owned by Sheikh Yusuf al-Makassari, he can teach you four kinds of flow congregation includes ; Naqsyabandiyah, Syattariyah, Ba'alawiyah, and Qadiriyyah. He himself is known as an advocate and teacher institutes Khalwatiyah. (Abu Hamid, 2005).

If we listen to the historical construction of the relationship between Islam Gowa-Gorontalo in the 17th century, then we could conclude that the deployment of troops in the past was also accompanied by the inheritance of Islam versus militia; Gowa, which is certainly become their somewhat Adherents and proponents of Islamic congregations as taught by their religious teachers including Sheikh Yusuf al-Makassari them. According to Dr. Sofyan You, that lafaz-lafaz of remembrance and prayers contained in the various moments of ritual religious ceremonies, both Tasyakuran (thanksgiving prayer) and in prayer spirits (prayer for the safety of the spirits of the ancestors), heavily influenced by a variety of color flow congregations, between another Syattariyah, Naqsyabandiyah, Qadiriyyah, and Khalwatiyah. But supposedly the more dominant is the teaching institutes and Qadiriyyah Naqsyabandiyah.

Even shades of tahlil and blessings are found in texts lafaz and prayer is the dominant pattern of the flow of the congregation mentioned above, does not mean that the flow of the congregation / mystical Sufism is received through the teaching of the official or the more popular with the term methods of teacher-pupil , the reason is not the discovery of a single donor of both the order's in Gorontalo area which has official diploma as a follower / advocate (mursyid) published by alira-flow of the Order, even though awalul early Muslims that those believed to be the first generation of donors and the advocates of Islam on earth Gorontalo.

In minutes *Sirr al-Asrar wa ma fi Muzhhir Yahtaju Ilaihi al-Abrar*, works as-Shaykh Abdul Qadir Jilani, pointed out that the dzikir-dzikir were stratified according spiritual status, either clear or vague; ranging from oral dzikir. Dzikir soul, heart dzikir, dzikir spirit, conscience dzikir, dzikir faint, until the most vague remembrance.

Dzikir will verbally remind a person's heart to remember God when forget. Dzikir dzikir soul is inaudible to the letters and sounds, but heard by the senses and inner movement. Dzikir heart is careful attention to the grandeur and beauty of God in the heart. Dzikir spirit lights are witnessing the unfolding of God's attributes. Dzikir conscience is monitoring the concentration of the disclosure of the secrets of the Divine. Dzikir is sketchy hand in hand Light-light beauty of Existence Oneness transcendence in and favor. While most vague remembrance is looking Itself Supreme Mahayakin right again, which is not known by other than Allah Ta'ala. He said that means; 'He knows the secret and the more hidden "(Q.S. Taha [20]: 7). That's the highest goals and the latter (Ahmad Fadhil, 2003).

Furthermore, given that the road to Allah Ta'ala is always the bodies were on the road Straight by way of implementing shari'ah day and night, while constantly spirit (heart) remembering God is a religious duty for those who take the spiritual path (Ahmad Fadhil, 2003). The context to be appreciated by Iwan Ismail (39) a donor teachings of the congregation and one practitioner / leader of remembrance in prayer and religious ceremonies in the city of Gorontalo revealed that there are two paths to God the path of light / jasad and street sir / secret (hidden). If the first path is the road taken by the group Awwam (ummah usual) in Islam, and the second path is the path chosen by the "choice" that the Khawwas (special) even "khawwasul Khawwas", ie people who choose the path of Sufi (mysticism) in towards ma'rifatullah.

Furthermore, the prayer of remembrance and prayers are patterned certain institutes like Naqsyabandiyah and Qadiriyyah (is dominant) is found in the classification of various religious rites were based on local customs Gorontalo. The ceremonies of social religion shall include prayers for the salvation of ancestors or the ancestors who have died, and in addition there is also a tradition ceremonies social religious, which was held for the purpose of expressing gratitude for favors sustenance and longevity that God gave to His servants. The tradition of prayer ceremonies in the category of spirits (salvation) include; hair clippers ceremonies, prayers spirits in order to enter the holy month of Ramadan, the Prophet's Birthday, Entering the Islamic New Year, and the Revelation of the Qur'an. The wird is pronounced with the pattern of the congregation is tahlil with lafaz laa ilaha illa Allah. While for the thanksgiving prayer therein carried blessings on the Prophet Muhammad, and attributed to the mayor Abdul Qadir Jilani sacred or Sufi figures / Sufi others. As for religious ceremonies in this category include; Up New House, Grateful for new vehicles, Bath Lemon, and Raba Puru.

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4.CONCLUSION

1. Islam is a religion that spread Gorontalo from Ternate land, which has historically had a common thread in rites and rituals, including those relating to the mystical elements that are present in each of rites and rituals of Islamic governance.
2. Wisdom of the value and wisdom pattern of Shari'a as a parameter in the development of Islamic culture in Gorontalo kingdom.

3. The socio-religious ceremonies are based on local customs Gorontalo includes prayer for the salvation of ancestors or the ancestors who have died, social religious ceremony that was held to express gratitude for the sustenance and longevity favors which God gave to His servants.

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Non patentability Inventions under the Patent Act, 1970 – An analysis

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Abstract- Under the Patent Act, 1970 a patent is granted for any invention for a period of 20 years from the date of grant of patent – Whether all invention are patentable? Or is there any restriction on granting patent to an invention – In this article, the authors are going to analysis the invention that are not patentable under the Patent Act, 1970.

Index Terms- Invention – Non patentability – Patent Act, 1970.

I. INTRODUCTION

Patent is an exclusive rights granted for an inventor, by the Government or by the registrar of patents, for his/her invention which is new, useful and non obviousness. Initially, the patent was granted for a period of fourteen years. Now, the period of fourteen years has been enhanced to twenty years. In *Biswanath Prasad Radhey Shyam Vs Hindustan Metal Industries*¹, the Supreme Court of India held that “the object of Patent Law is to encourage scientific research, new technology and industrial progress. Grant of exclusive privilege to own, use or sell the method or the product patented for a limited period, stimulates new inventions of commercial utility. The price of the grant of the monopoly is the disclosure of the invention at the Patent Office, which after the expiry of the fixed period of the monopoly, passes into the public domain”.

The fundamental principle of Patent Law is that a patent is granted only for an invention which is new and useful. That is to say, it must have novelty and utility. It is essential for the validity of a patent that it must be the inventor's own discovery as opposed to mere verification of what was, already known before the date of the patent. In this article the author, is going to analyse the inventions that are not patentable under the Patent Act, 1970.

Meaning of Patent:

According to Section 2 (1)(m) of the Patent Act, 1970 "patent" means “a patent for any invention granted under this Act”. From this section, it is clear that a patent can be granted to any invention. Then the question arose what is meant by invention. "Invention" means a new product or process involving an inventive step and capable of industrial application²; from this definition it is categorically clear that to constitute an invention the invention must be a product or a process. But one condition is that the product or the process, as the case may be, must be subjected to two conditions. i.e., (i) it should have inventive step

and (ii) capable of industrial application. If the above two conditions are fulfilled then, the product or the process, as the case may be, qualifies to be an invention. Under this section, even if a product is substantially improved by an inventive step, it would be termed to be an invention.

Meaning of “Inventive Step” and “capable of industrial application”:

Section 2 (1) (ja) of the Patent Act, 1970 defines the meaning of the term "inventive step". According to this section, "inventive step" means a feature of an invention that involves technical advance as compared to the existing knowledge or having economic significance or both and that makes the invention not obvious to a person skilled in the art. Sec. 2 (1)(ac) says that "capable of industrial application", in relation to an invention, means that the invention is capable of being made or used in an industry.

Section 2 (1) (i) "new invention" means any invention or technology which has not been anticipated by publication in any document or used in the country or elsewhere in the world before the date of filing of patent application with complete specification, i.e., the subject matter has not fallen in public domain or that it does not form part of the state of the art.

“Patents” under the TRIPS Agreement:

Part two of Section 5 of the TRIPS Agreement under Article 27 deals with the patentable subject matter. The opening part of Article 27 (1) says “Subject to the provisions of paragraphs 2 and 3, patents shall be available for any inventions, whether products or processes, in all fields of technology, provided that they are new, involve an inventive step and are capable of industrial application”³.

Exclusion of Certain Invention from the Purview of Patentability under the TRIPS Agreement:

Under Article 27 (2) of the TRIPS Agreement, the discretionary powers have been given to the members' country to exclude certain inventions from the purview of patentability on the ground of morality or *ordre public*. It says Members may exclude from patentability inventions, the prevention within their territory of the commercial exploitation of which is necessary to protect *ordre public* or morality, including to protect human, animal or plant life or health or to avoid serious prejudice to the

¹ AIR 1982 SC 1444 .

² Section 2 (1)(j) of the Patent Act, 1970.

³ For the purposes of this Article, the terms "inventive step" and "capable of industrial application" may be deemed by a Member to be synonymous with the terms "non-obvious" and "useful" respectively.

environment, provided that such exclusion is not made merely because the exploitation is prohibited by their law.

Members may also exclude from patentability⁴:

(a) Diagnostic, therapeutic and surgical methods for the treatment of humans or animals;

(b) Plants and animals other than micro-organisms, and essentially biological processes for the production of plants or animals other than non-biological and microbiological processes. However, Members shall provide for the protection of plant varieties either by patents or by an effective sui generis system or by any combination thereof. The provisions of this subparagraph shall be reviewed four years after the date of entry into force of the WTO Agreement.

What are not Inventions under the Patent Act, 1970?

The Patent Act, 1970 vide Section 3 deals with what are not inventions. Since the following categories are not inventions within the meaning of this Act, they are not considered to be patentable.

(i) **“An invention which is frivolous or which claims anything obviously contrary to well established natural laws”⁵.**

Under this clause, the following two inventions are not patentable i.e., (i) an invention which is frivolous and (ii) an invention which is obviously contrary to well established natural laws.

As an example “a machine purporting to produce perpetual motion, a machine alleged to be giving output without any input and a machine allegedly giving 100% efficiency are considered as frivolous nature and contrary to natural laws”.

(ii) **An invention, the primary or intended use or commercial exploitation of which would be contrary to public order or morality or which causes serious prejudice to human, animal or plant life or health or to the environment-Section 3(b)⁶.**

Under this clause, an invention (i) the primary or intended use or commercial exploitation of which would be contrary to public order (ii) An invention, the primary or intended use or commercial exploitation of which would be contrary morality (iii) an invention which causes serious prejudice to (a) human, (b) animal or (c) plant life or (d) health or (e) to the environment are not considered as invention and as such are not patentable.

An invention contrary to public order may be one the primary use of which would be a criminal act, punishable as a crime.

Examples:

⁴ Article 27(3) of the TRIPS Agreement.

⁵ Sec. 3(a).

⁶ This section is substituted by Patents (Amendment) Act, 2002 dated 25.06.2002 w.e.f 20.05.2003. Prior to its substitution it read as under : "(b) an invention the primary or intended use of which would be contrary to law or morality or injurious to public health"

a. Any device, apparatus or machine or method for committing theft/burglary.

b. Any machine or method for counterfeiting of currency notes.

c. Any device or method for gambling.

d. Bio war and bio terrorism

e. Inventions, the intended use or commercial exploitation of which is found to be injurious to public, animal or plant life or health, such as, a method of adulteration of food.

f. An invention, the primary or intended use of which is likely to violate the well accepted and settled social, cultural, legal norms of morality, e.g. invention relating to cloning of humans, processes for modifying the germ line and genetic identity of human beings, etc.

However, if the primary or intended purpose or commercial exploitation of a claimed invention is not causing serious prejudice to human, animal or plant life or health or to the environment, such subject matter may be considered to be an invention and may be patentable. **For instance:** pesticide.

Section 3 (c) says that the **“mere discovery of a scientific principle or the formulation of an abstract theory or discovery of any living thing or non-living substance occurring in nature is not an invention”⁷.**

Under this clause, a claim for discovery of scientific principle is not considered to be an invention, but such a principle when used with a process of manufacture resulting in a substance or an article may be considered to be an invention. New mineral discovered in the earth or a new plant found in the wild is not patentable subject matter. Likewise, Einstein could not patent his celebrated law that $E=mc^2$; nor could Newton have patented the law of gravity. Such discoveries are manifestations of . . . nature, free to all men and reserved exclusively to none⁸”.

A scientific theory is a statement about the natural world. These theories themselves are not considered to be inventions, since they do not result in a product or process. However, if the theory leads to practical application in the process of manufacture of an article or substance, it may well be patentable.

A claim for formulation of abstract theory is not considered to be an invention. Similarly, finding of a new substance or micro-organism occurring freely in nature is a discovery and not an invention. In *Bilski V. Kappos*, Justice Kennedy of the U.S Supreme Court said that “Method of hedging risk in commodities trading is an abstract idea and thus not patentable subject matter under § 101”. In this case Petitioners’ patent application seeks protection for a claimed invention that explains how commodities buyers and sellers in the energy market can protect, or hedge, against the risk of price changes. The concept of hedging is an unpatentable abstract idea, just like the algorithms – See: Benson and Flook. “An idea by itself is not patentable.” *Rubber-Tip Pencil Co. v. Howard*, 20 Wall. 498, 87 U. S. 507 (1874).

Whether a naturally occurring segment of deoxyribonucleic acid (DNA) is patent eligible under 35 U. S. C. §101 by virtue of its isolation from the rest of the human genome? While

⁷ Inserted by Patents (Amdt.) Act, 2002 dated 25.06.2002 w.e.f 20.05.2003.

⁸ See: *Le Roy v. Tatham*, 14 How. 156, 55 U. S. 175 (1853).

answering to the question, the U.S Supreme Court held that “a naturally occurring DNA segment is a product of nature and not patent eligible merely because it has been isolated, but that cDNA [synthetically created DNA known as complementary DNA (cDNA)] is patent eligible because it is not naturally occurring⁹.”

According to Section 3(d)¹⁰, **“The mere discovery of a new form of a known substance which does not result in the enhancement of the known efficacy of that substance or the mere discovery of any new property or new use for a known substance or of the mere use of a known process, machine or apparatus unless such known process results in a new product or employs at least one new reactant is not an invention”.**

The Parliament has consciously enacted the standard of non obviousness as a condition for patentability. Under this clause, the test of non obviousness of an invention and discovery of existence of significant enhancement in the known efficacy of a substance were pre requisites of patentability. Efficacy means “the ability to produce a desired or intended result¹¹”. The Madras High Court in *Novartis AG Vs Union of India*¹², while interpreting Section 3(d) observed as follows:

“If a discovery is made from a known substance, a duty is cast upon the patent applicant to show that the discovery had resulted in the enhancement of the known efficacy of that substance and in deciding whether to grant a patent or not. On such new discovery, the explanation creates a deeming fiction that all derivatives of a known substance would be deemed to be the same unless it differs significantly in properties with regard to the efficacy¹³”.

Section 3(d) provides an explanatory clause to make it more clear which reads as follows:

“Explanation:- For the purposes of this clause, salts, esters, ethers, polymorphs, metabolites, pure form, particle size, isomers, mixtures of isomers, complexes, combinations and other derivatives of known substance shall be considered to be the same substance, unless they differ significantly in properties with regard to efficacy”.

In *Glochem Industries Ltd vs Cadila Healthcare Ltd*¹⁴, the Bombay High Court held that “Section 3 (d) was a comprehensive provision covering all fields of technology including the field of pharmacology. The amended section not only covers the field of pharmacology but also other fields. Further in this case the court held that “the test to decide whether the discovery is an invention or not? The Patent applicant should

⁹ Association For Molecular Pathology V. Myriad Genetics, Inc. Decided June 13, 2013.

¹⁰ Section 3 (d) was Substituted by Patents amendment Act (15 of 2005) for the words "the mere discovery of any new property or new use for a known substance or of the mere use of a known process, machine or apparatus unless such known process results in a new product or employs at least one new reactant".

¹¹ *Novartis Ag v. Union of India*, (2013) 6 SCC 1.

¹² (2007) 4 MLJ 1153.

¹³ See also: *Glochem Industries Ltd vs Cadila Healthcare Ltd* available at <https://indiankanoon.org/doc/499132/>

¹⁴ Available at <https://indiankanoon.org/doc/499132/>

show the discovery has resulted in enhancement of known therapeutic efficacy of that substance and if the discovery is nothing other than the derivative of a known substance, then, it must be shown that the properties in derivatives differ significantly with regard to efficacy. So under this clause the very discovery of a new form of a known substance which does not result in the enhancement of the known efficacy of that substance will not be treated as an invention.

In *Ten Xc Wireless Inc & Anr vs Mobi Antenna Technologies*, the Delhi High Court held that “a method of replacing conventional antennae with split-sector antennae; and (ii) a split- sector asymmetric antenna for replacing conventional antennae - are all mere uses for the asymmetric antenna already known. Under Section 3(d) the subject matter claimed is therefore not an invention.

In *Novartis Ag v. Union of India*¹⁵, the Supreme Court of India held that “mere discovery of an existing drug would not amount to invention”. The Supreme Court of India further in this case held that “under Indian Patent Act for grant of pharmaceutical patents apart from proving the traditional tests of novelty, inventive step and application, there is a new test of enhanced therapeutic efficacy for claims that cover incremental changes to existing drugs which also Novartis’s drug did not qualify”.

Further, **a substance obtained by a mere admixture resulting only in the aggregation of the properties of the components thereof or a process for producing such substance is also not an invention**¹⁶. But an admixture resulting in synergistic properties is not considered as mere admixture.

Example:

A soap, detergent, lubricant and polymer composition etc, and hence may be considered to be patentable. In general, all the substances which are produced by mere admixing, or a process of producing such substances should satisfy the requirement of synergistic effect in order to be patentable. Synergistic effect should be clearly brought out in the description by way of comparison at the time of filing of the Application itself.

The subsequent submissions regarding synergism can be accepted in a reply to the office action as a further support of synergy. However, such submitted data may be incorporated in the Specification, subject to the provisions of Section 59.

Under Section 3 (f): **“The mere arrangement or re-arrangement or duplication of known devices each functioning independently of one another in a known way is not an invention”.**

- In order to be patentable, an improvement on something known before or a combination of different matters already known should be something more than a mere workshop improvement; and must independently satisfy the test of ‘invention’ or an ‘inventive step’.

To be patentable, the improvement or the combination must produce a new result, or a new article or a better or cheaper article than before. The Gujarat High Court in *Hind vs Shree*¹⁷ held that, as per the provisions of the Act, if Sections 2(j) & 2(ja) are read with Section 3(f), mere arrangement or

¹⁵ (2013) 6 SCC 1.

¹⁶ See Section 3 (e).

¹⁷ Date of Judgment: 21 August, 2007

rearrangement of known devices, each functioning independently of one another in a known way is not to be treated as an invention for grant of patent.

Mere collocation of more than one integers or things, not involving the exercise of any inventive faculty, does not qualify for the grant of a patent¹⁸. If the result produced by the combination is either a new article or a better or cheaper article than before, the combination may afford subject-matter of a patent¹⁹.

An invention claiming a mere juxtaposition of known devices in which each device functions independently is not considered patentable. Merely placing side-by-side old integers so that each performs its own function independently of the others is not a patentable combination. e.g., an umbrella with fan, bucket fitted with torch, clock and transistor in a single cabinet. These are not patentable, since they are nothing but mere arrangement and rearrangement of items without having any working interrelationship between them and are devices capable of functioning independently of each other.

Clause (g) of Section 3 omitted by Patents (Amdt.) Act, 2002 dated 25.06.2002 w.e.f 20.05.2003. Prior to omission it read as under:

"(g) a method or process of testing applicable during the process of manufacture for rendering the machine, apparatus or other equipment more efficient or for the improvement or restoration of the existing machine, apparatus or other equipment or for the improvement or control of manufacture;"

"A method of agriculture or horticulture is not an invention" vide Section 3 (h).

Examples: (a) A method of producing a plant, even if it involved a modification of the conditions under which natural phenomena would pursue their inevitable course (for instance a green house).

(b) A method of producing improved soil from the soil with nematodes by treating the soil with a preparation containing specified phosphorathioates.

(c) A method of producing mushrooms.

(d) A method for cultivation of algae.

Under Section 3 (i), **"Any process for the medicinal, surgical, curative, prophylactic, diagnostic, therapeutic or other treatment of human beings or any process for a similar treatment of animals to render them free of disease or to increase their economic value or that of their products is not an invention"**.

This provision excludes from patentability, the following:

- (a) Medicinal methods: As for example a process of administering medicines orally, or through injectables, or topically or through a dermal patch.
- (b) Surgical methods: As for example a stitch-free incision for cataract removal.
- (c) Curative methods: As for example a method of cleaning plaque from teeth.

(d) Prophylactic methods: As for example a method of vaccination.

(e) Diagnostic methods:

Diagnosis is the identification of the nature of a medical illness, usually by investigating its history and symptoms and by applying tests.

Determination of the general physical state of an individual (e.g. a fitness test) is considered to be diagnostic. In *Mayo Collaborative Services V. Prometheus Laboratories, Inc*²⁰, the US Supreme Court held that "diagnostic method patent is not patentable subject matter because it claims a law of nature".

(f) Therapeutic methods: The term "therapy" includes prevention as well as treatment or cure of disease. Therefore, the process relating to therapy may be considered as a method of treatment and as such not patentable.

According to Section 3 (j), **"Plants and animals in whole or any part thereof other than micro-organisms but including seeds, varieties and species and essentially biological processes for production or propagation of plants and animals are not inventions"**.

Under this clause, the following subject matters are excluded from the purview of patentability:

- (a) Plants in whole or in part
- (b) Animals in whole or in part
- (c) Seeds
- (d) Varieties and species of plants and animals
- (e) Essentially biological process (example) for production or propagation of plants and animals.
- (f) Microorganisms, other than the ones discovered from the nature, may be patentable.

For instance, genetically modified microorganisms may be patentable subject to other requirements of Patentability.

A new process of preparation of a vaccine under specific scientific conditions, the vaccine useful for protecting poultry against contagious bursitis infection was held to be patentable by the Court on the ratio that the statute does not make a manner of manufacture as un-patentable even if the end products contains a living organism²¹.

Section 3 (k) says **"A mathematical or business method or a computer programme per se or algorithms are not inventions and hence not patentable"**.

Under this clause, (i) mathematical methods, (ii) business methods, (iii) computer programmes *per se* and (iv) algorithms are not considered as patentable subject matter.

➤ 'Mathematical methods' are considered to be acts of mental skill. A method of calculation, formulation of equations, finding square roots, cube roots and all other methods directly involving mathematical methods are therefore not patentable.

➤ The term 'Business Methods' involves whole gamut of activities in a commercial or industrial enterprise relating to transaction of goods or services. With the development of technology, business activities have

¹⁸ Biswanath Prasad Radhey Shyam Vs. Hindustan Metal Industries(1979) 2 SCC, 511

¹⁹ Lallubhai Chakubhai Vs. Chimanlal and Co. (AIR 1936 Bom 99.

²⁰ Decided March 20, 2012.

²¹ Dimminaco – A.G. Vs. Controller of Patents & Designs and Others.

grown tremendously through e-commerce and related B2B and B2C business transactions.

- "Algorithm" is defined as a "procedure for solving a given type of mathematical problem," and such an algorithm, or mathematical formula, is like a law of nature, which cannot be the subject of a patent.

"While a scientific truth, or the mathematical expression of it, is not a patentable invention, a novel and useful structure created with the aid of knowledge of scientific truth may be²²." As such in *Diamond v. Diehr*²³, the U.S Supreme Court held that "Patent on process of curing rubber using a well-known mathematical equation and a computer is patentable subject matter under § 101.

Discovery of a novel and useful mathematical formula may not be patented²⁴. method for updating alarm limits during catalytic conversion processes, in which the only novel feature is a mathematical formula, held not patentable under § 101 of the Patent Act²⁵, Because, an algorithm, or mathematical formula, is like a law of nature.

- Under Section 3 (1), "**A literary, dramatic, musical or artistic work or any other aesthetic creation whatsoever including cinematographic works and television productions is not an invention**".

Example: Writings, music, works of fine arts, paintings, sculptures, computer programmes, electronic databases, books, pamphlets, lectures, addresses, sermons, dramatic-musical works, choreographic works, cinematographic works, drawings, architecture, engravings, lithography, photographic works, applied art, illustrations, maps, plans, sketches, three-dimensional works relating to geography, topography, translations, adaptations, arrangements of music, multimedia productions, etc. are not patentable. Such works fall within the domain of the Copyright Act, 1957.

According to Section 3(m), "**a mere scheme or rule or method of performing mental act or method of playing game is not an invention**".

Under this clause, A mere scheme or rule or method of performing mental act or method of playing game, are excluded from patentability, because they are considered as outcome of mere mental process.

For example:

- ✓ Method of playing chess.
- ✓ Method of teaching.
- ✓ Method of learning.

Section 3(n) says "**A presentation of information is not an invention**".

Any manner, means or method of expressing information whether visual, audible or tangible by words, codes, signals, symbols, diagrams or any other mode of representation is not patentable.

For example, a speech instruction in the form of printed text where horizontal underlining indicated stress and vertical

separating lines divided the works into rhythmic groups is not patentable. For instance, railway time table, 100 years calendar etc.

In a case, the Controller held that the Patent system was meant for protecting only one kind of creativity i.e. technological creativity and since the claimed invention relates to business method and method of presenting information, it is not allowed.

Under Section 3(o), "**Topography of integrated circuits is not an invention**".

Reason: Since protection of Layout Designs of Integrated Circuits is governed separately under the Semiconductor Integrated Circuit Lay-out Designs Act, 2000, three-dimensional configuration of the electronic circuits used in microchips and semiconductor chips is not patentable.

Further as per Section 3(p), "**An invention which in effect, is traditional knowledge or which is an aggregation or duplication of known properties of traditionally known component or components is not an invention**".

Traditional knowledge (TK) is knowledge, know-how, skills and practices that are developed, sustained and passed on from generation to generation within a community, often forming part of its cultural or spiritual identity.

Innovations based on TK may benefit from patent, trademark, and geographical indication protection, or be protected as a trade secret or confidential information. However, traditional knowledge as such is not protected by conventional intellectual property systems. Therefore, Traditional Knowledge, being knowledge already existing, is not patentable.

Example: Antiseptic properties of turmeric for wound healing, Pesticidal and insecticidal properties of neem.

Two American researchers of Indian origin, of the University of Mississippi Medical Center, put a claim to the US Patent and Trademark Office, maintaining that they had discovered haldi's healing properties. And, surprise, they were granted a patent in March 1995 for something you had known for years and our ayurveds for centuries. In a landmark decision, United States Patent and Trademark Office (US PTO) revoked this patent after ascertaining that there was no novelty, the innovation having been used in India for centuries.

This was the first time that a patent based on the traditional knowledge of a developing country was challenged successfully and US PTO revoked the patent.

The case of the revocation of the patent granted to W.R. Grace Company and US Department of Agriculture on Neem (EPO patent No. 436 257) by European Patent Office, again on the same grounds of its use having been known in India, is another example.

Apart from the above categories of invention, Section 4 of the Patents Act, 1970 also deals with invention that are not patentable: It says:- "**Inventions relating to atomic energy not patentable**".

Under this provision "No patent shall be granted in respect of an invention relating to atomic energy falling within sub-section (1) of Section 20 of the Atomic Energy Act, 1962".

²² *Mackay Radio & Telegraph Co. v. Radio Corp. of America*, 306 U. S. 86, 306 U. S. 94 (1939).

²³ 450 U.S. 175 (1981).

²⁴ *Gottschalk v. Benson*, 409 U. S. 63.

²⁵ *Parker v. Flook*, 437 U.S. 584 (1978).

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“Keongan” Ventilation Roof on Local Houses in Semarang City Indonesia

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Abstract- Keongan is a kind of roof ventilation usually used in Indonesian local houses. In a humid tropical climate, in general, the building is designed with a natural ventilation system that maximizes the speed of wind in order to cool the building structure or reach the achievement of physiological comfort. Some of the building design features in a tropical climate, such as the existence of wide openings, roofs with a slope angle, have a plafond, and maximizing the shades around the building. The density of buildings is one of the factors which affect the principle of micro-climatic conditions and determine the conditions of ventilation and air temperature. Heat symptoms in main cities affected by urban density rather than the size of the city itself, the more dense, the worse the condition of the building ventilation. Architecture of buildings, tried to adapt to the nature and tried to blend with nature. Norms, customs, climate, culture, beliefs and local materials will be given its own color in the development of vernacular architecture. The long journey through trial and error with the local genius, is capable of displaying its identity. Several features of houses in Semarang Village include : symmetrical floorplans extends to the rear, circulation straight from front to rear, limasan roof or saddle roof, three openings (doors) on the facade, door consists of two doors, Ornaments eaves (lisplank) on the front facade, the Consul made of iron or wood with the formation of ornamentation, Ornaments on bouven above the door. The results of this study, the shape of gable roofs are part keongan utilized for the air stream that is useful to cool the hot air under the roof at once will lower the temperature in the house. Roof ventilation in Semarang houses mainly applied keongan and openings in the ceiling to circulate the hot air out of the building. Roof ventilation in the form of air cushion roof due to the formation of a high roof space. High roof shape with a roof vent to expel the hot air trapped on building roof. This adaptation is one of the advantages of traditional buildings. This can be important lessons in developing the design by applying the model of natural ventilation for the comfort of the building.

Index Terms- Roof ventilation, local wisdom, local houses.

I. INTRODUCTION

Indonesia lies in the geographic conditions located at the equator, that resulted the climatic conditions in Indonesia are hot and very humid so it is known by the humid tropical climate. Humid tropical climate by Egan (2009) & Szokolay (2004), has the characteristic features such as high temperatures during the day and low temperatures at night, has a very high humidity level, having low air movement and low speed of wind, and a high intensity of sun exposure. The humid tropical climate conditions needs the level of planning that responds to climatic conditions and friendly to the environment that also make the people comfortable. The tendency of the problems encountered in the humid tropics is the same that the magnitude of heat in the building that influence the formation of air temperature in the room. Cities with high building density, are having impact on the poor socio-economic conditions and will potentially make the area into a slum. The need for open communal spaces in each row and a residential neighborhood. (Santoso, 2007). How to determine the level of density of the region and the environment quantitatively based on the number of occupants who occupy the building in hectares. The density of an area can also be calculated based on the number of buildings in hectares or calculating overall Basic Building Coefficient (KDB) in one hectare. Environmental Building solid in the category if the number of buildings around 80-100 buildings per hectare or more than 100 buildings in a single hectare. Basic Building Coefficient (KDB) about 50-70% for high density, or more than 70% of the environment is earmarked for residential buildings. Indicated that the density implicated in the squalor of the environment. The density of buildings is a one of the causes that will affect the climate conditions and the environmental impact on the movement of air flow for natural ventilation, the following also with an increase in ambient temperature.

Roof ventilation design that planned to support the concept of air jetting to above will be managed to create a good thermal comfort inside the building if all aspects of planning have been considered and taken into account. It is important to do because of the failure of the roof ventilation design will likely have the opposite effect, which adds to the discomfort in the room due to heat buildup in the field of space.

Szokolay (1987), describes a method for optimal passive cooling humid tropical climate is the effect of wind movement, namely physiological cooling not only depend on the wind speed but also the activity and clothing used by humans. In this passive cooling methods can expand your comfort zone is perceived by humans.

Research Sukawi (2009, 2010) Wooden houses from the Dutch stage in Purwodadi have Kedung teak ceiling elements made of planks. Installation of ceiling is not tight so that there is a gap that allows air into the room through the gap. This study knowing that porousitas ceiling wooden boards serve to expel warm air to the roof that will affect the indoor thermal conditions stated by the effective temperature (TE).

Purwanto (2006), form the roof of the building must have good air circulation. Roofs that do not have air circulation will conduct heat of air trapped in the roof to affect the condition of the heat in the room below. The use of modern roofing materials a very tight result in the absence of openings in the roof so that the roof can not "breathe" and the heat that occurs in the roof will affect the thermal conditions in the space under the roof. For the design of a good roof must have a good circulation system so that hot air is not trapped in a roof cavity.

Research on thermal comfort in rural areas that did in the area of East Java, found that the orientation of the house will be facing the village road that also serves as a communal space and social interaction. In traditional Javanese architecture there is no rule about the orientation and the direction toward the dwelling or residence. For that opportunity their orientation can be adjusted with the direction of circulation of the sun and the movement direction of the wind. This study indicates that the orientation does not have much effect on the thermal comfort in low-rise buildings. However, the removal of heat by the wind to the openings on the building will create efforts to cool buildings that have an impact on the level of heat in the building. (Samodra, 2005).

II. RESEARCH METHODOLOGY

Research methods used in this study is the observation method with a descriptive survey. The research object is a residential building which has a high density of residential homes in the hometown, in this case the research conducted in Pendrikan Village Semarang. Descriptive survey aimed to explore the phenomenon / symptom by observation. Observation method is a method that is done by direct observation, measurement and recording of symptoms or phenomenon. (Arikunto, 1998).

The method in this research is the observation, recording of measurement points inside and outside the home with tools such as a thermometer (to measure outdoor and indoor temperature), hygrometer (to measure humidity), hot wire anemometer (to measure air movement within both indoor and outdoor). Determination of measurement points in the house, carried out on the living room or family room and the space under the roof located at the back of the house. While the outdoor measurements carried out on the patio and the street in front of the residence. The collection of primary data collected in the field, will be in synchronize with secondary data such as temperature, humidity and wind movement from BMKG to see urban macro-climatic conditions and the environment.

III. RESULT AND DISCUSSION

One characteristic of dense residential village is downtown city. The village is a residential area of low-income people with poor physical condition. Village is a slum area with poor availability of public facilities or none at all, this region is often called the "slum" or "squater". Village is a traditional Indonesian environment, that marked the characteristic of life that exists in a close familial bond. Dirty Village which is a unique form of settlement can not be equated with a "slum" and "squater" or also equated with low-income settlements. Hometown is a form of settlement in urban areas unique to Indonesia with the characteristics, among others: the population still carry the nature and behavior of rural life are intertwined in family ties are strong, physical condition of the building and the environment is not good and not uniform, the density of buildings and high population, straitened means of basic services such as clean water, sewerage and storm water, garbage disposal and more. In the 1800s, the area along Imam Bonjol Street and Indraprasta street, a Dutch-owned land named Frederick, some called Van Hendrick and Prins Hendriklaan. Now, residential areas and offices in the region was better known by the name Pendrikan or Pindrikan. Due to limited land and space requirements, it is a spatial pattern tends town house in the village extends rearward. As a result, the spatial arrangement of rows backward from the terrace, living room, bedroom, family room or dining room and kitchen. The room service is placed at the rear. This backward elongated shape topped with a gable roof with mountains in the front and rear facade. Gunungan is part of the roof contained ornamentation in the form of openings, known as a roof vent on the lid of a snail.



Figure 1. Front Fasade House with "Keongan"



Figure 2. Front Fasade House without “Keongan”

This study begins by comparing two houses which the spatial form is nearly equal, start from spatial and material development as well as the walls and roof. The original wall materials are using plastered red brick walls. While the roof is still using clay tile and asbestos and zinc on the terrace .. The second differences between these houses, is on a roof vent located on ‘gunungan’ known as keongan roof. Mr. Sukadi’s home is apply a roof vent while the house of Mr. Ari does not have a roof vent.

Further research is done by searching for the ideal shape of a roof vent. One of many ways, is to look at some models of roof vents form in residences found in the field. From the survey, it was found that several models of roof vents form the shape of the house and a sketch that does not change drastically with a sketch of elongated backward.

Average house that has a roof vent has a greater air movement than the house without a roof vent. Difference in air movement in the room ventilated house with a roof of a house without a roof vent ranging from 0.01 m / s to most 0.39 m / s. The biggest difference at 02:00 PM to 04:00 PM in the afternoon and evening and the lowest difference at 5:00 to 6:00 o'clock in the morning. The average difference between the indoor air movement ventilated house with a roof that is not ventilated is 0.05 m / sec

Wind or air movement that occurred under the roof is also different between the 2 occupancy compared. The following graph the difference between the movement of air environment with air movement under the roof of the house of village equipped with openings keongan roof with houses that do not have openings keongan roof. To strengthen the research results in the data from the results of field measurements performed well simulation studies with ANSYS software. The results of these simulations will strengthen the research results in the field.

Mr. Ari’s House

Simulations performed by ANSYS with the wind speed of 1 m / s

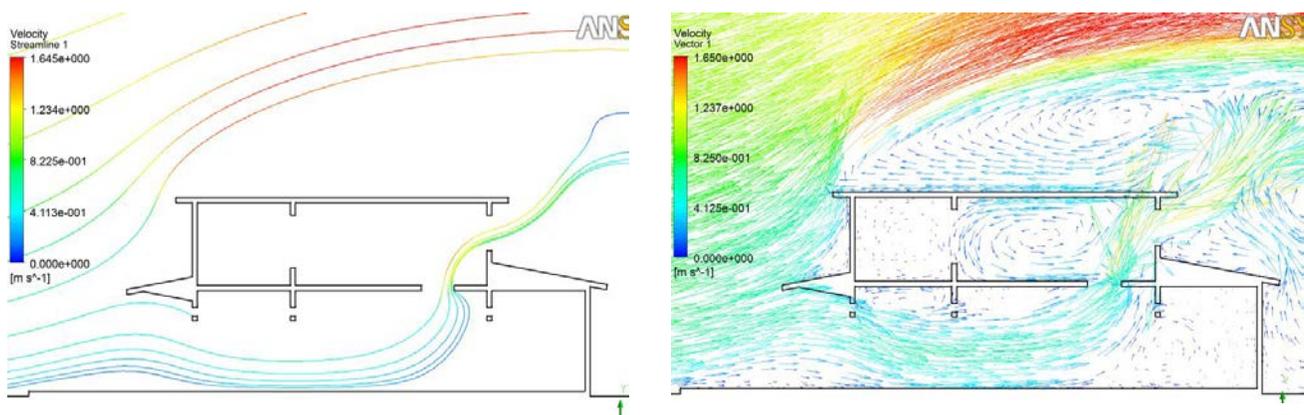


Figure 3. Simulation Mr Ari’s House without “Keongan” as Roof Ventilation

Mr. Sukadi's House

Simulations conducted with ANSYS software with a wind speed of 1 m / s

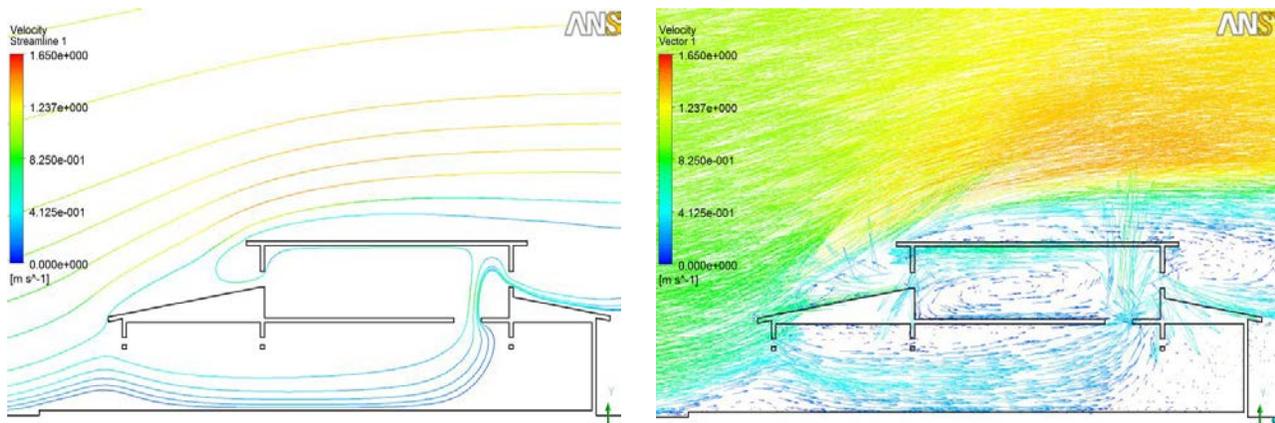


Figure 4. Simulation Mr Sukadi's House with "Keongan" as Roof Ventilation

The results of the analysis in the opening roof that serves as a variable, the obtained facts on the ground that the air vent in the roof can reduce air temperature in the room. The movement of air in the roof can occur if there is a hole *keongan*. Roof opening research is very helpful to know the performance of natural ventilation on occupancy with high density that can harness the potential of roof vents in solving thermal comfort in buildings. The house with a roof vent has a lower temperature and those air movement in the room is higher than the houses that are not equipped with a roof vent.

IV. CONCLUSION

Results of this research is to know the performance of natural ventilation with potential openings that lined with the roof of residential building in order to get around natural ventilation for thermal comfort in the buildings. The air vents in the roof can reduce both air temperature under the roof and in the room. House with the roof vents form *keongan* has a temperature below the lower roof and no air movement under the roof higher than the houses that are not equipped with roof vents or roof *keongan*.

The movement of the wind under the roof occurs because there is movement of air entering through cracks and holes in the *keongan* roof. The results of this study indicate that, on the orientation of the North, the movement of the wind can be used for roof ventilation. air movement under the roof on a house equipped roof openings or *keongan* ranged from 0.02 to 0.45 m / sec. The village houses are not equipped *keongan* openings in the roof, air movement under the roof in the range of 0.01-0.02 m / s, which would cause a heat trap on the roof heat and heat won't came out of the roof. This will affect the temperature of the room under the roof.

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Role of Depositories in Indian Capital Market – A Comparative Study between NSDL and CDSL

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Abstract: A Depository is an organization where the securities of share holders are held in the electronic format the request of the share holder through the medium of a depository participant. A depository interfaces with its investors through its agents called Depository Participants (DPs). The main objective of a depository is to reduce settlement risk by minimizing the paperwork involved in trading, settlement and transfer of securities. At present the two Depository Organisations are working in India - National Securities Depository Limited (NSDL) and Central Depository Services (India) Limited (CDSL). The present study is an attempt to know the role and growth of NSDL and CDSL in Indian Capital Market for 16 years i.e. period ending 31st March 2001 to March 2016. On the basis of results, it is concluded that number of beneficiary accounts, number of companies available for DEMAT, number of depository participants, number of depository participants service centers, Quantity of DEMAT Shares/Securities (No. of Dematerialized Securities) and DEMAT Custody in NSDL & CDSL (Value of Dematerialized Securities).

Keywords: National Securities Depository Limited (NSDL), Central Depository Services (India) Limited (CDSL), Dematerialization, Indian Capital Market, Depository, Depository Participants (DPs).

I. INTRODUCTION

The economic development of any country depends upon the existence of a well organized financial system. It is the financial system which supplies the necessary financial inputs for the production of goods and services which in turn promote the well being and standard of living of the people of a country. An efficient functioning of the financial system facilitates the free flow of funds to more productive activities and thus promotes investment. Thus, the financial system provides the intermediation between savers and investors and promotes faster economic development. The financial market exists to facilitate sale and purchase of financial instruments and comprises of two major markets namely the capital Market and the money market. The capital market mainly deals in medium and long – term investments (maturity more than a year) while the money market deals in short- term investments (maturity up to a year).

Capital market can be divided into two segments viz., primary and secondary. The primary market is mainly used by issuers for raising fresh capital from the investors by

making initial public offers or rights issues or offers for sale of equity or debt. The secondary market provides liquidity to these instruments through trading and settlement on the stock exchanges. Capital market is, thus important for raising funds for capital formation and investments and forms a very vital link for economic development of any country. The capital market provides a means for issuers to raise capital from investors. (Who have surplus money available from savings for investments). Thus savings normally flow from household sector to business or government sectors that normally invest more than they save.

The first depository in the world was set up way back in 1947 in Germany. Then the total number of depositories in the world was 22 only and the number had crossed 250 by the end of 2004 and 310 by the end of 2014. The move on depository in India was initiated by the Stock Holding Corporation of India Limited (SHCIL) in July 1992 when it prepared a concept paper on “National Clearance and Depository System” in collaboration with Price Waterhouse under a programme sponsored by the U.S. Agency for International Development. Thereafter, the Government of India constituted a Technical Group under the Chairmanship of Shri R. Chandrashekharan, Managing Director, SHCIL, which submitted its Report in December, 1993. The Securities and Exchange Board of India (SEBI) constituted a seven member action squad subsequently to discuss the various structural and operational parameters of Depository System. Considering the various problems and issues, the Government of India promulgated the Depositories Ordinance in September 1995, thus paving the way for setting up of depositories in the country. The Depositories Act was passed by the Parliament in August 1996, which lays down the legislative framework for facilitating the dematerialisation and book entry transfer of securities in a depository. The Act provides that a depository, which is required to be a company under the Companies Act 1956, and depository participants (i.e. agents of the depository) need to be registered with SEBI. The Depository shall carry out the dematerialisation of securities and the transfer of beneficial ownership through electronic book entry. The investors, however, have the option to hold securities in physical or dematerialised form, or to rematerialise securities previously held in dematerialised form. The Depository Related Laws (Amendment) Ordinance, 1997 issued in January 1997 enabled units of mutual funds and UTI, securities of statutory corporations and public corporations to be dealt through depositories.

Objectives of the Study:

1. To know the role of NSDL and CDSL in Indian Capital Market.
2. To know the growth of NSDL and CDSL in Indian Capital Market for 16 years i.e. period ending 31st March 2001 to 31st March 2016
3. To know the features of depository system in India

Research Design and Methodology:

(i) Research Design

Research Design of the study is analytical

(ii) Methodology

The basis of present analysis is comparison of data between NSDL and CDSL on yearly (financial year) basis.

Data Collection and Analysis

The study is based upon secondary data collected from various websites i.e. NSDL, SEBI, CDSL, NSE and Official publications, annual reports of NSDL and CDSL and research articles published in journals for a period of 16 years i.e. from 31st March 2001 to 31st March 2016.

II. ROLE OF NSDL AND CDSL IN INDIAN CAPITAL MARKET

A. NSDL

NSDL carries out its activities through service providers such as depository participants (DPs), issuing companies and their registrars and share transfer agents and clearing corporations/ clearing houses of stock exchanges. These entities are NSDL's business partners and are integrated in to the NSDL depository system to provide various services to investors and clearing members. The investor can get depository services through NSDL's depository participants.

NSDL was registered by the SEBI on June 7, 1996 as India's first depository to facilitate trading and settlement of securities in the dematerialized form. The NSDL is promoted by IDBI, UTI and NSE to provide electronic depository facilities for securities traded in the equity and debt markets in the country. NSDL has been set up to cater to the demanding needs of the Indian capital markets. In the first phase of operations, NSDL will dematerialize scrips and replace them with electronic entries. This depository promoted by institutions of national stature responsible for economic development of the country has since established a national infrastructure of international standard that handles most of the trading and settlement in dematerialised form in Indian capital market. The Depositories Act also provides for multiple depository system. Using innovative and flexible technology systems, NSDL works to support the investors and brokers in the capital market of the country.

NSDL provides numerous direct and indirect benefits like:

- Elimination of bad deliveries
- Elimination of all risks associated with physical certificates
- No stamp duty
- Immediate transfer and registration of securities
- Faster settlement cycle
- Faster disbursement of non cash corporate benefits like rights, bonus, etc.
- Reduction in brokerage by many brokers for trading in dematerialized securities
- Reduction in handling of huge volumes of paper
- Periodic status reports

- Elimination of problems related to change of address of investor
- Elimination of problems related to transmission of demat shares
- Elimination of problems related to selling securities on behalf of a minor
- Ease in portfolio monitoring

B. CDSL

CDSL was promoted by BSE Ltd. jointly with leading banks such as State Bank of India, Bank of India, Bank of Baroda, HDFC Bank, Standard Chartered Bank and Union Bank of India.

CDSL was set up with the objective of providing convenient, dependable and secure depository services at affordable cost to all market participants.

The balances in the investors account recorded and maintained with CDSL can be obtained through the DP. The DP is required to provide the investor, at regular intervals, a statement of account which gives the details of the securities holdings and transactions. The depository system has effectively eliminated paper-based certificates which were prone to be fake, forged, counterfeit resulting in bad deliveries. CDSL offers an efficient and instantaneous transfer of securities.

CDSL was promoted by BSE Ltd. in association with Bank of India, Bank of Baroda, State Bank of India and HDFC Bank. BSE Ltd. has been involved with this venture right from the inception and has contributed overwhelmingly to the fruition of the project. The initial capital of the company is 104.50 crores (INR). The list of shareholders with effect from 5th July, 2010 is as under.

Role of CDSL in Indian Depository System are as follows:

- Maintenance of individual investors' beneficial holdings in an electronic form
- Dematerialization and re-materialization of securities
- Account transfer for settlement of trades in electronic shares
- Allotments in the electronic form in case of initial public offerings
- Distribution of non-cash corporate actions
- Facility for freezing/locking of investor accounts
- Facility for pledge and hypothecation of securities

III. KEY FEATURES OF THE DEPOSITORY SYSTEM IN INDIA

1. Multi-Depository System: The depository model adopted in India provides for a competitive multi-depository system. There can be various entities providing depository services. A depository should be a company formed under the Company Act, 1956 and should have been granted a certificate of registration under the Securities and Exchange Board of India Act, 1992. Presently, there are two depositories registered with SEBI, namely:

- National Securities Depository Limited (NSDL), and
- Central Depository Service Limited (CDSL)

2. Depository services through depository participants: The depositories can provide their services to investors through their agents called depository participants. These agents are appointed subject to the conditions prescribed

under Securities and Exchange Board of India (Depositories and Participants) Regulations, 1996 and other applicable conditions.

3. Dematerialisation: The model adopted in India provides for dematerialization of securities. This is a significant step in the direction of achieving a completely paper-free securities market. Dematerialization is a process by which physical certificates of an investor are converted into electronic form and credited to the account of the depository participant.

4. Fungibility: The securities held in dematerialized form do not bear any notable feature like distinctive number, folio number or certificate number. Once shares get dematerialized, they lose their identity in terms of share certificate, distinctive numbers and folio numbers. Thus all securities in the same class are identical and interchangeable. For example, all equity shares in the class of fully paid up shares are interchangeable.

5. Registered Owner/ Beneficial Owner: In the depository system, the ownership of securities dematerialized is bifurcated between Registered Owner and Beneficial Owner. According to the Depositories Act, 'Registered Owner' means a depository whose name is entered as such

in the register of the issuer. A 'Beneficial Owner' means a person whose name is recorded as such with the depository. Though the securities are registered in the name of the depository actually holding them, the rights, benefits and liabilities in respect of the securities held by the depository remain with the beneficial owner. For the securities dematerialized, NSDL/CDSL is the Registered Owner in the books of the issuer; but ownership rights and liabilities rest with Beneficial Owner. All the rights, duties and liabilities underlying the security are on the beneficial owner of the security.

6. Free Transferability of shares: Transfer of shares held in dematerialized form takes place freely through electronic book-entry system.

IV. GROWTH AND COMPARISON OF NSDL & CDSL

The below tables show that, the growth and development of de-materialization with reference to NSDL & CDSL period ending 31st March 2001 to March 2016 under the study.

Table I: Beneficiary Accounts Growth in NSDL & CDSL during March 2001 to 2016

Year (As on 31 st March)	NSDL Accounts in Lakhs	NSDL Annual Growth Rate (%)	CDSL Accounts in Lakhs	CDSL Annual Growth Rate (%)
2001	37.48	-	0.76	--
2002	37.18	(0.80)	1.28	68.42
2003	37.95	2.07	2.47	92.97
2004	52.03	37.10	6.29	154.66
2005	63.00	21.08	10.11	59.21
2006	75.60	20.00	15.51	53.41
2007	79.03	4.54	23.68	52.68
2008	93.72	18.59	47.98	102.62
2009	96.85	3.34	55.27	15.19
2010	105.85	9.29	65.86	19.16
2011	115.44	9.06	74.79	13.56
2012	120.48	4.37	79.17	5.86
2013	126.88	5.31	83.27	5.18
2014	130.57	2.91	87.77	5.40
2015	137.08	4.99	96.10	9.49
2016	145.66	6.26	100.08	4.14
Average Annual Growth Rate		9.87		44.23

Source: Monthly Updates and Annual Reports of NSDL and CDSL

Table I shows that the beneficiary accounts growth in NSDL and CDSL period ending March 2001 to March 2016. The beneficiary accounts of NSDL continuously increased from 37.48 lakhs accounts to 145.66 lakhs accounts except a marginal decrease in the year 2002. The percentage of growth was high in 2004 at 37.10% and lowest at (0.80%) in 2002. The average annual growth in accounts in NSDL during 2001 to 2016 is 9.87%. The beneficiary accounts of CDSL also continuously increased from 0.76 lakhs accounts to 100.08 lakhs accounts. The percentage of growth was high in 2004 at 154.66% and lowest at 4.14% in 2016. The

average annual growth in accounts in CDSL during 2001 to 2016 is 44.23%. The average annual growth rate of CDSL is higher than the NSDL. But during 2004 the number of client accounts recorded a sudden jump in the opening of accounts in both NSDL and CDSL due to substantial rise in the prices of shares. Thus it may be concluded that with the familiarisation and compulsorisation of the demat system; the number of clients has recorded tremendous increase over the entire period of study.

Table II: Companies Available for DEMAT in NSDL & CDSL during March 2001 to 2016

Year (As on 31 st March)	NSDL (No. of Companies)	NSDL Annual Growth Rate (%)	CDSL (No. of Companies)	CDSL Annual Growth Rate (%)
2001	2786	-	2789	--
2002	4172	49.75	4296	54.03
2003	4761	14.12	4628	7.73
2004	5212	9.47	4720	1.99
2005	5536	6.22	5068	7.37
2006	6022	8.78	4819	(4.91)
2007	6483	7.66	5135	6.56
2008	7354	13.44	5969	16.24
2009	7801	6.08	6233	4.42
2010	8124	4.14	7049	13.09
2011	8842	8.84	8265	17.25
2012	9741	10.17	9983	20.79
2013	10843	11.31	11030	10.49
2014	12210	12.61	12765	15.73
2015	13992	14.59	9069	(28.95)
2016	15605	11.53	9658	6.49
Average Annual Growth Rate		12.58		9.89

Source: Monthly Updates and Annual Reports of NSDL and CDSL

Table II reveals that companies available for DEMAT in NSDL and CDSL period ending March 2001 to March 2016. Companies available for DEMAT in NSDL continuously increased from 2786 to 15605. The percentage of growth was high in 2002 at 49.75% and lowest at 4.14% in 2010. The average annual growth in NSDL during 2001 to 2016 is 12.58%. Companies available for DEMAT in CDSL also

continuously increased from 2789 to 12765 except in the financial years 2006 and 2015. The percentage of growth was high in 2002 at 54.03% and lowest at (28.95%) in 2015. The average annual growth in CDSL during 2001 to 2016 is 9.89%. The average annual growth rate of NSDL is higher than the CDSL. But during 2002 the companies available for DEMAT recorded a sudden jump in both NSDL and CDSL.

Table III: Depository Participants Growth in NSDL & CDSL during March 2001 to 2016

Year (As on 31 st March)	NSDL (No. of DPs)	NSDL Annual Growth Rate (%)	CDSL (No. of DPs)	CDSL Annual Growth Rate (%)
2001	186	-	158	--
2002	212	13.98	161	1.90
2003	213	0.47	191	18.63
2004	214	0.47	211	10.47
2005	216	0.93	271	28.44
2006	223	3.24	322	18.82
2007	240	7.62	365	13.35
2008	251	4.58	423	15.89
2009	275	9.56	471	11.35
2010	286	4.00	506	7.43
2011	293	2.45	546	7.91
2012	283	(3.41)	568	4.03
2013	282	(0.35)	579	1.94
2014	278	(1.42)	578	(0.17)
2015	273	(1.80)	574	(0.69)

2016	270	(1.10)	583	1.57
Average Annual Growth Rate		2.62		9.39

Source: Monthly Updates and Annual Reports of NSDL and CDSL

Table III shows that Depository Participants growth in NSDL and CDSL period ending March 2001 to March 2016. Depository Participants in NSDL continuously increased from 186 in 2001 to 293 in 2011 and thereafter the number of depository participants were decreased continuously from the year 2012 to 2016 and reached to 270 participants. The percentage of growth was high in 2002 at 13.98% and lowest at (3.41%) in 2012. The average annual growth in NSDL during 2001 to 2016 is 2.62%. Depository

Participants in CDSL also continuously increased from 158 in 2001 to 583 in 2016 except a very marginal decrease in the years 2014 and 2015. The percentage of growth was high in 2005 at 28.44% and lowest at (0.69%) in 2015. The average annual growth in CDSL during 2001 to 2016 is 9.39%. The average annual growth rate of CDSL is higher than the NSDL.

Table IV: DP Service Centres Growth with NSDL & CDSL during March 2001 to 2016

Year (As on 31 st March)	NSDL (No. of DP Service Centres)	NSDL Annual Growth Rate (%)	CDSL (No. of DP Service Centres)	CDSL Annual Growth Rate (%)
2001	1896	-	132	--
2002	1648	(13.08)	346	162.12
2003	1718	4.25	414	19.65
2004	1719	0.06	441	6.52
2005	2819	63.99	532	20.63
2006	3017	7.02	586	10.15
2007	5599	85.58	634	8.19
2008	7204	28.67	6000	846.37
2009	8777	21.84	6000	0.00
2010	11170	27.26	6000	0.00
2011	12767	14.30	9200	53.33
2012	14033	9.92	10600	15.22
2013	14641	4.33	12500	17.92
2014	14444	(1.35)	11381	(8.95)
2015	15960	10.50	11000	(3.35)
2016	26765	67.70	16500	50.00
Average Annual Growth Rate		22.07		79.85

Source: Monthly Updates and Annual Reports of NSDL and CDSL

Table IV reveals that DP service centres growth in NSDL and CDSL period ending March 2001 to March 2016. DP service centres in NSDL continuously increased from 1896 to 26765 except a sudden decrease in the year 2002 and a marginal decrease in 2014. The percentage of growth was high in 2007 at 85.58% and lowest at (13.08)% in 2002. The average annual growth in NSDL during 2001 to 2016 is

22.07%. DP service centres in CDSL also continuously increased from 132 to 16500 except in the financial years 2014 and 2015. The percentage of growth was high in 2008 at 846.37% and lowest at (8.95%) in 2014. The average annual growth in CDSL during 2001 to 2016 is 79.85%. The average annual growth rate of CDSL is higher than the NSDL.

Table V: Quantity of DEMAT Shares/Securities (No. of Dematerialized Securities) in NSDL & CDSL during March 2001 to 2016

Year (As on 31 st March)	NSDL In Billions	NSDL Annual Growth Rate (%)	CDSL In Billions	CDSL Annual Growth Rate (%)
2001	37.21	-	1.89	--
2002	51.67	38.86	4.82	155.03
2003	68.76	33.08	8.21	70.33
2004	83.69	21.71	14.01	70.65
2005	128.66	53.73	19.08	36.19
2006	174.72	35.80	26.9	40.99

2007	202.70	16.01	32.01	19.00
2008	236.90	16.87	52.8	64.95
2009	282.87	19.40	70.47	33.47
2010	351.14	24.13	78.56	11.48
2011	471.30	34.22	110.41	40.54
2012	579.80	23.02	137.66	24.68
2013	686.48	18.40	151.81	10.28
2014	795.50	15.88	177.31	16.80
2015	927.36	16.58	206.01	16.19
2016	1100.20	18.64	227.55	10.46
Average Annual Growth Rate		25.76		41.40

Source: Monthly Updates and Annual Reports of NSDL and CDSL

Table V shows that Quantity of DEMAT Shares/Securities (No. of Dematerialized Securities) in NSDL and CDSL period ending 31st March 2001 to March 2016. No. of Dematerialized Securities in NSDL continuously increased from 37.21 billion to 1100.20 billion. The percentage of growth was high in 2005 at 53.73% and lowest at 15.88% in 2014. The average annual growth in NSDL during 2001 to

2016 is 25.76%. No. of Dematerialized Securities in CDSL also continuously increased from 1.89 billion to 227.55 billion. The percentage of growth was high in 2002 at 155.03% and lowest at 10.28% in 2013. The average annual growth in CDSL during 2001 to 2016 is 41.40%. The average annual growth rate of CDSL is higher than the NSDL.

Table VI: DEMAT Custody in NSDL & CDSL (Value of Dematerialized Securities) during March 2001 to 2016

Year (As on 31 st March)	NSDL Rs. in Billions	NSDL Annual Growth Rate (%)	CDSL Rs. in Billions	CDSL Annual Growth Rate (%)
2001	3262	-	127.36	--
2002	4426	35.68	243.37	91.09
2003	5513	24.56	361.64	48.60
2004	9662	75.26	1039.01	187.31
2005	14477	49.83	1209.59	16.42
2006	24789	71.23	2322.41	92.00
2007	31426	26.77	3150.39	35.65
2008	43770	39.28	6864.65	117.90
2009	31066	(29.02)	5201.48	(24.23)
2010	56178	80.83	8579.21	64.94
2011	66079	17.62	11645.81	35.74
2012	71323	7.94	10150.31	(12.84)
2013	76790.27	7.67	9869.24	(2.77)
2014	89398.76	16.42	10876.03	10.20
2015	117483.15	31.41	13942.64	28.20
2016	117157	(0.28)	13267.97	(4.84)
Average Annual Growth Rate		30.25		45.56

Source: Monthly Updates and Annual Reports of NSDL and CDSL

Table VI shows that DEMAT Custody in NSDL and CDSL (Value of Dematerialized Securities) period ending 31st March 2001 to March 2016. Value of Dematerialized Securities in NSDL continuously increased from Rs. 3262 billion to Rs. 117157 billion except in the financial years 2009 and 2016. The percentage of growth was high in 2010 at 80.83% and lowest at (29.02%) in 2009. The average annual growth in NSDL during 2001 to 2016 is 30.25%. Value of Dematerialized Securities in CDSL also continuously increased from Rs. 127.36 billion to Rs. 13942.64 billion except in the years 2009, 2012, 2013 and 2016. The percentage of growth was high in 2004 at 187.31% and lowest at (24.23%) in 2009. The average annual growth in CDSL during 2001 to 2016 is 45.56%. The

average annual growth rate of CDSL is higher than the NSDL.

V. CONCLUSION

To sum up, there is a sizable increase in terms of number of beneficiary accounts, number of companies available for DEMAT, number of depository participants, number of depository participants service centers, Quantity of DEMAT Shares/Securities (No. of Dematerialized Securities) and DEMAT Custody in NSDL & CDSL (Value of Dematerialized Securities). Positive annual average growth rate shows the growth of Indian Capital Market.

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Sunlight- mediated synthesis of silver and gold nanoparticles using Active Manuka Honey 20+ UMF^R against wound infection causing bacteria

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Abstract- The noble metal gold and silver nanoparticles have been successfully prepared using a bio-derived product-Active Manuka honey 20+ UMF^R. Manuka honey is well recognized for its beneficial properties over and above mixed flora honey for use in wound treatment. Having been found to offer effective antimicrobial, anti-inflammatory and debridement properties as a dressing, it is only the medical grade Active Manuka honey that should be used in open wounds. A high UMF^R grading above 10+ is recommended for wounds. The formation of silver and gold nanoparticles has been confirmed using UV-vis, SEM and FTIR analysis and its antibacterial activity was evaluated against *Enterococcus faecalis*, *Staphylococcus aureus* and *Escherichia coli*. Silver and gold nanoparticles showed a clear well defined inhibition zone compared to control. The results suggest the stabilized and reduced molecules of silver and gold nanoparticles may act as an effective antibacterial agent for wound healing.

Index Terms- Manuka Honey; Nanoparticles; Antibacterial activity; Wound healing.

I. INTRODUCTION

Manuka honey obtained from the *Leptospermum scoparium* (Manuka tree) in New Zealand. It is well-known for a pronounced antibacterial activity which cannot be found in any other honey. This honey demonstrates exceptional antimicrobial activity; however, studies have shown its antimicrobial process is independent of hydrogen peroxide, antimicrobial phenolics and flavonoids, all of which exert some degree of antimicrobial activity [1]. The antimicrobial activity of methylglyoxal forms a near perfect linear correlation with that of phenol, allowing its activity to be expressed as an equivalent phenol concentration commonly known as its unique manuka factor (UMF) [2]. The UMF rating given to manuka honeys increases with antimicrobial activity and ranges increases [3]. Manuka honey itself has long been in employment for clearing up infections, including abscesses, surgical wounds, traumatic wounds, burns and ulcers of different etiology [4]. Nanoparticles often show unique and considerably changed biological, physical and chemical properties compared to their macro scaled counterparts [5, 6]. Nanocrystalline silver and gold particles have been found tremendous application in the fields of high sensitivity

biomolecular detection, antimicrobials, micro-electronics, diagnostics and therapeutics [7]. Silver and gold belong to a family of 'free' electron metal that have a filled valence shell but an unfilled conduction band. When nanoparticles of silver and gold are irradiated with incident light, the 'free' electrons move under the influence of the electromagnetic field and are displaced relative to their positive core, which creates an oscillating dipole. Oscillating dipole absorb maximum energy at their resonance frequency, which lies in the visible range of the electromagnetic spectrum for silver and gold nanoparticles. To the best of our knowledge, the use of Manuka honey for the green synthesis of silver and gold nanoparticles has not been reported. Hence the present study was carried out to synthesize and characterize the silver and gold nanoparticles using Active Manuka honey20+ UMF^R and evaluate its antibacterial efficiency against wound infection causing bacteria *Enterococcus faecalis*, *Staphylococcus aureus* and *Escherichia coli*.

II. MATERIALS AND METHODS

A. Chemicals and materials

AgNO₃ and AuCl₄ were purchased from Sigma Aldrich. Manuka honey was purchased online from New Delhi.

B. Synthesis of silver nanoparticles

For the reduction of silver ions, 1 ml of honey was added to 9 ml of 0.1M aqueous AgNO₃. The reaction mixture was stirred properly and exposed to bright sunlight. The color of solution turned to yellowish- brown. The changed colour indicates the formation of silver nanoparticles.

C. Synthesis of gold nanoparticles

Honey dilution was prepared by mixing 1 ml honey to 9 ml of distill water. For the reduction of gold ions, 5 ml of aqueous honey was added to 5ml of aqueous AuCl₄. The reaction mixture was stirred properly and exposed to bright sunlight. The color of solution turned to brownish-black indicating the formation of gold nanoparticles.

D. Characterization

UV-vis spectroscopic analysis of the yellowish-brown colored solution and brownish-black solution was carried out using UV-vis spectrophotometer. The reduction of silver ions was monitored from (350-650) nm. And the reduction of gold ions was monitored from (400-700) nm. For FTIR measurement

the dried powder was analyzed on a FTIR spectroscopy. The morphology of the silver and gold nanoparticles was analyzed using scanning electron microscope (SEM).

E. Antibacterial assay

The efficiency of silver and gold nanoparticles as an antibacterial compound was evaluated against *Enterococcus faecalis*, *Staphylococcus aureus* and *Escherichia coli*. The disc diffusion method was used to assess the antibacterial activity of the synthesized silver and gold nanoparticles.

III. RESULTS AND DISCUSSION

A. UV-Vis Spectrophotometric analysis

UV-Visible spectroscopy is a significant technique to ascertain the formation and stability of metal nanoparticles in aqueous solution. Metallic nanoparticles display characteristic optical absorption spectra in UV-visible region called surface plasmon resonance (SPR). Metal nanoparticles have free electrons, which gives surface plasmon resonance absorption band, due to the combined vibration of electron of metal nanoparticles in resonance with light wave. The UV-Visible absorption of silver nanoparticles are exhibit maximum in range of 400-500 nm and gold nanoparticles are exhibit maximum in range of 500-600 due to this property[8]. Figure 1 shows the sharp band of silver nanoparticles was observed at 413 nm and gold nanoparticles band were observed at 534 nm.

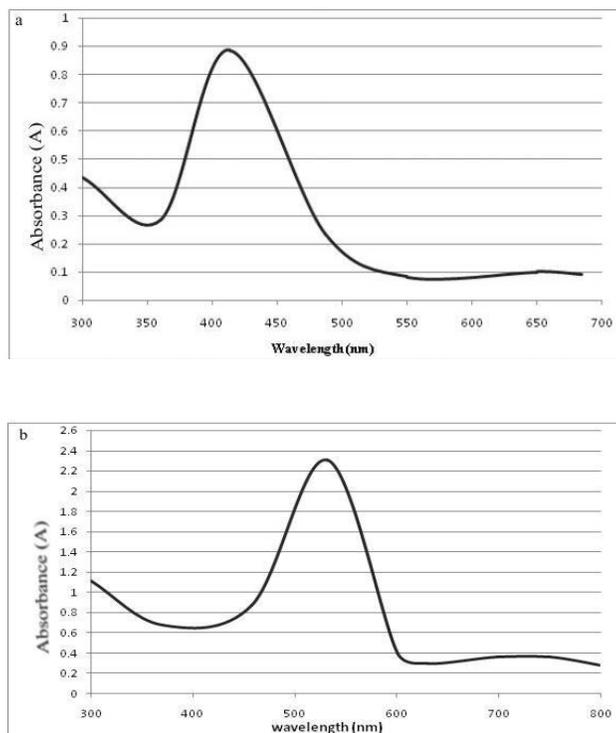


Figure 1: UV-vis spectra of manuka honey containing (a): AgNPs and (b): AuNPs

B. Scanning Electron Microscopy (SEM)

Morphology of silver and gold nanoparticles was confirmed using SEM analysis, which indicates that the metal nanoparticles presence in nano-size. Figure 2 shows aggregation of spherical shaped silver nanoparticles and spherical and square shaped gold nanoparticles was observed below 100 nm with the magnification of 20,000X

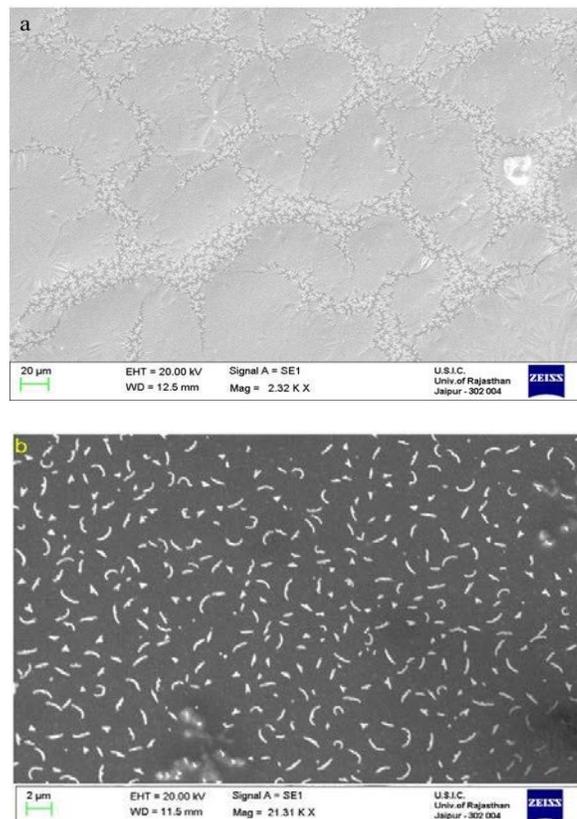


Figure 2: SEM micrograph of (a) silver nanoparticles (b) gold nanoparticles

C. Fourier transform infrared spectroscopy (FTIR)

FTIR measurement was carried out to identify the possible biomolecules of Manuka honey 20+ UMFR responsible for capping leading to efficient stabilization of the silver and gold nanoparticles. The FTIR spectrum obtained for Manuka honey 20+ UMFR displays a number of absorption peaks, reflecting its complex nature due to biomolecules. The IR spectrum of silver nanoparticles manifests prominent absorption bands at 3927, 3561, 3198, 3068, 2756, 2539, 2401, 1811, 1627, 1546, 1482, 1328, 1278, 1228, 1045, 854, 698, 588. The strong bands at 1627 cm⁻¹ and 1546 cm⁻¹ are due to the carboxyl stretch and N-H deformation vibrations in the amide linkages of protein. Ag nanoparticles can bind to protein through free carboxylate ion or amine group of the amino acid residue in it. The bond at 1045 cm⁻¹ is due to the C-O-C symmetric bending and C-O-H bending vibrations of protein in the manuka honey. The IR spectrum of gold nanoparticles manifests prominent absorption bands at 3956, 3447, 3058, 2902, 2832, 2379, 1993, 1646, 1442, 1329, 1099, 847, 673, 589, 463 cm⁻¹. The strong band at 3447 cm⁻¹ is due to N-H stretching vibration of primary amines. The band at 1329 and

1099 cm⁻¹ are may be due to C-N and -C-O-C stretching modes, respectively. The band at 673 cm⁻¹ is due to the bending vibration of N-H groups in proteins. This result suggested that the opening of the glucose ring by abstraction of the alpha-proton of the sugar ring oxygen and the metal ions oxidize glucose to gluconic and sucrose and protein/enzyme play a role in reduction.

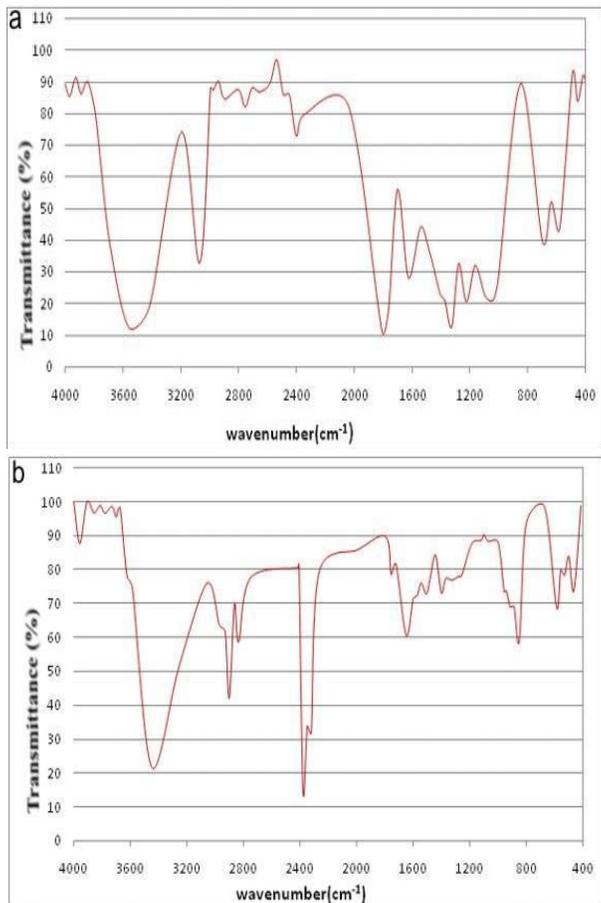


Figure 3: FTIR spectrum of (a) silver nanoparticles (b) gold nanoparticles

D. Antibacterial Screening

Silver and gold nanoparticles have been used for its antimicrobial properties. The more advances in generating silver and gold nanoparticles use as a powerful bactericide against various clinical pathogens.

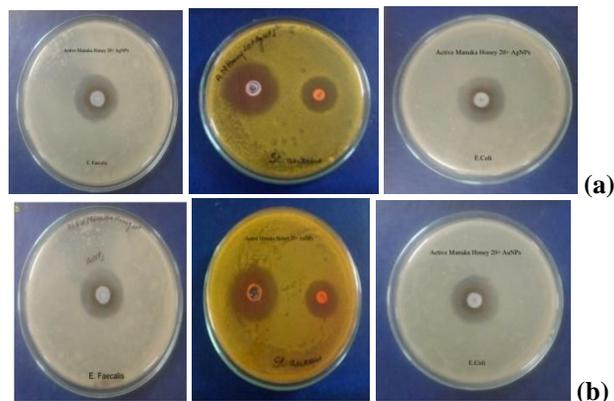


Figure 4: (a) Zone of inhibition of Silver nanoparticles against *Enterococcus faecalis*, *Staphylococcus aureus* and *Escherichia coli* and (b) Zone of inhibition of Gold nanoparticles against *Enterococcus faecalis*, *Staphylococcus aureus* and *Escherichia coli*.

In the present study, zone of inhibition of biologically synthesized silver and gold nanoparticles was evaluated against *Enterococcus faecalis*, *Staphylococcus aureus* and *Escherichia coli*. Figure: 4 depict synthesized silver and gold nanoparticles showed a clear well defined zone of inhibition against all the bacterial species. Thus, in the present investigation, the application of silver and gold nanoparticles was proved as an antibacterial agent by green route method.

IV. CONCLUSION

For the first time, a completely eco-friendly and fast method for the synthesis of metallic nanoparticles using Active Manuka honey 20+ UMF and sunlight is demonstrated. The use of natural honey, distilled water and practically nontoxic reagents can be produced silver and gold nanoparticles through “Sunlight- mediated”, methodology thus avoiding the presence of hazardous and toxic solvent and waste. The synthesised nanoparticles are used in sensitive areas such as biomedicine. Since the synthesised silver and gold nanoparticles using Active Manuka honey 20+ UMF shows antibacterial activity against tested bacterial pathogens, it could be targeted for the promising potential to prepare metallic nanoparticles impregnated wound dressing material for healing wounds effectively in future.

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Workplace Design and Job Performance: A Study of Operational Level Employees in the Apparel Industry of Sri Lanka

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Abstract- Work place design is one of the major determinants of employee job performance in all organization. Matching work place design with employee necessities is very essential for obtain maximum contribution of employees towards organization objectives. There for it is need to identify the relationship and the impact of workplace design towards job performance. Hence the main focus of this study was to identify the relationship between workplace design and job performance. Operational level employees in a leading garment manufacturing organization of Sri Lanka were investigated by using a sample of 90 employees. Simple random sampling method is used to select the representative sample. A self-administrated structured questionnaire was used to collect data. Correlation analysis and multiple regression analysis were used to test the research hypotheses. Study confirmed that workplace design is significantly correlated with employee job performance. Findings of the study indicate that there is a strong positive relationship between workplace design and job performance of operational level employees.

Index Terms- Workplace design, Job performance, Operational level employee

I. INTRODUCTION

Job performance of employees is an important matter for any organization and refers to whether an employee does his/her job well or not. Job performance consists of behaviors that employees do in their jobs that are relevant to the goals of the organization (Campbell, McCloy, Oppler and Sager, 1993). Organization's overall performance is affected by the job performance of the employees. Work place design, motivation, work life balance, job satisfaction, leadership style are some factors that influence to the job performance. Among them workplace design plays a significant role in affecting to the job performance of the employees. Many organizations do not give importance to workplace design; thus this study will give them ample reasons to consider workplace design as an important factor in increasing their employees' performance.

The workplace environment impacts employee morale, productivity and engagement - both positively and negatively. Unsafe and unhealthy work place environment includes poorly designed workstations, unsuitable furniture, lack of ventilation, inappropriate lighting, excessive noise, insufficient safety measures in fire emergencies and lack of personal protective equipment. People working in such environment are prone to

occupational disease and it impacts on employee's performance. It is the quality of the employee's workplace environment; how well they engage with the organization, especially with their immediate environment that most impacts on their level of motivation and subsequent performance.

Garment industry has become Sri Lanka's largest export industry since 1986 and it is also the country's largest net foreign exchange earner since 1992 (Dheerasinghe, 2003). Employee job performance is an important concept that every manager wants to maintain within their organizations. However the available studies do not provide empirical evidence with regard to the relationship between work place design and job performance of operational level employees in apparel industry in Sri Lanka. So this study will focus on whether there is a relationship between work place design and operational level employees' job performance in the apparel industry in Sri Lanka.

II. LITERATURE REVIEW

In today's competitive business environment, corporations can no longer afford to waste the talent of their workforce. Companies are run in a marathon to achieve their own goals and objectives. Therefore high performance of their employees is a must. The literature reveals that good workplace design has a positive effect on employees' performance.

Workplace Design

Research indicates a strong relationship between indoor environment and employee performance. Improvements in the physical environment result in the increase of employee productivity. Clements- Croome (2000) suggests that employee productivity could be improved by 4 to 10% by improving the office environmental conditions. Recent studies have constantly shown that improvements in the physical environment increase office performance (Sundstrom, Town, Rice, Osborn & Brill, 1994; Fisk and Rosenfeld, 1997; Heerwagen, 2000; Leaman and Bordass, 2001; Veitch and Newsham, 1998; Wyon, 2004). The physical layout of the work place, along with efficient management processes, is playing a major role in boosting employees' productivity and improving organizational performance (Uzee, 1999; Leaman and Bordass, 1993).

A comparative Australian post-occupancy evaluation between green buildings and conventional buildings shows that there are significant associations between perceived productivity and thermal comfort (Leaman et al, 2008). Also, several post-occupancy evaluations show that the higher indoor air quality is

the better occupant satisfaction and perceived productivity could be achieved (Paevere and Brown, 2008). The natural features including daylight, external view and natural ventilation strategies, have shown measurable gains for occupant health and performance at workplace. A research suggests that the well-designed natural conditioning and mechanical and lighting system interfaces could provide energy efficiency gains of up to 5 percent of energy use in the United States as well as health and quality of life gains (Loftness et al., 2005). According to Hameed & Amjad (2009) a widely accepted assumption is that better workplace environment produces better results. A comparative Australian post-occupancy evaluation between green buildings and conventional buildings shows that there are significant associations between perceived productivity and thermal comfort (Leaman, Thomas and Vandenberg, 2008). According to Sundstrom (1994) most people spend 50% of their lives within indoor environments, which greatly influence their mental status, actions, abilities and performance. Better outcomes and increased productivity is assumed to be the result of better workplace environment. Better physical environment of office will boost the employees and ultimately improve their productivity.

According to Carmen (2013) the work place design considerations include thermal comfort which indicates the right combination of temperature, airflow and humidity. A combination of these elements is required for physical comfort in the workplace. Good indoor environmental quality starts with a well-designed lighting system, which involves more than just providing windows and incandescent lighting. Lighting has an enormous potential for influencing occupant perception of the interior space. A variety of factors contribute to the lighting experience, including the amount and color of light, glare, variations in light levels, and use of day lighting (R S Means, 2002). Leaman and Bordass (2000) present evidence that air-conditioned buildings (usually, but not always deeper than 15 meter) have a more negative effect on perceived productivity than naturally ventilated buildings (less than 15 meter across). The connection is made between increased dependencies on environmental systems, such as air conditioning, and ill-health symptoms.

Robertson and Huang (2006) had researched the effects of a workplace design and training intervention and the relationships between perceived satisfaction of office workplace design factors (layout and storage) and work performance measures (individual performance, group collaboration and effectiveness) by studying 120 office workers using a workplace environment questionnaire. Results showed a significant, positive impact of the intervention on environmental satisfaction for workstation layout. Satisfaction with workstation layout had a significant relationship with individual performance, group collaboration and effectiveness. To perform the given tasks successfully employees should also be provided with sufficient equipments. This also includes personal protective equipments. According to Haladiya, Sachdev and Mathur (2005) if the workers have good knowledge about the health problem and the protection measures, but a huge gap could be observed between the knowledge and usage of personal protective equipment mainly due to non availability of safety devices, high cost and safety devices not provided by the manufacturers.

Job performance

Job performance of employees is an important issue for any organization and refers to whether an employee does his job well or not. Job performance consists of behaviours that employees do in their jobs that are relevant to the goals of the organization (Campbell, et al.1993). Motowidlo (2003) define job performance is based on employee behavior and the outcome is vital for the organizational success. Muchinsky (2003) explained job performance as a combination of employee's behaviors. Further he described that it can be monitored, measured and evaluated as outcomes at employee level and linked with the organizational goals. Therefore job performance is a vital determinant for organizational success.

There are different dimensions relating to job performance. According to Blumberg and Pringle (1982), three factors affect job performance namely ability variables (the requirement that helps to achieve the job performance), motivation variables (linked with employees to determine the job performance) and opportunity variables (work environment, group and leadership characteristics of the job) jointly affect performance. The term "performance" could be used to evaluate office work of employees, which is more focused on behaviour rather than result itself, compared with productivity. According to the expectancy model by Victor Vroom, an individual's performance is determined by effort with the interaction of environment and ability (Luthan, 2002).

Factors affecting to Job performance

Al-Anzi (2009) suggests that the key factors that affect employee productivity and performance fall into two categories:

1. Management driven factors
2. Factors that arise from premises, offices or factory design

Management driven factors

Al-Anzi (2009) identifies the followings as some of the management driven factors that affect employee's productivity and performance:

- Organization plans such as the allocation of responsibilities at all levels organization, definition of job descriptions and the degree of access management and administrative support needed to complete their tasks
- Working patterns, shift-working, break times, absence or holiday cover
- Health and safety policies, including the provision of training, development working practices and the adequate supply of protective clothing and equipment

Factors that arise from premises, offices or factory design

Al-Anzi (2009) further identify the followings as the key premises or office factors that tends to affect employee productivity and performance:

- Furniture
- Workspace availability
- Light intensity

- Weather/temperature
- Ventilation/humidity
- Noise/vibration
- Premises hygiene/welfare facilities

Workplace Design and Job performance

Over the years, many companies have been trying new designs and techniques in office buildings, which can promote productivity, and attract more employees (Hameed & Amjad, 2009). Many authors have noted that, the workplace design, along with effective management processes, is playing an important role in increasing employees’ productivity and boosting organizational performance (Uzee, 1999; Leaman and Bordass,1993). Research by the architects, Gensler (2005) of 200 UK business managers showed that an improved workplace would boost employee productivity by 19 per cent and their own productivity by 17 per cent. These improvements have great implications for the economy if proven. Gensler (2006) followed up this research in a survey of 2,000 of employees in the USA which showed that 90 per cent of the respondents believed that better interior design and layout result in better general employee performance.

The American Society of Interior Designers (ASID, 1999) carried out an independent study and revealed that the physical workplace design is one of the top three factors, which affect performance and job satisfaction. The study results showed that

31% of people were satisfied with their jobs and had pleasing workplace environments. 50% of people were seeking jobs and said that they would prefer a job in a company where the physical environment is good. Many executives are under the mistaken impression that the level of employee performance on the job is proportional to the size of the employee’s compensation package. Although compensation package is one of the extrinsic motivation tools it has a limited short term effect on employees’ performance (Ryan and Deci, 2000). Brill (1990) estimates that improvements in the physical design of the workplace may result in a 5-10 percent increase in employee productivity. Stallworth and Kleiner (1996) argue that increasingly an organization’s physical layout is designed around employee needs in order to maximize performance and satisfaction.

Conceptual Framework

The objective of this study is to examine the relationship between work place design and job performance of the operational level employees in the apparel industry of Sri Lanka.. An analysis and review of the relevant literature have used to develop the following conceptual framework (Figure 1). The framework shows five (5) independent variables such as workplace layout, ventilation, lighting, establishment of equipments and thermal comfort to measure workplace design. Job performance of the employees is the dependent variable.

Independent Variables

Dependent Variable

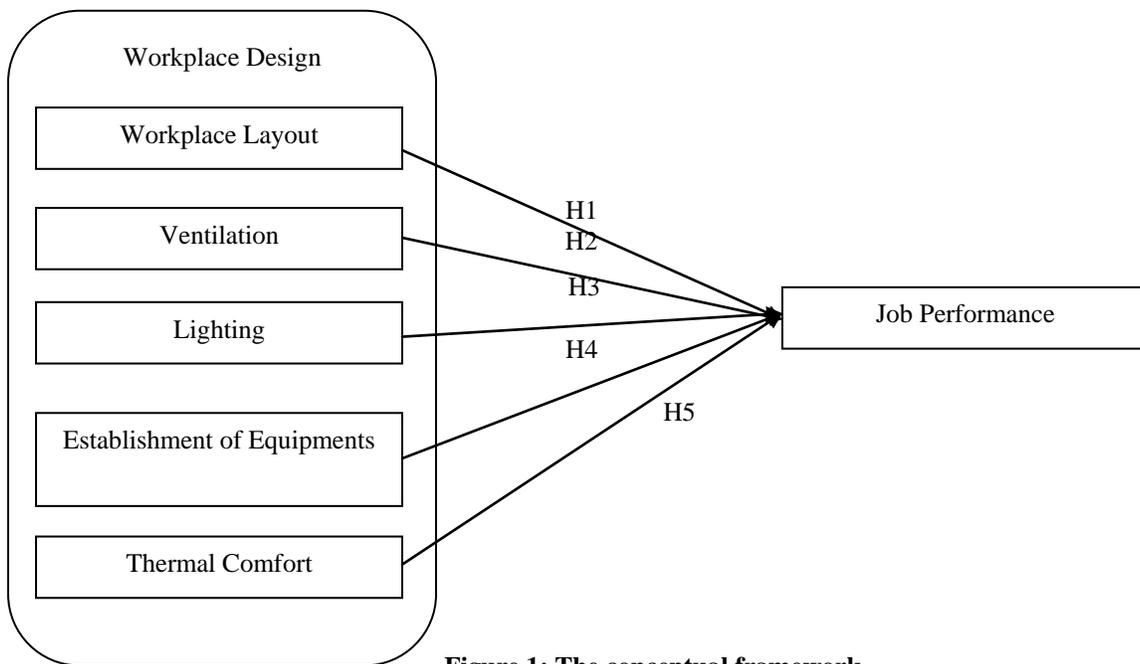


Figure 1: The conceptual framework

III. HYPOTHESES

Based on the above literature review and the conceptual model, following hypotheses (H) have been formulated for this study. H: Workplace layout, ventilation, lighting, establishment

of equipments and thermal comfort have significant relationships with job performance of employees.

IV. METHODOLOGY

The sample of this study is 90 operational level employees from a leading garment manufacturing organization in Sri Lanka. The simple random sampling technique was used to draw this sample from a population of 293 employees. Data collection was done by using self-administrated structured questionnaires.

The questionnaire consists of 38 questions and the first section of the questionnaire designed to obtain demographic characteristics, including age, gender, the length of work experience etc. In the second section there are 17 questions

regarding workplace design factors. Finally the third section consists of 16 questions regarding job performance. Some of the questions were close ended, while others scored on a 5-point Likert scale. Point 5 for strongly agree, 4 for agree, 3 for neutral, 2 for disagree and 1 for strongly disagree have been given in order to analyze data.

To test the hypotheses, Pearson's product moment correlation analysis, and multivariate analysis were used. The statistical computer package SPSS version 20.0 was utilized to analyze the data.

V. FINDINGS

Testing of Hypotheses

The results of Pearson's product moment correlation analysis used to test the hypotheses are presented in the Table I.

Table I: Pearson Correlation for all selected variables and job performance

Independent variables	Dependent variable (Job performance)	Sig.
Workplace layout	0.868	0.000
Ventilation	0.784	0.000
Lighting	0.907	0.000
Establishment of equipments	0.817	0.000
Thermal comfort	0.795	0.000

** . Correlation is significant at the 0.01 level (2-tailed).

The analysis of the results indicate a positive correlation between workplace layout and job performance ($r = 0.868$) and is significant at 0.01. This shows that when the workplace layout of the factory is not comfortable according to the needs of the employees their performance is affected. There is a positive relationship between ventilation and performance. The correlation coefficient ($r = 0.784$) is significant at 0.01. The positive relationship between lighting and performance ($r = 0.907$) at 0.01 shows that employees' performance is highly correlates to the lighting conditions in the factories. The results of establishment of equipments reveal its significant correlation

with performance ($r = 0.817$) at $p = 0.01$. Thermal comfort is the right combination of temperature, airflow and humidity in factory design; when the correlation was calculated in SPSS it gave a positive relation with performance ($r = 0.795$) where $p = 0.01$.

Multivariate analysis evaluates the simultaneous effects of all the independent variables on dependent variable. The results of regressing the five independent variables against the dependent variable occupational health and safety problems are shown in the Table II.

Table II: Aggregate impact of the workplace design factors on job performance

R	R ²	Adjusted R ²	Std. error of the estimate	F	Sig. F
0.929	0.864	0.862	0.40529	499.957	0.000

The adjusted square of the multiple R is 0.862 indicating that the 86.2% of variance in workplace design is explained by the five independent variables jointly. There is statistical evidence to

claim that five independent variables have significantly explained the 86.2% of the variance in workplace design in the selected domain.

VI. DISCUSSION

As hypothesized it was found that there are significant relationships between workplace layout, ventilation, lighting, establishment of equipments and thermal comfort and job performance of employees. The overall relationships of different elements of workplace design showed that lighting has the strongest positive relationship with job performance. Analysis of the collected data revealed that work place design has a significant impact on the employees' performance.

The sample indicated that majority of the operational level employees are female (74.1%). And the ages of 44.4% of operational level employees are in the range of 20 -29 years and 44.4% of the operational level employees have 1- 4 years experience. 58.0% of the operational level employees are General Certificate in Education (Ordinary Level) qualified. There is 35.8% of grade 10 pass out workers and 6.2% of General Certificate in Education(Advanced Level) qualified among operational level employees considered for the study.

VII. CONCLUSION

In line with this research, it is found that workplace design might affect to arising job performance. The research findings give evidence that good workplace layout, ventilation, lighting, establishment of equipments and thermal comfort leads to increase job performance of operational level employees. Therefore there is a direct relationship between workplace design and job performance. A strong correlation exists between elements of workplace design and job performance of employees. The regression analysis of the data shows that the coefficient of determination adjusted R. square = 0.862, so, it can be concluded that 86.2% of the variability in employees' job performance is accounted for by the variables in this model. Most of the organizations do not give importance to workplace design; this study will give them ample reasons to consider workplace design as an important factor in increasing their employees' performance.

VIII. RECOMMENDATION

Lighting was found to be the major factor, which has strongest positive relationship with the job performance of employees in the apparel industry of Sri Lanka. Therefore, it is recommended to have proper and adequate artificial as well as natural light to improve the workplace design for better performance. In order to establish a greater understanding of these relationships, research which combines human resource management, workplace design and performance needs to be developed. Within the indoor environment, lighting and workplace layout have the strongest relationship with employees' performance. Therefore it is recommended to develop, a validated human model in which at least the workplace layout in combination with the lighting conditions can be evaluated.

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Cytological evaluation of thyroid swellings in tribal population of Jharkhand

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Abstract- The goal of this study was to evaluate the diagnostic value of FNAC in the diagnosis of the thyroid swellings. Fine needle aspiration cytology is the unique tool for the pre-operative decision-making of the thyroid swellings. This research work was performed at the department of pathology, MGM Medical College and Hospital, Jamshedpur, Jharkhand. This was cross-sectional comparative study. The period of the study was two years from March, 2014 to February, 2016. The study group constituted of 112 patients presenting with thyroid swelling attending a tertiary care centre in MGM Medical College and Hospital, Jamshedpur, Jharkhand. FN aspiration were carried out in all cases and compared with surgical biopsies taking as gold standard. FNAC was done on total of 112 cases of the thyroid swellings. Females outnumbered males with a ratio of 3:1(85females and 27 males). In the FNAC, maximum cases (75.90%) were of colloid goitre, follicular carcinoma was found in 7.14% and anaplastic carcinoma in 3.57% of cases. Microscopical examination of stained tissue sections showed predominantly colloid goitre (72.32%) and then follicular carcinoma (8.04%). The overall incidence of malignancy was 11.61% diagnose by HPE and 9.82% by FNAC. FNAC is a primary diagnostic device for the pre-operative screening of thyroid swellings. It is simple, safe, reliable, minimally invasive, and cost effective.

Keywords – Fine needle aspiration cytology (FNAC), Histopathological examination (HPE), Ultrasonography (USG), Outpatient Department (OPD).

I. INTRODUCTION

Now-a-days different imaging techniques are used for pre operative diagnosis of thyroid swellings but still FNAC is regarded as the single most and cost effective procedure. FNAC of thyroid gland is now a well established, first line diagnostic tool for the evaluation of diffuse thyroid lesion as well as solitary thyroid nodule (STN) with main purpose of confirming benign lesion and by reducing unnecessary surgery. Thyroid nodules associated with troublesome clinical features were considered for FNAC. It should also be performed on nodules with abnormal USG findings. Aspiration is usually performed without local anesthesia and the patient does not require any previous preparation. Although there is a large body of world literature claiming the accuracy and advantages of thyroid aspiration cytology, there is also documents of showing possible limitations and hazards of this procedure. The best outcome of FNAC can be achieved by clinical assessment prior to the procedure, observation made by the performer during the procedure, quality of smear prepared, final microscopy evaluation and reports. The goals and objectives of the study were-

- a) To study the benefit of FNAC as a simple tool for the diagnosis of thyroid swellings.
- b) To compare the pre-operative FNAC with post operative HPE and to determine the sensitivity and specificity of this test.

II. MATERIALS AND METHODS

It was a case-control study organized at the department of pathology, MGM Medical College and Hospital, Jamshedpur, Jharkhand. The duration of study was two years from March, 2014 to February, 2016. This study included 112 subjects of thyroid swelling attending the outpatient department (OPD) of MGM Medical college and Hospital, Jamshedpur and sent them to pathology department for FNAC. The patients of all age groups and both sexes with thyroid swellings, were included in this study.

The principle out-come measures were to correlate the FNAC findings with clinical findings and also with that of postoperative histopathological findings.

A. Procedure of FNAC

The procedure was explained briefly to the patients for their cooperation. FNA of thyroid swelling was less painful, so no local anesthesia was used. First of all the skin over the swelling was cleaned, than it was fixed in between the left thumb and index finger and a disposable plastic 10 ml syringe fitted in to 23 gauge disposable needle was held in the right hand.

The needle was inserted vertical direction with the plunger of the syringe in the resting position. When the needle was in the right position, the plunger was retreated up-to a negative volume of 10 ml. Then the needle was moved back and forth within the lesion in different directions. FNAspiration was stopped if any material was found to appear in the hub of the needle, released the negative pressure before the needle was withdrawn. For each aspiration, 3 to 5 alcohol fixed (wet smear) and air dried smears were prepared. The wet smear was stained with Papanicolaou stain and dried smear was strained with Giemsa (MGG) stain or Leishman stain. A smear was considered satisfactory if it contained at-least 5 to 6 groups of 10 -15 well preserved follicular cells.

Finally, accuracy, sensitivity, specificity, etc were calculated by using standard criteria.

B. Statistical Analysis Used

The investigated data was thoroughly cleaned and entered into MS-Excel spread sheets and analyzed. Percentage were used in this study to analyze epidemiological variables

Accuracy: $((TP + TN) * 100) \div (TP + TN + FP + FN) = 99.11\%$

Specificity: $(TN * 100) \div (TN + FP) = 100\%$

Sensitivity: $(TP * 100) \div (TP + FN) = 91.67\%$

False Positive: $(FP * 100) \div (FP + TN) = 0\%$

False Negative: $(FN * 100) \div (FN + TP) = 8.33\%$

Predictive Value of a Positive Test : $(TP * 100) \div (TP + FP) = 100\%$

Predictive Value of a Negative Test : $(TN * 100) \div (TN + FN) = 99.01\%$

III. RESULTS

The research incorporated 112 cases of thyroid swellings. The female and male ratio was of 3:1 which is shown in fig 1.

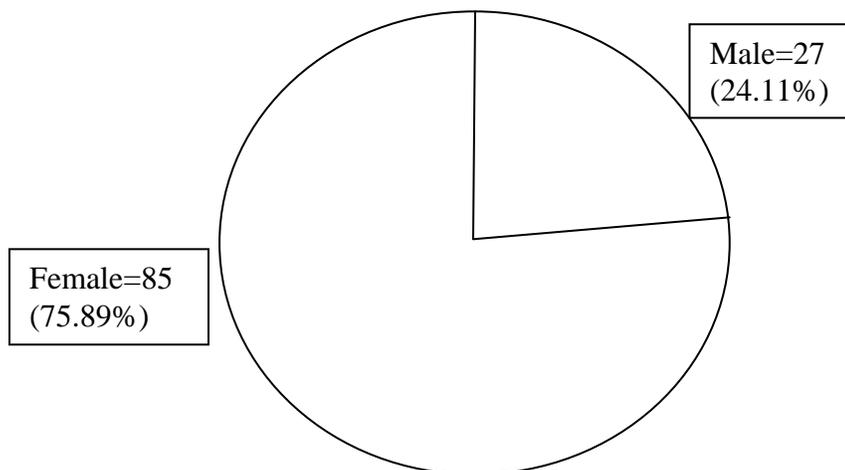


Fig 1. Gender wise distribution of studied patients.

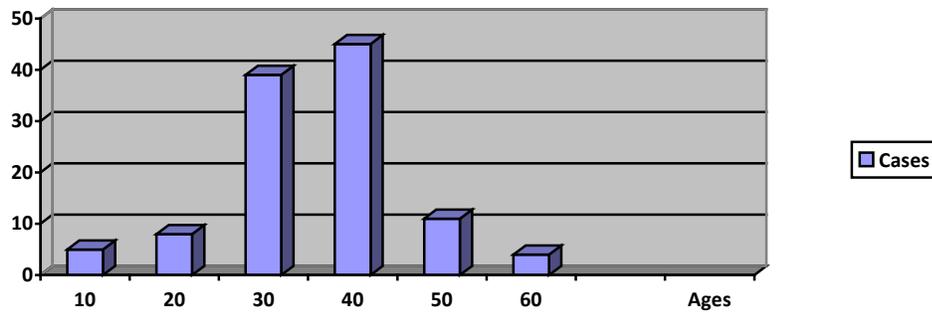


Fig. 2: Age wise distribution of studied population.

Maximum cases belonged to the age group of 21-40 years. Most of the patients presented in fourth decade (40.18%) followed by third decade (34.82%) shown in fig 2.

In this study FNAC was done in all 112 cases on an OPD basis. The greater number of the cases (75.90%) were diagnosed as colloid goitre. Follicular carcinoma was detected in 7.14% and anaplastic carcinoma in 3.57% of cases. Excisional biopsy and HPE were done in all the cases of thyroid swellings. In my research work, HPE showed 72.32% were of colloid goitre and 8.04% were of follicular carcinoma (table – 1).

Table 1. Thyroid swelling diagnosed by FNAC and HPE.

Diagnosis of Thyroid Swelling	Test	No. of Cases	Percentage
Colloid goitre	FNAC	85	75.90
	HPE	81	72.32
Granulomatous Thyroiditis	FNAC	08	7.14
	HPE	09	8.04
Follicular adenoma	FNAC	07	6.25
	HPE	08	7.14
Follicular carcinoma	FNAC	08	7.14
	HPE	09	8.04
Anaplastic carcinoma	FNAC	04	3.57
	HPE	05	4.46
Total	FNAC	112	100
	HPE	112	100

The overall prevalence of malignancy was 11.61 percent by HPE and 9.82 percent by FNAC. By FNAC 9.41 percent and by HPE 10.9 percent cases were diagnosed as malignant among females where as among males 14.81 percent cases were malignant as per FNAC and 18.52 percent were malignant as per HPE. In our research, the malignant rate was more in men (18.52%) as compared to women (10.59%) as shown in (table-2).

Table 2. Sex distribution of prevalence of malignancy as per FNAC and HPE.

Sex	Test	Total	Benign (%)	Malignant (%)
Female	FNAC	85	77 (90.59)	08 (9.41)
	HPE		76 (89.41)	09 (10.59)
Male	FNAC	27	23 (85.19)	04 (14.81)
	HPE		22 (81.48)	05 (18.52)
Total	FNAC	112	101 (90.18)	11 (9.82)
	HPE		99 (88.39)	13 (11.61)

The diagnostic value in FNAC in our research was that 11 cases were true positive while 100 cases were true negative. In thesis false positive cases were zero while false negative cases were one [Table-3]

True positive (TP) cases are those which are diagnosed correctly as malignant and true negative (TN) are those which are diagnosed correctly as benign. False positive (FP) cases are those which are benign but wrongly diagnosed as malignant. False negative (FN) are those cases which are malignant but are diagnosed as benign.

According to the research data of FNAC, the accuracy was 99.11 percent while sensitivity was 91.67 percent and specificity was 100 percent. PPV and NPV was 100 percent and 99.01 percent respectively.

Table 3. Correlation of FNAC and HPE in detecting the malignant nature of thyroid swelling.

FNAC diagnosis	Histopathological diagnosis		
	Malignant	Benign	Total
Positive	11 (TP)	0 (FP)	11
Negative	1 (FN)	100 (TN)	101
Total	12	100	112

IV. DISCUSSION

FNAC is an accurate preoperative screening method for the detection of thyroid lesions and distinguishing between benign and malignant lesions. Majority of clinically diagnosed thyroid nodules are non-neoplastic, only 5% -30% are neoplastic and require surgical intervention. We had a diagnostic accuracy of 99.11 percent with a predictive value for negative test of 99.01 percent. Overall of current research confirms the predictive value of FNAC as diagnostic tool.

In this thesis papillary carcinoma was not found. Most of the patients presented thyroid swellings in fourth and third decades of life which is also in accordance to the study of Bukhari and colleagues. The accuracy, percentage of false positive, and predictive value for negative result of FNAC as reported by the workers in this field as shown in table 4 and 5.

In our series, HPE showed a malignancy rate of 11.61 percent (13 cases out of 112 cases). The specificity was 100 percent, the sensitivity was 91.67 percent as compared with 64.3 percent sensitivity reported by others.

Table 4. Comparison of the results of this study with other reported.

Authors	Accuracy (%)	Sensitivity (%)	Specificity (%)	PPV (%)	NPV (%)
Ko et al 2003	84.4	78.4	98.2	99.0	66.3
Morgan et al 2003	67.2	55.0	73.7	70.0	67.4
Jogal et al 2005	78.1	88.4	99.1	---	---
Cal et al 2006	97.0	83.3	98.0	71.4	98.4
This study 2016	99.11	91.67	100	100	99.01

PPV:- Positive predictive value, NPV:- Negative predictive value

Table 5. Percentage incidence of malignancy as reported.

Authors	Year	Incidence (%)
Kapur et al.	1982	11
Bhansali	1982	9
Ng Eh et al.	1992	18.4-26.2
Adwork J. A.	1995	15
Abu Eshy et al.	1995	15.2

The follicular variant of papillary carcinoma is a hazard in thyroid FNAC. FNA smears show hypercellularity with a prominent follicular pattern but no obvious papillae. Leung et al disclosed that true nature of the histological variants of the papillary carcinoma cannot be foretold from the appearance of the FNAC.

Agarwal et al evaluated thyroid nodules in 100 cases, FNAC displayed an accuracy of 19.9 percent, sensitivity of 76.5 percent, and a specificity of 99.5 percent. False positive 2 percent, false negative 4 percent, PPV and NPV was 86.7 percent and 92.2 percent. They recapitulated FNAC as an accessory to clinical judgment not to replace it. In 1995, Ghosal, Pal, Mazumdar reported that accuracy rate of FNAC was 93 percent.

FNAC is common investigation in the diagnosis of superficial lumps though it's success depends on the skill of the person performing the procedure. The major drawback of FNAC is the lack of reliability with respect to distinguishing follicular adenoma from follicular carcinoma. The reason for this is that diagnosis of each entity is based on histological criteria i.e. vascular &/or capsular invasion. FNAC cannot provide this information.

V. CONCLUSION

FNAC is a primary diagnostic tool for thyroid nodules because it's one of the most useful, simple, safe, quick, reliable, minimally invasive, and cost effective. It can differentiate non-neoplastic lesions from neoplastic lesions and can be performed in OPD. It is easily reputable and is highly patient-compliant. FNAC is not a substitute for HPE.

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Study of the Impact on Morphological Features of *Abelmoschus esculentus* var. Ankur 41, irrigated by the Waste Water from AmanishahNallah, Sanganer Town, Jaipur, Rajasthan

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Abstract- In the present Study , Waste Water from AmanishahNallah, Sanganer Town, Jaipur is used for the irrigation of *Abelmoschus esculentus* var. Ankur 41, in Experimental Pot analysis. Water is used in many Diluted Levels to assess the Impact of Water Quality on the Morphology of selected Plant Species in their three Developmental Stages viz. Pre Flowering , Peak Flowering and Post Flowering Stage. Results show that the Water Quality affected the Morphology of Plant Species and retardation in Growth Parameters and Developmental Structures at various Developing stages had been observed by increase in the Dilution Levels(increase in Waste Water Concentration) and after comparing them with the Control Level. Results reveal that the Waste Water is not utilized directly for the irrigation purpose without prior treatment and not beyond certain level.

Index Terms- Waste Water, Morphology, Developmental Stages, *Abelmoschus esculentus*, AmanishahNallah.

I. INTRODUCTION

Water and its Quality Impacts all the Living Beings which depend on it for their survival. Today in our fast growing Metropolitan World, the rapid Industrialization and Developmental activities stresses out our all the natural resources, one of them is Water. Availability of the Water impacts its consumption pattern and later on impacted its Quality. Direct accumulation of untreated Waste Effluents into the water body changes its Physico- Chemical Parameters and when this quality of water is utilized for the irrigation purpose then it impacts the associated Soil quality as well as induces the negative impacts on the Plant Species, if irrigated by that untreated Waste Water directly without prior treatment. The

untreated and partially treated waste water contains Fertilizers, Pesticides, Textiles waste water, Pharmaceuticals and, various types of other chemicals which have been prove harmful for Living Beings including animals, Plants and Human Beings¹⁻⁴. Physico- Chemical parameters are induced due to discharge of Untreated or partially treated Industrial waste and Sewage Waste into Water Bodies⁵⁻⁷. The Untreated or Partially treated Waste Water from Industries are continuously used in irrigating the agricultural fields in Developing Countries including India⁸⁻¹⁰. Continuous use of this Waste Water for irrigation effects Soil Quality^{11,12}. The industrial effluents, in lower quantities provide macro and micro nutrient requirements of the plants, but higher quantity becomes harmful. Green vegetables are rich source of minerals like Calcium, Magnesium, Iron and Potassium, Vitamin K and C. They are low in fat, high in protein, and contain good amount of dietary fiber and water.

The Present Study aimed at studying the Impact of WasteWater collected from AmanishahNallah on the Morphological Features of *Abelmoschus esculentus* var. Ankur 41.

II. MATERIAL AND METHODOLOGY

Study Area and Collection of Water Samples: The Waste Water samples were collected from the AmanishahNallah at Sanganer Town, Jaipur, Rajasthan. Area is a hub of large number of Textile , Dyeing and Printing Industries , famous for its Sanganeri Printing. The Waste Water samples were collected from the area where the Industrial effluents directly merge inside the flowing Nallah.

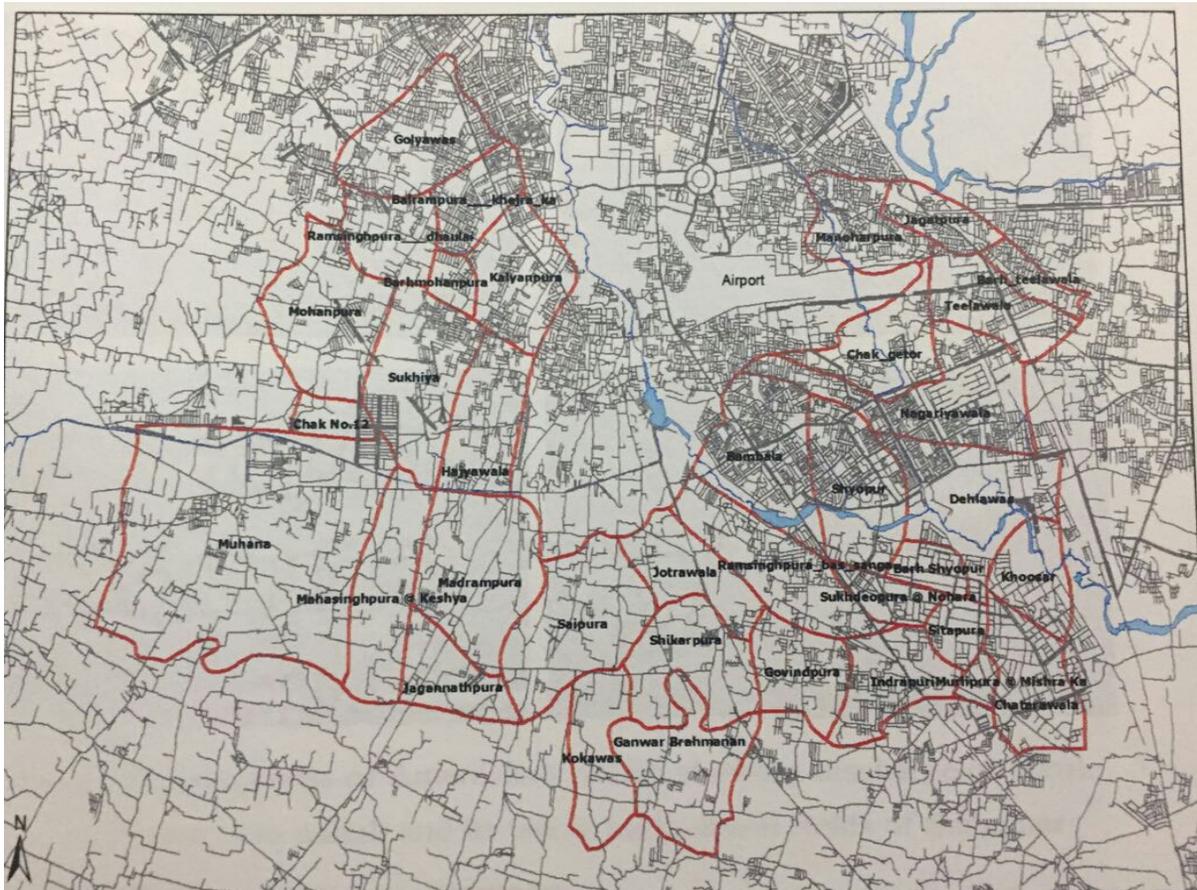


Figure 1: Showing Map of AmanishahNallah, flowing through Sanganer area, Jaipur, Rajasthan.

Experimental Setup andRising of Plants:

Experimental Pot Study had been carried out for analyzing the Impact of Water Quality on the Morphology of *Abelmoschusesculentus* var. Ankur 41; during all the Three Developmental Stages of the plant viz. Pre, Peak and Post Flowering Stage.

Morphological Analysis had been carried out to Study all the growth parameters of the Plant like: Root Length (cm); Shoot Length (cm); Root Dry Wt. (mg); Shoot Dry Wt. (mg); Total No. of Leaves; Leaf Length (cm); Leaf Width (cm); Total No. of Flowers; Total No. of Fruits; Fruit length (cm); Total No. of Seeds; Seed Colour; Seed Length(cm) and Seed Dry Wt. (mg). All the Morphological Features are studied timely from days to days in all the Three Stages of Plant.

Plant Height: All the Five Plants from per Pot in the Form of Five Replicates were taken out, Height of shoot and Root of these plants were measured by Meter Scale from the Soil Surface to the base of the fully expanded top leaf at each harvest. Average was calculated on the basis of number of plants/replicates.

Biomass Estimation:

For Dry Wt. determination Individual plants were carefully removed from pots and field keeping the Root and Shoot system intact. Plant roots were thoroughly washed in running water to remove soil particles. Roots and Shoots (Biomass of shoot was taken without ear) were separated and dried in the oven at 80°C for 48 hours then their Dry weights were recorded. These

Weights were expressed in g/plant. Average was calculated on the basis of number of plants/replicates.

Genotype of the Species:-

Abelmoschusesculentus var. Ankur 41.
Common name is Bhindi, (okra; Ladyfinger)

- Kingdom – Plantae
- Order - Malvales
- Family – Malvaceae
- Genus – Abelmoschus
- Species – A. esculentus
- Variety – Ankur 41
- Edible Part – Green Seed Pods

Use – one of the most common Vegetable, Medicinal use in curing Diabetes, Hair loss solutions, source of Vitamin E and Vitamin K .

Sowing – January- February

Maturity- March – April

Experimental Design for studying Impact of Water Quality on Plant Species through Pot Experiment :-

Levels of Irrigation Water samples	Distilled Water (Control, 100% D.W.), 20%, 50%, 80%, 100%
Frequency of Irrigation by Particular Water samples with Dilution Levels	Every Next Day

Site of application of Levels	Soil Surface in the pot
Mode of application	Poured in the pot
Duration of Experiment	Almost 90 days
Number of Harvest	Total three harvest- Pre, Peak and Post Flowering Stage
Individual Pot size	12 inches diameter
Population of Plants Maintained per pot	5
Plant Harvested per Harvest per Level	5

Following 5 treatment levels were prepared by diluting the water from AmanishahNallah , Jaipur with the Distilled water. The Plants investigated at 3 stages of their maturation at Pre, Peak and Post Flowering Stage.
Level 1: DW(control): WW (100:00)
Level 2: DW:WW (80:20)
Level 3: DW:WW (50:50)
Level 4: DW:WW (20:80)
Level 5: DW:WW (00:100)

Earthen Pots (with a diameter of 12 inch) were used for conducting pot experiment for the test Plant species i.e. *Abelmoschuseculentus* var. Ankur 41.

Results and Discussion:

S.no.	Morphological Features	AmanishahNallah Irrigated		(Pre Flowering Stage)		
		Control (DW:WW) (100:00) (Level 1)	(DW:WW) (80:20) (Level 2)	(DW:WW) (50:50) (Level 3)	(DW:WW) (20:80) (Level 4)	(DW:WW) (00:100) (Level 5)
1.	Root Length(in cm)	21.36±0.152	21.26±0.057	19.43±0.115	18.16±0.057	13.06±0.057
2.	Shoot Length(in cm)	15.2±0.208	14.2±0.1	14±0.1	12.46±0.230	11.76±0.230
3.	Root Dry Weight(in mg)	1.78±0.012	1.68±0.011	1.66±0.010	1.58±0.012	1.48±0.010
4.	Shoot Dry Weight(in mg)	1.97±0.012	1.86±0.059	1.74±0.023	1.61±0.010	1.57±0.011
5.	Total No. of Leaves	18	17	17	16	16
6.	Leaf Length(in cm)	6.46±0.057	5.8±0.173	5.36±0.057	5.26±0.057	3.96±0.057
7.	Leaf Width(in cm)	7.16±0.057	6±0.1	5.76±0.057	5.4±0.173	4.33±0.057
8.	Leaf Colour	Dark Green	Dark Green	Light Green	Light Green	Light Green

Table 1: Morphological Study of *Abelmoschuseculentus* var. Ankur 41, irrigated by AmanishahNallah, Jaipur, Water. (Pre Flowering Stage):-

S. No.	Morphological Features	AmanishahNallah Irrigated		Peak-Flowering Stage		
		Control (DW:WW) (100:00) (Level 1)	DW:WW) (80:20) (Level 2)	(DW:WW) (50:50) (Level 3)	DW:WW) (20:80) (Level 4)	DW:WW) (00:100) (Level 5)
1.	Root Length (in cm)	24.26±0.057	22.53±0.472	21.13±0.907	20±0.1	17.5±0.1
2.	Shoot Length(in cm)	17.76±0.152	15.56±0.493	15.13±0.057	14±0.1	12.6±0.435
3.	Root Dry Weight (in mg)	1.78±0.010	1.73±0.058	1.68±0.010	1.59±0.010	1.53±0.010
4.	Shoot Dry Weight (in mg)	2.39±0.506	2.08±0.010	1.96±0.010	1.91±0.016	1.83±0.010
5.	Total No. of	24	22	20	20	19

	Leaves					
6.	Total No. of Flowers	10	08	09	07	05
7.	Leaf Length (in cm)	6.76±0.057	6±0.1	5.73±0.057	5.36±0.230	4.13±0.115
8.	Leaf Width(in cm)	7.26±0.152	6.26±0.057	5.96±0.057	5.7±0.1	4.6±0.1
9.	Leaf Colour	Dark Green	Dark Green	Light Green	Light Green	Light Green

Table 2: Morphological Study of *Abelmoschus esculentus* var. Ankur 41, irrigated by AmanishahNallah, Jaipur, Water. (Peak Flowering Stage):-

S. No.	Morphological Features		AmanishahNallah Irrigated		Post Flowering Stage	
		Control (DW:WW) (100:00) (Level 1)	DW:WW (80:20) (Level 2)	(DW:WW) (50:50) (Level 3)	DW:WW (20:80) (Level 4)	DW:WW (00:100) (Level 5)
1.	Root Length (in cm)	26.03±0.737	23.36±0.251	22.4±0.435	20.46±0.513	19.1±0.360
2.	Shoot Length(in cm)	18.16±0.305	16.2±0.4	15.8±0.1	15.26±0.351	13.53±0.321
3.	Root Dry Weight (in mg)	1.79±0.010	1.71±0.010	1.67±0.058	1.64±0.010	1.58±0.010
4.	Shoot Dry Weight (in mg)	2.15±0.010	2.08±0.010	1.96±0.010	1.93±0.010	1.86±0.054
5.	Total No. of Leaves	28	26	27	24	23
6.	Total No. of Fruits	10	07	05	03	03
7.	Leaf Length (in cm)	7.2±0.2	6.53±0.550	6.3±0.2	5.86±0.057	4.9±0.1
8.	Leaf Width(in cm)	8.2±0.264	7.16±0.404	6.46±0.11	6.1±0.1	5.23±0.351
9.	Leaf Colour	Dark Green	Dark Green	Dark Green	Light Green	Light Green
10.	Fruit Length (in cm)	7.46±0.057	7.1±0.1	6.8±0.1	6.13±0.208	5.33±0.208
11.	Total No. of Seeds	43	35	30	28	20
12.	Seed- Shape	Round	Round	Small Round	Wrinkled Round	Wrinkled Round
13.	Seed- Colour	White	White	White	White	White
14.	Seed Length (in cm)	0.46±0.057	0.36±0.057	0.36±0.057	0.16±0.057	0.13±0.057
15.	Seed Dry Weight (in mg)	5.36±0.057	4.9±0.1	4.1±0.2	3.83±0.152	3.43±0.208

Table 3: Morphological Study of *Abelmoschus esculentus* var. Ankur 41, irrigated by AmanishahNallah, Jaipur, Water. (Post Flowering Stage):-

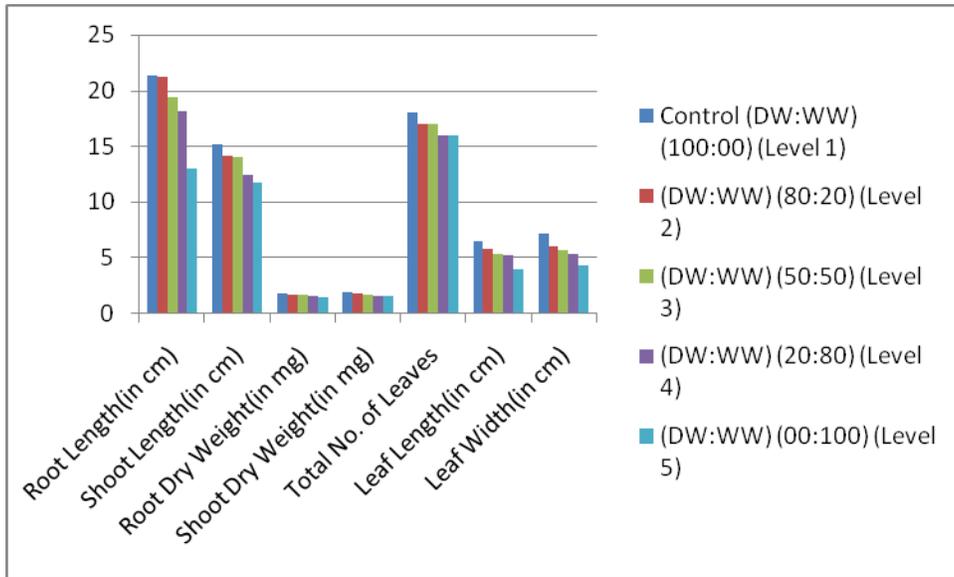


Figure 1: Morphological Analysis of Abelmoschus esculentus var. Ankur 41, irrigated by Water of Amanishah Nallah, Jaipur. (Pre Flowering Stage).

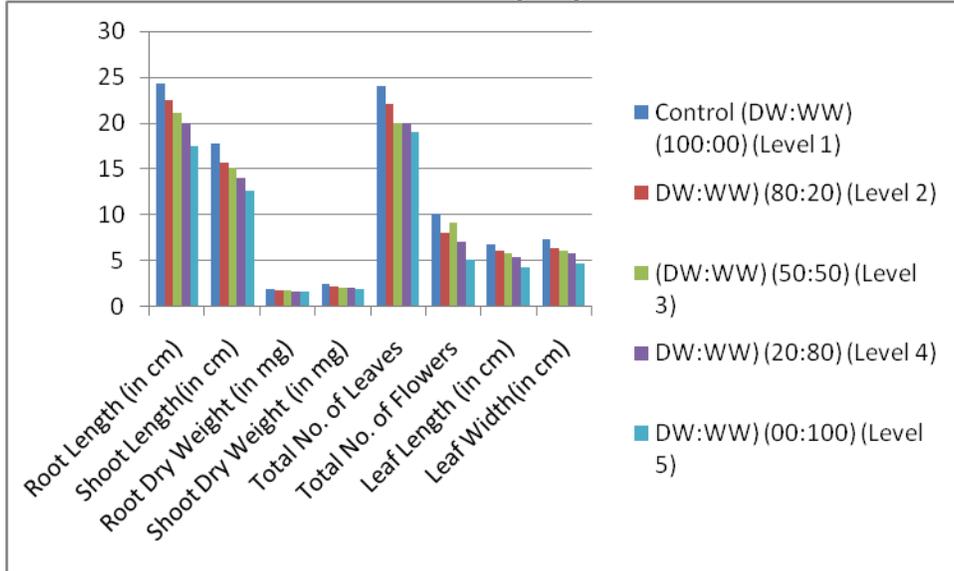


Figure 2: Morphological Analysis of Abelmoschus esculentus var. Ankur 41, irrigated by Water of Amanishah Nallah, Jaipur. (Peak Flowering Stage).

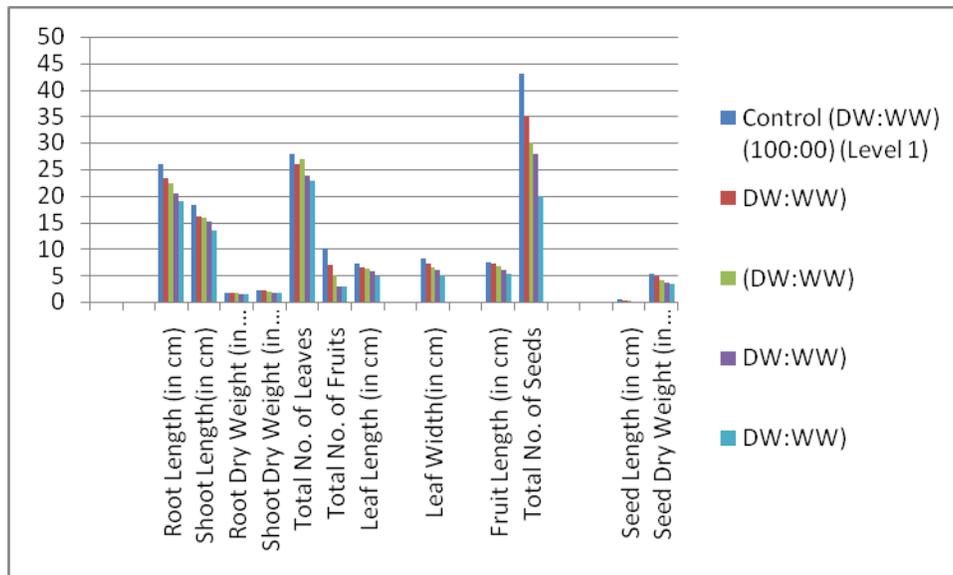


Figure 3: Morphological Analysis of *Abelmoschus esculentus* var. Ankur 41, irrigated by Water of AmanishahNallah, Jaipur. (Post Flowering Stage).

Root Length: Results show that the Root Length of *Abelmoschus esculentus* var. Ankur 41, at Pre Flowering Stage when irrigated by the Water of AmanishahNallah in all the Five Levels is 21.36, 21.26, 19.43, 18.16 and 13.06 cm respectively. Results show that the Root Length of the AmanishahNallah Water irrigated Plants in their Peak Stage is 24.26 cm in First Dilution Level and 22.53, 21.13, 20, 17.5 cm in Second, Third, Fourth and Fifth Dilution Level. **Root Length:** Results show that the Root Length of the AmanishahNallah Water irrigated Plants in their Post Stage is 26.63cm in First Dilution Level and 23.36, 22.4, 20.46, 19.1 cm in Second, Third, Fourth and Fifth Dilution Level.

Shoot length: Results show that the value of Shoot Length calculated when irrigated by AmanishahNallah at all the Five Levels is 15.2, 14.2, 14, 12.46 and 11.76 cm respectively. Results Show that the Shoot Length of the AmanishahNallahWater Irrigated Plants in Peak is 17.76 cm in First Dilution Level Stage while it is 15.56, 15.13, 14, 12.6 at Second, Third, Fourth and Fifth Dilution Levels respectively. Results Show that the Shoot Length of the AmanishahNallahWater Irrigated Plants in Post stage is 18.16 cm in First Dilution Level Stage while it is 16.2, 15.8, 15.26, 13.53 at Second, Third, Fourth and Fifth Dilution Levels respectively.

Root Dry Weight: Results show that the Root Dry Weight in Pre Stage when irrigated by Water of AmanishahNallah is 1.78 mg at First Dilution Level whereas it is 1.68, 1.66 1.58 and 1.48 mg at Second, Third, Fourth and Fifth Dilution Levels. Results show that the Root Dry Weight of AmanishahNallah irrigated Plants In Peak has 1.78, 1.73, 1.68, 1.59 and 1.53 mg of First, Second, Third, Fourth and Fifth Dilution Levels respectively. Results show that in the Post stage Root Dry Weight of AmanishahNallah irrigated Plants has 1.79, 1.71, 1.67, 1.64 and 1.58 mg of First, Second, Third, Fourth and Fifth Dilution Levels respectively.

Shoot Dry Weight : Results show that the AmanishahNallah irrigated Plants have Shoot Dry Weight in all

the Five Dilutions Level in Pre is 1.97, 1.86, 1.74, 1.61 and 1.57 mg respectively. Results show that the Shoot Dry Weight of AmanishahNallah Irrigated Plants in Peak is 2.39 mg at First Dilution Level Stage the it is 2.08 mg at Second Dilution Level Stage while it is 1.96 mg at Third Level, then at Fourth Level it is 1.91 mg and finally at Fifth Dilution Level it varies to 1.83 mg. Results show that the Shoot Dry Weight of AmanishahNallah Irrigated Plants in Post is 2.15 mg at First Dilution Level Stage the it is 2.08 mg at Second Dilution Level Stage while it is 1.96 mg at Third Level, then at Fourth Level it is 1.93 mg and finally at Fifth Dilution Level it varies to 1.86 mg.

Total No. of Leaves: Results show that at Control Level the AmanishahNallah irrigated Plants have Total 18 Leaves while at Second, Third, Fourth and Fifth Dilution Levels the No. of Leaves is 17, 17, 16 and 16 respectively in Pre stage. Results show that the Total No. of Leaves in AmanishahNallah Water Irrigated Plants in Peak is 24 Leaves at First Dilution Level, 22, 20, 20 and 19 Leaves in Second, Third, Fourth and Fifth Dilution Levels respectively. Results show that in Post the Total No. of Leaves in AmanishahNallah Water Irrigated Plants is 28 Leaves at First Dilution Level, 26, 27, 24 and 23 Leaves in Second, Third, Fourth and Fifth Dilution Levels respectively.

Leaf Length: Results show that the Length of Leaves irrigated by the Water of AmanishahNallah at the Pre Flowering Stage of their Plants is 6.46 cm at First Level, 5.8 cm at Second Dilution Level, 5.36 cm at Third Level, 5.26 cm at Fourth Level and 3.96 cm at Fifth Level. Results show that the AmanishahNallah Water Irrigated Plants in Peak stage has Leaf Length of 6.76 cm in First Dilution Level while it variates to 6 cm, 5.73 cm, 5.36 cm and 4.13 cm in Second, Third, Fourth and Fifth Dilution Levels respectively. Results show that the AmanishahNallah Water Irrigated Plants has Leaf Length of 7.2 cm in First Dilution Level while it variates to 6.53 cm, 6.3 cm, 5.86 cm and 4.9 cm in Second, Third, Fourth and Fifth Dilution Levels respectively in their Post Flowering stage.

Leaf Width: Results show that the Width of the Leaves irrigated with the Water of AmanishahNallah in Pre stage has

Width of 7.16, 6, 5.76, 5.4 and 4.33 cm at their all the Five Dilution Levels respectively. Results show that the AmanishahNallah Water Irrigated Plants in Peak has Leaf Width of 7.26 cm in their First Dilution Level, 6.26 cm in Second Dilution Level and 5.96, 5.7 and 4.6 cm Width in Third, Fourth and Fifth Dilution Levels respectively. Results show that the AmanishahNallah Water Irrigated Plants has Leaf Width in Post stage of 8.2 cm in their First Dilution Level, 7.16 cm in Second Dilution Level and 6.46, 6.1 and 5.23cm Width in Third, Fourth and Fifth Dilution Levels respectively.

Leaf Colour: Results show that the Colour of the Leaves Irrigated by the Water of AmanishahNallah in First Dilution Level is Dark Green and in Second Dilution Level it is Dark Green in colour then later on it becomes Light Green in all the three Dilution Levels that is Third, Fourth and Fifth Level in Pre stage. Results show that in Peak the Leaf Colour of the AmanishahNallah Irrigated Plants at their First Dilution Level is Dark Green, and Dark Green is Observed in Second Dilution Level while it is Light Green in Third, Fourth and Fifth Dilution Levels. Results show that the Leaf Colour of the AmanishahNallah Irrigated Plants in Post at their First Dilution Level is Dark Green, and Dark Green is Observed in Second Dilution Level as well as Third Dilution Level, Fourth and Fifth Dilution Levels show Leaves of Light Green Colour.

Total No. of Flowers: Results show that the Total No. of Flowers in Plants Irrigated by the Water of AmanishahNallah at their Peak Flowering Stage is 10 at First Dilution Level, 08 at Second Dilution Level while 09, 07 and 05 in their Third, Fourth and Fifth Dilution Levels.

Flower Colour: Results show that the AmanishahNallah Irrigated Plants in Peak Stage are Light Yellow Colour in all the Five Dilution Levels.

Total No. of Fruits: Results show that the Total No. of Fruits in Plants in their Post Stage Irrigated by the Water of AmanishahNallah at their Post Flowering Stage is 10 at First Dilution Level, 07 at Second Dilution Level while 05, 03 and 03 in their Third, Fourth and Fifth Dilution Levels.

Fruit Length: Results show that the Length of Fruits in AmanishahNallah Water Irrigated Plants in their Post Stage is 7.46cm in First Control Level, then it is 7.1 cm in Second Dilution Level while it is 6.8 cm, 6.13 cm and 5.33 cm in Third, Fourth and Fifth Dilution Levels respectively.

Total No. of Seed: Results show that the Total No. of Seed in AmanishahNallah Water Irrigated Plants in Post stage is 43 Seeds in First Control Level while 35, 30, 28, 20 Seeds at Second, Third, Fourth and Fifth Dilution Levels respectively.

Seed Shape: Results show that the Seed Shape in AmanishahNallah Water Irrigated Plants in Post Stage is Round in Control and Second Level, while it is Small Rounded in Third Level and Slight Wrinkled Round in Fourth and Fifth Level respectively.

Seed Colour: Results show that the Seed Colour of AmanishahNallah Water irrigated Plants is White in their Post Stage.

Seed Length: Results show that the Length of the Seeds in AmanishahNallah Water Irrigated Plants in Post Stage is 0.46 cm in First Level, 0.36 cm in Second Level, while 0.36 cm, 0.16 cm and 0.13 cm in Third, Fourth and Fifth Level respectively.

Seed Dry Weight: Results show that the AmanishahNallah Water Irrigated Plants Seeds has Dry Weight of 5.36 mg in First Dilution Level, then 4.9 mg in Second Dilution Level while 4.1 mg, 3.83 mg and 3.43 mg in Third, Fourth and Fifth Dilution Levels respectively in their Post Flowering Stage.

III. CONCLUSION AND RECOMMENDATIONS

In the present Study, all the results reveal that the Waste Water is not suitable in its pure Untreated Form for the irrigation purpose in the Agricultural Fields. Here also in the Study Conducted, it can be easily observed that as the Dilution Level increases up to the pure Waste Water Range, the plants show stressed and reduced Morphological features and, up to the appropriate range which seems to be 20% diluted or maximum to the 50% dilution level, Plants show less Waste Water stress inside them. So if we want to proceed irrigation with utilization of such form of water then we have to plan and act for its proper prior treatment measures and then its utilization in the activities like Agriculture.

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Contribution of Umwalimu Savings and Credit Cooperative (Umwalimu Sacco) On Socio –Economic Development of Teachers in Rwanda

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Abstract- This study seeks to assess the contribution of Umwalimu Saving and Credit Cooperative (Umwalimu Sacco) on socio-economic development of teachers in Rwanda. Specifically the study was guided by the following objectives: to assess the contribution of saving on Umwalimu Sacco that increase the socio-economic development of teachers in Rwanda; to examine the impact of loan/credit provided by Umwalimu socio-economic development of teachers in Rwanda and the last determine the importance of teachers' cooperatives supported by Umwalimu Sacco on socio-welfare -economic development of teachers in Rwanda.

The study used a convenient sample that included 90 respondents out of 1276 from Primary and Secondly Teachers members of Umwalimu Sacco in Gasabo District, Officials of Umwalimu Sacco and finally the officials of Gasabo District. The survey was conducted anonymously through the Internet and participants were asked to answer a researcher-developed questionnaire such as the contribution of saving on Umwalimu Sacco; the importance of loan/credit and the impact of teachers' cooperative on socio-economic development of teachers in Rwanda?.

The researcher was followed the Qualitative research paradigm as a systematic subject approach used to describe life Experiences and give meaning with a goal of gaining insight; explore the depth, richness, and inherent complexity in the phenomenon through specific approach which was a Case study that was described in-depth the experience of one person, family, group, community or institution with the method of direct observation and interaction on the subject. Data has been obtained from the officials of the Umwalimu Sacco; Teachers of 121 Primary Schools and 82 for Secondly Schools in Gasabo District, Officials of the Umwalimu Sacco and finally officials of the Gasabo District; This study demonstrated the significant impact of Umwalimu Sacco on socio-economic development. However, the results indicated that there is a significant impact on socio-economic development. Data was mainly collected using questionnaires and content analysis has been done to make meaning to the collected qualitative data so as to make conclusions and recommendations on the contribution impact of Umwalimu Saving and credit cooperative (Umwalimu Sacco) on increasing the socio-welfare of in Rwanda and regression and correlation model has been used.

Index Terms- Saving; Loan and Cooperative

I. INTRODUCTION

For many years, the concept of microfinance programs have been increasingly established in a number of countries as a means to mitigate the key constraint of sustainable access to financial resources faced by micro and small enterprises; Microfinance programs extend financial services ranging broadly across savings, loans, payment services, money transfers, and insurance to enterprises generally owned by poor and low income households, a group long thought not to have the ability to save nor to utilize credit productively and repay loans at non-subsidized interest rates (Thouraya, T. et al. 2013).

According to ZviGlor, (1989) the first Savings and Credit Cooperative were established in mid-19th Century, mainly in Germany by two men considered as the founding fathers of the credit cooperative movements: Herman Schultze-Delitsche, who established a credit cooperative for minor artisans and the urban middle classes, and FriedrichReifeisen, the founder of the rural credit. After consume cooperatives, the savings and credit cooperatives is the common type of cooperatives to be found in the modern world, including the Third world (Munyiri, 2006).

For Getachew, M., T. (2006), consultant for Chemonics International Inc. in his report submitted in 2006, demonstrated that Sacco' Societies have been developed to meet the fundamental human need to find a way of savings and borrowing methods without taking risks and without handing over too much power to a money lender. The Savings and Credits movements started in 1846 in South Germany at the time of agriculture crisis and continue heavy drought in Europe, (ibid 2006). As far as Luigi, L. (1898) who established Sacco in Italy by combined the principles of the two German predecessors founders of Sacco.

Though in some countries of Africa, the Savings and Credit Cooperatives were promoted between 1965 and 1989; The first Sacco was introduced by Father John Neculty in Ghana with purpose to assist villagers improve their economic conditions (Fredrick, O., W. 2013). The African Confederation of Cooperatives saving and Credit Associations (ACCOSCA) was formed in Kenya in 1968 having goal to attain sustainable and viable Saccos in Africa.

In recent years, in developing countries consideration of the potential of Savings and Credits Cooperatives and Credit Unions as tool for sustainable poverty alleviation has been increasingly recognized (Jonathan, M, et al. 2002). The first forms of cooperatives were introduced to Rwanda in 1949 by the colonial masters but Credit and Savings Cooperatives started as early as

1988 and were first legally recognized by law number 31/1988 of 1988, (RCA, 2009). Later law number 08/1999, of June 1999, regulating the banking and non-banking financial institutions in Rwanda affirmed the role of savings and credit cooperatives in Rwanda (ibid 2009). Such institutions were established under the instructions and supervision of National bank of Rwanda (BNR, 2008).

Thus, to enhance the socio-economic development of Rwandan community in general, and the teachers' welfare in particular, the government of Rwanda established a teachers' cooperative in the name of "Umwalimu Sacco" that grants loans to teachers to enable them to set up small income generating projects to supplement to their regular professional income (Ntambara, D. 2012).

It is from this experience that the researcher took an interest to verify how teachers are affected at the level of GDP Per capita and household income earned through Umwalimu Sacco Cooperative as the strategy adopted in improving teachers additional source of income, and promoting their economic well being.

In Rwanda, teachers are low income earners due to their minimum salary so that it is very difficult to satisfy their daily economic needs. Though there is always budget constraint, teachers' wages should be comparable to those of other workers of other sectors with the same level of qualifications (e.g. nurses) whom they meet at the market demand and whose salary is larger than that of teachers.

During the decades ago, Rwanda budget was limited to insufficiency teachers' salaries; Due to the lack of sufficient financial incentives, it was necessary to implement a combination of benefits and inducements as supplements to the low wages earned by teachers especially those of primary and secondary schools by creating Umwalimu Savings and Credit Cooperative, referred to as Umwalimu Sacco, as a Savings and Credit Cooperative for Rwandan teachers, (Umwalimu Sacco Report, 2012). This was one among other government's initiatives aimed of contributing to teacher retention, stability and enhancing teachers' socio-economic development constraints. The alternative chosen by the government was therefore that of supporting teacher's self-help initiatives. This requires teachers to act in collaboration with microfinance institutions especially Umwalimu Sacco as one way that should assist them on savings and cooperative in order to create supplement activities generating additional income (Umwalimu Sacco Business Plan, 2009). In addition, the governments of Rwanda views Umwalimu Sacco as a financial intermediary for teachers to expand access to income generating activities, develop their business, increase savings and investments, and improve social well-being with special emphasis on, health care, livestock, payment of school fees etc.

According to teacher development and management policy, TDMP (2007), some teachers who are qualified start looking for greener pastures due to lack of adequate financial motivation, poor salary schemes and undefined status vis a vis to other civil servants; Therefore, there is a need for teacher motivation by creating and straightening other inducements to supplement low wages and other advantages.

Delivering financial services through Savings and Credit Cooperatives Society may essentially classify the needs to grant

loans oriented towards social needs and small business. The members become the beneficiaries, sole savers and sole decision makers, which makes them integrated and effective tools for rural development. The establishment and growth of Sacco' should be regarded as one of the important instruments for economic, social and cultural development as well as human advancement (Stephen, 2011).

Thus, basing on such idea this research takes an interest to assess the impact of UmwalimuSacco as a Savings and Credits Cooperatives on increasing the socio welfare of teachers in Rwanda and focusing on Umwalimu Sacco located in Kigali City.

A total of 90 survey questionnaires out of 1276 members of of Primary and Secondary Teachers members of Umwalimu Sacco, Gasabo District, officials of the Gasabo District were obtained. From Primary a total of 45 surveys were collected, in which the majority of respondents (65%) were males and 35% were females. The mean average age was 40; the age range for teachers was between 20 and 65 years old. The level of education for Teachers in Rwanda included 46.7% who had a bachelor's degree and 4.3% who had a master's degree.

Literature review

Different theories and models from Literature were used that assisted the conceptual relationship between Umwalimu Sacco and Socio-economic development of Teachers in Rwanda. The literature review helped the researcher to know what others scholars were demonstrated on the study as theoretical review and what they brought out as solutions and recommendations.

Theoretical Review

During this study, Theoretical literature was based on as thoughts and opinions of how Societies view were interpreted Umwalimu Sacco values. Different theories and models from various scholars were based on that was backed to assess the Contribution of Umwalimu Sacco on socio-economic development such as:

- The Theory of Life Cycle Saving and Investing(Zvi B., et al. 2007)
- Theory of loan syndication ([Scoones](#), D. et al. 2005)
- Cooperative Theory: New Approaches (Randall, E. T. et al. 1987)

Empirical review

There have been some studies regarding the contribution of Umwalimusacco on economic development, but no previous research has been found regarding the impact of Umwalimusacco on socio-economic development of teachers in Rwanda organizational such as in Gasabo District. Therefore, the purpose of this study is to report across specific Hispanic groups such as primary and Secondly schools of Gasabo District, in order to better understand the impact of Umwalimu Sacco on socio-economic development of Teachers in Rwanda.

Contribution of saving on Umwalimu Saccoon socio-economic development of Teachers in Rwanda.

The Economic theory predicts that the absolute amount of saving should be increased with income. This is because people with more income have more resources available to save; Theory

also predicts that saving is related to income and the savings rate will increase with income (Deaton, 1992b) Andrew et al (1998), argued that one benefit from an increase in income is that in addition to enjoyed consumption today, an individual can also plan for the future consumption by saving a part of the current income.

However, in developing countries like Rwanda to break from poverty trap to a self-sustained growth in generating enough saving is still difficult; Low income earners need microfinance institutions like Saccos that constitute an efficient financial intermediation system in economic growth process. Rwandan teachers intend to improve their economic welfare if their increment income is injected in savings. This can improve capital formation for low income earners and as a result increase in investment that leads to the improvement in income.

Savings has a close relationship with wealth. Savings empowers teachers by shifting the savers' perception of their situations from "a day-to-day struggle to survive to a longer term view based on planning with a growing cushion of savings".

The advantages of the loan/credit provided by Umwalimu Sacco on socio-economic development of Teachers in Rwanda

According to Robinson, M. (2001), among the active poor of the developing world, there is a strong demand for small scale commercial services for both credit and savings. Where available, these and other financial services help low income people improve household and enterprise management, increase productivity, smooth income flows and consumption cost, enlarge and diversify their microbusiness and increase their income.

Household income of families with access to credit is significantly higher than for comparable households without access to credit. Poor households that have had access to microfinance services show significant increases in asset accumulation, providing them with both a safety net against misadventure as well as resources for self- help investment. Increased household income improves nutrition, and improves the probability that children from poor families will go to school (Versluysen, E.1999).

Therefore, we are concerned with teachers as households and how they are affected economically in the level of income on increasing their socio-welfare through loans provided by Umwalimu Sacco. Thus, there are the impacts that can certainly provide the teachers with increased access to working capital and

other financial services through Umwalimu Sacco; they reduce risks and protect them from life's financial shocks and helping to stabilize their income.

The importance of teachers' cooperative supported by Umwalimu Sacco on socio-economic development of Teachers in Rwanda

Due to their democratic organisation and their economic orientation, cooperatives contribute significantly to social integration, job creation and the reduction of poverty. Cooperatives are thus stabilizing regional economic cycles and can generate regional employment. The United Nations general assembly declared 2012 as the international year of cooperatives and thus acknowledges their worldwide impact on economic and social development. (Georg, M. 2012)

According to Mellor (2009), the high cost and low profit margins which discourage formal banks from providing financial services to low income and poor people; when individuals recognize that individually they cannot access financial services they badly need, they decide to collaborate and cooperate with others who have the same needs and together they become members of this special group of people with a common need and goal of self service.

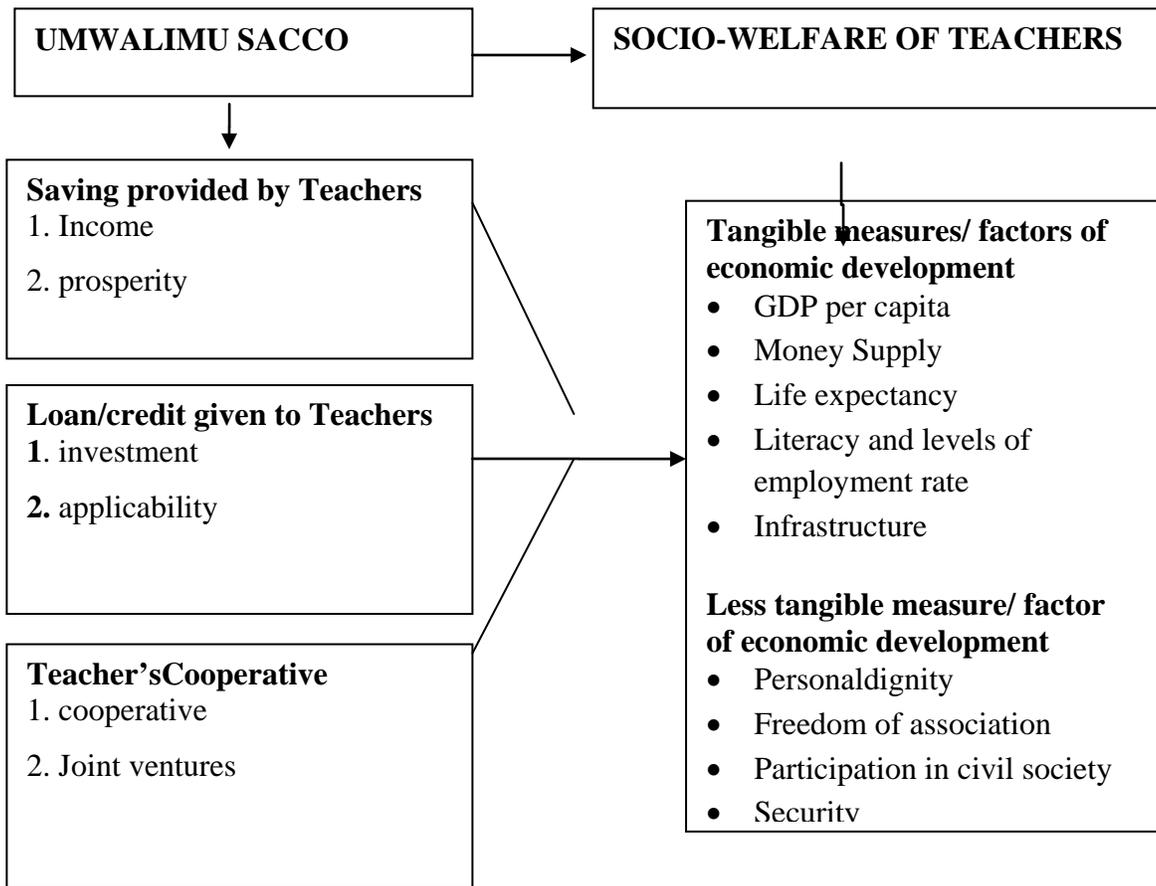
It is from above opinion that Umwalimu Sacco has focused on mobilizing teachers to form cooperatives at the school centers and come up with income generating projects which Umwalimu Sacco finance. (Example of a cargo truck that was bought in the loan from Umwalimu Sacco to the Teachers' Cooperative at St Joseph Secondary School in Rwamagana District, Eastern Province); The security of loan depends on the type of loan given and the level of risk related. However, it is possible for members to get a collateral free large loan when they form licensed cooperative, (Usaccoaction plan. 2015).

Conceptual framework

The main variable of interest is the study of dependent variable growth of corporate entrepreneurs which is measured by amount of credits from microfinance, good working environment, to meet customer satisfaction, to follow government policy, to establish strategic business plan, monitor and evaluation of business performance. Apart from this, organization, operating in secured environment, access to trainings and then forming joint ventures have seen as important to promote growth. The relationship between dependent and independent variable is shown as follow:

Figure 1: Conceptual framework

Figure2.1: Conceptual framework for understanding the relationship between Umwalimu Sacco and socio-economic development of teachers in Rwanda.



Source: MC Cleland (2007), Greg P (2007) and modified by the researcher

II. MATERIALS AND METHODS

The ethnicity variable in this study was based on the sample of the population living in Gasabo District, Kigali-Rwanda, which were the target groups. The study also had a sample of individual's teachers. The participation in the study was voluntary and anonymous. The research designs of this study was applied Qualitative approach as systematic subject approach used to describe life experiences and give meaning with a goal of gaining insight; explore the depth, richness, and inherent complexity in assessing the impact of Umwalimu Sacco on socio-economic development of teachers in Rwanda.

The qualitative paradigm and its related epistemological and social dimension; Denzin and Lincoln (1998).

According to Denzin and Lincoln (1998), qualitative research involves an interpretative naturalistic approach, as things are studied in their natural settings. For this reason the research on examining the contribution of impact of Umwalimu Sacco on socio-economic development of teachers in Rwanda.

has been undertaken qualitatively. The research was undertake comprehensive review of literature on Umwalimu Sacco as well as socio-economic development of teachers in Rwanda.

The definition of qualitative research is expanded by Tutty, Rothery and Grinnell (1996), who describe qualitative research as "the study of people in their natural environments as they go about their daily lives". Qualitative research method will enable the researcher to interact with people that work in the air transport industry as part of their daily lives of work. It is critical for the researcher to be objective.

The researcher selected the qualitative paradigm as a research design suitable for the conduct of this research given that critical thinking is a concept that is open to different interpretations. Some of the advantages of this research design are that qualitative researchers use a variety of methods to collect data, and this includes; questionnaire, case study, grounded theory and review of related literature as well as content and textual analysis. (Hesse, B. 2011). These methods are also relevant in assessing the contribution of Rwanda's foreign policy on its economic development.

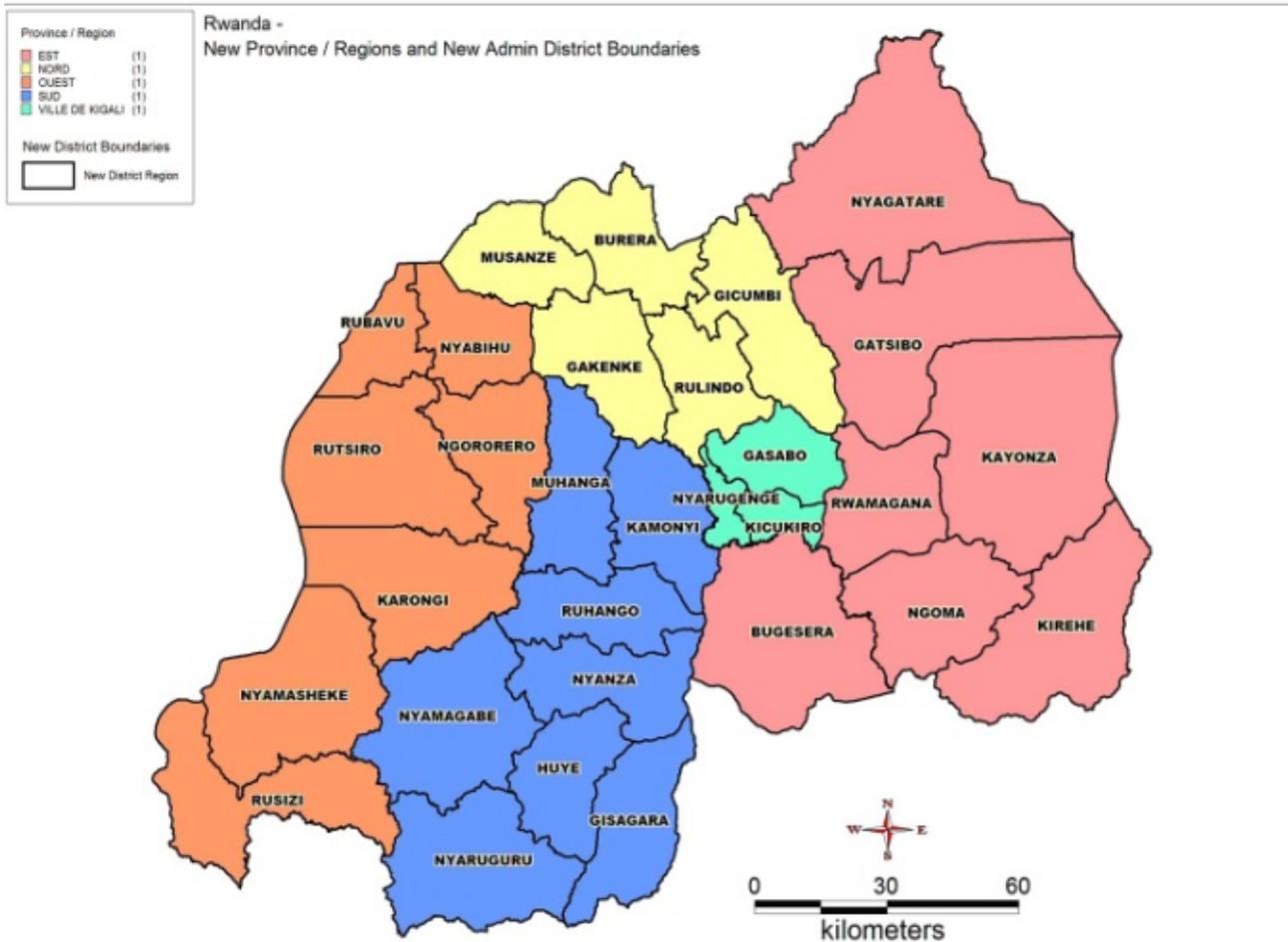
Ultimately the researcher has used the following qualitative research strategies;

(i) Comprehensive review of literature of on Umwalimu Sacco and welfare of teachers in Rwanda.
 Primary data collection by using questionnaire on key officials from the selected institutions

Area of study

The study shall be conducted in Rwanda with the Population study of Gasabo District

Figure 2: Map of Rwanda



Population, Sample size and Sampling technique

The Population study focused on the officials of the Umwalimu Sacco; Teachers of the Primary Teachers, Teachers of Secondly and officials of the Gasabo District.

Sample size

Kothari, C. R. (2004) pointed out that sample design is a definite plan for obtaining a sample from a given population.

Because of limited time and resources, the researcher could not be able to study the whole population; it is from that point of view that the researcher had to determine the sample size to represent the whole population. This sample was taken referring to the formula proposed by Alain Bouchard. For that, when the entire population is inferior than one million (1000,000), the sample size correspond to 96 persons and 10% as significance level of error (Bouchard, A. 1984).

Perriens, G. (1974), explains how to find the number 96 as the sample size to represent the whole population:

n : Sample size for infinite (or large) population

P : Expected probability of individual to be included in the sample

Q : failure (probability of individual to be excluded in the sample, 1-p)

d : Significance level of the error

Zα: Normally distributed value of the population (Represents the 95% of the confidence interval)

$$n = \frac{(Z\alpha)^2 \times P \times Q}{d^2}$$

Where :

$$Z\alpha = 1.96$$

$$P = 0.5$$

$$Q = 0.5$$

$$D = 1\%$$

$$\frac{(1.96)^2 \times 0.5 \times 0.5}{0.1^2}$$

$$*n = \frac{0.1^2}{0.1^2} = 96$$

For this 96 is found

$$NC = \frac{N \times n}{N + n} \text{ (NC : Corrected sample)}$$

N : The total finite population in which the sample is taken, correspond to 1276 teachers in Umwalimusacco Head Office Branch.

$$NC = \frac{1276 \times 96}{1276 + 96} = \frac{122496}{1372} = 89.2827 \sim 90$$

A total of 90 respondents out of 1276 of Primary and Secondary Teachers members of Umwalimu Sacco in Gasabo, officials of the Gasabo District, Officials of 15 Sectors of Gasabo.

Data Analyses

In order to summarize and describe data, descriptive statistics were used. An ANOVA was used to compare these three groups. The ANOVA test was used to reveal which, if any, of these groups statistically significantly outperforms the others. It allowed the researcher to find whether there is a significant difference in organizational citizenship behavior and ethnicity using an Alpha level or level of significance of 0.05.

III. RESULTS AND DISCUSSION

The main hypothesis of this study was that Umwalimu Sacco was impacted a lot on socio-welfare of Teachers in

Rwanda. It was based on the views that differences in beneficials and managers of Umwalimu Sacco’s perception on the socio-economic development of teachers in Rwanda.

The impact was linked with whether in the absence of salary increment that teachers should continue to ameliorate their conditions of living as a result of accumulated savings and acquisition of loans for the income generating activities. The discussion shows that Umwalimu Sacco is a viable project which should continue to serve the purpose for which it has been established.

Part I: Socio-demographic information

This section includes gender, age, and marital status, level of education and experience of respondents.

Sex

The aim of this specific investigation by the researcher is to find out extent to which female teachers have responded to the initiative to improve their welfare because the government policy is to create awareness about gender balance in all activities.

Table 1: Distribution of respondents by sex

Sex	Number of respondents	Percentage (%)
Male	58	64
Female	32	36
Total	90	100

Source : Primary Data

Observation: From the table above, the percentage above shows that male have been put forefront by the agency at 64%, this means that male teachers are more engaged towards credit and saving services more than women teachers whose rate is 36%. Again, the researcher analyzed the sex composition of the respondents which is indicated in the above table and it is shown that the number of male respondents were bigger than women respondents.

This does not explain that the female were not much involved in income generation activities compared to the male. The proportion of female is still lower than those of males because initially the cultural mentality was that it should be men

to be involved in income generating activities, but the mentality is changing at very fast rate. Regarding how Uwalimu Sacco affects teachers’ income, female and male are all affected even the table shows that male are more than women, there is of course the evidence that household composed by two teachers credit is undersigned to the man as household leader.

Age

The aim is to find out whether age has effects on individuals that would like to take the risk at venturing into investment activities while still working within the teaching profession in Rwanda.

Table 2 : Distribution of respondents by Age group

Age	Number of respondents	Percentage (%)
Between 21 and 30 yearold	38	42.2
Between 31 and 40 yearold	36	40.0
Between 41 and 50 yearold	11	12.2
Above 50 yearold	5	5.6
Total	90	100.0

Source: Primary Data

Observation: The table 2 above indicates that the majority (42.2%) of respondents as Umwalimu Sacco members are between 21 and 30 years old. This means that the majority of Umwalimu Sacco members are young. When we tried to analyze the situation above, we noticed that the category of teachers between 21-30 ages is very active and that are those who ask loan to finance activities that provide additional income in order to get their own households especially mortgage loan. As long as the level of age increase, the level of being engaged in

supplemental activities other than teaching diminishes especially physical weaknesses that prevent them to do income generation activities.

Marital status

The aim of this specific investigation is to access the category of teachers that are eager to exploit the opportunities offered by Umwalimu Sacco to improve their welfare other than always relying on the salary.

Table 3: Distribution of Respondents by marital status

Marital Status	Number of Respondents	Percentage (%)
Single	46	51.1
Married	39	43.3
Divorced	1	1.1
Widow/Widower	4	4.4
Total	90	100.0

Source : Primary Data

Observation: The fact that 51.1% of respondents are single compared to 43.3% who are married indicates that all categories of teachers are eager to exploit the opportunities offered by USACCO to engage in socio- economic and other welfare

development. The very low percentage of divorcees and widows simply shows that they are either few in teaching profession or have not yet become members of the Cooperative USACCO.

Educationallevel

Table 4: Distribution of respondents by level of teaching

Source: Primary Data

Education Level	Number of Respondents	Percentage (%)
PrimaryLevel	59	65.6
SecondaryLevel	31	34.4
Total	90	100.0

Observation: Table 4 indicates that 65.6% of respondents being primary teachers mean that their percentage in the teaching profession is higher than those of secondary teachers and a big number has responded very positively towards becoming members of Umwalimu Sacco in order to access loans for their social economic development. However, according to

Umwalimusacco management through interview, secondary school teachers save greater amount of money than primary school teachers because 5% of their higher monthly salaries give them an advantage of accessing bigger loans because of the capacity to pay back monthly.

Experience in teaching

Table 5: Distribution of Respondents by experience in teaching profession

Experience in teaching	Number of Respondents	Percentage (%)
Between 1 to 5 years	39	43.3
Between 5 to 10 years	31	34.4
Between 10 to 20 years	16	17.8
Over 20 years	4	4.4
Total	90	100.0%

Source: Primary Data

Observation:The table 5 indicates that the teachers with experience of less than five years in Umwamu Sacco durable future opportunities as their source of fund to venture into business generating activities to address their needs compared

with those with more than ten years' experience who have been members of other microfinance institutions still paying back loans they had before the existence of Umwalimu Sacco.

Part. B. Responses according to the specific Objectives

Section A. To assesses the contribution of saving on Umwalimu Sacco of teachers in Rwanda.

which increases the socio-economic development

Table 6: Members' personal savings

Response	No of Respondents	Percentage (%)
Yes	90	90
No	0	0
Total	90	100.0

Source: Primary Data

Observation: The table 6 shows that all respondents who are members do savings as at the beginning saving was an obligation and made compulsory by employers deducting 5% of the net pay for every teacher in government schools and later

teachers themselves started asking to have their saving increased because they realized how useful the savings would be in the near future. They also motivated by the fact that when they want to acquire a loan, the level of their saving is based on.

Table 7: Savings permanent Membership

Permanent Savings	No of Respondents	Percentage (%)
Between 2000frw and 5000Frw	65	72.2
Between 5000frw and 10,000Frw	19	21.1
Above 10,000	6	6.6
Total	90	100.0

Source: Primary data

Observation: Table 7 indicates that 72.2% of respondents save between Frw 2000 and Frw 5000, because majority of them as members are primary school teachers who earn less salaries than their secondary school counterparts and since their monthly deductions for savings is 5% of their net pay or Frw 2000 for those where 5% is less than 2000Frw, because Frw 2000 is the minimum on individual can save monthly.

Improvement in the level of saving Economic theory predicts that the absolute amount of saving will increase with income. This is because people with more income have more resources available to save. Theory also predicts that saving is relative to income, the savings rate, will increase with income (Deaton,1992 b).

Table8: Comparison of the level of saving before and after being member of Umwalimusacco

Source: Primary Data

Response	Number of Respondents (before)	(%)	Response	Number of Respondents(After)	(%)
Yes	52	57.7	Yes	68	75.5
No	38	42.2	No	22	24.4
Total	90			90	100.0

Observation: As shown in the table8, respondents who accepted that they saved before working with UmwalimuSacco are on average of 57.7% whereas after working with Umwalimu Sacco, the rate increase on the average of 75.5%. The rate of

respondents who said that they didn't save before working with Umwalimu Sacco and that still don't save or start saving after working with it has gradually decreased from 42.2% to 24.4% of the respondents.

Generally, the majority of respondents confirmed that working the Cooperative Umwalimu Sacco has raised or changed remarkably the level of their savings. Once saving increased, as determinant of income, it is positively related to the income increase. This shows us that additional source of income has been available for teachers through the Cooperative Umwalimu Sacco services.

Section B. To examine the loan/credit provided by Umwalimu Sacco that increases the socio welfare of Rwandan teachers

The intention of the research was to find out if credit distributed are oriented in activities that generate additional teachers' income for further measurement of benefits incurred in monetary terms, and it is absolutely no doubt that, profit gained is supplemental income for teachers apart from salary and it is one way of improving the teachers' welfare.

Table 9: Beneficiaries of loans

Response	Number of Respondents	Percentage (%)
Acquired loans in Umwalimu Sacco	77	85.5
Did not benefited loans	13	14.5
Total	90	100.0

Source: Primary Data

Observation: Findings in the table 9 shows that bigger proportion (85.5%) of the respondents are on the way towards improvement of their social economic development as a result of loan collections. The remaining (14.5%) who say that they have not yet got loans is because the issuing of loans is in phases since all teachers cannot be considered at the same time. This

impressive big number of members who have taken a loan is motivated by many factors among which the interest rate which is lower than that for commercial banks and other microfinances. Umwalimu Sacco lending rate between 11% and 14% is quite competitive compared to market rate of between 18% and 22%.

Table 10: Credit distribution according to respondents

Amount of loan (in Frw)	Number of Respondents	Percentage (%)
Below 200,000	11	14.3
Between 200,000 and 1000,000	34	44.2
Between 1000,000 and 5000,000	13	16.9
Between 5000,000 and 10,000,000	16	20.8
Above 10,000,000	3	3.9
Total	77	100.0

Source : Primary Data

Observation: Table 10 indicates that 44.2% of respondents got loans between Frw 200,000 and Frw 1000,000 because Umwalimu Sacco started with short term loans against members' savings as loan security. It is an interval that includes the amount of money accessed by many teachers considering salary without taking into account other collateral. The amount of loan would not exceed eight times the individual net salary which was still very low. Members required loans for the satisfaction of urgent basic needs to help them fight daily financial difficulties.

Long term loans mainly started in the year 2013 especially for heavy business and investment that lead to heavy benefits generating income and for mortgages.

The significant process by which financial services are conceived as increasing income is by the provision of income generating loans. The aim of this research is to find out whether income has increased through loan oriented activities generating income that are financed by Umwalimu Sacco Cooperative.

Table 11: Distribution by respondents he activities financed by Umwalimu Sacco

Activity	Number of Respondents	Percentage (%)
Buying equipment	7	10.0
Small commercial business	23	28.9
Agricultural and livestock	11	12.2

Payingschoolfees	19	23.3
Mortgage	14	22.2
Other	3	3.3
Total	77	100.0

Source : Primary Data

Observation: Table 11 shows that most of respondents (45.5%) = (23.3%+22.2%) said that buying and building houses (mortgage) and paying school fees were the most urgent. This means that most teachers had been incapable of addressing the basic needs for the families and Umwalimu Sacco came as a solution to the problem. This helps them afford the purchase of food as their highest expenditure, paying school fees and other. According to respondents, some teachers borrow money for their own studies to acquire education level especially those with A2 level. This has medium term effects on their income because the salary increases as the educational level also increases. Others use that money for their children education and this will affect their household income in long term trend. As the majority of teachers are still young persons, they are more interested in building houses especially with expectation of their own further household whereas others are reconstructing them.

The table also depicts that 28.9% of respondents are engaged in business projects. The reason which pushes teachers through small business is that these commercial activities are more benefitable even though it is more difficult to associate

them with teaching. For this reason, to invest in these incomes generating projects have created job opportunities to their family members and the community at large. It is worth noting that 28.9% of respondents indicate that they have taken a step further in venturing into money making business which is what Umwalimu Sacco is encouraging, to create wealth and fight poverty.

According to focus group, education and marriage loans are also among the desired products as expressed by respondents as many of them are still young.

Therefore, basing on the interpretation of activities financed, it is consistent with our objective of assessing the impact of Umwalimu Sacco on increasing the welfare of Rwandan teachers. This somehow contributes to the teachers' welfare.

Asking this question, the researcher wanted to know to which extend loan distributed among teachers have been repaid as a step oriented to the net interest incurred. The net interest helped the researcher to know how UmwalimuSacco has affected teacher financially.

Table 12 : Weather loan is repaid or still repaying

Repayment	Number of Respondents	Percentage (%)
Just repaid	36	46.8
Stillrepaying	41	53.2
Total	77	100.0

Source: Primary Data

Observation:It can be observed those loans which are still being repaid are on the average of 53.2% higher than those which are just repaid on the average of 46.8%. The results from respondents in the table 12 show that delinquencies and loan portfolios at risk are minimal. No respondent has mentioned that

he/she didn't get possibility of repaying the loan at the time due. It is here that the first limitation of the research started to occur and it has been demonstrated that the research is now oriented to those who have just paid the loan borrowed.

Utility function from the loan according to respondents

Table13: Respondents data about the advantages acquired

Extra monthlyincome (Frw)	Number of Respondents	Percentage (%)
Increaseasset	30	38.9
Increasefamily nutrition	34	44.2
Improvedsavings	13	16.9
None	0	0.0
Total	77	100.0

Source: Primary Data

Observation: Of course, because the utility theory underlying models of consumption expenditures involves quantities consumed, empirical analysis have generally related measures of spending on consumption to measures of income.

In this paper, we draw attention to nutrition aspect of teachers, but relatively to the level of income. In table 13, it is revealed that 38.9% of respondents asserted that the Cooperative Umwalimu Sacco through loans oriented activities generating income affect positively their household assets and nutritional standards. It is realistic to expect nutritional improvement as a result of income increase at a level of 44.2% and many of the respondents (38.95) acquired their own houses.

Holding different types of asset vary systematically with the income levels of individuals (Thomas R. et al. 1956). Increase in assets was estimated by asking the respondent about all of the economically active members of their household and the money or product generated in activities they are engaged in, that results in buying assets.

The table 13 shows that 16.9% of respondents save as a result of benefits incurred from their planned projects to which

they invested money from the loan. No respondent has mentioned that he/she got loan for nothing.

Teachers view on the statement that the living condition has changed. Table14: The rating of living conditions of members.

Source: Primary Data

Observation:The table 14 reveals that the majority of the respondents gave a positive answer showing that their income changed by increasing after joining Umwalimu Sacco. They asserted that Umwalimu Sacco has enabled them for coping with emergency. Over 85% of the respondents acknowledged an improvement in their living conditions. Generally, Umwalimu Sacco services led to improved welfare; 38.8% of respondents indicated very good living conditions and 47.7% said that they were satisfied with their living conditions.

Result from Umwalimu Sacco Management as source of information by interview and documents.

Table15: Membership and Savings trends

Source: Secondary data/Umwalimu Sacco report 2015

Description	Dec. 2012	Dec. 2013	31/12/2014	31/05/2015
Members	62,117	70,777	75,746	74,285
Permanent savings	5,413,396,478	7,287,478,911	9,257,547,242	10,021,728,748
Free savings	1,297,912,439	4,887,143,468	7,053,153,402	7,506,597,507

Rate	Number of Respondents	Percentage (%)
Very good	35	38.8
Good	43	47.7
The same	12	13.3
Deteriorated	0	0.0
Total	90	100.0

Observation: The table 15 shows the positive trends according to the documentation given by some of Umwalimusacco management members and this is due to vigorous campaigns done by Umwalimu Sacco leaders in different administrative structures. Teachers joined the cooperative in masse because of anticipated benefits of low interest rate between 11% and 14%; but also because of non-financial services offered by Umwalimu Sacco which include funeral mut

ual funds, credit solidarity funds, business training and advisory services to help members to develop and manage profitable business projects.

The research result indicates that Umwalimu Sacco finances a widerange of business projects namely: Education, Livestock, Agriculture, Construction Small business and others. The table below shows the variety of business and the amount of loans going into each type of business project by Umwalimu Sacco members in all the branches (30 branches) by the end of May/2015.

Table16: Loan granted per activity sector
Source: Secondary data/Umwalimu Sacco report of 2015

Number and amount of loans	Dec. 2012	Dec. 2013	31/12/2014	31/05/2015
Number of loans/Agriculture	Cases: 1520	Cases: 2169	2,544 cases	3,467
Amount (Rwf)	650,449,163	1,323,408,699	1,691,829,459	1,995,489,358
Number of loans/livestock	cases: 2481	2841 cases	3,223 cases	3,364 cases
Amount (Rwf)	1,144,657,841	1,542,983,941	1,693,728,759	1,868,941,439
Number of loans/construction	Cases: 18,994	24,819 cases	29,347 cases	30,281 cases
Amount (Rwf)	12,237,603,920	21,437,266,428	30,450,598,754	32,292,274,296
Number of loans/School fees	Cases: 49,889	53,140 cases	55,141 cases	55,659 cases
Amount (Rwf)	5,632,226,657	7,378,506,888	8,629,630,524	8,980,126,960
Otherloans (small business)	Cases: 187,242	302,002 Cases	548,211 cases	660,090 cases
Amount (Rwf)	18,478,423,706	26,234,342,958	40,994,114,284	49,105,205,050

Obseration: The findings in table16, indicate extent of participation of teachers in country’s economic development, employment and poverty reduction. To distribute Frw49, 105,205,050to 74,285 members can be described as one of the most successful achievement (it is deducted that a teacher can benefit more than one loan). The implication of this is that the status of teaching profession can be raised even above other professions. This emphasizes the role of Umwalimu Sacco in teachers’ retention and so to improve the quality of education in Rwanda.

The study intention was to assess the impact of Umwalimu Sacco microfinance saving and credit cooperative on increasing socio welfare of Rwandan Teachers. The analysis was made depending on Umwalimu Sacco documents that were analyzed and responses got from the respondents about the opinion that Umwalimu Sacco has improved the teachers’ welfare. The eighty five percent (85%) of the respondent revealed that the Cooperative Umwalimu Sacco has increased teachers income as indicated in table13. They confirmed this by saying that Umwalimu Sacco grant loan that helped them to be engaged in small activities generating income apart from teaching.

Additional justification to the effects of Cooperative Umwalimu Sacco on increasing the teachers’ welfare also indicated that 75.5% of the total respondents has increased and started saving after working with Umwalimu Sacco as indicated

in table12.Table17 also justifies that credits distributed are effective since it is evaluated to be very good as far as concrete effects are concerned.

All in all, a big percentage of the respondents associated credit in Umwalimu Sacco as effective strategy to increase their additional sources of income. Generally, UmwalimuSacco services led to improved welfare of its members.

IV. CONCLUSIONS

Wages alone will never satisfactorily address the needs of teachers unless other wealth creation initiatives and innovations are supported. Umwalimu Sacco was established not only for credit schemes but also to enforce the culture of saving because cumulatively, it is to cater for ones future and to ensure the security of money against theft, disasters and even extravagancy when money is kept in homesteads or hidden in other funny places like gardens and plantations.

Teachers have to be above poverty line by increasing their income so as to acquire minimum standard of living and to be accorded the respect they deserve because they are role models in the community and agents of fighting poverty, ignorance and disease and to educate future leaders and entrepreneurs.

Umalimu Sacco is contributing to teacher retention, effective curriculum instruction in schools and is causing

multiplier effects in the community through business interactions and joint ventures with the community. The government of Rwanda has been visionary by injecting direct financial assistance as a startup capital to provide infrastructure and to meet initial operating costs.

Basing on the positive effects of Umwalimu Sacco indicated by the respondents, and which are directly related to the income increase, it goes with no doubt that Sacco Umwalimu has come at a time when it was needed most both by the government to solve the problem of low wages and by the teachers to address their socio- economic problems.

V. RECOMMENDATIONS

In order to strengthen the strategies of promoting Rwandan teachers, the researcher recommend the following:

There is a need for Umwalimusacco to sensitize its members to have a culture of savings because there is a low level of deposits compared to withdrawals made in their day to day operations since almost all deposit and members' salaries are immediately withdrawn leaving their accounts at zero balance. The saving is a factor which qualifies a member to have a big loan.

Umwalimu Sacco should strengthen and develop new savings and loan products for the youth (as they are the majority) with the aim of motivating them to save with Umwalimu Sacco including but not limited to education, marriage and household assets loans. For married, there is a need to develop new product that respond to their household needs such as saving for secondary schools, university education, clothing, and nutrition needs through strengthening agriculture loan strategies to boost food security.

There should also be promotion of group saving at schools level which can managed through Umwalimu Sacco current account as well as develop policies that offer incentives which motivate members to save more with Umwalimu Sacco including offering remuneration according to the volume of savings on long term deposits and competitive interest rate on savings.

These strategies will result in increased financial capacity and growth of the loan portfolio, increased self-sufficiency with decreased over reliance on government subsidies and increased access to Umwalimu Sacco products and services by members as well as increased income.

Umwalimu Sacco needs to put more effort on financing of benefits project loans and discouraging the emergency and overdraft loans which are taken by the majority of members, it will lead to improved members' welfare. For this, Umwalimu Sacco should sensitize members on the benefits of income generating loans shifting from emergency and construction as well as other consumer loans by settling for medium term loans and invest in IGAs for quick return.

As far as non-financial services are concerned, members' big skills gap in entrepreneurship is a challenge. Strategies to regularly train individual members in entrepreneurship skills mainly in business plan writing, business management, and ICT skills development are needed for the growth of business loan portfolio, increased profitability of businesses and increased income.

To teachers, there is a need to participate in lending programs because it has been shown that it may result in the diversification of one's income. The teachers who were engaged in supplemental activities resulting an additional income apart from salaries indicate that diversification of income lending programs may be an effective strategy to increase their sources of income.

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Can virtual space become the Zone of Proximal Development ? Online architecture optimization of ESL courses through Learning Analytics

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Abstract: This study recognizes that the provision of Vygotsky's *More Knowledgeable Others* (MKOs) within the *Zone of Proximal Development* of online courses as a unique challenge to all stakeholders. Extending the data-driven decision making culture at the Centre for Distance and Continuing Education of University of Kelaniya to the newly introduced online course *English for Communication*, the aim of this study is to develop a learning analytics mindset to predict at-risk students enabling timely intervention. Further, future cohorts of the course are provided analytics on student performance thus enabling them to take decisions to improve the course especially to address the necessity for increased MKO availability. Capturing attendance data benefits the need to identify reasons for absenteeism.

The instrument was a 100 mark allotting paper which evaluated three of the four skills: Reading, Writing and Speaking. The total population was stratified into 19 centres across provinces. The corpus for analysis (n= 3700) was selected under stratified random sampling procedures from which approximately 200 papers were shortlisted from each centre. Findings illustrate the diversity of Poverty and prosperity indices and Digital denizenship across the provinces have a significant influence on the performance of the population. The % mean marks distribution indicated a strong variation based on the province. Thus this study provides Learning analytics which constructs an information-rich landscape for the functional groups for understanding and optimizing the learning process of the students who offer the course. The findings benefit educational mandates of similar institutions who face the challenge of handling groups which are non-monolithic in proficiency in English and Digital denizenship but who are monolithic in size.

Key words: More Knowledgeable Others, Digital denizenship, Proficiency in English, online courses

1. INTRODUCTION

Vygotsky and online learning

Applying the constructivist theory by Vygotsky (1962)^[1] to the context of online learning, an evolutionary process within the *Zone of Proximal Development* (ZPD) is noted. ZPD is the distance between a student's ability to perform a task under teacher guidance and/or with peer collaboration and the student's ability to solve the problem independently. ZPD is where a learner's achievements progress from the *Cannot do yet* to the *Can do alone or current knowledge*. For optimal outcome the learner should work within the ZPD in collaboration with a *More Knowledgeable Other* (MKO) and conduct a cooperative or collaborative dialogue. The MKOs can be a teacher or peers. In online courses the ZPD is in virtual space. Virtual is defined as facilitated by networked computers; Space is used as a generic term to denote a platform or environment where people can interact (Sköld, 2012)^[2]. Though online resources such as LMS, podcasts and videos are provided, learners can construct knowledge only if a meaningful cooperative and collaborative dialogue occurs within virtual space. The compilation of technological tools and/or techniques required by online learning environments (Moore, et al., 2011: 132)^[3] identify the following: Online discussion boards, emailing the coordinator, LMS, podcasts and videos, online chat rooms, synchronous video conferencing but does not include virtual classrooms which are also beneficial. The following figure proposes an adaption of Social constructivist Vygotskian views of learning to online education.

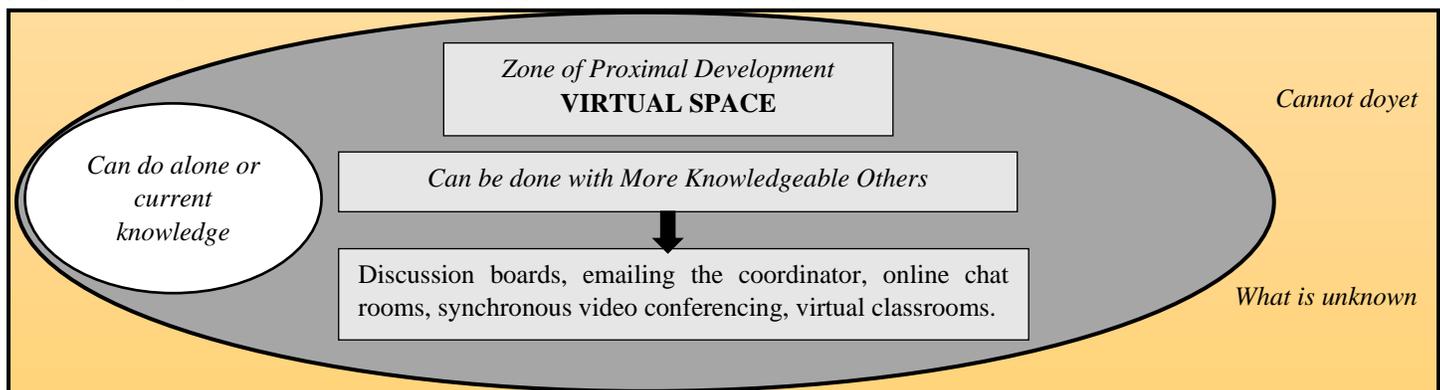


Figure 1: Adaption of constructivist Vygotskian views to online education

With the concept of the ZPD, Vygotsky establishes a position on the way in which learning may serve a developmental function. As cited in Pablo et al (2007: 279)^[4] according to Vygotsky (1978a, pp. 56–57)^[5] development of higher functions appears twice: first it appears on the social level, and later, on the individual level; first *between* people (*interpsychological*), and then inside the individual (*intrapsychological*). Thus this study argues that Interpsychological development of higher functions in an online learner optimally should progress and reach intrapsychological level as follows:

Can do alone ← ~~Can be done~~ with MKOs in virtual space → Cannot do yet ←

Ivic(1989: 434)^[6] states that Vygotsky not only placed prominence on the transmission and acquisition of a body of information through education but he also found that the provision of the tools, techniques, and intellectual operations that would facilitate development are equally important. Vygotsky according to Ivic (ibid) was critical of many forms of education that aim primarily at transmission of knowledge. Thus not only the lack of contact with MKOs (teachers and/or peers) in the ZPD which is the pedagogical online space but also the deficiency in provision of the tools, techniques, and intellectual operations that would facilitate development prevents the learners from producing an optimal outcome.

The course

The Centre for Distance and Continuing Education (CDCE) at University of Kelaniya, Sri Lanka which offers external degree functions in an established virtual learning environment. The e-book *English for Communication* (ELTU E 1014) was introduced in Learning Management Systems (LMS) form as course material from the academic year 2012/2013. It is a compulsory course for Bachelor of Arts First Year Examination. Candidates who do not fulfil the necessary requirements to pass or refer examinations are considered to have failed the prescribed examinations. Thus to pass the Bachelor of Arts First Year Examination *English for Communication* (ELTU E 1014) candidates have to obtain a C grade (40 marks) or above. Based on the syllabus the material of this course is presented in 10 units.

Table 1: Contents of English for Communication

Unit	Functional genres	Grammar: forms with usage
1.	Getting to know each other and initiating conversations	WH questions, The simple tenses: past, present and future
2.	Describing people and places	Adjectives, <i>to be</i> and <i>to have</i> , adverbs of frequency
3.	Give and ask for opinions	Discourse markers, conjunctions
4.	Give and ask for directions	Prepositions
5.	Telephone conversations, describing graphs and trends	Adverbs of manner
6.	How to make effective presentations	Ordering points, Signposting
7.	Writing summaries	Progressive Tenses
8.	Common deviations from Standard Sri Lankan English pronunciation	
9.	Writing in an Academic Style	Direct and Indirect speech, Recapping adverbs of manner
10.	Contemporary social issues	Recapping subject verb agreement, adverbs of frequency

Each unit of the course further comprises of the following:

- An introduction to the contents of the unit and unit outcomes.
- Core content of the unit with a variety of hands on activities given at diverse stages of the unit. Learners may have to read a passage, write an essay, watch a video or listen with comprehension to a podcast during these activities.
- Glossary; Online self-assessments: Quizzes, exercises.

Further, an Exam Preparation Package provides model papers to inform on the format of the paper and enable learners to practice for the *End-of- course written exam* which assigned a 100% mark. The expected total learning time for this course is 60 online hours across one academic year but learners were advised to spend extra time on self-study.

Out of the tools and/or techniques required by online learning environments (Moore, et al., 2011: 132)^[7]. *English for Communication* provided discussion boards, emailing the coordinator facilities, LMS, podcasts and videos but online chat rooms and synchronous

video conferencing were not employed. The number of students registered for the course were 19,604 and they were from all provinces of Sri Lanka and they sat for the paper at 19 centers across the country other than the North.

2. LEARNING ANALYTICS

Analytics is the science of examining raw data with the purpose of drawing conclusions about that information source. According to Ferguson (2012: 9)^[8] Learning analytics began to coalesce as a discipline its own right around 2010. Siemens & Gašević, (2012: 1)^[9] state,

Learning analytics is the measurement, collection, analysis and reporting of data about learners and their contexts, for purposes of understanding and optimizing learning and the environments in which it occurs.

Constructing a reference model for learning analytics Chatti et al. (2014)^[10] compiles its key concepts based on four dimensions: data, environments, context (what?), stakeholders (who?), objectives (why?), and methods (how?). As this study tracks the progress of learning analytics based on dimensions identified by Chatti et al. (ibid) it structures the methodology as a development through the knowledge continuum postulated by Baker (2007)^[11].

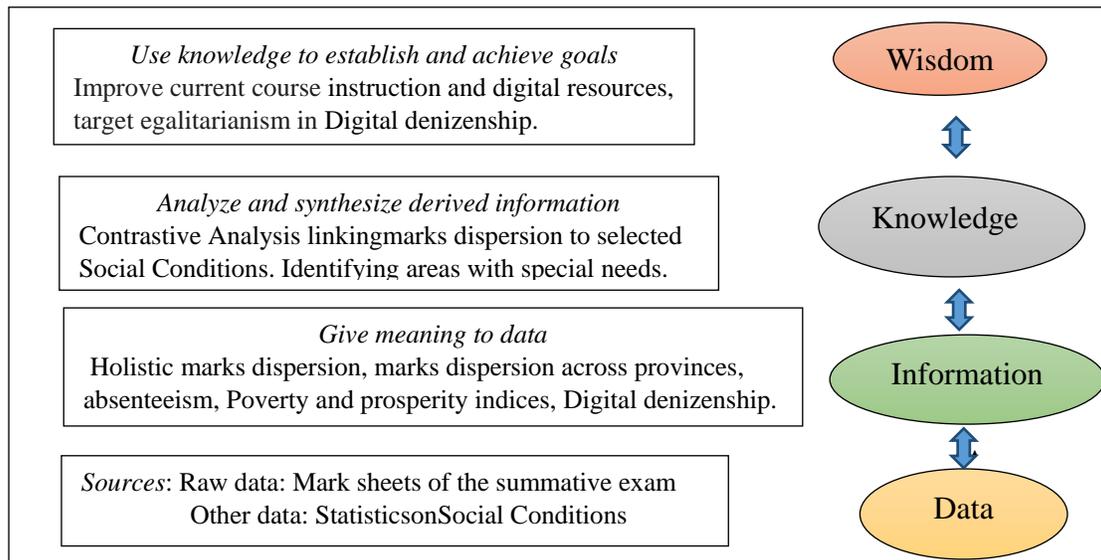


Figure 2: Adapting the depiction of the knowledge continuum (Baker, 2007)^[12] to the context of this study

The study of learning analytics cannot be conducted devoid of an assessment of statistics on social conditions pertaining to the study population.

3. SOCIO-ECONOMIC CONDITIONS

Poverty and prosperity indices

The importance of Socio-economic conditions by province is due to the identity of the population who register for external degrees. In Sri Lanka most students who are eligible for tertiary education do not get selected to national universities. Students from a high socio-economic level are sent to universities in foreign locales. The fee levied by private degree awarding institutes is very high and could be afforded only by upper middle class parents. Thus most of the students who register for external degrees come from the lower-middle class or a lower socio-economic strata. The figure below illustrates the poverty and prosperity indices in the provinces from which the population of this study was obtained.

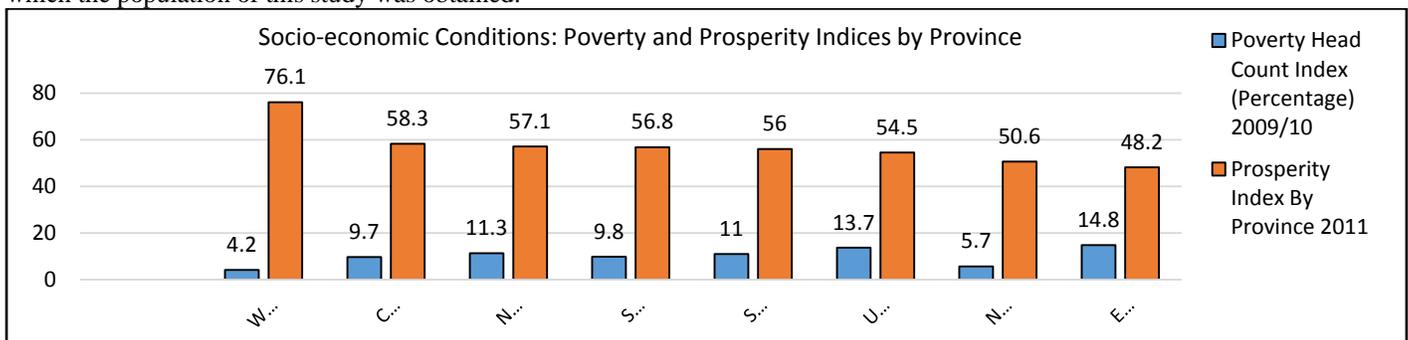


Figure 3: Socio-economic Conditions: Poverty and Prosperity Indices by Province

Source: Household Income and Expenditure Survey Series, Department of Census and Statistics Cited In Cited In Sri Lanka Socio-Economic Data. Central Bank of Sri Lanka, VOL. XXXVI June 2014, Poverty Indicators By Sector And Province: 34. Prosperity Index by Province: 37

Proficiency in English

Though TESL has a history of around 160 years in Sri Lanka and was based on egalitarian values it is a very low population who self-assess and claim that they have literacy in English. But what is noted in the statistics provided by the two national surveys below is a significant improvement in their ability to speak, read and write English over a ten year span.

Table 2: Ability to Speak, Read and Write English: 2001 – 2011

Year of survey	%literacy rates (10 years and over)			% ability to	
	Male	Female	Overall	Speak English Overall	Read and Write English Overall
2001	92.6	90.0	91.2	14.4	17.1
2011	96.8	94.6	95.6	23.8	30.5

Source: <http://www.statistics.gov.lk/PopHouSat/CPH2011/Pages/Activities/Reports/5cph2011/Table22.pdf>

Yet the statistics below indicate that in 2015 at the two national summative examinations the failure rate is higher than the passed %. Thus the TESL pedagogical process in Sri Lanka has not produced a satisfactory outcome as the summative English paper in G.C.E. O/L follows 9 years of learning English as a second language and General English at G.C.E. A/L after 2 years of ESL learning.

Table 3: Performance of Candidates in English at G.C.E. O/L and G.C.E. A/L (2015)

Examination	Subject	# of candidates	A %	B %	C %	S %	Passed % (A+B+C+S)	Failed % (W)
G.C.E. O/L	English	272,576	7.33	5.49	11.33	21.24	45.40	54.60
G.C.E. A/L	General English	248,482					39.19	60.81

Source: Extracts from Performance of Candidates, G.C.E. O/L: 2015 and G.C.E. A/L: 2015, Research and Development Branch, National Evaluation and Testing Service, Department of Examinations, Sri Lanka.

Digital denizenship

One external driver for technology in education is the technological progress of a country. In the current context it is the rate of entry of digital natives into the education system. A digital native as identified in Feeney’s continuum (2010)^[13] of Digital denizens chooses to use technology for numerous tasks and adapts as the tools change while a Digital refugee is unwillingly forced to use technology; prefers hard copies, does not trust electronic resources and seeks assistance. While Digital natives possess the ability to access and decipher information speedily, Digital refugees would struggle within the online space.

This study attempts to estimate Digital denizenship through the following statistics: Computer Literacy in Sri Lanka, % of computers owned by households and % Computer literacy rate by province, Internet user population (%) in Sri Lanka by province. If a desktop or laptop is available at a household then that household is considered as a computer owning household (Computer Literacy Statistics, 2015: 1)^[14]. The table below mirrors a divide between the Urban and the Rural sectors in Sri Lanka.

Table 4: Percentage of computer owned households and Computer literacy rate (%) by sector

Sector	% of computer owned households (2015)	Computer literacy rate (%) (2015)
Sri Lanka	24.4	27.1
Urban	41.5	39.2
Rural	22.0	25.5

Source: Extracts from Table 1 and 3, Computer Literacy Statistics – 2015 (Annual bulletin), Department of Census and Statistics, Sri Lanka

The main statistical analysis of this study is based on provinces. Thus as measure of digital denizenship of the sample population statistics on% of computers owned by households and % Computer literacy rate by province are produced below.

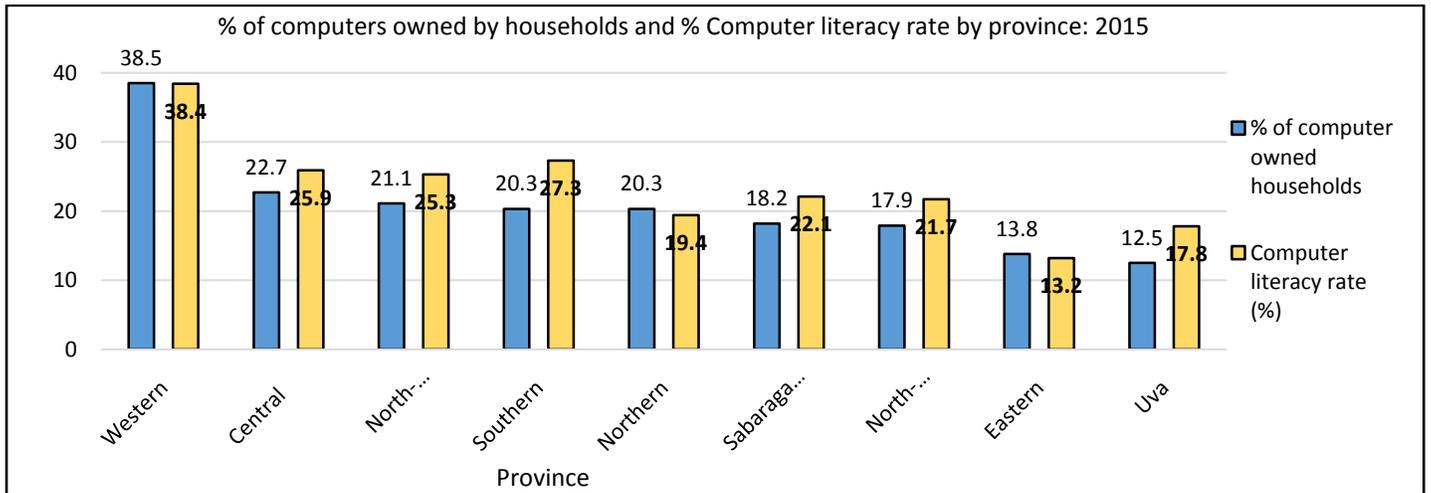


Figure 4: % of computers owned by households and % Computer literacy rate by province

Source: Extracts from Tables 1 and 3, Computer Literacy Statistics – 2015 (Annual bulletin), Department of Census and Statistics, Sri Lanka

Yet again what is noticed in the statistics above is that when compared with the other provinces the Western province emerges with the highest availability of computers in households and % Computer literacy rate (38.5% and 38.4% respectively). The lowest availability is reported from Uva (12.5%) but the % Computer literacy rate in Uva is higher than in the Eastern province.

It is heartening to note that statistics on the % of Computer Literate population denote a gradual increase. Overall Computer Literacy reported in 2015 for Sri Lanka is 27.1%. The survey results show an increase of 11 percentage points from 2006/07 to 2015 (Computer Literacy Statistics – 2015: 2)^[15].

The survey results further reveal that the urban sector, where the facilities are largely available, shows the highest usage of both e-mail and internet. Statistics on internet subscribers given below indicate that many Sri Lankans fall into the category of digital refugees as they might not belong into the minority category of internet users.

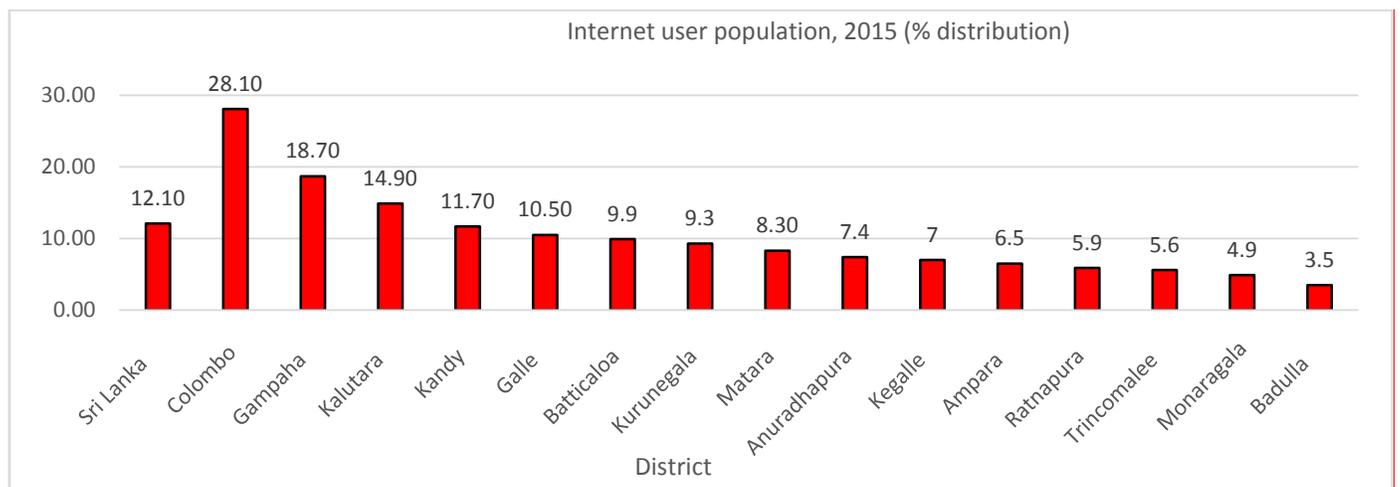


Figure 5: Internet user population(% distribution) in Sri Lanka by province

Source: Extracts from Table 8, Computer Literacy Statistics – 2015 (Annual bulletin), Department of Census and Statistics, Sri Lanka

Internet User in the above context is identified as an individual who can access the Internet at home, via any device type and connection. Thus the statistics clearly should include the population of this study who have to follow the coursework online. But the

reality may be different. Digital denizenship for this population might vary from Digital natives to Digital refugees whose digital literacy is not only low but also who do not have access to the Internet at home or a locale such as a communication centre nearby. Thus even within the higher education landscape the digital divide which is witnessed affects egalitarianism in on-line courses.

Recognizing this problem the CDCE introduced a compulsory course *Computer Literacy*(COMP E1014) for the academic year 2012/2013 along with *English for Communication*. This ICT course module aims at providing basic ICT knowledge and skills. The learning outcomes state that after successfully completing this course, students will be able to carry out basic operations in the desktop environment of Windows, Search for information using browser on the Internet and communicate through Internet using common tools. The assessment procedure comprises of a one hour MCQ examination and two hour essay question paper at the end of semester. By making this course compulsory CDCE has commenced on the right path towards motivating the undergraduates to improve their digital literacy. This forecasts a brighter future which would result in the alleviation of the digital divide within its distance learner population.

4. ONLINE LEARNING

Discussing factors driving the development of learning analytics Ferguson (2012: 4)^[16] identifies that the upsurge of Online learning as a major driver. Online learning in the context of this study has three major stakeholders: The Centre for Distance and Continuing Education at University of Kelaniya, online lesson planners and online learners. Unlike students who receive face-to-face instruction online learners are self-directed and have to handle coursework alone. Thus large cohorts of students of this study may reflect the following affective factors, which according to Mazza and Dimitrova, (2004)^[17], are present in most online learners.

- i. A tendency to feel isolated due to lack of contact with teachers and/or peers
- ii. Become disorientated in the online space
- iii. Lack of know-how to handle technical problems

Further, it has to be recognized that there are multiple barriers to accessing internet in remote areas of the island. Thus it can be inferred that all three factors above influence the online learners' motivation levels negatively. Thus when Lehmann (2004)^[18] crushingly states that a virtual classroom can only be successful if the communication tools used in the classroom are "in the student's possession... accessible to the student... (and) operable by the student" (cited in Nedeva et al: 7)^[19] it spells disaster to developing countries like Sri Lanka where distance education is moving towards digitalization.

On the other hand the online lesson planners, who are vital stakeholders, too face multiple challenges. As most ESL populations consist of multi-ability learners, what parts of the input are beyond comprehension for the weak ESL user cannot be estimated. The role of these lesson planners is different from one who has feedback from face-to-face teachers. As online learning is self-directed the multiple challenges faced by learners when grappling with the material unaided goes undetected. Further, no online lesson planner/facilitator will be privileged to observe the body language signals of heightened affective filters: boredom in the high proficiency learners and confusion in the weak ones unless virtual classrooms/ video conferencing facilities are provided.

5. METHODOLOGY

The population

The total population who registered and were eligible to sit for the summative paper was (N=) 19,604. The examination locales were distributed across 19 centres across provinces.

Table 5: Distribution of the sample population

Province	Centres
Western	Kadawatha, Colombo 10, Colombo 13, Wattala, Kelaniya, Kaluthara, Gonawala, Siyabalape
Central	Kandy
North Western	Kurunegala
Southern	Galle, Matara
Sabaragamuwa	Kegalle, Rathnapura
Uva	Badulla, Monaragala, Bibile,
North Central	Anuradhapura
Eastern	Ampara

The instrument

The instrument was a 100 mark allotting paper which evaluated three of the four skills: Reading, Writing and Speaking. Speaking skill was evaluated through dialogue construction. Given the magnitude of the population and its distribution space conducting a Listening assessment was rendered as impossible.

Data source

The mark sheets where the marks obtained for the paper by individual candidates was the main data source. Rating scale for marks obtained for evaluating internal students is given in the table below.

Table 6: Rating scale for marks obtained

A ⁺	85-100	C+	45-49
A	70-.84	C	40-44
A ⁻	65-69	C-	35-39
B ⁺	60-64	D+	30-34
B	55-59	D	25-29
B ⁻	50-54	E	00-24

Though the student rating scale used for evaluating internal students is used in this study for the purpose of analysis the CDCE follows an evaluation mode of Pass/Fail where the Pass mark is 40. As *English for Communication* is a compulsory paper Further the following regulations apply for referring the examination even though they have obtained the minimum standard of marks required to pass the examination. If the candidate obtains one 'D' or 'E' grade in one paper, are considered to have referred the examination.

Sampling procedure

The total population was stratified into centres across provinces. Then the corpus for analysis was selected under random sampling procedures. On average random sampling procedures shorted listed 200 papers from each centre for analysis. In two centres the population was less than 200. Thus the results were on % basis. The total sample for analysis was 3700.

Data analysis

The analysis used the software SPSS. At macro level the % Mean of marks were obtained based on examination centres. The number of absentees per examination centre too was calculated. As a trend which indicated a province and examination centre based variance in the mark dispersion was recognized a micro contrastive analysis of marks along the Rating scale based on examination centres was conducted.

6. RESULTS AND ANALYSIS

Macro analysis

The summative assessment was through a 100 mark issuing written paper. The figure below illustrates that the Mean of marks obtained fluctuates across the examination centres.

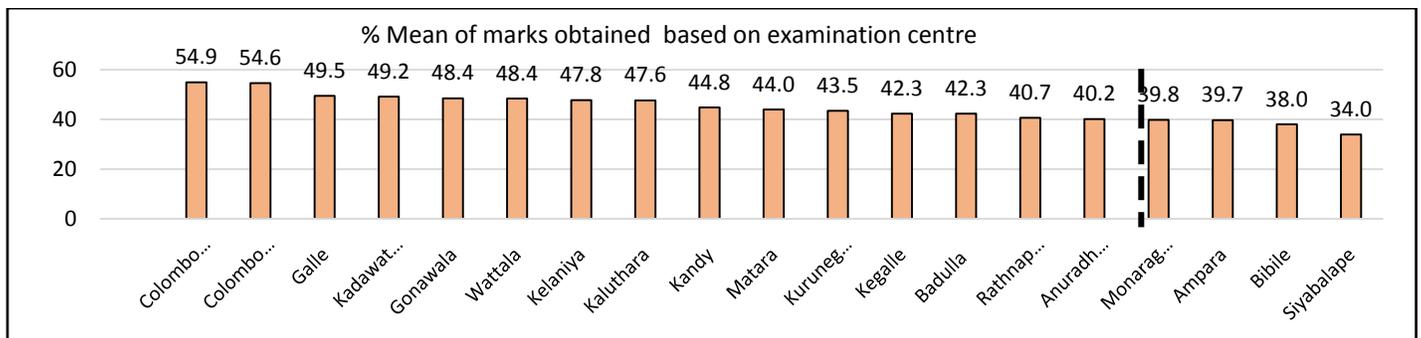


Figure 6: Mean of marks obtained based on examination centre

What is noted is that the % Mean of marks obtained at the examination centres in the Western Province: Kadawatha, Colombo 10, Colombo 13, Wattala, Kelaniya, Kaluthara other than Siyabalape is far above the pass mark of 40. Along with Siyabalape, Monaragala, Ampara (Eastern) and Bibile (Uva) had a % Mean of marks below the pass mark of 40.

With reference to Figure 3:Socio-economic Conditions: Poverty and Prosperity Indices by Province the Western Province claims the highest Prosperity index (76.1%) while Uva (54.5%) Eastern and (48.2%) are ranked the lowest. The low Socio-economic Condition in the latter two provinces would be an indication of poor digital competency and lack of internet facilities at home.

Another feature which requests attention is the high % of absentees per examination centre. According to the data in the Figure below absenteeism was the highest in the Eastern Province where the percentage Poverty Head Count Index in 2009/10 (Figure 3) was the highest (14.8%) across all provinces. This needs the attention of the policy makers as the lack of digital competency resulting in inability to access the e-book would have affected the confidence level of the learners making them disinclined to sit the summative assessment.

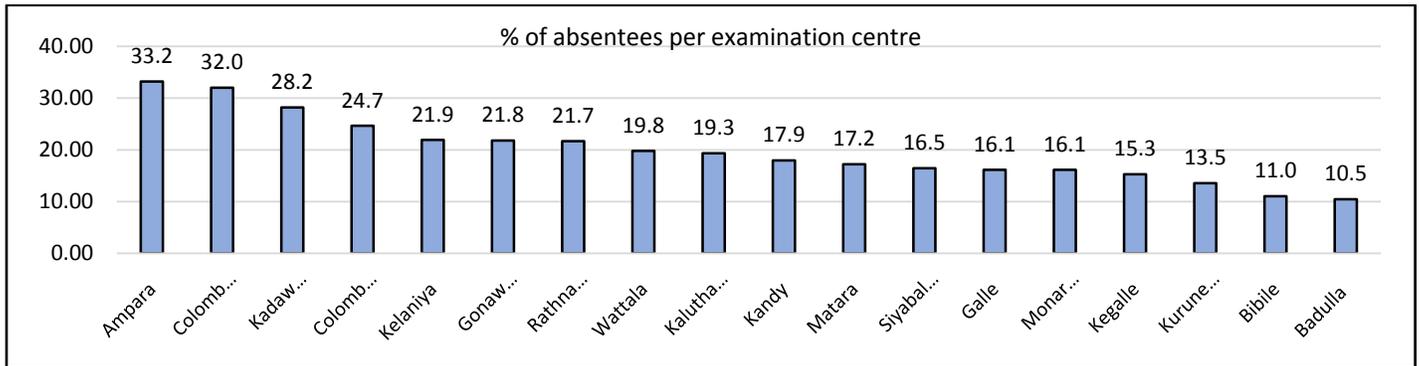


Figure 7: % of absentees per examination centre

Statistics presented in Table 3:Performance of Candidates in English at G.C.E. O/L and G.C.E. A/L (2015) in Sri Lanka indicates that the % of candidates who have obtained a Failed (W) grade are 54.60% and 54.60% respectively. Though the statistics do not provide an analysis based on provinces it can be suggested that Ampara falls into a district which has obtained a very low % (Polonnaruwa is the lowest) in eligibility for University Entrance (Passed in 3 Subjects) which is 59.13 % (Performance of Candidates: 8^[20]). Thus a multitude of factors would have contributed to the high % of absentees at Ampara.

Yet the next centres which indicate a high % of absentees: Kadawatha, Colombo 10, Colombo 13, Wattala, Kelaniya are urban areas in the Western Province where digital competency would be high and internet facilities would be available at home/communication centres. Further, proficiency in English too could be considered as high. The attention of the CDCE is drawn to this trend as English for Communication is a compulsory paper.

Comparison of marks distribution between centers based on provinces

The Standard Deviations obtained was high, ranging from Wattala 21.198 to Kandy 16.516 being the lowest, indicating that the data points are spread out over a wide range of values. Thus histograms indicating distribution of ratings scales across centres were used for micro level analysis. This wider spread indicates the dispersion over the mark range of the population undergoing rating. The following histograms indicate the marks dispersion analysis across the provinces. The candidates who sat for the paper in the Western province centres Colombo 10 and Colombo 13 obtained the highest % of passes (86.15 and 85.37% respectively) while the highest % of failure were witnessed in Siyabalape (56.76%).

Western province

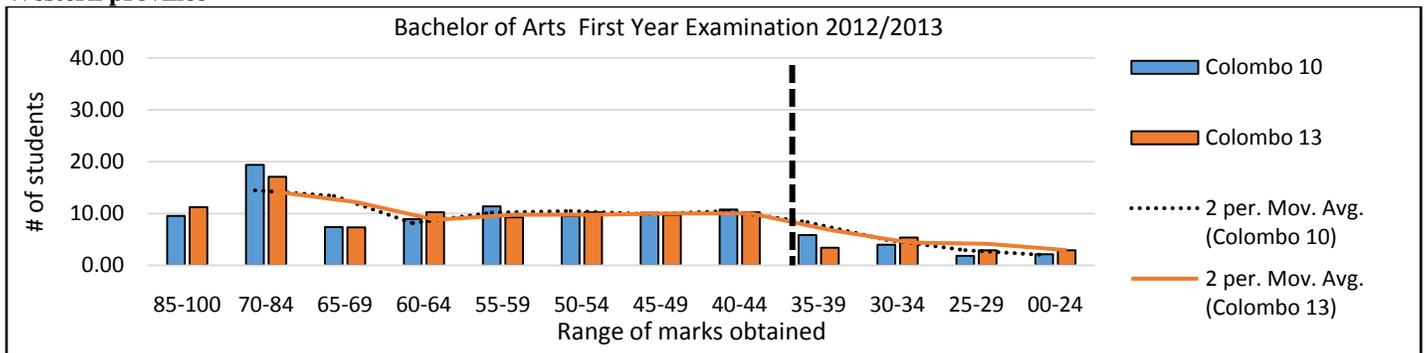


Figure 8: Contrastive analysis of marks obtained at Colombo 10 and 13 with trendlines indicating the moving average

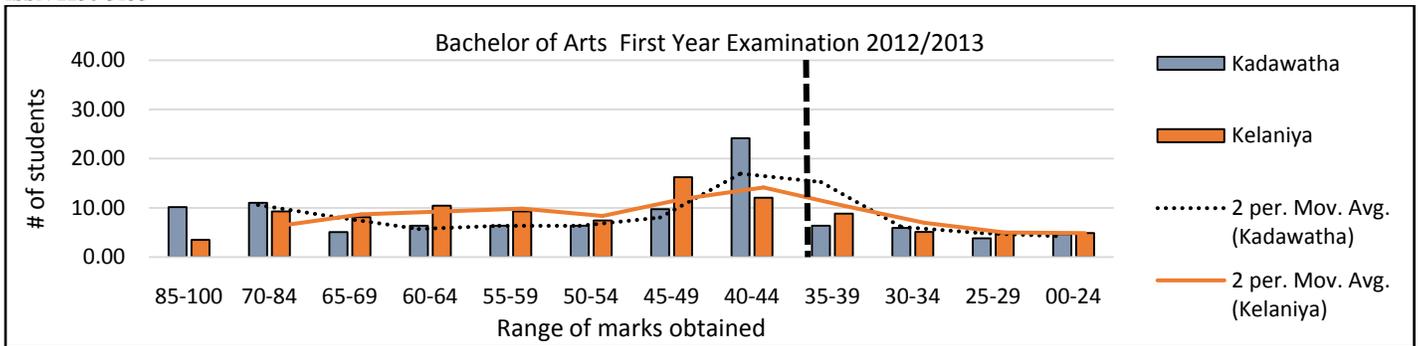


Figure 9: Contrastive analysis of marks obtained at Colombo 10 and 13 with trendlines indicating the moving average

Central province

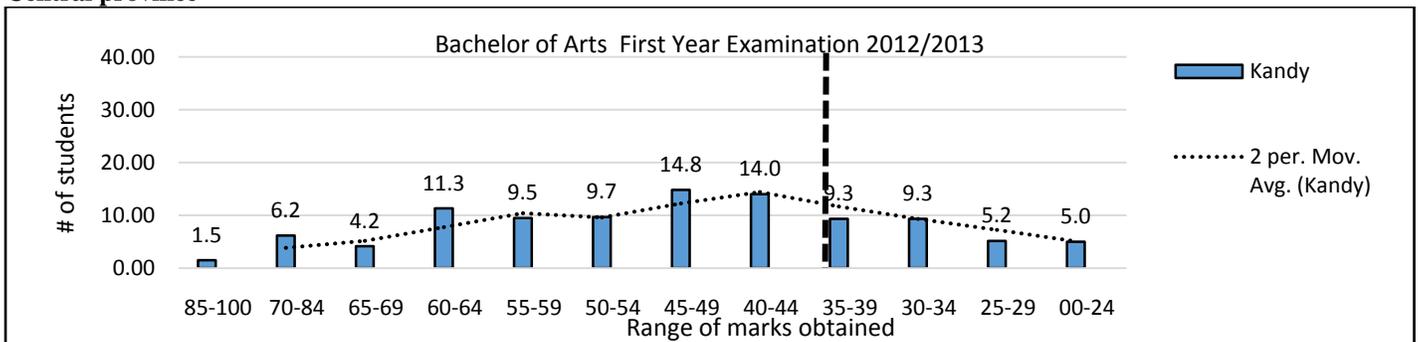


Figure 10: Marks obtained at Kandy with trendline indicating the moving average

Southern province

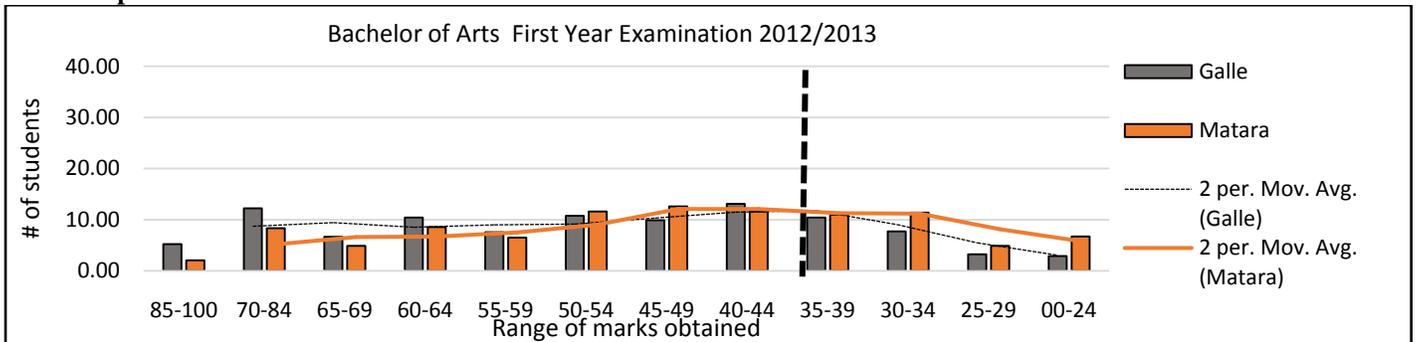


Figure 11: Contrastive analysis of marks obtained at Galle and Matara with trendlines indicating the moving average

North Central province Anuradhapura; North Western province: Kurunegala

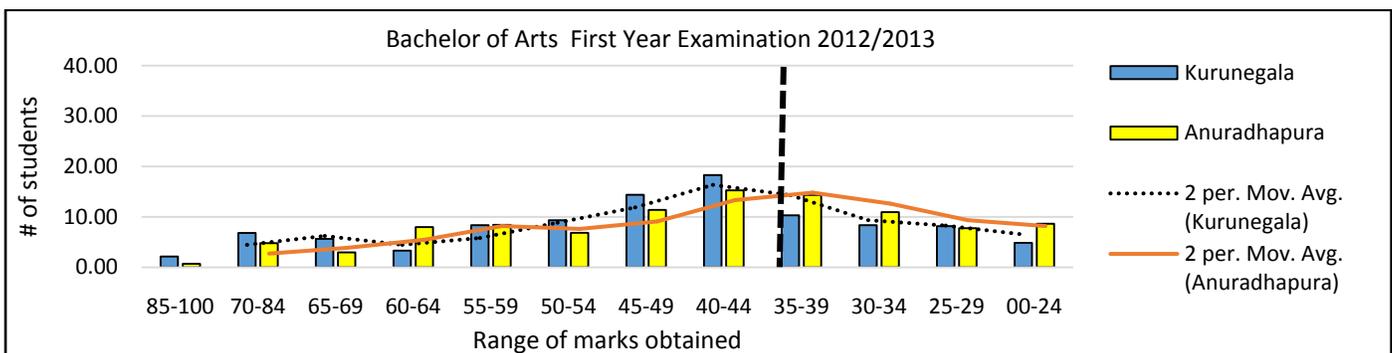


Figure 12: Contrastive analysis of marks obtained at Kurunegala and Anuradhapura with trendlines indicating the moving average

Sabaragamuwa

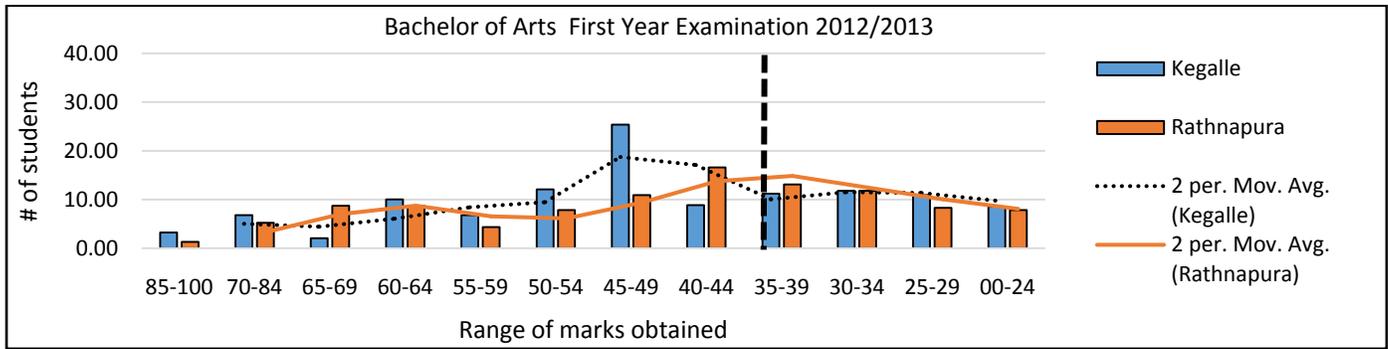


Figure 13: Contrastive analysis of marks obtained at Kegalle and Rathnapura with trendlines indicating the moving average

Eastern (Ampara) and Uva(Monaragala)

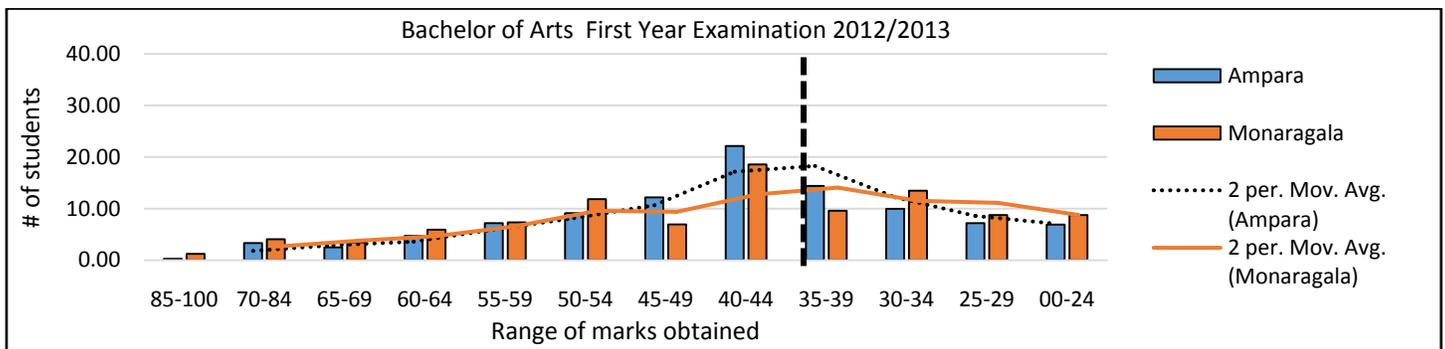


Figure 14: Contrastive analysis of marks obtained at Ampara and Monaragala with trendlines indicating the moving average

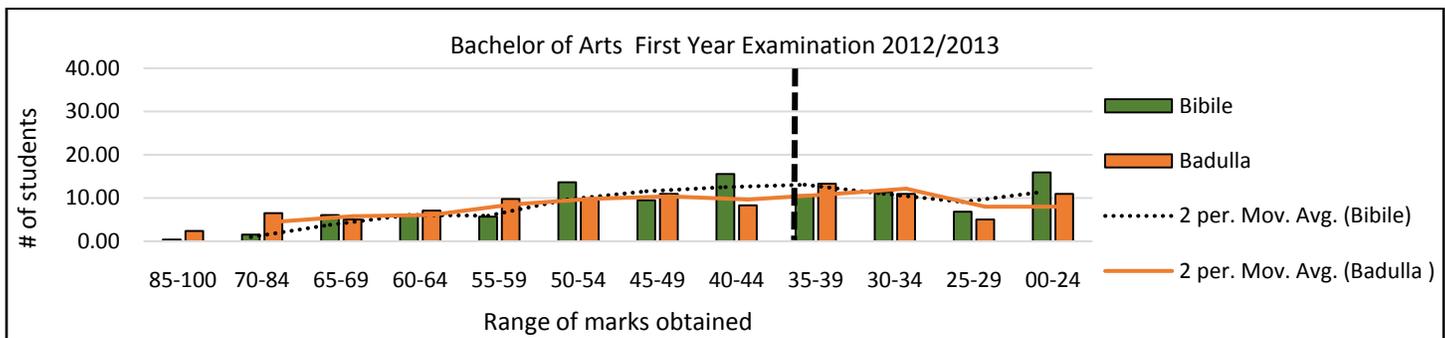


Figure 15: Contrastive analysis of marks obtained at Badulla and Bibile with trendlines indicating the moving average

Summary of % of failure

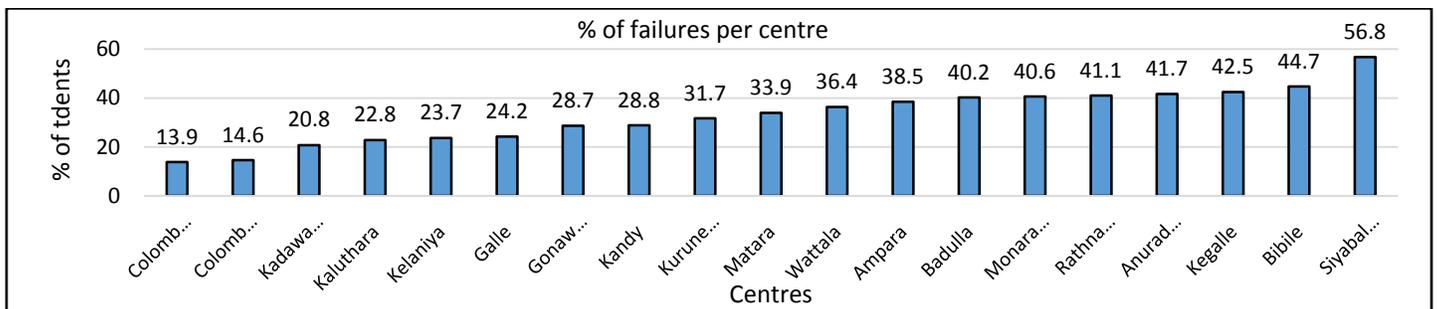


Figure 16: % of failures per centre

Based on the statistics above the study links the diversity of the economic conditions across provinces to the inability to access the internet and both as variables which affect the performance at the paper *English for Communication*.

Table 7: Correlation between Prosperity Index, Internet user population and % Mean of marks

Province	Prosperity Index by Province (%), 2011	District	Internet users 2015 (%)	% Mean of marks by Centre	
				Centres	% of passes
Western	76.1	Colombo	28.10	Colombo 10	86.15
				Colombo 13	85.37
		Gampaha	18.70	Kadawatha	79.24
				Gonawala	71.31
				Wattala	63.64
				Kelaniya	76.33
				Siyabalape	43.24
		Kalutara	14.90	Kaluthara	77.17
Central	58.3	Kandy	11.70	Kandy	71.17
North Western	57.1	Kurunegala	9.30	Kurunegala	68.29
Southern	56.8	Galle	10.50	Galle	75.76
		Matara	8.30	Matara	66.06
Sabaragamuwa	56.0	Kegalle	7.00	Kegalle	57.52
		Ratnapura	5.90	Rathnapura	58.95
Uva	54.5	Badulla	3.50	Badulla	59.76
		Monaragala	4.90	Monaragala	59.39
				Bibile	55.30
North Central	50.6	Anuradhapura	7.40	Anuradhapura	58.31
Eastern	48.2	Ampara	6.50	Ampara	61.50

As evidenced by the above statistics there is a correlation between the Prosperity Index, Internet user population and % of passes. If the Prosperity Index is a gauge for possessing a computer % Internet users in 2015 provides proof for it. In most districts (Kurunegala, Matara, Kegalle, Ratnapura, Badulla, Monaragala, Anuradhapura, Ampara) less than 10% of the population use internet. In all of the above districts approximately 40% of the population has failed *English for Communication*. Though the CDCE cannot provide solutions for the poor digital denizenship in rural Sri Lanka it has to recognize that weak digital literacy should not be allowed to penalize the students who find accessing the e-book compiled for *English for Communication* and doing the coursework online difficult.

Suggestions for online architecture optimization: *English for Communication*

Arnold et al (2015) ^[21] state that statistical analysis of historical and current data derived from learners and the learning process will allow for predictions that improve the learning. This study rests on a vacuum of historical data and is dependent on current data which lacks the much required fluidity. Fluid data or the kind of data generated by a student as the way they interact with their university has become increasingly digital. Literature identifies this as a ‘digital footprint’. Though learner analytics in the current pedagogical universe sets down the norm: analyze the ‘digital footprint’, many inherent difficulties hinder the process in the current context. The process of making each student (n= 19,604) imprint a ‘digital footprint’ and accessing and analyzing such data is not feasible in the context of the learning environment of this study. But the rudimentary analytics conducted by this study has provided an insight to the needs of distance students who follow *English for Communication*.

The learner analytics above strongly draw attention to areas which need remedial measures. Keeping in mind the inherent threats and challenges faced by all stake holders, this study wishes to make the following suggestions.

- The CDCE has at present provides sufficient on-campus technology to make the digital learning environment fruitful for the learners who are following external degrees. Furthermore it is commended that the policy makers had the insight to introduce a parallel compulsory course: COMP E1014- *Computer Literacy* which aims at instructions which at the end of the course will provide the ‘learners with the basic Information and Communication Technology (ICT) knowledge and skills required to function in a typical working environment’. But it is a pity that assessment is not online and comprises of two written segments: a one hour MCQ examination and two hour essay question paper. It is only through an online assessment that the

hands on experience of each student can be gauged. It is cognized that given the magnitude of the student body (n= 19,604) online assessment was not feasible. Yet if such an assessment mode is introduced, better understanding of the correlation between Computer Literacy and performance at English for Communication can be obtained.

- The institution should recruit in-house expertise who will function within CDCE and cater exclusively to the needs of the students of the course. For example, I as the compiler of the course material for *English for Communication* is an academic who has to fulfil requirements for disseminating knowledge for a population of internal students while handling lesson material preparation etc. and administrative duties. With a hectic time table though I was provided digital space for interacting with the distance students and had the intention of doing so it did not reach the level where I could interact with a majority of students to provide them with timely, appropriate interventions. Most students who did interact did not even leave sufficient information for a 'digital footprint'. Thus by recruiting in-house expertise identified cohorts of weak students can be provided better feedback on their progress.
- One of the most progressive tools recommended by Ferguson (2012: 10)^[22] for online courses is 'nudge analytics' that support and 'prompt individuals to take action'. As the learner analytics of this study predicts that students in areas such as Kegalle, Rathnapura, KurunegalaBadulla, Bibile, Anuradhapura and Siyabalapela behind the others in the performance at the summative examination a nudge mechanism which encourage them to access further help and prompt these students to take timely action could be conducted with in-house expertise at the CDCE. Such in-house expertise should not be burdened with in-campus teaching commitments and should exclusively focus on dealing with student queries on-line on a daily basis, conducting tele- conferences and to take on virtual teacher responsibilities.
- To overcome these deficiencies to a certain extent the CDCE has implemented a discussion forum for *English for Communication*. Unlike face-to-face courses, according to Creasman (2012)^[23], an online discussion forum is an asynchronous activity, where students can interact with each other anytime, 24/7. In many online courses around the world discussion forums between student-student and student-facilitator are powerful sources of providing MKOs in virtual space. As these discussion forums are serendipitous rather than planned tracking and evaluating of the electronic discussion material is done by a facilitator in the course management system.
For most ESL courses weekly discussion assignments based on weekly material readings/ videos viewing/ activity completion is conducted. On the online discussion boards learners discuss the ideas found in the materials, share experiences and opinions, ask and answer each other's questions, and find new solutions to issues they experience. For example each week they are expected to add at least two posts of 4-5 sentences/questions to the discussion board. They are given deadlines: you have to make 2 posts; one by Thursday and the other by Monday. These posts are evaluated by a facilitator and marks are allotted.
In the context of *English for Communication* the discussion forum was not very targeted. What is suggested, keeping in mind the monolithic population, is the implementation of some form of progress assessment on the discussion board. It has to be acknowledged that the facilitator feedback was given sporadically as the number of queries were high.
- For online courses Solloway and Harris (1999)^[24] recommend a Course Orientation where the learners are familiarized with software and the course. Further they suggest the conduct of a needs analysis of hardware access and technical skills, and the provision of an on-line self-directed tutorial that enables students to use the site.
It is suggested that conducting a project during such a Course Orientation that aims to provide the CDCE and administrators with a more comprehensive view of undergraduates' preferences and practices related to new technologies and digital literacies will be beneficial. Winke and Goertler (2008)^[25] stress the need to survey language students' preferences for using technologies when technology based lessons and tasks are created. Kim et al. also found that technological affordances and limitations should also be considered when designing tasks.
Thus if such a project identifies that the requirement of students from areas where the failure rate is very high is for a hard copy of the e-book it should be provided. But it is to be remembered that the student population has to move away from traditional modes of education and the CDCE should take steps to increase the motivation in the students to take-up online learning.

Meeting these challenges will require decisions regarding reconceptualizing the current digital framework to incorporate more collaborative communication between an in-house course coordinator/s and students and between students. What has to be

immediately rectified is the dire requirement for in-house TESL expertise. Then only can the virtual space provided for *English for Communication* by the CDCE become the Zone of Proximal Development or the distance learner undergraduates.

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Impact of Uncontrolled Asthmatic Disease upon Functional Performance of Patients at Respiratory and Allergy Care Centers in Baghdad City

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Abstract- A descriptive design of study was carried out to measure the impact of uncontrolled asthmatic disease upon functional performance of patients. The present study started from March 28th 2016 to 20th September 2016.

Methodology: A non- probability (purposive) sample of 100 patients who were suffering from uncontrolled asthma diseases and treated in specialist centers according to the criteria (the patient determined with uncontrolled asthma disease, get scored less than 20 on ACT and who visit the specialist centers for asthma to receive medications and follow up for investigation). The data were collected through the utilization of the developed questionnaire and by means of structured of interview method with the subjects who were individually interviewed in the center. The instrument consists of three, parts the first part is socio-demographic characteristics; the second part is to identify the medical history and the third part which consists of five domain (66 items) is to identify the information about the functional performance of asthma patient. The instrument has been validated by (16) experts, each of them has more than (10) years of experience. In specialty, the internal consist reliability is determined by Crohn Bach correlation Coefficient which was $(r) = 0.88$. The analyzed data have been conducted through application of descriptive statistics (frequencies, percentages, mean of scores Standard deviation) and inferential statistics (Chi-squared test).

Results: have shown that the majority of the (60%) patients are always affected by uncontrolled asthma on physical efficiency, the majority of the (50%) patients are sometime effected by uncontrolled asthma on emotional efficiency. (42%) of the patients are sometime affected by uncontrolled asthma on the efficiency of the social function, (69%) patients of the study results are sometime effected by uncontrolled asthma on social and family activities, 54%) patients are sometime effects by uncontrolled asthma on spiritual and religious beliefs and the majority of the study sample (81%) are sometime effects by uncontrolled asthma.

Conclusion: The study indicates that the uncontrolled asthma affects the patients' social and family; emotional behaviors and social; spiritual and religious beliefs. Which indicates the sample were complaining nervousness & anxiety. The study confirms that the asthma affects the patients' physical mobility as well as their work status.

Recommendations: the study is recommended to Initiate specialized asthmatic health care centres to provide a complete quality care for people who have asthma. Diagnosing, treatment & written health information program, equipped with all needed

therapeutic educational facilities such as a lecture room with data show, is recommended to increase the patients' knowledge. It is also recommended to provide a well-educated nursing staff for follow up visits, to Assess, monitor, & review asthma action plan in order to reduce impairment & risk.

Index Terms- Impact, Uncontrolled Asthmatic, Functional Performance.

I. INTRODUCTION

Asthma is a chronic inflammatory disease of the airway that causes reversible obstruction by narrowing and clogging the air passages due to hyper-responsiveness to stimuli (National Heart, Lung, and Blood Institute, 2007). Although the exact cause of asthma is unknown, genetic predisposition and environmental exposure factors seem to be the main cause. The World Health Organization (WHO) reports that 300 million people suffer from asthma, that it is the most common chronic illness among children, and that it occurs in all countries, but over 80% of asthma deaths occur in lower income countries⁽¹⁾. Asthma is a chronic respiratory disease that can have varying effects on the quality of life of sufferers. The patho-physiology of asthma involves a circular progression of physical manifestations due to airflow obstruction as a result of inflammation of the airways. The types of inflammation differ between patients, even if the same mechanisms (such as allergy) are involved. Patients now respond differently to a variety of stimuli or, even, the same stimuli at different times. At the same time, the response to treatment can also vary greatly (Kemp 2002). Asthma is properly treated, people are well educated about all aspects of their illness and compliant are reduced affected. Those that are not may be severely impaired by chronic airflow limitation. It has been proven by research that the management and control of asthma greatly affects the quality of life of the person living with asthma, and that any level of symptom severity has an impact on quality of life even in people who only experience occasional symptoms⁽²⁾. Asthma is a public health issue affecting adults and children. Asthma morbidity and mortality is always on the increase worldwide. The burden of asthma in recent years is enormous and the cost to manage asthma increases over time. Even with new and innovative research and practice, asthma cannot be cured; however, it can be managed. With this in mind, asthma management is an imperative part of saving lives for both children and adults.

Translating research into public health practice is challenging as it relates to asthma management because there are many variables. For example, environmental triggers are complex in regards to asthma management. What may trigger one asthmatic (i.e. environmental tobacco smoke) may not affect another^{(3) (4)}.

Objectives of the study

1. To identify the characteristic of uncontrolled asthmatic patients at respiratory and allergy care center in Baghdad city.
2. To find out the relationship of some demographical characteristics of the sample such as age, gender, level of education, occupation and genetic factor with deferent domains of functional performance.

II. METHODOLOGY

Design of the Study: A descriptive design of study was carried out to measure the impact of uncontrolled asthmatic disease upon functional performance of patients, the present study started from March 28th 2016 to 20th September 2016.

Setting of the Study: The study was conducted in two centers the first at the Allergy of Baghdad City, AL-Zahra'a Center consultative for Allergy and Asthma, and the second study was conducted at the, Clinic consultative for Chest and Respiratory Diseases.

Sample of the Study: A non- probability (purposive) sample of 100 patients who were suffering from uncontrolled asthma diseases and treated in specialist centers.

Data Collection: The data were collected through the utilization of the developed questionnaire and by means of structured interview method with the subjects who were individually interviewed in the specialist centers for asthma by using the Arabic version of the questionnaire the time for interview of each sample was 15 to 20 minutes , The data collection was performed from June 19th 2016 to July25th 2016.

Study Instrument: Through review of the related literature and studies, the constructed questionnaire is that is used as a mean of data collection. It consists of (3) major parts;

Part I: Is composed of socio-demographic characteristics.

Part II: Is composed of medical history.

Part III: Is composed of the functional performance of asthma patients .

Validity and Reliability: The content validity of the instrument was established through a panel of (16) experts, the reliability of the items were based on the internal consistency of the checklist was assessed by calculating Cronbach s' Alpha which as= 0.88.

Statistical analysis: The statistical data analysis approach by using (SPSS-ver.20) is used in order to analyze and evaluate the data of the study. A descriptive statistical data analysis approach used to describe the study variables : Frequencies and Percentages. Inferential statistical data analysis approach: used by application of the Chi-square test.

III. RESULTS

Table (1): Distribution of the Demographical Characteristics of the sample

Demographic Characteristics	Rating	Patients	
		Frequency	Percentage
Age (years)	20-30	16	16
	31-40	24	24
	41-50	19	19
	51-60	35	35
	61-and more	6	6
	Total	100	100
Gender	Male	47	47
	Female	53	53
	Total	100	100

Level of education	Read and write	30	30	
	Graduate of Secondary	19	19	
	Graduate of High school	4	4	
	Graduate of institute	25	25	
	Graduate of college and above	22	22	
	Total	100	100	
Marital status	Single	15	15	
	Married	82	82	
	Widowed	3	3	
	Total	100	100	
Profession	Governmental employee	43	43	
	Retired	5	5	
	No work	1	1	
	Freelance	26	26	
	Housewife	25	25	
	Total	100	100	
Profession that trigger asthma	I work in factory of wool	Yes	2	2
		No	98	98
	I work in laboratory of chemical materials	Yes	6	6
		No	94	94
	I work in factory of blocks	Yes	5	5
		No	95	95
	I work in factory of cements	Yes	3	3
		No	97	97
Place of resident	Urban	53	53	
	Semi-urban	45	45	
	Rural	2	2	
	Total	100	100	
Monthly Income	Enough	11	11	
	Almost enough	83	83	
	Not Enough	6	6	
	Total	100	100	

This table represents the distribution of the patients demographic data in terms of frequencies and percentage. Results reveals that the highest percentages (35%) of patients are within fourth age groups (51- 60) years old. Elementary graduated patients record approximately (27%) out of the study sample. The majority of the study sample were females (63%) out of (100) patients participated in this study and records (82%) of them are married. Regarding patients professions, results indicate (43%) out of the total number are governmental employed. The highest percentage of patients that trigger asthma are those with no profession at all. Most of the patients reside in urban areas which count to (53%) out of the total number of the study sample. Finally in this table, it is obvious that the majority of the study sample making almost enough monthly income are counted up to (83%).

Table (2): Distribution of the Study Sample regarding the Patients History

Demographic Characteristics	Rating	Patients	
		Frequency	Percentage
Date of disease diagnosis / year	1-10	22	22
	11-21	47	47
	22-32	28	28
	33-43	2	2
	44 and more	1	1
	Total	100	100
How many admissions to hospital due to asthmatic attack	Yes	48	48
	No	52	52
	Total	100	100
Other direct family with asthma	Father	40	40
	Mother	46	46
	other	14	14
	Total	100	100
Body Mass Index	18.5- 25	11	11
	25.5-30	39	39
	30.5-35	27	27
	35.5-40	17	17
	40.5 and more	6	6
	Total	100	100
Are you smoking	Yes	28	28
	No	72	72
	Total	100	100
Do you drink alcohol	Yes	0	0
	No	100	100
	Total	100	100
Do you have diabetic mellitus disease	Yes	14	14
	No	86	86
	Total	100	100
Do you have blood pressure disease	Yes	42	42
	No	58	58
	Total	100	100
Blood group	A	53	53
	B	8	8
	AB	20	20
	O	19	19
	Total	100	100
Do you visit the health care provider	Yes	15	15
	No	85	85
	Total	100	100
Using asthma medication	permanently	11	11
	according to need	89	89
	Total	100	100
Type of treatment you are using	sprayer	55	55

	burner	6	6
	pills	29	29
	injection	10	10
	Total	100	100

This table demonstrate that the age of (11-12) years is considered the age of disease diagnosis which count to (47%) of patients who are diagnosed at this age . Proportion of (52%) of the patients with asthma attack not admitted to hospital. Concerning family, mother patients who have asthma record the (46%) of the study sample. Regarding smoking status, (72%) of patients in general are not smokers. In the same table, the proportion of all patients participated in the present study do not drink alcohol which records (100%). In addition, most of the study samples do not have diabetic mellitus and blood pressure diseases which count up to (86% and 58%) respectively. Regarding patient's blood groups, results indicate (53%) of the study sample are (A) blood groups. In general, (85%) out of the total number of the study sample do not visit the health care provider, and (89%) of patients use asthmatic medication when needed Concerning treatment types, results indicate (55%) of patients use sprayer methods.

Table (3): Distribution of Patients' Effects by their Uncontrolled Asthma

Effect Uncontrolled Asthma	Scale	Frequency	Percentage	M.S.	S.D.	Effect
	Never	0	0			
	Sometime	81	81			
	Always	19	19			
	Total	100	100			

M.S.= Mean of score, Cut off point (0.66), Never (mean of score 1-1.66), Sometime (mean of score 1.67-2.33), Always (mean of score 2.34 and more), S.D= Stander Deviation.

This table shows that the majority of the patients (81%) are sometime affected by uncontrolled asthma.

Table (4): Statistical Association between the Patients' Demographic Characteristics and Uncontrolled Asthma

Demographic Characteristics	Rating	Overall			χ^2	D.f	p-value
		Never	Sometime	Always			
Age (years)	20-30	0	2	14	2.197	4	0.700 NS
	31-40	0	3	21			
	41-50	0	4	15			
	51-60	0	9	26			
	61-and more	0	1	5			
Gender	Male	0	41	6	2.239	1	0.135 NS
	Female	0	40	13			
Level of education	Read and write	0	22	8	4.048	4	0.542 NS
	Graduate of Secondary	0	14	5			
	Graduate of High school	0	4	0			
	Graduate of institute	0	22	3			
	Graduate of college and above	0	19	3			

Marital status	Single	0	13	2	1.176	2	0.555 NS	
	Married	0	65	17				
	Widowed	0	3	0				
Profession	Governmental employee	0	38	5	7.621	4	0.106 NS	
	Retired	0	5	0				
	No work	0	1	0				
	Freelance	0	21	5				
	Housewife	0	16	9				
Profession that trigger asthma	I work in factory of wool	Yes	0	1	1.274	1	0.259 NS	
		No	0	80				18
	I work in laboratory of chemical materials	Yes	0	5	0.023	1	0.881 NS	
		No	0	76				18
	I work in factory of blocks	Yes	0	5	1.235	1	0.267 NS	
		No	0	76				19
	I work in factory of cements	Yes	0	3	0.725	1	0.394 NS	
		No	0	78				19
	Place of resident	Urban	0	42	11	0.619	2	0.734 NS
		Semi-urban	0	37	8			
Rural		0	2	0				
Monthly Income	Enough	0	9	2	0.030	2	0.985 NS	
	Almost enough	0	67	16				
	Not enough	0	5	1				

χ^2 = Chi-square, Df= Degree of freedom, P-value= Probability value

This table reveals that there is a non-significant association between the patients' demographic characteristics and uncontrolled asthma at p-value more than 0.05.

IV. DISCUSSION

Part I: Discussion of the Socio Demographic Characteristics and Clinical Data among uncontrolled Asthma

The findings of the present study indicate that the majority of the study subjects are within (51-60) years old, and most of them are females. This result is agreed with (Dean et al., 2010), where they conducted an Internet-based survey which was administered to adult caregivers of children aged 6-12 years with moderate to severe asthma. Their results indicate that the majority of the study subjects are females.

Regarding to the level of education, the study findings indicate that most of the study subjects are elementary graduates. In addition, the study findings also indicate that most of the study subjects are married, their professions, are government employed and workers at wool factory. The study sample also shows that most of the people chosen come from urban area and their monthly income is enough to some extent. Moreover, the majority of the study subjects have almost enough monthly income.

The study findings indicate that most of the study subjects' disease diagnosed (11-21) years, are admitted to hospitals due to asthmatic attack and direct family with asthma. Also, the study subjects are obese their body mass index (30.5- 35), most of them are smokers, no diabetic mellitus disease, nor high blood pressure, and most of them have blood type (A group); the finding also show that most of the study subject visit health care providers, and intake asthma medication when needed. Naturally, this would not give them asthma control and in turn they would require appropriate medication like sprayer treatment. These results are supported by (Kempe, et al., 2014) where they conducted a cross-sectional study, asthma patients aged 18-75 were randomly selected from primary and secondary health care centers. Postal questionnaires were sent to 1,675 patients and the response rate was 71%. A total of 846 patients from primary and 341 patients from secondary care were evaluated. Data were collected using a questionnaire and review of medical records. Their results indicate that the majority of the study subjects are more than 50 years old, smokers, employees in a risky

environment, use inhaler bronchodilators, and from urban residential area, with low educational level, and good economic status⁽⁵⁾. (Eisner, et al., 2000), prospectively studied 242 with asthma, aged 18-50 years, recruited from a random sample of allergy and pulmonary physician practices in Northern California to identify risk factors for subsequent hospitalization. Their results indicate that the majority of asthmatic patients; are of 50 years old and more; They are married; and the most common of them are females⁽⁶⁾.

Part II: Discussion the Impact of Uncontrolled Asthma upon the patients' Performance.

The study results indicate that there is a sometimes effect of uncontrolled asthma on patients' functional performance. Mancuso, et al., 2015, mentioned that asthma affects the patients functional status as well as the patients' quality of life⁽⁷⁾. Peters, et al., 2006, studied 300 million people who are affected by asthma worldwide and the burden is likely to rise substantially in the next few decades. Estimates of the prevalence of asthma range from 7% in France and Germany to 11% in the USA and 15-18% in the United Kingdom. Approximately 20% of these patients have severe asthma, of which 20% is inadequately controlled. Patients with inadequately controlled severe persistent asthma are at a particularly high risk of exacerbations, hospitalization and death, and often have severely impaired quality of life and functional performance⁽⁸⁾.

Part III: Discussion of the Relationship between Uncontrolled Asthma for Patients' Performance and their Socio Demographic Data

The study results show that there is a Non-significant association between the patients' demographic characteristics and the levels of performance of uncontrolled asthmatic patients, except with the patients' body mass index. This result might be occur the asthma refers to a pathological and allergic problem and affect people with different educational and social classes so their demographic data may not affect asthmatic circumstances. Also Narry, et al., 2014, assessed the relationship between asthma, body mass index (BMI) and aerobic performance, as

indicated by a shuttle test. They found that there is a significant impact of the patients' body mass index on patients' performance⁽⁹⁾.

The study results shows that there is a significant association between the patients' demographic characteristics profession & place of residence and emotional efficiency. Meng, et al, 2008, conducted a study entitled "Uncontrolled asthma means missed work and school, emergency department visits for many Californians". They found that the Californians suffering from frequent asthma symptoms have higher rates in missing school or work due to their asthma, in visiting the emergency department or urgent care for their asthma, and they rated their overall health as fair or poor. Improvements in access to health care, asthma management and avoidance of triggers can help these Californians reduce the severity of their asthma burden. So there is a significant impact of the patients' levels of performance and their profession⁽¹⁰⁾. A study that confirm the risk factors for asthma; they found that there is a significant relationship between the levels of performance and even the uncontrolled asthma and the place of residency⁽¹¹⁾.

V. CONCLUSIONS

- [1] The study results confirmed the majority of the patients with uncontrolled asthma are those with an advanced age and female patients.
- [2] The study indicates that the majority of the study sample level of education are of primary education and that there is little opportunity for them to develop their level of education.
- [3] Most of the uncontrolled asthma patient occupation are governmental employed.
- [4] The study indicates that the uncontrolled asthma is most likely to occur among urban residents than those in rural.
- [5] The study results confirmed that most of asthmatic patients have no chronic disease such as (DM and BP).
- [6] The study indicates that nervousness & anxiety are the most common psychological problems that the asthmatic patients experience.
- [7] The study indicates that the uncontrolled asthma affects the patients' social and family life; emotional and social behavior; spiritual and religious beliefs. thus indicating that the chosen sample were complaining of nervousness and anxiety.
- [8] The study confirms that the asthma affects patients' physical mobility as well as affect their work status.

RECOMMENDATIONS

- [1] Initiate a specialized asthmatic health care centres to provide a complete quality care for people who have asthma. Diagnosing, treatment & written health information program equipped with all needed therapeutic

educational facilities such as lecture room with data show, to increase the patients' knowledge.

- [2] Provide a well-educated nursing staff for follow up visits, to Assess, monitor, & Review asthma action plan for reducing impairment & risk.
- [3] A mass media approaches should be employed by the ministry of health to increase the patients' awareness about how to control asthma.
- [4] Further studies should be conducted to involve national levels in order to assess the incidence of uncontrolled asthma and to compare the levels of performance between the controlled and uncontrolled asthma.

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Production of Biogas Fuel from Alcohol Distillery Plant

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Abstract- Due to limited availability of natural fuels like Gasoline, diesel, LPG etc, scientists are going to research on agricultural based fuels. Many countries like Brazil, USA, New Zealand, India, etc, are using alcohols blended gasoline and biodiesel blended diesel. The increase in capacity of the distilleries to produce fuel-grade and chemical grade ethanol will immensely increase the water pollution problem ,due to generation of large volume of distillery waste water (DWW) having high biological oxygen demand(BOD), chemical oxygen demand (COD) with high color intensity.

Thermal treatment at pH 0-1 and $T = 1400^{\circ}\text{C}$ with a C_w of 3 kg/m^3 are maximum COD reduction of about 70% from its initial value of 34 kg/m^3 . The COD and BOD reduction were due to formation of solid residues.

From the distillery units we can not only get ethanol ,chemicals but we can also get bio-gas fuel and solid residues fuel by treatment of waste water from same unit .These can be our future fuels.

Index Terms- Thermal treatment, catalytic thermolysis, biodigester effluent, charred residue, distillery Spent wash.

I. INTRODUCTION

In India the alcohol is produced in the distilleries mostly by fermentation of molasses. Alcohol is separated from the fermented product in distillation column as top product. The bottom product is waste, which is known as distillery waste water (DWW). The distillery waste water which produces from molasses/sugar cane juice is dark brown in color and has very high COD ($60\text{-}200\text{kg}/\text{m}^3$) and BOD ($50\text{-}75\text{kg}/\text{m}^3$) in comparison to other raw materials like sugar beet and grains. This is also very difficult to treat. About $12\text{-}17\text{m}^3$ of waste water per m^3 of ethyl alcohol is generated. Most of the distilleries in world use anaerobic systems to recover the maximum amount of energy through biomethanation reactors (biodigester). These reactors operate at around 80-90% BOD removal efficiency and around 70% COD removal efficiency. Thus the effluents of these systems still contain very high COD ($\sim 30\text{-}45\text{kg}/\text{m}^3$) and very high BOD ($\sim 4.5\text{-}7\text{kg}/\text{m}^3$). [6, 7]

The government of India has recently order to market 5-10% ethanol-blended gasoline from the oil outlets in the country. This singular decision has increased the demand of fuel-grade ethanol, which cannot be met from the molasses based fermentation units only. Hence the shift to juice of sugar cane, sweet sorghum and beet and non-edible great food grains (wheat, rice, maize etc) as the additional and alternative raw materials for alcohol fermentation is a near possibility to meet the projected ethanol requirements of 500million liter alcohol per annum as 5% ethanol & in the next stage for 10% ethanol blending with

gasoline an additional 500 million litres of ethanol will be required. While the use of ethanol –blended gasoline and bio-diesel will reduce the environmental pollution due to reduction of the noxious gases and particulates from vehicle exhausted emissions, the increase in the capacity of the distilleries to produce fuel-grade and chemical grade ethanol will immensely increase the water pollution problem, due to generation of large volume of DWW having high BOD, COD with high colour intensity.

As the bio methanation is attractive process to recover the energy contains in these wastewater as methane rich gas but this effluent still contain very high COD ($\sim 10\text{-}45\text{kg}/\text{m}^3$) and very high BOD ($\sim 1.5\text{-}7\text{kg}/\text{m}^3$), which is treated to further to meet the discharge water quality standards for release into surface waters (BOD $< 0.03\text{kg}/\text{m}^3$) and sewers (BOD $< 0.10\text{kg}/\text{m}^3$, COD $< 0.30\text{kg}/\text{m}^3$) applicable in India. Most of the disillery units used bioaeration process for treatment for bio digester effluent. For this oxygenation system like either surface aerators or submerged high pressure bubblers are used. The cost of operation of such oxygenation system is very high even than they are unable to meet for standards for discharge quality of waste water as the residual COD is still $8\text{-}15\text{kg}/\text{m}^3$ and the residual BOD is in the range of $3\text{-}7\text{kg}/\text{m}^3$. One of the disadvantage of this process is that he hydrocarbon is wasted due to its oxidation .These hydrocarbon is wasted due to its oxidation. These hydrocarbons may be recovered as fuel material after separating from the biodigester effluent. For treatment of BDE, a three step process: thermal heat followed by flocculation and wet oxidation has been suggested.

In the present paper the Thermolysis of biodigester effluent (BDE) is presented to treat the BDE and to recover the energy in the form of residues. In the laboratory, various oxides of metals, viz, Cu, Mn, Zn either singly or in mixed forms were used as catalysts. However, CuO was found to be the best among them and, therefore, CuO catalyst was chosen further studies. . Utilization of ethanol as fuel and generation of biogas from distilleries is also being covered.

II. ETHANOL AS FUEL

Ethanol is now being used as fuel in many countries. Brazil introduced a program to produce ethanol for use in automobiles in order to imports. Brazilian ethanol is made mainly from sugarcane. Pure ethanol (100% ethanol) is used in approximately 40% of the cars in Brazil. The remaining vehicles use blends of 24% ethanol with 76% gasoline. Sweden is using large quantities of ethanol as a fuel. They have used ethanol in chemical production for many years. As a result Sweden's crude oil consumption has been cut to half since 1980. During the same time period the use of gasoline and diesel for transportation has

also increased. Some Canadian provinces promote ethanol use as a fuel by offering subsidies of upto 45 cents per gallon of ethanol. [8]

III. BIOGAS FUEL FROM DISTILLERY WASTEWATER

There are about 300 distilleries in India producing 3.0 billion litres of alcohol and generating 40 billions of waste water annually. These distilleries have potential to produce 1300 million cubic meters of biogas. A nearby distillery unit with an annual alcohol production of about 2150 kiloliters has been found to generate about 32700 m³ of spent wash. The plant was claimed to achieved a COD removal efficiency of 86% with a HRT of 10 days and the biogas production was around 450-500 m³/day. Another moderate sized chemical unit, having captive distillery is manufacturing 55000 KL of alcohol per year. Its distillery produces an effluent spent wash of about 1400 m³/day with a BOD value between 45000-50000 nm³/day. The biogas was composed of 50-60% methane, 1-3% hydrogen sulphide and 31- 49% of carbon dioxide.

A comparative study of the treatment of the sugarcane based vinasse of different countries has been made by Drissen et al, the results of which are shown in Table 1. These results confirm the fact that varying characteristics of the spent wash affects the efficiency of treatment.

IV. THERMOLYSIS OF BIODIGESTER EFFLUENT

4.1 Materials

The biodigester effluent was obtained from a nearby sugar plant. Typical of the effluent, before and after thermal, is presented in Table 2.

4.2 Preparation of catalyst

The CuO catalyst was prepared in the laboratory from the cupric nitrate by alkali precipitation followed by drying and calcinations. To prepare 10gm CuO catalyst, 30.40 mg/lit copper nitrate solution was prepared in distilled water and liquid ammonia was added to the solution gradually (drop by drop) while stirring the solution at a constant speed. The resultant precipitate was washed thoroughly with distilled water and then it was dried in an oven at 105⁰C for 18 h. The dried matter was calcined in a furnace at 400⁰C for 4 hours. The calcined solid was ground in a laboratory grinder and sieved. The solid particles with an average size of 220 nm were used in the experiments.

4.3 Experimental setup and Procedure

The Thermolysis experiments were performed in a 1dm³ High pressure stainless steel (SS-316) reactor (SSR). The SSR was equipped with electrical heating, temperature indicator-cum-controller, liquid sampling port, pressure indicator, and a cooling coil. The reactor contents were agitated using a magnetic stirrer. After the start of an experimental run at a desired temperature, the effluent samples were withdrawn from the reactor at definite time intervals. The samples were filtered and the filtrate was analyzed for its COD values [2]. The effect of such variables as initial pH (pH₀=1-10) and temperature (T=100-140⁰C) on the COD removal efficiency were studied. The experiments were performed at temperature(100-140⁰C) and self-generated pressure the autogenously pressures of the solution at 100⁰ C,

120⁰C, 130⁰C, 140⁰ C were, respectively, 2.8, 5.1, 7.20 and 8.80 bar as against the vapor pressure of water which were 1.2, 2.7 and 3.6 bar at the corresponding temperatures. This pressure enhancement is due to the pressure of organic matter in the effluent. The effluent was preheated from the ambient temperature to the required temperature; the preheating period varying with the temperature. The starting time of the start was considered as the 'zero time' when the temperature was attained due to preheating of the waste water from its ambient temperature. All the experimental runs were carried out for 6h duration. Chemical oxygen demand (COD) was determined by the standard dichromate reflex method. BOD of a sample was determined by incubating the seed sample for 3 days at 27⁰ C.

4.4 Result and Discussion

First to screen the catalyst, the experiments were performed in a atmospheric pressure reactor at 100⁰ C and different pH (pH=1-10) using different catalyst like homogeneous copper sulphate and heterogeneous metal oxide/mixed oxide of Cu, Mn, Zn, Pb, Fe. Oxide etc. among this CuO catalyst gave best results at pH=1, therefore CuO catalyst was chosen further for thermolysis and kinetic studies.

4.4.1 Effect of initial pH

The effect of pH on the catalytic thermolysis of BDE was studied at 140⁰C temperature and the autogenous pressure (self pressure). The pH₀ of the effluent batch in the reactor was varied between 1 and 10. The pH₀ was adjusted with either sulphuric acid or liquid ammonia. The COD reduction at 140⁰C and autogenous pressure versus treatment time (t_R) with pH₀ as the parameter are presented in the Fig.2. It may be seen from the figure that the COD reduction is maximum at pH₀=1. Between pH₀=2-4, the COD reduction efficiency goes down drastically. Above pH₀=4-8, COD reduction increases, although marginally, and then decreases. It is also that the treatment at pH₀=8 is the best within range 4 ≤ pH₀ ≤ 10.

We can draw a plot that shows significant drop in the COD of the effluent at zero time. During the transient (pre-) heating period (t_h) from the ambient temperature to the treatment temperature, thermal degradation/precipitation occurs. Pre-heating periods require for rising the temperature of the effluent from the ambient temperature to the treatment temperature was 23 min for 100⁰C, 2 min for 120⁰C, and 30 min for 130⁰C and 34 min for 140⁰C. At 140⁰C, the COD reductions during the pre-heating period at different pH₀ were as follows: 52 % (pH₀ =1), 48 % (pH₀ =2), 15 % (pH₀ =4), 18 % (pH₀ =6), 17 % (pH₀ =8) and 16 % (pH₀ =10). These values are shown at the ordinate at zero time, i.e., t=0. It may be seen that COD reduction during the pre-heating period is substantial when compared with the overall COD reduction obtained after 2 h of treatment at the steady state reaction temperature. After 6 h period, the COD reduction was 70.01%, 65.39%, 34.55%, 38.1%, 36.91% and 35.61% at pH₀ = 1, 2, 4, 6, 8 and 10, respectively.

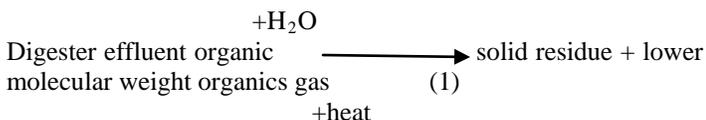
During pre-heating period, thermolysis increases with increase in reaction temperature and consequent reduction in pH. Metal complexation with lignin, carbohydrates and other soluble organics like proteins, etc. make the reaction products insoluble. The insoluble matter/residues (char) of 14.63, 14.63, 9.05, 10.02, 11.18, 9.28 kgm⁻³ were obtained at experimental conditions of

initial pH (pH₀) 1, 2, 4, 6, 8, 10 respectively with T=140⁰c, C_w kg/m³, t_R = 6 h. This data shows that low pH (acidic condition) is favorable for more solid formation and, thus, more COD reduction. For thermolysis, the constituents: lignin, carbohydrates and proteins containing functional groups are more reactive at acidic condition in presence of CuO catalyst. These residues have heating values 14.5-19 MJ/Kg shows its organic nature. It also reflects that COD reduction is due to separation of these organics in the form of solid residues during thermolysis process.

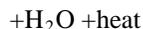
4.4.2 Effect of Temperature

The effect of temperature on thermolysis of BDE was studied in the temperature range of 100-140⁰C and solution autogenously pressure at pH₀=1 using C_w=3 kg/m³ and COD₀=34 kg/m³. The COD reduction was taken as a parameter. The results are shown in figure.3. From the figure it may be seen that the COD reduction is fast during the initial period of reaction (up to 2 h) and slow thereafter. With the increase in temperature, the COD reduction of the supernatant solution also increases. It can be seen that 27% and 51% COD reduction were obtained at the end of pre-heating period (i.e., zero time) to raise the solution temperature from the ambient temperature to 100⁰C and 140⁰C, respectively, which has increased to 41% and 70% at the end of reaction period 6 h. At 140⁰C, 62% COD reduction is obtained in t_R=2 h which increases to 70% in t_R=6 h.

During catalytic thermolysis, two mechanisms, both in parallel but complimentary to each other, take place simultaneously. The organic molecules, smaller and larger – present in the effluent undergo chemical and thermal breakdown and complexation forming insoluble particles which settle down. Further, during the Thermolysis larger molecules also undergo break down into smaller molecules which are soluble. Due to formation of insoluble particles, and slight gasification involving COD and BOD of the supernatant, get reduced. The thermolysis process of the biogas digester effluent can, thus, be represented as



In the presence of the catalyst, the solid residue formation gets hastened and its yield is increased. The reaction equation can be written as,



4.4.3 Analysis of residues

The residue obtained after filtration was dried in an oven, and its composition and physical properties are presented in Table-3. It may be seen that the colour of the residue obtained after treatment at different pH₀ is different from one another. At lower pH₀ easily grind able bulky mass with free flowing properties was formed, while at higher pH₀, flakes or small granular particles were found. The lower the initial pH(pH₀=1-2), the higher is the energy recovery in the form of residue. At pH₀=1, the energy recovery is 42.4%, whereas at pH₀=2, the energy recovery is 47.7%. Reduced drying period for the residue, higher specific energy and high COD reduction for the effluent were achieved when Thermolysis was conducted under acidic condition. The residue is a complex solid with a good heating value (~18 MJ/kg at pH₀=1) and high C/H atomic ratio. It also contains the majority of copper used as the catalyst. The copper content of the residue is a minimum (13.3%) at pH₀=1. This residue could be used as a fuel in a combustor, furnace or an incinerator. The ash contains more than 50% copper and is therefore, a good copper source to enrich organic manure. This blended manure could be a very good fertilizer for agricultural crops.

V. CONCLUSION

The ethanol is good fuel material for gasoline engine as it produces low emission of CO₂ and hydrocarbon.

Biomethanation is the well recommended process to treat the waste water originated from the distillation column of ethanol production plant. It produces methane rich gas, which has high heating value.

Thermolysis has been found to be effective process for the treatment of biodigester effluent. Thermolysis at 140⁰C, pH 1 with a C_w of 3 kg/m³ gave maximum COD reduction of about 70% from its initial value of 34 kg/m³. The BOD reduction was found to be 83% from its initial value of 6.3 kg/m³. The COD reduction is accompanied with the formation of settle able solid residue which is enriched in carbon having heating value 17.92 MJ/kg.

The fuel may be obtain from distillery in three ways

- I. As ethanol
- II. As methane rich biogas
- III. As solid residues during thermolysis of biodigester effluent

Table-1 –Result of UASB process treatment of the sugarcane based vinasse for different countries

Parameter	Brazil	India	Venezuela
COD removal (%)	88	65-70	65-70
BOD removal (%)	96	85-90	85-90
Biogas, l/g COD removal	0.5	0.5	0.5
Organic loading rate (g COD/l. day)	22	10	16

Table-2 – Typical composition of biodigester effluent before thermal and after thermal (at T = 140 °C, pH₀=1)

Parameter	Biodigester effluent	Biodigester effluent thermal
COD	34000	10200
BOD	6300	1075
Organic Carbon	9636	1845
Inorganic Carbon	3528	1468
Total Carbon	12864	3313
Reduced Carbohydrate	32500	6550
Dissolved lignin	16100	1230
Protein	3280	32
NH ₄ -N	687	140
Organic Nitrogen	190	73
Total Kjeldahl Nitrogen	877	213
P ₀₄ ²⁻	157	54
KH ⁺	5170	3840
S ₀₄ ²⁻	7120	4230
Cl ⁻	3000	2820
Fe ⁺⁺	10	8
Ca ⁺⁺	558	170
Cu	8	210
Total Dissolved Solids (TDS)	28320	25710
Total Suspended Solids (TSS)	12180	----
pH	7.8	1.54
Color	Blackish brown	Orange

Note: All the values except pH are in mg dm⁻³

Table - 3. : Analysis of the Residue Obtained after Catalytic Thermolysis at Different pH₀ values (T =140°C, t_R=6h)

pH ₀						
	1	2	4	6	8	10
Wt. of residue (kg/m ³)	14.63	14.63	9.05	10.02	11.18	9.28
Color	Dark brown	Dark brown	Dark brown	Black	Blackish brown	Greyish brown
Nature	Bulky mass, 1-2 mm flakes, easily grindable	Bulky mass, 1-2 mm flakes, easily grindable	1-2 mm flakes, easily grindable	3-5 mm flakes, difficult to grind	2-3mm flakes, difficult to grind	1-2 mm granules
Approx. drying period (h)	3.0	4.0	4.5	6.0	8.0	10.0
Specific energy (MJ/kg)	17.92	18.73	16.22	19.0	16.77	14.5
% Convertible COD	70.01	65.39	34.55	38.1	36.91	35.61
% Energy recovery	42.43	47.66	25.51	33.09	32.60	23.39
% Copper in residue (g)	13.26	14.50	1.26	22.72	17.14	25.50

$$\% \text{ Energy recovery} = \frac{(\text{Specific energy} \times \text{Mass})_{\text{residue}}}{(\text{Specific energy} \times \text{Mass})_{\text{Biodigester effluent}}} \times 100$$

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Musculo-skeletal Problems of Women Weavers in Handloom Industry of Lakhimpur District, Assam

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Abstract- Handloom industry plays a vital role in the socio-cultural and economic life of the people. It is dependent on manual labor and here the major contribution comes from women. The present study was conducted on women workers, who perform the activities in handloom industry of Lakhimpur district of Assam to find out the musculo-skeletal problems and perceived joint discomfort of their body due to uncomfortable working postures. Various parameters observed were weight, height, angle of deviation, time and body mass index (BMI). A five point scale given by Vergese et al (1995) was used to record the musculo- skeletal problems and perceived joint discomfort. A sample of 40 women workers of Lakhimpur district Assam was selected for the study through multistage random sampling. Statistical analysis of the data are employed through frequency, percentage, mean, standard deviation, critical difference and coefficient of correlation. Maximum joint discomfort was found in the waist(4.02) followed by finger (3.85), wrist (3.55), elbow (3.47), shoulder (3.45), and in knee(2.72) respectively while performing different activities in handloom. About 47.5% respondents perceived very severe pain in back. Less than 45% respondents made complaint of severe pain in low back. The 57.6% respondents made complain of moderate pain in leg followed by mild pain in fingers (32.5%) and knee (12.5%).

Index Terms- Handloom, Joint discomfort, Musculo skeletal, Women workers

I. INTRODUCTION

Handloom Industry in India is ancient cottage industry with a decentralized set up spread through the length and breadth of the country and Assam accounts for the highest concentration of handloom industry {census of handloom in India (2009-10) NCAER, New Delhi} engaging about 12 lakhs persons. It is dependent on manual labour and here the major contribution comes from women. A great deal of research has been under gone in analyzing the postural effort for various purpose while people may still be unaware of the same. Next to agriculture, handloom plays a predominant place in rural economy of the state and women are the main working force in the handloom industry. While at work the weavers have to adopt postures without giving consideration to their individual capability which results in stress and trauma the worker experience. Sitting for

active work is not the same in its demand on the body as sitting quietly at rest. Hence comfortable postures at work is always important for a worker, because uncomfortable posture or bad posture may increase load on lumbar spine and different body segments or body joints. Considering the workload of industrial workers and evaluating the problem that exist when working in an industry a critical assessment of workplace design, method of work, functioning of muscles is done which produce the movement of joints and maintain postures. Based on this rational, the objective of the present study was - to ascertain the perceived joint discomfort and musculoskeletal problems faced by the women respondents.

II. MATERIALS AND METHODOLOGY

A sample of 40 women workers of Lakhimpur district, Assam were selected for the study through multistage random sampling. Descriptive cum experimental research design was used in the present study and tool employed for the data collection was interview schedule. For experimental data various parameters were used i.e. weight, height and time were recorded by weighing balance, anthropometric rods and stopwatch. Five point scale given by Vergese et al. (1995) was used to record the musculoskeletal problems and perceived joint discomfort. Statistical analysis of the data were employed through frequency, percentage, mean, standard deviation, Critical difference while inferential statistics employed were coefficient of correlation.

III. RESEARCH FINDINGS

It was observed from the study that majority (47.5%) of the respondents belong to age group 31 to 40 years. The highest mean height of the respondent were found to 155.33cm and the highest mean weight was found to be 55.08 kg. While assessing body mass index for physical fitness maximum (90%) respondents belonged to the category 18.5-25.0 was found normal. Maximum (60%) of the respondents were engage in various activities in handloom industry for 5-10 years. The hours of work was found to be 7-8 hours per day for all the respondents in all the handloom industry. The findings of the study are presented in the following head.

Table-1: Distribution of the respondent according to rating of perceived joint discomfort in various static activities
Number of Samples: 40

Sl. no.	Joint Movements involved	Activities											
		Threading the reeds/healds		Throwing the shuttle		Drawing the reed to and fro		Paddling		Putting designs in the fabric		Drawing the harness	
		Mean	S.D	Mean	S.D	Mean	S.D	Mean	S.D	Mean	S.D	Mean	S.D
1	Neck	3.8	27.54	2.7	9.44	2.95	13.49	-	-	3.6	25.97	2.95	15.61
2	Elbow	2.75	15.03	3.47	22.40	2.77	14.70	-	-	2.87	14.77	3.45	10.25
3	Finger	3.6	22.47	2.92	15.21	3.52	22.81	-	-	3.47	26.41	3	9.88
4	Wrist	3.5	23.62	3.3	21.47	3.55	21.31	-	-	3.52	22.09	3.4	12.94
5	Shoulder	2.9	23.76	3.42	24.51	3.5	21.11	-	-	3.12	13.66	3.62	11.77
6	Waist	2.85	15.59	3.12	16.79	2.97	16.31	2.5	11.47	2.97	11.80	-	-
7	Knee	-	-	-	-	-	-	2.7	10.10	-	-	-	-
8	Ankle	-	-	-	-	-	-	2.5	8.56	-	-	-	-

Table-2: Distribution of the respondents according to rating of perceived joint discomfort in various dynamic activities.**Number of Samples: 40**

Sl.no.	Joint movements involved	Activities					
		Warping		Setting the warp on the loom		Preparing the loom for weaving	
		Mean	S.D	Mean	S.D	Mean	S.D
1	Neck	2.82	17.72	2.9	17.42	2.55	15.43
2	Elbow	3.55	21.70	3.32	19.04	3.45	21.43
3	Finger	2.85	15.15	2.97	15.07	2.55	11.37
4	Wrist	3.62	25.21	3.42	24.32	3.05	18.40
5	Shoulder	3.65	27.74	8.6	27.7	3.45	20.08
6	Waist	4.02	29.02	2.82	13.22	2.65	11.62
7	Knee	2.95	16.34	2.7	15.40	3.0	12.24
8	Ankle	2.67	14.34	2.75	14.37	2.85	11.36

Table-3: Distribution of respondents according to rating of perceived joint discomfort in both static and dynamic activities.**Number of Samples: 40**

Sl. no.	Joint movement s involved	Activities									
		Spinning		Winding		Twisting		Reaching for the doobby		Beam getting	
		Mean	S.D	Mean	S.D	Mean	S.D	Mean	S.D	Mean	S.D
1	Neck	2.67	17.65	3.60	23.67	3.05	18.84	3.37	19.13	2.05	18.35
2	Elbow	3.75	24.90	2.72	17.96	3.4	22.46	2.9	10.98	2.3	23.60
3	Finger	3.85	28.35	2.97	19.13	3.15	21.27	2.7	8.90	2.15	20.31
4	Wrist	2.8	24.29	3.17	25.86	3.3	17.30	3.3	16.34	2.3	23.59
5	Shoulder	2.3	9.52	2.62	17.20	2.8	17.44	3.45	20.88	2.27	23.11
6	Waist	2.27	8.84	2.5	16.32	2.75	15.16	3.47	19.62	2.3	23.59
7	Knee	-	-	-	-	2.95	16.64	2.77	11.27	2.1	19.21
8	Ankle	-	-	3.57	25.21	2.85	13.73	2.75	16.36	2.17	20.80

In order to find out the severity of the perceived joint discomfort of the respondents in performance of various activities a rating scale was developed categorized as “No joint discomfort”, “Just noticeable” , “Tolerable”, and “Intolerable” joint discomfort .Table 1,2,3 depicts that the rating of perceived joint discomfort varies depending upon the task they perform .Maximum joint discomfort felt by the respondent while spinning, threading the

reeds/healds and putting designs in the fabric was found in the finger i.e., 3.85, 3.6 and 3.47 respectively. The severity of the joint discomfort felt by the respondents while setting the warp on the loom, preparing the loom for weaving and drawing the harness was found in the shoulder i.e. 3.32, 3.45 and 3.6 respectively. Majority of the respondents perceived severe joint discomfort while twisting, throwing the shuttle and beam getting in elbow i.e. 3.15, 3.47, and 2.3 respectively. While warping and reaching for the dobbie the maximum joint discomfort was felt in waist i.e. 4.02 and 3.47 respectively. Joint discomfort felt by the respondents while drawing the reed to and fro was found in wrist 3.55 and while paddling was found in the knee 2.725.

Table-4: Distribution of the respondents according to occurrence of musculo-skeletal problems.
Number of Samples: 40

Sl.No.	Body parts	Frequency of occurrence		
		Always	Sometimes	Rarely
1	Back	13 (32.5)	26 (65)	1 (2.5)
2	Shoulder	12 (30)	25 (62.5)	3 (7.5)
3	Shoulder joint	17 (17.5)	31 (77.5)	2 (5)
4	Neck	27 (67.5)	13 (32.5)	1 (2.5)
5	Leg	11 (27.5)	25 (62.5)	4 (10)
6	Elbow joint	10 (25)	28 (70)	2 (5)
7	Hand	14 (35)	26 (65)	-
8	Finger	12 (30)	26 (65)	2 (5)
9	Knee	12 (30)	25 (62.5)	3 (7.5)
10	Low back	29 (72.5)	8 (20)	3 (7.5)
	Mean	14.7	23.3	2.1
	S.D	7.27	7.0875	1.1972
	't'	-2.677*	5.4055**	9.3268**

**1% level of significant

*5% level of significant

Table-5: Distribution of the respondents according to musculo-skeletal problems in different body parts while performing various activities.

Number of Samples: 40

Sl. no.	Body parts	Very Severe	Severe	Moderate	Mild	Very mild	Scores	Rank	Standard Deviation
1	Back	19 (47.5)	15 (37.5)	4 (10)	2 (5)	-	4.272	II	41.643
2	Shoulder	8 (20)	12 (30)	18 (45)	2 (5)	-	3.775	IV	25.984
3	Shoulder joint	7 (17.5)	4 (27.5)	15 (37.5)	6 (15)	1 (2.5)	3.425	V	19.857
4	Neck	16 (40)	14 (35)	20 (25)	-	-	4.150	III	35.088
5	Leg	-	10 (25)	22 (55)	6 (15)	2 (5)	2.975	VI	28.586
6	Elbow	-	5	23	10	2	2.750	VIII	28.026

	joint		(12.5)	(57.5)	(25)	(5)			
7	Hand	2 (5)	6 (15)	20 (50)	12 (30)	-	2.95	VII	22.733
8	Finger	-	3 (7.5)	20 (50)	13 (32.5)	4 (10)	2.55	X	24.265
9	Knee	1 (2.5)	5 (12.5)	17 (42.5)	12 (30)	5 (12.5)	2.625	IX	18.854
10	Low back	3 (7.5)	18 (45)	13 (32.5)	6 (15)	-	5.625	I	22.653

Table-6: Co-efficient of correlation value showing relationship between dependent and independent variables.
Number of Samples: 40

Dependent variables	Independent variables	Correlation coefficient (r)	't' value
Perceived joint discomfort	Age	0.853**	10.294** (P<0.001)
	Years of involvement	0.566 **	4.296** (P<0.01)
	Body mass index	0.137	0.857
Musculo skeletal problem	Age	0.616**	4.809** (P<0.001)
	Years of involvement	0.6293**	5.032** (P<0.01)
	Body mass index	0.199	1.254

*Significant at 5% level

**Significant at 1% level

Table 4. Illustrated that majority of the respondents faced the occurrence of musculo-skeletal problems “Sometimes” in shoulder joint, back, hand and finger. The occurrence of musculo-skeletal problem was found “rarely” in shoulder, knee and low back in majority of the respondent. From the table 5. and the figure it is clear that about 47.5 per cent respondents perceived “Very severe” pain in back. Less than 45% respondents made complaint of “severe” pain in low back. Maximum (57.6%) respondents made complaint of moderate pain in leg. Less than 32 per cent respondents were found having mild pain in fingers. Only 12.5per cent respondents made complain of “very mild” pain in knee. Mean value 5.625 showed that maximum severity of musculo-skeletal problems was found in low back of the respondents. Table 6. Illustrates the correlation value of perceived joint discomfort and musculo-skeletal problems was found significant with the age and years of involvement at 1 per cent level of significance and 5per cent level of significance. The ‘t’ value of perceived joint discomfort and musculo-skeletal problem was found significant with age and years of involvement at 1per cent level of significance.

IV. CONCLUSION

It can be concluded that the posture adopted by the respondents while performing different activities in the handloom industry was found to be poor and improper. The respondents had to bend in almost 90° increases stress on low back of the user. Poor postures have found a great impact on health in the musculo-skeletal system. The respondents were

found to adopt inadequate postures while performing various activities.

These unnatural postures causing joint discomfort and severe musculo-skeletal problems in the long run. Joint discomforts were found maximum in finger, neck, waist, elbow shoulder and knee respectively. On the whole the perceived joint discomfort and musculoskeletal problems were high due to long period of service.

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Photophysical Investigation of Coumarin – A Study of the Effect of Substituents in Fluorescence

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Abstract- In the present work, coumarin has been subjected to photophysical analysis. Though the influence of the electron-donating groups such as amino, substituted amino, hydroxyl, alkoxy groups, etc. at position 7 of the coumarin ring system has been extensively studied, the luminescent properties of the coumarin moieties with an aliphatic amine substituent have not been explored. Here it is attempted to study the variation of fluorescent lifetime behaviour of coumarin with n-butyl anine (NBA).

Index Terms- Coumarin, n-butyl amine, Lifetime, Fluorescence.

I. INTRODUCTION

During the last few years there has been a remarkable growth in the use of fluorescence in biological sciences especially in biochemistry and biophysics. Fluorescence also finds application in environmental monitoring, clinical chemistry, DNA sequencing and analysis by fluorescence *in situ* hybridization (FISH). In molecular biology, fluorescence is used for cell identification and counting in flow cytometry, and in cellular imaging and movement of intracellular substances by means of fluorescence microscopy.

Coumarin derivatives are the subject of photophysical studies during the last few decades as they are highly fluorescent molecules. The nature and position of the substituent on coumarin ring has profound importance in deciding the photophysical behavior of the substitute, coumarin compounds, coumarins substituted position with an electron-donating group are known to exhibit strong fluorescence (1).

Coumarins are used as non-linear optical chromophores and as an excellent probe to study solvation dynamics in homogenous solutions as well as organized media (2-8). It is found that the nature of solvents and substituents bring out changes in the values of fluorescence wavelength maxima, quantum yield, lifetime, polarization and excited-state dipole moment of the coumarin (9).

II. MATERIALS AND METHODS

Coumarin and n-butyl amine were purchased from Sigma Aldrich Company, Bangalore, and were used without further purification.

UV/Vis absorption spectra were taken using 1650 PC SHIMADZU UV-Visible SPECTROMETER. Fluorescence measurements were made by CARRY ECLIPSE VARIAN FLUORESCENCE SPECTROPHOTOMETER.

III. RESULTS AND DISCUSSION

Pico and nano second resolved photo are important spectroscopic techniques for characterizing quenching processes that are associated with the generation and the fate of photo excited state. The fine resolved spectra reveal as to how the acceptor is distributed in space around the donors (10). In addition to this, they give information on the quenching process, specifying whether it is due to diffusion or complex formation.

The lifetime spectra of Coumarin without and with n-butyl anine are shown in Fig.1. and the compiled data have been presented in Table 1. The occurrence of the shorter fluorescence decay times may be due to the distance between the pair (11).

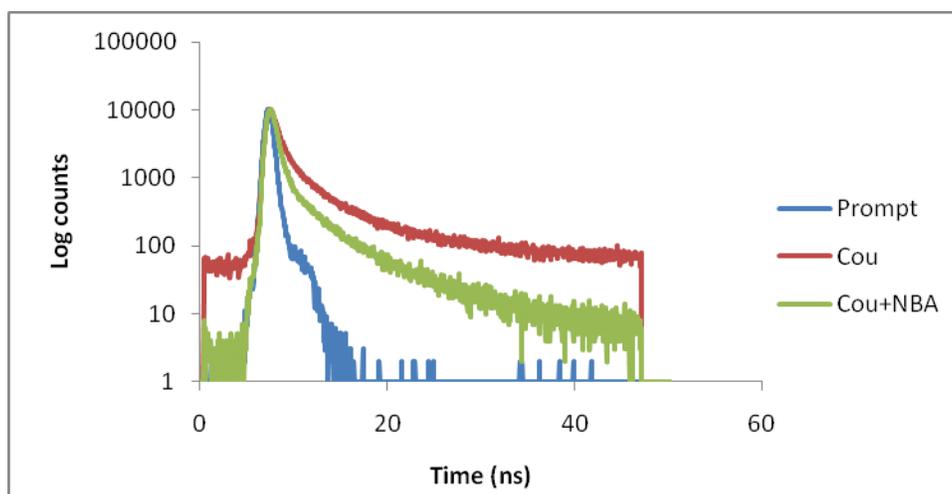


Fig.1. Fluorescence decay curves of Coumarin with and without NBA

Table 1: Fluorescence life time and amplitudes of Coumarin without and with different concentrations of NBA

Concentration of NBA (M)	Lifetime (ns)			Average life time 10^{-9} sec	Relative amplitude			χ^2	S.D 10^{-11} sec		
	τ_1	τ_2	τ_3		α_1	α_2	α_3		τ_1	τ_2	τ_3
COU	1.04	5.58	0.042	1.75	27.73	25.86	46.41	1.177	2.32×10^{-4}	3.49×10^{-5}	7.95×10^{-3}
COU+NBA	0.78	0.21	5.21	1.32	28.79	52.3	18.91	1.172	4.109×10^{-11}	0.820×10^{-11}	6.217×10^{-11}

The increase in lifetime indicates that the complexes may form in the solution such change in the lifetime occurs because quenching is an additional rate process that depopulates the excited state.

In the present investigation the lifetime of Coumarin in both conditions [(i) Coumarin & (ii) Coumarine + NBA], hence the merging of the kinetic traces is not observed (The plots not look like a single decay curve). This shows that the quenching of Coumarine might be dynamic in nature.

IV. CONCLUSION

From the fluorescent decay curves it is obvious that the compound follow a characteristic bi-exponential fluorescent decay, which reveals the existence of two different emissive states for the molecules, which could be the locally excited state (LE, Frank condon state) and charge transfer state (CT). the average lifetime has been calculated and presented in table.

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Coping Strategies of the Small-Scale Fishing Communities in the Midst of Marine Protective Policies in the Lake Victoria: The Power of Agency in Creating Own Life Trajectories

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Abstract- In consequence of what was explained as serious deterioration of fish stock and destruction of fish-breeding grounds, the government decided to enact and implement severe measures that would undoubtedly protect marine resources against destructive fishing methods. In practice, this attempt meant that, all fishers who used gears that were categorised as destructive should either stop from accessing fish from the lake or buy non-destructive gears, a condition that was seemingly impossible for many poor artisanal fishers in Tanzania. This attempt therefore compelled many who were employed in this sector to turn into other alternative means of livelihood for survival. This paper examines the strategies that have been employed by the fishing community in eking out their living as a response to restrictive measures from 2005 to date. The findings in this paper are fundamentally qualitative derived from a survey which was conducted in the Musira Island from September 2015 to June, 2016. In general terms, it was found that, a number of socio-cultural, economic, and illegitimate coping strategies were crafted out of desperation for survival as a result. Victims through their interpretation of the situation they faced and their power to manipulate it, they were somewhat able to endure the shocks initially presented by the government's intervention. The paper recommends that, for marine resource protection policies to work, before disrupting the dominant fishing livelihood strategy for people in the coast for whichever reasons, attempts to create another culturally informed and consented strategy is vital in ensuring the sustainability of protected resources.

Index Terms- Coping strategies, Fish resource, Power of agency

I. INTRODUCTION

Small-scale fisheries make significant socioeconomic contributions to over 51 million people worldwide, the vast of whom live along the coast in developing countries. In Tanzania, the fisheries sector is among the most important economic sub-sectors of the economy. The sector provides substantial employment, income, livelihood, foreign earnings and revenue to the country. The industry employs more than 5,000,000 people engaged in fisheries and fisheries related activities, while more than 480,000 fisheries operators are directly employed in the sector. In 2009 the fisheries sector contributed 1.3% to GDP, the per capita fish consumption was 8.0 kilogram and about 30% of animal protein consumption in

Tanzania (National Economic Survey; [URT, 2012]). Like in other parts in the developing countries, small-scale and artisanal fishery accounts for the majority of fish catch caught by more than 43,000 fishermen in the country (URT, 2010).

Although artisanal fisheries can be subsistence or commercial fisheries, providing for local consumption or export, this category of fishers mostly fish for subsistence, involve households members (as opposed to commercial companies), use a relatively small amount of capital and energy, use lower level of technology for harvesting [include beach seines, various cast and lift nets, fishing by hook and line from shore, fish traps and weirs (large and small), and manual harvesting (seaweed, bivalves, crabs, etc in coastal zones)], have relatively small fishing vessels (if any), make short fishing trips close to shore, and mainly for local consumption. Generally, some of the relative advantages of small-scale fisheries in certain conditions include; lower running costs and fuel consumption; lower ecological impact; higher employment opportunities; higher versatility; lower construction costs; less expensive technology; and the use household members. For coastal dwellers, marine resources are very important both as source of food, supplying 90% of animal protein, and of income, fishing often being their primary occupation (Narriman, *et al.*, 2002; Wagner, 2004; Sesabo and Tol, 2005; Mwaipopo, 2008).

Even with its significant contribution to socioeconomic development, since the 1960s, marine areas in Tanzania have been prone to destructive fishing practices, such as dynamite fishing, the long-term trend of over-harvesting fish and the use of seine nets, mono filament nets, gill nets, and dragnets among others (Francis *et al.*, 2002). These and many other activities along the coast destroy important fish habitats and other living and non-living organisms within the area (*ibid*, 2002; Francis and Bryceson, 2001; Mohamed, 2000; Masalu, 2002; Wagner, 2004). As a response to what are referred to as destructive and unsustainable extraction methods in harvesting marine resources, the government of Tanzania established a number of regulatory frameworks to control both the access and utilisation of marine resources in an attempt to protect, conserve, and restore the species and genetic diversity of living and non-living marine resources, and the ecosystem in general for the betterment of the nation and its population, particularly, the ones residing along the coastline (URT: 1997; James T *et al.*, 2006; EAME-APT, 2008; Levine, 2003).

However, such protective measures range from temporary to permanent fencing and zoning of fishing grounds and habitats, displacing fishers from traditional land and fishing grounds, and delaying of fishing activities among others (Bennett, 2005). Suffice it to assert that these current institutional and legal frameworks in a way affect people's right of access to marine resources, and their capacity to engage in and benefit from them. Such limitations result in impoverishment, disempowerment, and marginalisation of fishing communities to varying degree (Mwaiipopo, 2008). As a result of such activities, it is estimated that more than 64,241 and 50,000 full-time and part-time fishermen respectively have largely been affected by these policies in Tanzania (Kamukala, 2014; Neumann, 1990, 1997).

This paper is therefore set to present in details ways through which coastal community members like that of Musira Island have been able to eke out their living under such a restrained terrain. It is divided into six main sections. While the introduction section provides the background of an issue which this paper is trying to divulge on, the methodology section briefly demonstrates the grounds upon which the findings and conclusion were drawn from. The third section presents the nature of the socio-cultural set-up of the island and ways through which this context compelled community members to adopt various coping strategies. The fourth section brings to light the fact that the newly adopted strategies have not been without the price, instead as a result, deep ecological damages have also been produced in the course of struggling for survival. The fifth section unveils different economic openings which community members exploited to eke-out a living on the one and the extent to which such opportunities have to some extent repositioned the gender role configuration in the island on the other hand. The last section presents the conclusion which encapsulates on the findings and also offers a suggestion on the proper approach possible if future protection and conservation measure were to succeed.

II. METHODS

The findings in this paper are based on the study which was conducted in Musira Island in Bukoba Rural District in 2015-2016. In order to fill in the gap which was long created by quantitative studies on the subject, and also to understand even concealed processes individual use to eke out their living, qualitative data rather than quantitative, generated through in-depth interviews, narratives and focus group discussions are used in the analysis and presentation of the findings in this paper. Both qualitative and quantitative data were drawn from various key respondents who directly took part in fishing or participated in fish-related activities in the area. A sample of 75 respondents therefore was used in the analysis.

The study employed five (5) focus group discussions (FGDs), these groups comprised of the following subjects; the first group comprised of thirteen (13) fishermen, the second; ten (10) mat wavers, third; ten (10) women-fishers, fourth; eleven (11) mixed group of women, and last; eleven (11) mixed group of men. The study also employed thirteen (13) in-depth interviews (Public Relation Officer-Medad Fishing Company, Village Executive Officer, Village Chairman, Village Treasurer, Chairman, [Musira Fishing Association], Mama-Mboga, Sheikh,

Retired Beach Management-Chairman, Retired Beach Management Unit member, 2 most experienced fishermen [the one who use legal and other who use illegal fishing method), employed-mother of six children, and a food vendor, and three (3) narratives (two old and experienced fishers and the Village Chairman). The sample size was determined by the ability of the researcher to manage the collected data given the nature of data collected (qualitative), limited amount of time, and resources available

III. SOCIO-CULTURAL TERRAIN OF THE ISLAND AND THE NEED FOR INSTANTANEOUS COPING STRATEGIES

Like many other small communities in Africa, life in the Musira Island is built around a mechanical solidarity social life. Despite the heterogeneity and multidimensionality in originality and tribes, community members in the island have outshined such differences and live as a single formed community. The physical reality, social-cultural, economic, and political contexts stand at the core of this new homogeneity. The noted integration and cohesion among individual emanates from performing and sharing same economic activities, difficulties, religion, trainings, and a somewhat same life-style.

The significance and functionality of the above exemplified social relationship in Musira Island has to a greater extent been noted in times of socio-economic turbulences where it acts as one of the imperative lifeline to most community members than in normal times where it presents itself as a supplementary living strategy.

Approaches and attempts to protect marine resources, particularly, illegal fishing in the island ranges from cutting people from their daily subsistence to prosecution. The Beach Management Unit (BMU) which is comprised of both government officials and Local trained officers have been confiscating and burning fishing gears (nets), individuals have been charged in court with criminal offenses, and paying fines as a way of compensating for the damage done.

...“in a nutshell, there are a number of punishments that we give to fishers who employ prohibited gears in the Lake or engage into businesses that contravene with the current government policies on marine resources management. For example, if you were found with illegal fishing gears, before anything else, we used to confiscate and apprehend individuals responsible. Although not required by the law but for communal approval, the charges were first presented to the village meeting and offenders required to defend themselves before the meeting. If were found guilty, the meeting normally ordered for their gears to be confiscated. But this strategy has proved failure because of knowing each other. What we have decided as BMU in collaboration with police force, is to apprehend, charge them with a criminal offence, and burn their gears. So we are very aggressive on this and people do not like us very much”... [IDI: BMU government representative]

One important thing the Islanders share however, is their conception of the “Lake” which is considered as their only source of survival. This is because, like many islands in Tanzania, agriculture and business have hardly flourished due to soil infertility and lack of business knowledge and reliable market in most of these Islands. The preceded reality labels whoever tries to configure this thinking as an enemy of most of the Islanders, even if he/she is elevated among themselves.

...“look around you and tell us what you see. Do you see businesses, banana trees, coffee or anything of that sort? What do you want us to do for living if not fishing? Even if the government brings the police with guns, we will continue fishing unless they evacuate us from this island by force. The lake is our farm, our shops, and our life. Have we forced them to not farm? ----and so---why do they do that to us? No one will prohibit us from fishing, no one. Not even leaders of this village”... [FGD: Fishers]

In order to establish the implication attached to the Lake so as to understand the magnitude of the problem and consequences of protection measures, the study sought to figure out quantitatively from a few qualitative respondents used in this study the contribution of the Lake to their daily subsistence. Therefore the question intended specifically to find out the one most important function of the Lake in their opinion. The answers are as indicated in Table 1 below;

Table 1: Contribution of the Lake Victoria to Musira Residents

Function	Respondents	Percentage
Food	24	32.00
Income	47	62.68
Health Services	1	1.33
Clothes	1	1.33
School	1	1.33
Enjoyment	1	1.33
Total	75	100

Source: Field Data, 2015-2016

From Table 1 above, it was unveiled that, 62.68% of all respondents were of the opinion that the Lake was important as a source of income while 32% the amount which is almost half of the former voiced that the Lake was imperative in the provision of food.

For the case of Musira however, the most dominant food is stiff-porridge (ugali in Kiswahili) and rice, and yet, these staples are not produced in the island. For one to get his/her hand on such food he/she has to purchase it from a kiosk in the vicinity or on the mainland. Therefore, as much as respondents in the asked question above meant that the Lake provided them with food (fish), in a way, they also meant that it supplied them with cash that enabled them to purchase rice and maize-flour. Even when analysed from the social services angle, the aspect of ‘cash’ will

still come out strongly as the most important benefit obtained from the Lake.

As a result of protective measures in the island, social, cultural, and economic routines have either been reduced or shortened. A number of people, depending on their specialisations and gender have long benefited from the fishing activity in the Lake until the government among other agencies decided to intervene.

There are quite a good number of individuals who have been enormously affected by both the scarcity of fish and government’s efforts of trying to arrest the situation in the Lake. For example, the island harbors various fish-relating activities which in the end award residents with economic rewards which enable them either to purchase or access different basic needs. Particularly, in the island, there are food vendors (mostly women) who cook for a big number of bachelor fishermen, few married fishermen, and non-fishermen and women. There are also other groups of people who are specialised in repairing of canoes¹ and nets, construction of new canoes, fish buyers (retailers), employees (by bigger fishermen and companies), and business (Kiosk).

Furthermore, according to BMU, there are six types of fishermen in the Island as indicated in Table 2 below. All these groups of fishermen, each according to its specialization, were affected by either the stoppage or the alteration of the laws that used to guide fishing activities before new interventions in the area. Generally, in a way, all available occupations in the area were connected by the presence of the Lake and the interdependence of each group’s activity.

Table 2: Categories of Fishermen in Musira Island

Types of Fishermen	Number	Percentage
Who own fishing gears, vessel & engines	30	10.49
Who own fishing gears only	18	6.29
Who own fishing vessels only	21	7.34
Who are employed by fellow Local countrymen	122	42.66
Who are employed by foreign/Local Companies	84	29.37
Who own engines only	11	3.85
Total	286	100

Source: BMU Data Base in Musira Island, 2015-2016

This is also to assert that the impacts of restrictive measures in the island cut across to almost all age groups depending on the nature of activity performed by these individuals. This on the other hand has made it so difficult for the

¹A canoe is a small wooden narrow boat, typically human-powered, though it may also be powered by sails or small electric or gas motors. Canoes are usually pointed at both bow and stern and are normally open on top, but can be decked over. In its human-powered form, the canoe is propelled by the use of paddles, usually by two people. Paddlers face in the direction of travel, either seated on supports in the hull, or kneeling directly upon the hull. Paddling can be contrasted with rowing, where the rowers usually face away from the direction of travel and use mounted oars (though a wide canoe can be fitted with oarlocks and rowed). Paddles may be single-bladed or double-bladed. See Robert, 2000

socio-cultural institution to provide and cater for all the affected groups unlike in the old times whereas only the vulnerable who could otherwise not reach subsistence level because of old age, invalidity, sickness, death, unemployment, maternity, lack of factors of production, employment injury and pregnancy were taken into account (Albrecht, 1984). However, in making sure that no community member breathe the last breath and continues to subsist, it had to adjust and adapt to new mechanisms that would somewhat ensure their survival.

Due to the Islanders' nature of production, similarity in activities, and inherent interdependence of activities conducted by community members, the prevailing socio-cultural organisation could not improvise and absorb instantaneously the shock of unemployment as compared to shortage of food supply as it would have been in the organic society².

The problem was further intensified by the fact that most of the Islanders do not have a tendency of saving for tomorrow or at-least prepare for worst case scenarios. The phenomenon is primarily because of believing that the Lake was their farm with natural fruits, what is needed is the energy to reap it. The other reason is the nature of their farm which presents a very precarious environment to their survival.

...every day we are faced with death in the water. We use poor fishing facilities, fish during strong winds and waves, travel far in deep water, and confronted with ghost in order to get fish. Therefore for us, life is very unpredictable. We do not plan for tomorrow; we only care about now and today. I can assure you, if you ask how many of us here have at least Tshs 10,000 in his pocket or at home, you will find not more than two if you are lucky or none, ---am I lying guys? Tell him...
[FGD: fisherman]

... No, you are not, that's why here in the island we highly depend on GOD for survival, and most of us do not get sick like people in the mainland...[FGD: Aged-fisherman]

In most cases the assistances are based on kin relationships, although some are based on alliance, on friendship or on systems of mutual help. However, for the case of Musira, assistance is mostly based on mutual help, moral support, and compassion probably because of the nature of religion (Islam) guiding most of the occupants as was attested in the FGD by the Leader (Imam) of the only religious institution (Mosque) in the vicinity;

... "here in the island, we regard ourselves as people of one GOD (Allah), even though some few of us are not

Moslems. We do not segregate, be it in bad times or in good times. For Muslims, giving or helping those in needy is not a request but rather an obligation from Allah. Here we live with people of different ethnic backgrounds, even with Rwandese and Burundians. When someone is in trouble, we do not care about where he came from though some community members have depicted such behaviour. What we do is to help that particular individual depending on the type of problem is confronted with"... [FGD: Imam]

In an attempt to cope with difficulties presented by government's interventions in the area, some socio-cultural activities had to change and some had to be invented in order to cope with a new reality.

IV. THE NEW ADOPTED LIVELIHOOD STRATEGIES IN THE ISLAND: PREVIOUS SOCIO-CULTURAL MECHANISMS RE-DEFINED

Lending out fishing gears and vessels to fishermen is the common phenomenon in the fishing arena (Becha, 2008; Sesabo and Tol, 2005; Wagner, 2004). Many community members who are involved in the fishing activity in the Lake do not have all the necessary equipments to allow them to engage into the fishing business independently. Most of them depend on each others' strength except for the few who own all the necessary fishing facilities and are able to engage others by either employing or lending them.

Before implementation of government strategies, especially, that of burning and confiscating of undesired fishing nets and gears, the number of fishermen who owned fishing gears was 85 compared to the current number of 18 fishermen. Most fishermen who did not have fishing gears used to borrow from those who owned. The price for lending these equipments ranged from Tshs 20,000 to Tshs 35,000 per catch depending on the type and condition of gears and nature of negotiations with the owner. According to the Village Executive Officer (VEO), this amount was reasonable and so far had not generated any complaint from fishermen. This situation facilitated many who had no equipments to benefit from this arrangement through employment in different fishing-related activities in the area.

... "not only here, visit all the islands around, you will find only a few people who have gears and boats as their own property. Most of the fishermen depend on these few for survival, and also, these few rich people depend on these many for survival, so it is a two way traffic though not a win-win situation"...[FGD: Fishermen]

Nevertheless, in a period that would have seemed to be a booming season for the few owners who have survived the sweep by taking advantage of big pool of gearless population by increasing the renting amount, the opposite was evident in the island. The renting amount decreased drastically from the former amount to about Tshs 10,000 to Tshs 15,000 per catch at the moment. This was to allow many who could still afford to borrow continue with fishing activities. Furthermore, the reduction in amount was never without conditionalities. It was agreed in a meeting of all equipment owners that whoever

² Organic solidarity comes from the interdependence that arises from specialisation of work and the complementarities between people, the type of development which occurs in "modern" and "industrial" societies. This is a social cohesion based upon the dependence individuals have on each other in more advanced societies. Although individuals perform different tasks and often have different values and interest, the order and very solidarity of society depends on their reliance on each other to perform their specified tasks. Organic here is referring to the interdependence of the component parts. Thus, social solidarity is maintained in more complex societies through the interdependence of its component parts (e.g., farmers produce the food to feed the factory workers who produce the tractors that allow the farmer to produce the food). Study this concept more in Morrison K (1983). Formation of Modern Social Thought, London. Thousand Oaks. New Delhi: SAGE

wanted to borrow the equipments was supposed to double his working force unlike in the former. In addition to this new arrangement, each vessel was compelled to bring at least one “sadoline” (small plastic bucket) or two kilogrammes of fish in each catch depending on the type of fish they were fishing and nature of the catch (big or small). The above amount was set for good catches. This scheme was devised by community members in trying to help those who were greatly affected (HIV/AIDS families, elderly people, and orphans) by government’s attempt by denying them an opportunity to earn a living in their one and only farm. These were those who once participated either directly or indirectly in any of the fishing-related business.

...“in December 2005, the government sent its people here to investigate and question people on the different ways they use in fishing, their problems, profits, and the kind assistance they would need to be given from the government. Fishers were excited as they were promised to be assisted through provision of loans and modern fishing equipments. In February 2006, early in the morning we got the message from the Village Chairman that we were all needed at the ground for special announcement from government officials. It was in that meeting that it was announced that all people operating in the Lake were henceforth prohibited from using seine net, beach-seines, mosquito-nets, gillnets, monofilaments and many others (a long list was posted outside the office of the Village for people to read). Since that day, life in the island changed drastically. This is because the announcement touched almost the biggest section of this community who directly and indirectly depended on these abandoned equipments for survival. Hence, this was a tragedy of the entire community and not just fishermen. The Leadership of the Village thought therefore that it was wise to hold a meeting in an attempt to brainstorm what to do. This is where a request to those who had non-prohibited equipments to lower the amount and other related conditions were tabled, discussed, and agreed upon”... [IDI: BMU-Chairman]

Lending of fishing gears for such a small amount did not ensue without challenges. As a result of this amount, many fishermen had wanted to borrow these few gears in vain. Consequently, the time for lending was therefore adjusted from one month to two weeks to allow others also to lend. This attempt also necessitated many fishermen to start thinking of “saving” for the future, a phenomenon that hardly existed in the past. Fishermen who had not had an opportunity to borrow were compelled to save the money until after two weeks when their fellow colleagues had finished their tenure. This circle was determined, controlled, and monitored by the Fishers Association in the island to avoid illicit attempts.

...“before government interventions, I used to work every day and get at least Tshs 5,000 everyday. As you can see, I was still sleeping before you came in because of having nothing to do. I am now supposed to wait for about eleven days for my turn to get another Tshs 50,000 for fourteen days (two weeks) if I am lucky. I, and other five members

of my family are forced to use not more than Tshs 3,000 per day, otherwise we won’t make it”... [IDI: 18 years old-Depended Fishermen]

The other socio-cultural phenomenon that came to light is that, there were also few fishermen who were employed in the fish companies around the island even before the interventions. These include, Andiphance, Medad, and Kagera Fishing Company Ltd. These companies own and control big fishing vessels, heavy-duty engines, highly advanced gears, and nets which permit them to extract big catches unlike their counterparts. They also buy all fishes which ranges from an average of 0.5 kilogrammes and above from local fishermen. However, in order for them to harvest more, local expertise is highly desired. Thus, experienced and energetic people with a desire to be employed in these companies have long been absorbed. In addition, some few non-fishermen from the island, especially, women have been absorbed in these industries particularly in the cleaning department. The difference between the former and current arrangements is that, companies have now decided to hire two categories of workers. The first category (original) is the one that receives wages on monthly basis and the second that receives their wage on a daily basis. This adjustment was meant to absorb the many who have remained jobless as a result of recent government’s intercession in the island.

According to Public Relation Officer of Medad Fishing Company, after a noted sharp increase in crimes and HIV/AIDS in the island which was clearly aggravated by the state of joblessness in the area, the company felt obliged to include a reasonable number of youths (men and women) in its employment list as part of its Cooperate Social Responsibility (CSR). This was until the management was asked in village meeting to try to assist some of its members even at the lowest pay possible.

...“since this industry started in 2004, it has succeeded to employ many young people around it. However, the significant increase was noted in 2006 and 2007 when we were requested by the Regional Commissioner and the village leadership of Musira Village to assist its community members, especially, women to get employment at the company instead of considering people from the mainland. It was explained in the meeting that women and young people have now started to engage into abominable acts namely; prostitution and theft because of lack of employment. Since then, we have been trying to accommodate many Islanders not only from Musira but also other surrounding islands because of the nature of their difficulties which cut-across. However, we are forced to pay them very low wages because of their hugeness in number, but I hope we are making the difference”... [IDI: PRO Medad Fishing Company]

The concept of ‘Life’ was another aspect that further aggravated the difficulties people faced. Life on the island is built around the concept of today and not tomorrow so much so that all aspects of life that intend to prolong it have very much been compromised. Spending as much as you can, regular and abnormal drinking, polygamous life and, prostitution has been

some of the prevalent characteristics of life at the coast. These are some of the noted aspects of life that have long been practiced at Musira Island. These and some other practices in the island require a substantial amount of money to maintain and sustain. It is quite unfortunate that such practices have long dominated many fishermen's lives notwithstanding the cautiousness of the prevailing social organisation. For example, according to Village Chairman, a number of jobless, women and girls from the mainland migrate to this island for prostitution purpose each year. However, following the demise of what was conceived as illegal fishing practices which led to a limited supply of food and little or no cash among others in households, serious measures such as selling of alcohol (local brew) to men from 6:00 pm up to until 8:00 pm was adopted. Furthermore, prostitution business and prostitutes were prohibited and threatened of being chased away if they did not stop respectively. All these measures installed by the village government (VG) were on the one hand to ensure limited spending on the part of men and protection of vulnerable members of the households namely women, children, and elderly people on the other.

...“life in the island is different from other places. When we are not fishing we do not have anything very important to do. After a tiresome and risky journey of fishing in the lake the whole night, you would want to relax your mind ready for the next day. The only things you can find for relaxation are women and alcohol. Therefore you choose either alcohol or women or both depending on your pocket”... [FGD: Fishers]

...“when someone wants to spend his/her money on something, it is difficult to restrict him from doing that and by so doing; you will be invading his/her freedom. Although things like local brew “gongo” and women do not cost much here, you find man spending even his last cent on these items instead of on his family”... [VEO: IDI]

The study also noted an attempt by canoe-owners to diversify their fishing facilities into other income generating activities, particularly in the transportation sector. The dominant fishing vessels in the island are local canoes powered by humans and the ones powered by motor (sometimes referred to as boats by natives). Most of fishermen however, use the former method in fishing due to the costs one should incur to purchase the latter. Canoes are an important part of Musira culture, having been used for exploration, fishing and travel between and around the islands for social and economic purposes. In particular, both types of canoes in the island have predominantly been used for fishing activities for centuries.

Of all the Lakes in the region, Lake Victoria is known for its strong rapids. Usually, mornings and evenings are windy seasons, and unfortunately, this is the time when many Islanders and Non-islanders make their journey either to or from the island. Again, during the rainy season which is between April to June and November through-out December, the Lake normally become a raging torrent with rapids and cracking waves, making it far too dangerous to make a journey by canoe not to mention it being slow, wet, and uncomfortable.

Notwithstanding its simplicity and the risks it presents, canoes have now become the most dependable means of transport for many in the island unlike in the old days (five years back) where boats used to be the chief means of transport. These canoes carry people from the island to the Mainland either to seek for daily manual labour or to work in different sectors where they have secured employments after the cessation of the former only at the rate of Tshs 250 per person as opposed to five years back when they used to pay Tshs 4,000 for the same service by boat.

According to a mother of six children who was compelled to seek for employment outside the island, the transport was neither comfortable nor safe but convenient and cheap.

“Traveling in the Lake by the canoe needs strong courage. Whenever you are in, you feel like sinking or overturning anytime, but you persevere. Travelling especially during the night is even more scaring. The canoe takes long time in the water; sailors sometimes disappear outlandishly, often times you get wet because of the wind and waves, and sometime the sailor is forced to go-around to escape terrible waves, so indeed, it is bumping ride. One thing I like about this transport though is that, it is never expensive and it is always there waiting for passengers unlike in the old times when boats were used. I work in the hotel in town, and normally, I finish at 10pm and the last canoe leaves at 11:30 pm. So if you ask me, it is very helpful”... [IDI: An employed mother of six children from the Island]

Therefore, instead of confining their canoes for fishing activities alone, owners decided to diversify the horizon of business by including also an aspect of transportation on their menu. This again was made possible due to the fact that, confiscation of gears implicated and affected more people who were using canoes for fishing other than boats. This approach therefore was a strategy for the owners to continue subsisting economically.

Further, religion in the island was found to be one of the social enabling factors for people to earn their living. Historically, the first people to settle in the island were the Arabs who were denied an opportunity to stay in Kamachumu village in Muleba District. This was because of the sudden deaths of three people of the same family whom apparently one of them had fought with one of the Arabs over a piece of land back in 1968. In the struggle to look for a permanent place to stay, one old man (Arabian) who used to live alone and do his fishing activities in the island offered them a chunk of land where they began to multiply in numbers. Apart from their ethnic background, religious inclination was one important attribute that bonded this population. As a result, many immigrants when they reach in the island, they are confronted with one of the most difficult decisions, that is, either to acquire new or remain with their ascribed religious statuses.

Religion guides, informs, and defines the nature of relationship people should have with each other in the vicinity. Further, it somewhat dictates who should and who should not be assisted and the kind of obligation one has over each other. It might not be explicit, but belonging to the Christian religion

might cost an individual not to access or get the assistance he/she deserves in times of need.

...“people in this island live like brothers and sisters as it directed by the word of GOD, and it is expected that everyone abides by the Islamic principles. Whoever does the opposite contravenes with the fundamentals of the Islamic religion. We usually treat and help people according to Allah’s principles”... [FGD: Imam]

According to an old woman whose specialty was to dry Nile-Perches by smoke before their disappearance, had it not been for the food and money she got from the Mosque to start the tea-selling business, life would have been so difficult for her. This is considering the fact that she had lost her entire family members through the canoe accident on their way to Kelebe Island for the wedding. Normally each Friday after the prayer, the Leader conducts the fundraising where members donate whichever amount and property for the Mosque to help the needy.

V. NEWLY ADOPTED ECOLOGICALLY THREATENING LIVELIHOOD PRACTICES IN THE COURSE OF STRUGGLING FOR SURVIVAL

Illegal fishing practices which include the use of illicit fishing gears like gillnet, monofilaments, and beach seines were among the reasons for the introduction of serious and prohibitive measures in the fishing arena. These and other many practices have been blamed for plundering its fish stock at an alarming rate and destroying fish-breeding grounds in general. Whereas the above was true and probably merited the attention of both repressive and ideological state apparatuses, the failure to divert the attention of desperate fishermen from these instruments made the situation even more devastating.

A sudden raid on fishermen’s highly dependable livelihood strategy gave rebirth to a precarious fishing practice that had long been abandoned in the area. The use of poison, especially, agricultural pesticides was once a common practice in the island. However, this practice failed to co-exist with other now branded illegal fishing practices because it was discouraged by community members who slightly got affected by the practice in its initial stage, and again, it did not even receive an implicit go ahead from fishermen themselves.

After the eradication of what was envisaged as cheap by fishermen but destructive means of fishing by the state, some fishermen reverted into an old method which required no better fishing techniques, no advanced fishing gears, no capital except for the canoe, energy, and courage as it was aptly explained by one of the fishermen who use that particular method in fishing;

...“we, fishermen who are using this method are not proud of it and we do not use it regularly; it is just that we are faced with life difficulties. This is the easiest and effortless way of getting fish from the lake if you do not have all the necessary equipments. The only thing you need is the boat, to be healthy, and the gallon of a solution made of sleeping pills (Piriton solution). This is not actually the poison as BMU calls it because humans

also use it. The difference is that we spill it in the water and for humans drink it”... [IDI: Fisherman using illegal fishing method]

This fishing technique is still not accepted by Islanders but somewhat tolerated. Fishermen who use this technique are well known and yet no serious measures have been taken against them, including that of reporting them to BMU officials or revealing them during village meetings. This again could also be due to the reality that fish obtained through this method are carefully prepared and dried with salt to remove the poison. These are not sold within the island but shipped either to Mwanza or Bukoba Town Regional market.

Membership to the BMU was again another approach fishers used to access fish in the Lake. BMU is a community management organization composed of stakeholders in a coastal community whose main functions are geared towards sustainable management, conservation and protection of marine and coastal resources in their locality in collaboration with the Government (URT, 2009). Specifically, the Unit is responsible to enforce respective legislations (Fisheries, Forestry and Beekeeping, Land Use, Environment, etc), prepare by-laws that supplement the implementation of the national laws above, ensure beach sanitation and hygiene, and collect fisheries data/information and dissemination to relevant stakeholders. Others include educating other stakeholders on the negative impact of illegal fishing practices and other environmental issues that affect the marine and coastal resources and the general environment, prepare and implement economic sub-projects, and ensure security of the people and property. Finally, the Unit is in charge of undertaking Monitoring, Control and Surveillance (MCS) in collaboration with the government authorities and other responsible stakeholders (Ibid, 2009).

However, in spite of its significance, membership to the Unit is said to be voluntary but with qualifications (URT, 2010). For one to qualify as a member of the unit, he/she has to be a resident of coastal community but also meeting the following criteria; a member should be a Tanzanian; should be a fisher, a fish trader, a fish processor or any fisheries stakeholder; should be a resident of the coastal village/fish landing site for at least one year; should be ardent conservator of the fishery resources; could be males and females above 18 years of age. In addition, traditional leaders in the villages/beaches with the above qualifications are highly recommended to join the units in order to exploit their experience for best achievements on fishery resources management; should be honest, trustful, team player, self motivated, and ready to work in a group; should be ready to work on voluntary basis (there is no remuneration); and leaders should know how to communicate (read and write) in Kiswahili.

Reflecting on above qualifications, it is the State that is left to define who should and should not be in a unit. Further, the cost of guarding the now known as confiscate community highly dependable resources for the government is free. Importantly, the social organisation that creates the individual and defines, assigns roles, and statuses to community members is left out of the script. These and many other operational weaknesses have made it difficult for BMU strategy to thrive.

Ideally, the concept of BMU emanated from above (government) after experiencing both administrative and

financial difficulties on the ground in managing and controlling coastal resources. Persuading people to participate in managing the little, state controlled (legal framework in place), and liberalized resource without providing a recourse is untenable.

Traditional systems of management and other community-based organizations have always existed at the fish landing beaches even before the introduction of BMU (Scheinman, 2006). Unlike the current, the old sprung from the social organisation itself. These were guided by the culture of the community which stands at the core of their success. Leaders of community were entrusted to organize and manage community resources on behalf of community members and not on behalf of the state which the current is actually doing.

For a mechanical and glued community like Musira that takes care of and protect each other for survival, becoming a member of BMU is creating either enmity with the rest of the community or an opportunity to help your community members to exploit limited resources for endurance. There has been a long misunderstanding among BMU members, and the local BMU members have been blamed for this state of affairs. This feeling stemmed from the fact that, there was lack of flow and sharing of information among members of the unit. Government officials were blaming the locals for not cooperating fully and for not reporting incidences of fishing misconduct despite the BMU office in the island being raided and their boat and motor vandalised.

...“BMU is the government property but includes also members of our community, especially, those doing fishing activities. Most of these members however, are those who were greatly affected by what the BMU actually does. It is difficult for these members to apprehend or report his uncle, cousin, brother, or neighbor when he is found doing things that are prohibited by the BMU. If he does that he will be mocked and isolated by community members. Besides, BMU membership rotates each year, if you report your fellow today, tomorrow you or your family member will also be reported. So what you do is to keep quite or pretend you have not seen him....I know this is not right but it is difficult”... [IDI: BMU retired member]

During the in-depth interview with one of the fish-traders in the island, it was revealed in confidence that, using ring-nets in fishing is not as rewarding as using seine-nets or other gears that have been prohibited. As a result of the shortage of gears that qualify for the stipulated sizes of fishes to be harvested, those who either used their own or hired the gears and boats were forced to include/employ many clue members to help them survive. However, the amount of catch was never enough to satisfy all members, pay costs for lending, and bring some for the rest of community members. Therefore, the only way possible was to fix the deficit by allowing fishers to use both methods but with caution.

...“in the second meeting with government officials, the village meeting blamed the government for coming out with a sudden and harsh condition of stopping almost all fishermen from accessing the Lake. Therefore, the

meeting asked for at least six months for the government condition to be effected or a phased approach that would start with the few who have most destructive gears. However, they were informed that, that was a policy and they could not do anything about it. This did not impress the congregators and the leadership in general. We could not put all people out of business at-once, so we somewhat allowed them to access the lake using less destructive gears but with the condition of using it for one catch only”... [IDI: Village Treasurer]

During this study, it was unveiled by the Village Chairman that, for ages, life in the island has been a peaceful and harmonious one, until recently when cases of petty and somewhat grand thefts among community members have been reported. It was further revealed that, much of these incidences have been due to lack of appropriate and sustainable means of earning a living in the island. For instance, theft of fishing gear on Lake Victoria is an old problem that was there even in the early 1970s [for example, Jansen (1973) mentioned it in his report]. Such cases, though, were isolated and not in a scale that could have an impact on the overall fishing activities. In any case, the existing norms in the fishing community ensured that gear thieves received adequate sanction to deter them from repeating the crime as it was explained during the FGD by group of fishers.

...“stealing a boat or fishing net to fishers is like killing the lives of about 10 to 15 households. Most of those who steal such equipments do not have families and mostly come from outside this island. Stealing of fishes is tolerated, but stealing of fishing equipment, especially, fishing nets, is dangerous. If caught, you can be chased away from this island”... [FGD: Fishers]

The increased demand for fish, particularly, Nile perch in the 1980s on the one hand and the desperation for survival as a result of government interventions fuelled by ego on the other, especially, in late 1990s throughout 2000s provided enough incentives for fishers to invest in illicit activities including the renaissance of gear theft. Gear theft is now recognized by the fishing community as one of the most serious management problems in the Lake Victoria fishery (SEDAWOG, 2012).

In recent times, there have been even more serious cases of violent robberies on the lake, where outboard engines have been stolen from fishermen at gunpoint. Fishers from different landing-sites namely; Musira (Island), Nyamukazi (Mainland), Nyabesinga (Island), Ntoro (Mainland), Igabiro (Mainland), Kelebe (Island), Makibwa (Island), and Nyaburo (Island) have been pointing fingers at each other on the same. Brutal cases however are linked to fishermen from Uganda.

...“last month we had a meeting of all fishermen-leaders of nine landing-sites which are highly affected by motor (boat-engine) theft. The main agenda was to resolve the heated conflict between us and also to come up with a solution to curb it. The meeting did not go well because leaders in the mainland were accusing fishermen in the

islands of conspiring with the thieves”... [IDI: Chairman-Musira Fishers Association)

The BMU in the area is aware of such cases but appears ill equipped to stop gear theft since they do not have the capacity to confront armed robbers on the lake. At the same time there is no Police unit specifically trained to combat theft or robbery on the lake.

The immediate vicious consequence of gear theft is that many fishermen who have lost nets have become jobless. They cannot earn an income to support their families, making them food insecure. The community has on the other hand pinned the blame on the inefficiency of government to protect the fishermen. As a result, some fishers have now been retaliating by employing beach seines and mosquito seines.

...“this government is so funny. While it orders fishermen not to use destructive gears it fails to protect us from notorious thieves from the mainland and Uganda who invade us on the Lake and steal our motors. What it cares about is fishing license and fees but not our lives.....its medicine is in the kitchen boiling. That’s why I am saying, people will never stop using destructive gears until the government cares for them”... [FGD: Fishermen]

Furthermore, there have been cases of theft of clothes, poultry and electronic devices such as phone, televisions, and radio from the mainland by people from nearby islands such as Musira. These and some other easily snatched properties are kept in the islands and then brought back after sometimes to be sold in the mainland for a very little amount of money for food.

VI. FINANCIAL AND ENTREPRENEURIAL EXITS: AN INVASION OF MEN’S FARM

In fisheries, men and women often have distinct roles. For instance, in marine fisheries, usually only men go out to fish, but women are often involved in trading and processing. Collection of intertidal resources (clams, urchins, and octopus) for subsistence is usually the domain of women, and provides an important additional protein source for households (FAO, 2004). Children also often engage in fisheries at this subsistence level.

However, in recent years, the fish trading and marketing sectors of the fishery, which have traditionally been dominated by women, have witnessed enormous incursions by male entrepreneurs in the island (Medard, 2000). This move has to some extent hindered the participation of women in eking-out their living in the fishery field.

One old tourist woman from Switzerland visited the island in 2008 as part of her expedition. She was given a traditional woven bag as a souvenir by a group of four women who were waving as part of their evening activity. After she left, the tourist established a link with the group through one of the Evangelical Lutheran Church-Tanzania (ELCT) officials in Bukoba. The group was asked to name the kind of assistance they needed to enhance their business. However, instead of concentrating on their waving business, they agreed on starting the fishing business which in their opinion was more rewarding and fast

moving. The tourist agreed to their proposal and assisted them with the fiber fishing boat, engine, and nets.

During the FGD with the group members, the chairperson revealed that, although the group had gained respect because of how it has been able to endure and achieve in the men’s field. However, the group relies, and is dependent on men for many things, including the provision of advice and mechanical services, which has on the other hand caused them trouble in their operations on a number of occasions.

...“our lack of technical knowledge about fishing equipment has added to our problems and forced us to rely on men. For example, after our boat, along with an outboard engine, had been purchased, it was only with time that we noticed that the engine was too large for this size of boat. As a result, fuel consumption was unnecessarily high”... [FGD: Group Chairperson]

It was further learned that, some of the men in households where group members belonged had demanded full involvement in the women’s fishing activities. They also wanted to participate in the selection of crew members, engine operators, and financial accountability. They wanted to know the exact income from the women’s group, and hence, interfered with the planning and operations of investment as it was revealed by the group Treasurer in the FGD;

...“men usually question us on how much we get from our group. As a leader however, it is hard to provide such information as it is immoral and it is against my leadership ethics----One time I had to sleep outside for not revealing that information. I almost broke my marriage because of group funds. My husband forced me to give him Tshs 100,000 for his court case which again he lost”.... [FGD: Group Treasurer]

...“another exceptional case was one in which a chairperson’s husband demanded the control of our outboard engine because his wife was the chairperson of the group. When the engine was brought to the group, they scheduled a period for testing, and the engine was passed on to the chairperson’s husband for the task. After two days of testing, the man disappeared with the engine amongst other gears for two weeks. Neither of his wives knew where he had gone. Finally, the group held a meeting, which resulted into the resignation of the chairperson”.... [FGD: Group Member]

With all the above problems among others, this group has triumphed most of the prevailing socio-cultural hurdles in the island and managed to provide for their households and contributed to others through employment. The group has four (4) permanent and nine (9) non-permanent members who are employed to assist in cleaning, fishing, and sometimes drying the fishes. It is a norm for the group not to include their husbands in their business except for their sons. The biggest share of the catch is usually sold directly to the nearby fish Industry (Medad Fishing Company) which offers them a good deal as compared to retail selling. Group members have also managed to open up a

small shop in the island where many people get services even on a credit arrangement.

VII. SUPPLEMENTARY ECONOMIC LIFE-LINES IN THE VICINITY

Whilst waiting for the fishermen to buy their food, food vendors who are usually the women keep themselves busy by weaving mats from local materials which they will sell in the market. Mat weaving activity has now been strengthened and small organizations formed. So far, there are two groups of women who are performing this kind of activity.

Women's weaving groups called "Tweyambe" and "Goshoka" have enabled their members to earn extra income by selling woven mats to tourists in the island or by bringing them to the market in Bukoba Town. The former has ten (10), while the latter has seven (7) members. There is also a good number of women who are not in groups who are doing the same activity. Weaving is regarded as an additional livelihood activity that enables women to continue other activities such as looking after the family whilst also being able to earn additional income.

... "this was never a well paying activity in the island. We used to do it just for fun in the evening and because most of our chairs and beds are mat-made. We did not bother to decorate them; we just weaved for the purpose of using it ourselves. However, today, weaving of mats and baskets is a lucrative business. We still wave for our uses but most of them are now sold in town. Each month we sell about 35 to 40 baskets for about Tshs 5,000 to Tshs 7,000 each depending on the size and style. We spend Tshs 50,000 for materials and colour, the rest we divide it among ourselves. I for one do not ask for money from my husband anymore"... [FGD: Chairperson-Tweyambe Group]

The other livelihood strategy that people (both men and women) in the island are engaged in is vegetable and crop growing. This study noted that, with few vegetables grown in the area however, high demand existed. The establishment of vegetable growing was able to tap into this ready market. Households were able to grow enough vegetables for their own needs as well as a surplus to sell in the market.

Nevertheless, the income from these activities is relatively small and so is not going to result in the complete disengagement of marine livelihood activities by those engaged. Furthermore, of late, this venture has experienced some theft of vegetables, most notably, spinach and tomatoes which are highly demanded and have a somewhat high value in the market relative to other plants. This demonstrates the vulnerability of this new adopted livelihood. This was attested during the in-depth interview with a vegetable grower in the island, famously known as "Mama-Mboga".

... "unlike other types of things and stealing, vegetables do not make noise and requires no effort when stealing it. At first, I used to think probably people were stealing it for food because of lack of fish, but when I found two terraces of spinach have been cleared, then I knew this

was serious because someone must be selling it. I and my colleagues have already reported these incidences to office of the Village Executive Officer"... [IDI: Mama-Mboga]

Food vending is yet another but old survival strategy that existed even before government interventions in the island. The only difference between the old and new arrangement is that, in old times this used to be a full-time job unlike today where this has now turned into a part-time job as was elucidated by one of Mama-Lishes during the FGD.

... "i have been doing this work for more than fifteen years now. I remember I used to help my mother to cook since morning up to evening. Most of my mothers' friends and many others used to do this business. Out of almost twenty huts around the coast which used to do this business on permanent basis, we are only three now, other five are doing it as a part time job"... [FGD: Mama-Lishe]

Food selling is one of the lucrative businesses in the island. There are four groups of women who do this kind of business. There are those who sell tea and bites in the morning, those who sell lunch (rice, bananas and ugali) in the afternoon, those who sell porridge, coffee and ginger-tea in the evening, and very few who provide all the above mentioned services under one roof (hotel) who do this business on full-time basis. This business has been possible and long sustained due to the fact it is informed and favoured by the culture of most coastal communities.

... "eating is part and parcel of our tradition. Above all, eating in one's home is never a crime, instead, one gets blessed by inviting people, and especially the underprivileged ones to come and eat in his home. Therefore, for us, it does not matter so much where you have eaten, whether in the hotel or to a food vendor, but what matters is that you have not starved your family and you have eaten the food prepared by your wife. Therefore, you might find a man eating even hundred times from other places but as long as he has fulfilled the above requirements no problem. Everything you find in the area was created by GOD (Allah) for a reason. These vendors depend on us for survival; therefore, we cannot abandon them even if we have families. It is through such people where we get blessed and continue to get fish"... [IDI; Village Chairman]

Last but not least, poultry keeping was another alternative used by some community members to eke-out an existence in the island. Traditionally, ducks and chicken keeping has long been part and parcel of the African culture (Ellis, 1998). More often than not, these have been used for ritual purposes and food during special occasions such as, festivals, cultural celebrations, and when visited with special guests (Ibid, 1998). On the other hand, keeping poultry for sale was never explicit. This happened only in a few occasions when one (usually head of households) was in need of money (usually sold at a very low price), or wanted to exchange it for something else.

In an attempt to cope with the short supply of fish for food because of the decreasing in number of fishermen and catches on the one hand, and the introduction of fish industries due to liberalization policies around the coast which offer attractive price for fishermen as compared to the local market on the other hand, the large section of the community now depend of vegetables and poultry for food.

The above state of affair has necessitated them to seriously start investing in poultry, especially, chicken and ducks. However, their dire need for poultry for food, unfortunately, coincided with the high demand of the same from nearby tourist hotels namely; Spice Beach, Kolping, and Walk-Guard Hotels. This business has now completely changed the original definition of poultry keeping in households as it was revealed by the wife of a now renowned poultry-seller.

... "if you want to pick a fight with my husband, try to ask him for the amount of money that is beyond Tshs 1,000 and tease or ask him to allow you to slaughter one of his poultry, even during religious celebrations. We do not remember the last time we tasted chicken-meat in this house".... [FGD: Male and Female]

Spice beach hotel is well known in town for a delicious grilled duck meat. Among other sources, the hotel depends on the surrounding villages and Musira Island for this food. The hotel offers a special price (Tshs 10,000-15,000) for well-built and muscled ducks, and unfortunately, most of them come from the islands apparently because of the kind of food they get fed with.

Conversely, chicken meat was highly needed by all three hotels. However, two hotels, that is, Walk-Guard and Kolping bought chicken which weighed from 1kg and above. When this study was being conducted between, one kilogramme of chicken meat was bought at the price of between Tshs 6,500 to Tshs 7,000 by these hotels depending on the season. This condition has on the other hand compelled them not to sell immature chicken. Generally, poultry was one of the most important sources of income to some individuals and households in the island.

VIII. CONCLUSION

From above findings therefore, it can generally be concluded that, it is obvious that the government and other civil society organizations which champion for structural preeminence in constraining the individuals ignored the power of the agency before the structures. It was expected that, BMU among other regulatory agencies would have restricted people who use illegal fishing methods from accessing the Lake in favor of what these structures have predefined for Musira community. However, it is evident from the findings that, regardless of the power of structures, individuals were free to interpret, influence, and act with their understanding in order to survive.

Even with new livelihood strategies in place, life in the island has never been the same. In order to get their hands on identified socio-cultural, economic, and illegal lifelines, one has to engage into profound mental gymnastics, and sometimes accompanied with social and economic risks. Therefore, for marine resource protection policies to produce desired outcomes

attempts to create new culturally informed and consented strategy is vital in ensuring the lives of community members in place on the one hand and the sustainability of protected resources on the other.

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A Critique on the Ban on Romantic Relationships between Instructors and Students in the Higher Learning Institutions

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Abstract- A major concern often overshadowing Higher Learning Institutions (HLIs) during the past three decades has been dealing with issues surrounding sexual harassment. Generally, HLIs have developed policies that sanction *unwanted sexual attention* and that prohibit working and, increasingly, learning environments which are held to be *hostile* to women. During this same period, a literature has emerged which has called on HLIs to expound further on what it entails by sexual harassment to include a ban on romantic relationships between students and instructors. It is against this backdrop where the apprehension of this paper is anchored. This paper which capitalises on a methodical analysis and review of secondary proceedings critiques the intellectual underpinnings of the banning movement and explores the underlying psychosocial dynamics which have propelled the movement forward. It contends that, the ban undermines students' self-determination and actualisation, and that; the right to form adult consensual intimate relationship is a fundamental personal freedom which must be honored and protected so long as each party does not fall a victim or compromise the responsibilities bestowed to each.

Index Terms: Romantic relationship, the ban, HLIs, Student-Instructor Relationship

I. INTRODUCTION

Inquiries, for example, should instructors engage in romantic relationships with their students? Should HLIs tolerate such relationships or should it seriously seek to frustrate and forbid them? Will the forbiddance of such relationships contravene with human and constitutional rights and hinder personal and character development of a student? Would it be appropriate for us to view such contacts as inescapable consequence of grown-ups meeting and cooperating in a mutual situation and shared context or as cases of an abuse of power by instructors or students?; have as of late pulled a great deal of attention in various academic and non-academic fora. Without regard to particulars or exceptions, romantic relationships between these two categories of people have now become a controversial issue (York St John University, 2012). Articles on the same have appeared both in national and international newspapers and similar discussions and talks have dominated both radios and televisions talk shows and broadcast. The topic has also been fiercely debated at trade union and academic conferences (LaBossiere, 2016; Philip and Ryan, 2012). Nonetheless, It appears that after decades of indifference, students, academics, HLIs administrators and the media have not been able to pin-

down inherent complexities which continue to make this subject unfathomable, and instead, policies in the form of ban both categorical and contextual have been invented, reinvented, and reinforced to protect the students.

Both consensual and non-consensual romantic relationships between instructors and students (University of Dundee, 2004) are not new to HLIs life. *Romance* has always been a distinctive attribute of the campus novel since ancient times (Eagleton, 1988; Burley, 2014; Marris, 2008). It has as well now become an important ingredient of the campus film and television drama or series (Burley, 2014). One of the greatest romances in human history rocked the University of Paris in the twelfth century when Pierre Abelard, a professor of logic, and one of his students, Heloise, fell in love and secretly got married. After being maimed by hooligans contracted by her uncle, Abelard became an abbot of a monastery and Heloise an abbess of a convent (Foucault, 1994; Hearn, et al., 2009). Their consequent correspondence, particularly, the three letters composed by Heloise, are today among the world's most noteworthy love letters (ibid).

Heloise was a rarity at the University of Paris 800 years back, as was the case for women before the 1950s. After the World War II and the begin of women's rights movements, the number of female students going to HLIs exploded to the point where there are now more women than men in HLIs in the developed countries and the number has increased significantly in the developing world (Burley, 2014; Philip and Ryan, 2012).

More female students mean more opportunities for male instructors and these students to be attracted to each other and develop a sexual relationship. Although there are no hard statistics, a background check of academicians' and staff's spouses on any large campus today would likely reveal a significant number of HLIs employees and instructors who have married former students. However, generally the literature on the same affirms that romances between students and instructors are relatively less common in small colleges, especially those with a conservative religious atmosphere, and more common in large and public HLIs with larger populations of older graduate students (Burley, 2014; Russell, 2003; Chitty, 2012). More often than not, when a romance between the student and instructors concludes, the advocators of the ban and some students come to the conclusion that she or he was the victim of sexual harassment and pressured into an intimate relationship that was never really desired (Conroe and Schank, 2009). Much as this could be true, there are numerous other cases where the student feels responsible and remorseful for the breakup and emotional injuries inflicted to the instructors (Ibid, 2012; 2009).

As a result of recent public and legal awareness on sexual harassment both developed and developing countries (Alston and Goodman, 2012), the students-instructors relationships have turned into a major political and legal debate. Similar workplace relationships have resulted in litigation (Ibid, 2012). Plaintiffs have been awarded millions of money in damages in cases when a *consensual* relationship turned sour between a manager and an employee and that employer did not take action to resolve repeated complaints of sexual harassment, which followed when the manager refused to acknowledge the conclusion of the relationship (Nicolson, 2016). To avoid this risk, some organisations have adopted policies that ban all amorous and sexual relationships between employees, regardless of their position in the organisation. In some organisations, when two employees start a romantic relationship and one supervises or evaluates the other, they must immediately advise their supervisor so that one or the other can be given a lateral transfer to avoid any appearance of conflict of interest and reduce the risk of sexual harassment charges being made. In its cruelty form, in other organisations the ban covers all employees and requires that both employees be terminated unless one seeks employment elsewhere.

This paper therefore looks into the often untold account of the need to consider individuals' freedom, growth, and right in the course of ensuring efficiency and objectivity on the one hand and halting sexual harassment on the other. It does this by critically assessing the conventional *ban approach* which has long been used to suppress individuals' rights of association and freedom and the psychosocial development. In the end, while this paper intends to invoke a more deeper and down-to-earth discussion on two controversial yet fundamental questions which require the reader to reflect on whether a strict ban on amorous relationships between the instructors and students is important to escape so as to avoid the possibilities of damaging the students, or would such a sanction generate too much unproductive vacuum between the students and instructors which can in the process affect the former both academically and psychologically (York St John University (2012)? Therefore, it is in expectation of this paper that the impending discussion will inevitably produce a more cautious and considerate approach. The paper starts by briefly expounding on the fundamentals upon which the ban movement or approach is elevated and then proceeds to explaining its weaknesses which make it unfeasible and vulnerable particularly in the liberal civilization era.

II. THE GROUNDS FOR STUDENTS-INSTRUCTORS RELATIONSHIPS BAN

In accordance with the advocates of this position, romantic relationships between instructors and students should be banned because this type of relationship is by nature lopsided and may cause instructors to abuse their position of authority (Dziech and Weiner, 1998; Audi, 2000; Benjamin and Thomas, 2002; Campbell, 1988; Connolly and Marshall, 1989; Los, 1990; Robertson, et al., 2014). Instructors hold places of trust and they are required to devise curriculums and complete their teaching obligations to help their students into becoming critical thinkers and problem solvers. This undertaking may include close

working contacts in instructional exercises or research facilities, singular gatherings to examine research projects or long papers, and more easygoing events for scholarly give and take. Thus, for susceptible youthful students, the limits between scholarly improvement and individual life may get to be obscured. In this circumstance, a few scholars slowly move from scholarly to individual to sexual connections (Brian, 2002).

In their contentions, Dziech and Weiner (1998) and Brian (2002) affirm that some students are ever, in the strictest sense, consenting grown-up. At no time will a student be on equal footing with his instructor given the positions (socially, economically and professionally) he holds which supply him power over the students. Whether the student agrees to participate or whether the instructor ever destined to utilise his influence against a female student is not an issue. The point is that the power and levels of influence always exist between the two subjects

Aside from an abuse of power and confidence, advocates argue that sexual relationships between instructors and students offer a genuine irreconcilable situation. The likelihood of favouritism in the evaluation of students' assignments is self-evident, just like the likelihood of prejudicial assessment for the individuals who have decided to cut off relationships (Brian, 2002). Connolly and Marshall (1989) and Brian (2002) emphasize that, regardless of the possibility that scholastic assessments are kept totally free of individual involvements, it is likely that there will still be a feeling of bias in the eyes of fellow instructors and students.

In each of these supporters' angles of argument, an issue of 'special treatment' was over and over referred to especially when the instructor, particularly a renowned has an intimate relationship with the student in a partner's class. As a result, pressure in a way of request might be exerted as a powerful influence for the partner to give special treatment to the student, for example, better grades, augmentations on expositions, or additional time to complete assignments (Brian, 2002; Dziech and Weiner, 1998). Indeed, even without such inducements, special treatment might be given to the student to abstain from colleagues' discontentment. At the point when there are various intimate relationships on the campus involving a few instructors and students, the potential outcomes for irreconcilable situation are psyche boggling (Brian, 2002).

However, in the assessment of many, they recognise that in numerous occasions it is hard to draw a firm line between a damaging and a welcoming affair and satisfactory and inadmissible practices. That in any case, they uphold that intimate relationships ought not to be allowed between the instructors and the students. While just a handful of banners support the 'contextual ban'(Brian, 2002), where instructors are only restricted to draw into intimate relationships with students in their own particular classes or under their watch and prescribe that if a relationship is foreseen, then a commonly pleasant course of action ought to be rolled out to change the teaching arrangement or assessment. Even after admitting that there could be a possibility and degree of influence to a colleague to favour his partner, most banners advocate for categorical banning, that is, with absolutely no fraternisation between students and instructors (University of Dundee, 2004). Generally, a tough policy against student-instructor intimate relationship is

advocated in the conviction that this would decimate the existing supposedly inappropriate practices and discourage potentially affectionate relationships.

III. ETHICAL & PRAGMATIC REFLECTIONS ON THE BANNERS' GROUNDS

Since Higher Learning Institutions (HLIs) have a commitment to provide a conducive atmosphere helpful for learning (LaBossiere, 2015), they also ought to have regulations that guide and moderate instructor-student relationships on campus. Since HLIs likewise have a commitment to guarantee that examinations grades are awarded on merit, they should also have mechanisms in place that prohibits exchange in sexual services in return for undeserving grades (Ibid). Sexual offenses, for example, rape and assault ought to be taken care of by the police despite the fact that HLIs should absolutely have rules guiding the employment of instructors who are found guilty of raping or assaulting anybody. Obviously, since the instructor would no doubt be in jail, this would likely make proceeding with work rather impossible.

Both LaBossiere, (2015) and Audi (2000) contend that, the issue of whether or not HLIs ought to prohibit consenting intimate relationships between instructors and students when the student is registered in the instructor's class or generally professionally under the instructor's guidance is difficult to implement. There is, indeed, a genuine fear about fairness. Eventually, if the student is romantically involved with the instructor, then the student may have an undeserved advantage comparing with other fellow students. I consider this to be a unique phenomenon from trading on grades for sexual favours; rather, this involves such scenarios as 'positive favouritism' for the student that result-in special treatment. For instance, that the instructor may review his sweetheart's paper much less objective than those of different students. In its extension, nonetheless, while romantic relationships can result into academic prejudice, these are by all account not the only relations that can lead to this impact. The instructor who is a companion with the student or related to a student either by blood or any other unromantic forms can as well enjoy the same undeserving privileges. Thus, if the assumption validating barring the instructors from having the student in his class he has romantic relationship with is anchored on the potential for injustice and unfairness, then students who fall in the second category of relationship with the instructor, that is, relatives in various forms, friends, or generally equivalently associated with the instructor would likewise ought to be forbidden.

It can be contended that there is an important contrast between sexual relations and non-sexual relations that would legitimise denying the instructor from dating the student in his class, while as yet permitting him to have a friend or relative as a student (Ibid, 2015). On the other hand, HLIs could basically put a general prohibition on instructors having students with whom they have a conceivably biasing relationship be it sexual, unemotional, or a family relationship. As a general rule, this appears to bear a sense and degree of justice for categories and parties involved. It can, in any case, be countered in light of the fact that instructor who is ordinarily considered as a professional

(Ibid) ought to have the capacity to control his inclination with respect to family and friends. This, obviously, opens the castoff argument by the banners that the professional ought also to likewise have the capacity to control his predisposition with respect to a sexual relationship in spite of the fact that many would surely be incredulous about that. The considered view of this paper is a restrictive one: if the instructor can keep up his objectivity, then the unwarranted and bias contention would have no significant impetus in this regard. Nevertheless, considering the specific cases, there is a genuine fear that a few (or even many) instructors couldn't keep up such neutrality, and therefore, justifying the application of a general rule as a legitimate framework for handling romantic relationships between instructors and students on campus. Besides, social and statutory mechanisms devised to restrict what is perceived as misconducts are not made in light of the best individuals in society, but rather those that are not exactly the best (LaBossiere (2016) like the instructors who seduce and take advantage of their students.

Because of lack the forcible nature of elements and harassment in the relationship and the presence of fairness which are, obviously, used to legitimise not barring instructors from dating students who are not and won't be in the instructor's classes (or generally under their supervision), then this sort of approach would appear to be significantly appropriate than the categorical ban which demoralises and cancels such relationships entirely. While there it would appear to be no reason for denying this relationship, in any case, there are the individuals who might contend that the justification for a general prohibition are significantly imperative educationally even in the absence of intimidation, provocation, injustice, harassment et cetera (Ibid). One supposedly major justification that can be associated to this reasoning is that romantic relationships for the most part come up short and regularly flop in emotional ways that sometimes spillover to other delicate sections of the institution, and thus, have an effect on the undertakings and reputation of the institution. Therefore, it could be risky for the HLIs to have such a sensational disappointment play out on campus. But then again, another reason could be that such relationships can be a legal powder barrel in terms of potential lawsuit claims against the institution (Ibid), as such, the administration most likely feel that their image ought to be ensured by denying any such connections notwithstanding the fact that such events have never been used in rating the HLIs as academically and socially poor or excellent.

One widespread argument for the ban is that there is always a power play and dissimilarity between instructors and students (Chitty, 2012; LaBossiere, 2015; 2016), and this means that, at all times where these two subjects meet, the context is hypothetically coercive. Regardless of the possibility that most instructors would not deliberately force the student, rules (as noted earlier) are not made for the best individuals. Accordingly, the sweeping restriction on instructors-students relationships is important to keep any probability of coercive relationships between the two unequal categories (Ibid, 2015;2016). Nonetheless, this could without much of a stretch be disputed that the instructors always has power over the students by virtue of the positions and status they hold even when the instructor has no professional relationship to the student (LaBossiere, 2016). While it somewhat true the instructors may have some "power" with respect to being more established (more often than not),

having some status, having more wage (for the most part), etc, these don't appear to be unique from the "power" anybody could have over any other individual. That is, there is by all accounts nothing particular to being the instructor that would give the instructor control over the student that would make the relationship naturally coercive. Thus, there would appear to be no justification for prohibiting the relationship.

Moreover, it could be protested that students are helpless against the power of the instructors and that do not possess the overriding power to oppose instructors' power (LaBossiere, 2016; Conroe and Schank, 2009). However, rather than furnishing the students with the ability to battle back when not intrigued and report the matter to the higher administrative powers for enquiry any disciplinary procedures, HLIs must act paternalistically and deny all romantic relationships in defense of the supposedly innocent, credulous and totally weak students from the finesse, immoral and irrepressible sexual predatory instructors. In the view this paper and the conclusions of numerous who subscribe to my perspective, this would be comparable to the laws that protect minors (under 18 from grown-ups 18 or more), where the minors can't and ought not to provide informed consent (LaBossiere, 2016). If students in the HLIs are also regarded as minors and considered defenseless against instructors, then a similar sort of rules applies or then there ought to be a reevaluation of the agreeable age of consenting, raising it to twenty four where most undergraduates students graduate (Ibid). But again since there is similarly a good number of students who spend up to four and five years, then maybe it ought to be twenty five. There are also postgraduate students, so maybe it should be extended up thirty or even more. Besides, the students can decide to join the college at any age they deem fit. Unless it is accepted that students are 'powerless victims' and instructors are 'powerful predators', then a sweeping restriction on instructors-students romantic relationships appears to be ethically baseless, at least on the basis of disallowing such relationships due to a belief of coercion.

Nevertheless, there are other moral justifications for such principles to apply. For instance, a case can be made that dating students would be a violation of professionalism. While the impact would be the same, the grounds do appear to make the difference.

IV. THE DISTORTED LENS OF THE FEMINIST BANNERS

Starting in the 1980's, a feminist literature emerged calling for the banning of intimate, organisationally based, asymmetrical relationships and the subsumption of such relationships under the rubric of sexual harassment. Thus, when individuals in asymmetrical relationships engage in sexual behavior such a relationship is seen as sexual harassment with the person in the superordinate position viewed as the harasser and the person in the subordinate position as the victim. Fitzgerald and Weiner (1990) provide a representative statement of sexual asymmetry as sexual harassment when they state;

...When a formal power differential exists, all sexist or sexual behavior is seen as harassment, since the woman is not considered to be in a position to object, resist, or give

fully free consent; when no such differential exists, it is the recipient's experience and perception of the behaviour as offensive that constitutes the defining factor... [1990: 19]

Or, as Paludi puts it;

... Sexual harassment is an issue of organisational power. Since work (and academic) organisations are defined by vertical stratification and asymmetrical relations between supervisors and subordinates...individuals can use the power of their position to extort sexual gratification from their subordinates... [2002: 14]

As indicated in these statements, the woman's perception of the situation is no longer central. What is central is her organisational position relative to the man. If her organisational position is subordinate and she is involved in an intimate relationship, she is simply incapable of giving fully free consent. Given that consent is precluded in an asymmetric relationship, the banning of such relationships becomes appropriate. Indeed, if such a ban does not exist, the non-prohibiting organisations may become liable for the resulting sexual harassment.

Although the principles which lead to the prohibition of intimate asymmetrical relationships are applicable to both the normal working-environment and the HLIs, concern has been prevalently within the latter; and within the HLIs, concern has overwhelmingly focused on students-instructors relationships (Dundee University, 2004). It is in the context of student-instructor relationships that the inapplicability of the concept of consent has been advocated with particular vigor. In 1984 the authors of *The Lecherous Professor* set the tone of the debate when they spoke of consent in student-instructor relationships as a myth. As they advocate;

... "Some of the students are ever, in the strictest sense, consenting grown-ups. A student can never be a true equivalent of his instructor given that his professional edge provides upper-hand over her" [Brian, 2002: Dziech and Weiner, 1984: 74]. Or as Sandler (1990) succinctly puts it: *... another myth is that of the consenting adult. True consent can occur only between equals, and a relationship does not consist of equals when one party has power over the other...* [1990: 8]

Given the belief that consent is a myth, it follows that a student in a relationship with the instructor cannot meaningfully indicate to herself or others whether the professorial attention is welcome or unwelcome. As Wagner (1993) has indicated, the usefulness of the argument that a student consented to a sexual relationship lost significant ground when the authoritative structures like the disciplinary bodies set this victimless act at 'unwelcome'. He goes on by asking, how many female college or university students have endured the sexual advances of their instructors out of the fear, fascination, or just plain naiveté, but found them 'unwelcome' nonetheless (Ibid).? And even when a student internally feels that the attention is wanted, consent still cannot be given, these feminist writers argue. This is however in direct opposite to what Lori Peters, a student from the University

of Ghana found as a result of her consensual relationship with a professor;

...my past experience with sexual harassment led me to believe that in the context of power imbalance there is no such thing as consent. Where the power lies so lies the responsibility. This is however in direct opposite to what actually happened between I and my husband. I was the one who came on to him and dictated the terms of our engagement except for academic favours which he had cautioned me from earlier on.... [In Sipchen, 2009: 21]

Another way of putting it is that, to the feminist banners, the subjective perceptions of the student are neither a necessary nor a sufficient condition in determining whether sexual harassment has occurred. In light of Lori Peter's confession, either party may propose and either may accept, but according to this emerging perspective, the instructor is still guilty of harassment since the student is in an asymmetrical relationship and is simply incapable of consent. As Fitzgerald and Weiner (1990) have indicated in their analysis on who falls the victim between the two parties, perceptions alone, whether those of observers or victims are not adequate for a valid definition. The feminist perspective nevertheless defines 'sexual harassment' not as subjectively presented by the supposedly the victim (woman), but objectively by what feminists like to call the power-relations, a situation that on the one hand ends up infringing the rights of both parties and victimises male instructor on the other.

V. ACADEMICIANS AS SEX OBJECTS

For Hearn and Parking (2010), the boundary dividing students and instructors was inviolate. And, as for instructors who crossed such boundaries, for them the common story is *the teacher who is a sickie*. They objectify academicians who are sexually involved with students as being intrinsically abusive. In fact, the entirety of the banning literature makes instructors out as sexually obsessed predators who prey on their female students and treat them as sexual objects. Perhaps not surprisingly, while condemning professional objectification of female students, feminist banners have no problem with sexually objectifying male academicians. Almost all of the banning literature since the publication of *The Lecherous Professor* is simply an embellishment on this theme. Illustrative of such objectification is that of Herklots account;

...finally rape of the mind... Most young women experience a profound mixture of humiliation and intellectual self-doubt over sexual gestures by men who have power to award grades, open doors to grants and graduate school... Even if turned aside, such gestures constitute mental rape, destruction to a woman's ego. They are acts of domination, as despicable as the molestation of the daughter by the father... [Herklots, 2008: 26]

Given the powerful imagery of the predatory sex-obsessed instructors, it is also not surprising that such imagery also contains elements of pollution and poison, elements that often characterise the imagery of threatening outsiders (Dank and Los, 2003). As feminist scholar, Audi notes:

...today the psychological and social pollution... harassment spews forth is like air pollution. No one defends either one of them... below the stratosphere, in classrooms and laboratories, sexual louts refuse to disappear, imposing themselves on a significant proportion of our students... [Audi, 2000: 12]

Some may view such rhetoric as simple hyperbole. Others, however, take it quite seriously, invoking it in the attempt to implement categorical bans. Accordingly, the chairman of the council of the University of Helwan (Egypt) when advocating the categorical ban he explicitly indicated that the love affair between the instructor and the student is poison (Hollway and Jefferson, 1994). The instructor intimately involved with a student has thus been effectively dehumanised, deprived of individual motivations not to mention feelings and is seen entirely in categorical terms. An English professor Joan Blythe (1993) has poignantly responded to this objectification and dehumanisation;

...education is also a transformation of us by our students, allowing us to learn and be changed by our encounter in the classroom. This ban is a prophylactic to that kind of fertility because it presents me, the teacher, as rapacious, predatory, and dangerous even before I walk into the classroom... In setting up a law, you have immediately cast me as a potential raptor. You are emphasizing my role not as educator but as assailant. You define me in negative terms, stripping me of my ability to teach... [Blythe et al., 1993: 42]

VI. THE STUDENT AS AN INNOCENT CHILD

Just as the banning movement has objectified instructors, it has also objectified female students. The literature has almost uniformly cast students as gullible, innocent, helpless children or youths who must confront the all-powerful manipulative male instructors. It is an imagery that reinforces the premise that female students cannot give consent. Since there is a social consensus that children cannot give sexual consent, and since the image of student and child are so often used interchangeably, the premise that female students cannot give sexual consent to their male teachers since they are childlike, innocent, and powerless meets with social receptivity.

Illustrative of this construction of female students as innocents who need protection is the commentary by Russell

...“they (female students) are at that developmental stage in which it is common to question values and standards of behaviour and open themselves to new viewpoints and experiences... Students look up to their professors with great admiration, and attribute to them such appealing characteristics as brilliance, sophistication, wisdom, and maturity... [2003: 105]

Or as Zalk articulates;

...the bottom line in the relationship between academic staff and student is POWER. The faculty member has it and the student does not... The student does not negotiate-

indeed, has nothing to negotiate with. There are not exceptions to this. Knowledge and wisdom are power. While superior knowledge, and presumably greater wisdom, are often ascribed to academic staff by society at large, the student's adolescent idealism exaggerates its extent... [1990: 145].

And Hearn and Parking (2010) have directly involved the image of the innocent young girl in their advocacy of categorical banning. In responding to a question as to whether they made any differentiation between female students in or out of the professor's classroom, they stated.

...no...An 18 year old woman, first time away from home, she's in this new environment. She changes her major... she might think she will never take a chemistry class, because she can go out with the chemistry teacher. But... she suddenly decides she wants to be a vet and now she has to take chemistry, but the relationship has ended badly. We have situations where the woman cannot even walk into the classroom or will not even walk into the building... [2003: 13]

Given the helpless-child imagery of female students, they are seen as needing protection from predatory male instructors, protection in the form of prohibition. The banners' reduction of female students to children places them into the traditional protected category of "women and children". It functions to disempower female student and empower (feminist) professors and administrators as their protectors. Ironically, it not only affirms an asymmetrical, not equalitarian relationship between instructors and students, it flies in the face of what many believe is the core of true feminism that advocates for the empowerment of all women. As Zalk et al (1990) pointed out; campus feminists often do just the opposite. Any value there may be in promoting this idea about female passivity and gullibility is eclipsed by its negative effects. In her opinion, feminist educators should keep track of the images they project, particularly, the demeaning credence that "women cannot take care of themselves, women cannot make their own decisions". She adds, this is an invasion of the private lives of consenting adults, and it reeks of paternalism. This also affirms the concerns of the two female students from Makerere and Ibadan Universities with 22 and 20 years of age respectively who impliedly claimed to have been offended by the feminists' banners respectively;

... "I am older enough to decide who to bed with and when to do it"... [Female student In: LaBossiere, 2016; Hollway and Jefferson, 1994: 12]

... "I do not need outsiders to tell us what is going on and how we should react in such situations as if we are ten years old. We know better, even better than the supposedly called predators"... [Female student-In: Wise & Stanley, 2001: 8]

The banners' emphasis on the youthfulness and childlike qualities of female students is also at odds with demographics of female students in, for example, East African HLIs as they are in many other parts in the world. According to the records of the

Inter-University Council for East Africa, 59% are 22 years or older, 43% are 25 years or older, and 30% are 30 years or older. In fact, the student population is aging rather significantly. The proportion of students entering HLIs at the age of 22 or older was 28% in 2009 and in 2012, it was 38%. Despite the demographics, banning advocates continue to see students-instructors romances through the child-adult lens. It serves well for their purposes because of the powerful taboos surrounding adult-child sexuality. While this model functions as a powerfully device of social control, pornographising student-instructor romances, it also reinforces the instructor as "child-molester" caricature. No wonder a few instructors are willing to come forward as involved or formally involved in intimate relationships with students (Los, 1990; Robertson, et al., 2014). Even those in ongoing marriages have generally chosen to remain insulated from the public throughout the debate, a situation that has made it so difficult for scholars to pound a fair verdict on the phenomenon.

VII. THE REAL ISSUE: AGE AND AGE-DISLOYALTY

Given that the instructor and student categories are age-differentiated, it is to be expected that romantic relationships between students and instructors are almost always older man-younger woman. Skeen and Nielsen (1983) and Sipchen (2011) found an average age differential of 10 years. Of course, romantic relationships generally reflect the proclivity of women to be attracted to older men and of men to be attracted to younger women (Buss, 1994). With academic couples, the age differential tends to be significantly above that of non-academic couples; at times so great as to reflect a crossing of generational boundaries, that is, middle-aged men paired with women in their twenties.

It is in the view of this critique that many women are deeply offended by older men dating and/or marrying much younger women. Why? Given the age and dating norms in Africa as extensively studied by McDonald (2000) in his work *Reproductive Change in Developing Countries: Insights from the World Fertility Survey*, the eligible men for middle-aged single women are their cohorts middle-aged men. The field of eligible is further narrowed for middle-aged academic women because social norms dictate not dating and/ or marrying down. Thus, the female academic's field of eligible men is radically decreased by their academic accomplishments. Of course, the most eligible men for middle-aged academic women in terms of propinquity, age, and social status are academic middle-aged men. And it is these same men who are perhaps seen as deserting their female age cohorts to date much younger students. In fact, this paper would go so far as to suggest that many women, particularly, academic women resent the *power* that young women have to attract their eligibles. In fact, one can view the banning movements as reflecting a rather traditional generational conflict, an attempt by older women to control the dating/ mating behaviour of younger women. This attempt, of course, is disguised by the banners' construction of the lecherous-predatory-male instructor as exploiting younger women. But the banners undermine a key feminist principle, that 'no' means 'no', as well. Surely, if anything means 'yes', 'yes' means 'yes'

Farrell (1993) captures the potentially traumatic nature of the situation when he makes the following comparison;

...“when a man is forced into early retirement, he is often being given up for the young man. Being forced into early retirement can be to a man what being ‘given to a younger woman’ is for a woman” (1993:174)

Given this framework, it is only to be expected that many academic women would feel hostility toward student-instructor couples. Unfortunately, too many campus feminists (Ann Lane, Anita Hill, Tail Hook, Catherine Stimpson, and Robin Wilson amongst many) have dealt with their problem by advocating policies that effectively disempowered, infantilise, and patronise younger women. Such infantilisation is evidenced by their inability to imagine a female student ever taking the initiative with a male instructor consenting.

To be sure, few feminist academics have conceded such motivations. When there are such public avowals, it is usually by men coming to the defense of women. When the Principal of Université Ferhat Abbas de Sétif, was interviewed by *The Horizons* regarding his ban of student-instructor couples, he indicated that he based his decision in part on his being tired of seeing professors *dump* their wives for younger women (May, 1999). Interestingly and yet incongruous is the phenomenon that, some banners do back off when same-age relationship are invoked in student-instructor relationships as it is the case in many younger academic institutions jam-packed with younger instructors like the University of Dodoma in Tanzania.

Other areas of emphasis which need clarity and which have barely been addressed by the banners either by being afraid of committing more controversy or being forgotten, and thus, making the ban untenable, include cases where what is now seen as a romantic relationship between the instructor and the student by the HLIs managements is simply a continuation of what they (instructor-student) had started earlier on even before the male became an academics. How about those who are searching for soul-mates particularly in the younger HLIs where majority of instructors (Tutorial Assistants and Assistant Lecturers) are sailing relatively in the same age (peers) as their students and also given the fact that social proximity and repeated exposures play a greater role in *social bonding*? If at all ethics and adult-child sexuality taboo are central to the ban, why is it okay now for instructor-student relationship violation to be committed in other HLIs where the instructor is not employed?, lastly, the current feminists’ writings on the ban invoke two fundamental yet complicated and controversial issues, these include, the issue on what love is and how it happens, but fundamentally, whether humans (particularly men) are rational or irrational beings.

VIII. CONCLUSION

Given the prevalent caricaturing of student-instructor romances, such relationships give the impression on professorial abuse thus presenting problems for HLIs administrators concerned with public relations and *appearances*. But such superficial concerns must not be used as a rationale of repression of the associative freedoms. The concept of informed consent between adults should be the guiding principle for intimate relations on or off campus. According to UNHCR [United Nations High Commission for Refugees] (2003), intimate association is intrinsic element of personal liberty and is secured generally by the Bill of Rights which proclaims that “choices to

enter into and maintain certain intimate relationships must be secured against undue intrusion by the State”. It is in the strong conviction of this piece that the freedom to decline or resist intimate associations is inextricably bound up with the freedom to form desirable intimate associations. Upholding both of these freedoms simultaneously in the HLIs may appear to engender inherent conflict. However, the right to form adult consensual intimate relationships is a fundamental personal freedom which must be protected. A strong and effective university policy against sexual harassment together with the recognition of the right to privacy of instructors and students will serve the interests of both the HLI and the individual.

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Kinetics of oxidation of o-toluidine by potassium dichromate

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Abstract- The Oxidation kinetics of o-Toluidine by Cr (VI) has been studied Iodometrically in aqueous sulphuric acid medium. The reaction follows complex kinetic behavior with respect to concentration. Mechanism with the associated reaction kinetics is assigned and discussed all kinetic and thermodynamic parameters are calculated.

Index Terms- Kinetics, Oxidation, Catalyst.

I. INTRODUCTION

The metabolism of nitrogen compounds by oxygenation was established in the beginning of last century. Further, interest was developed in such type of reactions in view of involvement of product of N-Oxidation in Certain pharmacological and toxicological processes, effecting physiological changes in the body. Oxidation of 1^o aromatic amine by lead acetate has been studied by Pausacker[1]. The medium of the reaction is acetic acid as benzene it is assumed that the reaction mechanism with lead tetra-acetate remains analogous to that proposed for phenyl iodo-acetate. It is established that o-Toluidine and m-Toluidine give better yield of azo compound with both the oxidants in comparison to p-toluidine. Pausacker[2] has studied the oxidation of 1^o aromatic amines by phenyliodosocetate in benzene. It is reported that o-Toluidine gives purple color intermediate which transforms to deep carmine color solution m-Toluidine gives pink colored throughout the course of the reaction. The product identified is azo compound by chromatography method using alumina as stationary phase and benzyne as stationary phase and benzene as eluent. The oxidation of aniline and substituted aniline by hexocyanoferrate (111) is studied by R.K. Murti[3] and others. The rate constants w.r.t. hexacyanoferrate is pseudo first order under all conditions. The reaction is first order in [substrate] also. The reaction rate is independent of [alkali]. Antelo[4] and others have investigated oxidation of ethanol amines with Cr(VI) in acetic acid. The rate of K₂Cr₂O₇ oxidation of ethanol amine

[HOCH₂CH₂O]_n NH_{3-n} (n=1-3) (1) in 50% aqueous HOAc increases with n. Kinetics of 1(n=3) and the order of reaction indicated that the rate determining step involved the decomposition of R'CH₂CH₂O Cr(O₂)OH formed by protonation. Mishra[5] others have studied kinetics of o, m and p-toluidines by Chromic acid has been studied in acetate acid-water medium. The reactions were found to be first order w.r.t. (oxidant), [Substrate] and [H⁺]. An addition of Cu²⁺ and Ag⁺ increases the rate of reaction while addition of Mn²⁺ decreases the rate. An addition of neutral salts like NaCl, KCl, Na₂SO₄ and K₂SO₄ in the reaction mixture showed negligible effect. Ramananda[6] and others have studied kinetics of

oxidation of o-Toluidine by NaN-Chlorobenzene sulfonaamide in aqueous H₂SO₄ medium at 303 K. Rate showed first order dependence on [CAB], fractional order in [oTd] and increase first order dependence on [H⁺]. The variation of ionic strength, change in dielectric constant of the medium, addition of reaction product and halide ions had no effect on reaction rate. Kaushik[7] and others have studied periodate oxidation of o-Toluidine in acetone water medium. Order with respect to both oxidant and substrate is one.

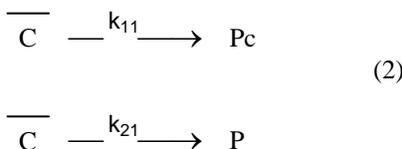
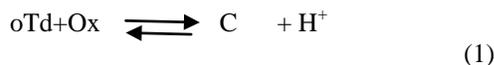
II. EXPERIMENTAL SECTION

o-Toluidine (Merck), Potassium dichromate (Loba Chemia), H₂SO₄ (Qualigens), Sodium thiosulfate (Loba Chemie), Starch (Loba Chemie), Potassium Iodide (E.Merck) were used without purification. Solutions of all reagents were prepared in doubly distilled water. The oxidant concentration of 0.0002 mol dm⁻³ was maintained throughout the kinetic runs. Pseudo first order conditions were maintained in all runs with excess o-Toluidine (~10x). Kinetic runs were reproducible within ±5% of required value. Requisite amount of substrate was taken in one flask and oxidant with acid in another flask. They were thermally equilibrated for 20 mins. and then thoroughly mixed by shaking. The reaction was studied up to 90% of completion.

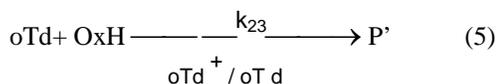
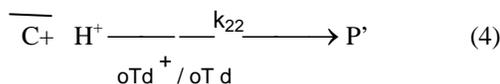
Kinetics of Oxidation of o-Toluidine

Dependence of ^ok (pseudo first order rate constant determined by titer values at time t) on [H⁺] and [oTd] gives a complexed rate law consisting of four terms. An attempt has been made to identify which of these four routes are involved in producing the colored product and which ones are involved in the formation of uncolored product. This has been done in following manner.

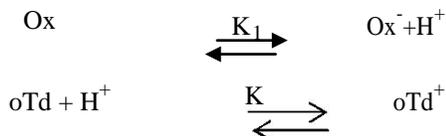
It is observed that at very low [oTd]_o (initial concentration of o-Toluidine) the oxidation rate decreases with increasing [H⁺]. However, at moderate and high [oTd]_o the trend is reversed. This and other kinetic features of the reaction are satisfied by the following proposed mechanism:



(3)



Equilibrium for oxidant and o-Toluidine are as given below:



In the above mechanism, the oxidant-substrate complex, C formed in step 1 breaks down by four different routes. At low formed [oTd]_o it is assumed that only the first route is significant. The total Cr (IV) is largely present in the form of three major species [Ox], [Ox⁻] and [C] from the mass-balanced equation for [Ox]_t, giving

$$[\text{Ox}]_t = [\text{oTd}]_o [\text{Ox}]_t / \rho + \rho' [\text{H}^+] + [\text{oTd}]_o$$

where,

$$\rho = K_1 / K_o \quad \text{and} \quad \rho' = (1 + K K_1) / K_o [\text{H}^+]$$

a. At low [oTd]_o :

The oxidation rate may be expressed as:

$$\begin{aligned} \frac{-d[\text{Ox}]_t}{dt} &= k_{11} [\overline{C}] \\ &= \frac{k_{11} [\text{oTd}]_o [\text{Ox}]_t}{\rho + \rho' [\text{H}^+] + [\text{oTd}]_o} \end{aligned}$$

Giving the pseudo first order rate constant, k as:

$$\ln R_o/R_t = {}^0k t$$

$$\text{where } {}^0k = \frac{k_{11} [\text{oTd}]_o}{\rho + \rho' [\text{H}^+] + [\text{oTd}]_o}$$

The equation (6) may be arranged as,

$$\left(\frac{{}^0k}{[\text{oTd}]_o} \right)^{-1} = \frac{\rho + [\text{oTd}]_o}{k_{11}} + \frac{\rho' [\text{H}^+]}{k_{11}}$$

$$= k_{LI} + k_{LS} [\text{H}^+]$$

Equation (7) has been verified from the plots of L.H.S. i.e. ({}^0k/[oTd]_o)⁻¹ Vs [H⁺] which are found to be linear. From these plots, intercept, k_{LI} and the slope, k_{LS} have been determined at

different temperatures and [oTd]_o.

In view of the fact that the reaction becomes very slow at low [oTd]_o the reaction has been studied only at two different concentrations of o-Toluidine. Secondly, the plots of intercepts k_{LI} vs [oTd]_o have been used to evaluate the values of k₁₁ and ρ and putting the values of k₁₁, the values of ρ' have been obtained at different temperatures and these values have been presented in Table-3.

b. At moderate and high concentration of o-Toluidine

At [oTd] above 0.06 mol dm⁻³, the oxidation rate shows a complex dependence on [H⁺] and [oTd]_o. It appears that in the concentration range 0.06 mol dm⁻³ and above all the four routes as proposed in the mechanism come into play. The overall oxidation rate may be expressed as:

$$\begin{aligned} \frac{-d[\text{Ox}]_t}{dt} &= k_{11} [\text{C}] + k_{21} [\text{H}^+] [\overline{C}] + k_{22} [\overline{C}] [\text{oTd}]_o \\ &\quad + k_{23} [\text{oTd}]_o [\text{oTd}]_o [\text{OXH}] \end{aligned}$$

The first term represents the minor reaction path by which the colored product is formed at different [H⁺] and [oTd]_o. The second term is hydrogen ion catalyzed and leads to the formation of other product. It appears that the complex, C may form an intermediate with protonated o-Toluidine, [oTd⁺] or the unprotonated o-Toluidine, [oTd], which breaks down in route 3 to give the uncolored product. [oTd] in the third and fourth term represents that both protonated and unprotonated, o-Toluidine may be involved in similar steps. The fourth term represents the oxidation of o-Toluidine by OXH i.e. H₃CrO₄⁺ which may be involved as minor oxidizing species in the reaction. This may be preceded by a complex formation of H₃CrO₄ with [oTd]₁ i.e. protonated or unprotonated species of o-Toluidine. In the above equation we put the value of C on the assumption that overall mass balanced equation for Cr(VI) is not altered although the presence of other complexes as reaction intermediate cannot be ruled out. The overall rate law may be obtained by fitting the values of [C] and [oTd] in terms of [oTd]_o:

$$\frac{-d[\text{Ox}]_t}{dt} = \frac{[k_{11} [\text{oTd}]_o + k_{21} [\text{oTd}]_o [\text{H}^+] + k_{22} [\text{H}^+]^2 [\text{oTd}]_o + k_{23} [\text{oTd}]_o^2 [\text{H}^+] [\text{Ox}]_t]}{\rho + \rho' [\text{H}^+] + [\text{oTd}]_o}$$

$$\text{Where } k'_{23} = k'_{23} K_3$$

From the above equation the observed pseudo first order rate constant {}^0k may be defined as:

$${}^0k = k_c + \left\{ \frac{k_{21} [\text{H}^+] [\text{oTd}]_o + k_{22} [\text{H}^+]^2 [\text{oTd}]_o + k_{23} [\text{H}^+]^2 [\text{oTd}]_o^2}{D} \right\}$$

Where k_c represents

(7)

$$k_c = \frac{k_{11} [\text{oTd}]_o}{\rho + \rho' [\text{H}^+] + [\text{oTd}]_o} \quad \text{and}$$

$$D = [] + []' [H^+] + [oTd]_0$$

The values of k_c at different $[H^+]$, $[oTd]$, and temperatures have been evaluated using the values of $[]$, $[]'$ and k_{11} from table-2. Also D values have been a calculated using values of $[]$ and $[]'$ from table under different conditions.

Equation (8) may be further arranged as,

$$\frac{[] - k [] k_c}{[] D} = \frac{k_1 + k_s [H^+]}{[H^+][oTd]_0} \quad (9)$$

where, $k_1 = k_{21}$ and $k_s = (k_{22} + k_{23} [oTd]_0)$

Equation (9) has been tested at different temperatures by using a plot of by using $[]$, $[]'$ and k_c a plot of L.H.S i.e. $\frac{[] - k [] k_c}{[] D}$ vs $[H^+]_0$

which is found to be linear at different $[oTd]_0$ as shown in Fig. (1) at Temp. $35^\circ C$ similar plots are obtained at other temperatures. It may be observed that these plots give same intercepts at different concentrations of o-Toluidine. Intercept of these plots give the value of k_{21} . The slopes of these plots k_s have been tested for their dependence on $[oTd]_0$ and are tabulated in table 1. It is observed that the plot of k_s versus $[oTd]_0$ in Fig. (2) are linear giving a positive intercept from which the values of k_{22} have been obtained whereas slopes of these plot give the values of k_{23} . All kinetic parameters have been evaluated at different temperatures and are presented in Table-2 along with their activation parameters in Table 3

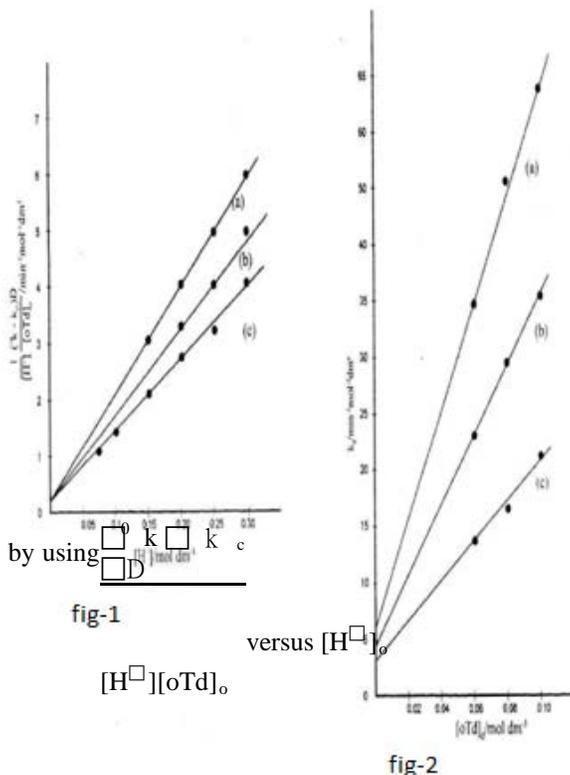


Table - 1

Rate Constant	35°C	40°C	45°C
k_{11}	0.13 min	0.14 min	0.16 min
k_{21}	$0.30 \text{ min}^{-1} \text{ mol}^{-1} \text{ dm}^3$	$0.60 \text{ min}^{-1} \text{ mol}^{-1} \text{ dm}^3$	$2.22 \text{ min}^{-1} \text{ mol}^{-1} \text{ dm}^3$
k_{22}	$3.50 \text{ min}^{-1} \text{ mol}^{-2} \text{ dm}^6$	$5.00 \text{ min}^{-1} \text{ mol}^{-2} \text{ dm}^6$	$6.50 \text{ min}^{-1} \text{ mol}^{-2} \text{ dm}^6$
k_{23}	$175 \text{ min}^{-1} \text{ mol dm}^{-3}$	$300 \text{ min}^{-1} \text{ mol dm}^{-3}$	$600 \text{ min}^{-1} \text{ mol dm}^{-3}$
ρ	0.09	0.19	0.46
ρ'	5.2	5.6	6.4

Fig.: (i) Plots between $(k - k_c)D / [H^+][oTd]_0$ vs $[H^+]_0$
Temp. = $35^\circ C$, $[oTd]_0$ (a) 0.10 mol dm^{-3} , (b) 0.08 mol dm^{-3} , (c) 0.06 mol dm^{-3}

Table - 2: Kinetic data for the oxidation of o-toluidine by Potassium dichromate in acid medium

Rate constant	E_a /KJ mol ⁻¹	ΔG^\ddagger /KJ mol ⁻¹	ΔH^\ddagger /KJ mol ⁻¹	ΔS^\ddagger /KJ mol ⁻¹	Nature of rate constant
k_{11}	11.87	80.62	9.32	-0.231	$\bar{c} \xrightarrow{k_{11}} P_c$
k_{21}	111.06	78.57	108.49	0.097	$\bar{c} \xrightarrow[k_{21}]{H^+} p$
k_{22}	57.15	72.31	54.69	-0.057	$\bar{c} + H^+ \xrightarrow[k_{22}]{oTd/oTd} p$
k_{23}	86.36	62.29	83.80	0.069	$OTd + O_xH \xrightarrow[k_{23}]{oTd/oTd} p$

III. CONCLUSION

A complexed rate law consisting of four routes is been assigned. At low $[oTd]_0$, the oxidation rate decreases with increase in $[H^+]$. At moderate and high $[oTd]_0$, oxidation rate is in reversed order and over all oxidation rate is expressed as some

of four terms. The first term represents the minor reaction path by which the colored product is formed at different $[H^+]$ and $[oTd]_o$. The second term is hydrogen ion catalyzed and leads to the formation of other product. It appears that the complex, C may form an intermediate with protonated o-Toluidine, $[oTd^+]$ or the unprotonated o-Toluidine, $[oTd]$, which breaks down in route 3 to give the uncolored product. $[oTd]_I$ in the third and fourth term represent that both protonated and unprotonated, o-Toluidine may be involved in similar steps. The fourth term represents the oxidation of o-Toluidine by OXH i.e. $H_3CrO_4^+$ which may be involved as minor oxidizing species in the reaction. This may be preceded by a complex formation of H_3CrO_4 with $[oTd]_I$ i.e. protonated or unprotonated species of o-Toluidine.

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Strategic policy of the Government of Indonesia In the Field of Maritime and Fisheries Affairs

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Abstract- The Law Number 45 Year 2009 on Fisheries and the Law Number 32 Year 2014 on the Marine deemed not able to provide a significant impact on the welfare of fishermen, this is because the implementation is not maximized also necessary strategic policy of the Indonesian government in marine and fisheries. This strategic policy intended to develop the business potential of marine and fisheries so that fishermen's welfare can be realized, and Indonesia is very abundant fisheries is expected to be the leading sectors of the national economy.

Index Terms- Strategic policy, the government of Indonesia, the field of marine and fisheries

I. INTRODUCTION

Sea is one of the sources of wealth of a country, because it saves natural resources very much, be it fish, seaweed, rocks, coral, and others. One of the lucky country by the grace of the god associated with the marine area is Indonesia. Indonesia has a very big potential of the sea, became one of the island nation in the world, Indonesia is flanked by the Indian and the Pacific Ocean so that the number and species of fish in Indonesia are many and varied. Indonesia also often host the international meeting to discuss the issues in marine world. It is not directly a world recognition of the existence of marine resources owned by Indonesia, but on the other hand, Indonesia is also harmed by neighboring countries who often took advantage by stealing the fish in the sea area of Indonesia.

Indonesia was awarded the vast sea with a variety of fish resources in it. Indonesia is the largest archipelago in the world because it has an area of the sea and a large number of islands. Long Beach Indonesia reached 95 181 km (World Resources Institute, 1998)[1] with a sea area of 5.4 million km², Indonesia dominate total territorial area of 7.1 million km². This potential puts Indonesia as a country endowed with huge marine resources including biodiversity and non-living marine World (Satwika Ambara, 2014)[2]. This is certainly the main attraction for fishermen, fish entrepreneurs, and entrepreneurs in the field of marine resources to explore Indonesia's marine area that has such huge potential.

Especially for capture fisheries (Perikanan Tangkap in Indonesian), the potential of Indonesia is abundant so it can be expected to be the leading sectors of the national economy. The potential for it to be used optimally and sustainably, this task is a shared responsibility of government, communities, and

employers in order to increase incomes and state revenues that lead to the welfare of the people (David Setia Maradong, 2016)[3]. Indonesia has a fishery resource covering, fishing in public waters covering an area of 54 million hectares with a production potential of 0.9 million tons / year. Mariculture consisting of fish farming (include snapper, grouper, and gobia), cultivation of molluscs (oyster, pearl, and sea cucumbers), and the cultivation of seaweed, brackish water (ponds) are potential land development reached about 913 000 ha, and cultivation freshwater consists of public waters (lakes, reservoirs, rivers, and swamps), a freshwater pool, and mina rice in paddy fields, as well as marine biotechnology for the development of marine biotechnology industry such as industrial raw materials for food, industrial materials natural food, fish seed and shrimp and foodstuffs industry. The magnitude of the potential of marine and fisheries Indonesia reached 3,000 trillion per year, but that has been exploited only about 225 trillion or about 7.5% only (Satwika Ambara, 2014)[4]. Based on these data, the potential of marine and fisheries Indonesia has not maximized properly, so that the required national and regional policies to be implemented so that the potential of marine and fisheries a large Indonesian is used for the greatest prosperity of the people of Indonesia and not be exploited by fishermen or businessmen fish from other countries.

Opportunities for business development of marine and fisheries Indonesia still has good prospects. Marine and fisheries development can be used to boost economic recovery is estimated at US \$ 82 billion per year. Indonesia has the opportunity to become the world's largest producer of fishery products, due to the contribution of fisheries in 2004-2009 continued to rise. Besides, other potential began to be managed, such as non-renewable resources, in order to make a significant contribution to development. To optimize utilization of marine resources and fisheries and make this sector as the prime mover of national economic development, the necessary efforts to accelerate and breakthroughs in the development of marine and fisheries are supported by political and economic policies as well as the social climate conducive (Satwika Ambara, 2014)[5].

Formerly prosperous fate of the fishermen, so that the offspring are required to become a fisherman, too. But today, prosperity is wishful thinking of the fishermen is difficult to achieve. The problems led to the triumph of the territorial waters of stops, such as (Ilmu Hewan, 2016)[6]:

1. Damage to the aquatic environment is getting worse.
2. The marine ecosystems are damaged.

3. The weather is hard to predict.
4. Much cheaper transportation than a ship.
5. Facilities and infrastructure for the fishermen inadequate.
6. Local fishing boat less sophisticated with foreign fishing vessels entering the waters of Indonesia.
7. Wages earned in accordance with the fishermen did not struggle.
8. People prefer to consume imported fish.

Indonesian fishery resources, is actually able to contribute to the welfare of Indonesian society if properly managed. Minister of Fisheries and Marine of the Republic of Indonesia, Susi Pudjiastuti, is someone who cares for the territorial waters of Indonesia firmly and have tangible results for its performance as a minister. On the other hand, fishery resources Indonesia increasingly alarming. The results have been unable to support marine life of the fishermen. Many Indonesian fishermen who chose to become migrant workers in South Korea (Ilmu Hewan, 2016)[7].

National regulation in the fishery has been in existence since the past 2009 years, with the enactment of the Law of the Republic of Indonesia Number 45 Year 2009 on the Amendment of the Law of the Republic of Indonesia Number 31 of 2004 on Fisheries, consideration of the release of these laws (Law of the Republic of Indonesia Number 45 Year 2009) this law came out with consideration of (1) that the waters which were under the sovereignty of the Unitary Republic of Indonesia and the Indonesian Exclusive Economic Zone and the high seas contain fish resources potential and as a commercial fish breeding was a blessing from God Almighty mandated to the nation Indonesia, which has a life philosophy of Pancasila and the Constitution of the Republic of Indonesia Year 1945, taking into account the existing carrying capacity and sustainability to be utilized as much as possible for the welfare and prosperity of the people of Indonesia; (2) utilization of fish resources yet provide improved living standards through sustainable and equitable fisheries management, surveillance and law enforcement system that is optimal; and (3) that Republic Act No. 31 of 2004 on Fisheries has not been fully able to anticipate technological developments and the needs of law in the management and utilization of fish resources (Law of the Republic of Indonesia Number 45 Year 2009)[8].

Increase the sustainability of fishery business as stipulated in Law Number 32 Year 2014 concerning the Marine, in Article 3, which mandates that the use of marine resources is done in a sustainable manner for the welfare of the present generation without compromising the interests of future generations, and in Article 59 directs so that utilization of marine resources is prioritizing the preservation of the sovereignty and laws of Indonesian waters, seabed and subsoil. From the regulatory side, the second this legislation (Law of the Republic of Indonesia Number 45 Year 2009 on Fisheries and the Law of the Republic of Indonesia Number 32 Year 2014 on Marine) is indeed intended to maximize the utilization of natural resources of Indonesia majoring in marine and fisheries, but in fact both these laws have not been able to provide significant impact on the welfare of fishermen, it is because in addition to its implementation is not maximized also required the Indonesian government strategic policy in the field of maritime affairs and

fisheries. This strategic policy intended to develop the business potential of marine and fisheries Indonesia so that the fishermen's welfare can be realized, and capture fisheries are very abundant Indonesia is expected to become the leading sectors of the national economy. Based on the explanation, the issues to be discussed in this paper is that what should be a strategic policy issued by the government in order to develop the potential of marine and fisheries in Indonesia? and how efforts should be made so that the implementation of these policies can be maximized in the community?

II. RESEARCH METHODS

Type of Research

Based on the objectives to be achieved in this research, the type of research is a type of normative legal research (Amiruddin and Zainal Asikin, 2013)[9] using the statute approach (Bambang Sunggono, 2012)[10] and conceptual approach (Peter Mahmud Marzuki, 2010)[11].

Type of Legal Material

Data collection techniques in this study using research literature (Tukiran Taniredja and Hidayah, 2011)[12]. Legal materiel type that used in this research are primary and secondary legal material (Salim HS and Erlies Septiana Nurbani, 2013)[13].

Data Analysis

After legal materials were collected, then conducted an analysis using qualitative, then presented descriptively (Soerjono Soekanto, 2012)[14].

III. RESULTS AND DISCUSSION

A. The Government Strategic Policy in the Field of Maritime and Fisheries Affairs

As I have mentioned previously that the government's strategic policy is needed to develop the business potential of marine and fisheries Indonesia so that the fishermen's welfare can be realized, and capture fisheries are very abundant Indonesia is expected to become the leading sectors of the national economy. This is because the Law of the Republic of Indonesia Number 45 Year 2009 on Fisheries and the Law of the Republic of Indonesia Number 32 Year 2014 on Marine are still not able to answer the needs of Indonesia in the field of maritime affairs and fisheries. Based on these needs, then there are at least four important policy that the writer became government's strategic policy in the field of maritime and fisheries affairs, the four policies are :

1. Eradication of Illegal Fishing

Minister of Maritime Affairs and Fisheries (Susi Pudjiastuti) states that the activities of illegal fishing (Illegal unreported unregulated / IUU fishing) has made Indonesian children born with a condition growing stunt. Children who are born malnourished due to rarely eat fish, for dozens of years those involved in illegal fishing in marine fish stealing Indonesia, and took him to their country. While the Indonesian public, who should enjoy the wealth of marine resources in the country have to bite the finger because the fish has gone stolen foreign vessels. 10 years of the last census showed one in three children born and growing Indonesia stunt. If the physical alone is growing stunt,

because food is lacking protein. 10 years earlier census, national fish consumption is low. Susi Pudjiastuti wants the quality of human resources in Indonesia can be improved. Therefore, any fish consumption should continue to rise in the future. One done to combat against ships perpetrators of IUU fishing. Because, with IUU fishing, the government has provided a foundation for increasing fish consumption. So in addition to Gross Domestic Product (Produk Domestik Bruto / PDB) fisheries had increased to 8.96%, but still well above the average Gross Domestic Product compared to other sectors is clearly much lead. When all slowing, so the only fisheries sector that relied (Sindonews Issue November 3, 2016)[15]. This is certainly a concern for all of us, for the management and utilization of fish sources is not the duty of the government alone, but the entire people of Indonesia, the next question is what has the government and we have made to safeguard and secure the Indonesian territory of the invading ships foreign illegal fishing.

Fisheries resources in Indonesia is still a source of wealth that provides immense potential to be developed for the prosperity of the Indonesian nation, both to meet the protein needs of its people, as well as for export in order to obtain funds for the nation's development efforts (Hasjim Djalal, 1979)[16], therefore this fishery resources already should be utilized as well as possible.

Fishing boats foreigners who have access rights to the exclusive economic zone of a coastal state must obey the laws coastal countries concerned, which may contain the obligations and requirements regarding various things, such as licensing, financial rewards, quotas, conservation measures, information, research, spotter, landing catches, cooperation agreements, etc. (Albert W. Koers, 1994)[17]. Susi Pudjiastuti mention, illegal fishing policy issuance has resulted. After almost two years of rolling, at least 10,000 foreign ships to escape from Indonesian waters. So far, Indonesia is too late to land resources and ignore the magnitude of Indonesia's marine resources. Consequently, other countries take for of Indonesia's marine wealth. "We forgot our oceans, while the neighboring countries take benefit from the richness of our seas". Therefore, the Minister Susi Pudjiastuti, since its inception has served as Minister of Marine and Fisheries, a breakthrough first is combating IUU fishing which has been detrimental to Indonesia is very large. Conceivably, a foreign fishing company caught fish about 3.5 million tonnes per year at sea Indonesia, if it costs \$ 1, the (loss) of \$ 3.5 billion. Though it was no shrimp, calamari that cost may not be Rp. 10,000 to Rp. 20,000, and there are a few companies like this. Susi Pudjiastuti said the number of foreign ex ship sunk in the fight against IUU fishing program is only about 286 units. However it turns out, the effect is greater for 10,000 other ships ran away for fear of being drowned. During 1.5 years drownings only 286 units. But who goes from the sea Indonesia more than 10 thousand ships. So deterrence effect occurs there. According to him, the eradication of illegal foreign vessels should be a national mission Indonesia. Therefore, IUU fishing has been entrenched for decades. "If it is not used as a national mission would have no problem. It can not, eventually we take ownership of this eradication of all fishing boats and drown us under the constitution and the Law (Sindonews Issue November 3, 2016)[18]. However, that should also be cautious is the existence of these illegal activities carried out by Indonesian citizens

themselves, several modes / types of activities illegal often do citizens of Indonesia, among others: fishing without permission, have permission but violating the provisions stipulated by law - undang-an relating to fisheries, forgery / manipulation of documents, transshipment at sea, do not turn on the transmitter, and destructive fishing using chemical, biological, explosives, equipment and / or means, and / or buildings that endanger conserve resources fish (Rohmin Dahuri, 2013)[19].

2. Fishery Products Using One Price in Indonesia

Minister of Maritime Affairs and Fisheries (Susi Pudjiastuti) plans to build a fishing industry in the 12 outer islands in Indonesia. To make it happen, the Ministry of Maritime Affairs and Fisheries will cooperate with PT Perikanan Indonesia (Persero) and PT Perikanan Nusantara (Persero), as well as involving PT Pelni (Persero) and PT Garuda Indonesia (Persero) Tbk as the motor distribution of fishery products to the eastern part of Indonesia. The Ministry of Maritime and fishery Affairs will open the gate (gateway) for the fishing industry of eastern Indonesia to the Republic of Palau and Darwin, Australia, because it will also improve logistics costs become more rational. Susi Minister Pudjiastuti want to open the gateway to eastern Indonesia to Palau which is only 1/5 than Jakarta, as well as the southern gateway to Darwin and to Kenth which distance is also 1/5 or 1/7 of Jakarta. It will change more rational logistics. Fish can be directly sold to the international market fresh. Later, fishery products for the outer islands 12 will also be sent directly from Darwin or Palau. During this time, fishery products for the area in eastern Indonesia were sent from Java, thus making the cost becomes more expensive. Susi Pudjiastuti pointed out that if we take out of Darwin, in the supermarket Darwin just USD3-USD4. ATR flown by Garuda use only, the cost is only \$ 1. Susi Pudjiastuti hope, the plan had to be realized in the beginning of January 1, 2017. (Garuda) should start flying later Kupang-Darwin-Kent Timika, Merauke-Kent and will deduct 1/5 of economic cost, and provide an opportunity to get the price of eastern Indonesia the same one (Sindonews Issue November 3, 2016)[20]. Based on the reports, the policy on fishery products using a single price in Indonesia seems to be the most popular because of this policy that is in direct contact with many people, the main consumer of fish daily.

3. The Issuance of Regulations which Implementative

Sustainable potential Indonesian marine fish resources of 6.5 million tonnes per year spread in the territorial waters of Indonesia and the Indonesian Exclusive Economic Zone waters (Zona Ekonomi Eksklusif Indonesia / ZEEI) divided into nine major Indonesian territorial waters. Of all the potential of these resources, in order to maintain the sustainability of fish stocks total allowable catches (Jumlah Tangkapan yang diperbolehkan / JTB) amounted to 5.12 million tons per year. Volume and value of production for each of the main commodity aquaculture in 2010-2014 increased, consisting of: (1) The shrimp has increased on average per year by 14.03%; (2) the grouper has increased on average by 9.61% per year; (3) milkfish has increased on average per year by 10.45%; (4) Patin increased on average per year by 30.73%; (5) The tilapia has increased on average per year by 19.03%; (6) Goldfish experienced an increase in average per year amounted to 14.44%; (7) The catfish has increased on average

per year by 26.43%; (8) Gurame increased on average per year by 17.70%; and (9) Seaweed has increased an average of 27.72% per year. In the Medium Term Development Plan (Rencana Pembangunan Jangka Menengah / RPJMN) 2015-2019, the construction carried out by promoting the role of the marine economy and national marine development synergy with the target (David Setia Maradong, 2016)[21] :

1. Utilization of marine resources for the economic development and welfare of fishermen and coastal communities;
2. Establishing a Tol Marine efforts to improve services and increase connectivity sea transport sea;
3. Maintenance of preservation of the environment and marine resources; and
4. Achievement of Human Resources (SDM) and Science and Technology (Iptek) marine quality and increased insight and marine aquaculture, the establishment of the network infrastructure as the glue all the islands and the islands of Indonesia.

As the implementation of the objectives RPJMN, the Ministry of Maritime Affairs and Fisheries in the Strategic Plan 2015-2019 states that to achieve the success of Indonesia's development as reflected in the maritime (David Setia Maradong, 2016)[22] :

1. The optimal management of ocean space, conservation and marine biodiversity.
2. Increased corporate sustainability of fisheries and aquaculture.
3. Increased competitiveness and logistics systems the results of marine and fisheries.
4. Increased supervision of the management of marine resources and fisheries.
5. Increased human resource capacity, community development, and science and technology innovation of marine and fisheries.
6. The development of fish quarantine system, quality control, security, fisheries and fish biosafety.

In addition, to optimize the utilization of marine resources, especially capture fisheries to remain sustainable, some policies have been issued, namely (David Setia Maradong, 2016)[23] :

1. Regulation of the Minister of Marine and Fisheries No. 10 Year 2015 concerning Amendment to the Regulation of the Minister of Marine and Fisheries No. 56 / Permen-KP / 2014 on Termination of Temporary (Moratorium) Licensing Business fisheries in Regional Fisheries Management (Wilayah Pengelolaan Perikanan / WPP) of the Republic of Indonesia;
2. Regulation of the Minister of Marine and Fisheries No. 04 Year 2015 concerning the Prohibition of Fishing in WPP 714 (Sea Netherlands);
3. Regulation of the Minister of Marine and Fisheries No. 02 Year 2015 on the Prohibition of the Use of Fishing trawler Hela (trawls) and trawl Pull (Seine Nets) in WPP Republic of Indonesia;
4. Regulation of the Minister of Marine and Fisheries No. 01 Year 2015 on Catching Lobster (*Panulirus* spp), crab (*Scylla* spp) and swimming crab (*Portunus pelagicus* spp);

5. Regulation of the Minister of Marine and Fisheries No. 57 Year 2014 concerning the Second Amendment to the Regulation of the Minister of Marine and Fisheries No. Per.30 / Men / 2012 on Business fisheries in WPP Republic of Indonesia;
6. Regulation of the Minister of Marine and Fisheries No. 56 of 2014 on Temporary Cessation (Moratorium) Licensing Business fisheries in WPP Republic of Indonesia;
7. Letter from the Minister of Marine and Fisheries No. B.622.MEN/KP/XI/2014 on Petition To All Governors and Regents / Mayors to manage resources in a sustainable manner; and
8. Local Government has issued regulations on the utilization of fishery resources that are environmentally friendly and sustainable.

Implementable rules was necessary as one step in the government's strategic policy to maximize all available resources in marine and fisheries.

4. Changing Management and Building a Sustainable Fisheries

To realize a sustainable national fisheries catch, it must be ensured that the rate of arrests resources (stocks) fish does not exceed the sustainable production potential (maximum sustainable yield / MSY). MSY total Indonesian marine fish resources of 6.5 million tonnes per year. In 2010 the total marine fish production of 5.1 million tons. MSY total freshwater fish of 0.9 million tonnes per year and a barn used 0.5 million tons. The issue of distribution of fishermen and fishing vessels uneven. More than 90 percent of Indonesian fishing fleet is concentrated in the coastal waters and shallow seas such as the Malacca Strait, north coast, the Strait of Bali, and the southern coast of Sulawesi. There also has been largely excess catch. If the rate of fishing as it is now continued, the catch per vessel will decrease, fishermen are getting poorer, and even extinct fish resources such as fish Terubuk in the waterway and the flying fish on the south coast of Sulawesi. In contrast the number of Indonesian fishing vessels operating on the high seas, the deep sea, and border areas such as the Natuna Sea, South China Sea, the Sulawesi Sea, the Seram Sea, the Banda Sea, the Pacific Ocean, Arafura Sea and the Indian Ocean could be counted on the fingers. This is where foreign fishing vessels rampant and cost the state at least Rp 30 trillion per year. The rate of fishing in waters that have excess fishing should be reduced and simultaneously multiply modern fishing boat fleets to operate in waters that are still underfishing or that had been looted foreign fishermen. All this will help the economic development of fisheries-based regions (Ministry of Marine and Fisheries of the Republic of Indonesia, 2015)[24]. Keep in mind also that building a sustainable fishing program is very important and strategic for the long term and prospects for sustainability in the future.

Each fishing vessel must be equipped with a fish storage facilities are refrigerated to maintain quality of the fish arrive at fish landing sites. Fishermen should be trained and counseled to practice ways of good fish handling during on board. Fishermen throughout the country should be guaranteed to land a catch of fish in fish landing sites or fishing ports. In addition to meeting sanitary and hygienic standards, the fishing port should also be equipped with ice plants, cold storage, fish processing plants,

refrigerated fish transport cars, cooperative seller of fishing gear, fuel, rice, and supplies at sea, as well as fish bona fide purchaser. Third, rehabilitation of coastal ecosystems that have been damaged and control pollution of the marine conservation areas and mengembahgkan. In addition, the enrichment of the stock (stock enhancement) and restocking with species suited to do in the territorial waters of the excess catch. Although it is a maritime nation and the world's largest archipelago, Indonesia only has the Ministry of Marine and Fisheries under President Abdurrahman Wahid. Ministry of Maritime and Fisheries (KKP) dealing with capture fisheries, aquaculture, fishery product processing industry, the biotechnology industry waters, construction of small islands, salt production, utilization of valuable objects from the sinking ship, as well as the development of natural resources nonconventional in coastal areas and oceans. Since the presence of the CTF appears some progress. Fisheries production, which in 1999 the new 3.5 million tons (ranking seventh world), in 2010 reached 10.5 million tons and Indonesia became the third largest fishery producer after China (55 million tons) and India (14 million tons). In 2010, the contribution of fish protein in total animal protein intake of the people of Indonesia barn 50 percent, now 62 percent. The value of fisheries exports also increased from 1.5 billion US dollars (1999) to 3 billion US dollars (2010). Similarly, the contribution of marine and fishery sector to gross domestic product, has now reached 3.2 per cent from 1.9 per cent in 1999. However, much work is unfinished. Until now the majority of fishermen, especially fishermen labor, still live in poverty puddle. Ironically, the fish stocks in some sea areas such as the Strait of Malacca, Java Sea, the southern coast of Sulawesi, Bali Strait and Arafura already overfished saturated (fully-exploi-ted) or excess fishing (overfishing). Coastal ecosystems such as estuaries, mangroves, coral reefs and seagrass beds are broken, either as a result of exploitation, conversion (reclamation), as well as pollution. In fact, coastal ecosystems are the breeding, care, feeding, or self-aggrandizement almost all types of fish and marine life. Concern is the onslaught of imported fish craze in the last three years. Previously we only imported fish meal, salmon, and some fish products which can not be produced in Indonesia and the value was not significant (less than 50 million US dollars) per year. Now the imported commodities including those in Indonesia such as bloating, overpasses, anchovies, mackerels, and malalogis with a value of more than 200 million dollars per year. In fact, the potential of Indonesian fishery production in the world, 65 million tons per year, and only used 10.5 million tons (16 percent) (Ministry of Marine and Fisheries of the Republic of Indonesia, 2015)[25]. Fish stocks have been overfished saturated must be overcome by proper government, because if this is done fishing continuously in these areas, it is unlikely that the future prospects for sustainable fisheries program will not be realized.

B. Policy Implementation in the Community

Implementation of the four government policies that are classified as strategic policy that must be done by the government should be implemented well in the community, it is for people to participate actively in taking part of the strategic policies of the government. To measure whether the government's strategic policy has been implemented well, then

there is a level indicators that must be met. According to the authors there are at least two government efforts should be done to implementation of the policy can be maximized in the community.

1. Consistency in Implementing Policies

Any measures taken by the government, should be consistent in implementing it, do not have a policy that is run is not optimal, or if policies are run at national level but the local governments do not fully support, synergy between the central government and local governments need to be improved so that the similarity of mission in implement a national policy that is considered strategic to the public, it should be noted that the implementation of these policies can be maximized in the community.

2. Sustainable Policy Orientation

Regarding policy orientation sustained in question is a policy that if it had changed government policy that already exists if it has the prospects and progress both should continue, not to change the regime, the policy was changed, even the policies of long-term to a standstill due to the policy that will be implemented by the new government, this must be rethought because a policy is not a strategy to get instant imaging nature, the policy is a long thought process up to the point where the policy should be better implemented.

Based on the above two attempts, according to the author of four strategic policies that have been implemented by the current government has been implemented well, it can be seen from the policies that have been issued a positive impact as follows (David Setia Maradong, 2016)[26]:

1. In some areas, an increasing number of fishing trips of 2-3 trips / week to 7 trips / week (reduction in distance fishing ground of the 4-mile to 2 miles). Besides production in the ocean fishing port rose 5.16% and in the fishing port rose 11.48%;
2. Productivity increase for the size of vessel <10 GT (1.9%), 10 - <30 GT (40.6%), and 30-100 GT (52.4%);
3. Saving Fuel (Bahan Bakar Minyak / BBM) National by 36%;
4. Gross Domestic Product (Produk Domestik Bruto / PDB) reached 8.64% Fisheries (first quarter 2015) that the economies of scale of Rp.67,08 trillion;
5. Indonesia gets fisheries products duty-free to the United States;
6. The value of exports reached USD906,77 million in the first quarter of 2015;
7. Obtaining the support of friendly countries and the International CSO technical assistance for capacity building, institutional, and human resources and marine fisheries; and
8. Will do Indonesia Joint Declaration - Republica Democratica de Timor Leste - Papua New Guinea - Australia - Fiji to combat Illegal Fishing.

IV. CONCLUSION

Based on the presentation and discussion of research results, it can be concluded that the Law of the Republic of

Indonesia Number 45 Year 2009 on Fisheries and the Law of the Republic of Indonesia Number 32 Year 2014 on Marine are still not able to answer the needs of Indonesia in the field of maritime and fisheries affairs. Based on these needs, then there are at least four important policy into government's strategic policy in the field of maritime and fisheries affairs, the four policies are (1) Eradication of Illegal Fishing, (2) Fishery Products Using One Price in Indonesia, (3) The issuance of Regulations which implementative, and (4) Changing Management and Building a Sustainable Fisheries. There are two government efforts should be done to implementation of the policy can be maximized in society, namely (1) Consistency in implementing the policy, and (2) The Policy Sustainable orientation.

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The Impact of Job Characteristics and Role Stressors on Cyberloafing: The Case of Pakistan

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Abstract- Internet technology has enabled the employees to work more efficiently and to prove themselves to be more productive. In this study, job characteristics are combined with role stressors in single modal. The purpose of this study was to explore whether all five core values of job characteristics and three types of role stressors serve as the predictors of cyberloafing behavior of employees at workplace or not. It is hypothesized separately that job characteristics and role stressors has impact on cyberloafing. Data was collected from PTCL employees who have access to internet at workplace. It is found that out of five core values of job characteristics (skill variety, task identity, task significance, job autonomy, and feedback) only skill variety and job autonomy have impact. Furthermore, out of three types of role stressors (role ambiguity, role overload, and role conflict), role ambiguity and role conflict were found to have impact on cyberloafing. Implication for employers and employees both are discussed as well.

Index Terms- Skill variety, task identity, task significance, job autonomy, feedback, role ambiguity, role overload, role conflict, cyberloafing.

I. INTRODUCTION

Computer and internet based functioning has grown very much common in the organizations in recent years. Internet is helping business in many ways through reducing cost, shortening product cycle times, and by marketing services and products without incurring much cost (Anandarajan, Simmers, & Igbaria, 2000). Since both these facilities computers and internet are playing tremendously important role not only in professional but also personal lives of workers, these things have also generated a considerable problem for management in organizations (Glassman, Prosch, & Shao, 2014). It is also seen that personal internet usage to some extent is understandable by management (Muhl, 2003). On one hand internet has helped the users to complete their assigned tasks more easily and effectively, on other hand the probability of engaging in non-work related activities such as sending or receiving personal emails, playing online game, shopping online and maintaining social connections, has also increased. This emerging kind of loafing is termed as cyberloafing (Lim, 2002; Lim & Teo, 2005). Cyberloafing also termed as cyberslacking (Vitak, Crouse, & LaRose, 2011) (Greengard & Samuel, 2000), personal internet use at work (König & Guardia, 2014).

Employees engage in cyberloafing activities due to many reasons. A number of studies are conducted to find out the antecedents of such behavior and these studies show that Employees can engage in cyberloafing activities because of stress or pressure experienced by employees at work (work stressors) which may include role ambiguity, role conflict and role overload. Employees who face job stress in any form will try to avoid this stressed situation by engaging in cyberloafing (Sawitria & Runing, 2012). The present study also intends to explore the effects of five core values of job characteristics and three major kinds of role stressors on cyberloafing. In contrast to existing research this study includes all five core values in single model along with role stressors. Five core values of job characteristics include skill variety, task identity, task significance, job autonomy and feedback. Moreover in Pakistani context studies related to cyberloafing are very limited, so this study will also explore the antecedents of cyberloafing in Pakistan.

This study expands past studies on cyberloafing by combining the various factors in single model to check the extent to which they contribute to cyberloafing. To the extent that employees' misuse of the internet entails considerable costs to organizations and affects employees' productivity, it is important to understand what motivates individuals to engage in this behavior so that effective organizational intervention programmes and policies may be developed and implemented to remove or limit its occurrence. (Lim & Vivien K., 2002)

1.1 Cyberloafing

Cyberloafing is the misuse of company provided internet for checking personal emails and surfing hours to websites other than work related purpose (Lim & Vivien K., The IT way of loafing on the job: cyberloafing, neutralizing and organizational justice, 2002). "Cyberloafing refers to the organization's internet usage by employees to access and send emails during working hours with a purpose unrelated to work" (Sawitria & Runing, 2012). Another definition is that cyberslacking is the usage of internet and mobile in working hours (Vitak, Crouse, & LaRose, 2011). Cyberslacking is "The use of web pages for personal purposes during working hours" (Andreassen, Torsheim, & Pallesen, 2014). In accordance to the definition cyberloafing was taken as production deviance (Lim & Teo, 2005), one type of workplace deviance while others were property deviance, political deviance and aggression (Robinson & Bennett, 1995). These days' human resources are considered as most important assets in every organization. But the emerging trend of internet usage addiction as social networks, quick access to news and

financial sites is transferring this 'allowance of internet use' into internet abuse (Xu, Hock-Hai Teo, & Agarwal, 2010). Also some studies suggest that using company provided internet facility for personal use is sometimes beneficial with respect to reducing boredom, avoiding stress, increasing creativity and job satisfaction (Eastin, Glynn, & Griffiths, 2007; Oravec, 2002; Reinecke, 2009).

Employees can just not merely engage in loafing on workplace, but they can also enjoy the best of both worlds by maintaining the position of being hard at work in the actual world and also at the same time, visiting through cyberspace by surfing Web sites for personal stakes and purposes. Cyberloafers need not be physically absent from the office for apparently long periods of time, as long as the lunchers do. Cyberloafers also need not worry as much about the disclosure of their loafing like those of restroom-minded or those who hang out with their colleagues by the water cooler to chat. Cyberloafers, however, spend a lot of time in surfing the internet, moving from one Web site to another simply only with a click of the mouse. Also, cyberloafers usually visit sites which expose the organization to legal liabilities and to the dangers posed by computer viruses. These factors taken together suggest that cyberloafers may cause a greater 'threat' to organizations relative to other types of loafers, in terms of productivity losses and costs incurred (Lim & Vivien, 2002).

1.2 Research Question

What are the factors perceived to be important in cyberloafing of employees?

What are the significant predictors of cyberloafing?

1.3 Objective of the study

The objective of this study is:

- 1) To determine the factors which are perceived to be important in cyberloafing behavior of employees.
- 2) To determine factors those predict cyberloafing.

II. LITERATURE REVIEW

To maintain a balance between work and non-work related activities at work has emerged as one of the major challenge for employees (Byron, 2005). It was seen that not all deviant activities prevailed equally but some are more prevalent and adopted by the employees as compare to others. Studies concluded that more prevalent activities would be less serious for example checking, sending and receiving personal mails is found commonly among the employees and it is not really serious. Furthermore it was also observed that employees try to neutralize their non-work related activities by justifying it with the perceived cyberloafing of coworkers. Internet has removed the boundaries of workplace and home so cyberloafing is considered normal behavior by the employees as they are free to perform any activity at homes (Lim & Teo, 2005). Ways to bring the employees back to focus on work activities instead of cyberloafing were studied. It was seen that proximity does not prevent from cyberloafing. Likewise monitoring also does not affect the cyberloafing behavior of employees. Interaction of these two variables, monitoring and proximity, caused no reduction in the cyberloafing. Interaction of monitoring and proximity along with punishment, however, reduced the cyberloafing behavior of

employees. Cyber loafers were not affected by the punishment alone also. It was also analyzed that certain amount of monitoring and proximity. When there is high level of proximity and high monitoring along with punishment only then it has tendency to prevent cyber loafers from indulging in cyberloafing activities (Zoghbi-Manrique-de-Lara & Olivares-Mesa, 2010).

Job characteristics/Task characteristics have been the most commonly investigated motivational work design characteristics. Task characteristics are primarily concerned with how the work itself is accomplished and the range and nature of tasks associated with a particular job (Morgeson & Humphrey, 2006). There exist a relationship between job characteristics and personal outcome. Personal outcomes include general satisfaction, growth satisfaction and internal motivation of employees (Bhatti, Syed, & Shaikh, 2012).

2.1 Core Values of Job Characteristics

2.1.1 Skill Variety

Skill variety is the extent to which an employee requires a wide range of skills (Katsikea, Evangelia, Theodosiou, Perdakis, & Kehagias, 2011). This characteristic of job requires large variety of expertise to finish a task. In other words, an employee needs to perform various tasks in order to complete a specific job. Skill variety is also defined as the amount of skills needed by employee for the accomplishment of particular work assignment (McKnight, Phillips, & Hardgrave, 2009). Moreover job characteristics affect personal online communication (POC) at work. Employees get engage in cyberloafing when they find their job boring because of limited number of activities or skills. Skill variety and personal online communication at work by the employees is negatively related. Furthermore organizations are facing the costly and constant threat of counterproductive behavior. One of the job characteristic, skill varieties has direct negative relation with counterproductive behavior of employees. It is obvious that if a job requires more skills to be done, it keeps the employees away from deviant behaviors (Ansari, V., Mazraeh, & Arab-Khazaeli, 2013).

H₁: Skill variety has an impact on cyberloafing of employees.

2.1.2 Task Identity

Task identity is defined as the degree to which employees believe that the job is specific and well designed (McKnight, Phillips, & Hardgrave, 2009). It means that if the job is well defined in nature, the workers are more motivated towards their assignments and goals. According to another definition task identity is the extent to which workers finish an entire amount of work and recognize the outcomes of their efforts (Katsikea, Evangelia, Theodosiou, Perdakis, & Kehagias, 2011). Higher level of task identity enhances the motivation level of employees and their self-actualization to the work. It booms up the employees' feelings of work accomplishment. Also all core values of job characteristic do not show the same impact on studied the impact on job satisfaction and affective commitment. Among all job characteristic task identity along with task variety showed no impact on either affective commitment or job satisfaction (Ozturk, Hancer, & Im, 2014). Task identity enables an employee to feel his job meaningful which ultimately provides him satisfaction. More the task or job is meaningful

perceived by the person, more he will be motivated to perform well. (Lau, Bin, & Huang", 1999).

H₂: Task identity has an impact on cyberloafing of employees.

2.1.3 Task Significance

Task significance determines the importance of a job. It is defined as the extent to which a job has a significant impact on the lives and work of other co-workers. This characteristic is about the outcomes of the job that how significantly the job of a worker is affecting the work of another worker. This may have a positive or negative impact on the job of another employee. Task significance is very important characteristic of a job as it has a great impact on the work of other colleagues (Katsikea, Evangelia, Theodosiou, Perdikis, & Kehagias, 2011). Task significance is the extent to which the job or work of one can effect more or less to the lives of other person either in the same organization or in external environment. For example if medical researcher works in a lab to prepare drug to cure some disease, it would influence so many people's lives. In terms of employees of some organization task significance can be assumed as the degree to which the job of one employee contributes towards the achievement of the overall goal of the organization (Lunenburg, 2011). Job characteristics are the tool to measure the performance of employees. Task significance is not considered as much important for salesperson's activities as those of other business and organizational employees have (Becherer, Morgan, & Richard, 1982).

H₃: Task significance has an impact on cyberloafing of employees.

2.1.4 Autonomy

Autonomy is the extent to which an employee has a liberty to schedule, prioritize and perform his job in his own way (Katsikea, Evangelia, Theodosiou, Perdikis, & Kehagias, 2011). An employee has freedom to make his choices of work priorities. Autonomy provides the employees an opportunity to schedule their work in accordance to their conveniences. Autonomy decreases the work exhaustion by permitting self redirection of the endeavors of employees.

Job autonomy is considered as a basic tool to develop the sense of responsibility in employees (Lunenburg, 2011). Furthermore a study was conducted to investigate the effect of job characteristic on personal online communication (POC) of employees at work. This study revealed that employees having high level of job autonomy are usually more engaged in personal online communication. Positive relationship between job autonomy and POC shows that this does not affect productivity in any negative way. And also POC to some extent helps employees to refresh their minds (Jian, 2013).

H₄: Job autonomy has an impact on cyberloafing of employees.

2.1.5 Feedback

Feedback is the response from the supervisor regarding the quality of work done by the employees. Managers communicate to the employees that how efficiently they have performed their job (McKnight, Phillips, & Hardgrave, 2009). According to another definition feedback is a way of getting the clear and complete information and remarks about one's performance of

the work or tasks that are assigned to him. It can be positive and negative as well. Feedback should occur on frequent basis rather on delayed time lag to avoid any negative circumstances in final performance evaluation procedure (Lunenburg, 2011). When an employee is satisfied with his job, he will be committed to the organization and his work. Impact of feedback on affective commitment and job satisfaction was studied. Studies revealed that there is significant affect of feedback on job satisfaction and affective commitment (Ozturk, Hancer, & Im, 2014). In addition, while determining various predictors of counterproductive work behavior of employees. It was found that feedback is not a reason for deviant behavior of employees at (Ansari, V., Mazraeh, & Arab-Khazaeli, 2013). So it is possible that employees engage in cyberloafing when they are not receiving any feedback and they are free to do whatever they want without considering the outcomes in the form of negative feedback.

H₅: Feedback has an impact on cyberloafing of employees.

2.2 Role Stressors

A role stressor can be defined as the pressure experienced by an individual as a result of organizational and job-specific factors in the form of demands and constraints that have been placed on them (Kahn, Wolfe, Quinn, Snoek, & Rosenthal, 1964). Previous studies show that stress faced by employees affect them not only mentally but also physically. A study showed that if employees experience stress at workplace it affects their physical as well as mental health which ultimately influence employees' turnover intentions and job performance (Hang-yue, Foley, & Loi, 2005). Role stressors can be divided into three types that are: role overload, role conflict and role ambiguity.

2.2.1 Role Ambiguity

Role ambiguity occurs when an individual does not have clear information about the expectations of his or her role in the job or organization (Rizzo, House, & Lirtzman, 1970).

Role ambiguity could be measured by investigating the amount of information provided to him in relevance with his or her job. It may occur either due to role of employee at organization or just because of surrounding or organizational culture around him (Bedeian & Armenakis, 1981). A person becomes doubtful when he does not know his legal limits at his workplace that affects his as well as organizational performance. there are two perspectives of role ambiguity; one related to the personal or role tasks and activities needed to accomplish goals while the other is considering with the other is concerning with feedback for his performance (Fisher & Gitelson, 1983).

Insufficient knowledge for fulfilling the organizational rationales may be termed as role ambiguity (Luthans & Thomas, 1989). And this is due to poor flow of communication among supervisors and subordinates or employees' inadequate training and unclear role expectations. Furthermore role ambiguity has positive relationship with cyberloafing (Blanchard & Henle, 2008).

H₆: Role ambiguity has an impact on cyberloafing of employees.

2.2.2 Role Overload

Work overload is being presented as imbalance in the requirement of task, and the time allowed and at the availability of resources to fulfill the task requirements (Rizzo, House, & Lirtzman, 1970). This problem of work overload is faced when the work role of an employee is followed by more work, shortage of time, sharp deadlines coupled with less resources required for the performance of duties, the tasks due and the work role related responsibilities (Glazer & Beehr, 2005). Studies show that role overload does not directly cause the employees to cyberloaf but it's the internet experience that moderates the relationship between role overload and cyberloafing (RuningSawitria, 2012). Furthermore in another study it was seen that role overload does not force employees to involve in cyberloafing whereas other kinds of role stressors (role ambiguity and role conflict) do (Blanchard & Henle, 2008).

H₇: Role overload has an impact on cyberloafing of employees.

2.2.3 Role Conflict

“Role conflict refers to the incompatibility in communicated expectations that impinge on perceived role performance.” (Rizzo, House, & Lirtzman, 1970). Like role overload, role conflict also influences employees in many ways. (Rizzo, House, & Lirtzman, 1970) in their study demonstrated that role conflict and role ambiguity are two constructs negatively correlated with each other and job outcomes. These two concepts of role stressor are discussed together in various researchers and found to be significantly related with productivity, employee turnover frequency and absenteeism (Onyemah, 2008).

Employees are more willing to cyberloaf when they feel that there exists role conflict. When the employees are not clear about

their duties and tasks or when they donot aware of the procedure necessary to accomplish these tasks they cyberloaf to avoid this role stressor (Blanchard & Henle, 2008). Moreover a study conducted on all three types of role stressors and cyberloafing shows that role conflict and cyberloafing has direct positive relationship among them (RuningSawitria, 2012).

H₈: Role conflict has an impact on cyberloafing of employees.

III. METHOD

3.1 Sample

The purpose of this study is to examine the impact of job characteristics and role stressors on cyberloafing. In order to obtain data, questionnaires were distributed to 325 employees of Pakistan Telecommunication Company Limited (PTCL) in Lahore by using convenience sampling technique. Out of 325 distributed questionnaires 289 were used for further investigation purpose. Response rate was 89%. The summary of demographics description is revealed through table 1. An examination of the demographics shows that respondents were qualified enough to understand the phenomenon under study.

3.2 Data collection

Data was collected through personal links and visit to the offices of PTCL in different regions of Lahore. The questionnaire based on 5 Likert scales (1 = strongly disagree; 5 = strongly agree), were used.

3.3 Conceptual Framework

According to previous literature review, following model is constructed for the study.

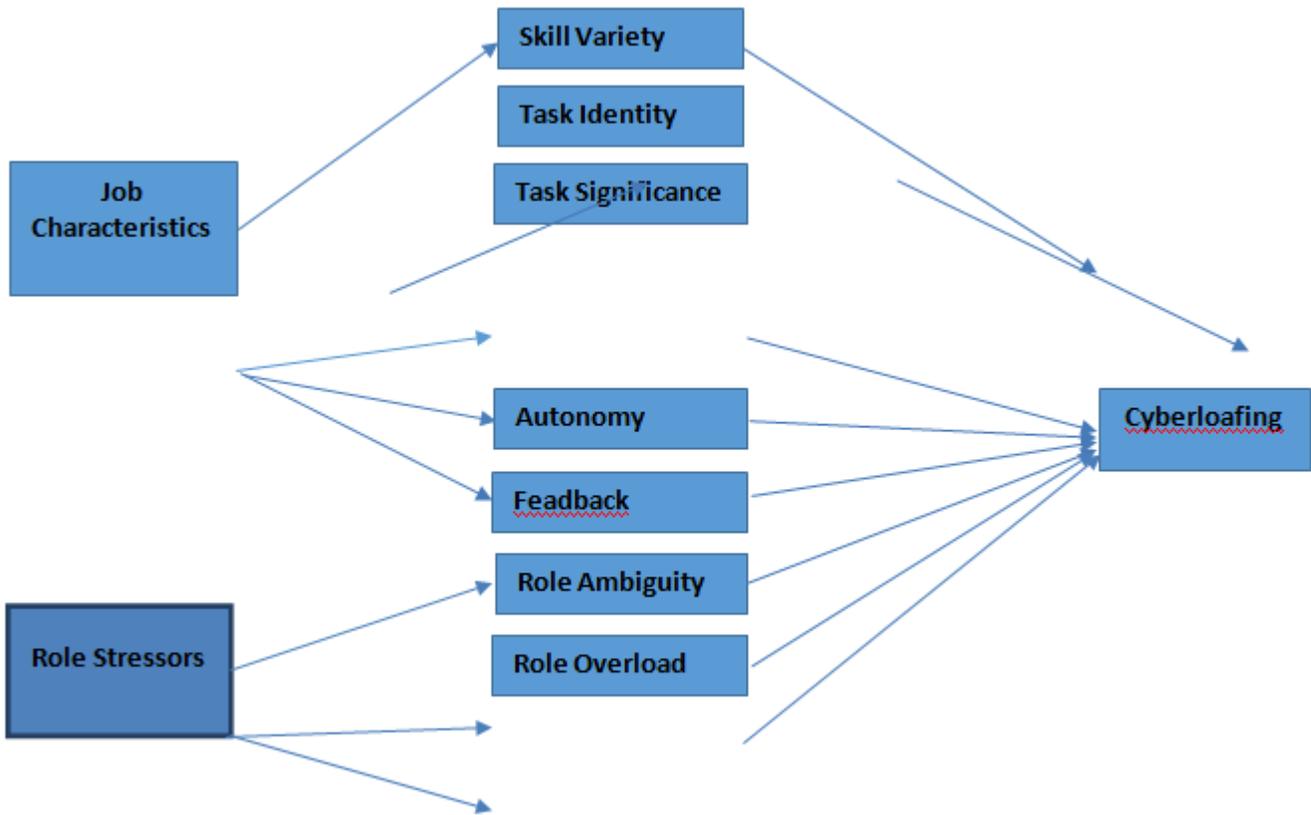


Table 1: Demographic analysis

Factors	Classification	No. of respondents	Percentage
Gender	Male	215	74.4
	Female	74	25.6
Age(years)	20-25	93	33.2
	26-30	126	43.6
	31-35	32	11.1
	36-40	13	4.5
	Above 40	25	8.6
Job tenure(years)	Below 1	104	36.0
	1-5	135	46.7
	6-10	33	11.4
	Above 10	17	5.9
Job position	Manager	206	71.3
	Non manager	83	28.7
	1-3	111	38.4

Internet usage	3-6	107	37.0
hours	6-9	45	15.6
	Above 9	26	9.0

3.3 Measure

Excluding demographics the responses against the variables are taken by using five point Likert scales (1 = strongly disagree; 5 = strongly agree), with items coded in such a way that higher score shows the high amount of understudy variables.

3.3.1 Cyberloafing

Cyberloafing which is the dependent variable of the study was measured by using the scale of (Blanchard & Henle, 2008), which consist of 17 items ($\alpha = 0.931$) including sample items “send non-work emails”, “visit news site”, “download music” etc.

3.3.2 Job characteristics

Five dimensions of job characteristics including skill variety, task identity, task significance, job autonomy and feedback were measured through adopting the scale of (Johari, Mit, & Yahya, 2009). This scale consist of two items ($\alpha = 0.852$), two items ($\alpha = 0.857$) of task identity, two items ($\alpha = 0.864$) of

task significance, two items ($\alpha = 0.897$) of job autonomy and three items ($\alpha = 0.928$) of feedback.

3.3.3 Role stressors

Role stressors are divided into three types, which are measured through adopting the scale of (Vanishree, 2014). This scale consist of five items ($\alpha = 0.849$) of role ambiguity, role overload has five items ($\alpha = 0.849$) and role conflict has four items ($\alpha = 0.748$).

IV. RESULTS

The results of means, standard deviations and correlation analysis for the current study variables are shown in table 2. Internal consistency of the scale was 0.726. All of the correlations were in the predicted direction and each variable is correlated with cybreloafing with significance level of 0.01. For example, skill variety is negatively correlated with cybreloafing and role ambiguity is positively correlated with cyberlaofing with significance level of 0.01.

Table 2: Descriptive statistics and correlation analysis among the variables of the study

	Mean		1	2	3	4	5	6	7	8	9
1 Cyberloafing	3.77	.7654	1								
2 Skill variety	2.18	1.077	-.723**	1							
3 Task identity	2.19	1.094	-.703**	.962**	1						
4 Task significance	2.19	1.082	-.691**	.946**	.976**	1					
5 Job autonomy	3.80	.9963	.614**	-.651**	-.634**	-.620*	1				
6 Feedback	2.20	1.110	-.663**	.828**	-.837**	.829**	-.667**	1			
7 Role ambiguity	3.85	.9026	.870**	-.688**	-.678*	-.660**	.699**	-.646*	1		
8 Role overload	3.71	.8498	.628**	-.631**	-.611**	-.596**	.492**	-.541*	-.581*	1	
9 Role conflict	3.66	.7464	.714**	-.697**	-.689**	-.684**	.569**	-.613*	.660*	.772*	1

* p < .05.
** p < .01.

We conducted multiple regression analysis, for this purpose all dimensions of job characteristics and all types of role stressors are entered to test the main effects on dependent variable i.e; cybreloafing. Results of the multiple regression analysis are shown in table 3.

Table 3: Multiple regression analysis

Coefficients					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.383	.231		5.992	.000
Skill variety	-.167	.071	-.234	-2.342	.020
Task identity	.112	.101	.160	1.105	.270
Task significance	-.029	.087	-.042	-.338	.736
Job Autonomy	-.079	.031	-.102	-2.551	.011
Feedback	-.051	.035	-.074	-1.442	.151
Role Ambiguity	.579	.036	.683	16.016	.000
Role overload	.039	.038	.043	1.025	.306
Role conflict	.165	.049	.161	3.389	.001

a. Dependent Variable: Cyberloafing

Hypothesis 1 which states that skill variety has an impact on cybreloafing was supported by the analysis ($\beta = -.167, p < 0.05$). This shows that skill variety has significant impact on cybreloafing which is consistent with the previous studies of (Jian, 2013). Hypothesis 2 according to which task identity has an impact on cybreloafing was not supported by our study ($\beta = .112, p > 0.05$). Hypothesis 3 states that task significance has an impact on cybreloafing, this hypothesis is also not supported by the study ($\beta = -.029, p > 0.05$). This result indicates that there is no significant impact of task significance on cybreloafing. Hypothesis 4 is supported by the study which shows that there is significant impact of job autonomy on cybreloafing ($\beta = -.079, p < 0.05$) same as the results in previous findings of (Jian, 2013). Hypothesis 5 stating that feedback has an impact on cybreloafing is not supported by the current research ($\beta = -.051, p > 0.050$), which means feedback is not one of the significant predictor of the cybreloafing. Hypothesis 6 was strongly supported by the study ($\beta = 0.579, p < 0.01$), this indicates that role ambiguity has significant impact on cybreloafing. This result matches the results of previous study of (Blanchard & Henle, 2008). Hypothesis 7 which states that role overload has an impact on cybreloafing, it is also not supported by the current study ($\beta = .039, p > 0.05$). Hypothesis 8 stating role conflict has an impact on cybreloafing was supported by the results of the current research ($\beta = 0.165, p < 0.01$).

The results of the multiple regression analysis can be summarized as follows:

$$Y = 1.383 - 0.167x_1 + 0.112x_2 - 0.029x_3 - 0.079x_4 - 0.051x_5 + 0.579x_6 + 0.039x_7 + 0.165x_8$$

Where Y= Cyberloafing, x_1 = skill variety, x_2 = task identity, x_3 = task significance,

x_4 = job autonomy, x_5 = feedback, x_6 = role ambiguity, x_7 = role overload,

x_8 = role conflict.

V. DISCUSSION

The new emerging kind of loafing that is studied in this study (cybreloafing) is taking high consideration near the higher authorities of the organizations. There are many studies in which factors that cause cybreloafing are being studied. In this study five core values of job characteristics and three main types of role stressors are studied in order to determine the factors that are predictors of cybreloafing and those which are perceived to be important in cybreloafing. Results of the study showed that all of the five core values are correlated with the cybreloafing. Out of these five values skill variety has significant negative impact on cybreloafing. This means more a job's requirement is to have variety of tasks less the employee will be inclined towards

cybreloafing. Job autonomy has significant positive impact on cybreloafing. An employee who is free to perform his duty according to his own way or schedule his tasks according to his own priorities is tends to indulge in cybreloafing more. All three types of role stressors showed positive correlation with cybreloafing. Role ambiguity and role conflict has significant positive impact on cybreloafing whereas role overload does not show significant impact on cybreloafing. Conclusively, it can be summarized as that all the under studied core values of job characteristics and all types of role stressors are predictors of cybreloafing but skill variety, job autonomy, role ambiguity and role conflict are significant predictors of cybreloafing.

VI. LIMITATIONS

Like most of the other research, our research also has some limitations. As our data were cross sectional in nature so it is less generalizable because it is possible that an employee who is facing the problem of role conflict or role overload may not have it in future. Sample was selected randomly and convenience sampling technique was used so this study could produce more reliable results if sample is selected by stratified sampling.

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An Insight into Naipaul's Africa in *A Bend in the River*

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Abstract- V.S.Naipaul's *A Bend in the river* talks of Africa in four parts: The Second Rebellion; The New Domain; The Big Man and Battle. In all the parts, he basically reflects the rebel and the conflict which goes on in the minds of the Protagonist, which can be generalised to the Africans and the outsiders. The fiction starts with the thought that "the world is what it is; men who are nothing who allow themselves to become nothing, have no place in it (p.3). The narrator—Salim, an ethnically Indian Muslim was a long resident on the coast of Central Africa. He talks about post-colonial time-- the time of independence when life was not easy, and Africa have had its own troubles. He talks about a 'Town' in the interior--at the bend in the great river, whose existence had come to a standstill. Naipaul talks of this town as a natural meeting place-- for people, and do the trade.

Just like Conrad's *Heart of Darkness* which does not mention the name of the river, Naipaul also does not mention the name of the river or the town at its bend. But some feel that he may have referred to the Kisangani on the Congo River. Irving Howe in *Dark Vision* in The New York Times says that there can hardly be a writer alive who surpasses V.S.Naipaul.

I. INTRODUCTION

The narrator shows corruption as a predominant feature of Africa. He talks of 'few more bank-notes', 'more of my tinned food' settle for 2 or 3 dollars instead of 21 or 3000 dollars. He depicts 'Africa' of chaos, bankruptcy, disruption, and frustration, and admits that: too many of the places on the way have closed down or are full of blood.... And then I had to talk even harder, and shed a few more bank-notes and give away more of my tinned food, to get myself--and the Peugeot--out of the places I had talked us into(p.3). The narrator's despair becomes quite prominent when he talks of the despair, the disillusionment which he experiences in Africa:

As I got deeper into Africa--the scrub, the desert, the rocky climb up to the mountains, the lakes, the rain in the afternoons, the mud and then, on the other, wetter side of the mountains, the fern forests and the gorilla forests....There can't be a new life of this(p.4).

Salim compares his journey in Africa with the strange journey of the slaves. He finds it similar to the experience they had and says that the more they got discouraged and frustrated with the journey they made on foot, and in the opposite direction, from the centre of the continent to the east coast, the more they became interested to accept their new life instead of running back home. Salim emphasizes the town-- *at the bend in the river*, which was more than half-destroyed. He shows that gradually as the Africans began coming back to the town, the demand went up and the business flourished. The narrator talks about Zabeth--one of her regular customers, and her difficult ordeal. For her

Africa symbolised hard life--a real life which she did not want her son--Ferdinand to accept. She wanted him to be in association with the Narrator so as to learn the mannerisms of a foreigner. Naipaul throws light on the culture of the Africans:

Beer was part of people's food here; children drank it; people began drinking from early in the morning....women slept with men whenever they were asked; a man could knock on any woman's door and sleep with her(p.44).

The narrator talks of post-colonial Africa as a dead civilization. He highlights the devastated town which was at the corner of the river:

...; the streets had disappeared; vines and creepers had grown over broken, bleached walls of concrete or hollow clay brick.... The ruins, spreading over so many acres, seemed to speak of a final catastrophe. With its ruins and its deprivations Nazruddin's town was a ghost town (p.29-30).

In Africa, the Narrator talks of men who were considered to be prey--the victims made by other people, who were more powerful. The slaves made their entries into the house just like children--who screamed, stamped and sulked which was a usual site on the coast. He depicts Africa as a place where brutal killings was a common site. The bleeding arms and legs lying on the streets was a common site. It was as if a pack of dogs had got into a butcher's stall (p.36).

The narrator, though a bachelor, became a custodian of two boys--master of Metty and guardian of Ferdinand. He characterizes African living style by stating that they never learnt how to spend money wisely and keep their households. The narrator also states that he himself owned a shop which was no less than a sea of junk with buckets, plastics, tyres, oil lamps scattered on the floor. As junk gave him livelihood he had to have some respect for the same. "As soon as you opened the landing door you got the warmed-up, shut-in smell of rust and oil and kerosine, dirty clothes and old paint and old timber. And the place smelled like that because you could not leave any window open (p.46)". Salim expresses his desolation and loneliness in life. He feels that he could not do any worth in life, that his life was similar to that of Ferdinand and that his thoughts took him to the places where he did not want to be. Often he felt that everything he possessed was worthless--the Paintings, the books, the magazines, everything was a junk which made him feel frustrated with his life. Though he had come to the town which was at the bend in the river, to make fortune, it only gave him gloomy nights. He feels all the more miserable when he thinks of 'the Americans', 'the White People', and 'Europeans', who were makers of big things; who were scientists; who were no less than gods. The narrator, a young man from an Indian family, could find no difference between his life and the life of the Africans. Both were without any aspirations, without any support and purpose. This depression made him feel that all the physical things were useless and futile. He could feel that the paintings

and the books and the magazines were of no worth. Now no book of Science and knowledge could inspire him, could do magic and change version of his life. The communication gap which reflected a second rebellion in Metty and Ferdinand who were not interested in knowledge of new things shows the pace of African life. As Ferdinand was a lycee boy, the more he thought, the more confused he became. The narrator feels that in Africa, it was easy for an individual to adjust if he remained primitive and without technical skills. He feels that even if Africa at times became peaceful, the men have to be feared, as one always tried to trap others just as a cat chases a bird. The author depicts Africa in a state of anarchy, with no rules and regulations, where corruption had become a culture. Chinua Achebe-- one of the most famous African author, also characterizes Africa in a similar way. But Naipaul compliments Africa when Salim says that:

I knew that the slave people were in revolt and were being butchered back into submission. But Africa was big. The bush muffled the sound of murder, and the muddy rivers and lakes washed the blood away(p.60).

Naipaul by quoting Ferdinand's example of being educated and having difficulty in adaptation to civilization seems to generalize the statement that the more educated the person was in Africa, the more confused and baffled he was, with his mind full of junk. Just like Francis Bacon-- the father of English Essays, who about 'Reading Books' says that, Some Books need to be tasted, some to be chewed and digested, and some need to be swallowed; in the same way the Narrator says about the Africans that in Africa, some men were to be feared, with some it was necessary to be servile, and some people need to be approached differently as they always set trap for others. Just like Chinua Achebe-- the renowned African writer, Naipaul talks of Corruption which had become the African culture which meant, "Don't harm me, boy, because I can do you greater harm" (p.65). Achebe had beautifully described the masks and the carvings exhibiting the African culture, likewise Naipaul talks of masks and carvings of religious quality without which he feels that the things were dead and with no beauty.

The narrator talks of the chaos and anarchy that prevailed in Africa--of the war around them, of the ambushes on roads, of the villages attacked, of the headmen and the officials being killed. He feels anxious of the crazed and half-starved people against whom the guns were going to be used. The schools were not safe, the students were not safe. The soldiers were retreating showing a situation of lawlessness. But the narrator supports the Africans by saying that even the raggedest of them had their villages and tribes, they could run to their secret worlds if terrible things occurred. The Africans knew how to cope with all worse situations with no regrets in life. Ferdinand and Metty have been shown as the two characters who reflect the second rebellion. Ferdinand sobs saying that he never wanted to be in town and study in lycee. People's fear has been described at several places who deputed many slaves in their place. The Europeans went away but some soldiers came to the village who began to behave badly. The army was reorganised in the capital by the President. But the rebellion was on-- the war was on between the army and the rebels:

The rage of the rebels was like a rage against metal, machinery, wires, everything that was not of the forest and

Africa....the rage of simple men tearing at metal with their hands(91-92). Naipaul then talks of the New Domain where in Africa the things were a bit improving. "After each setback, the civilization of Europe would become a little more secure at the bend in the river; the town would always start up again, and would grow a little more each time. In the peace that we now had the town was not only re-established; it grew"(p.99-100).Naipaul seems to express the plight of Indians in Africa whose condition was no less than ants. Just like ants do complicated things, same way they did complex things, without expecting the rewards. Their efforts may go waste, may smash up, and others would replace them. Though quite painful, had to persist like ants do. The new domain brought new intelligence and new energy and new confidence which came with order and money. It has reflected the change and the development taking place in the town which was at the Bend of the river. The new cities were being built, many new buses and taxis could be seen, new telephone system revolutionised the area. It became the trading centre for the region. Naipaul sarcastically remarks that they owed all progress to the 'Big Man'-- the white man who ruled over Africa. Poaching of ivory, gold and slaves which was the feature of oldest Africa could be seen again. Naipaul shows the transition--the change which could be felt by the people of the bush.

"... in those days. We felt that there was treasure around us, waiting to be picked up. It was the bush that gave us this feeling. During the empty, idle time we had been indifferent to the bush; during the days of the rebellion it had depressed us. Now it excited us--the unused earth, with the promise of the unused(p.109-110).But the isolation and the desolation could be seen in human life as the narrator says that the stillness of the place-- the flat, the shop, the market, the bars, the river, the dugouts, gave him a feeling of stagnation--a place without further human promise. The development was rapid. The copper money was flowing in, the prices were rising symbolising growth and prosperity. The President was creating Modern Africa--a miracle that could astound the Rest of the world. "He was by-passing real Africa, the difficult Africa of bush and villages, and creating something that would match anything that existed in other countries"(p.116).But to the contrary, the narrator started developing hostility for the place--the bedroom, the foam mattress ,the window panes, the clothes, the shoes, the kitchen, the sitting room. Even he became desolate with everyone. Ferdinand and Metty, too became preoccupied with their anxieties. Like Chinua Achebe, who talked of colonisation of Africa, of Things falling apart, Naipaul also talks of culture causing rift in people. When the narrator enters a building, he feels offended:

...in my dark suit and my university tie,...I was entering a London building, an English building.... For the first time in my life I was filled with a colonial rage....a rage with the people who had allowed themselves to be coralled into a foreign fantasy (169). Later on Salim is caught in a post-imperial chaos when Ferdinand asks him to flee for his life, "It's bad for everybody. That's the terrible thing. It's bad for prosper.... We're all going to hell, and every man knows this is his bones. We're being killed. Nothing has any meaning (p.319). The fiction seems to end on a optimistic note that the steamer moves away from the area of battle--Africa, with no one chasing the saviours.

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Re – Thinking Pastoral Resource Conflict Persistence Through the Lens of Marginalization: The Case of the Pokot and Karamojong Since 1894

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Abstract- Banditry is one of the biggest security challenges currently facing Kenya and East African sub-region. The practice is creating great concerns and has resulted into loss of human lives, stealing livestock, destruction of property and dislocation of populations. The thrust of the paper is, rustling and banditry has contributed to a state of violence and lawlessness thus creating insecurity and threatening lives of the residents. The availability of weapons in the hands of bandits has not only contributed in fueling instability, lawlessness and conflict but also pose a threat to sustainable development. Geopolitical issues that wrap together poverty, political instability and lawlessness. The states are found caught up in the whole issue to provide effective control leaving the perpetrators to have a field day. The scenario is given impetus by the fact that bandits have transformed their operations becoming more sophisticated, militarized and destructive. The rapture of the vice is traceable through colonialism and post colonial period. In the concluding reflection measures are recommended for the governments to eradicate the problem.

Index Terms- Cattle raids, rustling, banditry, Marginalization, Kenya, Uganda, North Eastern and West Pokot frontier.

I. HISTORICAL BACKGROUND: LEGACY OF COLONIALISM

The historical event which culminated into the actual arrival of colonial rule in eastern Uganda and western Kenya was the declaration of the British protectorate over Uganda in 1894 and Kenya in 1895 (Kwamusi,1996). This was in fulfillment of the Anglo-German Agreement of 1890 (Heligoland treaty) in which Uganda became a British sphere of influence (Entebbe archives, 1901). At this time, western Kenya formed part of the wider region of eastern Uganda. Consequently, it was the 1894 declaration that ushered in British imperialism in Karamoja and Kenya thereafter. This led to significant administrative changes through the imposition of British imperial authority over the various communities in the region.

The colonial officer's perceptions and Act of Marginalization

Right from 1894, the early British Colonial Officers in Kenya and Uganda had intolerant ideas and views about West Pokot and Karamoja. For instance, William Grant, Hesketh Bell and Colonel Colville (the British colonial officers in Uganda) described northern Uganda and Kenya as areas where the British will only fritter away their resources without any reward

(National Archives Entebbe, 1902). Consequently, the extension of the British imperialism into northern Kenya and Uganda took a gradual process that was completed much later than was the case in the southern regions.

According to Ogot (1968) and Kabwegyere (1981), these areas were perceived as marginal in two main ways. First, they are dry and sparsely populated and thus did not strike the British as regions that could offer any economic value. For instance, when the new British Commissioner to Uganda Hesketh Bell visited the regions in 1906, he was not impressed by both northern Uganda and North western Kenya describing them as regions with little or no promise of successful development. He said, "I cannot think of a single product that might be grown here which will pay for the cost of carriage to the seaboard." (National Archives Entebbe, 1910). Second, the inhabitants of the regions particularly the Pokot and Karamojong were perceived by the colonizers as uncivilized, war like, and hence had little to contribute to the development of their areas.

In most cases, they were unwilling to submit to colonial authority. Therefore, in the colonizers' view, the two northern areas only offered heavy expenditure without any economic reward. Besides, their decentralized and small scale political organization did not impress the British at all. As Barber (1968) puts it,

"No tribe in northern Kenya and northern Uganda had an effective Central political leadership to make it powerful enough to capture attention of the British. At best, they were seen as potential threats to British interests and as potential allies to share the burden of administrative expansion." p86.

The point to note here is that the change of guard where Lord Lansdowne succeeded Salisbury at the Foreign Office in London also came with a change of heart and policy on the British expanding to the north. On the same note, James Hayes Sadler who succeeded Sir Harry Johnson and Fredrick Jackson as the new Commissioner in Uganda had favoured Johnson's policy of expansion but was forced to abandon it very quickly due to opposition from London. Likewise, the British East African territory which bordered north east Uganda had little or no British activity (Ingham, 1957). For instance, Sir Charles Elliot who was commissioner in British East Africa between 1900 and 1904 had mixed feelings about expansion. With the exemption of the administrative post at Lake Baringo also known as "the place in the wilderness," Eliot never advocated for expansion for its own sake or administering an area because it is there Barber

(1968). He vividly expressed this when he wrote to Lansdowne saying that,

I am convinced that it is useless to spend lives and money on subduing the barbarous inhabitants of barren deserts... not unless it is absolutely necessary to protect our borders to allow the general movement of the protectorate not to be retrogressive (KNA, FOCP 1906).p46.

In effect, what Eliot had in mind was that given the fact that northern Kenya and northern Uganda had little if any economic value, they could only be brought under British control if there was external threat to the borders and for easy movement of the British officials and perhaps troops. Consequently, British activities in northern Kenya and northern Uganda were marked by a fierce opposition. For instance, by 1905, the position was still the same as Sir Donald Stewart, Eliot's successor in British East Africa had London's policy confirmed to him in a dispatch which read,

It is not the policy of His Majesty's Government to extend their practical administration over the remote parts of the protectorate until it is thoroughly consolidated around existing centres and stations as the advantages of getting small tax is not commensurate with the risks and expenses which such expansion would entail (K.N.A FOCP 8357,1904).p2.

However, as time went by, it became necessary for the British to extend their control in the areas north of Elgon and between the Nile and Lake Rudolf which is now Lake Turkana. This was in accordance to Johnson's view that expansion to the north was in itself desirable. On his part, Sadler had expressed the same view but stated that it should only be undertaken if it could not be avoided (KNA, 1906). It was not until there were ethnic based wars and constant attacks on the British officials by the Suk and Karamojong, the people referred to as 'quasi civilized', that the British made their control felt by pacifying them. The point to note here is that right from the beginning, the British imperialism in northern Kenya and northern Uganda was marked by poor relationship between them and the local people. This arose from the mistrust and how they perceived each other. To the Pokot and the Karamajong, the British were viewed as intruders or (*Ngiserukale*) in Karamojong out to interfere by maligning them in the context of entrenching their political authority and their way of life. To the Pokot and Karamojong, this was un-acceptable hence vehemently resisted. On their part, the British colonizers perceived the Pokot and Karamojong as pockets of disgruntled "primitive" people trying to resist the British "superior civilization" that had been "accepted" by the majority. It was for this reason that the two communities engaged the British colonial authority in persistent wars.

Despite the fact that the Pokot and Karamojong were perceived as primitive, their regions were gradually incorporated into colonial Kenya and Uganda respectively. For instance, in 1897, the British were compelled to abandon their halfhearted policy of occupation of East Africa. This was after the Sudanese troops, presented their grievances of low pay at Eldama Ravine in the Kalenjin territory, inadequate, and delayed basic needs to Macdonald who was a British official in the area (Karugire, 1980). When their grievances were not settled, they killed three British officials on their way to Buganda with the intention of toppling the British and establishing themselves as rulers of the region. According to Karugire (1980), the British only managed

to defeat the Sudanese in 1899 after receiving assistance from Nabongo Mumia and Nandi mercenaries when he stated that "the idea to ask for reinforcement from Mumia and the Nandi came about after it emerged from the British colonial circles that the Sudanese could easily team up with the 'war like' communities of Pokot and Karamojong". To ensure that the British remained in control of northern Kenya and northern Uganda, Colonel Colville who was in charge of the colonial administration in Uganda, dispatched Velvet Spire in 1894 to establish an administrative post in Mumias and Karasuk (Ochieng, 1986). The setting up of administration posts in Mumias and Karasuk areas was purposely for opening up the Kavirondo and the turbulent Rudolf region even though they were perceived as areas with little or no economic significance to the British. However, the major turning point in the colonial government's attitude to the Pokot and Karamojong regions was in the years after 1900. This was prompted by fighting in the region. First, was the colonial government's report of 1900, which revealed the fierce ethnic fighting to control the lucrative ivory trade that had been on going in the region (National Archives Entebbe, 1910). This report indicated that the British interest in the two protectorates was under intense threat from the Ethiopian Emperor, the ivory hunters as well as from the fighting communities (National Archives Entebbe, Doc No. 106). Consequently, a touring officer was appointed by the acting Governor of Uganda Stanley Tomkins to check on Ethiopian intrusion and poachers in Karamoja and Turkwell South of latitude 30⁰ N. The officer had the duty of controlling ivory trade as well as to enter into negotiation with the northern communities to stop their ethnic conflicts as it had been observed by the colonial authorities that they persistently raided each other all year round.

The Ethiopian threat to the British was made real when, in 1891, Emperor Menelik sent a circular letter to the European powers (Britain included) declaring that he intended to extend his empire to its traditional limits of Khartoum in the west and Lake Victoria in the South. This was confirmed by Sir Rennell Rodd who had been sent by the British government in 1898 to negotiate with Menelik when he wrote to Salisbury: "I am convinced of the fact that Menelik is straining every effort to bring under his sway all the countries he lays claim to in his proclamation of 1891" (National Archives Entebbe, A106). It is important to note that Menelik's claim and threat went into the years after 1900. It was this that compelled the colonial government to change its policy of 'concentration' or keeping the British occupation to the more "economically viable" south to that of "expansion" into the north.

Subsequently, Governor Fredrick Jackson in 1902 extended the British authority and control in Karamoja and Rudolf areas by sealing the administrative loopholes and vacuum that were initially exploited by poachers and Menelik's forces. In 1903, Jackson reported that the entire country lying West of Lake Rudolf and for some distance South is continuously swept by raiding bands of Abyssinians or Ethiopians and this had to be stopped (Barber,1968). From this time onwards, the colonial government then viewed the North more positively as a source of revenue though not for a long time. This was because most fortunes from ivory trade went to individuals and not to the government. Besides, the colonial government could not rely on

revenue from ivory as the elephants had been depleted through destruction by poachers.

Second was the prevalence of inter-ethnic raids, which forced the colonial government to change its attitude towards the pastoral communities in the region. The emphasis was then not how economical the region was to the British but how effectively the areas could be put under British control. This came about after reports were made about the ethnic fighting in the area. For example, in 1903, T. Grant, an administrative officer in Karamoja reported tribal raids for goats, cattle and sheep and in 1906, H. Rayne, a police officer, made a full report of the unlawful activities in the area. In 1908, Lieutenant Fishbourne also wrote about the people living in northern Uganda and northern Kenya stating that though they are “excitable, they like interfering and fighting” (National Archives Entebbe correspondence file No.32/10, 1911). The point to note here is that the colonial governments in Kenya and Uganda did nothing to end cattle raids and inter community fighting except for 1919. In 1919, the only attempt to curb or probably end the incessant inter-ethnic wars in Northern Kenya and Uganda, the colonial government called for a peace conference in Karamoja (Gulliver, 1955). It involved elders and chiefs from Suk, Karamojong, Turkana and the Bantu and Nilotic elders from Bukedi (National Archives Entebbe, No. A46/871). However, this conference failed to achieve its objective of bringing harmony between the hostile communities particularly between the Pokot, Karamojong and Turkana. Two reasons have been advanced for the botched conference. According to Mkutu (2008), the first reason for the failure of the conference was the fact that the colonial government lacked viable alternatives to cattle raiding and commitment to African livestock development. He argues that the latter was vehemently opposed by the colonial government due to the competition it was imagined it would offer to the white settlers. Now, the white settlers were the colonial administrative partners in revenue generation for the colony. As such, the development of the African livestock sector as a way of ending cattle raiding and the insecurity that it caused was regarded by the colonial government as a “minor factor” in their development agenda. In fact, they were comfortable with the status quo.

Karugire (1980) argues that the second reason was the use of administrative variant of chiefships as the full-blown village based despots. The chiefs were meant to replace the council of elders in the case of stateless societies like the Karamojong and the Pokot. In Uganda for instance, chiefships were only instituted in communities that could not adapt the *Kiganda* model of political administration which the British had wanted to export into all parts of the protectorate (Karugire, 1980). The *Kiganda* Model had received a lot of accolades from the colonial administration as probably the most viable and cheapest political organization as compared to the decentralized system. To the British colonial administrators, the latter was defined in terms of what political institutions they lacked rather than in terms of how they organized their political life. Consequently, the Pokot and the Karamojong systems of governance, which fell in this category, did not strike the colonial officials as appropriate for collective presentation of law and order, administration and the protection of human rights among people.

The British use of indirect rule with local chiefs as their main instruments of administration in East Africa Protectorate and Uganda only epitomized their politics of manipulation and division in these areas. As a result, the appointed chiefs were an integral part of the new system of alien rule but were hated, ridiculed and rebuked by their subjects. This kind of situation was caused by the fact that the colonial authorities in Kenya and Uganda had mandated the chiefs to undertake administrative and executive functions for which there was no precedent in their ethnic organizations. Cases in point were, first, when they presided over judicial cases in the villages, a privilege that was accorded only to the elders’ *po* in the case of the Pokot. Second, was when they forcefully carried out the colonial government’s disarmament order on their subjects. This came about after the British signed the Brussels Arms Regulation Treaty in 1890. Consequently, the British colonial governments in the two protectorates implemented what became known as the firearms ordinance in 1903 as a way of fulfilling the Brussels Treaty (National Archives Entebbe, 1911). Therefore, the 1903 firearms ordinance permitted the colonial chiefs to disarm the Karamojong and Pokot to what these locals referred to as an ‘acceptable level’.

The worst scenario was that the chiefs acquiesced the new political arrangement to exacerbate division in West Pokot and Karamoja areas (Mamdani, 1996). Besides, the chiefs retained their firearms as they maintained a monopoly of force in northern Kenya and north Eastern Uganda. A church leader from Alale indicates that in contrast to what was expected, the chiefs used their firearms as instruments of vengeance on their old and new rivals and not for ensuring peace and order. As such, the colonial disarmament in Karamoja and West Pokot areas created serious imbalance as not all people in possession of illegal firearms were disarmed and this enhanced rather than curbed the raids and violence between these communities.

The large presence of the colonial chiefs at the Karamoja Peace Conference meant to create harmony between fighting communities only led to failure of the conference even before it commenced. The problem of the acquisition and misuse of small arms in northern Kenya and northern Uganda was due to the European, Swahili, Ethiopian and Nubian incursions into these areas in search of elephant tusks. These foreign traders gave the local people guns to hunt down elephants while others exchanged them with elephant tusks. As a result, almost every community in northern Kenya and northern Uganda that were in contact with these ivory traders became armed with guns, hostile to each other and later to the British. It was this kind of situation that was used to justify the stereotyping of the Pokot and Karamojong as being “war mongers”, yet this was the outcome of their interaction with foreigners such as ivory traders.

Given the fact that northern Kenya and northern Uganda areas largely remained arid or semi-arid, sparsely populated and relatively “volatile” to the British colonizers, between 1902 and 1960 the two regions remained “closed districts” (Zwanenberg, 1975). Consequently, apart from the established administrative and military outposts, who were purposed to pacify the local people, there was little if not nothing in terms of development that the British colonial government did in these areas. In any case, the leaders of the two protectorates and later colonies, Sir James Hayes, William Grant, Charles Elliot, Edward Northey,

Fredrick Jackson, and C.W. Hobley, were all under instruction from the British Foreign Office in London to concentrate on the “economically viable” areas in the two colonies. This kind of situation drew support from a detailed Foreign Office dispatch to the commissioners of East Africa and part of it, which read, “You will bear in mind that in the opinion of His Majesty’s Government, it will not be desirable to push too quickly amongst tribes in outlying districts who have little to offer of commerce and have not yet accustomed to the sojourn of the white man. Such tribes should rather be attracted to larger centres where they will see the work of civilization in progress and begin to appreciate its advantages” (National Archives Entebbe, 1930).

Based on the foregoing, the northern Frontier District of Kenya and Karamoja remained not only peripheral but also marginalized throughout the era of British colonization in Kenya and Uganda. This not only hardened the Karamojong and Pokot ethnic consciousness and belief but also changed their perception both on the colonizers as well as the citizens. The situation was that they considered themselves heroes who were able to block the White man from interfering with their culture or as second rate citizens who were abandoned during the White-man’s development moments.

Consequently, the Colonial government’s position of classifying these areas as either “closed” or “restricted” not only interfered with the ties between neighbouring communities, but also with how these communities perceived colonial administration as well as those of the post independent regimes. It is perhaps this that has led to cross-border incessant raids and rustling that has persisted to date. Due to the colonial marginalization policy, the idea of attracting the peripheral communities to centers of “civilization” or development was self defeating. In addition, the colonial government’s introduction of land tenure system in Kenya and Uganda had far reaching effects on both the Karamojong and Pokot. For instance, the 1954 Swynnerton Plan introduced the concept of title deeds for the first time in Kenya. It was purposely meant to integrate the pastoralists by creating group ranches where the title gave security to each group while circumventing their ability to access pasture (Mkutu 2003). As a result, the creation of group ranches meant confining the Pokot of Kenya to small pieces of land, which was detrimental to their pastoral activities. It also meant that they were to keep only few herds for themselves.

The two regions have remained predominantly pastoralist in orientation like many other parts of Kenya and Uganda. Their economic disparity with other parts in the two countries are discernible poor infrastructure, poor roads in vast areas, inadequate and dispersed health facilities, poor telecommunication services, bad schools and no electricity to mention but a few. The regions seems to be so neglected that one hardly identifies government presence in the remote villages.

The day to day life of the inhabitants of these regions is in reality a tale of constant interaction with poverty and insecurity appears in multiple forms; the incessant conflict with neighbours over land, water and pasture, fear of famine and starvation, fear of destruction and loss of life among many others. In other words, the majority of people in the regions are destitute, poor and lack the means of empowerment.

Although banditry in north-east Uganda and North West Kenya cannot be said to a direct byproduct of British

colonialism, it is important to note, however, that the British divided Kenya and Uganda into three regions. The first were the developed while highlands in Kenya and central Uganda in Uganda were the less developed native lands also providing a source of cheap labour. Lastly, were the frontier or closed districts the frontier or closed districts of North West Kenya and Eastern Uganda. In their quest to carve out the white highlands the British took some of the most arable lands of the Pokot and other parts of the Rift Valley. The Pokot were herded to the more drier parts where their livelihood depend on pastoralist. Other sections in the Rift Valley suffered similar experiences. The British administration did not do much to redress the conditions or those dispossessed. The Pokot and their neighbours henceforth became exposed to conditions of hardships as they came face to face with colonialism. The spread of rustling within this period must therefore be understood to have been resorted to as a coping mechanism by those dispossessed and marginalized. Ocan (1994) has aptly said, as access to land shrunk and population of animals and people increases in restricted areas, it strains on the available resources an the natural response has been to resort to cattle raiding.

Moreover, during the colonial period, the area’s potential in agriculture and livestock development was under exploited while Karamojong and Pokot ethnic communities were socially isolated from the mainstream Kenya and Uganda societies except when used to perform traditional dances for entertaining tourists and visiting government officials KNA (1933). So right from the advent of colonial the two tribes retained a devastating means of conducting organized violence while economic and political isolation of their geographical region during colonization and after provided them with the motive and opportunity Mburu (1984).

The official policy of the colonial state was skewed towards developing settler agriculture. Peasant production and pastoralist played a second fiddle. Frantic efforts were made to discourage the two sector. One such effort was demarcation of tribal reserves which apart from appropriating fertile lands for white settlements also created borders. The borders limited free access to grazing land and water hence creating social conflict among pastoraists. The borders also hindered movement of people and livestock and thus affecting the pastoralists mode of life. Other impediments to pastoralism brought about under colonialism were imposition of market taxes, quarantine laws, destocking campaigns all aimed at depastoralising the communities. The onset of the 19th century witnessed steady transformation within the modes of the Karamojong and the Pokot as they adopted transhumance. The adoption of transhumance came with accompanying problems namely, rise of hostilities among various groups competing over grazing grounds. Moreover the loss of animals during droughts provided justification for raiding to restock the herds.

Northern Kenya and North Eastern Uganda were closed district during the colonial period and were administered by military officers. This had negative effects on the social, economic and political developments of the pastoral communities. Whenever there occurred a raid, the government would send punitive expeditious against the suspect groups. Many human casualties resulted from such expeditions besides loss of livestock through confiscation by the authorities.

Measures taken by the administration on Africans solicited equal measure of resentment against colonial rule.

Since livestock keeping remained the mainstay for the pastoralists, it was prudent that they protect their livestock from wild animals and human thieves. It was necessary therefore for them to be armed. The British perceived them to be warlike and hence a threat to colonial authority. The administration used this perception as a justification to put a close watch over the Karamojong and the Pokot. Perceiving them as war-like was a way of creating an enemy image and using it as an ideological justification for counter aggression Markakis (1993). The myth that nomadic communities are traditionally warlike and aggressive seems to have gained international currency among a section of extreme anthropologists who have studied the role of stock rustling, territorial expansion, ritualized and actual war in pastoral community. They claim that it is through war with neighbours that certain clans gain their identity and sense of being Mburu (1984). An easily observable characteristic of pastoral people is the way they casually but proudly carry offensive weapons around. It is easy to assume that the unusual cultural phenomenon that concern external experts-pastoral warrior clan systems, age grade systems, pride of war traditional raiding are the main reason for the fullblown wars, banditry and breakdown of state law and order and have been characteristic of Africa's arid areas. If this is the case the only way to solve the insecurity problem is to thoroughly change the pastoralist cultures and discarding traditional ways!! Mburu (1984) It was in this light that government officials and their African collaborators believed that the only way to deal with cattle raids and rustling was to use brute force Osamba (1994).

Marginalization in the post independence since 1962

The history of post-colonial Africa is replete with accounts of socio-political and economic conflicts most of which arose from marginalization. The phenomenon of marginalization and conflict have over time been explained largely in terms of old hatred and rivalry between and amongst communities and political parties in post-independence Africa (Nasongo 2000). Of great concern have been the contests between the pastoralists and agriculturalists in what Turton (1994) describes as cattle raiders against the more industrious and progressive farmers.

In Africa, the concept of marginalization and patron client loyalty was actualized by the post –independence leadership who were keen to favour their people as they excluded those they perceived as their opponents. In Kenya and Uganda, this was illustrated by the entrenchment of politics of ethnicity and regionalism in which one-man rule was a characteristic feature of political headship. For instance, four years into independence in Uganda, Prime Minister Milton Apollo Obote suspended the constitution, deposed Edward Mutesa and adopted a new constitutional order with himself as executive president (Mazrui 1972). In a similar way, Jomo Kenyatta (Johnstone Kamau) instituted a series of constitutional amendments that reversed the Majimbo constitution and adopted a republican state with all powers centered in his presidential office (Ghai et al 1970). All these were grounds on which the politics of patron-client loyalty and marginalization were to be perpetuated. From this time hence-forth, state resource allocation and development in Kenya and Uganda depended on how well a region related with the

president. And his political cronies this then marked the point of departure for marginalization in post-independence Kenya and Uganda. The post-independence period in Kenya and Uganda thus replicated the colonial policies while dealing with the Pokot of Kenya and Karamojong. Given the fact that these pastoral communities refused to abandon way of life, the Obote I and Jomo Kenyatta governments continued from where the colonial authorities left by using immense force on the two communities. In Uganda for instance, the Obote I government demarcated part of the Karamoja grazing territory of the Dodoth and turned it into what is today the Kidepo Game Park, hitherto a grazing reserve for the Karamojong (Onyango 2010). Similarly, during the process of demarcating district boundaries, part of the Karamojong grazing reserve was curved out and placed in Teso District (Gatrell 1988). Of great concern to the Karamojong was the new governments' policy of confiscating their cattle as a way of subduing. Yet another concern was the government's implementation of the 1958 Special Regions Ordinance Act 19, which had given the Provincial Commissioner of Karamoja the power to declare any section of the region a prohibited area (National Archives Entebbe, A3/131 1964). The point to note here is that this was only applicable to Karamoja and not any other part of Uganda. For instance, the other pastoral groups such as the Ankole had their area intact yet it was also suitable for the creation of a game park. Besides, it was only the Karamojong area that experienced a loss of territory during the creation of districts.

When the Obote I government implemented the 1958 Special Region Ordinance Act 19, this emerged as the first marginalization policy by the new government on the Karamojong as it did not only delineate Karamoja from the rest of Uganda but also restricted the movement of both cattle and humans in the region. In effect, this legislation expelled all the traders from the district and the result was that the Karamojong became cut off from any form of external contact or influence (Onyango, 2010). In addition, it required that the Karamojong swear peace bonds, which committed them as a group, to ensure that no one amongst them engaged in acts of violence. The breach of this pact through cattle raids would result in the entire community being punished through the confiscation of cattle as a "collective fine" (Republic of Uganda 2007). This measure however did not stop cattle raiding. If anything, oral accounts indicate that it triggered more raids especially across the international boundary that was porous and poorly patrolled. In their view, the bond was only operational within the state of Uganda and therefore did not stop them from raiding across the border and escalating conflicts with the Pokot in Kenya.

Marginalization of the Karamojong was worsened when the Obote I government and other regimes amended the laws in Uganda. For instance, the Karamoja Amendment Act of 1964 was amended by Cap 314 Act of 1970 (Section 241) and repealed by the Special Regions Act (Cap 306) in the 1996 Revised Laws of Uganda (Republic of Uganda, 2006). By and large, the amendment and repealing of Special Regions Act were to prohibit cattle raiding and stealing in Karamoja. In addition, the government looked at it as a way of implementing its laws by providing effective governance. More importantly, the government was out to ensure that armament in Karamoja was put under check and control.

In 1971 when Idi Amin Dada took over power from Obote, the confiscation of cattle and use of force went a notch higher as the military employed brutal methods in dealing with the Karamojong. This was corroborated by an oral account that stating that Amin's army always went after the raiders with excessive brutality and vengeance. A further marginalization of the Karamojong during Amin's reign was witnessed in 1975 when the government passed a decree that changed the land tenure system in Uganda. The decree was that all land in Uganda was owned by the state in trust for the citizens (Mamdani 1996). This meant that all land in Uganda became public land and was, from 1975 henceforth, administered by the state. Consequently, the decree had far reaching effects on the Karamojong as their vast land, which initially was crucial for seasonal trans-humance was taken by the state. In Karamoja, such land was set aside for game parks, forest reserves, mission stations, or administrative centres (Bazaara 1994). The outcome of the decree was the reduction of Karamojong grazing land against the backdrop of increasing human and animal population. This perpetuated the vicious cycle of raiding and counter-raiding as a way of salvaging the region's chronic livelihood difficulties.

The years after Idi Amin was deposed from power saw the worsening of State - Karamojong relations worsen. This was because the different regimes that came to power never bothered to change the longstanding state of marginalization in Karamoja. In any case, they were more prejudiced about the Karamojong's military strength that saw them use a lot of coercive measures on them. For instance, the fall of Amin's government in 1979 saw the Karamojong, more particularly the dreaded Matheniko, re-arm themselves with sophisticated weapons that they looted from Moroto Garrison (Mkutu, 2008). The result was that the Matheniko together with other Karamojong sub-groups were now well armed at the expense of their neighbours hence capable of countering government troops. The wider picture of this situation was the escalation of cross-border resource based conflicts. In addition, the less armed groups took advantage of the security lapse in Uganda during the turbulent period to buy guns from traders as well as rebels and disgruntled army officers (Kwamusi 1996; Mamdani 1996; Mkutu 2003 and Onyango 2010). Convinced that all the regimes in Uganda were prejudiced against them, they now turned to defending their hard earned weapons for security, livelihood, and status purposes. In their opinion, the gun enabled them to maintain their pastoral identity and sustain their livelihood so they had to jealously guard it. The existence of small arms and light weapons in the hands of the Karamojong and their neighbours only exacerbated pastoral resource based conflicts more particularly across borders.

The coming to power of Yoweri Kaguta Museveni in 1986 did not change the Karamoja marginalization situation. Like the previous regimes, Museveni's government began its reign by instituting a disarmament programme in Karamoja. On ascending to power, the National Resistance Movement (NRM) drew up a 10-point programme as a solution to ending the political turbulence in Uganda (Satya 2004). The new regime's 10th point was known as the "Karamoja problem". The main aim of NRM's government was how to integrate the region into other parts of Uganda. They envisaged that this would be done through institutionalized structures of development in Karamoja. Consequently, a Ministry of State in charge of Karamoja

development was formed with a host of other developments lined up like the Karamoja Project Implementation Unit (KPIC) (Republic of Uganda, 1996). The projects were purposely meant to address the unique needs of the Karamoja. Nevertheless, all these existed on paper with a lot of their implementation dogged by corruption. For instance, the Karamojong Development Agency (KDA) which, was created by an Act of Parliament in 1987, was largely known for its failure in Karamoja (Oxfam Report, 2004). Similarly, the Ministry of Karamoja Affairs equally performed below par. This drew support from the New Vision newspaper, November 2009, which read partly that, "Even president Yoweri Museveni is aware of the failure of the ministry a fact that prompted him to appoint his wife (the first lady) to head the Ministry...to at least salvage the Karamoja neglect".

All these numerous ventures failed because of the topdown approach that lacked "township" from the Karamojong. The biggest challenge and major contributor to the failure of this Ministry were numerous. Part of it was on the fact that all its activities were centralized in Kampala, which is hundreds of miles away from Karamoja. The next was that Karamoja, for many decades, had never known any meaningful infrastructural development hence the terrain is ragged making communication very difficult. In addition, the Karamoja problem was further compounded by the fact that the NRM government allocated the Ministry of Karamoja Affairs meager resource that could not facilitate see its smooth operation. This has since left the Ministry cash strapped and unable to respond even to the smallest emergency in the region that is best known for crisis. The fact that there exists the Ministry of Karamoja Affairs, it lacks the structures and the goodwill from the Karamojong and the government to make it realize its goals. In a nutshell, Karamoja has never been a priority for any regime in Uganda including the NRM government. One oral account wonders why the NRM has forgotten about them saying, "We thought this government (NRM) was for us. We supported them while they were in the bush fighting Obote II and Okello. It is a pity they have turned their backs on us as the situation is now worse than bad."

This oral account reflects the levels of neglect and marginalization of Karamoja by the Museveni government. The worst of the situation was from the end of 1980s when the NRM government decided to arm militia groups in Karamoja as a strategy of fighting off the Lord's Resistance Army insurgents in northern Uganda (Satya 2004). As a matter of principle, this was to help them contain any rebellion in Karamoja as they policed the region. However, in practical terms, the government ended up drawing more actors into the crisis, which has contributed to the runaway insecurity and subsequent marginalization of the region. Unlike central, western, and southern Uganda that enjoys the government's goodwill through the provision of modern infrastructure, administrative facilities, and other social amenities, such facilities are only scattered in Karamoja. The few roads, schools, health facilities, government offices and security machineries in Karamoja are in a deplorable state.

In Kenya, the marginalization of the Pokot by the Jomo Kenyatta government was not any different from the Karamojong case in Uganda. As a concept, marginalization came from the fact that the African leaders in Kenya were conditioned by the

years of exposure to the colonial government whose legacy of marginalization they carried on. This was so because the KANU leadership had been co-opted and socialized in mechanisms and processes, which tended to concentrate in the more “economically” viable areas of the country. By treading on the familiar path and benchmark of colonial policy, the Jomo Kenyatta government became primarily concerned with and articulated the ideology of separate development where the interest of capital reproduced itself (Aseka, 2010). As result, remote areas such as those occupied by the Pokot became victims of marginalization by the national government.

As a way of ensuring that the country began on the same footing, the KANU government then came up with its First Development Plan (FDP) whose ideological blueprint was articulated in Sessional Paper Number Ten on African Socialism (Ndege, 2000). The content of this Sessional paper was that power and wealth in Kenya were to be disproportionately distributed between and with all Kenyans. Like in Uganda, these ideas remained on paper and were never implemented. The Jomo Kenyatta, Moi, and Kibaki governments found themselves more inclined to linking development to political regions or areas that did not oppose their leadership. It was on this ideology that they marginalized regions with Moi coining the popular phrase *siasa mbaya, maisha mbaya* (bad politics, poor livelihood).

Therefore, the recalcitrant nature of the Pokot of Kenya against the post-independence regimes saw them being classified as “anti-development.” As such, their marginalization continued during this period, which more often than not, came because of their persistent conflict with state authorities. As a result, during the last fifty three years into independence, the West Pokot region not only remains under developed but also knows very little of state security leaving the raiders as the *defacto* administrators of the region (Magaga and Ogalo 2012). An indication of state neglect of the Pokot can be summed up in the county’s food security situation. This has been vividly expressed by various humanitarian agencies like Action Aid, Red Cross, and World Vision that operate in the county. Whenever hunger strikes the area, concerns have been expressed regarding the governments’ poor attitude and reluctance to avert the problem (Oxfam 2014). One oral account confirmed that the region’s food problem remains an annual event because the government prefers it that way. Even when a rapid assessment carried out by the Kenya Red Cross society revealed that Pokot County’s household food situation was getting bad, the government waited until private media houses like citizen came up with the “Kenyans for Kenyans” initiative. This mobilized funds and food to the hunger stricken areas. Interestingly, the government was a late comer in this noble initiative (Oxfam 2004). An assessment carried out in 2012 by Oxfam concluded that the perennial food shortage in the region is attributed to many factors such as the climate and terrain but above all, the government’s neglect on its citizens in such regions.

On security, a member of the County Assembly in West Pokot indicated that in his Sub County of Sekerr with an estimated population of 34,000, there are hardly 10 police personnel, nor is there a court and that there was no presence of the government. In other words, the structures of the government existed on paper. His counterpart in Kapenguria confirmed that over the years, there has been one operational court situated at

the regional headquarters in Kapenguria. Statistics from the County Commissioners’ office also indicate that in the entire region, there are approximately 100 police personnel and on average of 18 police officers per Sub County. This is against the internationally accepted ratio of one police officer for 400 citizens (UN Security Council Report, 2000). This oral account confirmed that most of the security personnel were either stationed at the headquarters or at Sub County posts leaving most of the villages with serious security lapses. One political leader confided in us when he said that,

“We hardly live here... when raiders come it is terrible as there is no government security at all. For the few who dare come, they always hide on hearing gun shots. We don’t know why the government doesn’t want us to have guns yet they don’t protect us. We pray that one day God will give us a listening government but for now we and our children will just die in the hand of raiders”(March 11th 2012, Kapenguria).

The degree of marginalization in West Pokot has been such that the roads are in a deplorable state, schools and health centers have either been vandalized or closed down. There are no chiefs’ camps and police stations or posts are far apart. One teacher confirmed that the kind of situation in West Pokot is neither new nor strange as there has been no consistent government service for a long time. Instead, few non-governmental organizations occasionally carry out mobile operations that provide health services and food aid among others. The majority of people in West Pokot hold the view that no government initiated project has ever been completed with most of them remaining as white elephants. The most conspicuous ones are boreholes, chiefs’ camps, schools, and hospitals.

Still on security concerns, West Pokot remains one of the few areas in Kenya that is occasionally volatile and insecure for non-Pokots. This has sent ambiguous signals to the community with the implication being that they should take care of their own security. This has solidified their belief that the government has been unable to take care of this basic need (Kiflemarian 2002). The security neglect has over the years seen the Kenya –Uganda border remain porous, which has epitomized the level of sporadic bandit activities along it. Moreover, this kind of situation has for some time been perpetuated by the influx of small and light weapons, which the Pokot have always used for criminal purposes (Magaga and Ogalo 2012).

The Pokot generally assumed that the Moi regime (1979-2002) would offer them respite. This was on the ground that they were not only his staunch political supporters, but were part and parcel of the Kalenjin, Maasai, Turkana, and Samburu (KAMATUSA) ruling elite. However, there was soon a growing disquiet within their circles that they were not gaining much as compared to the other ethnic groups within the KAMATUSA conglomeration (Magaga and Ogalo 2012). In the view of the Pokot, it was the Tugen and Keiyo who benefited more from this regime. Their disappointment was not due to the fact that the regime failed to provide infrastructural development but that it did nothing to return their land that had been alienated to the white settlers in Trans-Nzoia and later bought by non-Pokots. Out of this discontent, in 2002 general election many of the Pokot voted against Moi’s preferred candidate Uhuru Kenyatta in what appeared as a ‘protest’ vote. By voting for the National

Rainbow Coalition (NARC) presidential candidate, they were not expecting development in their area. This was just a way of expressing their disappointment with the Moi government. In any case, they were convinced that, just like the late president Jomo Kenyatta did nothing to initiate development in their region, no presidential candidate from central Kenya would do that to them (Daily Nation May, 2004). One elder indicated that during the NARC and Jubilee governments, cattle raids and rustling have been on the increase.

The misconception that has pervaded the regimes in Kenya is that they have always approached the West Pokot problem from a political angle with a hope of solving it. For instance, both the Moi and Kibaki regimes assumed that appointing political leaders from the region into government positions would succeed at integrating the community into the nation state. This belief informed the appointment of Francis Lotodo, Samuel Moroto, Samuel Pughisio, John Lonyangapuo and Asman Kamama to different posts in the government in the hope that the Pokot would look at the government and its policies positively. The only problem with this approach was that the government forgot that these were people who were socially attached to their cultural values. In addition, the Pokot people cared less about politics, have little if any interest in formal education but instead have a lot of regard for their traditional leaders and their pastoral way of life. The appointment of individual leaders from the Pokot region has thus been a misconception and has failed to achieve its objectives. Given this failure by the previous regimes and the high level armament by the Pokot, the Uhuru Kenyatta government has remained wary of their intentions. In the meantime, runaway insecurity in Kenya's North Rift region continues unabated pitting the Pokot against their neighbours. Even after the promulgation of the constitution of *Kenya's 2010* that increased the number of representatives at county level and the devolution of basic services such as health and infrastructure, West Pokot still faces neglect and marginalization. It was expected that with the devolved government, poverty and marginalization in West Pokot would register reduce drastically. This was on account that the region's representation was significantly increased and it was also allocated a larger percentage of money in the new dispensation so as to bridge its economic disparity with the rest of the country (National Budget 2014).

It is important to note that all this was against the backdrop that previously, the national cake in Kenya was in the hands of the central government and West Pokot was one of the regions that complained about unfairness in the distribution of the national cake. Since 2013, the county government of West Pokot led by the governor Simon Kachapin has done little to radically change this trend. All indicators show that apart from a few government offices, hospitals or health centres and murram roads, West Pokot's development is still wanting. This goes against all expectations since the county government comprises of leaders from this locality who are familiar with the needs of the region. A report from Oxfam 2014 confirmed this situation when it indicated that it is perhaps in the education and security sectors that the reality of decades of marginalization are most evident although other social indicators of development are more or less dire. In the sector of education, for instance, the current situation is such that despite free primary and affordable

secondary education, many children from the region cannot go to school due to insecurity, inadequate and dilapidated schools that are far apart.

From the foregoing, the Pokot and the Karamojong are evidently victims of state neglect. Consequently, these people continue to struggle for meaningful development. They have undertaken this within the confines of social and ecological realities of their arid regions. Carter (1996) in his social cubism theory, states that marginalization is one of the factors that leads to dispute between and within communities. The case of the Pokot and Karamojong's cross-border resource conflict is a clear reflection of marginalization in the context that the neglect by the state had paved the way leaving a vacuum for these communities to fill. In this situation, the focus has been their debilitating and fierce struggle for the same resource.

As part of the theory's tenets, Carter (1996) states that in every society or bordering groups where some, if not all people are marginalized, it produces different access to resources which breeds conflict in such a society or group. Carter (1996) further states that in such situations, the marginalized group will often feel aggrieved, become emotional, tend to operate outside the law, use force to secure itself and get things they need. Right from the colonial era, all the regimes in Kenya and Uganda have failed to fully integrate these pastoral groups into their societies. This has left the communities socially and economically steeped in their leading to endemic resource conflict between them. One consequence of state neglect and marginalization of the Pokot and Karamojong is on the runaway insecurity in these regions. This has compelled these pastoral groups to arm themselves. The easy access to arms in the two regions has made life manageable for the local people and bandits yet causing serious stress to the Kenya and Uganda governments. Due to the fact that fire arms are cheap, banditry thrives in the endemic poverty that springs from neglect and marginalization by the existing state structures of Kenya and Uganda (Magaga and Ogalo 2012). Therefore, as a tenet within the theory of social cubism, marginalization of the Pokot and Karamojong emerges as a serious factor that has bred cross-border resource conflict between these two communities over the years.

In both West Pokot and Karamoja, the number of humanitarian agencies matches the activities, facilities and structure of the Kenya and Uganda government operations. In the process, the humanitarian agencies end up performing the government's roles and covering its inadequacies. For instance, in Uganda, Oxfam GB has for many years been funding short and long term projects in Karamoja to the tune of US Dollar 700million or 2.45 billion Uganda Shillings (Republic of Uganda, 2014).

In Kenya's West Pokot, the major humanitarian agencies out numbers DANIDA, World Vision, and Red Cross that run an annual budget of US dollar 1 million or 10 million Kenya shillings (GOK 2013). In both cases, these humanitarian agencies offer essential services such as water, food, health care, veterinary operations, as well as schools in the two regions. The major concern is why the two governments have not taken the initiatives to engage more development partners or agencies to assist the regions rather than burdening the few existing players. It has been on this account that these pastoralists have been convinced of their governments' prejudiced position about them

in the context of marginalization. This perception is based on the fact that the same governments have undertaken and completed several such projects in other parts of the country without the assistance of humanitarian agencies.

Way forward

During the pre colonial period, there were clear methods employed to control war and peace. During the war elders from different clans would keep the option of peacemaking alive, partly through lively communication with rival clan elders. Reciprocal grazing rights. Mutual assistance during times of drought and exchange of livestock, wives and sons were methods used to carry on relationships with rival clans. Peace between the clans was celebrated ritually through symbolic meals, sharing and involvement of religious leaders.

Whereas colonialism broke down these traditional methods, African governments at independence relegated them further. It is important today for the government to think about reinstating these traditional and cultural institutions that would help regulate community behavior. The gerontocratic authority should be given more recognition and support by the government so that they play the role of inter-tribal arbiters. Clan home guards are deemed more effective in stamping out localized inter-clan banditry through proactive dialogue within the community as opposed to applying coercive methods using regular troops.

At another level eradication of banditry could start with a dedicated in-depth study of the problem itself. Physical environment, weather constraints and inexplicable epidemics have been contributive factors to the phenomena. Lawlessness can be eradicated if the government embarks on a serious economic development particularly in livestock industry. This could be done through provision of water through boreholes and dams, introduction of cattle insurance to cushion the pastoralists from livestock losses and introduction of group ranches that would control seasonal movements as a way of arresting conflicts related to pasture among many others.

There is need to create and deploy specialized regional task forces under the auspices of the East African Community to specialize more on counter banditry in the region. Currently the existing organization is built on the premise that regional integration is more feasible in the economic field which is a delusion unless security and political stability can be given equal measures of importance.

To stem out banditry requires one to identify and win the cooperation of the victims of banditry who would be used to provide vital human intelligence. Time and patience may be required to inculcate trust among the victims and to convince them of the government's unconditional commitment to their security and sustainable development. The highhanded approach adopted by the government in dealing with banditry must be given up completely if the confidence of the people is to be won.

II. CONCLUSION

This paper has attempted to provide an analysis of problem of rustling and banditry in North West Kenya and North East Uganda Regions. Ecological factors have been identified as having a debilitating effect on pastoral economy thus making

lawlessness an alternative means of livelihood. The legacy of the colonial state had been seen as a contributor to rustling phenomena. Colonialism strained the economic relations of the pastoralists an appropriation in parts of north west Kenya dispossessed the Pokots and limited their access to land and brought strain on the available resources thereby naturally forcing the people to resort to other means of obtaining livelihood.

During the colonial period not much attention was given to either West Pokot or Karamoja region. Government policies became inimical to pastoralism which over the years remained unexploited. Instead measures taken were aimed at depastoralizing the region; imposition of market taxes, quarantine laws, destocking campaigns and punitive expedition exhibiting highhandedness all attracted equal measure of hatred from pastoralists. Pushed against the wall the Africans had no choice but to turn to banditry as a way of survival.

The post-colonial states in Kenya and Uganda have tended to ignore and neglect the welfare of the pastoralists in terms of development and distribution of political and economic resources. A more proactive and interactive approach need to be developed by policy makers that should go a long way to integrating the pastoralists within the nexus of the two countries modern economies. This method must be seen as the only avenue through which debilitating effectors of banditry can be slowed and eventually eradicated. Whereas surveillance must be exercised by the government, it should nonetheless desist from archaic forms of managing rustling namely; it must desist from applying highhandedness in wrestling banditry. This only hardens the bandits and exacerbates the vice.

The institutional of violence and the resultant insecurity have contributed to widespread poverty, hunger and destitutions in the region. The paper therefore argues that under the background of marginalization the two communities have been hardened and left to operate outside formal land. The paper ends with a way forward recommending that socio-economic and political instability be addressed which the root causes of banditry as well as the formation of regional mechanisms from pro-active resolution of tensions arising from the phenomena.

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ICP determination of Pb, Mn, Cu, Zn, Fe, K, Na, P, Mg and Ca in edible wild mushroom

(*Boletus pinophilus*)

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Abstract- The aim of this study was to perform ICP analysis of the content of Pb, Mn, Cu, Zn, Fe, K, Na, P, Mg and Ca in wild edible mushrooms *Boletus pinophilus*. The samples were collected from the Batak mountain, Bulgaria. The preparation of samples was done by microwave mineralisation. All mineral concentrations were determined on a dry weight basis (d.w.). The average content of studied elements: Pb, Mn, Cu, Zn, Fe, K, Na, P, Mg and Ca in *Boletus pinophilus* samples was: 0.579 mg kg⁻¹, 10.415 mg kg⁻¹, 23.669 mg kg⁻¹, 69.003 mg kg⁻¹, 98.418 mg kg⁻¹, 30555.6 mg kg⁻¹, 94.749 mg kg⁻¹, 7347.933 mg kg⁻¹, 647.256 mg kg⁻¹ and 256.960 mg kg⁻¹.

Index Terms- ICP, mushroom *Boletus pinophilus*, Batak mountain, mineral concentrations

I. INTRODUCTION

Wild edible mushrooms are prized for their desirable taste, with their annual consumption exceeding 10 kg per individual in some countries [1]. In addition to their flavor and texture, the nutritional value of the fruiting bodies is much appreciated [2]. Mushrooms have also been proven to have therapeutic properties, counteracting diseases such as hypertension, hypercholesterolemia and cancer [3]. It should be noted that some studies have suggested that heavy metal accumulation may be species-specific [4,5], and that while metal levels in mushrooms may be an important indicator of environmental pollution, some wild mushroom species can exceed legal limits for heavy metals even in non-polluted areas where heavy metal concentrations in soils are low [6-13].

The aim of this study was to perform ICP analysis of the content of Pb, Mn, Cu, Zn, Fe, K, Na, P, Mg and Ca in wild edible mushrooms *Boletus pinophilus*. The samples were collected from the Batak mountain.

II. MATERIALS AND METHODS

In determining the amount of elements in samples of wild edible mushroom *Boletus pinophilus* used ICP Optima model 7000, at wavelengths: Pb – 220.353 nm, Fe – 238.204 nm, Zn – 213.857 nm, Mn – 257.610 nm, Cu – 327.395 nm, K – 766.491 nm, Na – 589.592 nm, Ca – 317.933 nm, P – 213.618 nm and Mg – 279.553 nm.

Reagents

Reagents are qualified "AR" (pa Merck & Fluka). The starting standard solutions for ICP determination of Pb, Fe, Zn, Mn, Cu, K, Na, Ca, P and Mg at concentrations of 1000 mg l⁻¹ were supplied by Merck, Darmstadt Germany.

All chemicals were at least of analytical-reagent grade. Water was de-ionized in a Milli-Q system (Millipore, Bedford, MA, USA) to a resistivity of 18.2 MV cm.

All plastic and glassware were cleaned by soaking in diluted HNO₃ (1/9, v/v) and were rinsed with distilled water prior to use.

Samples

One hundred and fifty mushroom samples were collected in 2014 and 2015 from the Batak mountain by the authors themselves. The mushroom samples were cleaned from forest debris (without washing) with a plastic knife, transported to the laboratory within 4 h of collection and placed temporarily in glass vessels at 18 C.

The samples were prepared for the experiment in a standard way; they were dried at 65°C in a fan oven and stored in dark polyethylene bottles.

Sample preparation

Microwave acid digestion method was used for sample preparation. An amount of 0.2 g of samples was taken into digestion tubes and 5 ml of HNO₃ (65%), 1 ml of HCl and 3 ml of H₂O₂ (30%) were added. The samples were digested in a microwave closed system Multiwave 3000 (Anton Paar, Germany) according to the programme given in Table 1. After digestion, the samples were diluted up to 25 ml with 2 ml l⁻¹ HNO₃. Duplicated analysis was performed on the samples. Blank digestion was also carried out in the same way.

Table I: Microwave acid digestion programme

Step	Ramp time, min	Hold time, min	Cooling period, min	Pressure (MPa)	Temperature (°C)
1	10	10	5	0.758	110
2	10	10	5	1.023	150
3	20	10	5	0.758	190

Accuracy and precision

Comparison of the experimental data to the certified reference material data In order to validate the accuracy, reliability and sensitivity of the above analytical methods the certified reference material (CRM) CTA-VTA-2 (Virginia Tobacco) was used. The CRM was stored under specified controlled conditions to ensure its stability. Ten measurements on the CRM were performed and the results were compared with the certified values.

III. RESULTS AND DISCUSSION

The results for the efficiency of microwave mineralization for Pb, Fe, Zn, Mn, Cu, K, Na, Ca, P and Mg determination in the certified referent material - Virginia tobacco CTA- VTA-2 are displayed in Table 2. The results from the descriptive analysis of the concentration of Pb, Fe, Zn, Mn, Cu, K, Na, Ca, P and Mg in *Boletus pinophilus* samples are presented in Table 3.

Table II: Effectiveness of microwave mineralization in the determination of Pb, Fe, Zn, Mn, Cu, K, Na, Ca, P and Mg in Virginia Tobacco-CTA-VTA-2 certified reference material (n=10)

Element	Certified value	Observed value	Recovery (%)
Pb	22.1 ± 1.2 mg kg ⁻¹	23.1 ± 1.2	104.5
Fe	1083 ± 33 mg kg ⁻¹	1160 ± 44 mg kg ⁻¹	103
Zn	43.3 ± 2.1 mg kg ⁻¹	44.1 ± 1.6 mg kg ⁻¹	101.8
Mn	79.7 ± 2.6 mg kg ⁻¹	77.5 ± 2.1 mg kg ⁻¹	97.2
Cu	18.2 ± 0.8 mg kg ⁻¹	18.1 ± 0.7 mg kg ⁻¹	99.4
K	1.03 ± 0.04 %	1.0 ± 0.03 %	97.1
Na	312 mg kg ⁻¹	302.64 ± 12.64 mg kg ⁻¹	97
Ca	3.60 ± 0.15 %	3.23 ± 0.1 %	89.6
P	2204 ± 78 mg kg ⁻¹	23550 ± 110 mg kg ⁻¹	106.8
Mg	0.510 ± 0.023 %	0.531 ± 0.013 %	104.1

Table III: Concentration of heavy metals in mushroom samples (*Boletus pinophilus*) collected from Batak mountain, Bulgaria (n=15)

Элемент	\bar{X} mg kg ⁻¹	SD mg kg ⁻¹	-95% Confid.	+95% Confid.
Pb	0.579	0.287	0.421	0.739
Fe	98.418	32.564	80.384	116.451
Zn	69.003	6.292	65.519	72.488
Mn	10.415	1.57	9.545	11.285
Cu	23.669	6.151	20.263	27.075
K	30555.600	2735.731	29040.600	32070.600
Na	94.749	23.569	81.696	107.801
Ca	256.960	50.856	228.797	285.124
P	7347.933	807.505	6900.752	7795.115
Mg	647.256	98.788	592.549	701.963

Table 3 presents the mineral composition (mg kg⁻¹ of dry weight) of the investigated mushrooms. Mushrooms were reported to be a good source of minerals, and the levels of these studied mineral elements meet well the recommended dietary allowances of NRC/NAS [14]. The variations and mean concentrations of ten macro- (sodium, potassium, calcium, phosphorus and magnesium) (Table 3) and micro- elements (iron, zinc, copper and manganese), and the heavy metal lead (Table 3) were examined in edible wild mushroom (*Boletus pinophilus*) under study. The samples were shown to be rich in potassium. The trend in decreasing order of macro elements content for the studied mushrooms was K > P > Mg > Ca > Na. This agrees with previous reports [15-17], which found the highest mineral to be K in various species of edible mushrooms analysed. Based on previous reports, the Na/K ratio was often varied from 0.01 to 0.2 [15-17]. While in the present study, the Na/K ratio is very low (0.003) and Chenet al. [17] indicated it is considered to be an

advantage from the nutritional point of view, since the intake of sodium chloride and diets with a high Na/K ratio have been related to the incidence of hypertension.

Living organisms require varying amounts of “heavy metals”. Iron, cobalt, copper, manganese, molybdenum, and zinc are required by humans, but excessive levels can be damaging to the organism. Other heavy metals such as mercury, plutonium, and lead are toxic metals and their accumulation over time in the bodies of animals can cause serious illnesses. Copper as stated is an essential metal, which serves as a constituent of some metalloenzymes, and is required in haemoglobin synthesis and catalysis of metabolic growth [18,19]. The average concentration of Cu in the studied samples was 23.568 mg kg⁻¹, which was far below the safe limit of 40 mg kg⁻¹ set by WHO [6]. Copper levels in mushrooms reported in literature are 4.71–181.0 mg kg⁻¹ [20-24]. Iron (Fe) is an essential metal involved in biochemical processes. The average Fe content recorded in the studied

samples was $98.418 \text{ mg kg}^{-1}$, respectively, which are above the safety limit of 15.0 mg kg^{-1} , determined by the WHO. Levels of Fe reported in literature were $31.3\text{--}1190.0 \text{ mg kg}^{-1}$ [25-27]. Manganese (Mn) is an essential metal needed for biological systems such as metalloproteins [28,29]. The average Mn content recorded in the studied samples was $10.415 \text{ mg kg}^{-1}$, respectively, which are also below the toxicity limit of $400.0\text{--}1000.0 \text{ mg kg}^{-1}$. The literature has reported levels of Mn as $12.9\text{--}93.3 \text{ mg kg}^{-1}$ [20-29]. According to Vonugopal and Lucky [23], lead (Pb) is toxic even at trace levels and the impairment related to lead toxicity in humans include abnormal size and haemoglobin content of the erythrocytes, hyperstimulation of erythropoiesis and inhibition of haem synthesis. The maximum level of Pb present in the studied wild mushrooms was 0.579 mg kg^{-1} , which is far below the 10.0 mg kg^{-1} limit set by the WHO [6]. Lead levels reported in literature are $0.4\text{--}7.77 \text{ mg kg}^{-1}$ [20-29]. Zinc is an essential metal and a component of a wide variety of different enzymes in which it is involved in catalytic, structural and regulatory roles. The average Zn content recorded in the studied samples was $69.003 \text{ mg kg}^{-1}$, respectively, which are above the safety limit of 60 mg kg^{-1} , determined by the WHO [6]. Zn levels reported in literature were $29.3\text{--}158.0 \text{ mg kg}^{-1}$ [20-29].

The trend in decreasing order of elements present in wild samples was $\text{Fe} > \text{Zn} > \text{Cu} > \text{Mn} > \text{Pb}$. Mushrooms are known to possess a very effective mechanism that enables them to readily take up some heavy metals from the ecosystem [18-29]. The accumulation of heavy metals in mushrooms seems to be affected by environmental and fungal related factors. Environmental factors such as organic matter content, pH and metal concentration in soil and fungal factors such as the species, morphological part of the fruit body, developmental stages, age of mycelium, intervals between fructifications and biochemical composition [7-15].

IV. CONCLUSIONS

According to this study, the edible wild mushroom *Boletus pinophilus* could be used in human nutrition due to its good parameters. Heavy metal content of samples indicated that the Batak mountain was an ecologically pure region of Bulgaria, and therefore the mushrooms collected from this location could be consumed without any risk for human health.

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Constructing a mean-variance portfolio of four assets

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Abstract- List of five special criteria is constructed and based on this list are selected four financial assets. It is calculated the return and risk for each of them. It is built up a mean-variance portfolio with fixed return and minimum risk conditions. It is calculated the portfolio structure and it is noticed that the investor prefers to invest the less in the first two assets which shows the lowest return and risk and prefers to invest an appropriate proportion in the latter two assets of the highest risk but with a more attractive return.

Index Terms- Assets, Mean-Variance portfolio, Return, Risk

I. INTRODUCTION

In 1990 Harry Markowitz received the Nobel Prize in Economics for his work in the 50s of XX century, which offers the first systematic solution to the dilemma that every investor faces: conflicting objectives of high profit and low risk.

The model of Markowitz also called Mean-Variance model used the statistical analysis for measurement of risk and selection of assets in a portfolio in an efficient manner. His framework led to the concept of efficient portfolios. An efficient portfolio is expected to yield the highest return for a given level of risk or lowest risk for a given level of return [1-8].

Markowitz generated a number of portfolios within a given amount of money or wealth and given preferences of investors for risk and return. Individuals vary widely in their risk tolerance and asset preferences. Their means, expenditures and investment requirements vary from individual to individual [9-15]. Given the preferences, the portfolio selection is not a simple choice of anyone security or securities, but a right combination of securities. Markowitz emphasised that quality of a portfolio will be different from the quality of individual assets within it. Thus, the combined risk of two assets taken separately is not the same risk of two assets together [16-23].

In this article we aim to show how can create a portfolio from four assets using Mean-Variance model proposed by Harry Markowitz.

II. MATERIALS AND METHODS

Markowitz Mean-Variance model

The model of Markowitz also called Mean-Variance model is parametric optimization model that is both common enough for most practical situations and simple enough for theoretical analysis and numerical solutions. This model has the following mathematical representation [24]:

$$(1) \begin{cases} \min \frac{1}{2} \sigma_p^2 = \min \frac{1}{2} \sum_{k=1}^n \sum_{j=1}^n x_k x_j \sigma_{kj} \\ \sum_{k=1}^n x_k \mu_k = \rho \\ \sum_{k=1}^n x_k = 1 \end{cases},$$

where x_k is the percentage of capital that will be invested in asset k ; μ_k is the expected return per asset k ; σ_{kj} is the covariance between assets k and j ; σ_p^2 is the expected return of the portfolio and σ_p is the portfolio risk.

Selection criteria for selection of assets

The process of selecting the assets in which to invest certain amount of capital is done by the decision maker (investor). For this purpose, there are many strategies that investors can use to ready to combine or even ignored, as follows only his own flair. Let us in this paper the list of assets from which to invest, to be built up based on the following rules:

- shares belong to different market sectors;
- the coefficient Price/Earnings Growth Ratio (PEG) have a sufficiently good values;
- reports of analysts based on the financial performance of the company and the state of the sector in which it operates, provide an estimate: the stock to be bought.
- to invest in large companies, because thanks to its size is more likely to overcome the problems negatively affecting the price of their assets.
- to take into account the index USATODAY Stock Meter, which is associated with the reliability of companies.

Calculation of return

In practice there are different ways to calculate the return per asset.

Simple Return

Let P_i is the price of an asset at date t and assume for now that this asset pays no dividends and let P_{i-1} is the price in month $t-1$. Then the one-month simple net return on investments in asset between months $t-1$ and i is calculated by the formula [25]:

$$R_i = \frac{P_i - P_{i-1}}{P_{i-1}}$$

Recording

$$\frac{P_i - P_{i-1}}{P_{i-1}} = \frac{P_i}{P_{i-1}} - 1$$

the simple net return is defined by:

$$1 + R_i = \frac{P_i}{P_{i-1}}$$

One month gross income is interpreted as the future value of 1 means money invested in stocks for a month.

Continuously compounded return

The continuously compounded return is denoted by r_i and it is defined [25]:

$$r_i = \ln(1 + R_i) = \ln\left(\frac{P_i}{P_{i-1}}\right), \tag{2}$$

where $\ln(\cdot)$ the natural logarithm function.

Continuously compounded returns are very similar to simple returns with regard to the relatively small returns, which is generally true for monthly or daily rate, usually.

However, for the purposes of modeling and statistics it is much more convenient to use continuous complicated returns due to additive properties. Moreover, asset prices are positive integers

$$R_i = \frac{P_i - P_{i-1}}{P_{i-1}} \in (-1, +\infty) \quad r_i = \ln\left(\frac{P_i}{P_{i-1}}\right) \in \mathbf{R}$$

in which and . Thus, the representation is advantageous because it is assumed that the returns are normally distributed, and there are in the interval $(-\infty, +\infty)$.

Calculation of mathematical expectation, variance and covariance based on historical data of stock prices

Let us have a portfolio $X(x_1, x_2, \dots, x_k)$, consisting of k number of assets. Then the expected return μ_k per asset k is calculated by [8]:

$$\mu_k = E[r^k] = \frac{\sum_{i=1}^m r_i^k}{m} = \bar{r}^k, \tag{3}$$

where r_i^k is the return per asset k between periods $i-1$ and i ($i = 1, \dots, m$), and m is the number of periods, whose return we have calculated.

The variance and the covariance per asset are calculated using the following formulas[8]:

$$\sigma_k^2 = Var[r^k] = \frac{\sum_{i=1}^m [r_i^k - \bar{r}^k]^2}{m-1}, \tag{4}$$

$$\sigma_{kj} = \frac{\sum_{i=1}^m [r_i^k - \bar{r}^k][r_i^j - \bar{r}^j]}{m} \tag{5}$$

When working with assets dimensions of risk are organized in the return covariance matrix $\Omega_{n \times n}$, usually. This matrix contains variances in its main diagonal and covariances between all pairs of assets other items, i.e.

$$\Omega = \begin{pmatrix} \sigma_1^2 & \sigma_{12} & \dots & \sigma_{1n} \\ \sigma_{21} & \sigma_2^2 & \dots & \sigma_{2n} \\ \dots & \dots & \dots & \dots \\ \sigma_{n1} & \sigma_{n2} & \dots & \sigma_n^2 \end{pmatrix} \tag{6}$$

Portfolio return and risk

According to [26] the variance of a portfolio is calculated using by:

$$\sigma_p^2 = X^T \Omega X, \tag{7}$$

$$X = \lambda_1 \Omega^{-1} \mu + \lambda_2 \Omega^{-1} e,$$

$$\mu = (\mu_1, \mu_2, \dots, \mu_n)^T, \quad e = (1, 1, \dots, 1)^T, \quad \lambda_1 = \frac{A\rho - B}{D}, \quad \lambda_2 = \frac{C - \rho B}{D},$$

$$A = e^T \Omega^{-1} e, \quad B = e^T \Omega^{-1} \mu, \quad C = \mu^T \Omega^{-1} \mu, \quad D = AC - B^2.$$

The first identity of (7) can be overwritten in terms of the portfolio return R_p and matrices A, B, C and D as:

$$\sigma_p^2 = \frac{1}{D} (AR_p^2 - 2BR_p + C) \tag{8}$$

This identity emphasizes the effective relationship between portfolio return R_p and its variance σ_p^2 . According to (8), the portfolio return R_p is given by:

$$R_p = \frac{B}{A} + \sqrt{\frac{D}{A}} \sqrt{\sigma_p^2 - \frac{1}{A}} \tag{9}$$

The risk of portfolio is

$$\sigma_p = \sqrt{\sigma_p^2}$$

III. RESULTS AND DISCUSSIONS

Based on selected five rules, the list of assets among which will be invested, has four companies that provisionally we will denote with *I, II, III* and *IV*.

There are many sources of free access, which can be obtained historical price data (daily, weekly or monthly) for each asset. For the purposes of this work we use historical data of assets prices provided by website www.finance.yahoo.com. Prices of each of the four assets we use weekly data for a period of four years. Let us denote the order of these

observations $i = 0, m$. Due to the fact that a year has 52 weeks,

for a selected period we have $m = 208$. Then with P_i^k we denote the price for a period i per asset k ($k = 1, 2, 3, 4$).

Using price per asset k ($k = 1, 2, 3, 4$) for two consecutive periods

$i-1$ and i we calculate using formula (2) the returns r_i^k for period i . The results are presented in Appendix I.

In the reviewed model (1), using equation (3), we calculate the expected returns of each of the selected assets

$$\mu = (0.00234, -0.00024, 0.000005, 0.00625)^T.$$

For a return covariance matrix, using (4), (5) and (6), we get:

$$\Omega = \begin{pmatrix} 0.00268 & 0.00129 & 0.00077 & 0.00165 \\ 0.00129 & 0.00350 & 0.00090 & 0.00151 \\ 0.00077 & 0.00090 & 0.00123 & 0.00057 \\ 0.00165 & 0.00151 & 0.00057 & 0.00351 \end{pmatrix}.$$

Then the inverse of a matrix Ω , we have

$$\Omega^{-1} = \begin{pmatrix} 606.61695 & -71.40607 & -226.64758 & -217.63695 \\ -71.40607 & 412.69751 & -206.05924 & -110.51266 \\ -226.64758 & -206.05924 & 1097.83196 & 16.90990 \\ -217.63695 & -110.51266 & 16.90990 & 432.00468 \end{pmatrix}.$$

By successive calculations of equations (7), we get

$$\Omega^{-1}e = \begin{pmatrix} 90.92635 \\ 24.71953 \\ 682.03504 \\ 120.76497 \end{pmatrix}, \quad \Omega^{-1}\mu = \begin{pmatrix} 0.07526 \\ -0.95787 \\ -0.36973 \\ 2.21737 \end{pmatrix},$$

$$(10) \quad A = 918.44589, \quad B = 0.96503, \quad C = 0.01413, \quad D = 12.04636.$$

Let us have the following additional requirement to the portfolio, which will be drawn, namely: portfolio return not less than triple the compound interest formula. Let us assume that the investor has chosen one particular bank, whose compound interest for one-year deposit with increasing interest for a period of one week is 7.25%. Therefore, to be prepared on a weekly return greater than

$$\rho = (1 + 3 * 0.0725)^{1/52} - 1 = 0.0038.$$

Hence, from equations (7) and received by the above results, we calculate successively

$$\lambda_1 = 0.22486, \quad \lambda_2 = 0.00085.$$

Therefore the portfolio is

$$X = \begin{pmatrix} 0.09421 \\ 0.00318 \\ 0.30136 \\ 0.60081 \end{pmatrix},$$

and the variance of a portfolio is

$$\sigma_p^2 = 0.00185.$$

From here the risk of portfolio we compute by

$$\sigma_p = \sqrt{\sigma_p^2} = \sqrt{0.00185} = 0.04302.$$

Thus, the risk of portfolio in percentage is

$$\sigma_p = 4.3\%$$

Using by (9) from portfolio return, we have

$$R_p = \frac{B}{A} + \sqrt{\frac{D}{A} \sqrt{\sigma_p^2 - \frac{1}{A}}} = 0.00421.$$

This relation is valid for $\sigma_p \geq 0.0330$ provide effective for

any size portfolio return R_p according to the risk assumed σ_p .

In view of the fact that the derivative of a function is, in terms of geometric slope of the tangent taken at the graph of the function at that point, it is clear that the equation of the tangent

taken at the point (σ_p, R_p) to the hyperbola, which is Markowitz border (efficient frontier portfolios) will be:

$$(11) \quad R - R_p = (R_p)_{\sigma_p}' (\sigma - \sigma_p).$$

According to (10) and (11) the tangent equation at the point $M(0.04302, 0.00421)$ is

$$R = 0.14497\sigma + 0.00347.$$

Therefore the intersection with the ordinates axis is obtained for $\sigma = 0$ and is $R = 0.00347$.

IV. CONCLUSIONS

This article aims to show how can create a portfolio using Mean-Variance model proposed by Harry Markowitz. For this purpose under a special criteria we selected four financial assets for which we calculated the return and risk for each of them. We built up a portfolio of fixed return of 0.4%, with minimum risk conditions. The portfolio structure is:

$x_I = 9.4\%$, $x_{II} = 0.3\%$, $x_{III} = 30.1\%$, $x_{IV} = 60.1\%$, while the minimum risk of the portfolio is 4.3%. By correlating the results with the initial data of the problem we can notice that an investor

prefers to invest the less in the assets x_I and x_{II} which shows the lowest return and risk and prefers to invest an appropriate

proportion in the assets of the highest risk, x_{III} and x_{IV} , but with a more attractive return. By building up the portfolio, the

investor bearing a behavior of Markowitz type succeeded to get a risk of 4.3%, a value below the risk of any other asset of the portfolio, here the significance of the Markowitz model being observed to the best.

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Appendix I: Calculated returns of selected assets for a period of four years.

Period	I	II	III	IV	Period	I	II	III	IV
22.8.20012 - 29.8.2012	0,017	0,085	0,023	0,010	17.9.2014 - 24.9.2014	0,013	0,004	0,000	0,063
29.8.2012 - 6.9.2012	0,036	0,010	0,015	0,104	24.9.2014 - 1.10.2014	0,046	0,024	0,040	0,051
6.9.2012 - 12.9.2012	0,004	-0,020	0,015	-0,002	1.10.2014 - 8.10.2014	0,070	0,000	0,006	0,035
12.9.2012 - 19.9.2012	0,049	0,020	0,002	0,038	8.10.2014 - 15.10.2014	0,011	-0,083	-0,056	0,019
19.9.2012 - 26.9.2012	0,003	-0,003	0,018	0,008	15.10.2014 - 22.10.2014	0,045	0,020	0,044	0,080
26.9.2012 - 3.10.2012	-0,011	-0,037	-0,033	-0,044	22.10.2014 - 29.10.2014	0,053	-0,004	-0,005	0,017
3.10.2012 - 10.10.2012	-0,055	-0,034	-0,044	0,051	29.10.2014 - 5.11.2014	-0,069	-0,060	-0,014	-0,128
10.10.2012 - 17.10.2012	0,138	-0,108	-0,014	0,030	5.11.2014 - 12.11.2014	-0,047	-0,014	0,000	0,006
17.10.2012 - 24.10.2012	0,052	0,043	0,044	-0,022	12.11.2014 - 19.11.2014	0,066	-0,012	0,001	0,030
24.10.2012 - 31.10.2012	0,086	0,048	-0,023	0,116	19.11.2014 - 26.11.2014	0,024	0,047	0,026	0,060
31.10.2012 - 7.11.2012	0,000	0,024	-0,004	0,006	26.11.2014 - 3.12.2014	0,031	0,031	0,031	0,064
7.11.2012 - 14.11.2012	0,025	0,043	0,000	0,048	3.12.2014 - 10.12.2014	-0,035	-0,011	-0,037	-0,020
14.11.2012 - 21.11.2012	0,069	0,012	0,011	0,071	10.12.2014 - 17.12.2014	0,010	-0,009	0,003	0,018
21.11.2012 - 28.11.2012	-0,026	0,015	-0,004	0,046	17.12.2014 - 24.12.2014	0,008	0,006	-0,014	0,030
28.11.2012 - 5.12.2012	-0,021	-0,012	0,008	0,023	24.12.2014 - 31.12.2014	-0,067	-0,065	-0,013	-0,104
5.12.2012 - 12.12.2012	0,050	0,026	0,010	-0,044	31.12.2014 - 7.1.2015	-0,029	-0,037	0,036	-0,042
12.12.2012 - 19.12.2012	0,002	-0,019	-0,002	0,031	7.1.2015 - 14.1.2015	-0,061	-0,044	-0,068	-0,068
19.12.2012 - 27.12.2012	-0,038	-0,013	-0,007	-0,020	14.1.2015 - 22.1.2015	-0,058	0,049	-0,081	-0,216
27.12.2012 - 3.1.2013	0,116	0,045	0,015	0,060	22.1.2015 - 28.1.2015	-0,093	0,085	0,062	0,028
3.1.2013 - 9.1.2013	0,001	0,031	-0,013	0,115	28.1.2015 - 4.2.2015	0,002	-0,054	-0,009	-0,064
9.1.2013 - 17.1.2013	-0,155	-0,021	0,005	-0,118	4.2.2015 - 11.2.2015	0,025	0,028	-0,001	-0,007
17.1.2013 - 23.1.2013	0,082	0,105	-0,001	-0,055	11.2.2015 - 19.2.2015	-0,042	0,017	-0,019	-0,042
23.1.2013 - 30.1.2013	-0,128	0,009	-0,034	-0,003	19.2.2015 - 25.2.2015	-0,075	0,016	-0,033	0,045
30.1.2013 - 6.2.2013	-0,051	0,009	0,008	-0,065	25.2.2015 - 3.3.2015	-0,084	-0,035	-0,007	-0,022
6.2.2013 - 13.2.2013	0,017	0,047	0,009	0,043	3.3.2015 - 10.3.2015	0,010	0,068	-0,010	0,035
13.2.2013 - 21.2.2013	0,023	0,009	0,002	0,017	10.3.2015 - 17.3.2015	-0,010	-0,013	0,015	0,051
21.2.2013 - 27.2.2013	0,002	0,026	0,001	-0,054	17.3.2015 - 24.3.2015	0,010	0,043	0,003	0,071
27.2.2013 - 6.3.2013	-0,114	-0,050	-0,032	-0,069	24.3.2015 - 31.3.2015	0,073	0,010	0,046	0,068
6.3.2013 - 13.3.2013	0,007	0,072	0,005	0,023	31.3.2015 - 7.4.2015	-0,029	-0,040	0,029	-0,040
13.3.2013 - 20.3.2013	0,074	-0,010	-0,021	-0,075	7.4.2015 - 14.4.2015	0,165	0,136	0,011	0,090
20.3.2013 - 27.3.2013	0,064	-0,050	-0,021	0,045	14.4.2015 - 21.4.2015	0,009	-0,036	-0,009	0,053
27.3.2013 - 3.4.2013	0,041	0,042	-0,009	0,107	21.4.2015 - 28.4.2015	0,066	0,007	0,018	0,064

3.4.2013 - 10.4.2013	-0,010	0,027	-0,030	-0,049	28.4.2015 - 5.5.2015	-0,014	-0,013	-0,018	0,014
10.4.2013 - 17.4.2013	0,083	0,015	0,024	0,009	5.5.2015 - 12.5.2015	0,012	0,024	-0,011	0,022
17.4.2013 - 24.4.2013	-0,045	-0,028	-0,002	0,049	12.5.2015 - 19.5.2015	-0,063	-0,026	-0,030	-0,035
24.4.2013 - 1.5.2013	-0,058	0,054	0,013	0,021	19.5.2015 - 27.5.2015	0,073	0,013	0,005	0,041
1.5.2013 - 8.5.2013	-0,053	-0,027	-0,029	-0,060	27.5.2015 - 2.6.2015	-0,033	-0,033	-0,009	-0,017
8.5.2013 - 15.5.2013	-0,011	-0,067	0,013	-0,048	2.6.2015 - 9.6.2015	0,008	0,019	0,020	-0,074
15.5.2013 - 22.5.2013	0,030	0,022	0,024	-0,015	9.6.2015 - 16.6.2015	-0,045	-0,030	-0,034	0,017
22.5.2013 - 30.5.2013	-0,005	-0,022	0,032	-0,030	16.6.2015 - 23.6.2015	-0,034	-0,070	-0,044	-0,030
30.5.2013 - 5.6.2013	0,019	-0,075	0,000	-0,040	23.6.2015 - 30.6.2015	0,017	-0,048	-0,001	0,000
5.6.2013 - 12.6.2013	0,011	0,044	-0,022	-0,029	30.6.2015 - 7.7.2015	-0,006	-0,007	0,014	0,014
12.6.2013 - 19.6.2013	0,036	0,022	-0,007	0,022	7.7.2015 - 14.7.2015	-0,103	0,021	-0,016	-0,044
19.6.2013 - 26.6.2013	0,035	0,032	0,010	-0,027	14.7.2015 - 21.7.2015	0,022	-0,006	0,005	-0,019
26.6.2013 - 3.7.2013	0,003	-0,026	0,013	-0,033	21.7.2015 - 28.7.2015	-0,050	-0,034	-0,023	-0,034
3.7.2013 - 10.7.2013	-0,041	-0,048	-0,003	-0,089	28.7.2015 - 4.8.2015	0,056	0,040	0,019	0,079
10.7.2013 - 17.7.2013	-0,034	-0,008	0,021	0,181	4.8.2015 - 11.8.2015	0,030	-0,008	-0,015	0,036
17.7.2013 - 24.7.2013	-0,005	0,041	0,030	0,077	11.8.2015 - 18.8.2015	-0,039	-0,001	0,011	0,006
24.7.2013 - 31.7.2013	-0,037	0,026	0,017	0,040	18.8.2015 - 25.8.2015	-0,057	0,007	0,002	-0,042
31.7.2013 - 7.8.2013	-0,014	-0,087	-0,009	-0,071	25.8.2015 - 2.9.2015	-0,042	-0,099	-0,041	-0,057
7.8.2013 - 14.8.2013	0,040	0,019	0,002	0,065	2.9.2015 - 8.9.2015	-0,015	0,021	0,044	-0,073
14.8.2013 - 21.8.2013	-0,027	-0,035	-0,013	0,012	8.9.2015 - 15.9.2015	0,026	0,016	-0,024	-0,055
21.8.2013 - 28.8.2013	0,014	0,019	0,022	-0,005	15.9.2015 - 22.9.2015	-0,041	-0,036	-0,027	-0,094
28.8.2013 - 5.9.2013	-0,002	0,001	-0,022	0,059	22.9.2015 - 29.9.2015	-0,108	-0,225	-0,044	-0,278
5.9.2013 - 11.9.2013	0,081	-0,029	0,016	0,022	29.9.2015 - 6.10.2015	-0,153	-0,172	-0,239	-0,003
11.9.2013 - 18.9.2013	-0,015	-0,041	-0,010	-0,015	6.10.2015 - 13.10.2015	0,115	-0,082	0,081	0,006
18.9.2013 - 25.9.2013	-0,005	0,047	0,007	0,053	13.10.2015 - 20.10.2015	-0,093	-0,166	0,021	-0,011
25.9.2013 - 2.10.2013	0,045	0,034	0,024	-0,037	20.10.2015 - 27.10.2015	0,057	0,137	0,052	0,110
2.10.2013 - 9.10.2013	0,016	0,015	0,071	0,011	27.10.2015 - 3.11.2015	-0,082	0,006	-0,042	-0,091
9.10.2013 - 16.10.2013	0,073	-0,153	0,033	0,064	3.11.2015 - 10.11.2015	-0,066	-0,040	0,002	-0,085
16.10.2013 - 23.10.2013	0,033	0,038	-0,009	0,006	10.11.2015 - 17.11.2015	-0,167	-0,064	-0,065	-0,089
23.10.2013 - 30.10.2013	-0,007	-0,014	-0,001	-0,027	17.11.2015 - 24.11.2015	0,110	0,168	0,076	0,115
30.10.2013 - 6.11.2013	0,004	-0,014	0,023	0,060	24.11.2015 - 1.12.2015	-0,031	-0,069	-0,045	0,014
6.11.2013 - 13.11.2013	0,052	0,022	-0,002	0,032	1.12.2015 - 8.12.2015	0,106	0,095	-0,002	0,044
13.11.2013 - 20.11.2013	0,012	0,031	0,005	0,065	8.12.2015 - 15.12.2015	-0,018	0,014	0,067	-0,088
20.11.2013 - 27.11.2013	-0,049	-0,027	0,010	-0,003	15.12.2015 - 22.12.2015	-0,032	0,001	0,006	-0,048
27.11.2013 - 4.12.2013	0,007	0,035	-0,003	-0,034	22.12.2015 - 29.12.2015	0,067	0,094	0,058	0,056
4.12.2013 - 11.12.2013	-0,008	-0,025	0,013	-0,006	29.12.2015 - 5.1.2016	-0,020	-0,082	-0,042	-0,002
11.12.2013 - 18.12.2013	-0,053	-0,020	0,003	-0,065	5.1.2016 - 12.1.2016	-0,050	-0,078	-0,004	-0,095

18.12.2013 - 26.12.2013	0,011	0,012	0,001	0,032	12.1.2016 - 20.1.2016	0,080	-0,103	-0,017	0,071
26.12.2013 - 3.1.2014	0,056	-0,018	-0,013	0,002	20.1.2016 - 26.1.2016	0,042	-0,145	-0,018	0,020
3.1.2014 - 8.1.2014	0,036	-0,008	-0,004	0,107	26.1.2016 - 2.2.2016	0,092	0,076	0,070	0,101
8.1.2014 - 16.1.2014	-0,031	-0,001	0,002	-0,067	2.2.2016 - 9.2.2016	-0,037	-0,073	-0,043	-0,006
16.1.2014 - 22.1.2014	0,012	0,028	0,031	-0,036	9.2.2016 - 17.2.2016	-0,032	-0,149	-0,077	-0,084
22.1.2014 - 29.1.2014	-0,029	0,066	0,023	-0,007	17.2.2016 - 23.2.2016	-0,025	-0,080	-0,049	-0,021
29.1.2014 - 5.2.2014	-0,042	-0,007	0,035	-0,018	23.2.2016 - 2.3.2016	-0,091	-0,058	-0,123	-0,046
5.2.2014 - 12.2.2014	0,017	0,043	0,010	0,019	2.3.2016 - 9.3.2016	0,050	0,142	0,018	0,117
12.2.2014 - 20.2.2014	0,001	-0,006	-0,003	0,049	9.3.2016 - 16.3.2016	0,018	0,011	0,088	0,057
20.2.2014 - 26.2.2014	-0,070	-0,065	-0,019	-0,042	16.3.2016 - 23.3.2016	0,052	0,114	-0,049	0,050
26.2.2014 - 5.3.2014	0,032	0,021	0,006	0,030	23.3.2016 - 30.3.2016	0,062	0,058	0,001	0,082
5.3.2014 - 12.3.2014	-0,027	-0,019	0,018	0,018	30.3.2016 - 6.4.2016	0,007	0,011	0,004	0,030
12.3.2014 - 19.3.2014	0,046	0,057	0,067	0,043	6.4.2016 - 13.4.2016	0,052	0,006	0,034	0,032
19.3.2014 - 26.3.2014	-0,008	0,002	-0,008	-0,007	13.4.2016 - 20.4.2016	-0,007	0,041	-0,043	0,004
26.3.2014 - 2.4.2014	0,029	0,009	0,002	0,019	20.4.2016 - 27.4.2016	0,011	0,103	0,029	0,027
2.4.2014 - 9.4.2014	-0,011	-0,013	-0,004	-0,048	27.4.2016 - 4.5.2016	0,034	0,062	-0,014	0,015
9.4.2014 - 16.4.2014	0,034	0,077	0,034	0,008	4.5.2016 - 11.5.2016	-0,043	-0,104	-0,047	-0,054
16.4.2014 - 23.4.2014	-0,007	0,027	0,000	0,094	11.5.2016 - 18.5.2016	0,009	-0,041	0,008	0,001
23.4.2014 - 30.4.2014	-0,017	-0,009	0,001	0,009	18.5.2016 - 26.5.2016	0,059	0,033	0,046	0,103
30.4.2014 - 7.5.2014	-0,009	0,024	-0,022	0,076	26.5.2016 - 1.6.2016	0,063	0,081	0,017	0,063
7.5.2014 - 14.5.2014	0,008	-0,001	0,005	0,012	1.6.2016 - 8.6.2016	-0,045	-0,019	0,044	-0,055
14.5.2014 - 21.5.2014	0,028	0,013	-0,039	0,032	8.6.2016 - 15.6.2016	-0,011	-0,114	0,013	0,018
21.5.2014 - 29.5.2014	0,034	0,032	0,007	0,041	15.6.2016 - 22.6.2016	0,012	0,027	0,009	0,021
29.5.2014 - 4.6.2014	0,030	0,005	-0,057	0,050	22.6.2016 - 29.6.2016	-0,040	-0,085	-0,012	-0,017
4.6.2014 - 11.6.2014	-0,019	0,033	0,030	-0,033	29.6.2016 - 6.7.2016	0,014	-0,039	0,009	-0,011
11.6.2014 - 18.6.2014	0,037	-0,003	-0,062	0,021	6.7.2016 - 13.7.2016	0,038	0,120	0,043	0,091
18.6.2014 - 25.6.2014	-0,004	-0,033	0,035	-0,008	13.7.2016 - 20.7.2016	0,038	0,212	0,038	0,053
25.6.2014 - 2.7.2014	0,031	0,006	0,009	0,081	20.7.2016 - 27.7.2016	-0,008	0,048	0,001	0,021
2.7.2014 - 9.7.2014	0,023	0,077	0,020	0,040	27.7.2016 - 3.8.2016	0,031	0,081	0,021	0,013
9.7.2014 - 16.7.2014	-0,060	-0,019	-0,004	0,043	3.8.2016 - 10.8.2016	0,006	-0,038	-0,003	0,008
16.7.2014 - 23.7.2014	-0,016	-0,090	-0,067	0,001					
23.7.2014 - 30.7.2014	-0,018	0,038	0,020	-0,087					
30.7.2014 - 6.8.2014	0,025	-0,018	0,071	-0,053					
6.8.2014 - 13.8.2014	-0,031	-0,065	-0,009	-0,024					
13.8.2014 - 20.8.2014	0,029	0,049	0,007	0,103					
20.8.2014 - 27.8.2014	0,000	-0,007	-0,050	0,023					
27.8.2014 - 4.9.2014	0,008	-0,031	0,001	-0,050					

4.9.2014 - 10.9.2014	0,018	-0,004	0,012	0,052					
10.9.2014 - 17.9.2014	0,058	0,066	0,022	0,038					

Quaternions and Rotation Sequences

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Abstract- The position of a point after some rotation about the origin can simply be obtained by multiplying its coordinates with a matrix. One reason for introducing homogeneous coordinates is to be able to describe translation with a matrix so that multiple transformations, whether each is a rotation or a translation, can be concatenated into one described by the product of their respective matrices. However, in some applications (such as spaceship tracking), we need only be concerned with rotations of an object, or at least independently from other transformations. In such a situation, we often need to extract the rotation axis and angle from a matrix which represents the concatenation of multiple rotations. The homogeneous transformation matrix, however, is not well suited for the purpose.

Index Terms- Quaternion, Quaternion triple-product, Rotation operator

I. INTRODUCTION

Up until now we have learned that a rotation in \mathbf{R}^3 about an axis through the origin can be represented by a 3×3 orthogonal matrix with determinant 1. However, the matrix representation seems redundant because only four of its nine elements are independent. Also the geometric interpretation of such a matrix is not clear until we carry out several steps of calculation to extract the rotation axis and angle. Furthermore, to compose two rotations, we need to compute the product of the two corresponding matrices, which requires twenty-seven multiplications and eighteen additions [1-5].

Quaternions are very efficient for analyzing situations where rotations in \mathbf{R}^3 are involved. A quaternion is a 4-tuple, which is a more concise representation than a rotation matrix. Its geometric meaning is also more obvious as the rotation axis and angle can be trivially recovered. The quaternion algebra to be introduced will also allow us to easily compose rotations. This is because quaternion composition takes merely sixteen multiplications and twelve additions [4-9].

Hamiltons Quaternions

While numbers of the form $a + ib$, that is, complex numbers of rank 2, were gaining general acceptance, some mathematicians of that day sought other mathematical systems over the hyper-complex numbers of, say, rank $3, 4, \dots, n$. In 1843 after years of struggling, in an effort to create such a system, a sudden stroke of mathematical insight came upon William Rowan Hamilton. History says she happened to be out walking with his wife and, reputedly, carved these now famous equations in the stonewall of the bridge, in Dublin, over which they happened to be walking:

$$\mathbf{i}^2 = \mathbf{j}^2 = \mathbf{k}^2 = \mathbf{ijk} = -1.$$

Implicit in these equations, is that

$$\mathbf{ij} = \mathbf{i} \times \mathbf{j} = \mathbf{k} = -\mathbf{j} \times \mathbf{i} = -\mathbf{ji},$$

$$\mathbf{jk} = \mathbf{j} \times \mathbf{k} = \mathbf{i} = -\mathbf{k} \times \mathbf{j} = -\mathbf{kj},$$

$$\mathbf{ki} = \mathbf{k} \times \mathbf{i} = \mathbf{j} = -\mathbf{i} \times \mathbf{k} = -\mathbf{ik}.$$

All of quaternion algebra proceeds from these equations, e.g. the product of two quaternions \mathbf{p} and \mathbf{q} where

$$\mathbf{p} = p_0 + \mathbf{p} = p_0 + \mathbf{i}p_1 + \mathbf{j}p_2 + \mathbf{k}p_3$$

$$\mathbf{q} = q_0 + \mathbf{q} = q_0 + \mathbf{i}q_1 + \mathbf{j}q_2 + \mathbf{k}q_3$$

can be reduced to

$$\mathbf{pq} = p_0q_0 - \mathbf{p} \cdot \mathbf{q} + p_0\mathbf{q} + q_0\mathbf{p} + \mathbf{p} \times \mathbf{q}$$

all in accordance with Hamilton's foregoing original equations.

Quaternion Algebra

The set of quaternions, together with the two operations of addition and multiplication, form a non-commutative [10,11] The standard orthonormal basis for \mathbf{R}^3 is given by three unit vectors $\mathbf{i} = (1, 0, 0)$, $\mathbf{j} = (0, 1, 0)$, $\mathbf{k} = (0, 0, 1)$.

A quaternion q is defined as the sum of a scalar q_0 and a vector

$$\mathbf{q} = (q_1, q_2, q_3), \text{ i.e.}$$

$$\mathbf{q} = q_0 + \mathbf{q} = q_0 + q_1\mathbf{i} + q_2\mathbf{j} + q_3\mathbf{k}.$$

Addition and Multiplication

Addition of two quaternions acts component-wise. More specifically, consider the quaternion q above and another quaternion

$$\mathbf{p} = p_0 + p_1\mathbf{i} + p_2\mathbf{j} + p_3\mathbf{k}.$$

Then we have

$$\mathbf{p} + \mathbf{q} = (p_0 + q_0) + (p_1 + q_1)\mathbf{i} + (p_2 + q_2)\mathbf{j} + (p_3 + q_3)\mathbf{k}.$$

Every quaternion q has a negative $-q$ with components $-q_i$, $i = 0, 1, 2, 3$.

The product of two quaternions satisfies these fundamental rules introduced by Hamilton:

$$\mathbf{i}^2 = \mathbf{j}^2 = \mathbf{k}^2 = \mathbf{ijk} = -1,$$

$$\mathbf{ij} = \mathbf{k} = -\mathbf{ji},$$

$$\mathbf{jk} = \mathbf{i} = -\mathbf{kj},$$

$$\mathbf{ki} = \mathbf{j} = -\mathbf{ik}.$$

Hence, the product of two quaternions P and Q is:

$$pq = p_0q_0 - (p_1q_1 + p_2q_2 + p_3q_3) + p_0(q_1\mathbf{i} + q_2\mathbf{j} + q_3\mathbf{k}) + q_0(p_1\mathbf{i} + p_2\mathbf{j} + p_3\mathbf{k}) + (p_2q_3 - p_3q_2)\mathbf{i} + (p_3q_1 - p_1q_3)\mathbf{j} + (p_1q_2 - p_2q_1)\mathbf{k}.$$

Using by the inner product and cross product of two vectors in \mathbf{R}^3 , we obtain:

$$pq = p_0q_0 - \mathbf{p} \cdot \mathbf{q} + \mathbf{p}_0\mathbf{q} + q_0\mathbf{p} + \mathbf{p} \times \mathbf{q}.$$

In the above, $\mathbf{p} = (p_1, p_2, p_3)$ and $\mathbf{q} = (q_1, q_2, q_3)$ are the vector parts of P and Q , respectively.

Complex Conjugate, Norm, and Inverse

Let $q = q_0 + \mathbf{q} = q_0 + q_1\mathbf{i} + q_2\mathbf{j} + q_3\mathbf{k}$ be a quaternion. The *complex conjugate* of q , denoted q^* , is defined as

$$q^* = q_0 - \mathbf{q} = q_0 - q_1\mathbf{i} - q_2\mathbf{j} - q_3\mathbf{k}.$$

From the definition we immediately have

$$(q^*)^* = q_0 - (-\mathbf{q}) = q,$$

$$q + q^* = 2q_0,$$

$$q^*q = (q_0 - \mathbf{q})(q_0 + \mathbf{q}) = qq^*.$$

Given two quaternions P and Q , we verify that

$$(pq)^* = q^*p^*.$$

The *norm* of a quaternion q , denoted by $|q|$, is the scalar $|q| = \sqrt{q^*q}$. A quaternion is called *unit quaternion* if its norm is 1. The norm of the product of two quaternions P and Q is the product of the individual norms, for we have $|pq|^2 = |p|^2|q|^2$.

The inverse of a quaternion q is defined as

$$q^{-1} = \frac{q^*}{|q|^2}.$$

We verify that $q^{-1}q = qq^{-1} = 1$. In the case q is a unit quaternion, the inverse is its conjugate q^* .

Power, Exponential, and Logarithm

Let we have $q = q_0 + \mathbf{q}$. That $q_0^2 + \|\mathbf{q}\|^2 = 1$ implies that there exists a unique $\theta \in [0, \pi]$ such that $\cos \theta = q_0$ and $\sin \theta = \|\mathbf{q}\|$. The quaternion can thus be rewritten in terms of θ and the unit vector $\mathbf{u} = \mathbf{q}/\|\mathbf{q}\|$:

$$q = |q|(\cos \theta + \mathbf{u} \sin \theta),$$

where $\theta = \arccos(q_0/|q|)$. Euler's identity for a complex number is

$$a + bi = \sqrt{a^2 + b^2} e^{i\phi},$$

where $i^2 = -1$ and $\phi = a \tan \angle(b, a)$, generalizes to the quaternion q can be rewritten as

$$q = |q| e^{u\theta}.$$

This allows us to define the power of q as

$$q^\rho = |q|^\rho (e^{u\theta})^\rho = |q|^\rho (\cos(\rho\theta) + \mathbf{u} \sin(\rho\theta)), \quad \rho \in \mathbf{R}.$$

Intuitively, the power is taken over the norm of the quaternion while a scaling is performed on its "phase angle".

An exponential of q makes use of the Taylor expansion that treats q just as an ordinary variable:

$$e^q = \sum_{i=0}^{\infty} \frac{q^i}{i!}.$$

The sum on the right hand side has a closed form that transforms the above into

$$e^q = \exp(q_0 + \mathbf{u}\|\mathbf{q}\|) = e^{q_0} (\cos \|\mathbf{q}\| + \mathbf{u} \sin \|\mathbf{q}\|).$$

The logarithm of q is accordingly defined as

$$\ln q = \ln |q| + \mathbf{u} \arccos\left(\frac{q_0}{|q|}\right).$$

The two operations are inverses of each other as we verify that

$$e^{\ln q} = e^{\ln|q| + \mathbf{u}\arccos(q_0/|q|)} = |q| e^{\mathbf{u}\arccos(q_0/|q|)} = |q| \left(\frac{q_0}{|q|} + \mathbf{u} \frac{\|\mathbf{q}\|}{|q|} \right) = q.$$

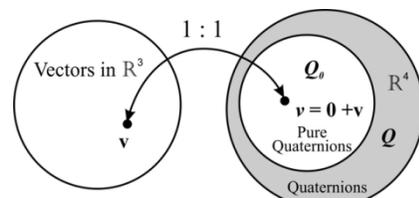


Figure 1. Correspondence: vector ↔ quaternions

Special quaternion triple-product – a rotation operator

Theorem 1. For any quaternion

$$q = q_0 + \mathbf{q} = \cos \theta + \mathbf{u} \sin \theta$$

and for any vector $\mathbf{v} \in \mathbf{R}^3$ the action of the operator $L_q(\mathbf{v}) = q\mathbf{v}q^*$

on \mathbf{v} may be interpreted geometrically as a rotation of the vector \mathbf{v} through an angle 2θ about \mathbf{q} as the axis of rotation [10].

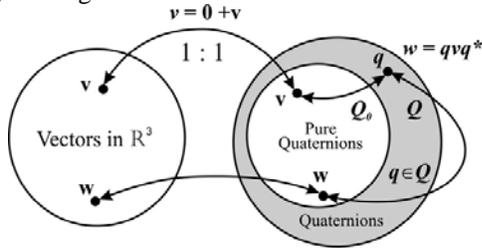


Figure 2. Quaternion operations on vectors

Rotation operator geometry

The quaternion rotation operator takes $v \rightarrow w$. That is,

$$w = qvq^* = (q_0^2 - |\mathbf{q}|^2)\mathbf{v} + 2(\mathbf{q} \cdot \mathbf{v})\mathbf{q} + 2q_0(\mathbf{q} \times \mathbf{v}).$$

If we write the vector \mathbf{v} in the form

$$\mathbf{v} = \mathbf{a} + \mathbf{n},$$

where \mathbf{a} is the components of \mathbf{v} along the vector part of q , and \mathbf{n} is the components of \mathbf{v} normal to the vector part of q . Then, it follows that

$$\mathbf{a} + \mathbf{m} = q(\mathbf{a} + \mathbf{n})q^* = (q_0^2 - |\mathbf{q}|^2)(\mathbf{a} + \mathbf{n}) + 2(\mathbf{q} \cdot \mathbf{a})\mathbf{q} + 2q_0(\mathbf{q} \times \mathbf{n}) = \mathbf{w}.$$

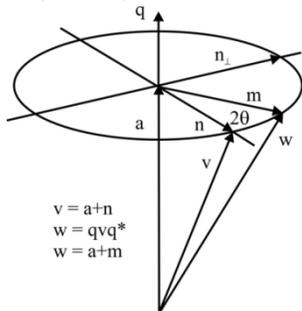


Figure 3. Rotation operator geometry

Two-rotation tracking sequence using matrices

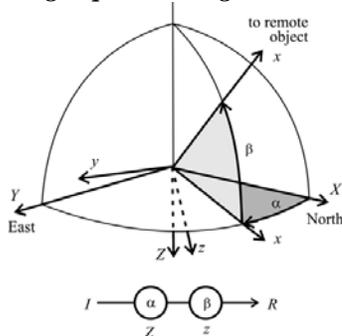


Figure 4. A rotation about Z-axis, followed by a rotation about new y-axis

$$\mathbf{R} = R_\beta^y R_\alpha^z \mathbf{I} = \begin{pmatrix} \cos \beta & 0 & -\sin \beta \\ 0 & 1 & 0 \\ \sin \beta & 0 & \cos \beta \end{pmatrix} \begin{pmatrix} \cos \alpha & \sin \alpha & 0 \\ -\sin \alpha & \cos \alpha & 0 \\ 0 & 0 & 1 \end{pmatrix} \mathbf{I}$$

$$= \begin{pmatrix} \cos \alpha \cos \beta & \sin \alpha \cos \beta & -\sin \beta \\ -\sin \alpha & \cos \alpha & 0 \\ \cos \alpha \sin \beta & \sin \alpha \sin \beta & \cos \beta \end{pmatrix} \mathbf{I}$$

where \mathbf{I} is identity matrix in \mathbf{R}^3 .

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Using Agile Methodology in Data Warehouse

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Abstract- In recent years, Agile Methodology for software development has been embraced by many organizations where traditional waterfall approach has failed. Agile method promises higher software quality, reduced risk and more cost savings as compared to waterfall. Many organizations using Agile have realized these benefits for online transactional processing (OLTP) applications and have recently tried to apply this method and gain benefits for online analytical processing (OLAP) or data warehouse applications. In this paper, we aim to explain the challenges faced during development in data warehousing projects using waterfall approach and how best the agile methodology can be applied for these types of projects.

Index Terms- OLTP, OLAP, Agile, Waterfall, Data Warehouse

I. INTRODUCTION

Data warehouse forms an integrated environment where data from disparate systems is brought together and presented in a consistent manner. Data Warehouse has several components such as data in different format from disparate sources, database, Extract Transform and Load (ETL) processes, Dashboards etc. Data integration using ETL from disparate sources is often the most time consuming and expensive tasks in developing a data warehouse and accounts for more than half of the project budget. Also the requirements in data warehouse project are subject to constant change by the business users making it harder to follow the traditional waterfall approach.

In waterfall method, the business value is not realized till the major phases of the project Requirement Analysis, Design and development are completed which makes the project more risky and likely to fail. As compared to Agile where the business benefit is realized on regular basis using 4-6 week of iterative development cycles called Sprints. At the end of each Sprint, development team is required to produce business value in terms of tangible work product. In case of data warehousing projects, these sprints can be useful in design and development of complex ETL integration

II. RESEARCH ELABORATIONS

For organization, which are starting to implement agile methodology and have only used waterfall methodology in the

past, it is recommended to use agile first for online transactional processing projects. Once the organization gets used to agile environment, it is recommended to deploy agile on Data Warehousing projects which are generally more complex in nature.

Data warehousing projects tend to be longer and often the business value is not realized as by the time when the requirements are delivered business has moved on to a different set of requirements due to changing market conditions. To address problems like these, it is often recommended to take agile approach where business value can be realized sooner and is visible to business on recurring basis.

III. RESULT FINDINGS

The result findings from different data warehousing projects using Agile methodology have shown to deliver better value to business especially when the scope of project is uncertain.

IV. CONCLUSION

In conclusion using agile methodology for data warehousing projects, IT teams can not only achieve increased flexibility to address new requirements but also improve the quality and response time to new requirements. Agile offers value to business on regular basis and helps in staying on track especially for data warehouse projects which are mostly large and complex.

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Maintaining Data Quality in Data Warehouse

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Abstract- Data warehouse forms an integrated environment where data from disparate systems is brought together and presented in a consistent manner. Based on the data present in the warehouse business users want to make key decisions. In order to support these decisions, quality of data in warehouse must be reliable. If there are issues in data loaded in warehouse, business users lose trust and the information from the warehouse becomes unreliable. One of the essential components of data warehouse is the (Extract, Transform and Load) ETL process. This process is used in most organizations to load data into the warehouse. An ETL is a complex process in itself and one which is most time consuming during the building of the data warehouse. It allows the data in the warehouse to be refreshed on the periodic basis (daily, 'maintained and there is no data loss every time data is loaded into the warehouse using ETL.

An audit balance and control (ABC) framework is for this purpose. Using this framework quality of data in warehouse can be maintained.

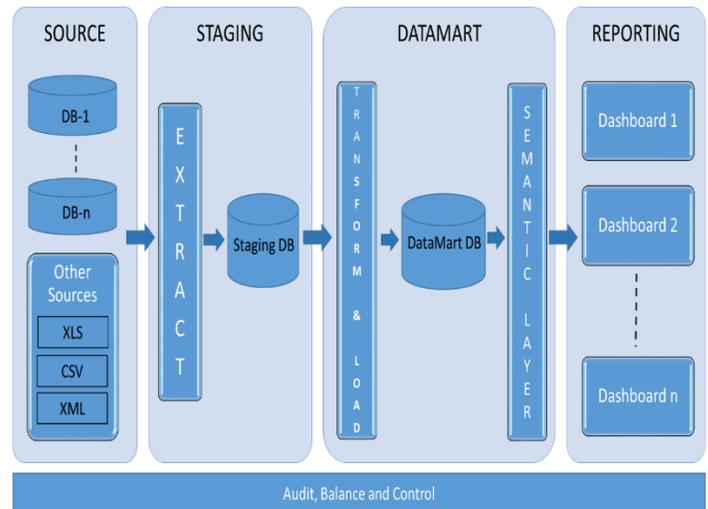
Each of the three layers (Audit, Balance and Control) serve a specific purpose in the data warehouse. Using Audit the schedule of various ETL jobs that run on daily basis, job start time and job end time, number of records loaded, number of records that errored out can be traced. Balance is for comparing the source data with the data loaded into the staging and into the rules to be applied, and have the functionality to report on exceptions. Control is for scheduling the ETL jobs and re-starting the ETL jobs in case of failures.

Index Terms- Audit Balance and Control (ABC), ETL, Data Quality, Data Warehouse

I. INTRODUCTION

In this framework, Audit is for tracking many of the processes used for ETL maintenance and operations. Not only the errors can be reported but also the quality of data loaded into the warehouse can be checked.

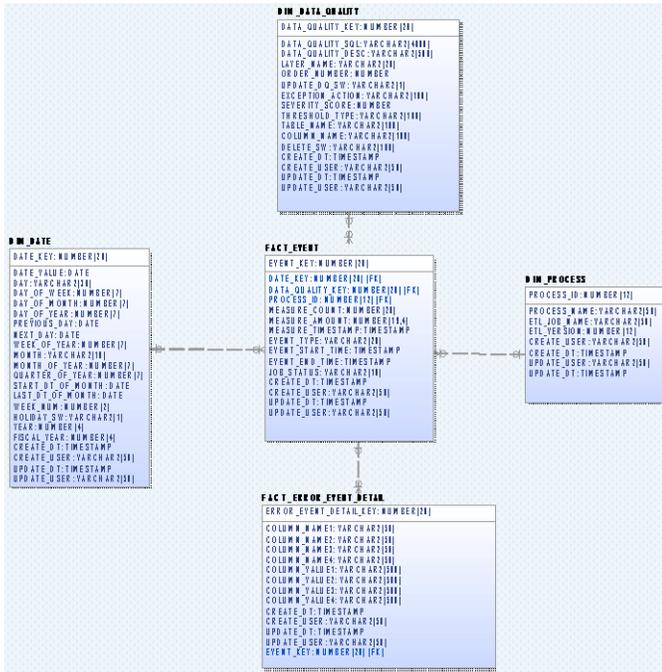
A.



As illustrated in diagram above, Audit Balance and Control framework can be used to audit balance and control the data movement between different layers such as source to staging and staging to DataMart.

1. The following are the main technical features which can be implemented by ABC subject area:-
2. Audit of all ETL batch jobs that run i.e. one event generated for each job start and job end with an indication if the job completed successfully, completed with warnings, or failed.
3. A predefined set of sql's are run at specific points in the ETL process. For example sql's are run sql' s at source, staging, and DataMart layers and the count of records compared.
4. Ability to control the ETL batches that run and to start or stop a process based on the output of the sql from step 2.
5. Perform row level exception handling i.e. flagging the problem records or records with data quality issues in the DataMart so they could be excluded in reporting.

Below is the data model for implementation of Audit Balance and Control (ABC) DataMart:-



DIM DATE:-This is standard date dimension used to track date when the event occurred. For example, the date when the audit event was recorded.

DIM PROCESS:-This dimension is used to store the information for ETL batch jobs. Using this dimension, name of each ETL job, its description and version can be tracked.

DIM DATA QUALITY:- This table is used for data quality checks which can be implemented using sql statements. This stores the sql scripts which are run against the source, staging or data warehouse layer to keep a count of the records or to compare the metrics in each layer. It can also be used for row level check to flag the problem records in each layer.

FACT EVENT:-This table records the date when the event occurred along with the record count in case of the control event. In case of audit event, it stores the date when event occurred along with count of the records which errored out.

FACT ERROR EVENT DETAIL:-This table stores the row level details of the records which errored out. The records are stored in key value pair where key represent the column name and value represents the actual value of the column.

Implementation of Audit:-

In audit, we basically store the start and end times of each job along with how many records were processed in each run. We also store the records that errored out during the loads.

To support the requirements of the audit a separate DIM_PROCESS table which has names of all the jobs is created. Each time a job is run, the start and end time of the job along with number of records processed is stored in FACT_ABC_EVENT. This way we can keep track of what all jobs ran successfully and what failed.

When an ETL job is run the successful records are loaded into respective target tables while the rejected records are stored in FACT_ERROR_EVENT_DETAIL table. This table holds the rejected records in key value pair form along with error message and error timestamp. The key values pair provides flexibility to

include any tables without doing any structural changes in the error table.

Implementation of Balance: -

In Balance, the ETL process is run so as to compare the results between different layers such as Source, Staging and DataMart. To support this, DIM_DATA_QUALITY will have list of sql scripts which will be stored and run at pre-defined intervals compare data in different layers. There can be two types of check done using this:-

- 1) The check to compare counts in different layers such as source, staging and DataMart.
- 2) The check to compare aggregates such as Amounts etc.

Implementation of Control:-

In control, we maintain the schedule of ETL jobs as well as the re-startability of ETL jobs in case of failures. Using the D_DQ_SCRIPT tables, we can also do row level checks and control the quality of the data loaded into the DataMart.

ETL job failures will be identified by querying the FACT_ABC_EVENT table based on the status attribute value as 'Failure'. Manual intervention will be required to identify the issue, fix it, and rerun the job. Issues can be database, source file structure incorrect, invalid data etc. and based on this analysis appropriate action needs to be taken and rerun the job in case of fixing the issue. In case job being success with rejected records, rejected records captured in the error table must be analyzed and correct record need to be sent in the next run to reprocess.

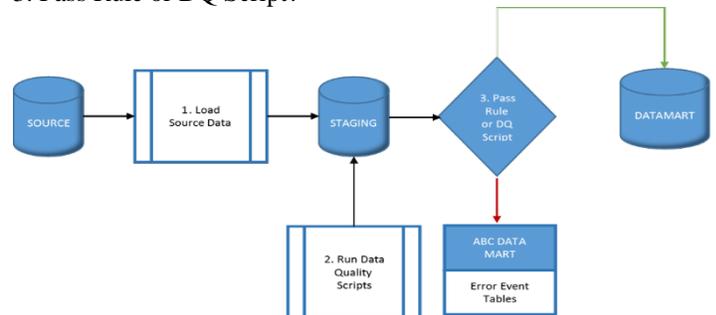
For doing row level checks and controlling the quality of data loaded into DataMart following process is followed:-

First the data is loaded from source into staging area. The data quality SQL Scripts is run on the Staging Table. The scripts should dynamically read from DIM_DQ_SCRIPT and execute the DQ process. It will update the DQ Flag, DQ_Severity and DQ_ActionCode appropriately on the Staging tables and determine DQ Flag = P/F (Pass/Fail).

If the DQ Flag = 'F' OR DQ_ActionCode = "Not Load in DM" then records get loaded into the FACT_ERROR_EVENT_DETAIL. If the DQ_FLAG = 'P' and DQ_ActionCode = "Load in DM" then it gets loaded in the DataMart.

The below diagram demonstrates the above data quality mechanism:

3. Pass Rule or DQ Script?
3. Pass Rule or DQ Script?
3. Pass Rule or DQ Script?



II. RESULT FINDINGS

The table below details the actions being taken from the numbered steps in the diagram above.

1. Source data is loaded into the Staging Layer via ETL process
2. Data Quality scripts held within the ABC Data Mart's are run against the staging layer
3. Records that meet data quality requirements PASS, if not, the records FAIL
4. Clean Record Set will be loaded into the Data Marts
5. Failed Records will be loaded into the ABC Data Mart's Error Event Tables

III. CONCLUSION

In conclusion the reconciliation of data from source to warehouse is critical to overall success of the business

intelligence program. Only if the data is reconciled on day to day basis can the business have faith in the report produced from the data warehouse. Using the Audit Balance and Control the quality of data in data warehouse can be tracked and maintained. To this extent, ABC framework is helpful so as to have trust of business on the data.

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Calliandracalythorus leaves as tanniferous fodder for ruminant animals

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Abstract- *Calliandracalythorus* is a multipurpose tree legume which has long been used by farmers as forage for their animals in the tropics and subtropics. Calliandra is well known as the high proteins and tannins plant, however much of the protein is wasted because its tannins bind protein fibre and reducing its digestibility. Tannins at high concentrations affect voluntary intake, nutritive value of the plant and rate of growth of animals consuming them. This review discussed the relationship between tannin, digestibility and growth of animals. Animal production from supplementation of Calliandra to low quality basal diets in comparison with supplementation with low tannin forage legumes are presented and discussed.

Index Terms- animal production, Calliandra, digestibility, proteins, tannins

I. INTRODUCTION

Inadequate year-round proper nutrition, especially during the dry season is the most important factor contributing to the low animal production in tropical developing countries, including Indonesia. During the dry season, most farmers use low quality standing hay and crop residues as feeds for their animals. These feeds are characterized by high levels of fiber, low levels of energy, proteins, minerals and vitamins which lead to low levels intake and digestibility (Sarwatt *et al.*, 2002). On average, during the wet season, grasses contain about 8 to 10% crude protein, however during the dry season, they drop to below the minimum 7% level required for maintenance, while crop residues like rice straw and standing hay only contain crude protein of 3 – 5% (Jackson, 1978). Consequently, many problems such as poor growth, weight loss, low reproductive performances, and sickness due to the lack of nutritional quality of feed arise during the dry season. One way of improving the utilization of standing hay and crop residues is by supplementation with forage tree legumes (Norton, 1998).

Calliandra is a small leguminous tree or large shrub in the family of Leguminosae (Fabaceae) and subfamily Mimosoideae. It is native to humid tropics and sub-humid tropical areas of Central America and Mexico. It was introduced to Java, Indonesia in 1036 and have spread from there over Indonesian archipelago and other parts of southeast Asia (Palmer *et al.*, 1994). Initially it was introduced to Indonesia to provide shade in coffee plantation, but the tree has now proved more useful for other purposes such as fuelwood, land reclamation and fodder.

As fodder, dry matter yield of Calliandra is quite high, it can attain 18.2 ton DM/ha, slightly less than *Gliricidia* (19.2 ton DM/ha) and *Leucaena* (21.8 ton DM/ha) (Catchpole and Blair,

1990). One superiority of Calliandra over *Leucaena* is high adaptability to acid soils which found in most eroded soils where *Leucaena* cannot thrive. *Leucaena* also suffers from psyllid attack whereas adult psyllids are unable to feed or oviposit on Calliandra (Vandesschricke *et al.*, 1992).

Like most legumes, Calliandra contains high levels of crude protein which is far higher than found in the grasses and crop residues. This makes Calliandra may be suitable used as sole feed or as feed supplement to provide protein for animals fed low quality feeds. However, despite its protein content is high, its digestibility is low, because its high levels of tannin tend to bind protein and fiber. Tannin also can reduce feed intake, lower nutrient digestibility and protein availability. There is fragmented information on the nutritional quality and the suitability of Calliandra as ruminant feed available. In this review, the summary of present knowledge on nutritional composition of Calliandra and its effects on animal growth are presented and discussed.

II. ACCEPTANCE BY ANIMALS

Freshly harvested Calliandra leaves are generally highly palatable to ruminants where animals have prior experience with the forage. Works in Indonesia and Australia indicate that Calliandra is better used when fresh than dried or wilted. When Calliandra leaves fed in fresh to sheep, voluntary intake was 59 g dry matter/kg $W^{0.75}$, whereas for dried materials, it was 37 g dry matter/kg $W^{0.75}$. (Palmer and Schlink, 1992). However, the reduced palatability of Calliandra is affected by wilting or drying of leaves only occurred at high levels of supplementation. At normal supplementation (20 – 40%), they had no effect on intake (Anon., 2016).

There is contradictory report on acceptance of Calliandra in comparison with other legume trees. Phiriet *et al.* (1992) reported that acceptance of fresh Calliandra was lower than *Leucaena* but it was superior to *Sesbania sesban* and *Gliricidia sepium*, however, Fadiyimu *et al.* (2014) reported that in Nigeria, preference index of *Gliricidia* was the highest, followed by *Leucaena* and Calliandra. They suggested that the highest preference index of *Gliricidia* was caused by the fact that *Gliricidia* was the most familiar to goats at the time of study. It is generally accepted that *Gliricidia* is high quality forage, but of low palatability when first introduced to animals (Norton, 1998).

III. CRUDE PROTEIN CONTENT

The protein content of Calliandra within the range of 20 – 30% as reported by Patterson *et al.* (1996). This protein content is

comparable with other forage tree legumes such as *Leucaenaleucocephala* (25.9%) (Shelton and Brewbaker, 1998) and *Gliricidiasepium*(20 – 30%) (Simons and Stewart, 1998).

Crude protein content of Calliandra varied with provenances (Premaratne and Perera, 1999), plant parts, cutting interval and season (Salawuet *al.*, 1997). Leaves and young shootsof Calliandracontain higher tannin than the older shoot. Increasing of cutting interval from 6 to 12 weeks reduced crude protein content from 22.4 to 21.6% (Tuwei *et al.*, 2003).

Feeds containing protein less than 7% are considered as deficient in protein as they can not provide the minimum ammonia levels (70 mg N/L) required for optimum activity of rumen microbes (Norton, 1998). All reported protein contents of Calliandraare far above than this value, so it can be judged that proteins of Calliandra are adequate for high producing ruminants. However, high tannins may form complexeswith proteinwhich decrease their degradability in the rumen, thereby decreasing rumen ammonia concentrations and increasing the amount of protein bypassing the rumen.

IV. TANNIN CONTENT

Condensed tannin contents of Calliandra varied from 6.00 to 16.0%, with averagedof 9.5% (Table 1), which higher compared to Leucaena (3.51%) and Gliricidia (3.79%)(Aye and Adegun, 2013). Tannin content is influenced by provenance, maturity, season and method of sample preparation. The amount of tannin in Calliandra is affected by drying method used, with freeze drying being the preferred method of sample preparation.Oven drying decreased condensed tannin contentfrom 11.7 to 8.2% (Ahnet *al.*, 1997). It is theorized that during oven drying, tannins bind with other cell polymers like protein or cell wall carbohydrates (Reed, 1986).

Table 1. Condensed tannin content of *Calliandra calothyrsus* leaves

Condensed tannin (%)	Reference
8.20	Ahnet <i>al.</i> (1997)
6.00	McSweeney <i>et al.</i> (1999)
11.3	Mahyuddin <i>et al.</i> (1998).
11.2 – 16.0	Premaratne <i>et al.</i> (1999)
8.08	Abqorayah <i>et al.</i> (2014)
7.43	Setyawati <i>et al.</i> (2016)

Tannins can be beneficial or detrimental to ruminants, depending on how much it is consumed. Low concentrations of plant tannins is believed to leave the protein is unprotected as to be completely degraded in the rumen, while presence of moderate levels of tannin in diets prevented protein degradation in the rumen and make protein available to enzymatic digestion in the lower gut (Perera *et al.* 1996).Barry *et al.* (1983) demonstrated that in*Lotus pedunculatus*, the ideal concentration of condensed tannin were between 2 – 4% of diet dry matter, at which level they bind with dietary protein during mastication and

appear to protect the protein from microbial attack in the rumen. This leads to higher nitrogen retention, higher growth rates and milk yield (D’Mello, 1992). At high concentrations (>5% DM), however, condensed tannin formscomplex particularly with protein and act as anti-nutritional that reducing voluntary intake and digestibility (Barahona *et al.*, 2003). All reported tannin contents of Calliandrain Table 1are higher than 5%, so it can be inferred that Calliandra can be categorized as high tanniferous plant.

V. DIGESTIBILITY

IVDMD and IVOMD value of Calliandra as reported by some authors are presented in Table 3. IVDMD value ranged from 25.3 to 38.9 and IVOMD values ranged from 26.1 to 48.4%. These values are lower compared to other leguminous tree such asLeucaena(IVDMD 65.2 and IVOMD 67.7%) (Datt *et al.*, 2008), Gliricidia(IVDMD 54.52%) (Barrios, 2016) and *Sesbaniasesban* (IVDMD 60.5 – 76.1) (Dzowela *et al.*, 1995).

Table 2. In Vitro Dry Matter Digestibility (IVDMD) and In Vivo Dry Matter Digestibility (IVOMD) of Calliandra

IVDMD (%)	IVOMD (%)	Reference
19.5 – 40.2	26.6	Dwozela <i>et al.</i> (1995)
25.3	26.6	Perera <i>et al.</i> (1996)
	27.3 – 36.1	Premaratne and Parera (1999)
38.9 and 36.5		Tuwei <i>et al.</i> 2003)
	48.4	Santoso <i>et al.</i> (2013)
35.88		Barrios, (2016)

IVDMD and IVOMD value are influenced by method of drying, ADF and tannin content. In Calliandra, the highest IVDMD value was obtained by freeze drying method, followed by sun-dried and oven-dried method (Dzowela *et al.* (1995). As ADF content of Calliandra was fairly low (around 25%) (Premaratne and Perera, 1999), it is strongly suggested that the low IVDMD and IVOMD valueof Calliandraarecaused by its high tannin content.The low digestibility of Calliandra indicates that this plant is not suitable used as sole diet, and it should be used as supplement. When dried Calliandra was fedad *libitum* as a sole diet, DDM intake decreased to 21.6 g/kg^{0.75} per day (similar to barley straw plus urea-molasses (Norton and Waterfall, 2000).

The average value of IVOMD of Calliandra (Table 2) is around 30% which is lower than critical level of 65% required for feeds to be considered as having acceptable digestibility. Forage with IVOMD value of <65% can be classified as low quality feed and may results in reduced dry matter intake (Moore and Mott, 1973).

VI. ANIMAL PRODUCTION

When used as sole diet, daily gain of sheep fed Calliandra was lower (44 g) compared to Gliricidia (50 g) and Leucaena (55 g) (Widiawati *et al.*, 2000). However, when used as supplement to low quality basal diets, live weight gains of animals fed Calliandra were higher than those fed low tannin plants like Sesbania (Wanbui *et al.*, 2005), Lucerne and Gliricidia (Pamoet *al.* 2006; Kinuthia *et al.*, 2007) as well as high tannin plant like Desmodium (Kaitho and Kariuki, 1998), but their daily gains were lower compared to animals supplemented with Tithonia and Leucaena (Table 3). This indicates that when used as supplement to low quality basal feeds, the growth of

animals fed Calliandra are higher compared to many other tree legumes, irrespective their tannin contents. It is suggested that by supplementing Calliandra to low tannin basal diet, concentration of tannin in diets decreased. When concentration of tannins reached 2 - 4% (Barry *et al.*, 1983), protein is prevented from microbial attack and making protein is available for enzymatic digestion in lower gut, leading to higher growth rates. The low daily gain of animals supplemented with low tannin plants in the present study might be attributed to the low tannin and by-pass protein levels of diets and much of protein is wasted in the rumen.

Table 3. Effect of supplementation of Calliandra on growth of animals fed low quality diets

Animal	Basal diet	Calliandra/other legumes inclusion	Live weight gain (g/day)	Reference
Goats	<i>Cenchrusciliaris</i> hay	Calliandra 0%, Calliandra 16%, 35% (fresh), and 27% (wilted)	-27.0 39.0 52.0 25.0	Ibrahim, 1994)
Dairy heifers	Old Napier grass	25% of either: Calliandra, Sesbania or Desmodium	732 606 638	Kaitho and Kariuki, (1998)
Sheep	Napier grass Maize stover	Fresh Calliandra 32.4% Wilted Calliandra 37.3% Fresh Calliandra, 52.7% Wilted Calliandra, 51.7%	90.1 79.1 26.1 42.7	Tuwei <i>et al.</i> , (2003)
Goats	Urea treated corn stover + 100 g maize germ	Tithonia 27%, Calliandra 30%, Sesbania 32%	82.6 57.1 39.3	Wanbui <i>et al.</i> , (2006).
Goats	Improved forage and natural grass	6 g protein of either: Calliandra, Gliricidia or Leucaena	13.8 4.50 20.6	Pamoet <i>al.</i> , (2006)
Goats	Rhodes grass hay	Calliandra 0%, Calliandra 100 and 200 g/goat/day Lucerne 100 and 200 g/goat/day	17.4 30.8 and 56.8, respectively 26.1 and 40.1, respectively.	Kinuthia <i>et al.</i> , (2007)

Besides is attributed to the lowering of tannin content of diets as effect of supplementation, the high animal production from supplementation with Calliandra may be caused by adaptability of herbivore animals to high tannin plants. Narjisse *et al.* (1995) states that proline rich protein in saliva of ruminants

can bind tannin which cancel their negative effect on palatability and improve digestion of tannin rich feeds.

The proportion of Calliandra in the diets that yielded the highest daily gain is influenced by basal diet quality. With low quality *Cenchrusciliaris* hay as basal diet, the best proportion was 35% of fresh Calliandra (Ibrahim, 1994) (Table 3).

Supplementation of fresh or wilted Calliandra at lower proportion to Napier grass basal diet gave higher daily gain compared to supplementation of fresh or wilted Calliandra at higher proportion to maize stover basal diet (Tuwei et al., 2003) (Table 3). This indicates that for high quality basal feed like Napier grass, proportion of Calliandra supplemented should be lower than supplementation to low quality basal feed like maize stover.

VII. CONCLUSION

Calliandra leaves are rich in crude protein, but its high level tannins reduced its digestibility and animal growth when it is used as sole diet. However, when used as supplement to low to moderate quality basal diets, growth of animals supplemented with Calliandra is higher than supplemented with lower tannin plants such as Gliricidia, Lucerne and Sesbania. Therefore the use of Calliandra as supplement provides much promise to increase animal production in tropical and subtropical region.

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Yield of Oyster Mushroom (*Pleurotus Ostreatus*) Influenced by Different Sawdust Substrate

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Abstract- The experiment was carried out at the Biochemistry laboratory and Mushroom Culture House (MCH), Department of Biochemistry, Sher-e-Bangla Agricultural University, Dhaka, during the month of June to November' 2015 to investigate the performance of different sawdust on the yield of Oyster mushroom (*Pleurotus ostreatus*). Five different sawdust viz. mango tree (*Mangifera indica*), rain tree (*Albiia saman*), teak tree (*Tectona grandis*), mahogany tree (*Swietenia mahagoni*) and mixture of all four sawdust supplemented with 30 % wheat bran and 1 % CaCO₃ as basal substrate were selected for determine the yield of oyster mushroom (*Pleurotus ostreatus*). The highest weight of individual fruiting body (5.60 g), dry yield (35.15 g), biological yield (368.18 g) and economic yield (360.68 g) were also found in mango tree sawdust. Therefore, it can be concluded that mango tree sawdust supplemented with 30 % wheat bran can be further used as a better substrate for maximum yield of oyster mushroom (*Pleurotus ostreatus*) among following substrate.

I. INTRODUCTION

Mushroom is being widely used as food and food supplements from ancient times. They are increasingly being recognized as one of the important food items for their significant roles in human health, nutrition and diseases [1]. There is a common saying that "medicines and foods have a common origin" [2]. One of the world's biggest challenges is food insecurity. This problem is largely common in low and middle-income countries that mainly have poor food production systems and suffer from serious malnutrition. Such countries must find ways of improving food production to feed the vastly increasing human population. Substrate plays an important role in the yield and nutrient content of oyster mushroom. The substrates on which mushroom spawn (Merely vegetative seed materials) is grown, affects the mushroom production [3]. Oyster mushroom can grow on sawdust, rice and wheat straw and other agro-waste. Sarker *et al.* (2007) observed a remarkable variation in nutritional content of oyster mushroom in different substrates [4]. The demand for mushroom has been increasing due to population growth, market expansions, changing of consumer behavior and developments in the manufacturing to industries, storage, transportation and retailing. Gradually, the world mushroom production reached 33.4 million tons in 2007 from the 26 million tons in 2000 [5]. Oyster mushrooms are one of the most popular edible mushrooms and belong to the genus *Pleurotus* and the family *Pleurotaceae*. Many of the *Pleurotus*

mushrooms are primary decomposers of hardwood trees and are found worldwide. The cultivation of oyster mushroom requires the use of cellulosic materials or residues such as cereals straw, cotton stalks, various grasses, weeds, reed stems, maize and sorghum Stover, sugarcane bagasse, banana residues, coffee pulp and coffee husk, cottonseed and sunflower seed hulls, peanut shells, rice husks, waste paper, wood sawdust and chips [6]. Therefore, the objective of the study is to know the suitable sawdust for the yield of oyster mushroom.

II. MATERIALS AND METHODS

The experiment was carried out to find out on the yield of oyster mushroom (*Pleurotus ostreatus*) grown on supplemented sawdust. The experiment was carried out at the Biochemistry laboratory and Mushroom Culture House (MCH) of the Department of Biochemistry, Sher-e-Bangla Agricultural University, Dhaka, Bangladesh, during the period from June' 2015 to Noverber' 2015. Mother culture of oyster mushroom was collected from Mushroom Development Institute (MDI), Savar, Dhaka, Bangladesh. The experiment consists of five different types of sawdust with 30% wheat bran was taken as basal substrates. The experiment consists of the following treatments:

T₁: Mango tree (*Mangifera indica*) sawdust supplemented with 30% wheat bran and 1% lime

T₂: Rain tree (*Albiia saman*) sawdust supplemented with 30% wheat bran and 1% lime

T₃: Teak tree (*Tectona grandis*) sawdust supplemented with 30% wheat bran and 1% lime

T₄: Mahogany tree (*swietenia mahagoni*) sawdust supplemented with 30% wheat bran and 1% lime

T₅: Control (Mixture of sawdust) supplemented with 30% wheat bran and 1% lime

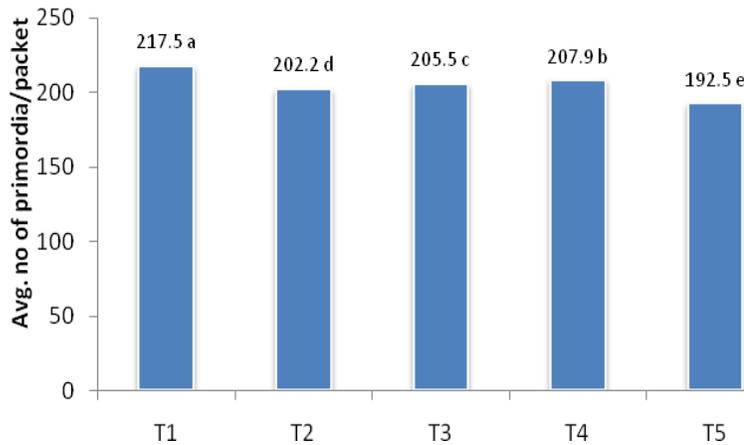
A medium was prepared using different sawdust. With spawn preparing substrate; different supplements (at the different rate on dry weight basis) and CaCO₃ (1%) was added. The measured materials were taken in a plastic bowl and mixed thoroughly by hand and moisture was increased by adding water. The mixed substrates were filled into 9×12 inch polypropylene bag @ 200 g. The filled polypropylene bags were prepared by using plastic neck and plugged the neck with cotton and covered with brown paper placing rubber band to hold it tightly in place. Oyster mushrooms matured within 2-3 days after primordia

initiation. The matured fruiting body was identified by curial margin of the cap, as described by Amin (2002) [7]. Mushrooms were harvested by twisting to uproot from the base.

III. RESULTS AND DISCUSSION

The study was conducted to find out the effect of different sawdust substrate on the yield of oyster mushroom (*Pleurotus ostreatus*). The results have been presented and discussed under the following headings:

Average number of primordial/packet



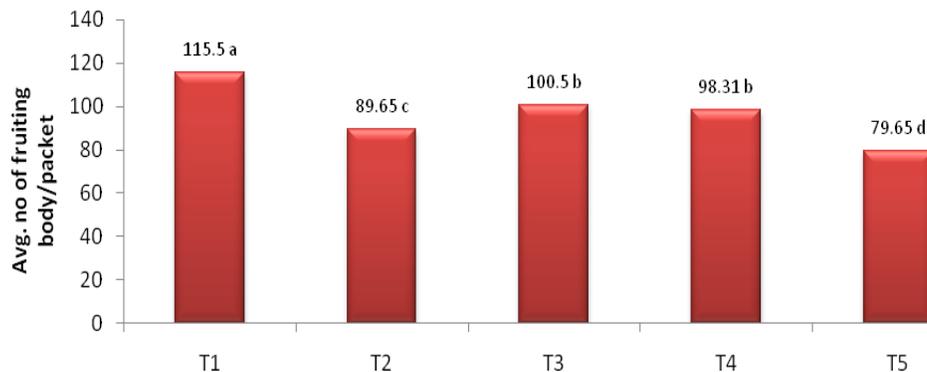
T₁: Mango tree (*Mangifera indica*), T₂: Rain tree (*Albiia saman*), T₃: Teak tree (*Tectona grandis*), T₄: Mahogany tree (*Swietenia mahagoni*), T₅: Controlled (Mixture of sawdust)

Figure 1. Performance of sawdust substrate on the average number of primordial/packet of oyster mushroom (*Pleurotus ostreatus*)

Statistically significant variation of average number of primordial/packet of oyster mushroom (*Pleurotus ostreatus*) showed due to different sawdust under the present trial (Figure 1). The highest average number of primordial/packet was observed in the treatment T₁ (217.5) and the lowest average number of primordial/packet was in the treatment T₅ (192.5). The result of the present findings keeps in with the findings of previous scientists [8,9,10]. Ahmed (1998) reported significantly different number of primordial on different substrates [8]. Dey

(2006) found that the number of primordial and the average yield significantly varied with the substrates used in production of oyster mushroom [9]. Bhuyan (2008) found similar findings growing oyster mushroom on saw dust supplemented with different levels of cow dung [10].

Average number of fruiting body/packet



T₁: Mango tree (*Mangifera indica*), T₂: Rain tree (*Albiia saman*), T₃: Teak tree (*Tectona grandis*), T₄: Mahogany tree (*Swietenia mahagoni*), T₅: Controlled (Mixture of sawdust)

Figure 2. Performance of sawdust substrate on the average number of fruiting body/packet of oyster mushroom

Statistically significant variation of fruiting body/packet of oyster mushroom (*Pleurotus ostreatus*) showed due to different sawdust under the present trial (Figure 2). The highest average number of fruiting body per packet was recorded from T₁ (115.5) while the lowest average number of fruiting body per packet was observed from T₅ (79.65) where T₃ (100.5), T₄ (98.31) are statistically similar. The result of the present findings keeps in with the findings of previous scientists [11, 12, 10]. Yoshida *et al.* (1993) reported that the number of fruiting bodies was lower, **Average number of effective fruiting body/packet**

but increased when the substrates was mixed with different supplements [11]. Sarker, (2004) found that the number of primordial increased with the levels of supplement and continued up to a certain range and decline thereafter[12] . In the present study the average number of fruiting body in creased up to 10 % of cow dung used as supplement and decreased thereafter. Bhuyan (2008) in a same type of experiment found similar results [10].

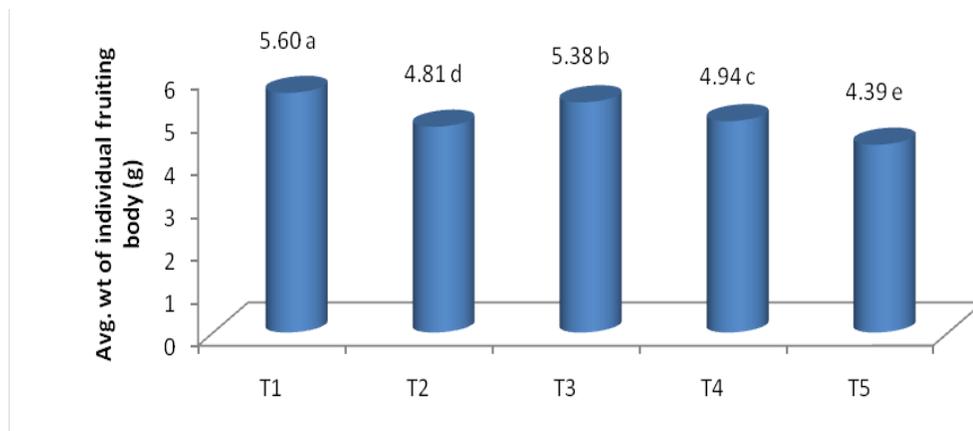


T₁: Mango tree (*Mangifera indica*), T₂: Rain tree (*Albiia saman*), T₃: Teak tree (*Tectona grandis*), T₄: Mahogany tree (*Swietenia mahagoni*), T₅: Controled (Mixture of sawdust)

Figure 3. Performance of sawdust substrate on the average number of effective fruiting body/packet of oyster mushroom (*Pleurotus ostreatus*)

The highest average number of effective fruiting body/packet was recorded from treatment T₁ (29.02), the lowest average number of effective fruiting body/packet was recorded from treatment T₅ (17.02). Statistically similar to T₄ (20.35) followed by T₂ (19.69) in terms of average number of primordial/packet (Figure 3). The result of the present findings keeps in with the findings of previous scientists [11] who reported that the no of fruiting body was low but increase when the substrate was mixed with different substrate.

Average weight of individual fruiting body (g)



T₁: Mango tree (*Mangifera indica*), T₂: Rain tree (*Albiia saman*), T₃: Teak tree (*Tectona grandis*), T₄: Mahogany tree (*Swietenia mahagoni*), T₅: Controlled (Mixture of sawdust)

Figure 4. Performance of sawdust substrate on the average weight of individual fruiting body of oyster mushroom (*Pleurotus ostreatus*)

Statistically significant variation was recorded from average weight of individual fruiting body of oyster mushroom due to different sawdust substrate (Figure 4). The average weight of individual fruiting body in different treatment ranged from 5.60 g to 4.39 g. The highest average weight of individual fruiting body was recorded from treatment T₁ (5.60 g), the lowest average weight of individual fruiting body was recorded treatment T₅ (4.39 g). The other treatments varied significantly over control in terms of average weight of individual fruiting body (Figure 4). The present study matches with the study of the previous scientist [10]. Bhuyan (2008) found significant effect of supplementation on the weight of fruiting body but he found comparatively higher weigh of individual fruiting body ranged from (5.02g to 7.01g), which may be due to environmental conditions or growing season [10]. Erkel E. I. 2009 found that 30 minutes soaking was the best in relation to studied characters [13].

Biological yield (g)

Statistically significant variation was recorded from biological yield of oyster mushroom due to different sawdust substrate (Table 1). The highest biological yield was recorded from treatment T₁ (368.18 g), the lowest biological yield was recorded from treatment T₅ (316.28 g), which was statistically similar with T₃ (348.58 g) and T₄ (344.68 g) treatment. Baysal *et al.* (2003) found the highest yield of oyster mushroom (*Pleurotus ostreatus*) with the substrate composed of 20% rice husk in weigh [14]. Ruhul Amin *et al.* (2007) found the highest biological yield 247.3g/packet [15]. He also found that the trend of economic yield corresponded with different supplements at different level.

Table 1. Effect of different sawdust substrate on the yield of Oyster mushroom (*Pleurotus ostreatus*)

Treatment	Biological yield (g)	Economic yield (g)	Dry yield (g)
T ₁	368.18 a	360.68 a	35.15 a
T ₂	329.08 d	309.98 e	30.08 e
T ₃	348.58 b	342.28 b	33.31 b
T ₄	344.68 bc	338.28 bc	32.9 bc
T ₅	316.28 e	322.98 d	31.38 d
LSD _(0.05)	7.009	7.193	0.718
CV (%)	1.13	1.18	1.18

Economic yield (g)

The highest economic yield was recorded under treatment T₁ (360.68 g) and the lowest economic yield was counted under T₂ (309.98 g). The other treatments varied significantly over control (Table 1), which was statistically similar with T₃ (342.28 g) and T₄ (338.28 g) treatment. Payapanon *et al.* (1994) mentioned that suitable amount of supplements added to sawdust medium maximized economic yield of oyster mushroom at optimum production cost [16]. Sarker (2004) found appreciable variations in economic yield also observed at different levels of supplements under different substrate-supplement combinations [12]. Bhuyan (2008) observed that the yield of *Pleurotus ostreatus* responded with the levels of supplements used with sawdust and increased with the level of supplementation and declined thereafter [10].

Dry yield

The dry yield of mushroom was maximum under the treatment T₁ (35.15 g) and the lowest dry yield was counted under T₂ (30.08 g). The other treatments were varied significantly over control (Table 1), which was statistically similar with T₃ (33.31 g) and T₄ (32.91 g). The result of the present study corroborates with Ahmed (1998) who observed significant effects of various substrates on diameter and length of stalk also diameter and thickness of pileus [8].

He also found that lower diameter of pileus produced the lowest yield and concluded that the diameter of pileus increased the quality and yield of mushroom and highest dry yield from mango sawdust. Sarker *et al.* (2007) found the range of dry yield from 4.28 g to 29.98 g, which was more or less similar to this study [4].

IV. CONCLUSION

From the above discussion, it was observed that treatment T₁ [mango tree sawdust + 30% wheat bran] among the treatments performed significantly better on yield of oyster mushroom (*Pleurotus ostreatus*).

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Measuring Copywriting Impact on Brand Identification

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Abstract- Words play a vital role in our everyday lives. They pursue, convince and change opinions. A good marketer is one who knows how best to get his products understood, sold and owned in future. This is where advertising steps in with its copywriting techniques and creative wordplay to access a wider market than otherwise. This study mainly focuses on print and electronic ad campaigns and the creative use of copywriting for brand identification. 515 respondents accurately filled questionnaires; P-Value for copywriting variable is less than the value for the level of significance which is 0.05 proving that the copywriting efforts of the brands have a powerful influence over consumer base in Pakistan. This study is thus useful for most brands that do not focus much on their copywriting, slogans, jingles and product descriptions and is a point of thinking for those who completely ignore the cultural influences of this market.

Index Terms- Copywriting, Advertising, Slogans, Jingles, Local Culture

I. INTRODUCTION

Overview and Background

This study attempts to understand Pakistani consumers' behavioral and attitudinal response to commercial content of a brand, used in the print and electronic media i.e. its positioning statement, slogans, taglines, product description and the overall expression in totality. Based on this research, brands shall benefit in understanding the importance of creative advertising content with respect to local culture to hook and retain the customers and improve the product life cycle. The time to trigger such behavior of association with the brand might come into effect instantaneously or take some time all the same. But this research finds peculiar behavior of consumers that even when they don't use a certain brand, advertising content and especially the words used in copy of print and electronic ads have had an interesting influence on their subconscious behavior as they seem to recall and store away the brand knowledge for some future use in their minds. This research aims to understand if ad copy used variably for several brand content types has any effect on brand identification which is the first step to brand knowledge and might even lead to purchase intention and loyalty thereof. They must offer the consumer something that no one else can, which leads to a much-quoted concept of USP –The Unique Selling Proposition. Rosser Reeves, the introducer of USP concept, understood USP in advertising and sales promotional terms. To him, USP is the rational approach to advertising because it seeks that special claim of a product to highlight, that sells it more than

any other product. (Meng & Pryce, 2014). Aaker is of the view that a brand image is different from its identity. A brand image is how a brand is seen but a brand identity is how the brand intends to be seen in future. According to him, the common mistakes made are to bring forth the product related characteristics, instead of emotional and self-expressive benefits and brand personality. Discussing the Harley-Davidson bike story of what defines the brand personality, he states that brands become part of consumer values and lifestyles such as the said motorbike brand is a symbol of freedom, patriotism (American) and being macho (Aaker, 1996). A brand that understands the psyche of consumers captivates them and manages better in terms of brand equity. Advertising and Sales Management, a book by Trehan covers the subject of advertising in the contemporary times with reference to Indian advertising industry especially from the perspective of FMCGs. He underlines six roles of advertising 1) to create positive approach of consumers towards product 2) to create the need of the product 3) to convince them that the product is the only choice to fulfill their need and 4) to urge them to buy the product 5) attract new customers 6) retain old customers (Trehan & Trehan, 2010). Advertising is an intermediary science between business and creativity. In the text above, we have explored its business aspect but there is a creative side to it too. It deals with creating the right message artistically to reach the consumers at the speed of lightning and touch them on deep emotional levels. These same visual and copy aesthetics of a brand are the basic contents of an advertisement that form part of 'experiential view' of the consumption phenomenon which includes the intangible attributes of the brand such as sensory pleasure, personal aspirations, aesthetic enjoyment and emotional responses to the use of a product (Holbrook & Hirschman, 1982). Advertising communication is incomplete without a good 'copy' that persuades the targeted segment to buy whatever tangible or intangible benefits the brand is selling them. Copywriting uses specific type of language used in marketing communications which can increase sales by margins. The use of right words can attract attention of consumers by appealing to their emotional needs as well as rational aspirations. It is important to turn standard marketing message into a must read piece to get the desired market effect (Laura Oles, 2008). The advertisements are used to communicate different messages of a brand through print, electronic, websites mediums, point of sale and product packaging. A standard ad follows some basic criteria. Every ad copy must have a main headline and sub-head (if required) followed by a body copy in smaller fonts than the headline. Electronic ads may contain jingles to convey feelings and emotional appeals to consumers which are equally effective. But this is not all. Even the slogan, logo and brand name comprise

the lower part of a copy. This holistic view of the advertisement is part of copywriting experience.

1.1 Statement of Purpose

This study will make an attempt to study the effects of copywriting in advertising on consumer behavior with regard to slogans, jingles and product description. It will also take into account the cultural aspect of Pakistan market that influences consumer moods and purchase intention thus leading to extraordinary success and recognition of Cadbury Dairy Milk.

1.2 Problem Statement

In Pakistan market, the consumer behavior is significantly influenced by the content/copywriting and significantly influences brand identification and the decision of the product purchase.

1.3 Organization under Study – Cadbury Dairy Milk

Cadbury chocolate was born in 1824 by John Cadbury in Bull Street Birmingham. By 1831, Cadbury changed from a grocery shop to manufacturer of drinking chocolate and cocoa. Apparently, John Cadbury stopped selling tea and coffee for the chocolate instead. In 1824, Cadbury’s first advertisement as a form of article, ‘Affording a Most Nutritious Beverage for Breakfast’ was published in the Birmingham Gazette (Sagheer, 2011). Cadbury Dairy Milk is a milk chocolate was first introduced in the United Kingdom in 1905. Currently Dairy Milk Chocolate, Dairy Milk Fruit and Nut, Dairy Milk Roast Almond and Cadbury Dairy Milk Bubbly are available to Pakistan market (Desk, 2014). Not just that the brand has a history of engaging

the online consumes with online campaigns such as ‘wrap-a-love’ for Valentine’s Day through fun and playful activities. As far as Pakistan and the other subcontinent countries are concerned, the biggest obstacle for any chocolate brand in these markets has been to penetrate the common belief that chocolates are unhealthy compared to homemade desserts or are for children only

1.4 Significance of Study

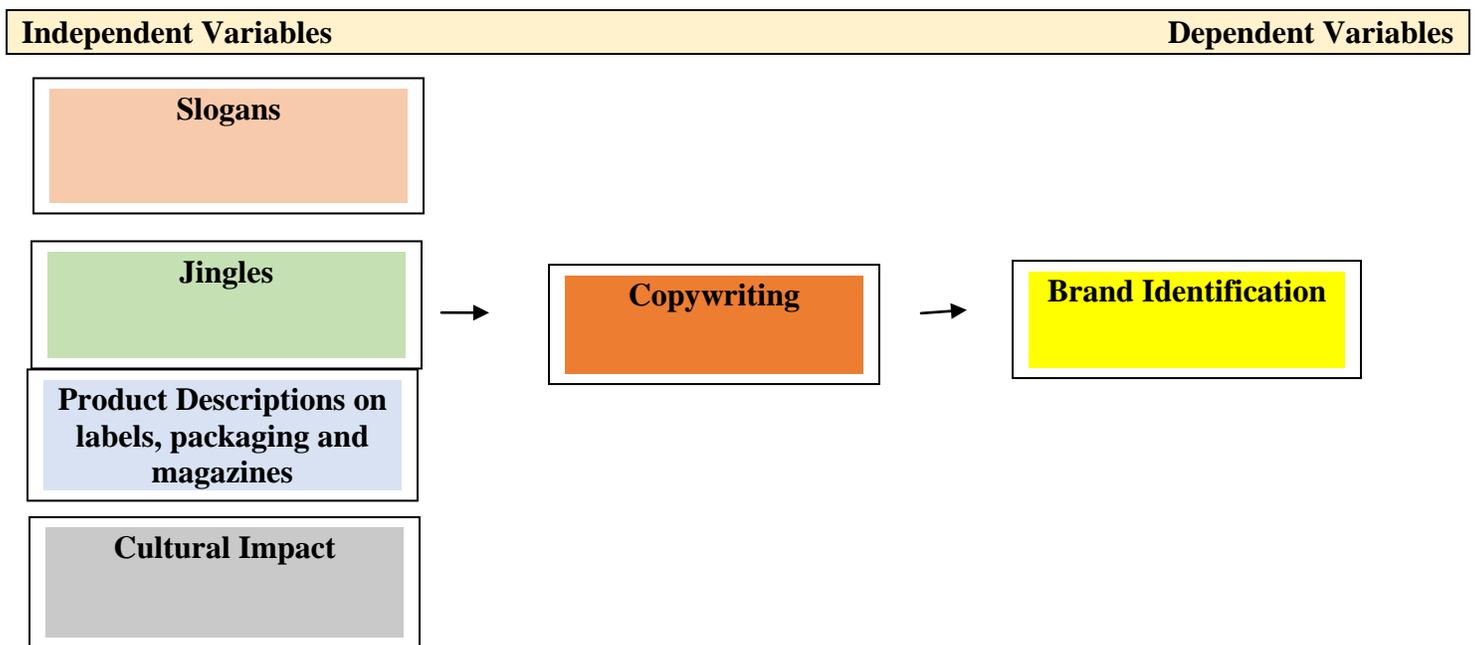
The study shall endeavor to understand whether consumers in Pakistan especially in Karachi, tend to buy products either on a whim or in accordance with the tangible or intangible benefits, communicated via copywriting and advertising. It will underline the psychology and evolutionary behavior of consumers with respect to the commercial content of the chocolate brands in the recent years i.e. how has the attitude towards chocolate consumption evolved in Karachi. This study also aims to understand whether or not the advertising content used in slogans, jingles and product descriptions has any impact on consumer purchase intention and ways in which the behavior of these consumers can be enhanced by altering the content from time to time.

1.5 Objectives

This study is being carried out to understand the Pakistani consumer behavior to advertising content with respect to the copywriting text used electronically and in print form. For this purpose four variables have been identified to gauge their responses i.e. cultural adaptation of advertising, jingles, slogans and product descriptions of a brand.

1.6 Research Model

Figure 01: Research Model



1.7 Hypothesis

H1_A There is a significant relationship between commercial content/copy advertisement and brand identification.

H2_A There is a significant relationship between slogan's content and brand identification.

H3_A There is a significant relationship between jingle content and brand identification.

H4_A There is a significant relationship between product description content and brand identification.

H5_A There is a significant relationship between cultural influence and brand identification.

II. LITERATURE REVIEW

2.1 Brand Identification

According to Keller, it can be achieved through six brand building blocks which are brand salience, brand performance, brand imagery, brand judgments, brand feelings and brand resonance. The power of a brand lies in the 'brand knowledge' which is established in the minds of customers through efficient products and services offered and accompanying marketing programs so that the 'desired thoughts, feelings, images, beliefs, perceptions, opinions become linked to the brand'. (Keller 2001) Brand identity is an asset as compared to the corporate identity of an organization which is an expense. If brands are intangible, brand identity is a tangible asset which appeals to senses and establishes recognition, differentiation and big ideas of the brand in the mind of the customers. An ideal brand identity comprises of a big idea which is ideally flexible to the company growth and change (Wheeler, 2009). A brand must establish a strong, growing brand community in which customers have a healthy, two-way interaction with other customers, product, brand and the organization behind it. This interaction is backed by a particular social experience and set of behaviors that also influence the marketing efforts. (Alexander, Schouten & Koenig, 2002). 'Advertising is influence, information, persuasion, communication, and dramatization.' (Wheeler, 2009). Advertising content especially copy is heavily relied on to voice a brand's tangible and intangible offerings. This can be achieved by using creative copy for slogans (positioning statements), jingles and product description (to connect with consumers without mass media implication on the point of sale).

2.3 Slogans

Slogan is a term from Scottish Gaelic language, 'sluagh-ghairm', pronounced slogorm which means battle cry. Steve Cone defines slogan as 'a memorable phrase, expressing an idea, purpose or claim'. In his opinions slogans and taglines are the power lines that achieve three objectives for a brand, they tell stories, they are genuine statements and they grab attention. Brand slogans are meant to enhance memorability and recall of a brand. (Cone, 2008). In addition to the brand name and its logo, brand slogan constitutes brand equity. Slogan communicates the specialness and values of the brand to consumers. (Keller, 2000). They can try to communicate with consumers and stepping into their world in the most direct fashion by use of the connotation, 'you'. (Ringrow, 2012). Slogans often make use of the polysemy 'phrases with multiple meanings' (Dimofte, Claudiu & Yalch, 2007) or puns 'entertaining and humorous' (Abass, 2007) and

using figurative language and rhetorical expressions to convey 'multiple meanings with a single word or phrase' to attract consumer attention, relate brand information and occupy a place in the memory (McQuarrie and Mick., 1992). Slogans are a brand's identity alongside brand logo and name, but slogans contribute uniquely to it. The common measure of slogan effectiveness is the ease with which they can be recalled (Kohli Thomas and Suri, March 2013). Mathur and Mathur study reveals that changes in advertising slogans influence market value of a brand positively. He discovered that if advertising slogans were redefined in line with marketing and advertisement strategies of the brand, then the market value also rose (Mathur, 1995). Although taglines and slogans both bring about the marketing advantages, the difference between a tagline and a slogan is highlighted in a study that states that tagline is a short-term brand expression for a certain advertising campaign but slogan is a long-term motto of the brand. (Silveira, Cravidão, Galvão, Vieira)

2.4 Jingles

Between May & December 2008, a survey, 'Sounds like Branding' was conducted by Heartbeats International – a brand communication agency to find effectiveness of music branding and if the trend was really effective, 70 top brand managers worldwide were questioned and majority of them agreed music branding was an effective, strategic media tool while 68% believe it helps in 'building a consistent and unique brand'. Music captures attention of consumers on product and brand marketing and improves the brand experience and recall. The survey also reveals that music branding is more frequently used in TV commercials followed by websites and commercial spaces such as stores and offices (Jakob Lusensky, April 2012). Cherng & Chien's study of the impact of music on shopping behavior in online stores reveals that of some of the environmental cues which included sign, color and light, background music has the most prominent influence. It is reported that the happy background music leads to emotional responses of arousal, pleasure and enhanced purchase intention (Cherng & Chien, 2011). Study shows that when elderly consumers are exposed to explicit product information with addition of music, a better brand appeal is established for improved product purchase (Gorn, Goldberg, Chattopadhyay, 1991). Studies also show that music influences the moods which are instantaneous and short-term and not necessarily the on-going emotional behavior of consumers towards a brand. These moods stimulated by the nature of music in commercials may direct consumer judgments and purchase behavior (i.e. if it is happy or sad music, behaviors may show variations) (Alpert & Alpert, 1989). Music plays several roles in advertising. It communicates captures, excites, relaxes or improve recall by storing up in the long-term knowledge store of consumers. It also instigates consumer responses, feelings, perceptions and actions. Music effectively creates strong associations and memory recall for adverts and brands (Alexomanolaki, Loveday, & Kennett, August 2006).

2.5 Product Descriptions

A product description can surpass any other form of advertising in this that sometimes consumers are not very familiar with TV, news, radio and internet. Product description is

therefore the only way to communicate to a consumer about the product quality and its benefits to consumers. Kotler in his book suggests that packaging is the buyer's 'first encounter with the product' and 'act as five-second commercials for the product'. He also goes on to say that the packaging markets product by describing product features that develop consumer confidence and improve impression of the product. Product packaging is a strategic marketing tool for the brand and it should not just identify the brand but also must convey descriptive and persuasive information of the brand. The packaging must be designed to facilitate the aesthetic and functional performance of the brand. Aesthetic elements of packaging involve color, size, text, graphics, shape and material of the package (Kotler & Keller, 2012). Packaging, labeling and the information on it must be guided by four necessary norms according to Habermas's theory of communicative competence. These include the norms of truthfulness, sincerity, comprehensibility and legitimacy to begin a communicative behavior, develop understanding and affect consume decision to make a purchase (Habermas, 1984). Product description is one of the structural elements of packaging that define the brand identity and personality for consumers (Mutsikiwa & Marumbwa, 2013). Consumers today are interested in knowing ingredients, expiry dates, and nutritional information alongside volume to be consumed and how to use tips from the brands (Dobson & Yadav, June 2012).

2.6 Cultural Aspect of Brand and its Local Adaptation in Commercial Content

Culture, sub-culture, social class, family pressure all impact the consumer choices and purchase decisions (Engel, Blackwell & Miniard, 1993). Hofstede model of dimensionalizing cultures presents six dimensions of national culture for comparison with other cultures which include: 'power distance (i.e. equality of humans), uncertainty avoidance (level of stress in society in the face of unknown tomorrow), individualism vs. collectivism (individual expressions vs. groups'), masculinity vs. femininity (emotional selves of men and women), long-term vs. short-term orientation (past, present and future choice of focus for people's efforts), indulgence vs. restraint (satisfaction vs. control of desires)'.

The dimension of individualism is more common in the western world, whereas the east shows tendencies of collectivism wherein peer pressure exerts a role in making groups follow the most revered opinions (Hofstede, 2011). People across different cultures perceive things differently, act differently, speak differently and derive different meanings out of the same words. Collective cultural conditioning affects consumer behavior, business philosophy and sense of humor. You cannot advertise and market your products to people from different cultures in the same manner. For example, 'Germans like lots of information' and do not appreciate 'clever slogans, catchphrases or hype'. They like genuine details of product but not clever twisted words to persuade them into buying (Richard D. Lewis, 2006). Consumers are becoming more tolerant and responsive of new advertising styles and their preferences for global brands are evolving accordingly (Pollay, Tse & Wang, 1990). Cultural conditioning may play a vital role in shaping the response of consumers towards different product types, their claims and overall brand personality. It even influences the perception

towards utilitarian and hedonic brand products and whether a consumer can differentiate between the two (Lim & Ang, 2008). Local culture is no longer defining the tastes based on local resources (Craig & Douglas, 2005). It is understood that people in different cultures correspond to different ways of expressing their self and this affects their social behavior considerably (Triandis, 1989).

III. METHODOLOGY

3.1 Participants and Sampling:

This is a descriptive, cross-sectional study which aims at understanding the experience of Pakistani consumers towards copywriting and advertising content with regards to one of the leading chocolate brands in Pakistan. It was found that quite many educated class in Pakistan understands the importance of advertising content and copywriting and values the brand s that have emotional and local cultural appeals. Not just that, a lot of research on the subject of slogans, jingles and product descriptions has already been carried out in various other markets, thus it is a descriptive studies of the Pakistani market. Six hundred and thirty individuals from different backgrounds were selected to fill the pre-testing questionnaire of the research of which only 578 forms received in hard and soft copy and 515 found appropriate for data usage.

The majority of the individuals fall in the age bracket of 21-30 years. Most of the participating consumers belonged to the working classes, were students, shopkeepers or homemaker women. The questionnaire was also created online and shared via email and other social networking sites to individuals who preferred the soft copy of it, which were later recorded on the hard copies of the form (if received in jpg or some other unprintable format) or printed out if possible. Due to the shortage of time and unwillingness of most people to participate in this survey, only a sample size of around 578 could be achieved. 63 forms of which were found incompletely answered and thus discarded for the purpose of inclusion in the data of the research. It was therefore a probability cluster sampling that helped to identify some groups from the overall population that do not just happen to be chocolate consumers in Pakistan but are also well-informed about current advertising campaigns and copywriting services, instead of those who showed less interest in the said industries.

3.2 Questionnaire and Variables

The ordinal scale measurement for opinion based statements and nominal scale measurement for demography and data mapping have been used. Questionnaire, consisting of 19 questions was designed in a standardized form for everyone with options for the answers on a 5-point response scale from strongly agree to strongly disagree, with in-between cases of agree, neutral and disagree (strongly agree is recorded as 1, agree as 2, neutral as 3, disagree as 4, and strongly disagree as 5). The 5-item demographics were based on gender, family structure, education, family income and age groups.

IV. RESULTS AND ANALYSIS

4.1 Demographical Frequencies

Respondents of the survey form for this study were 75% males (around 390) and hardly 25% (around 125) women participation levels were noticed. Individuals who participated in this survey were mostly young (about 325 persons), belonging to the age group of 21 to 30 years. It is because these are the individuals who are mostly willing to participate in academic institutions and are also savvy of the magic of advertising and copywriting. Respondents show belonging to various household income groups of the population. But around 145 are from low income level group which earns about 16 to 20 thousands a month, followed by those who earn more than 50 thousand to be around 125 individuals and those earning 30 to 45 thousand around a hundred individuals. The educational level of these respondents is dominantly graduation with over 275 individuals from this cadre. Over a 100 individuals are pursuing or have achieved their masters in various disciplines. Nearly as much the size of the sample size has its higher education up to intermediate.

4.2 Descriptive Statistics

For study 630 people in different places were approached, only 580 forms were received of which 65 had to be discarded for the reason of incomplete answers or demographical information, thus leaving only 515 valid complete forms. Data was compiled on SPSS software and Z-Test was used to estimate results of the compiled data sheet. There are several reasons for using Z-Test. Firstly, independent variables were pretested. Secondly, a random population sample was collected. Thirdly, it was a huge sample size. As for Z-Test, it calculates the standard normal distribution of a null hypothesis and presents the z-statistics which determine whether to accept or reject a null-hypothesis.

4.3 Variable Behavior

The results show a significant interaction between independent copywriting variables and brand identification. The study explores the influence of four independent variables on brand identification of one of the renowned and successful chocolate brands in Pakistan. The general response of consumers shows a positive projection for the said brand.

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Standard Deviation
Cultural Impact	515	1	4.4	2.186408	0.57757
Jingles	515	1	4.6	2.229126	0.60787
Product Description on labels, packaging and magazines	515	1	5	2.106019	0.59585
Slogans	515	1	5	2.084466	0.67393
Valid N (list-wise)	515				

4.3.1 Cultural Impact:

Table 01: Results of Cultural Impact

Cultural Impact	
Data	
Null Hypothesis m=	3
Level of Significance	0.05
Population Standard Deviation	0.57757
Sample Size	515
Sample Mean	2.186408

Intermediate Calculations	
Standard Error of the Mean	0.025450775
Z Test Statistic	-31.96727793

Two-Tailed Test	
Lower Critical Value	-1.959963985
Upper Critical Value	1.959963985

p-Value	0.000E+00
Reject the null hypothesis	

The impact of cultural values used in advertising context is also based in the lingual quality of copy and content, in this case, with reference to the culture of Pakistan. Statistical results revealed that the P-Value for cultural impact is less than the value for level of significance which is 0.05 (i.e. $p\text{-value} < 0$), which means that Null Hypothesis is rejected (with sample mean = 2.186408, population standard deviation = 0.57757). The variable of cultural impact in content writing emerges as an important element for brand identification. This means that participants place a high importance in the localization of the advertising content, even in terms of language and for this reason; the brand under examination is ahead of the other chocolate brands in Pakistan market.

4.3.2 Jingles

Table 02: Results of Jingles

H-2		
Jingles		
Data		
Null Hypothesis m=	3	

Level of Significance	0.05
Population Standard Deviation	0.60787
Sample Size	515
Sample Mean	2.229126

Intermediate Calculations	
Standard Error of the Mean	0.026785953
Z Test Statistic	-28.77903996

Two-Tailed Test	
Lower Critical Value	-1.959963985
Upper Critical Value	1.959963985
p-Value	0
Reject the null hypothesis	

The brand uses several electronic campaigns in which jingles are given special importance. The brand's easy to recall theme music has a residual effect in the memory of its consumers. Statistical results show P value to be less than 0.05 level of significance, thus null hypothesis is rejected, (with sample mean = 2.229126214, standard deviation = 0.60787). Jingles have been identified as a vital variable of content writing, which is essential to determine the brand identification in Pakistan market. It can be safely concluded that the brand has a positive musical echo and succeeded in establishing a positive reception in the Pakistan market.

4.3.3 Product Descriptions on Labels, Packaging and Magazines

Table 03: Results of Labels, Packaging and Magazines

H-3		
Description on labels, packaging and magazines		
Data		
Null Hypothesis	m=	3
Level of Significance		0.05
Population Standard Deviation		0.59585
Sample Size		515
Sample Mean		2.106019417

Intermediate Calculations	
Standard Error of the Mean	0.026256288
Z Test Statistic	-34.04824699

Two-Tailed Test	
Lower Critical Value	-1.959963985
Upper Critical Value	1.959963985
p-Value	0
Reject the null hypothesis	

In the past, research about product description has been limited to descriptions on packaging labels. This study on the other hand attempts to understand the product descriptions used anywhere, used in print such as magazines and newspapers. Respondents rate product descriptions of the brand as playing a very important role in their decision making about buying or not. The statistical outcome for product descriptions, a variable of copywriting shows P-Value to be less than the level of significance 0.05, which means we reject the null hypothesis. Product description, a variable of creative advertising content and copy plays a vital role in developing the brand identification amongst consumers in Pakistan (Sample Mean = 2.10601, Standard Deviation = 0.59585).

4.3.4 Slogans

Table 04: Results of Slogans

H-4		
Slogans		
Data		
Null Hypothesis	m=	3
Level of Significance		0.05
Population Standard Deviation		0.67393
Sample Size		515
Sample Mean		2.084466019

Intermediate Calculations	
Standard Error of the Mean	0.029696904
Z Test Statistic	-30.82927368

Two-Tailed Test	
Lower Critical Value	-1.959963985
Upper Critical Value	1.959963985
p-Value	0
Reject the null hypothesis	

Slogans – the forewords of any brand profile, they are created to make the brand legendary and gigantic on the market and claim a special place in the minds of targeted audience. Statistics mark the independent variable of slogans to have received a sample mean of 2.084466019 with a standard deviation of 0.67393. The P-value for this variable is 0 which is less than the level of significance, thus the null hypothesis is rejected. Slogan of the brand has so far been very successfully reaching masses in the Pakistan market and thus affecting their purchase intention and brand identification.

V. CONCLUSION & RECOMMENDATIONS

The results clearly indicate that various components of copywriting significantly influence brand recognition and success in Pakistan. Not to forget, the cultural impact is also not to be neglected. The previous researches in the field of content

used for advertising purposes have been limited to studying one or the other factor of copywriting. For example, some researchers in the past have discussed the role of slogans in building up the brand identity. Others have focused on jingles and their significance in keeping consumer attention and improving the brand recall. Other prior studies were made about product descriptions on labels to make more businesses at the point of sale. However, not one study in the past took into account the different areas of copywriting in one place and studied their effect, simultaneously. I believe that the research has been carried out in the sincerest and honest manner and would contribute highly to future research possibilities for other brands. A further expansion of the research may be extended to new media and website content development of the brand understudy. There are many more media of communications to consumers that are flourishing in the market and can be the subject of future studies. Although the results for overall copywriting content used for advertising and marketing campaigns shows a positive reception by respondents, it cannot with certainty be said that results could have been the same if people in other provinces, cities and villages of Pakistan were covered.

This study attempted to understand if respondents could recall and be persuaded to buy. It however never endeavored to study if the brand had gone from the level of recognition to earning the complete loyalty of its consumers. There is a complete room for future researchers to study in comparison of other chocolate brands if the battle of loyalty has been won single-handedly by Cadbury Dairy Milk. Future researchers can also make studies for checking out potential biases through availability filter. It is possible consumers have developed a liking for the brand because it is one of the most promoted brand and its commercials most played. There is a possibility that just the frequency of playing these commercials during prime time transmissions is increasing the memorability of the brand and not the quality of its copywriting content.

For the brand, the results indicate a positive outcome. It can be said with great emphasis on the results that the brand has had much success in this market compared to any other chocolate brand. Their content is strong but the only means of success for the brand has been constant evolution of its advertising content and copywriting i.e. slogans, jingles etc. It is thus advised to Cadbury Dairy Milk brand to come up with creative and crisp advertising content on the constant basis. The observation of results indicates that there is no one element of advertising content and copywriting which would bring the desired level of brand identification among the population in Pakistan. It is a combination of slogans, jingles and descriptions of the product that ensure brand recognition for potential consumers. Apart from graphical elements, background music, props, environment of the ads and celebrity endorsement, it is the wordplay and copywriting efforts that keep the consumers about the brand.

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Nano Carbon Filled Polyester Gradient Composites and their dc conductivity studies

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Abstract- Nearly 70% of HAF carbon black is used as a pigment and reinforcing filler in automobile tire. HAF carbon black also removing heat away from the tread and belt area of the tire, reducing thermal damage and increasing tire life. Particles of HAF carbon black are also used in some radar absorbent materials. This is also used in printer toner.

World production of HAF carbon black is about 8.1 million tonnes (2006). HAF carbon black is chemically and physically distinct from soot and black HAF carbon. Typically less than 60% of the total particle mass of soot or black HAF carbon is composed of HAF carbon, depending on the source and characteristics of the particles (shape, size and heterogeneity). In commercial HAF carbon blacks, organic solvents and high temperatures).

Traditional methods of producing HAF carbon black are as follows.

Ivory black is traditionally produced by charring ivory or animal bones. Vine black is traditionally produced by charring desiccated grape vines and stems.

Lamp black is traditionally produced by collecting soot, also known as lampblack, from oil lamps.

In this study, nano carbon high abrasion furnace (HAF) N330 having particle size 28-36 nm has been incorporated in unsaturated polyester resin to develop gradient composites. dc conductivity of nano carbon filled polyester graded composites has been determined in the temperature range ranging from 30 to 150 °C. It has been found that increase of nano carbon content increases the dc conductivity of composites.

Index Terms- Composite polymer, dc conductivity, HAF carbon, polyester

I. INTRODUCTION

Carbonaceous fillers used in the production of polymer composites can increase electrical conductivity and also maintain lightweight and corrosion resistance. Different types of carbon have different particle size, shape and structure. Dc electric conductivity of the polymer composites can be analyzed by the percolation theory [1-2]. Composites having high resistivity can be used in the power cables and low loss power apparatus. High conductivity can be used in shielding of electrical devices [3]. Polyesters are popular because of their low cost, ease of use, and versatility. It can be applied in laminates, castings, art objects, industrial construction, insulation,

embodiments, molding compounds, coatings, and adhesives. It has high impact resistance and good weathering resistance. [4] Studies of structure formation and peculiarities of deformation of polymer compositions with fillers of carbon nature have increased their possibility to produce a new polymer composite material possessing the shape memory effect accompanied by a considerable volume increase [5]. Fillers are used with polyesters to reduce their cost and to improve some of their properties like increasing the hardness, thermal conductivity, and wear and chemical resistance; decreasing the thermal expansion; and improving the insulation properties [6-7]

The conductivity of composites can be compared to that of conducting polymer. Insulator-conductor composites can be suitable for studying percolating behavior and also for their statistical nature. Percolation concentration depends on the shape of the particles and network of the matrix. [8] It was found that carbon nanoparticles lower the glass transition temperature of the polymer and as a result of it flexibility increases and has impact resistant. The highly cross linked nano composite polymers are generally resistant to heat and weathering. [9]

There is no report on the development of HAF carbon polyester gradient composites and their dc Conductivity characteristics in the literature.

II. MATERIALS AND METHODS

Nano HAF carbon powder filled polyester gradient composites have been developed by using centrifugation process, which was patented by Chand and Hashmi [10]. The centrifugal force is applied in the X. direction. Gradient samples are prepared from the nano carbon filled mix having 3 wt% of nano carbon powder. Nano carbon powder was added to a mix of Polyester resin and hardener. Total mix was thoroughly stirred with the help of a glass rod. Details of set up and of the process of making gradient composites are as reported in earlier patent (Chand and Hashmi (2003)). The total mix was filled in the mould to make sample. The sample is rotated at 800 ± 50 RPM at a radius of 130 mm. Samples were removed from the mould after post curing at room temperature for 24 hours. These samples were coated by air drying type silver paint before the measurements.

III. DC CONDUCTIVITY MEASUREMENTS

The resistance of each sample was measured by using a Kiethley Electrometer model 610 C in the temperature range

ranging from 30 to 150°C. Heating rate was kept constant at 1°C/min. dc conductivity $\sigma_{d.c}$ of the samples was calculated by using the following relation.

$$\sigma_{d.c.} = 1 / \rho$$

Where ρ is the resistivity, which is defined as

$$\rho = RA / L$$

Where R, A and L are the resistance of sample in ohms, cross sectional area (cm²) and thickness (cm) of the sample respectively.

IV. RESULTS AND DISCUSSIONS

Fig.1 shows the variation of dc conductivity vs temperature for nano carbon filled polyester sample1. There is a sudden increase in dc conductivity after 88°C. In this case there is an increase in dc conductivity up to 150°C. At 150 °C the dc conductivity of HAF carbon filled polyester sample was 1.87×10^{-10}

Fig. 2 shows the variation of dc conductivity vs temperature for nano carbon filled polyester gradient composites sample2. This plot shows that up to 100°C there is no increase in dc conductivity. After 100°C there is a sudden increase in dc conductivity with increase of temperature. At 150 °C the dc conductivity of nano carbon filled polyester sample was 1.94×10^{-10}

Fig. 3 shows the variation of dc conductivity vs temperature for nano carbon polyester gradient sample3

It has been observed that dc conductivity suddenly increases after 86°C. Increase of dc conductivity appeared at 126°C and a peak was found at 128°C. It goes on increasing up to 150°C. At 150 °C the dc conductivity of nano carbon filled Polyester sample was 2.77×10^{-10}

Fig 4 shows the variation of dc conductivity vs temperature for HAF carbon filled polyester gradient composites sample4. dc conductivity increases from 84°C then there is a peak at 92°C there is an increase in dc conductivity. At 150 °C the dc conductivity of HAF carbon filled Polyester sample was 4.61×10^{-10}

It was investigated that the resistance caused by phonon scattering freezes out at a temperature of half of their frequency [11]. At low temperatures the interparticle gaps are uniformly distributed but at higher temperature, the average gap width increases and it increases the resistivity also [12]. It was observed in the case of carbon black filled polymers that carbon black could be more conductive because of its high surface area and small aggregate size [13]

Fig 6-9 shows the variation of ln dc conductivity vs temperature for sample 1 to sample4 respectively.

It was investigated that value of percolation threshold depends on the porosity, shape, size and aggregation of the fillers and dc conductivity follows scaling law [14]:

$$\sigma = \sigma_0(p-p_c)^t$$

The ln σ versus T^{-1} plots in the case of nano carbon filled polyester gradient composites studies by us can be best expressed by the equation:

$$\sigma = A \exp (-W_E/KT)$$

Where A and W_E are two constants having different values for the regions above and below the softening temperature of the sample.

Table 2 lists the activation energy values of different samples. The observed variation of σ with T is due to the combined effect of change in conductivity with temperature and the distribution of nano carbon in polyester gradient composites.

At higher concentration of filler the activation energy of the sample 4 decreases, which can be explained as there is an increase in the number of conduction paths created in the sample. At higher filler concentration, the temperature independence of the electrical conductivity is attributed to the tendency of filler particles to form aggregation paved direct pathway for the charge carriers, The same conclusion has been reported in different experiments on polymer- metal composites [15].

V. CONCLUSION

- Increase of dc conductivity value from sample 1 to sample 4 shows the existence of graded structure.
- Increase of nano carbon content increases the dc conductivity value.
- dc conductivity of copper filled polyester gradient sample increased with increase of temperature.
- Activation energy decrease with increase of nano carbon content

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Table1. Density of the samples

S.No.	Density (g/cc)
Sample 1	1.25297
Sample 2	1.26196
Sample 3	1.26249
Sample 4	1.26289

Table 2 Activation energy (ev) of the Samples

Sample	Activation energy (eV)
Sample1	1.190
Sample 2	1.187
Sample3	1.053
Sample4	1.03

Figure captions

Fig.1 shows the Variation of dc conductivity vs temperature for HAF carbon filled polyester sample 1

Fig. 2 shows the variation of dc conductivity' vs. temperature for HAF carbon filled polyester sample 2

Fig. 3 shows the variation of dc conductivity vs. temperature for HAF carbon filled polyester sample 3

Fig. 4 shows the variation of dc conductivity vs. temperature for HAF carbon filled polyester sample 4

Fig. 5 shows the variation of ln dc conductivity vs. temperature for HAF carbon filled polyester sample1

Fig. 6 shows the variation of ln dc conductivity vs. temperature for HAF carbon filled polyester sample2

Fig.7 shows the variation of ln dc conductivity vs. temperature for HAF carbon filled polyester sample3

Fig.8 shows the variation of ln dc conductivity vs. temperature for HAF carbon filled polyester sample4.

Sample 1

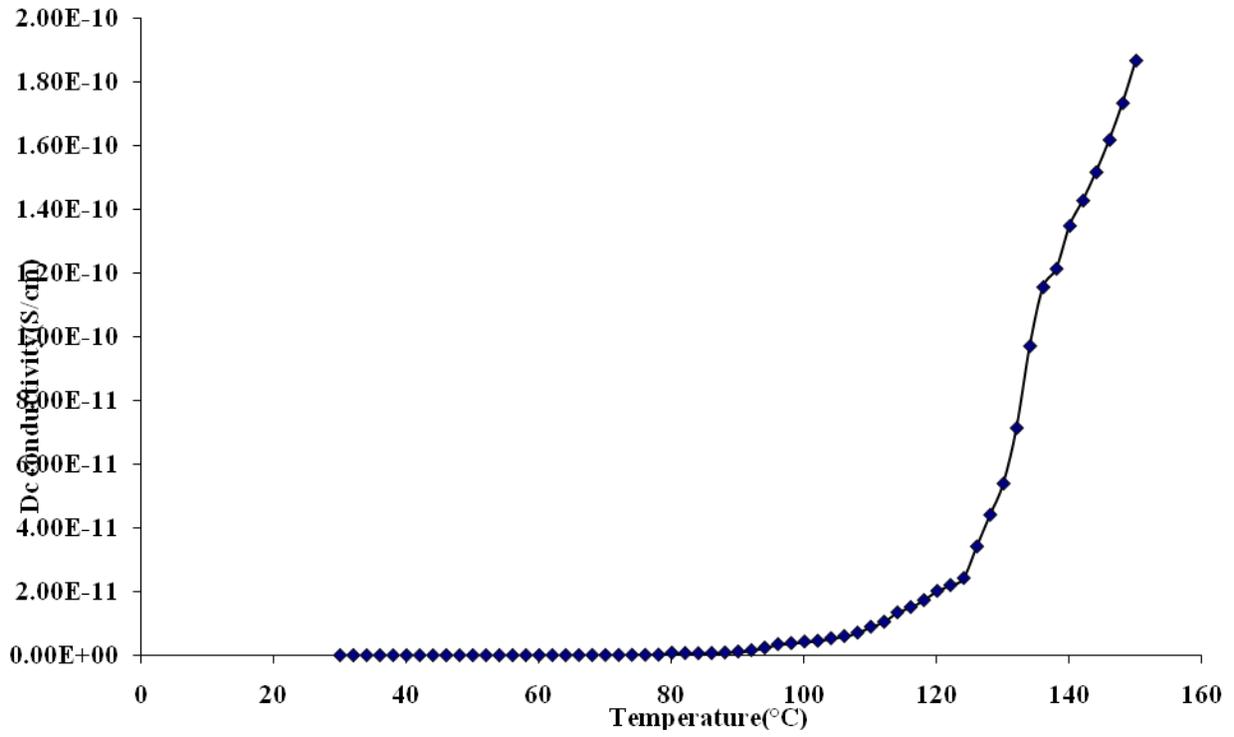


Fig.1

Sample 2

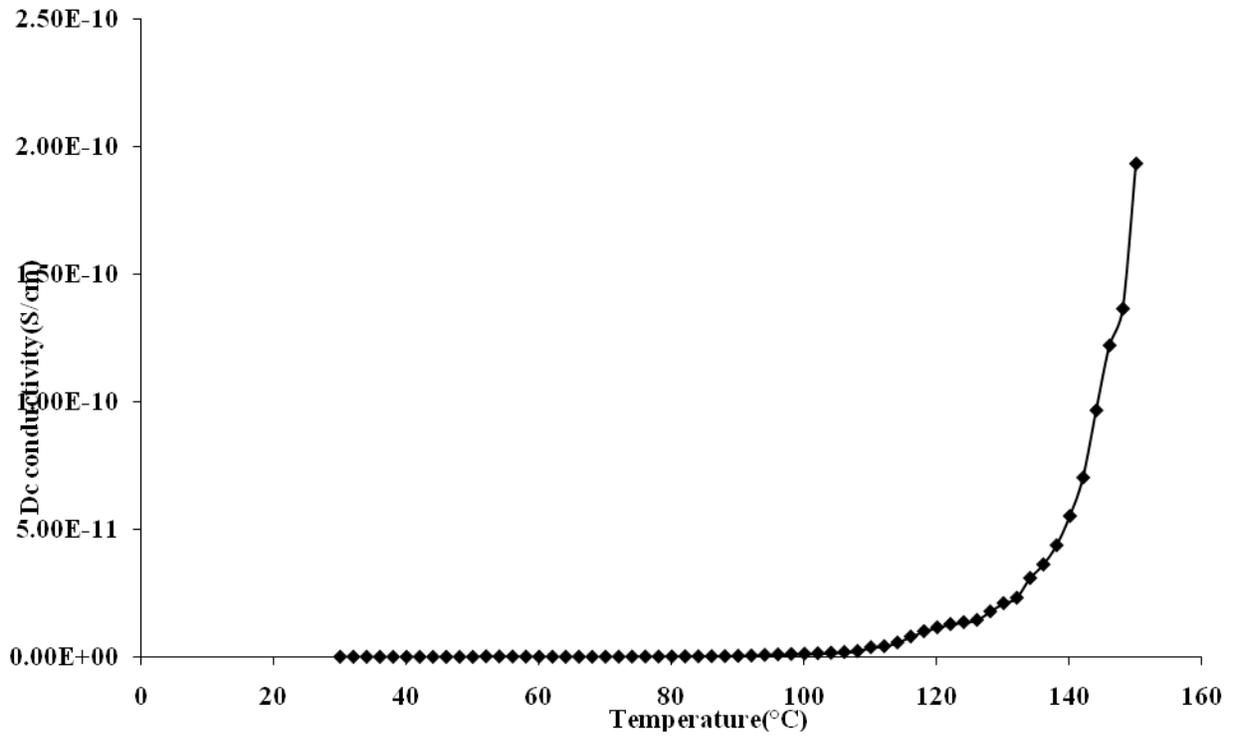


Fig.2

Sample 3

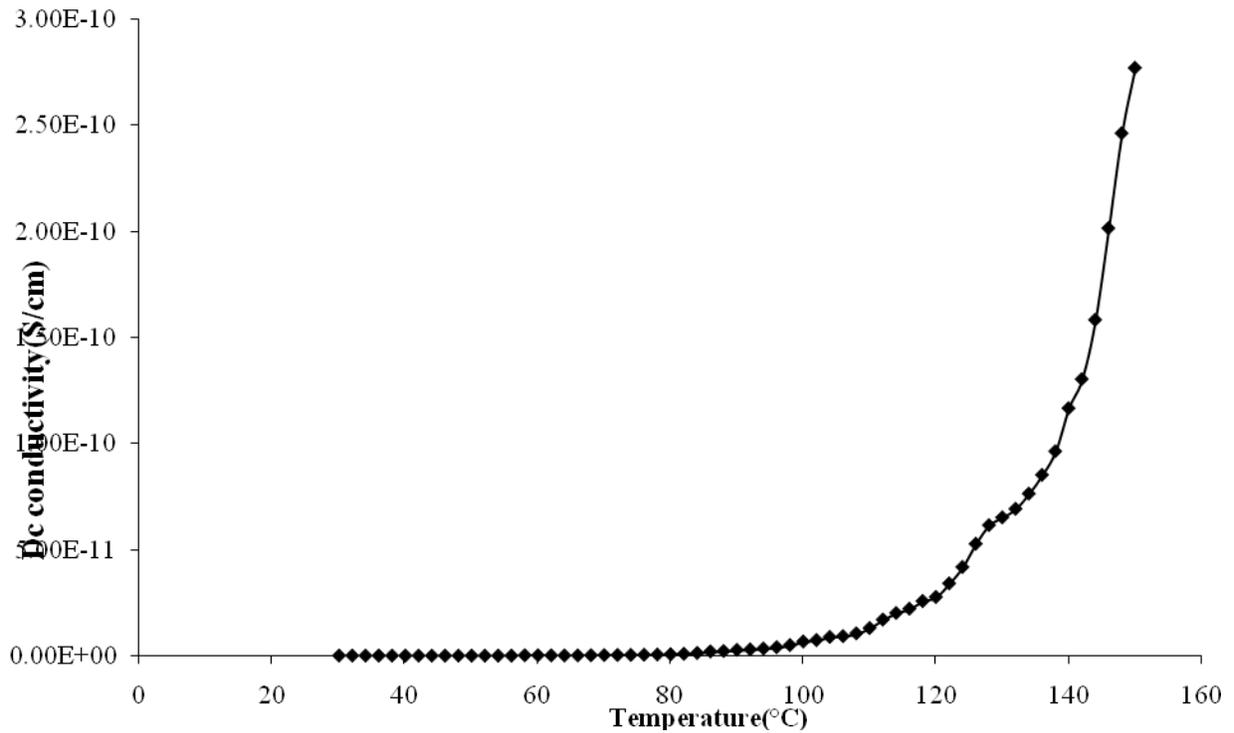


Fig.3

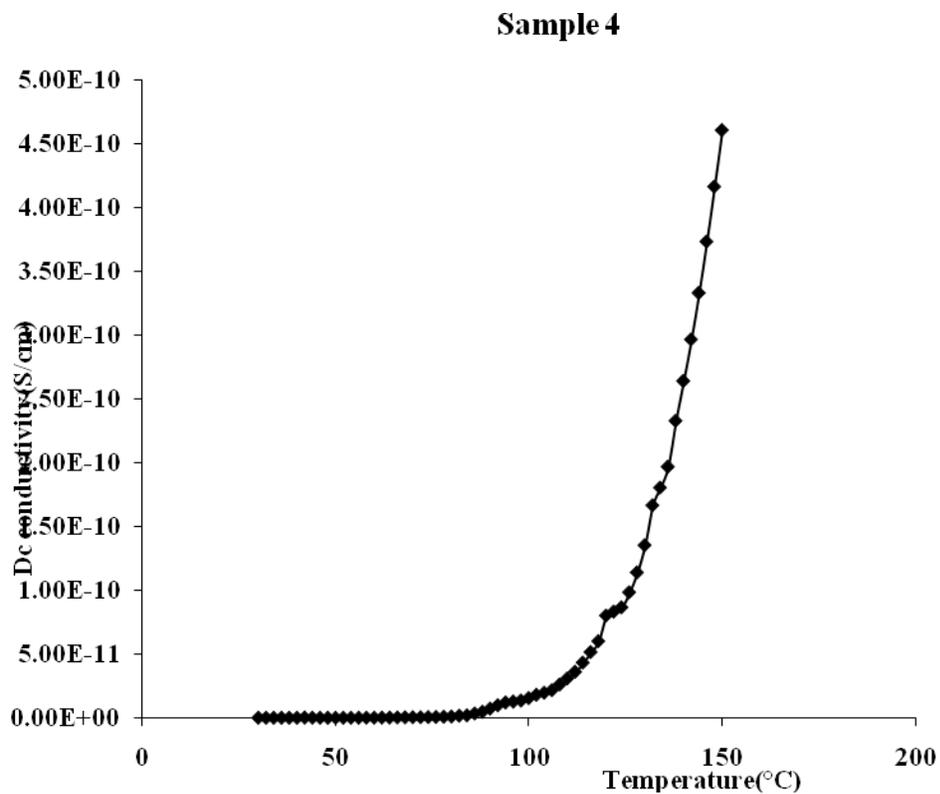


Fig.4

Sample 1

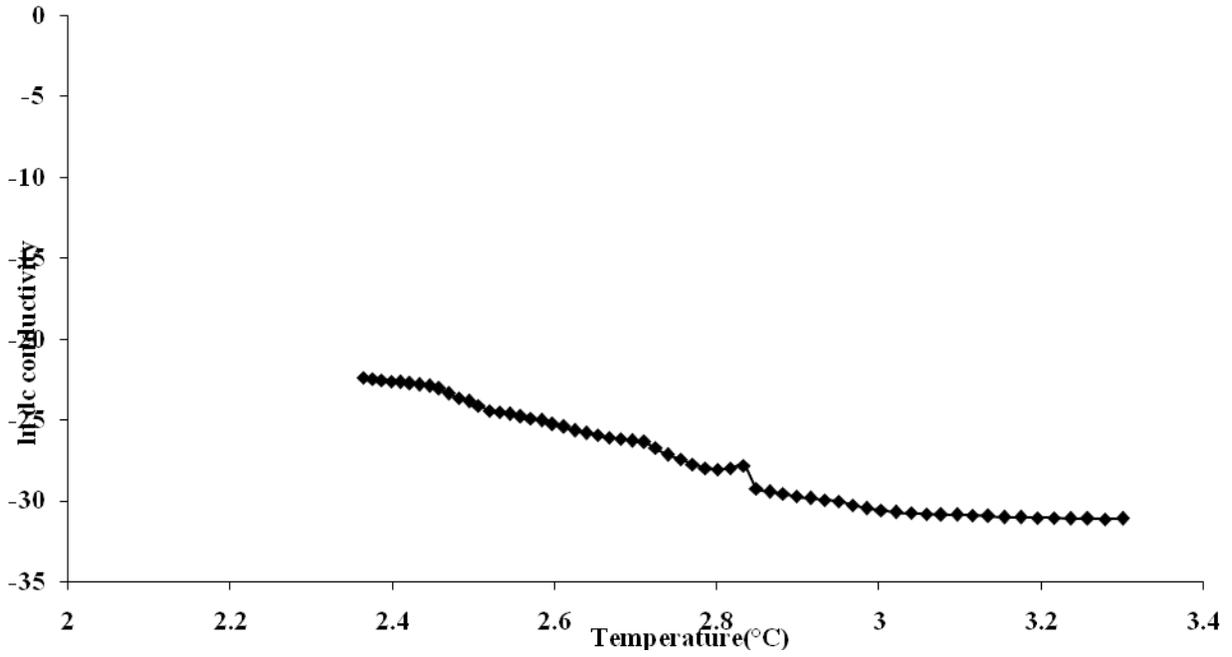


Fig.5

Sample 2

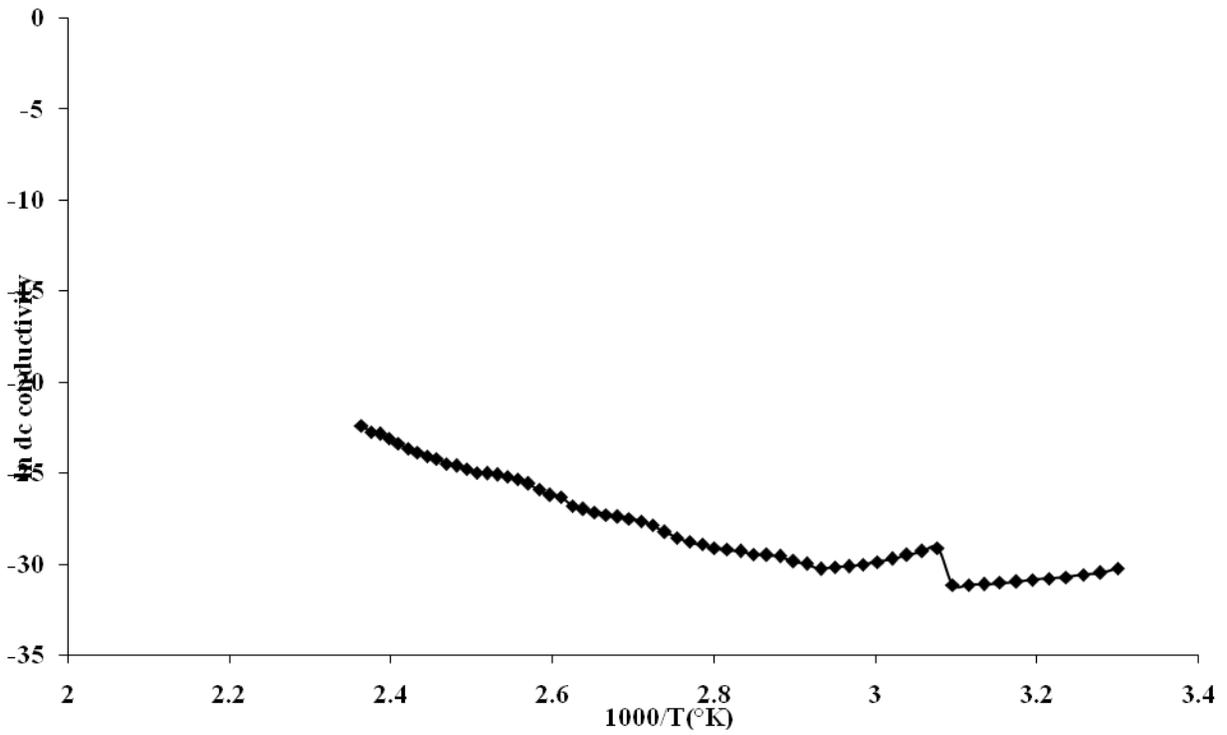


Fig.6

Sample 3

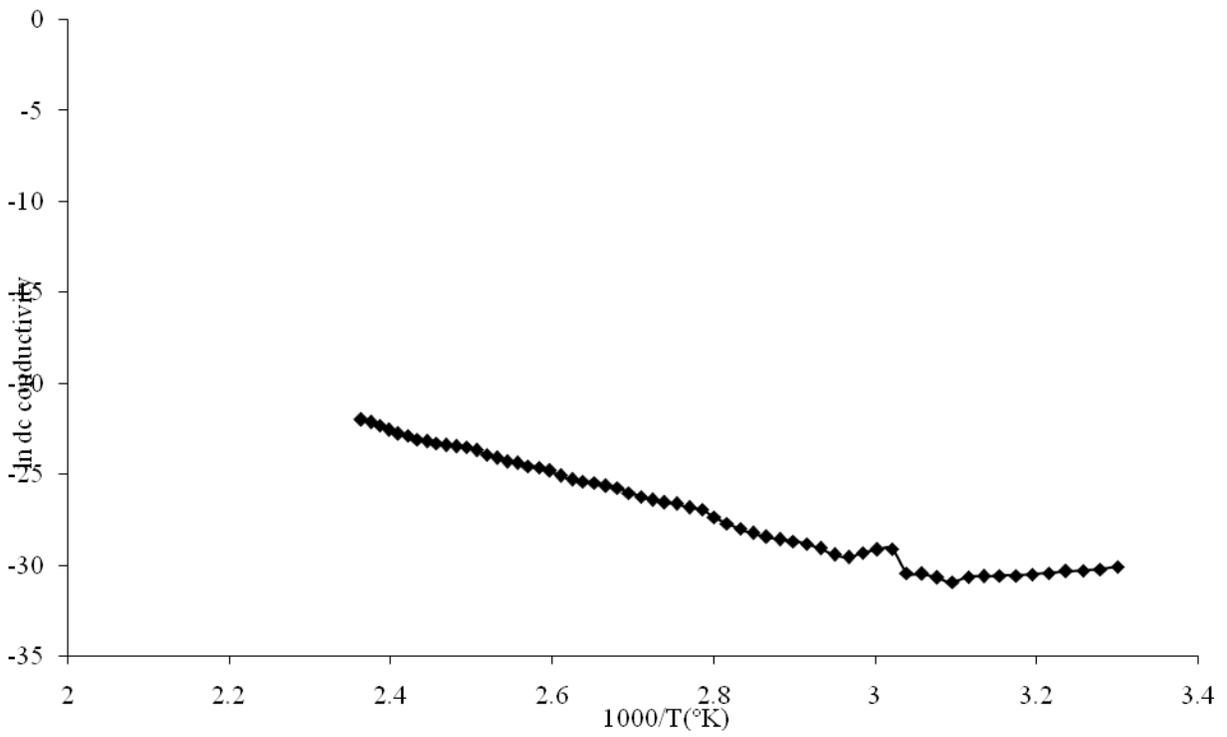


Fig.7

Sample 4

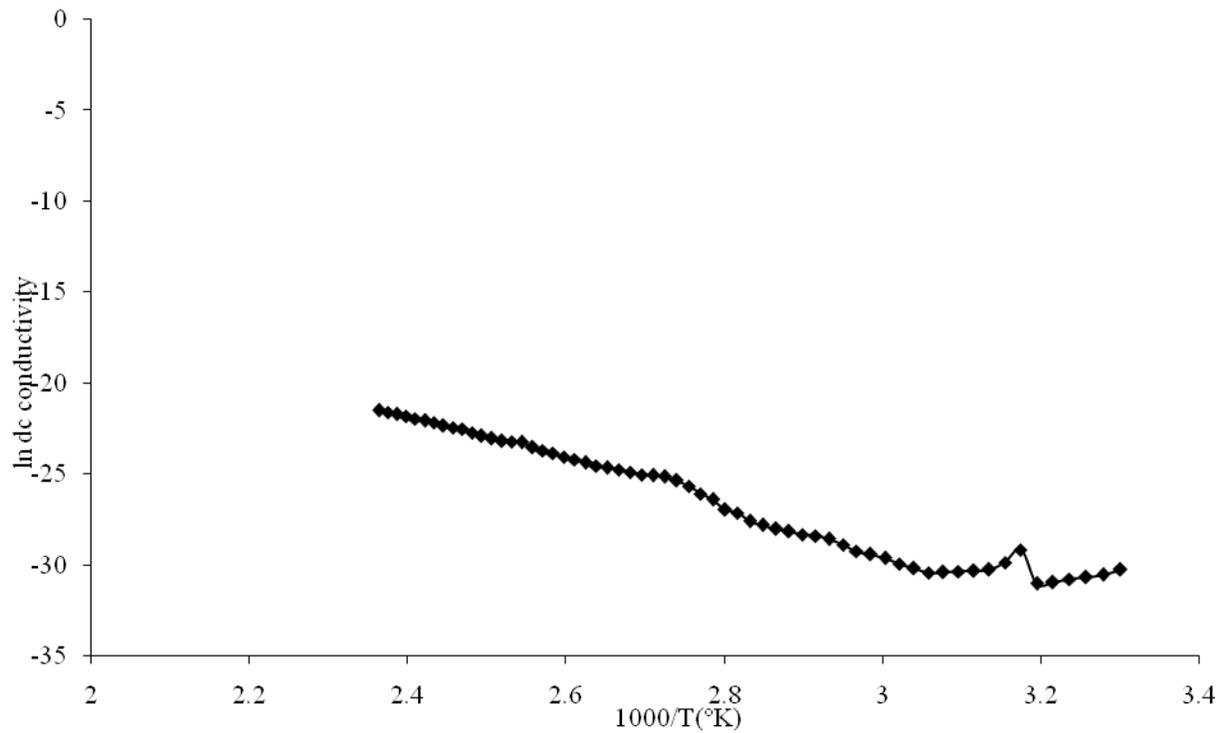


Fig.8

Analysis of Fundamental and Technical Factors to Stock Price on Residential Property Sector Companies Listed in Indonesia Stock Exchange

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Abstract- This paper aims identifying dominant factor of fundamental and technical factors to stock price of residential property sector at Indonesia Stock Exchange. This study is explanatory research with a quantitative approach to determine the influence of independent variables to dependent variable. Data used is panel data model which are 17 companies listed in residential property sector at Indonesia Stock Exchange during 2010-2015. Data processing uses SEM PLS method. The results show that stock prices of residential property sector at Indonesia Stock Exchange influenced by fundamental and technical factors. Indicators that reflects fundamental factors are ROA, NPM and total asset turnover, while indicator of technical factors is past stock prices. The dominant indicator of fundamental factors is ROA which has the biggest loading factor. Then the dominant indicator of technical factors is past stock prices as only this indicator reflects technical factor.

Index Terms- firm fundamental, macroeconomics, property sector, stock prices

I. INTRODUCTION

Capital market is an indicator economic progress for each country and also to support economic development state. Capital market has strategic roles as source of funding for the business world. Along with developing economic in Indonesia, more companies need greater capitals thus the companies decided to become a go-public company in Indonesia Stock Exchange (IDX).

Capital market could be one alternative to investors which it could be considered to invest in financial assets. The main objective of investing is to obtain return. To get maximum return, investors should analyze information to determine which company could obtain maximum return of capital implanted.

Stock prices in capital market continuously fluctuate as affected by internal and external factors thus investors should know the exact information to determine investment decisions. In analyzing stock prices, there are two approaches: fundamental and technical analysis (Kodrat & Indonanjaya 2010). Cohen *et al* (2011) found that investors used fundamental analysis more often than using technical analysis. It indicated using fundamental analysis for long term period investment and technical analysis for short term period investment.

Fundamental analysis discerns the problems from broad perspectives. These perspectives are from economic analysis,

industry analysis, and company analysis. On the other hand, technical analysis could predict stock prices in the future. Basically technical analysis uses stock prices movements and volume transactions in the past to predict stock price in the future.

The property is a sector which has an important role for the economy of a country. The growth property sector stipulates economic growth in society. Sectoral indices movement for property sector was at -6,47% in 2015. Property sector was being dropped in 2015 comparing in 2014 which it was at 55,76% (IDX 2015). The Indonesia government conducted decreasing BI rate policy however stock prices in property sector was decreasing.

The property market capitalization increased in 2011-2015 from 4% to 8% (IDX 2015). Increasing capitalization property indicated property sector has good potential sector to invest. The potential market property, specially real estate (residential) in Indonesia, increases continuously and encourage property companies to grow. Investors need information to determine which stock market would be invested by observing fundamental and technical factors to stock prices. Thus it is necessary to study about fundamental and technical factors to stock prices on property sector companies listed in Indonesia Stock Exchange.

II. RESEARCH METHODOLOGY

This study included exploration research to examine the relationship of a variable to other variables. The research objects are property companies listed in Indonesia Stock Exchange. Those would be analyzed the influence of fundamental and technical factors to stock prices. Dependent variable is stock price (SP) property sector companies. Independent variables are inflation rate (IR), Bank of Indonesia rate (BIR), gross domestic bruto (GDP), return on assets (ROA), debt equity to ratio (DER), net profit margin (NPM), total asset turnover (TATO), stock volumes (SV) and stock prices in the past (SPP). The framework for this research represents on Figure 1.

The data in this study are secondary data. Data are combination of time series and cross sectional data. Quantitative data used historic data from the companies financial statement during 2010-2015. The population was selected at companies property industry in Indonesia listed in Indonesia Stock Exchange. The samples were chosen by purposive sampling based on some criterions. The criterions are:

- 1) The companies engaged in property sector

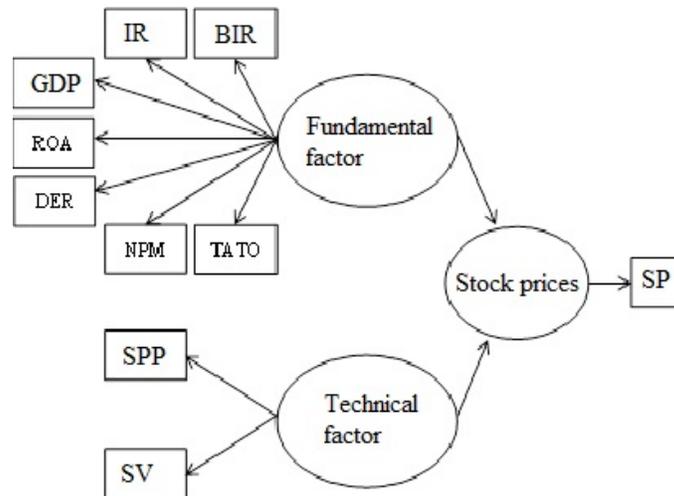


Figure 1 Framework the research

- 2) The companies listed in Indonesia Stock Exchange (IDX) during 2010-2015 continuously
 - 3) The companies issued financial statements quarterly during this period
- Based on these criterions, the samples were obtained seventeen companies which represented on Table 1. To process data, Microsoft Excell 2010 and SmartPLS 3 are used. The variables and indicators show at Table 2.

Table 1 The sample companies

No	Name of the company	No	Name of the company
1	AlamSutera Realty Tbk	10	Gowa Makassar Tourism Development Tbk
2	Bhuwanatala Indah PermaiTbk	11	PerdanaGapuraprimaTbk
3	Bukit Darmo Property Tbk	12	Jaya Real Property Tbk
4	Sentul City Tbk	13	KawasanIndustriJababekaTbk
5	Ciputra Development Tbk	14	LippoCikarangTbk
6	Ciputra Property Tbk	15	LippoKarawaciTbk
7	Ciputra Surya Tbk	16	DanayasaArthatamaTbk
8	Intiland Development Tbk	17	SuryamasDutamakmurTbk
9	Duta Pertiwi Tbk		

Table 2 Variables and Indicators in this research

Laten variables	Indicators	Definitions of indicators
Economic fundamental	a. Inflation rate b. BI rate c. Gross domestic bruto	Percentage of the consumer price index which for a year. Interest rates issued the central bank The total value of goods and services produced by various production line in the territory of a state after a certain period
Fundamental company	a. ROA b. DER c. NPM d. TATO	$ROA = \frac{\text{net profit after taxes}}{\text{total assets}}$ $DER = \frac{\text{long term debt}}{\text{stock holders equity}}$ $NPM = \frac{\text{profit}}{\text{sales}}$ $TATO = \frac{\text{sales}}{\text{Total activa}}$
Technical	a. Stock volume b. Stock prices in the past	Stock volume quarterly Stock prices the last period
Stock price	Stock prices	Closing price in the period quarterly

III. RESULTS AND DISCUSSION

A. Analysis of the Early Model

The latent variables in this study are fundamental and technical factors. The study analysed using SmartPLS 3 and the early model represents at Figure 2. Figure 2 showed fundamental variable reflected by inflation rate (IR), Bank of Indonesia rate (BIR), gross domestic bruto (GDP), return on assets (ROA), debt equity to ratio (DER), net profit margin (NPM) and total asset turnover (TATO). Technical variable is reflected by stock volumes (SV) and stock prices in the past (SPP). The model was analysed in first iteration then obtained its loading factor for each indicators. The loading factor should be higher than 0,6. If the

loading factor were below 0,6, it should be taken out and analysed in second iteration.

Final model showed at Figure 3 and the loading factor of indicator is higher than 0,6. The indicators of final model are ROA, NPM, TATO and stock prices in the past. These indicators are valid in measuring construct variable (Ghozali 2008).

ROA and NPM indicators denote profitability ratios. These ratios proved that these could reflect fundamental variable and valid. The findings fit with the theory that profitability ratio is the most determined by the investors (Munawir 2007). In this study, ROA loading factor is 0,836 and NPM loading factor is 0,782.

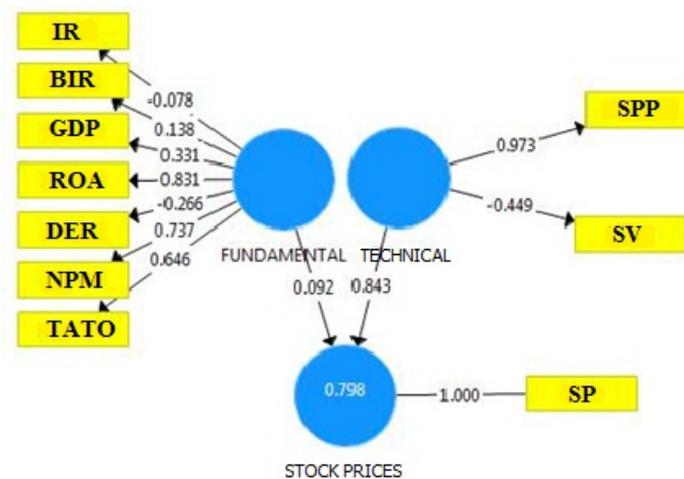


Figure 2 Early model

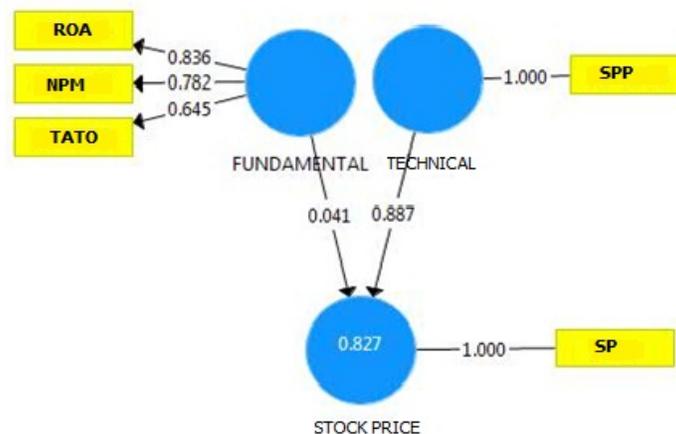


Figure 3 Final model

ROA measures efficiency the companies in managing their assets to profits. This ratio helps the management and the investors to see how well the companies managing the assets to become profit. The higher ratio, the investors more interest as this indicates the companies managing the assets to obtain the greater incomes. Positive ROA usually indicates profit trend

increasingly. ROA very useful to compare the companies in one industry.

Property industry has great assets than other industries as this industry contains physical assets or real assets, such as houses, bulidings, apartments, lands etc. Management needs to manage effectively and efficiently. The assets to obtain the profits in order to the investors interest at property industry. ROA is good

if it is higher than 2% (Lestari & Sugiharto 2007). Kennedy (2003) found out that ROA is positive and significant to stock return.

Activity ratio could be used to predict how much the capital the companies needed. For example, to increase sales the companies need additional assets. Activity ratio allows the analyst to estimate the companies necessary and to assess the companies capability to obtain the assets needed to maintain the assets growing. According Azhari, Rahayu and Zahroh (2016) found out that TATO is not significant to stock prices.

Stock prices in the past could reflect the technical laten variable with the loading factor 1. The results proved that stock prices in the past influenced to stock prices in the future. According Wulandary, Sumiaty and Susano (2009); Sappar, Suhadak and Raden (2015); also Bowonugraha (2007) found out that stock prices in the past had dominant influence to stock price variance. This indicates the investors use stock prices in the past more to determine investment decisions.

Table 3 Outer loading value

	FUNDAMENTAL	TECHNICAL	STOCK PRICE
ROA	0.836		
NPM	0.782		
TATO	0.645		
STOCK PRICE IN THE PAST		1	
STOCK PRICE			1

Validity showed that the examination could be valid if it is consistent measuring what is should be measured. This is displayed by average variance extrated (AVE). AVE of fundamental is 0,575, AVE of technical is 1 and AVE of stock prices is 1. These values are higher than standard value (0,5).

C. Evaluation Structural Model

Structural model or inner model described the relationship between laten variables. In this study is to see the direct relation between fundamental laten variable to stock prices variable and also technical laten variable to stock price variable. R² criterion of endogen laten variable showed how much variance from endogen laten variable could be explained by exogen variables. Endogen variable in this study is stock price variable. Stock prices variable that influenced by fundamental and technical variables obtained 0,827 R². Stock prices variable could be

Table 4 Output bootstrap of final model

	Original sample	Average sample	Standarddeviation	t-value	p-value
Fundamental →stock price	0.041	0.041	0.019	2.109	0.035
Technical →stock price	0.887	0.888	0.032	28.112	0.000

The relation of tecnical variable and stock prices variable show there are impact between each other as p-value (0,000) is smaller than 0,05. T-value (28,112) is higher than t-table (1,96). The value is positive and the value is 0,887. It indicates that technical impacts significantly to stock prices variable in this study. Both fundamental variable and technical variable could increase stock price as their value are positive.

B. Evaluation Outer Model

Outer model is evaluating the relation between laten variables with their indicators. Outer reflective model analysis could be evaluated by convergent validity evaluation, discriminant validity and reliability. Convergent validity is evaluated by three steps: first the loading factor for each indicator, second composite reliability, last average variance extracted (AVE) (Yamin & Kurniawan 2011).

Table 3 showed the loading factors ROA, NPM, TATO, stock prices in the past and stock price are higher than 0,6. These indicators had correlation with their constructs and these are valid. The results showed fundamental variables is explained by ROA, NPM and TATO. This indicates the consistency of investors expectation who is looking for profitability companies first before deciding investment in stock market.

explained by fundamental and technical variables by diversity 82,7% and the rest 17,3% was explained by the other variables that not included in this study. The value of R² refers to Chin in Yamin and Kurniawan (2011) are strong.

Table 4 showed ouput of bootstrap. The criterion p-value is smaller than 0,05 that showed there are significant influence. The relationship between fundamental and stock prices variables have 0,035 p-value. It indicates there are impact between each other variable. Based on t-value, fundamental variable and stock price variable is 2,109 which t-value is higher than t-table [|t-value|> t-table (1,96)]. This value is positive and the value is 0,041. It indicates that fundamental variable impacts significantly to stock price variable in this study.

IV. CONCLUSION

Stock prices in property industry listed in IDX 2010-2015 were influenced by fundamental factor and technical factor. Indicators of fundamental variable are ROA, NPM and TATO. While indicator of technical variable is stock prices in the past. The dominant indicator of fundamental is ROA and the dominant indicator of technical is stock prices in the past as their loading factor value are the greatest among each laten variable. Adjusted R² is 0,827 that showed exogen variables explained endogen variable is good.

V. SUGGESTION

In the future research, researcher could add sum of samples and the period of time. Adding samples is better to representation for a bigger population, in order to the next study could represent all sectors in IDX. Analysing data could determine time series aspect with using panel data regression or vector autoregression.

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“Positive Living” among women infected with HIV.

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Abstract- INTRODUCTION- An estimated 2.5 million Indians live with HIV/AIDS. Spread primarily through heterosexual contact, the epidemic is shifting toward women, 29% of whom are currently infected, with still more cases going unreported. OBJECTIVES: The study was intended to assess' positive living among HIV infected woman and to associate positive living with their demographic variables. MATERIALS & METHODS: A cross sectional study among 200 women infected with HIV attended ART centre, Govt General Hospital, Chennai. TN, India. Their positive living was assessed by Standard Beck's Self Reported hopelessness Inventory Scale. RESULTS: The mean score of positive living by Hopelessness was 11.355 with Standard Deviation of 2.53357 and a Median score of 11; most of the women (75%) were moderately Hopeless and none of them were in minimal Hopeless. Computed χ^2 value indicated that there was no statistically significant association of positive living with any of their demographic variable at $p < 0.05$ in women. CONCLUSIONS: The study findings revealed that majority of women(75%)infected with HIV were having moderate and 11% had severe level of Hopeless, which suggests to implement relaxation Therapy further to them, and none of the Demographic variables played a significant role on their positive living among women infected with HIV. RECOMMENDATIONS(1)Formulate an intervention strategy like counseling, Relaxation therapy to them to reduce their Hopelessness.(2)Promote consistency in condom usage to them during their Sexual Intercourse with partners.(3)Promote sexual Assertiveness among them to prevent increase in Viral Load.(4)Encourage Adherence to ART among them.(5)Empower them to approach life optimistically.

Index Terms- Positive Living,HIV,Women,infection

I. INTRODUCTION

An estimated 2.5 million people living with HIV/AIDS, India has the third high-test number of HIV-infected people in the world, despite reductions in prevalence among the general population, the percentage of all infections occurring among Indian women is continuing to raise. An estimated 2.5 million Indians live with HIV/AIDS. Spread primarily through heterosexual contact, the epidemic is shifting toward women, 29% of whom are currently infected, with still more cases going unreported.

Depression is one of the most prevalent psychiatric diagnoses seen in HIV – positive individuals. Women with HIV are about four times more likely to be depressed than those who are not infected Depression is highly prevalent among women living with HIV which is still under diagnosed and undertreated,

and there is a need to incorporate mental health services an integral component of HIV care.

Stigma shapes the lives of people living with HIV and may affect their willingness to seek medical care. But treatment delays can compromise health and increase the risk of transmission to others.

Enacted and internalized stigmas were correlated with delays in seeking care after testing HIV positive. Depression symptoms mediated the associations of enacted and internalized stigmas with care - seeing delays, whereas efforts to avoiding disclosing HIV status mediated only there association between internalized stigma and care - seeking delays.

Health system models that converge or link HIV services with other reproductive health services need to be tested to provide comprehensive reproductive healthcare to infected women in India. Access to reproductive health services in Human Immunodeficiency Virus (HIV) programs can greatly enhance programs potential to limit the spread of disease, reduce unintended pregnancies and safeguard the health of infected people.

Women's risk of HIV infection from their partner and observed associations between sexual violence and HIV from their partner and observed associations between sexual violence and HIV infection in India underscore the importance of understanding determinants of forced sex. As the primary caregivers for their families, women face many challenges when it comes to accessing care; these include dealing with discrimination from family, community, and health care providers, and a general lack of education, social support, and nutrition guidance and sustenance.

II. OBJECTIVES

The study was intended to assess' positive living among HIV infected woman and to associate positive living with their selected clinical and demographic variables.

III. MATERIALS AND METHOD

The cross sectional study was done among 200 women infected with HIV

IV. SAMPLE

The 200 women infected with HIV were selected by convenience sample technique at ART Centre, Government General Hospital Chennai for their ART Treatment

Inclusion Criteria

1. Females in the age of 18-49 Years irrespective of their marital status. 15-20 - Severe Hopelessness
2. Females who diagnosed to have HIV infection more than one year (HIV Positive) with CD4 count >250.
3. Females residing in Chennai district for past one year.
4. Females willing for participation.
5. The woman understands, read and write in Tamil language.

Exclusion Criteria

1. Females in the AIDS stage (CD4 cell <200)
2. Females migrated from other states.
3. Pregnant Women.

V. INSTRUMENT

The Instrument used as 2 sections

Section 1: Baseline Data

Section 2: Standard Becks Self Reported Hopelessness Inventory Scale consists of 20 items.

Scoring (Standard Becks Self Reported hopelessness Inventory Scale)

- 0-3 - Minimal Hopelessness
- 4-8 - Mild Hopelessness
- 9-14 - Moderate Hopelessness

VI. DATA COLLECTION PROCEDURE

The data was collected from December 2015 to February 2016 under the guidance of Dr.C.Susila, Principal, Billroth College of Nursing, Chennai and formal permission from Head of the Institution Government General Hospital, and for Beck Hopelessness scale, permission obtained from Pearson clinical and talent assessment Company, Bangalore, India. Brief Introduction about self and study has given and informed consent had obtained from the women for the assurance of participation. Confidentiality of their response was maintained. Women were selected at ART Centre by convenience sampling technique. Positive living by Hopelessness was measured in Becks Self Reported Hopelessness Inventory Scale. Their responses were scored and categorised into Minimal, Mild, Moderate, Severe Hopelessness. Instrument took 10 minutes to complete.

VII. RESULTS

Section- A: - Base line data of women.

Table-1 Demographic data of women infected with HIV.

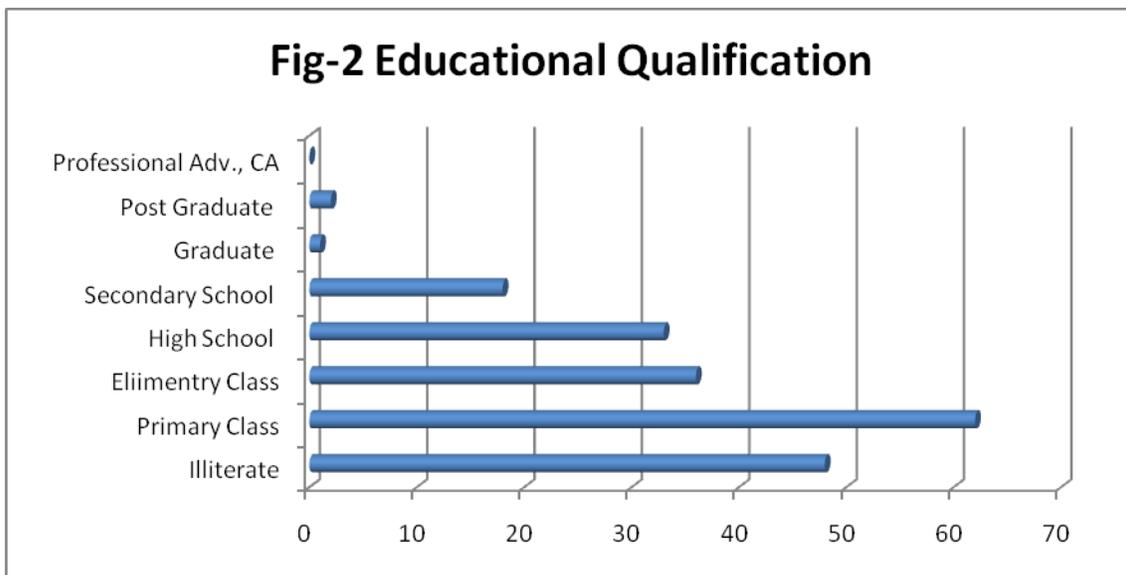
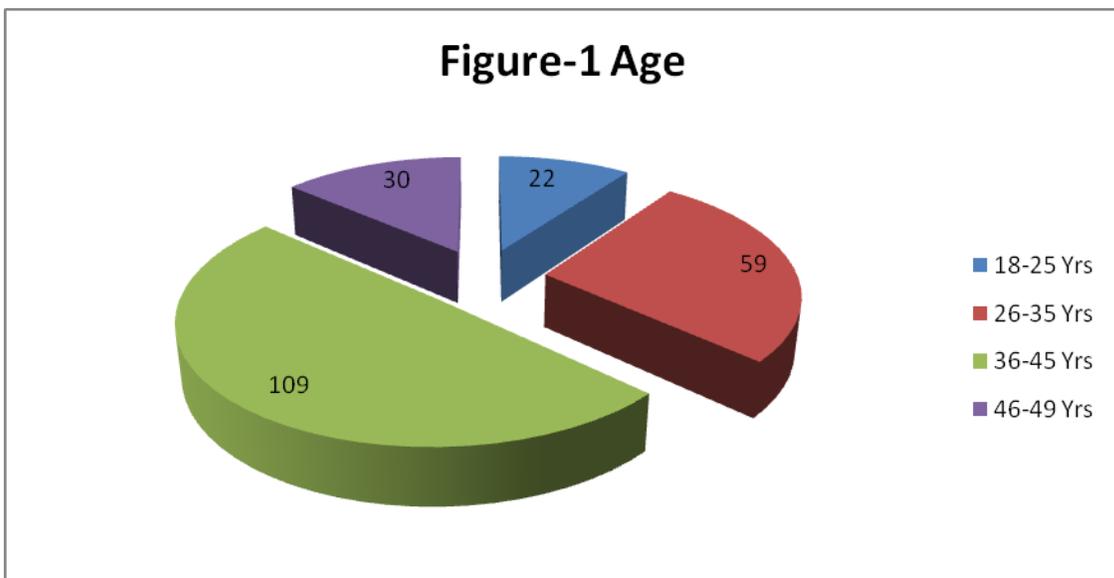
N-200

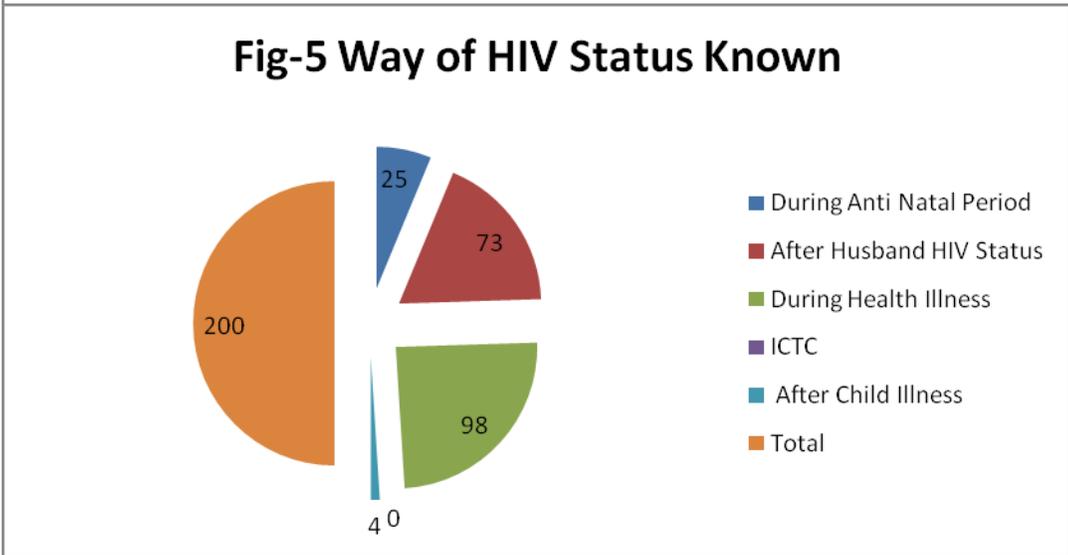
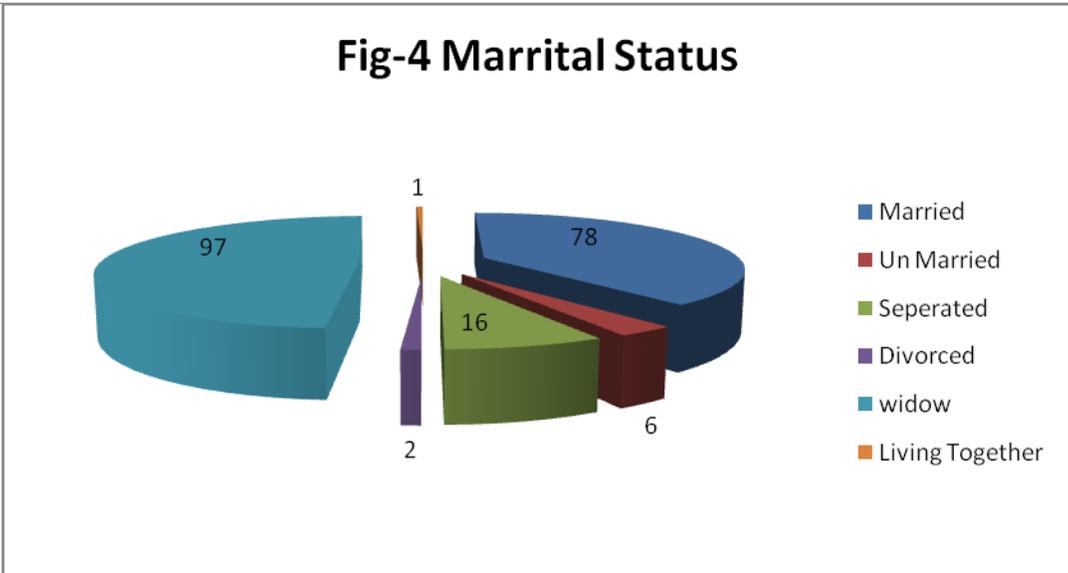
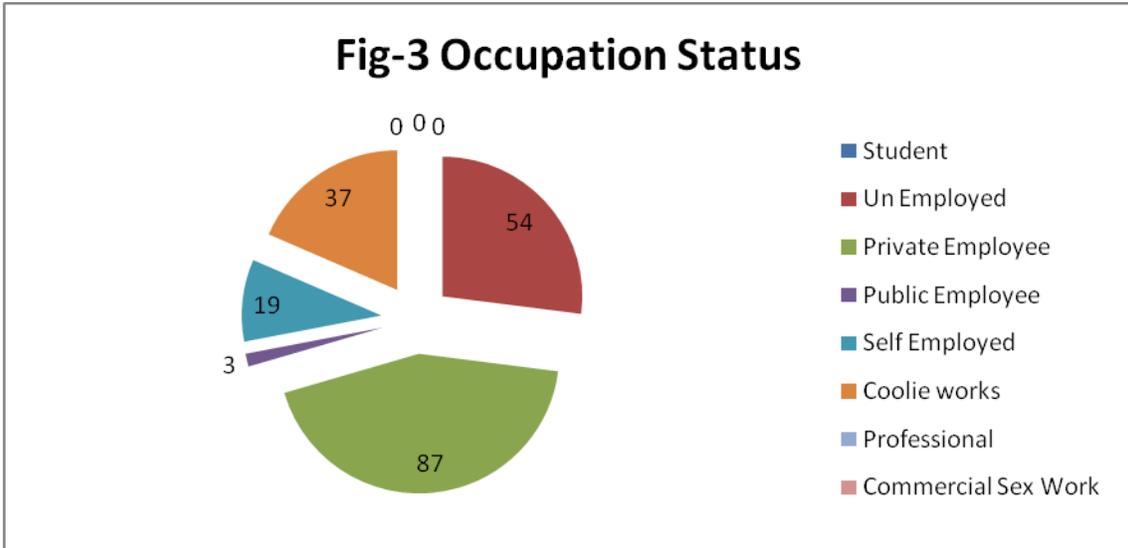
S. No.	Demographic Data	Number	Percentage
1	Age in Years		
	18-25 Yrs	22	11%
	26-35 Yrs	59	29.5%
	36-45 Yrs	109	54.5%
2	46-49 Yrs	30	15%
	Educational Qualification		
	Illiterate	48	24%
	Primary Class	62	31%
	Elementary Class	36	18%
	High School	33	16.5%
	Secondary School	18	9%
	Graduate	1	0.5%
Post Graduate	2	1%	
3	Professional Adv., CA	0	0
	Occupational Status		
	Student	0	0%
	Un Employed	54	27%
	Private Employee	87	43.5%
	Public Employee	3	1.5%
Self Employed	19	9.5%	

	Coolie works	37	18.5%
	Professional	0	0%
	Commercial Sex Work	0	0%
4	Marital Status		
	Married	78	39%
	Un Married	6	3%
	Separated	16	8%
	Divorced	2	1%
	widow	97	48.5%
	Living Together	1	0.5%
5	Monthly Income		
	Below 2500	89	44.5%
	Rs. 2501-5000	57	28.5%
	Rs. 5001-7500	47	23.5%
	Rs. 7501-Above	7	3.5%
6	Religion		
	Hindu	168	84%
	Muslim	4	2%
	Christian	28	14%
	Others	0	0%
7	Types of Family		
	Nuclear	186	93%
	Joint	14	7%
8	Annual Income of the Family		
	Below Rs 100000	183	91.5%
	Rs 10000-200000	15	7.5%
	Rs 200001-300000	1	0.5%
	Rs 300001-400000	1	0.5%
	Rs 400001-500000	0	0%
9	Condom Usage During sexual Intercourse		
	Yes	63	31.5%
	No	16	08%
	NA	131	65.5%
10	Way of HIV Status known		
	During Anti Natal Period	25	12.5%
	After Husband HIV Status	73	36.5%
	During Health Illness	98	49%
	ICTC	0	0%
	After Child Illness	4	02%
11	HIV Status known years		
	0-2	30	15%
	3-4	29	14.5%
	5-6	46	23%
	7-8	31	15.5%

	9-10	64	32%
12	Social Support		
	Husband	79	39.5%
	Parents	26	13%
	Relatives	13	6.5%
	Friend	10	05%
	Children	30	15%
	None	42	21%

Table-1 Shows most of the women aged 36 to 45 yrs (54.5%), majority of the women (89.5%) studied below high school and employed in private concern. 48.5% of women became widow and 49% of women HIV infection diagnosed during their Health illness, second highest after their husband HIV status known and most of the women living with husband were using condom 63(31.5%) during their sexual intercourse.





Section:B Level of positive living.

Table: 2 Level of Positive living in women infected with HIV.
 N=200

S.No	Level of Positive Living by Hopelessness	Number	Percentage	
1.	Minimal	0	0%	Mean11.355 SD-2.53357 Median-11 Skewness 0.133682
2.	Mild	27	13.5%	
3.	Moderate	150	75%	
4.	Severe	23	11.5%	

Table: 2 shows that majority of the women (75%) were Moderately Hopeless

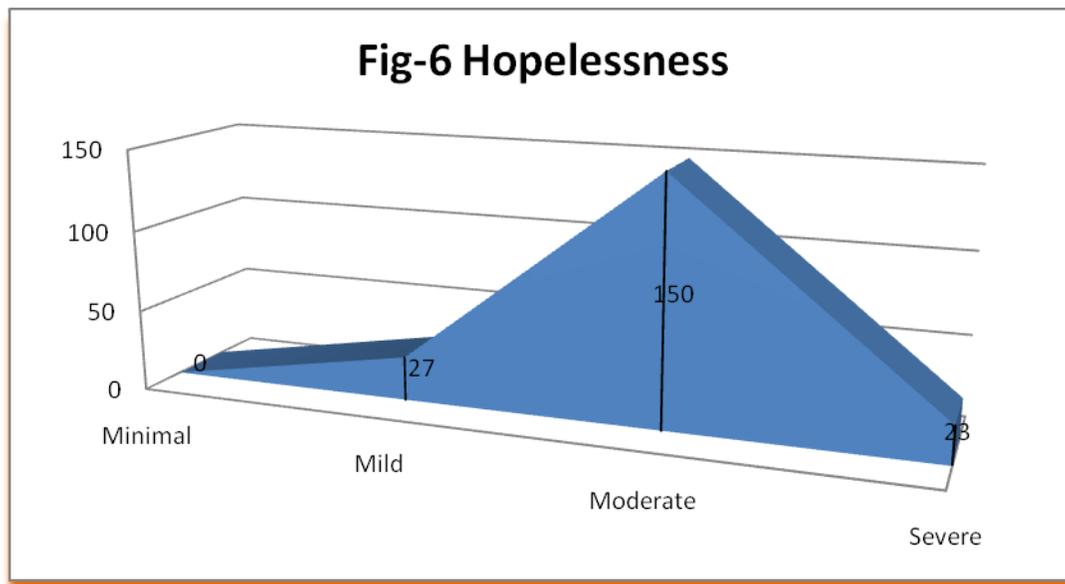


Table: 3 Association of positive living by their Hopelessness with their demographic Variables.
 N-200

S. No.	Demographic Data	Minimal	Mild	Moderate	Severe	Chi-square
1	Age					P value- 0.9584 NS At 0.05 level
	18-25 Yrs	0	0	22	0	
	26-35 Yrs	0	9	43	7	
	36-45 Yrs	0	14	80	15	
	46-49 Yrs	0	4	25	1	
2	Educational Qualification					P value- 0.490 NS At 0.05 level
	Illiterate	0	2	38	8	
	Primary Class	0	7	49	6	
	Elementary Class	0	4	26	6	
	High School	0	7	25	1	
	Secondary School	0	7	9	2	
	Graduate - Non	0	0	1	0	
	Post Graduate - Non	0	0	2	0	
Professional Adv., CA			0			

3	Occupational Status					P value- 0.9534 NS At 0.05 level
	Student	0	0	0	0	
	Un Employed	0	10	41	3	
	Private Employee	0	13	65	9	
	Public Employee	0	1	2	0	
	Self Employed	0	0	16	3	
	Coolie works	0	3	26	8	
	Professional	0	0	0	0	
	Commercial Sex Work	0	0	0	0	
4	Marital Status					P value- 0.888 NS At 0.05 level
	Married	0	12	61	5	
	Un Married	0	0	6	0	
	Separated	0	2	10	4	
	Divorced	0	0	2	0	
	widow	0	13	70	14	
	Living Together	0	0	1	0	
5	Monthly Income					P value- 0.2804 NS At 0.05 level
	Below 2500	0	10	63	16	
	Rs. 2501-5000	0	7	45	5	
	Rs. 5001-7500	0	10	35	2	
	Rs. 7501-Above	0	0	7	0	
6	Types of Family					P value- 0.6758 NS At 0.05 level
	Nuclear	0	25	141	20	
	Joint	0	2	9	3	
7	Way of HIV Status known					P value- 0.998 NS At 0.05 level
	During Antenatal Period	0	5	16	4	
	After Husband HIV Status	0	11	53	9	
	During Health Illness	0	11	77	10	
	ICTC	0	0	0	0	
	After Child Illness	0	0	4	0	
8	Social Support					P value- 0.2427 NS At 0.05 level
	Husband	0	12	62	5	
	Parents	0	1	20	5	
	Relatives	0	0	12	1	
	Friend	0	2	7	1	
	Children	0	4	25	1	
	None	0	8	24	10	

Computed χ^2 value indicated that there was no statistically significant association of positive living with any of their demographic variable at $p < 0.05$ in women.

VIII. DISCUSSION

This chapter discusses the findings of the study derived from the statistical analysis and its pertinence to the objectives of the study. This study was conducted to estimate positive living by Hopelessness among women infected with HIV in Chennai District, Tamilnadu.

1. Level of positive living among Women infected with HIV.

The mean score of positive living by Hopelessness was 11.355 with Standard Deviation of 2.53357 with a Median score of 11; most of the women (75%) were moderately Hopeless and none of them were in minimal Hopeless.

2. Association of positive living with their selected Demographic Variables.

Computed χ^2 value indicated that there was no statistically significant association of positive living with any of their demographic variable at $p < 0.05$ in women.

IX. CONCLUSION

1. The study findings revealed that majority of women (75%) infected with HIV were having moderate and 11% had severe level of Hopeless, which suggests to implement relaxation Therapy further to them
2. None of the Demographic variables played a significant role on their positive living among women infected with HIV.

X. RECOMMENDATIONS

1. Formulate an intervention strategy like counseling, Relaxation therapy to them to reduce their Hopelessness.
2. Promote consistency in condom usage to them during their Sexual Intercourse.
3. Promote sexual Assertiveness among them to prevent increase in Viral Load.
4. Encourage Adherence to ART among them.
5. Empower them to approach life optimistically.

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Chemical composition of Camel Fore-Stomach Digesta (FSD) ensiled with urea and graded levels of Rice milling Waste (RMW)

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Abstract- This study was conducted to determine the chemical composition and fibre fractions of Fore-Stomach-digesta (FSD) ensiled with Urea and rice milling waste (RMW) and also its effect on the performance of Uda sheep. Fore-Stomach Digesta (FSD) from camel were collected at the Sokoto abattoir. Samples were thoroughly mixed and representative samples were collected and ensiled for a period of three weeks. The ensiled materials are 100% FSD ensiled with urea designated as treatment A, 75% FSD and 25% Rice Milling Waste (RMW) ensiled with urea designated as treatment B, 50% FSD and 50% RMW ensiled with urea designated as treatment C while 50% FSD and 50% RMW treated with urea but not ensiled designated as treatment D. The results showed that there were no significant variations ($p>0.05$) between treatments in terms of Dry Matter (DM) content. Crude Protein (CP) content was significantly different ($p<0.05$) between treatment means with treatment D (19.04%) having higher value and B (17.05%) having the least. there were no significant variations ($p>0.05$) between treatments in terms of Dry Matter (DM) content. Crude Protein (CP) content was significantly different ($p<0.05$) between treatment means with treatment D (19.04%) having higher value and B (17.05%) having the least. The Nitrogen Detergent Fibre (NDF) was significantly higher ($P<0.05$) in treatment D (71.83%) and the lowest value was obtained in treatment B (63.67%) while treatments A (67.70%) and C (68.23%) values were similar. There were significantly ($P<0.05$) lower and similar values in treatments C and D of both Calcium and phosphorous contents. Treatments A recorded significantly ($P<0.05$) higher value followed by treatments B. The higher CP content in the present study might be due to the addition of urea, as urea adds nitrogen to feed material and therefore increase crude protein content.

Index Terms- Fore-Stomach Digesta (FSD), Urea, Ensiling, Chemical Composition

I. INTRODUCTION

Under dry conditions feed availability is an important issue for resource poor local farmers. Non-conventional feeds offer an option to overcome this and increase production and livestock survival rates. Fore-Stomach Digesta (FSD) is an abattoir waste product that can be obtained free of charge from most abattoirs in Nigeria. Due to lack of adequate waste disposal facilities, it is often found decaying in most abattoirs, (Maigandi and Tukur, 2002). Maigandi (2001) reported that FSD includes

all the materials from the fore-stomach compartments of camel and ruminant animals after cleaning out their guts. FSD is made up of partially digested feed materials and rumen liquor which is partly contributed by the water intake, water in feed and large volume of water secreted (Kumar, 1989). The partially digested feed residue of FSD may be considerably influenced by the type of diet and time interval between feeding and slaughtering.

The chemical composition of FSD depends on the specie of animal, the type of feed consumed by the animal, the season of the year (Alhassan, 1985), the time of sampling from the animal (Riveira, 1977) and the type of treatment given to the FSD prior to analysis (Kumar, 1989).

Therefore the utilization of FSD as feed ingredient will provide a means of its disposal and lowering feed cost (Maigandi and Tukur, 2002). There is also the need to improve its quality.

Rice milling waste (RMW) is an agro-industrial by-product found in large quantities in areas where rice is produced abundantly and it is a potentially useful component of concentrate portion of diets for ruminants (Alawa and Umunna, 1993).

Urea as the commonest source of degradable nitrogen for inclusion in diets of ruminants and also can provide a substantial amount of the supplemental Nitrogen (N) required where livestock management is good and feed is formulated and mixed properly.

As Fore-Stomach-Digesta (FSD) cannot be fed alone to animals, it is necessary to improve it through some means (Anthony, 1971). Ensiling is one of the ways of improving and preserving the value of feeds for ruminant animals (McDonald *et al.*, 1995; Maigandi *et al.*, 2004), therefore these methods can be used to improve and preserve Fore-Stomach-Digesta (FSD) for better utilization by ruminants.

II. METHODOLOGY

Sample collection and Preparation

Fore-Stomach Digesta (FSD) from camels was collected at Sokoto abattoir. At least 5-10 animals that were brought to the abattoir for slaughter were selected for the collection. After slaughter and evisceration at least 0.5kg of the fresh FSD was collected. Samples were thoroughly mixed and representative samples were collected. The representative samples collected were immediately transferred to an air-tight container and transported to the experimental site. Urea and Rice Milling Waste (RMW) were purchased from Sokoto central market and

Kalambaina rice processing centre in Sokoto respectively. The samples were ensiled for 21days in triplicate.

Experimental Design and Ensiling Procedure

A factorial design in CRD (Steel and Torrie, 1980) was used in this experiment, with three replications of fore-stomach

digesta (FSD) from camel. The factor was the inclusion of RMW at graded levels in the FSD as indicated in table 1. The samples were thoroughly mixed and ensiled for a period of three weeks.

Table 1: Gross composition of the Ensiled Camel FSD with Urea and RMW

	Inclusion Levels of Camel Fore Stomach Digesta			
	100 (A)	75(B)	50(C)	50(D)*
Rice Milling Wastes	0	25	50	50*

*1kg of Urea plus 25kg of the diet in all the treatments *Unensiled samples*

Twelve (12) bottles of 946ml capacity were used as laboratory silos (Ogunlolu *et al.*, 2010). The procedure of Roy and Rangnekar (2006) was followed in which 1kg urea was dissolved in 15 litres of water and sprinkled on 25kg FSD. The samples were ensiled for 21days in triplicate. Masking tape was used to further seal the bottles after filling weighed materials and compressed. The ensiled materials are 100% FSD ensiled with urea designated as treatment A, 75% FSD and 25% Rice Milling Waste (RMW) ensiled with urea designated as treatment B, 50% FSD and 50% RMW ensiled with urea designated as treatment C while 50% FSD and 50% RMW treated with urea but not ensiled designated as treatment D.

Chemical Analysis

After three weeks, the 12 ensiled samples were opened and collected for analysis. The samples were analysed for proximate composition using AOAC (1990) procedures and for fibre fractions (ADF, NDF, ADL, cellulose and hemicellulose) using Goering and van Soest (1970) and van Soest *et al.* (1991) procedures. The samples were analysed for mineral composition according to the procedures of AOAC (1990). Potassium (K) and Sodium (Na) were analysed using Flame photometer, while Atomic Absorption Spectrophotometer (AAS) was used to analyse the samples for Calcium (Ca) and Magnesium (Mg) contents. Energy was calculated from the formula: 37 X %CP + 81 X %EE + 35.5 X % NFE (Pautzenga, 1985).

Statistical Analysis

Data collected from the proximate, fibre fractions and mineral analyses were analysed using analysis of variance (ANOVA) and treatment means were compared using the Least Significant Difference test (LSD) (Steel and Torrie, 1980).

III. RESULTS

Chemical Composition of Camel Fore-Stomach Digesta ensiled with Urea and Rice Milling Waste slaughtered at Sokoto Abattoir

From table 2 it could be observed that there were no significant variations (p>0.05) between treatments in terms of Dry Matter (DM) content. Crude Protein (CP) content was significantly different (p<0.05) between treatment means with treatment D (19.04%) having higher value and B (17.05%) having the least. NFE Nitrogen Free Extract content recorded significantly higher (p<0.05) value in treatments A (32.08%), B (33.74%) and C (34.13%) whose values did not differ significantly (p>0.05) between each other. The lowest NFE was obtained in treatment D (30.58%).

The Nitrogen Detergent Fibre (NDF) was significantly higher (P<0.05) in treatment D (71.83%) and the lowest value was obtained in treatment B (63.67%) while treatments A (67.70%) and C (68.23%) values were similar. The Acid Detergent Fibre (ADF) was also significantly higher (P<0.05) in treatment D (44.87%) followed by treatment C (43.17%) and then treatments A (41.47%) and B (42.00%) were similar. Acid Detergent Lignin (ADL) was significantly higher in treatment D (14.50%) but differed significantly with the treatments A (12.23%) and B (13.00%) whose values were similar. The lowest value was in treatment C (11.20%). The Cellulose content was significantly higher (P<0.05) in treatment C (31.97%) compared to the other treatments, but also treatments A (29.00%) and B (29.00%) were significantly (P<0.05) the same. Hemi-cellulose was significantly higher (P<0.05) and similar in treatments A (26.23%), C (25.07%) and D (26.97%), while treatment B (21.67%) was significantly (P<0.05) different and also the lowest.

Table 2: Chemical Composition of Camel Fore-Stomach Digesta (FSD) ensiled with urea and graded levels of Rice Milling Waste (RMW)

Variables (%)	Inclusion Levels of FSD (%)				SEM
	A (100)	B (75)	C (50)	D (50*)	
Dry Matter	89.64	89.60	89.50	90.00	0.21
Organic Matter	76.40 ^b	76.39 ^b	77.14 ^{ab}	77.27 ^a	0.28
Crude Protein	17.55 ^c	17.05 ^d	18.48 ^b	19.04 ^a	0.12
Crude Fibre	28.93	29.83	29.53	29.37	0.26
Ether Extract	8.30 ^a	6.16 ^b	5.50 ^c	8.27 ^a	0.18

Nitrogen Free Extract	32.08 ^{ab}	33.74 ^a	34.13 ^a	30.58 ^b	0.42
Ash	13.24 ^a	13.21 ^a	12.36 ^c	12.73 ^b	0.14
**ME (kcal/kg)	2460.49	2327.58	2340.87	2459.94	
Neutral Detergent Fibre (NDF)	67.70 ^b	63.67 ^c	68.23 ^b	71.83 ^a	0.40
Acid Detergent Fibre (ADF)	41.47 ^c	42.00 ^c	43.17 ^b	44.87 ^a	0.15
Acid Detergent Lignin (ADL)	12.47 ^b	13.00 ^b	11.20 ^c	14.50 ^a	0.26
Cellulose	29.00 ^c	29.00 ^c	31.97 ^a	30.37 ^b	0.26
Hemi-cellulose	26.23 ^a	21.67 ^b	25.07 ^a	26.97 ^a	0.37

Means on the same row with different superscripts are significantly different (P<0.05)

*Unensiled samples

Table 3 indicates Mineral Composition of Camel Fore-Stomach Digesta (FSD) ensiled with urea and graded levels of Rice milling Waste (RMW). There were significantly (P<0.05) lower and similar values in treatments C and D of both Calcium and phosphorous contents. Treatments A recorded significantly (P<0.05) higher value followed by treatments B. In the Potassium content there was significantly higher (P<0.05) value

in treatment A (52.6%) and the lowest value in treatment C (45.2%). Magnesium content was also significantly higher (P<0.05) in treatment A (5.7%) compared to the other treatments. Also treatments C (3.3%) and D (3.4%) were similar. The Cobalt content recorded significantly (P<0.05) higher and similar values in treatments A (0.4%) and B (0.4%) compared to treatments C (0.3%) and D (0.3%) whose values were also similar.

Table 3: Mineral Composition of Camel Fore-Stomach Digesta (FSD) ensiled with urea and graded levels of Rice milling Waste (RMW)

Variables(%)	Inclusion Levels of FSD (%)				SEM
	(A)100	(B)75	(C)50	(D)50*	
Calcium (Ca)	7.9 ^a	6.6 ^b	5.3 ^c	5.6 ^c	0.01
Phosphorous (P)	5.3 ^a	4.3 ^b	3.9 ^c	3.8 ^c	0.01
Potassium (K)	52.6 ^a	46.5 ^c	45.2 ^b	50.4 ^b	0.02
Magnesium (Mg)	5.7 ^a	4.5 ^b	3.3 ^c	3.4 ^c	0.01
Cobalt (Co)	0.4 ^a	0.4 ^a	0.3 ^b	0.3 ^b	0.08

*Unensiled samples

IV. DISCUSSION

Chemical composition of the Camel's Fore-Stomach Digesta (FSD) ensiled with urea and graded levels of Rice milling Waste (RMW)

Dry Matter (DM) values of FSD from camel were higher in the treatment where FSD, Urea and RMW were not ensiled (treatment D) compared to those that were ensiled (treatments A, B and C). This might be due to the microbial activity as a result of ensiling FSD prior to the analyses (Kumar, 1989). The DM values obtained in this study were higher than those values (13-20%) obtained by Maigandi and Tukur (2002) and 14% obtained by Kumar (1989) when FSD was analysed alone. This might be due to the fact that ensiling improves value of feeds for ruminants (McDonald *et al.*, 1995 and Maigandi *et al.*, 2004).

The CP contents obtained from the present study where the FSD was ensiled for three weeks period were higher than those obtained by Maigandi *et al.* (2004) when FSD was ensiled at 2, 4 and 6 weeks period. This rejects the idea that there was progressive decrease in the CP due to tilt in the balance from true protein to Non Protein Nitrogen (NPN) due to enzymatic changes as the period of ensiling increases. Also there were higher CP values in the FSD from camel compared to those of Maigandi and Tukur (2002) and 12.04% for cowpea husk (Adeloye, 1994) as well as 2.4-6.4% obtained from cereal crop residues (Alawa and Umunna, 1993). The higher CP content in the present study might be due to the addition of urea, as urea adds nitrogen to feed

material (Ben Salem and Smith, 2008) and therefore increase crude protein content.

In the present study CP and DM values of camel were lower than those reported by Maigandi *et al.* (2008) when FSD was ensiled with poultry waste. This might be due to differences in ensiling materials used and proportion of FSD and other ingredients used (Maigandi *et al.*, 2008; Alhassan, 1985).

The Organic Matter contents of FSD from camel in the present study were lower than 90.99 for hay, 93.01 for wheat bran and 93.00 for corn stalk (Elkholy *et al.*, 2009). Also the OM values of unensiled sample in the overall study were higher than the ensiled samples. This might be due to the fact that the longer period of ensiling reduces the moisture content of FSD and increases the DM (Maigandi *et al.*, 2008; Jakmola *et al.*, 1984).

The CF contents of FSD obtained in this study are lower than those obtained by Weixian (1995) when wheat straw was treated with urea and ammonia, but were similar to those obtained by Boda (1990) and Maigandi *et al.* (2004), but were higher than those values when FSD was ensiled with poultry waste (Maigandi *et al.*, 2008).

In the overall study EE was highest in the 100% camel FSD (i.e 100% FSD ensiled with urea). This might be as a result of the fact that camels are said to produce higher amounts of volatile fatty acids in their fore-stomach compared to other ruminants (Jouany *et al.*, 1995).

The NDF contents of the diet show that unensiled materials contained more NDF which is an indication that it is bulkier than the ensiled materials. This clearly indicates that ensiling process had an effect on size particles of the experimental materials. This

result could be predicted to means that unensiled feed materials in this experiment requires more chewing so as to reduce particle size (Varga *et al.*; 1998). It means that when this diet is use in feeding animals there would be more regurgitation activities compared to the diets from other treatments.

Also the NDF and ADF content in this study were lower than those reported by Weixian (1995) when straw was treated with anhydrous ammonia and urea. The lower NDF in the present study might be due to the report that urea treatment reduced NDF concentration by solubilization of hemi-cellulose and/or ADL fractions (Gibb and Baker., 1989; Schiere and de Wit, 1995). But NDF and ADF fell within the range of values for roughages reported by (NRC, 1985) in the table of nutrients composition. Also NRC (1989), recommended 25-28% and 19-21% for NDF and ADF respectively.

Higher NDF in the diet require more chewing, as NDF represents structural carbohydrate components of feed that commonly require chewing activity for particle size reduction and passage. The higher NDF in the present study increases the regurgitation activity in the animals which is one of the important characteristics in ruminants (Varga *et al.*, 1989).

Mineral Composition of Camel FSD Ensiled with Urea and Graded Levels of RMW

The calcium content in this study is similar to those reported by Maigandi and Owanikin (2002). The calcium: phosphorous ratio in the camel FSD in this study are in line with what was reported by McDonald *et al.* (1995) that the calcium: phosphorous ratio considered most suitable for farm animals is within the range of 1:1-2:1, although there is evidence which suggests that ruminants can tolerate higher ratios provided the phosphorous requirements are met. The mineral composition contents recorded highest values in the 100% FSD ensiled with urea only (treatments A).

The cobalt content was within the normal range of 0.02-0.04 mg/kg as deficiency symptoms are said to occur where levels of cobalt in the herbage are below 0.1 mg/kg DM.

CONCLUSION

his study concludes that Dry matter, Crude protein and Crude fibre contents were improved by ensiling Fore-Stomach Digesta (FSD) with Urea and Rice Milling Waste (RMW) and can be used as feed for ruminants.

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Evaluation of Phytotoxicity of Mung Bean Genotypes Against Salinity Stress

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Abstract- The purpose of present study was to evaluate the differential behaviour of mung bean genotypes under salt stress. In this experiment five mung bean genotypes (Samrat, Sonali B1, Panna, Sukumar, and Bireswar) were evaluated under five different salinity conditions including control (0, 6, 10, 16 and 20 dSm⁻¹). Mungbean (*Vigna radiata* (L.) Wilczek) varieties showed significant and distinct varietal difference during screening for salt tolerance at early seedling growth stage regarding the parameters of germination efficiency and seedling characters. More adverse effect was noticed in shoot length than that of roots. Samrat and Bireswar were found to be the most tolerant and sensitive in response to salt stress condition respectively.

Index Terms- Germination parameters, mung bean, salinity, seedling characters

I. INTRODUCTION

Vigna radiata (L.) Wilczek is a vital eco-friendly food grain leguminous crop of dry land agriculture with rich source of proteins, vitamins, and minerals (Keatinge et al., 2011). India has the credit for contributing 35.7% to the global pulse production (FAOSTAT, 2013). It is a valuable crop in sustainable agriculture production due to its ability to fix nitrogen and small life span (Somta and Srinives, 2007). Soil salinity is a global atrocious environmental problem including the developing and developed countries. Salinity stress limits agricultural production affecting about half of the irrigated lands of the world (Horney et al., 2005) and threatening the sustainability of agriculture (Dagar, 2005). The arable land is constantly being converted into saline land because of human interferences and natural salinity. As a result, up to 50% land loss is expected by 2050 (Hasanuzzaman et al., 2013). Salinity delays the germination processes and reduces the total number of seeds germinating in all plants; though the responses of the plants towards salinity are inconsistent and varied (Ungar, 2007). Salinity also can considerably decrease growth rate of plants because it prevents water uptake due to influence of ion toxicity and & high osmotic stress. (Hasanuzzaman et al., 2013)

In this study, we have selected five genotypes of mung bean which are most commonly cultivated in West Bengal, India. Present study aimed to observe the differential physiological behaviour of mung bean genotypes under salt stress and to find out the most suitable one among the selected five mung bean genotypes for salt tolerance.

II. MATERIALS AND METHODS

Mung bean seeds were collected from Pulses and Oilseeds Research Station, Berhampur, West Bengal, India. In this experiment, after surface sterilization, five varieties (Samrat, Sonali B1, Panna, Sukumar WBM 29, and Bireswar WBM 4-34-1-1) of mung bean were allowed to germinate at five different levels of saline solutions (0, 6, 10, 16 and 20 dSm⁻¹). The electrical conductivity of saline solution was measured with a conductivity meter (dSm⁻¹ = deci Siemen per meter). Finally seeds were germinated. Data were recorded after seven days.

Seedlings were evaluated for the following parameters using the following formulae –

1. Plant height stress tolerance index (PHSI) = (Plant height of stressed plant / Plant height of control plants) × 100 (Ashraf et al., 2006)
2. Root length stress tolerance index (RLSI) = (Root length stressed plant / Root length of control plants) × 100 (Ashraf et al., 2006)
3. Seedling height stress tolerance index (SHSI) = (Seedling height of stressed plant/ Seedling height of control) × 100 (Ashraf et al., 2006)
4. Root phytotoxicity (%) = (Root length of Control – Root length of treatment) / Root length of control × 100 (Asmare, 2013)

5. Shoot phytotoxicity (%) = (Shoot length of Control – Shoot length of treatment) / Shoot length of control × 100 (Asmare, 2013)

Calculation of root T₅₀ and shoot T₅₀ was done using empirical probit values after converting the data into arcsine values.

Statistical analysis:

Interaction and differences between different salinity concentration and their effects on mung bean genotypes were determined by two-way analysis of variance with replication (ANOVA at $P < 0.01$ and $P < 0.05$ level). Separation of Mean was performed by Duncan's multiple range test (DMRT at $P < 0.05$). Correlation between different morphological attributes of mung bean at different salinity stage was done by using SPSS correlation matrix. Principal component analysis (PCA) of morphological parameters of mung bean at different concentration of salinity was analyzed by using XLSTAT 2015 software.

III. RESULTS AND DISCUSSION

Response of Genotypes towards salinity

The varietal growth of five mung bean genotypes was measured in terms of root and SL along with different indices at different salt stress condition as shown in the tables Table 1 and Table 2.

Table 1. Mean (\pm SE) values for effects of salinity on root length (RL) shoot length (SL), RL/SL ratio, Average lateral root number, PHSI, RLSI and SHSI of five genotypes of *Vigna radiata*. Means with the same letter in the columns do not differ significantly ($p < 0.05$, using DMRT).

Variety	Salinity (dSm ⁻¹)	Root Length (cm)	Shoot Length (cm)	RL/SL ratio	Average Lateral Root Number	PHSI	RLSI	SHSI
SAMRAT	0	10.00 \pm 0.82 ^a	14.750 \pm 0.58 ^a	0.678 \pm 0.020 ^{hi}	5.5 \pm 0.53 ^{ef}	100	100	100
	6	8.38 \pm 0.48 ^b	13.375 \pm 0.96 ^{bc}	0.627 \pm 0.047 ^{ijk}	5.75 \pm 0.21 ^{de}	90.677 \pm 0.78 ^g	83.8 \pm 0.48 ^d	87.89 \pm 0.48 ^g
	10	7.45 \pm 0.48 ^{cd}	10.300 \pm 0.87 ^f	0.723 \pm 0.047 ^{gh}	6.5 \pm 0.63 ^c	69.83 \pm 0.30 ^k	74.5 \pm 0.54 ^h	71.71 \pm 0.96 ^l
	16	3.13 \pm 0.92 ^h	5.675 \pm 0.54 ^{hi}	0.551 \pm 0.024 ^{lm}	3.75 \pm 0.72 ⁿ	38.47 \pm 0.48 ^l	31.25 \pm 1.76 ^l	35.56 \pm 1.36 ^q
	20	2.78 \pm 0.58 ^{hi}	2.150 \pm 0.58 ^{kl}	1.291 \pm 0.082 ^a	2.75 \pm 0.38 ^o	37.88 \pm 0.54 ^a	27.75 \pm 0.82 ^o	19.89 \pm 0.96 ^a
SONALI	0	9.50 \pm 0.58 ^a	13.750 \pm 1.00 ^b	0.691 \pm 0.082 ^{gh}	4 \pm 0.36 ^{kmm}	100	100	100
	6	7.95 \pm 0.82 ^{bc}	12.875 \pm 0.22 ^{bcd}	0.617 \pm 0.062 ^{jk}	4 \pm 0.30 ^{kmm}	93.64 \pm 0.82 ⁱ	83.68 \pm 0.54 ^d	89.56 \pm 0.96 ⁱ
	10	7.20 \pm 0.82 ^{de}	8.300 \pm 0.77 ^g	0.867 \pm 0.033 ^e	5.25 \pm 0.13 ^{fg}	60.36 \pm 0.53 ^m	75.78 \pm 0.82 ^g	66.66 \pm 0.82 ^m
	16	2.75 \pm 1.36 ^{hi}	4.750 \pm 0.29 ^{ij}	0.579 \pm 0.016 ^{kl}	6.5 \pm 0.63 ^c	34.55 \pm 0.82 ^q	28.94 \pm 0.53 ^m	32.25 \pm 0.58 ^r
	20	1.75 \pm 0.44 ^{jk}	2.150 \pm 0.44 ^{kl}	0.814 \pm 0.059 ^{ef}	4.75 \pm 0.72 ^{hi}	15.64 \pm 0.53 ^a	18.42 \pm 0.59 ^r	16.77 \pm 0.82 ^a
SUKUMAR	0	9.70 \pm 0.96 ^a	12.000 \pm 0.58 ^{de}	0.808 \pm 0.082 ^f	4.5 \pm 0.63 ^{ijk}	100	100	100
	6	8.25 \pm 1.26 ^b	8.875 \pm 0.89 ^g	0.930 \pm 0.038 ^d	5 \pm 0.82 ^{gh}	73.96 \pm 0.53 ^j	85.05 \pm 1.36 ^c	78.912 \pm 0.59 ^k
	10	6.550 \pm 1.26 ^e	6.000 \pm 0.91 ^h	1.092 \pm 0.082 ^c	6 \pm 0.72 ^d	50 \pm 0.30 ⁿ	67.52 \pm 0.44 ⁱ	57.83 \pm 0.58 ^p
	16	2.75 \pm 1.78 ^{hi}	3.750 \pm 1.04 ^j	0.733 \pm 0.054 ^g	4.25 \pm 0.96 ^{iklm}	31.25 \pm 0.48 ^r	28.35 \pm 0.58 ⁿ	29.95 \pm 0.92 ^r
	20	1.98 \pm 0.59 ^{jk}	1.600 \pm 0.59 ^{np}	1.234 \pm 0.033 ^b	6 \pm 0.82 ^d	13.33 \pm 0.59 ^a	20.36 \pm 0.44 ^q	16.47 \pm 0.82 ^a
PANNA	0	8.45 \pm 0.53 ^b	12.625 \pm 0.29 ^d	0.669 \pm 0.015 ^{hij}	8 \pm 0.13 ^a	100	100	100
	6	7.00 \pm 0.82 ^{de}	11.125 \pm 0.96 ^{de}	0.566 \pm 0.047 ^{ijk}	4 \pm 0.49 ^{kmm}	98.01 \pm 0.59 ^h	82.84 \pm 0.82 ^e	91.93 \pm 0.48 ^h
	10	6.70 \pm 0.82 ^e	8.000 \pm 0.71 ^h	0.838 \pm 0.047 ^{ef}	4.75 \pm 0.70 ^{hij}	63.366 \pm 0.82 ^o	79.29 \pm 0.58 ^f	69.75 \pm 0.82 ⁿ
	16	2.80 \pm 1.76 ^{hi}	3.875 \pm 0.48 ^l	0.723 \pm 0.047 ^{gh}	5.25 \pm 0.43 ^{fg}	30.69 \pm 0.59 ^r	33.14 \pm 0.58 ^k	31.67 \pm 1.36 ^t
	20	1.300 \pm 0.54 ^k	1.650 \pm 0.54 ^{kl}	0.788 \pm 0.024 ^{nop}	7 \pm 0.63 ^b	13.06 \pm 0.82 ^a	15.38 \pm 0.58 ^s	13.99 \pm 0.58 ^a
BIRESHWAR	0	5.300 \pm 0.48 ^f	10.575 \pm 0.93 ^f	0.501 \pm 0.050 ^f	4.25 \pm 0.55 ^{klm}	100	100	100
	6	4.93 \pm 0.30 ^{fg}	8.150 \pm 0.65 ^g	0.604 \pm 0.049 ^h	4.5 \pm 0.83 ^{ijk}	77.068 \pm 0.59 ^j	92.92 \pm 0.58 ^b	82.36 \pm 0.92 ^j
	10	4.38 \pm 0.30 ^g	5.250 \pm 0.87 ^{hi}	0.833 \pm 0.047 ^{jk}	7.25 \pm 0.48 ^b	49.64 \pm 0.54 ^p	82.54 \pm 0.44 ^e	60.62 \pm 0.82 ^o
	16	2.28 \pm 0.78 ^{ij}	2.625 \pm 0.48 ^k	0.867 \pm 0.033 ^m	5.25 \pm 0.48 ^{fg}	24.82 \pm 0.30 ^s	42.92 \pm 1.26 ^j	30.86 \pm 0.58 ^s
	20	1.25 \pm 0.15 ^k	1.125 \pm 0.15 ^l	1.111 \pm 0.237 ^p	4.5 \pm 0.83 ^{ijkl}	10.64 \pm 0.48 ^d	23.58 \pm 0.59 ^p	14.96 \pm 0.96 ^d

Table 2. Root and shoot phytotoxicity along with their T₅₀ values of five genotypes of *Vigna radiata*.

Variety	Salinity	Root				Shoot			
		Root Phytotoxicity	Empirical Probit	Linear Equation	T ₅₀ ± SEE	Shoot Phytotoxicity	Empirical Probit	Linear Equation	T ₅₀ ± SEE
SAMRAT	6	16.2±0.48 ^s	4.01			9.32±0.44 ^t	3.68		
	10	25.5±0.83 ^p	4.34	y = 3.218x + 1.489 R ² = 0.986	12.33±1.000 ^a	30.17±0.48 ^f	4.48	y = 4.369x + 0.198 R ² = 0.977	12.56±1.103 ^a
	16	68.75±0.55 ^l	5.49			61.53±0.59 ⁿ	5.29		
	20	72.25±0.63 ^h	5.59			85.42±0.82 ⁱ	6.06		
6	16.32±0.70 ^e	4.02				6.36±0.70 ^d	3.48		
SONALI	10	24.21±0.49 ^s	4.30	y = 3.732x + 1.036 R ² = 0.992	11.54±1.060 ^{ab}	39.64±0.43 ^t	4.74	y = 4.647x - 0.072 R ² = 0.986	12.34±1.079 ^{ab}
	16	71.05±0.43 ^p	5.55			65.45±0.55 ^s	5.39		
	20	81.58±0.55 ^m	5.89			84.36±0.58 ^l	6.00		
	6	14.95±0.43 ^g	3.96				26.04±0.44 ^h		
SUKUMAR	10	32.47±0.58 ^b	4.55	y = 3.540x + 1.271 R ² = 0.993	11.31±1.056 ^b	50.00±0.58 ^c	5.00	y = 3.151x + 1.864 R ² = 0.968	9.89±1.123 ^c
	16	71.65±0.48 ^s	5.57			68.75±0.48 ^t	5.49		
	20	79.64±0.82 ^q	5.83			86.67±0.96 ^o	6.11		
	6	17.16±0.96 ^k	4.05				11.88±0.70 ^j		
PANNA	10	20.71±0.82 ^f	4.18	y = 3.841x + 0.902 R ² = 0.969	11.67±1.129 ^{ab}	36.63±0.82 ^e	4.66	y = 4.309x + 0.412 R ² = 0.991	11.61±1.064 ^b
	16	66.86±0.70 ^c	5.44			69.31±0.49 ^c	5.50		
	20	84.62±0.49 ^s				86.93±0.58 ^t	6.12		
	6	32.07±0.55 ^o	4.53				27.66±0.70 ^q		
BIRESHWAR	10	39.66±0.43 ⁿ	4.74	y = 2.631x + 2.421 R ² = 0.977	9.56±1.109 ^c	52.72±0.55 ^m	5.07	y = 3.383x + 1.727 R ² = 0.982	9.28±1.09 ^c
	16	68.62±0.48 ⁱ	5.45			75.18±0.48 ^g	5.69		
	20	82.76±0.58 ^a	5.94			89.36±0.70 ^a	6.25		

Under salt stress, all the genotypes of mung bean responded in similar fashion though the intensity of reduction varied with genotypes. More adverse effect was noticed in SL than the RL. A highest inhibition in SL was noticed in the salt concentration at 20 dSm⁻¹. Both RL and SL were noticed maximum in Samrat & minimum in Bireshwar. Both PHSI & SHSI were highest in Samrat in all cases except 6dS/m where Sonali showed marginally higher values than that of SAMRAT. In all salinity concentrations Bireshwar showed the least PHSI value. But Sukumar and Panna comparatively showed higher RLSI and SHSI values. In case of RLSI, Samrat showed lowest value both in 6 and 20 dS/m though in 10 and 16 dS/m Bireshwar showed the lowest value. Out of five varieties Sukumar and Samrat showed highest Root phytotoxicity. On the other hand, Bireshwar showed highest shoot phytotoxicity. However, Samrat and Sonali showed the least shoot phytotoxicity. Out of the five varieties, Samrat was established as most tolerant, whereas Bireshwar was found to be most sensitive in response towards salt stress condition. The results revealed that root and SL gradually decreased with increasing salt concentrations (0 to 20 dSm⁻¹) which is in agreement with the previous reports (Elsheikh and Wood, 1990).

Correlation analysis:

Considering the present result, one attempt was made to find out a correlation between different morphological attributes of mung bean under salinity stress. From the correlation matrix (Table 3), it can be stated that root and shoot length were negatively correlates with root and shoot phytotoxicity respectively. PHSI, RLSI and SHSI were positively correlates with each others.

Table 3. Correlation of the morphological parameters & indices studied.

Variables	Root Length (cm)	Shoot Length (cm)	Average Lateral Root No.	PHSI	RLSI	SHSI	Root Phytotoxicity	Shoot Phytotoxicity
Shoot Length (cm)	0.9346							
Average Lateral Root No.	0.0102	-0.0273						
PHSI	0.9096	0.9696	-0.0938					
RLSI	0.8934	0.8951	0.0358	0.9411				
SHSI	0.9189	0.9599	-0.0081	0.9844	0.9781			
Root Phytotoxicity	-0.8934	-0.8951	-0.0358	-0.9411	-1.0000	-0.9781		
Shoot Phytotoxicity	-0.9096	-0.9775	0.0317	-0.9895	-0.9472	-0.9930	0.9472	
RL/SL ratio	-0.2949	-0.5548	-0.0487	-0.5007	-0.3985	-0.5001	0.3985	0.5590

Values in bold are different from 0 with a significance level alpha=0.05

Dendrogram analysis:

Dendrogram cluster analysis (Fig 1) of different genotypes of mung bean was conducted on the basis of dissimilarities among them. All five genotypes were categorized into three separate groups on dendrogram analysis. Samrat, Sukumar and Panna were placed in a group and this group shears a common ancestor of Sonali. But Bireshwar showed totally separated from rest all.

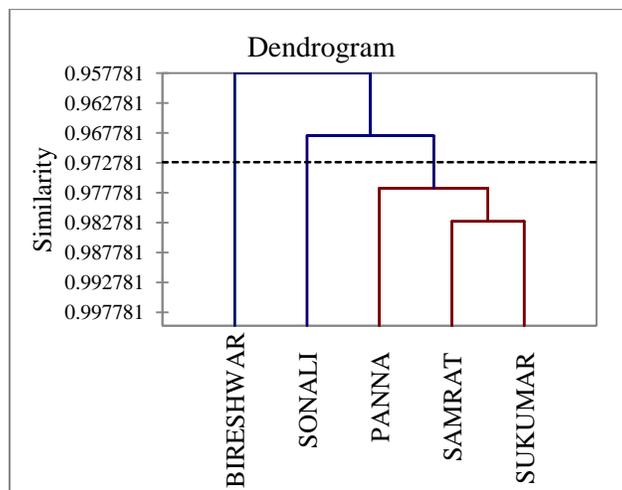


Fig 1: Dendrogram cluster analysis of the five genotypes of Mung Bean.

Salinity assists to increase phytotoxic level of mung bean. Negative correlation between root and shoot length with their respective phytotoxicity revealed that salinity affects on root and shoot development. On the basis of salinity tolerance capacity and the effects of salinity on morphological characteristic of mung bean genotypes samrat, sukumar and panna placed under a group. Though, on morphological aspect, sonali and samrat showed better stress tolerance activity among these five genotypes, but on the dendrogram analysis, sonali placed separates from samrat.

Analysis of variance (ANOVA):

In the present study, two-way ANOVA with replication was performed to find out the interaction between different concentrations of salinity with genotypes of mung bean. From ANOVA analysis (Table 3 and 4) it can be stated that the effects of both, genotypes and salinity, have a considerable impact on different morphological features of mung bean.

Table 4. Analysis of variance of five mung bean genotypes.

Source of Variation	df	F-Crit	Root Length			RL/SL Ratio			Root Phytotoxicity			Average Lateral Root Number			Shoot Phytotoxicity		
			MS	F	P-Value	MS	F	P-Value	MS	F	P-Value	MS	F	P-Value	MS	F	P-Value
Cultivars	4	2.49	42.91*	131.86	0.00*	0.21*	43.74	0.00*	999.48*	866.29	0.00*	6.19*	10.850	0.00*	442.81*	4775.24	0.00*
Salinity	4	2.49	157.86*	485.04	0.00*	0.58*	122.05	0.00*	18576.29*	16100.90	0.00*	36.06*	63.174	0.00*	26228.10*	282840.04	0.00*
Interaction	16	1.78	7.82*	24.03	0.00*	0.07*	15.63	0.00*	997.33*	864.43	0.00*	4.18*	7.319	0.00*	107.28*	1156.92	0.00*
Within	75		0.33*		0.00*	0.00*		0.00*	1.15*		0.00*	0.57*		0.00*	0.09*		0.00*

Table 5. Analysis of variance of five mung bean genotypes.

Source of Variation	df	F-Crit	Shoot Length			RLSI			PHSI			SHSI		
			MS	F	P-Value	MS	F	P-Value	MS	F	P-Value	MS	F	P-Value
Cultivars	4	2.53	40.31*	201.21	0.00*	251.25*	1678.83	0.00*	928.63*	3676.66	0.00*	176.57*	1363.514	0.00*
Salinity	3	2.76	302.86*	1511.76	0.00*	20074.03*	134132.09	0.00*	18373.32*	72744.28	0.00*	19917.34*	153808.229	0.00*
Interaction	12	1.92	3.85*	19.22	0.00*	58.57*	391.35	0.00*	142.31*	563.45	0.00*	36.51*	281.934	0.00*
Within	60		0.20*		0.00*	0.15*		0.00*	0.25*		0.00*	0.13*		0.00*

Morphological variation occurs with the variation of genotypes as well as with salinity changes. Interactions within salinity and different genotypes also were significant at $p < 0.05$ level. ANOVA analysis helps to visualize the overall impacts of salinity on different mung bean genotypes.

CONCLUSION

Thus, present study revealed that mung bean genotypes vary in their vigor, tolerance indices and phytotoxicity. Significant differences were noticed in control treatment for all the measured features. In line with the sensitivity towards salt stress, the mung bean genotypes can be arranged as follows: Samrat < Sonali < Panna < Sukumar < Bireshwar. Thus, screening of the mungbean germplasm suggests that for salt tolerance out of the five selected mung bean genotypes, Samrat variety had superior vigor quality and most halo-tolerant. This mung bean genotype can be further used for genetic improvement for growing in saline soil.

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Finite element analysis of beam having crack at various locations

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Abstract- Beam like structures have wide application in engineering field. Earliest detection of damage is to avoid catastrophic failure in the structures. To predict the failure, changes in the dynamic responses are required to be analysed by using vibration analysis. Beam like structures have different type of loadings that may cause cracks in the beam. To ensure durable, safety and flawless performance during the lifetime of the beam like structures, it is mandatory to take care of cracks, inherent flaw and air voids in the structure. In case, if there is a pre-existing crack in the structure, mass and stiffness of the structure gets altered there by mode shape and natural frequency of the structure gets changed. In this work, vibration analysis of both un-cracked and cracked cantilever beam were done by commercially available Finite Element Analysis (FEA) software ANSYS. Natural frequency of the beam was obtained from vibration analysis. Beam having single edged notch at various locations were analysed and the results were compared with un-cracked beam. From the results, it is inferred that the fundamental frequency of the cracked beam reduces when the crack location moves from free end to fixed end and it is due to the stiffness reduction of the beam.

Index Terms- Finite Element Analysis, ANSYS, crack location, Fundamental Frequency, Vibration Analysis

I. INTRODUCTION

In aerospace and aeronautical industries, many engineering components are considered as vibrating structures under the cyclic stresses. In these structures, cracks may produce different causes. Mainly they may be fatigue cracks due to limited fatigue strength of the material and also due to mechanical defects in turbine blades of jet engines. In this, cracks are caused by small stones and sand sucked from the runway surface. At the time of manufacturing processes another group of cracks are created inside of the material. Structures and machine components under vibration leads to failure by cyclic stresses.

Many examples of structures like tall buildings, long span bridges, robot arms, beams that may be modelled with beam like structures. If damage occurs in the structures, physical properties like mass and stiffness of the structure changes as well as changes the modal properties like mode shape and natural frequency. It can lead catastrophic failure to the structure. To predict the Failure, vibration analysis can be used to detect changes in the dynamic responses of the structure.

In this work, the natural frequencies of cracked and un-cracked beams have been calculated by using Finite element software ANSYS Mechanical APDL 15.0. Dimensions of the beam and crack dimensions are taken from [7] Yamuna P. and Sambasivarao K. (2014).

The objectives of the work includes,

1. To analyse the FE model of un-cracked cantilever beam and cracked cantilever beam with single edged notch using FEM software ANSYS under free vibration.
2. To obtain the vibrational parameters at various crack locations in the beam using modal analysis.
3. To compare the results from vibration analysis of cracked beam with un-cracked beam.

II. METHODOLOGY

The methodology adopted for this work has been represented in the form of flow chart as shown in Figure 1.

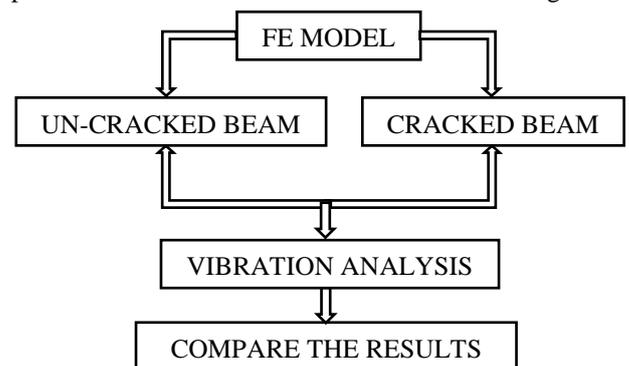


Fig 1 Flow Chart for Methodology

A. FE Modelling of Un-cracked Beam

An elastic, slender beam having Width (W) 0.015m, Height (H) 0.025m and Length (L) 0.5m is modelled by using FEA software ANSYS 15.0 Mechanical APDL. Initially the elements of quadrilateral 4 node PLANE 182 and brick 8 node SOLID 185 are selected. An area has been drawn by the use of Rectangle command as shown in Figure 2. Length of the beam has been taken as width of the Rectangle and height was same as like as beam.

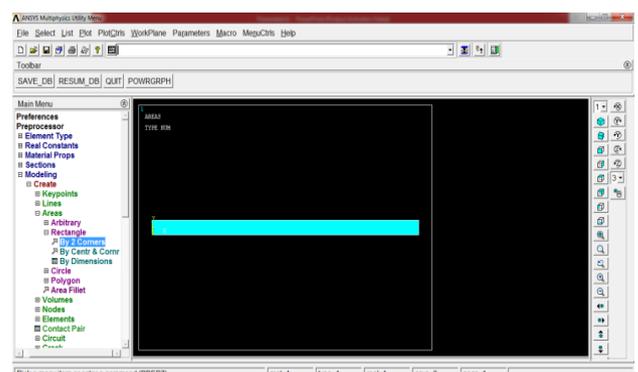


Fig 2 Areal Model

Meshing is done by the use of Mesh Tool. Smart size was selected and the range is set as 4 in Mesh Tool tab. Click mesh option in the tab and select the area drawn then the area should be discretized and again meshed. Figure 3. shows that discretized areal model of the un-cracked cantilever beam.

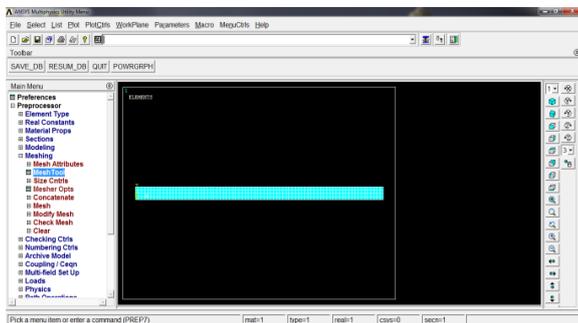


Fig 3 Discretized Areal Model

Then Select the Extrude option and the discretized areal model was selected and change the element from PLANE 182 to SOLID 185. Select the XYZ offset option and give the value of 0.015m in z-direction. Then volumetric discretized model had been made and shown in Figure 4.

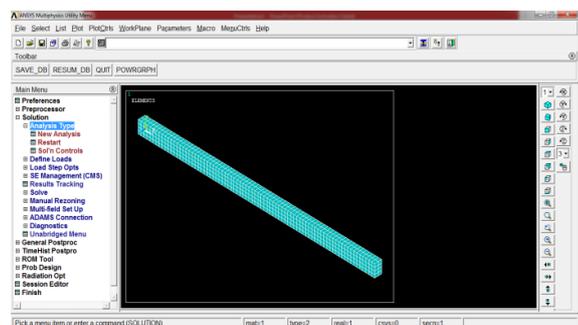


Fig 4 Discretized Volumetric Model

B. FE Modelling of Cracked Beam

Element Type and Material properties are same as like as Un-cracked beam. Areal model was created like Un-cracked beam and triangular area created at the top of the beam. Triangular area having width, depth and length are 0.005m, 0.01m, 0.015m respectively. Then the triangular area was subtract from the total area. This will produce a notch in the beam and it acts like a crack. Figure 5 shows that the areal model of cracked cantilever beam.

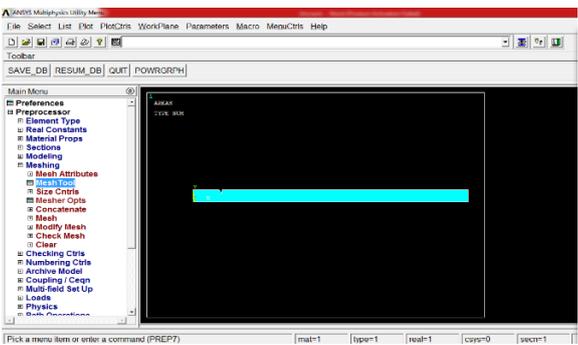


Fig 5 Cracked Areal Model

Initially the crack location was 0.05m from the left end. Later, Change the location of the crack along the length of the beam from 0.05m to 0.45m by the increment of 0.05m

for comparative analysis. Meshing and volumetric model is same as like as Un-cracked beam. Figure 6 shows that the discretized volumetric model of cracked cantilever beam.

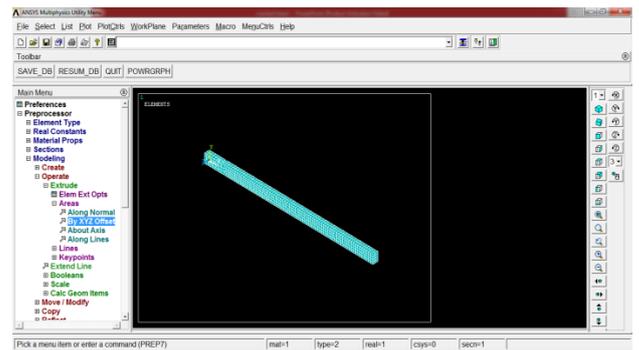


Fig 6 Discretized Volumetric Model of Cracked Beam

C. Support Conditions

Here the beam is considered as cantilever beam. So the support conditions of the cantilever beam are one end is fixed and another end is free. In a fixed end, displacements along all the directions are restricted. After the application of boundary conditions, constrained beam model has been created and it is shown in Figure 7.

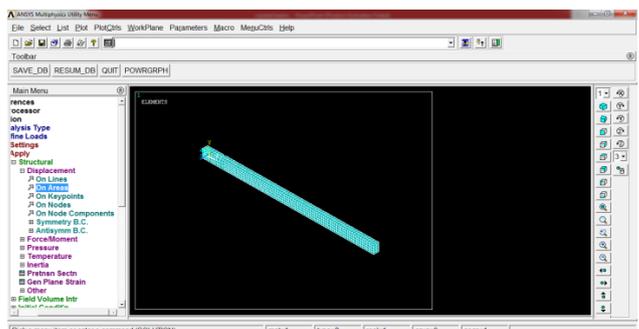


Fig 7 Constrained Model of Cantilever Beam

D. Vibration Analysis of Un-cracked Beam

To find natural frequencies of the beam is the first step of vibration analysis. In ANSYS, Eigen natural frequencies of the beam was found out by modal analysis. Initially, Un-cracked beam is taken for vibration analysis. Natural frequencies of first five modes are obtained by Block Lanczos method as shown in Table 1. It is the general method used to find the fundamental frequencies of symmetric structures. The fundamental frequency is found to be 83.5 Hz and as shown in Figure 8.

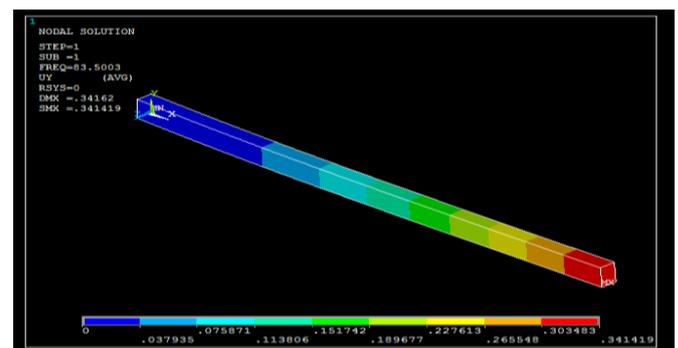


Fig 8 Mode 1 of Un-cracked Beam

Table 1 Frequencies of Un-cracked Beam

Mode No	Frequency (Hz)
1	83.50
2	98.23
3	517.43
4	605.92
5	1424.00

Table 5 Frequencies of Crack Location 0.2m

Mode No	Frequency (Hz)
1	81.40
2	97.52
3	498.73
4	599.93
5	1393.9

E. Vibration Analysis of Cracked Beam

A notch was introduced into the cantilever beam model for vibration analysis. Initially, it was located 0.05m from the left end of the beam model. The first five natural frequencies are obtained by modal analysis using Block Lanczos method in ANSYS. Similarly first five natural frequencies are obtained for various crack locations of 0.1m, 0.15m, 0.2m, 0.25m, 0.3m, 0.35m, 0.4m and 0.45m from the left end of the cantilever beam model. The first five natural frequencies of the cracked cantilever beam having various crack locations are shown in Tables 2 to 10.

Table 6 Frequencies of Crack Location 0.25m

Mode No	Frequency (Hz)
1	82.34
2	97.87
3	488.70
4	596.69
5	1424.60

Table 2 Frequencies of Crack Location 0.05m

Mode No	Frequency (Hz)
1	76.78
2	95.64
3	504.23
4	600.14
5	1418.40

Table 7 Frequencies of Crack Location 0.3m

Mode No	Frequency (Hz)
1	83.08
2	98.14
3	491.53
4	597.04
5	1384.40

Table 3 Frequencies of Crack Location 0.1m

Mode No	Frequency (Hz)
1	78.69
2	96.38
3	518.23
4	605.89
5	1404.00

Table 8 Frequencies of Crack Location 0.35m

Mode No	Frequency (Hz)
1	83.48
2	98.31
3	501.00
4	600.32
5	1340.70

Table 4 Frequencies of Crack Location 0.15m

Mode No	Frequency (Hz)
1	80.31
2	97.01
3	513.11
4	604.46
5	1367.6

Table 9 Frequencies of Crack Location 0.4m

Mode No	Frequency (Hz)
1	83.70
2	98.44
3	512.86
4	604.06
5	1369.50

Table 10 Frequencies of Crack Location 0.45m

Mode No	Frequency (Hz)
1	83.79
2	98.54
3	518.10
4	606.45
5	1417.30

The fundamental frequency of the cracked beam having various crack locations of 0.05m to 0.45m along the length of the beam are shown in Figures 9 to 17. From the results in tables show that the fundamental frequency of the cracked beam reduces when the crack location varies from 0.45m to 0.05m.

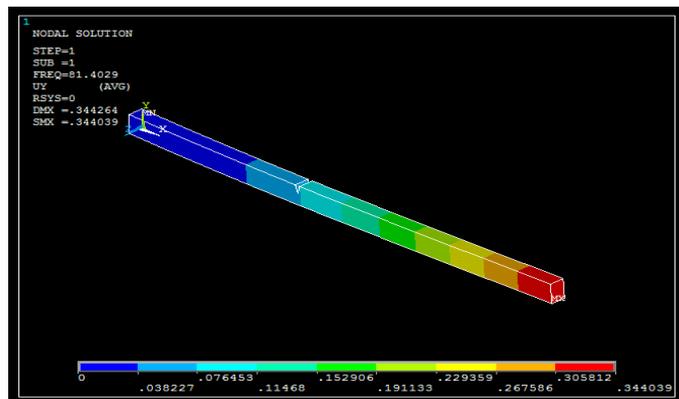


Fig 12 Mode 1 of Cracked Beam having Crack Location of 0.2m

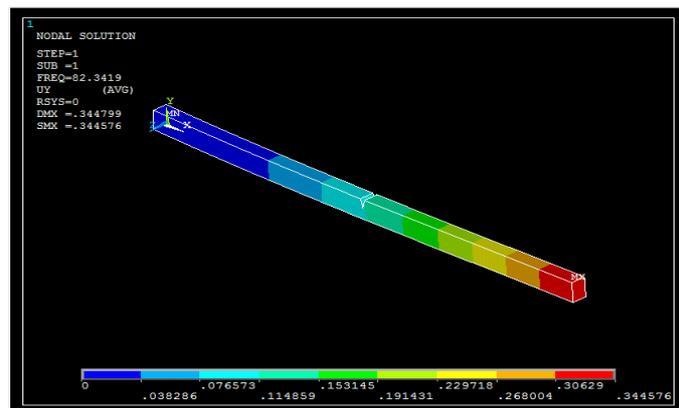


Fig 13 Mode 1 of Cracked Beam having Crack Location of 0.25m

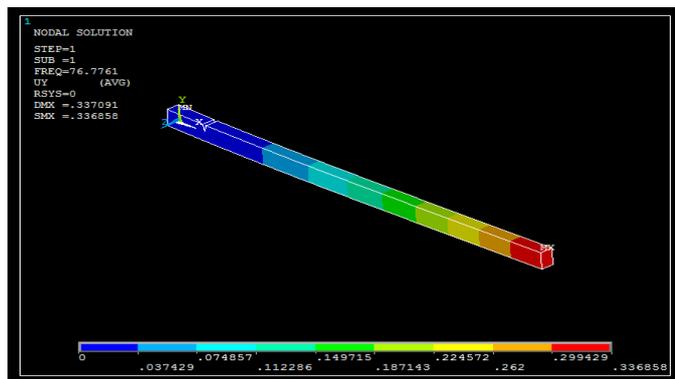


Fig 9 Mode 1 of Cracked Beam having Crack Location of 0.05m

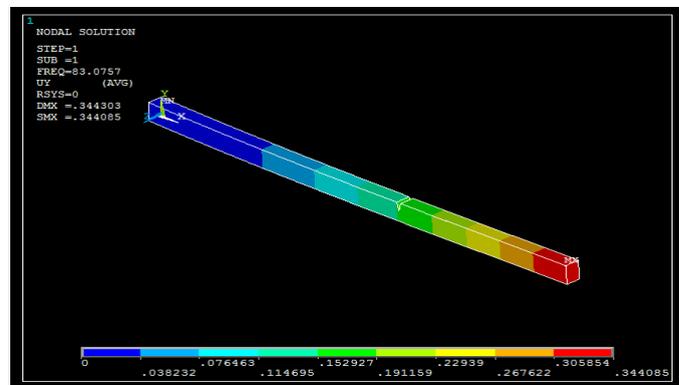


Fig 14 Mode 1 of Cracked Beam having Crack Location of 0.3m

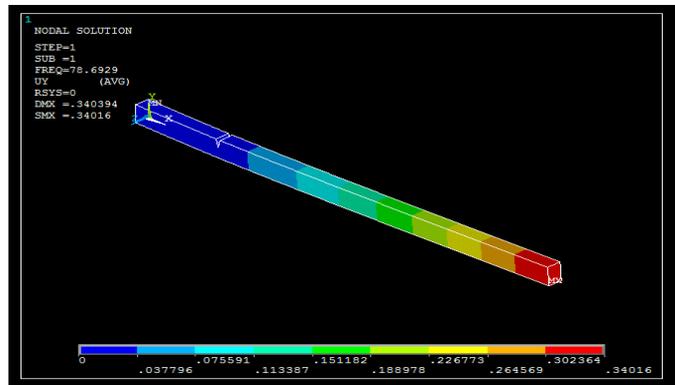


Fig 10 Mode 1 of Cracked Beam having Crack Location of 0.1m

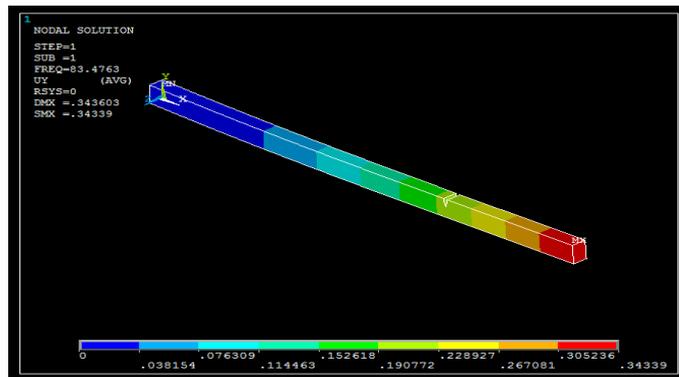


Fig 15 Mode 1 of Cracked Beam having Crack Location of 0.35m

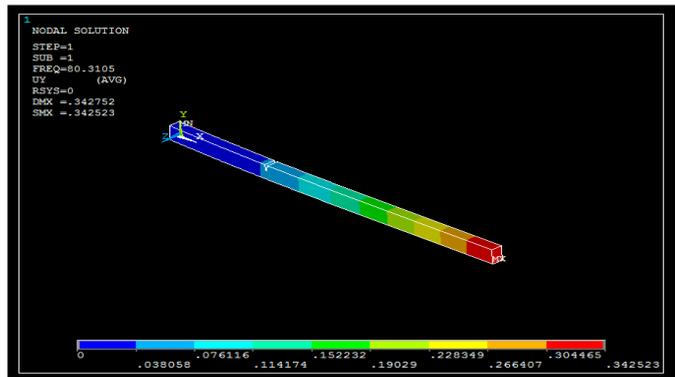


Fig 11 Mode 1 of Cracked Beam having Crack Location of 0.15m

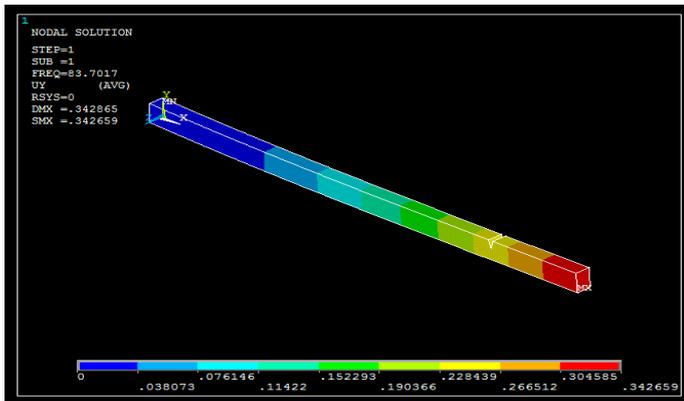


Fig 16 Mode 1 of Cracked Beam having Crack Location of 0.4m

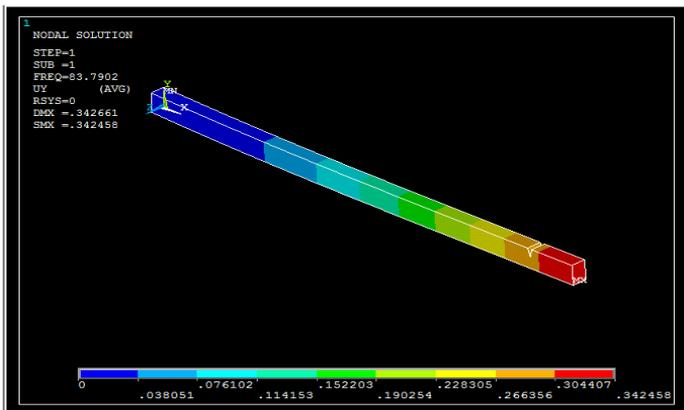


Fig 17 Mode 1 of Cracked Beam having Crack Location of 0.45m

F. Compare the Results

The fundamental frequency of various crack locations are compared in Table 11.

Table 11 Comparison of Fundamental Frequency of Cracked Beam having Various Crack Locations

Crack Location From Left End of the Beam (m)	Fundamental Frequency (Hz)
0.05	76.78
0.10	78.69
0.15	80.31
0.20	81.40
0.25	82.34
0.30	83.08
0.35	83.48
0.40	83.70
0.45	83.79

A graph plotted between the crack locations from the left end of the beam in ‘m’ versus fundamental frequency of the beam in ‘Hz’ as shown in Fig 18. And also the fundamental frequency of the cracked beam having various crack locations are compared with fundamental frequency of the un-cracked beam. It shows that the lowest frequency of the beam reduces when the position of notch moves from free end to fixed end.

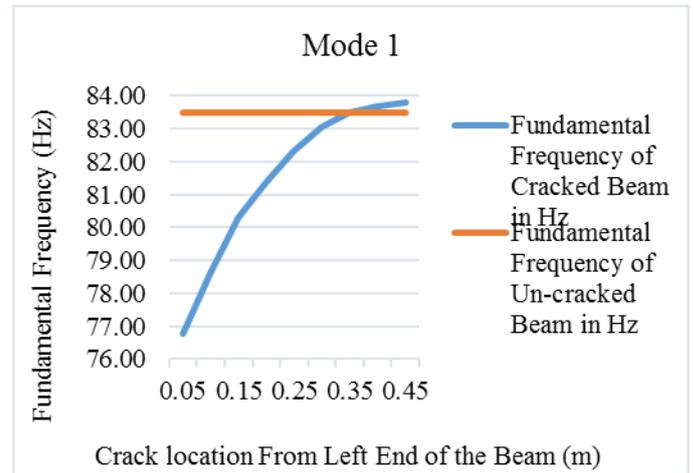


Fig 18 Plot Comparison of Lowest Frequency of Un-cracked beam and Cracked Beam having Various Crack Locations from the Left End

III. CONCLUSION

A slender cantilever beam of Width (W) 0.015m, Height (H) 0.025m and Length (L) 0.5m are considered for vibration analysis using FEM software ANSYS under free vibration. Material properties of aluminium are considered for cantilever beam and its properties are Young’s modulus (E) 70GPa, Poisson’s ratio (μ) 0.35, Density (γ) 2700 kg/m³. Natural frequencies of un-cracked beam are found and the lowest natural frequency is found to be 83.5 Hz. Then cantilever beam with single edged notch has been analysed. Initially notch was located at 0.05m from the left end and then the locations are varied at step increment of 0.05m. The frequencies of the cracked beam having various crack locations were compared with the un-cracked beam and the results proved that natural frequency of beam changes due to different positions of notch. From the results, it is inferred that the fundamental frequency of the cracked beam reduces when the crack location moves from free end to fixed end it is due to the stiffness reduction of the beam.

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Use of Creative Models and Presentation to Encounter the Problems While Studying Chemistry in Diploma College

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Abstract- Students Academic performance in College is based on various parameters such as level of understanding, the mental ability of a student to learn their respective subject for study of which chemistry is one of the subject to be learned . As the department of chemistry aims to develop students who are experimental thinkers and researchers which is a point reflected by their academic performance. This study aimed to determine the problems the students encounter while studying Chemistry in Diploma College. the research used a field research method to know the problems the students encountered while studying chemistry and experimental method to know the changes after creative models and presentation were used for students of diploma. Results of the field research showed that the problems encountered were vocabulary, level of understanding, retention of topics in mind. The results obtained from experimental method were growth in academic performance after using creative models and presentation for teaching Chemistry.

Index terms- Vocabulary bank, Academic Performance, Creative Models and Presentation, Retention of Concept, Effectiveness

1. INTRODUCTION

Great number of research shows that the Academic performance of students can be improved through innovative teaching strategies and other kind of innovation. (Adunola, 2011; Ayeni, 2011). One of the main aim of the education system is to make sure that the students will learn the competencies prescribed in curriculum guide. However, it cannot be denied that these students who are having difficulties in learning these competencies as reflected in their academic performance. The no. of vocabularies a student knows will have impact on his academic performance. As students have limited vocabularies, Comprehension is being at risk. Individuals who have problems or weak Language Skills will often lead to limited education that a student may acquire.

Many Studies have long pointed that there is relationship between vocabulary bank and student's academic performance. (Coyne, Simmons & Kame'enui, 2004, Stahl & Nagy, 2006). Moreover, Beck & McKeon (2002) stated that a person's vocabulary level is viewed as means of opening, closing access to information & helps define the success of students in his academics. It only depicts that those who have limited vocabularies will have difficulties in improving their academic performance.

Based on the results of student's assessment in Gosavi Polytechnic College, there is a need to improve student's vocabulary bank. This issue of having limited Vocabularies is alarming. Creativity models and presentation helps to show learning benefits because of active learning components present in it.

It is well known that students really enjoy activities beyond normal classroom interaction. Students depend now on the innovative teaching strategies of the teacher, which is use of creative models and presentation.

It is in this light that the researcher decided to conduct a study on the effectiveness of engaging students through creative models, presentation on the academic performance of Diploma Students.

Framework

This study is anchored in theory of Doug Lemov. In his theory he offers the essential tools of the teaching craft so that you can unlock the talent & skill waiting in your students, no matter how many previous classrooms, schools or teachers have been Unsuccessful.

This study is delimited on knowing the problems of students while studying Chemistry & measuring the effectiveness of engaging students through creative models, presentation on their Academic Performance.

Statement of the Problem

Specifically, the researcher sought to answer the following questions:-

- 1) What are the problems that students face while studying Chemistry?
- 2) What is the academic performance of the Control group & Experimental Group before use of Creative models and presentation as reflected in their pre-test?
- 3) What is the academic performance of the Control group and Experimental group as reflected in their post-test?
- 4) Is there any Significant Difference?
- 5) Based on findings, what may be suggested?

Hypothesis

There is no significant difference between academic performances of the Control group & Experimental group.

II. METHODOLOGY

The researcher used field research approach to know the problems of students while studying chemistry. Questionnaires were distributed to both the groups. Then the researcher used Experimental approach in which experimental group & Control group would be part of the study. The Control group was exposed to normal classrooms interaction while Experimental group was exposed to Creative models, Presentation throughout one grading period to make sure that there would be enough & adequate for the exposure of creative models & Presentation. In this study the use of creative models and presentation to increase the student's academic performance is innovative strategy of researcher.

Respondents

The researcher collected the College records of the students & consolidated their grades & grouped the students heterogeneously to make sure that all sections are equally divided. As part of study, the researchers used Control & Experimental Group.

Respondents of Study

Table 1. Respondent's of the Study

Control Group			Experimental Group		
Male	Female	Total	Male	Female	Total
13	08	21	12	13	25
Academic Performance of both Groups-			Academic Performance of both Groups-		
60 to 75%			60 to 75%		

As shown above, Students are well distributed to have fairness in result of study.

Instruments

The researcher exposed the Experimental and Control group through Questionnaires for knowing the problems during studying Chemistry. Then the researcher exposed the Experimental group through Creative Models of Atomic Structure & Presentation. After exposure the effectiveness of it would be measured. In terms of assessment, standardized test was used in his study. In terms of assessment a test of questionnaires was put on atomic structure whose creative model & presentation was used.

Data Analysis

The data gathered through test were classified, organized, tallied & tabulated. They were compared with other groups by taking average.

III.Results And Discussions

The Researcher utilised the field research method on the control and experimental group to know the problems the students encountered while studying chemistry.

Result

The problems were vocabulary, couldnt understand topics easily and retention of topics in mind.

Then the researcher utilized experimental type of research using Experimental and Control group.

Results of Pre-test were

Group	Mean
Control	11.23
Experimental	11.32

Findings revealed that on administration of pre-test, the Control group gathered mean of 11.23, while Experimental group has mean of 11.32. Based on the result, there is difference of 0.09 on their mean. It is showed that there is no significant difference between their pretest, which made 2 groups qualified for the experimental research. The control group was subjected to normal classrooms and experimental group to creative models and presentation.

Result of Post-test was:-

Group	Mean
Control	11.23
Experimental	15.6

It is found that in terms of mean, control group has mean of 11.23, while experimental group has mean of 15.6. Considering the gap on their mean it shows that Experimental group has higher academic performance as reflected in their post-test.

Conclusion and Recommendations

The study used a Field Research Approach to know the problems of students encountered in Chemistry and Experimental approach with the Control group and Experimental group to measure the effectiveness of engaging students through creative models & presentation in their academic performance.

Findings reveal that after using creative models & presentation performance of the experimental group is higher than the control group.

Based on the findings following recommendations are formulated:

- 1) Use of Creative models and Presentation should be used to increase the performance of students.
- 2) College teachers should use innovative ways such as Creative models & Presentation to improve students' academic performance.
- 3) Learning and Teaching should be done with the help of observation and learning by himself method for retention of concept in mind.
- 4) Creativity Skills should be increased in teachers.
- 5) Further Research for this study should be conducted.

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Contamination of Arsenic In Relation to Soil Properties of Mymensingh and Chuadanga Districts

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Abstract- An experiment was conducted during January 2015 to assess the present status of arsenic contamination and find out the relationship with soil properties and arsenic at Alamdanga upazila of Chuadanga district and Trishal upazila of Mymensingh district. Arsenic contamination and its relationship with soil properties (e.g. soil pH, total organic matter, total N, available P, available S, Exch. Ca, Exch. K and Exch. Na) of Alamdanga upazila and Trishal upazila were studied in the Soil Science laboratory at Bangladesh Institute of Nuclear Agriculture (BINA), Mymensingh. Arsenic contents of Alamdanga upazila ranged from 8.81 – 16.26 mg/kg and at Trishal upazila ranged from 6.58 – 9.16 mg/kg. Neutral acidic condition was observed at Alamdanga upazila (6.45 to 7.62) range where at Trishal upazila soil samples were slightly acidic in nature (6.38 to 6.69) range. Organic matter content in the soils of Alamdanga upazila ranged from 0.83 to 1.10%; Trishal upazila organic matter ranged from 1.23 to 2.06%. Total nitrogen content at the soils of Alamdanga upazila ranged from 0.07 to 0.09% where at Trishal upazila total nitrogen content ranged from 0.076 to 0.104%. Negative significant relationship was found with organic matter content and total nitrogen with As at Trishla upazila soil. At Alamdanga upazila available P content (12.1 to 17.3) range, available S (11.3 to 17.6 ppm) range; Trishal upazila available P content (5.76 to 8.5 ppm) range, available S contents (11.3 to 17.6 ppm) range. Positive significant relationship with As and available P were observed at Alamdanga upazila soil. Exchangeable Ca content (9.80 to 14.20me %) range, exchangeable K (0.20 to 0.42me %) range and exchangeable Na content (1.10 to 1.43me %) range were found at Alamdanga upazila where exchangeable Ca content (6.57 to 15.66me %) range, exchangeable K contents (0.06 to 0.08me %) range and exchangeable Na contents (0.23 to 0.25me %) range were found at Trishal upazila. Positive significant relationship was found among exchangeable Ca and exchangeable K with arsenic contents of Trishal upazila soil sample.

I. INTRODUCTION

Arsenic in groundwater was recognized as a potential threat to human life, much effort has been directed to ensure the safe drinking water either through mitigation techniques or through finding another water sources but the continuation of cropping of long-term irrigated soils subjected to As contaminated ground water will pose significant risk to animal and human health through soil-crop transfer of As. The As

concentration in soil varies widely because it depends on the initial concentration (background) in parent material, natural geochemical cycles and soil types (Díez et al. 2007); therefore, the mean values of As in natural soils, according to the literature, range between 0.1 and 80 mg kg⁻¹ worldwide (Alloway 1995; Adriano 2001; Bohn et al. 2001; Kabata-Pendias and Mukherjee 2007). The main soil properties affecting As availability are as follows: Fe oxides, pH, calcium carbonate, clay content, cation-exchange capacity and organic matter content (Lock and Janssen 2001; Smolders et al. 2003, 2004; Rooney et al. 2006; Song et al. 2006).

Arsenic in irrigation water can result in land degradation, adversely affecting incomes and agro-ecosystem services in terms of their ability to provide a sustainable source of sufficient and safe foods. Rice can contribute significantly to the total daily intake of inorganic As through water and foods in Bangladesh because of the high rice consumption and relatively high levels of inorganic As in rice. The present work evaluates the influence of different soil properties and constituents on As solubility in soils, with the aim of assessing the toxicity of this element for studies of environmental risk assessment in soil contamination.

MATERIALS AND METHODS

The methods and procedures are following and conducting this study has been presented in this chapter with a conceptual frame work. Study was initiated for the assessment of arsenic and other soil properties eg. (soil pH, organic matter, total N, exchangeable cations (Ca⁺⁺, K⁺ and Na⁺), available P and available S contents status of Alamdanga upazilla og Chuadanga districts and Trishal upazilla of Mymensingh districts whether the soils have undergone any contamination.

3.1 Sample preparation and laboratory analysis:

Air-dried soil samples were ground and passed through 100 mesh sieve and stored in a plastic bottle for laboratory analysis. 0.5 gram of air-dried soil samples were taken in a glass bottle for oven drying. After oven drying at 50⁰ C for 24 hours, all the samples were crushed and made into a fine homogenous powder within approximately 12 minutes using an agate mortar and a pestle. The agate mortar and pestle were cleaned with ethanol to ensure that the trace metal contamination did not originate from the grinding process.

3.2 Methods of analysis:

3.3.1 Soil pH:

Soil pH was determined by glass electrode pH meter as described by Jackson (1962). Twenty gram air-dry soil was taken in a beaker and 50 ml distilled water was added to it. The suspension was stirred well for several times during the next 30 minutes and allowed to stand for about an hour. Then the electrode was immersed into the partly settled soil suspension and pH was measured. The result was reported as "Soil pH measured in water" (Soil-water ratio being 1: 2.5)

3.3.2 Organic carbon:

Organic carbon was determined titrimetrically by Walkley and Black's (1935) wet Oxidation method with oxidation of organic carbon with potassium dichromate ($K_2Cr_2O_7$). According to procedure 2 g soil along with 10 ml 1 N $K_2Cr_2O_7$ solution and 20 ml of conc. H_2SO_4 was taken in a 500 ml conical flask. After 30 minutes rest, about 200 ml distilled water and 10 ml conc. H_3PO_4 were added. Then 40 drops of diphenylamine indicator ($C_{12}H_{11}N$) was added and titrated against XN ferrous sulphate solution until purplish blue color was turned to fresh green color. The organic matter content of each sample was calculated by multiplying the content of organic carbon by Van Bemmelen factor, 1.73 (Page *et al.*, 1982).

3.3.3 Total nitrogen content:

Total nitrogen content was determined by micro-Kjeldahl method. The soil was digested with H_2O_2 and conc. H_2SO_4 in presence of a catalyst mixture (K_2SO_4 : $CuSO_4 \cdot 5H_2O$: Se in the ratio of 10: 1: 0.1) and the nitrogen in the digest was determined by distillation with 40% NaOH followed by filtration of distillate trapped in H_3BO_3 with 0.01 N H_2SO_4 (Bremmer and Mulvaney, 1982).

3.3.4 Available P:

Available P was extracted from the soil by shaking it with 0.5 M $NaHCO_3$ solution at pH 8.5 following Olsen method (Olsen *et al.*, 1954). The extracted P was determined by $SnCl_2$ reduction of phosphomolybdate complex and measuring the intensity of color spectrophotometrically at 660 nano meter.

3.3.5 Available S:

Available S content of soil was determined by extracting the soil sample with $CaCl_2$ solution (0.15%). The S content in the soil extract was estimated turbidimetrically with spectrometer at 420 nano meter wavelength.

3.3.6 Exchangeable Ca, K and Na content :

Exchangeable calcium, potassium and Sodium were determined by ammonium acetate extraction method. In this method, soil sample was saturated with NH_4Oac solution and the supernatant clear solution was separated and collected. The NH_4Oac solution was added again to make the final volume up to 100 ml for each sample. For the cation of Ca^{++} , K^+ and Na^+ the flame photometer was separately adjusted and different standard curves were prepared to find out the concentration of the cation but the extracting solution used for each sample was same. From each reading the concentration of each ion was obtained from their respective standard curves and was expressed as me%.

3.4 Analysis of arsenic:

3.4.1 Reagents:

All reagents were of analytical reagent grade. Distilled deionized water was used throughout. Standard solutions were prepared by dissolving appropriate amounts of As_2O_3 (Merck, Germany), standard arsenic (V) Titrisol (Merck, Germany), $CH_3AsO_3Na_2 \cdot 6H_2O$ (Carlo-Erba, Italy) and $(CH_3)_2AsO_2Na \cdot 3H_2O$ (Sigma, USA). Standard stock solutions were stored in glass bottles and kept refrigerated. Dilute arsenic solutions for analysis were prepared daily. Cation [Dowex X-50w (H^+ form)] and anion [Dowex-1 (Cl^- form)] exchange resins (Sigma, USA) were used. Sodium diethyldithiocarbamate (Merck, Germany) was used as a 0.5% (w/v) solution and purified shaking with chloroform. Ashing acid suspension was prepared by stirring 10% (w/v) $Mg(NO_3)_2 \cdot 6H_2O$ and 1% (w/v) MgO in water until homogenous. The reducing solution was sodium tetrahydroborate (Merck, Germany) 1.25% (m/v) in 0.5% (m/v) sodium hydroxide. The HCl concentration was 5 M. Sodium acetate-acetic acid buffer at pH 5.5 was prepared by mixing acetic acid (0.2 M) until the pH was 5.5; citric acid-citrate buffer at pH 3.0 was prepared by using 40% (w/v) citric acid and adjusting the pH with NaOH solution. The buffers were purified by extraction with Na-DDTC and chloroform.

3.4.2 Speciation of arsenic content:

A 250-ml aliquot of filtered preserved water sample adjusted to a pH of about 5.5 by adding dilute NaOH was transferred into a 500-ml separating funnel; 10 ml of sodium acetate-acetic acid buffer at pH 5.5 was added and the funnel was shaken; 5 ml of 0.5% Na-DDTC and 5 ml of chloroform were then added. The solution was shaken for 3 min. The procedure was repeated twice. All three chloroform extracts were combined and placed into a 50 ml round-bottom flask; chloroform was then removed by a rotary evaporator kept at $30^{\circ}C$ on a water bath. The dry residue was decomposed by warming with nitric acid (0.1 ml), cooled and then transferred quantitatively into a known volume (5-10 ml) with water.

Then FI-HG-AAS was used for the determination of arsenic against arsenate standard. After arsenite was removed from the water by chelate extraction, the remaining arsenic was determined directly by FI-HG-AAS against an Arsenate standard or total arsenic was measured directly by injecting the aliquot into FI-HG AAS against arsenate standard and arsenate was determined by subtracting arsenite from total arsenic. Blanks were determined under identical conditions (Gautam *et al.*, 1999).

II. RESULTS AND DISCUSSION

Research results with regards to evaluate the soil properties (soil pH, organic matter, total N available P available S contents and exchangeable cations Ca^{++} , K^+ and Na^+), for the assessment of arsenic contamination and find out the relationship between soil properties with arsenic contamination at Alamdanga and Trishal Upazila.

4.1 General characteristics of soil

4.1.1 Soil pH, organic matter and total N contents at surface soils (0-10cm) of Alamdanga and Trishal Upazila

Soil pH value, organic carbon and total N contents of the selected soil series were illustrated at Table 3 for Alamdanga and Table 4 for Trishal Upazila.

Neutral acidic conditions were observed at Alamdanga Upazila which ranged from 6.45 to 7.62 except Hardi soil samples were slightly acidic (pH value 6.45). Trishal Upazila soil samples were slightly acidic in nature and ranged from 6.38 to 6.69.

Organic matter content in the soils of Alamdanga Upazila ranged from 0.83 to 1.10%. Hardi soil sample 1.10% has highest

value of organic matter content. At Trishal Upazila Organic matter ranged from 1.23 to 2.06% and highest value organic matter content were found at Kazirshimla soil sample 2.06%.

It was synthesized that the total nitrogen content in the soils of Alamdanga Upazila ranged from 0.07 to 0.09% and highest value were found at Gangni soil sample 0.09%. Total nitrogen content ranged from 0.076% to 0.104% at Trishal Upazila has highest value were found at Dulalbari soil sample 0.104%.

Table 1 Soil pH, total N and Organic matter contents at surface soil (0-10 cm) of Alamdanga Upazila.

SL. No.	Location	pH	Total N (%)	OM (%)
1	Khadimpur	7.26	0.07	0.97
2	Gangni	6.45	0.09	1.14
3	Bardi	7.39	0.07	1
4	Belgachi	7.05	0.07	0.83
5	Dauki	7.57	0.07	1.03
6	Bhangabaria	7.57	0.08	1.07
7	Hardi	7.62	0.08	1.1

Table 2 Soil pH, total N and Organic matter contents in surface soil (0-10 cm) of Trishal Upazila.

SL. No.	Location	pH	Total N(%)	OM (%)
1	Kanhor	6.67	0.076	1.23
2	Kzirshimla	6.62	0.087	2.06
3	Voradoba	6.69	0.095	1.89
4	Boilor	6.61	0.08	1.66
5	Mathbaria	6.66	0.098	1.89
6	Bashkuri	6.69	0.091	1.49
7	Dulalbari	6.38	0.104	2.04

4.1.2 Available P and Available S content at surface soils (0-10cm) of Alamdanga and Trishal Upazila

Available P and available S contents at the soils of Alamdanga Upazila were visualized respectively at the Figure 3 and Figure 4 and that of Trishal Upazila were at the Figure 5 and Figure 6

Available P content at Alamdanga Upazila ranged from 12.1 to 17.3 ppm where highest values were found at Bardi soil

sample 17.3 ppm. Trishal Upazila available P content were ranged from 5.76 to 8.51 ppm and Boilor soil sample 8.51 ppm has highest value of available P.

Available S contents at the soils of Alamdanga Upazila ranged from 11.3 to 17.6 ppm where Hardi 17.6 ppm soil sample has highest value of available S. Trishal Upazila Available S ranged from 3.1 ppm to 15.28 ppm and highest value of available P was found at Boilor soil sample 15.28 ppm.

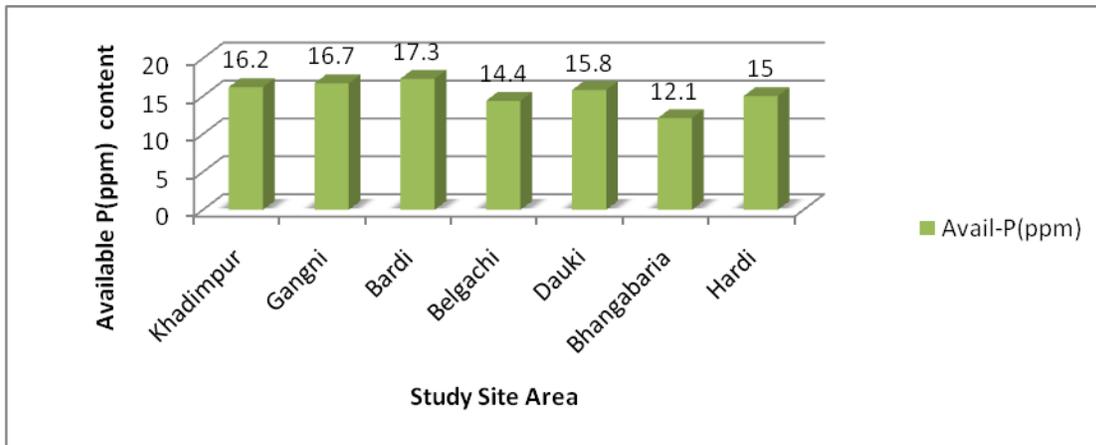


Figure 1 Available P content at surface soil (0-10 cm) of Alamdanga Upazila.

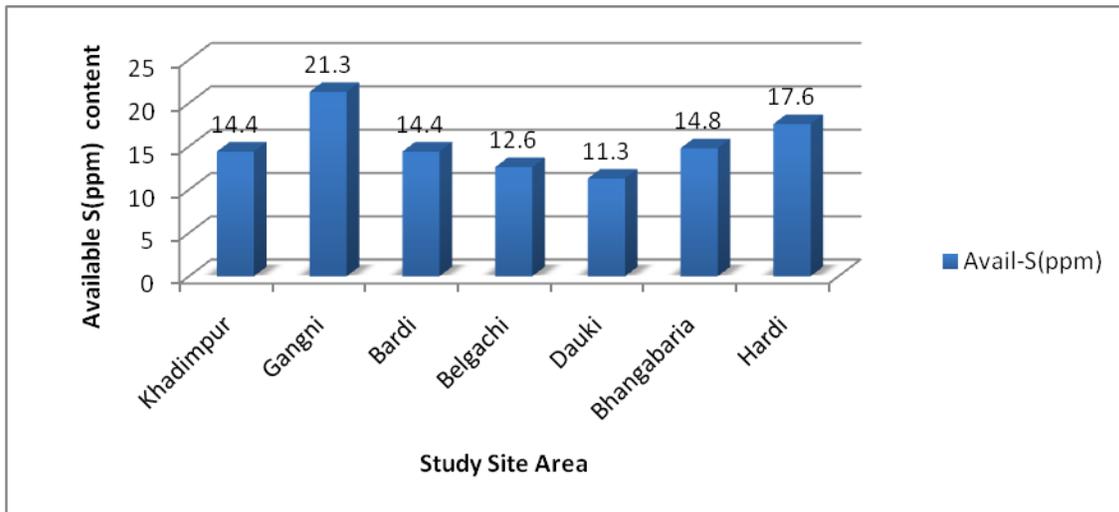


Figure 2 Available S content at surface soil (0-10 cm) of Alamdanga Upazila.

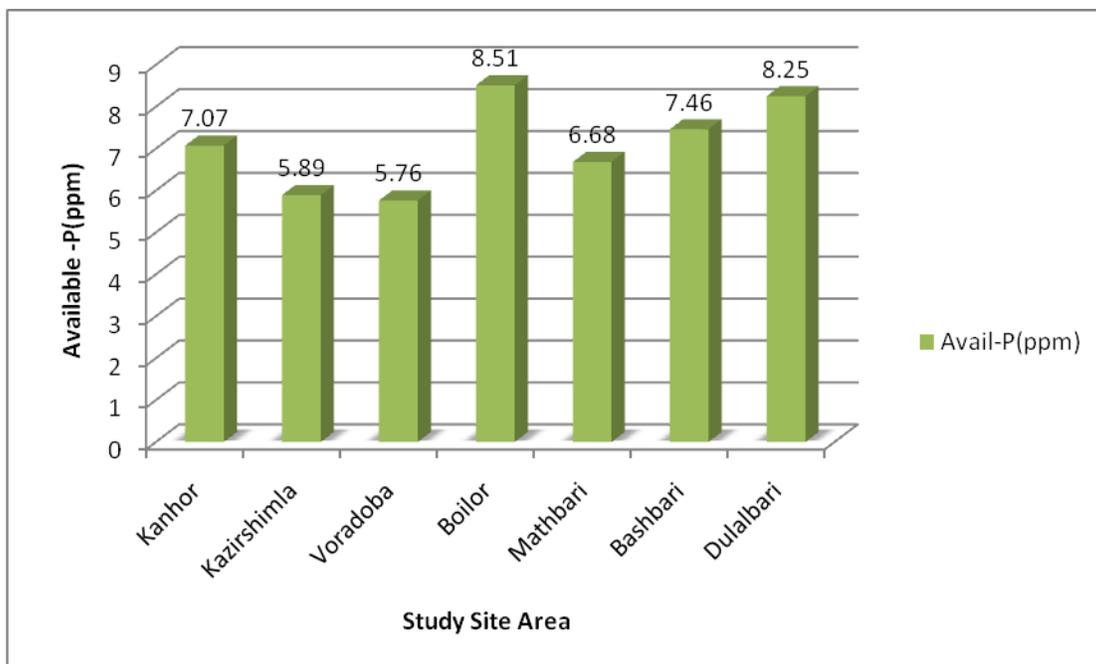


Figure 3 Available P content at surface soil (0-10 cm) of Trishal Upazila.

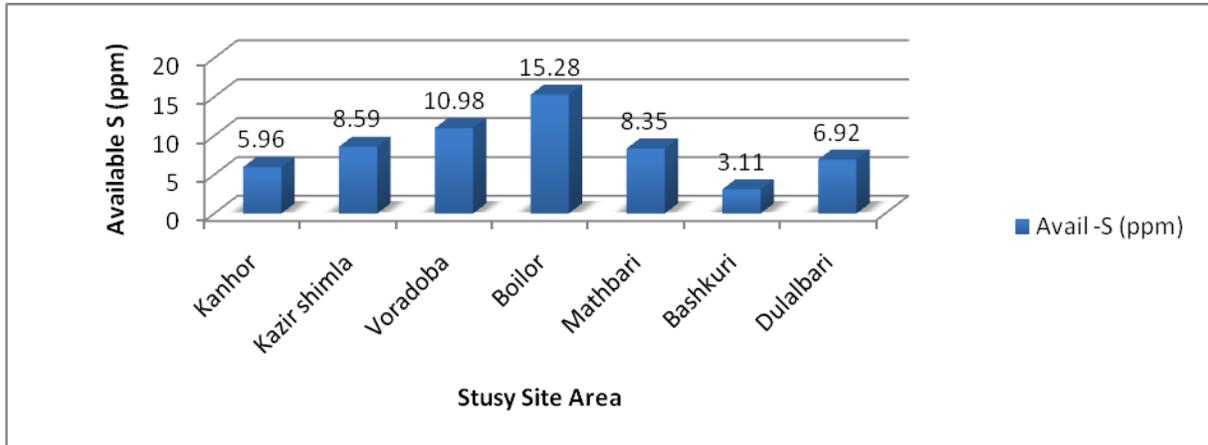


Figure 4 Available S content at surface soil (0-10 cm) of Trishal Upazila.

4.1.3 Exchangeable cation (Ca, K and Na) contents at surface soils (0-10cm) of Alamdanga and Trishal Upazila

Exchangeable Ca, K and Na contents in the soils of Alamdanga Upazila and Trishal Upazila were represented respectively at the study Table 5 and Table 6 Exchangeable Ca content at the soils of Alamdanga Upazila ranged from 9.80 to 14.20me % and highest value were measured at Gangni soil sample 14.2me %. Trishal Upazila exchangeable Ca content ranged from 6.57 to 15.66me% and Boilor soil sample 15.66me

% has highest value. Exchangeable K content at Alamdanga Upazila ranged from 0.20 to 0.42me % and highest values were identified at Gangni soil sample 0.42me %. At Trishal Upazila the exchangeable K content ranged from 0.06 to 0.08me %. Exchangeable Na content at Alamdanga Upazila ranged from 1.10 to 1.43me% where highest value was measured at Gangni soil sample 1.43me%. Trishal Upazila exchangeable Na content ranged from 0.23 to 0.25me %.

Table 3 Exchangeable cation (Ca, K and Na) contents at surface soil (0-10 cm) of Alamdanga Upazila.

SL. No.	Location	Exch. Ca (me%)	Exch. K(me%)	Exch. Na(me%)
1	Khadimpur	13.1	0.25	1.33
2	Gangni	14.2	0.42	1.43
3	Bardi	10.5	0.35	1.2
4	Belgachi	9.8	0.4	1.25
5	Dauki	11.5	0.2	1.1
6	Bhangabaria	13.4	0.36	1.4
7	Hardi	11.2	0.3	1.39

Table 4 Exchangeable cation (Ca, K and Na) contents at surface soil (0-10 cm) of Trishal Upazila.

SL. No.	Location	Exch. Ca(me%)	Exch. K(me%)	Exch. Na(me%)
1	Kanhor	8.23	0.08	0.25
2	Kzirshimla	6.68	0.07	0.23
3	Voradoba	7.05	0.06	0.25
4	Boilor	15.66	0.08	0.24
5	Mathbaria	7.35	0.08	0.24
6	Bashkuri	6.75	0.06	0.25
7	Dulalbari	6.57	0.06	0.25

4.2 Assessment of Arsenic contents

4.2.1 General Arsenic contents in soil

There are no federal regulations limiting soil As levels in the USA. However, the US Environmental Protection Agencies (EPA) superfund risk model gives a value of 0.43 ppm total soil As for a cancer risk of 1 in 106 for exposure by soil ingestion. This has created an interesting situation for regulation of soil As by individual States as the average background As level in USA soils is ~ 5 ppm. State standards for remedial action vary tremendously, but many require this when soil As is above the natural background, which is often less than 10 ppm. Background soil As levels have been shown to vary with soil type (Chen et al., 2002), which is sometimes considered in evaluations of soil contamination. Soil As standards in other countries (Canada, UK, Netherlands, Australia) are generally in the 10-20 ppm range for agricultural use of soils. Total soil As in the top 15 cm of Bangladesh soils was above 10 ppm for 48% and 65% of the 456 sites in the 2002 US-AID study and 161 sites in Shah et al. (2004), but it is clear that there is cause for concern from both agricultural sustainability and human health perspectives. The safe levels of arsenic in irrigation water, soils and foods are yet to be established for Bangladesh.

4.2.2 Arsenic contents at surface soils (0-10) of Alamdanga and Trishal Upazila

Arsenic contents of Alamdanga Upazila ranged from 8.81 – 16.26 mg/kg, where all soil samples were contaminated and the details data were showed in Figure 7. Highest As contents value was found at Hardi soil sample 16.26 mg/kg where lowest arsenic contents were found at Bhangabaria soil sample 8.81 ppm at Alamdanga Upazila. At Trishal Upazila arsenic contents ranged from 6.58–9.16 mg/kg, where all the soil sample were slightly contaminated and details data were showed in Figure 8 where the highest value of As contamination were found at Boilor 9.16 mg/kg lowest contaminated soil sample was observed in Mathbari 8.81 mg/kg.

Comparison of total arsenic contents among the different soil location showed variations at Alamdanga Upazila and Trishal Upazila. The variations of the arsenic contents in the soils of different soil series might be associated with the local differences in parent materials (e.g. as-bearing minerals), farm management practices (e.g. use of arsenical pesticides), continental inputs (e.g. dry and wet deposition) and other biogeochemical activities.

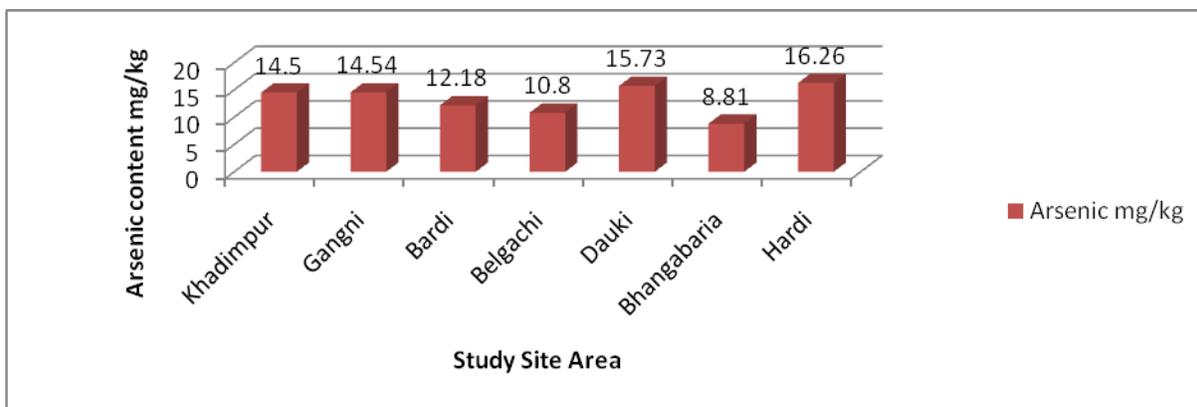


Figure 5 As content at surface soil (0-10 cm) of Alamdanga Upazila.

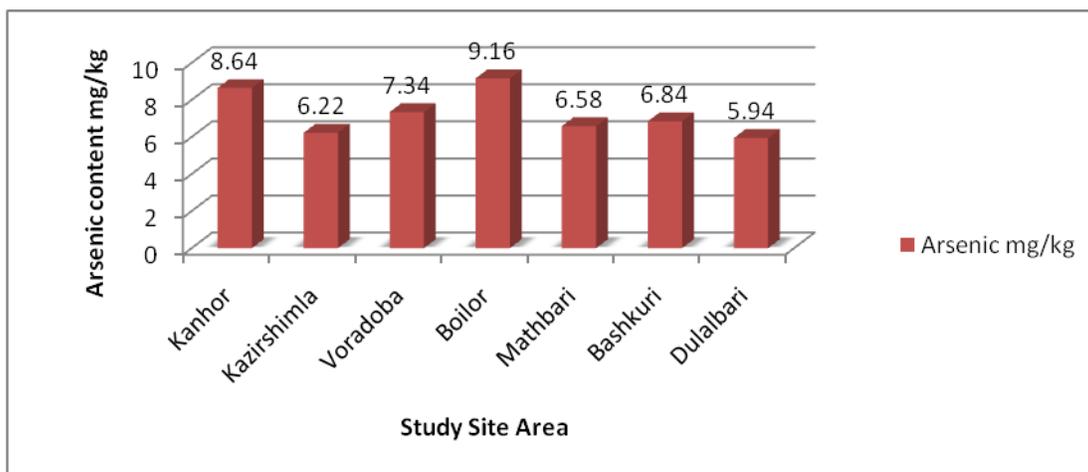


Figure 6 As contents at surface soil (0-10 cm) of Trishal Upazila.

4.2.3 Relationship between As distribution and soil properties

It has been reported that the soil composition such as sand, silt, clay contents, soil pH, organic carbon, total N, available S, available P and exchangeable cations (Ca, K, Na) are the major factors controlling trace elements in soils (Chen et al., 2008). The variation in the As contents recorded in this study was, therefore, expected since the soils also varied considerably in the sand, silt, clay contents, soil pH, organic carbon, total N, available S, available P and exchangeable cations (Ca, K, Na) contents.

Table 5 Correlation coefficient (r) among the total As contents and the selected soil properties.

Soil properties	r values	
	Alamdanga	Trishal
pH	-0.02835 ^{NS}	0.393591 ^{NS}
Organic OM (%)	0.370442 ^{NS}	-0.69594*
Total N (%)	0.085575 ^{NS}	-0.8116*
Avail -P (ppm)	0.611835*	0.305898 ^{NS}
Avail -S (ppm)	0.24479 ^{NS}	0.486246 ^{NS}
Exch. Ca (me %)	0.05007 ^{NS}	0.790737 *
Exch. K (me %)	-0.54795 ^{NS}	0.580288*
Exch. Na (me %)	-0.11714 ^{NS}	0.138998 ^{NS}

* = Significant at 5% level of probability
NS = Not significant.

4.3 Comparison of the soil properties in relation to As contamination in Alamdanga and Trishal Upazila

4.3.1 Soil pH, organic carbon and total N contents

Between pH value and arsenic contamination no significant relationship were found. Reza et al. (2010) identify that organic matter are the major leachable solids carrying As. Organic matter content in the soils of Alamdanga Upazila ranged from 0.83 to 1.10% and Trishal Upazila ranged from 1.23 to 2.06%. Result suggested that Trishal Upazila soils were enriched with Organic Matter. Natural organic matter is a prevalent constituent of natural waters, is highly reactive toward both metals and surfaces and is thus a clear candidate to influence arsenic mobility (McArthur et al., 2004). Arsenic contents in sediments positively correlated organic matter (Han et al., 2013) but in the surface soil a negative significant relationship were found between As contamination and the organic matter contents at Trishal Upazila soil sample (Figure 9)

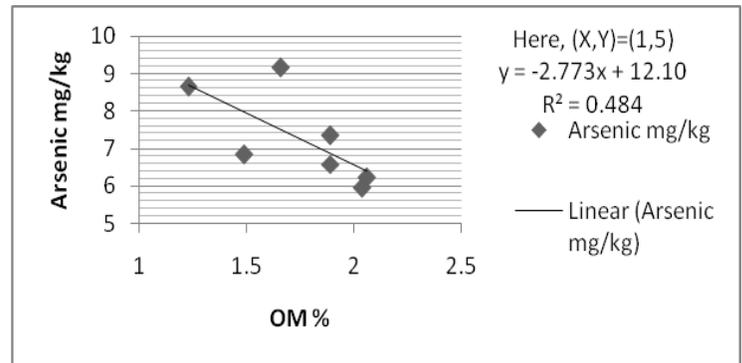


Figure 7 Relationship between As contamination and OM % at Trishal Upazila.

Total nitrogen content at Alamdanga Upazila ranged from 0.07 to 0.09% and Trishal Upazila 0.076 to 0.104%. Total N content at Trishal Upazila are higher than the Alamdanga Upazila. Microbial biomass C and N were significantly ($P < 0.05$) lower in contaminated than uncontaminated soils (Bardgett et al., 1994). As contamination and the total N (%) contents of Trishal Upazila soil samples showed negative significant relationship with arsenic contamination (Figure 10)

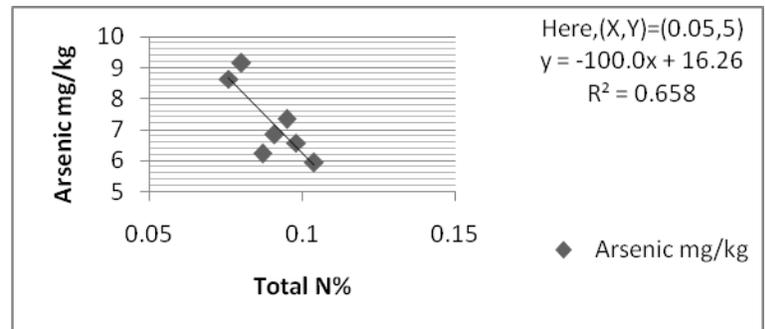


Figure 8 Relationship between As contamination and Total N (%) at Trishal Upazila.

4.3.2 Available P and Available S content

Concentration of silica and phosphate compete with arsenite and arsenate respectively during uptake by plants (Sahoo and Mukherjee, 2014). Available P content at Alamdanga Upazila ranged from 12.1 to 17.3ppm and at Trishal Upazila ranged from 5.76 to 8.51 ppm. Result showed that the amount of Available P at Alamdanga Upazila was higher than the Trishal Upazila. Arsenic concentrations in the roots of *U. dioica* were negatively correlated with concentrations of arsenic in the soil and positively correlated with phosphorus in the soil. Effects of arsenic on plants will therefore depend on the amount of phosphorus available in the soil (Otte et al., 1990). Positive significant relationship were observed between As contamination and the available P content of Alamdanga Upazila soil sample (Figure 11)

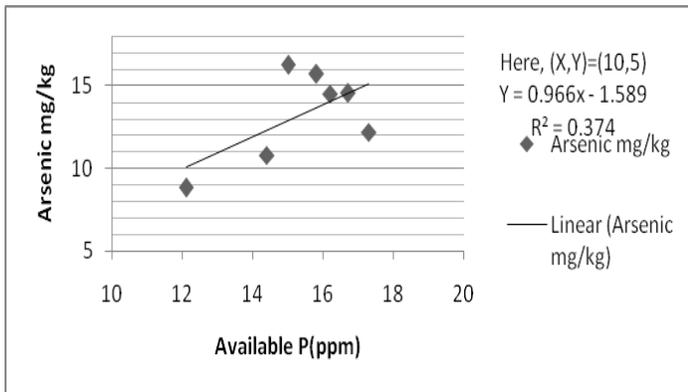


Figure 9 Relationship between As contamination and available P at Alamdanga Upazila.

Available S contents at Alamdanga Upazila ranged from 11.3 to 17.6 ppm and Trishal Upazila ranged from 3.11 to 15.28 ppm. Between available S and As contamination no significant relationships were found at Alamdanga and Trishal Upazila soil sample. The combined increase of P and S in the nutrient solution did not lead to higher accumulation of As, but enhanced As translocation from the root to the shoot (Grifoni et al., 2014).

4.3.3 Exchangeable cation (Ca, K and Na) contents in different surface soil series in Alamdanga and Trishal Upazila

Exchangeable Ca content in Alamdanga Upazila ranged from 9.80 to 14.20 me% and at Trishal Upazila 6.57 to 15.66 me%. Positive significant relationships were identified between As contamination and the Exchangeable Ca content of Trishal Upazila soil sample (Figure 12)

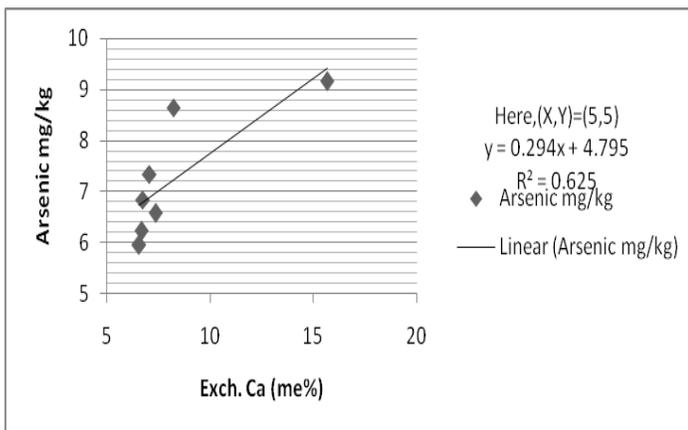


Figure 10 Relationship between As contamination and Exch. Ca in Trishal Upazila.

Exchangeable K content in the soils of Alamdanga Upazila ranged from 0.20 to 0.42 me% and at Trishal Upazila ranged from 0.06 to 0.08me%. Positive significant relationships were found between As contamination and the Exchangeable K content of Trishal Upazila soil samples (Figure 13).

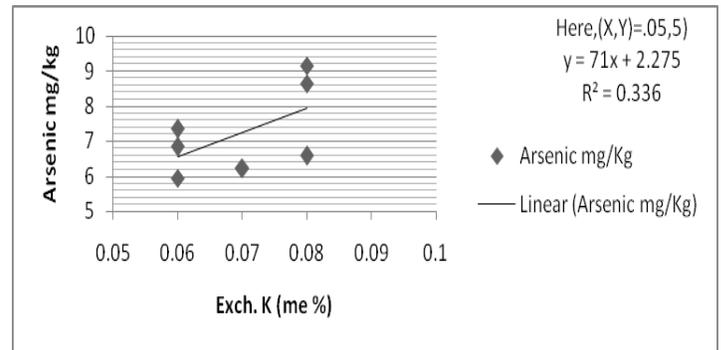


Figure 11 Relationship between As contamination and Exch. K at Trishal Upazila.

Exchangeable Na content in the soils of Alamdanga Upazila ranged from 1.10 to 1.43 me% at the Trishal Upazila exchangeable Na content ranged from 0.23 to 0.25 me%. No significant relationships were found between As contamination and Exchangeable Na at both Upazila.

Soil pH, organic matter, total N available P, available S and exchangeable Ca, K and Na contents showed variations in the soils of different soils of Alamdanga Upazila and Trishal Upazila. The process that can contribute to these variations might be due to the redistributions of particle size distribution (sand, silt and clay), soil pH, organic matter, total N, available P, available S and exchangeable Ca, K and Na contents in the different sampling areas. Variations in the e different soils might be due to the differences in the farm management activities (e.g. fertilizations, etc.). The soils of Alamdanga Upazila and Trishal Upazila are represented the intensity of various actions of different processes under the tropical environment and the intensification of the overwhelming human activities. The variations in the studied soils also might be due to the local differences in soil characteristics, changes in cropping systems (e.g. crop types, fertilization, irrigation, etc.) and other management practices in the farming communities.

The findings of this study revealed that the natural biochemical activities played important roles in soil pH, and contents of organic carbon, total N and exchangeable cations (Ca, K and Na). The study showed a wide variation in soil texture, organic carbon, total nitrogen and exchangeable cations (Ca, K and Na) with Alamdanga Upazila and Trishal Upazila. The soil characters might be due to the variations in the soil characteristics and management practices at the farm level.

III. SUMMARY AND CONCLUSION

With this study and others findings it is apparent that arsenic contamination are present at surface soils (0-10 cm), which are dependent on geological and anthropogenic factors, more research is needed on how arsenic moves through ground water systems and contaminated the soil within different areas of Bangladesh. Whether the variation in the soil properties are influences the differences in arsenic concentration in surface soil (0-10 cm) is still an open question. If answered, it can likely assist government, NGOs and communities in addressing the arsenic problem at a much greater scale than at present.

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An algorithm for MAX2SAT

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Abstract- In this paper I present a MAX2SAT algorithm based on the randomized algorithm of Papadimitriou from 1991. We also show that this algorithm finds a MAX2SAT solution (if it exists) with high probability in polynomial time.

Index Terms- NP-complete problems, MAX2SAT, Markov chain, 3SAT

I. INTRODUCTION

In MAX2SAT we are given a 2SAT expression involving a set of clauses, each with at most two literals in it, and an integer K . We are asked whether there is a truth assignment that satisfied at least K of the clauses. We call this the MAX2SAT problem. We note that if the 2SAT expression considered has m clauses, then the truth assignment mentioned above must leave at most $m - K$ clauses unsatisfied.

Definition 1. We know that there is (at least) a truth assignment that satisfies a maximum number of clauses M and leaves unsatisfied a minimum number of clauses $m - M$, where m represents the number of clauses of the 2SAT expression under consideration. The truth assignment satisfying this condition will be called the maximal truth assignment (there is at least one).

Proposition 1. (see [5] and [3]). MAX2SAT is NP- complete.

Proof. For the proof, see the references listed above (see [5], theorem 9.2, page 186).

II. PRESENTATION OF THE ALGORITHM

We will present the well known randomized algorithm for 2SAT. This is the Papadimitriou algorithm from 1991 (see [4]). We also note that Schoning discussed a similar algorithm for 3SAT in 1991 (see [6])

Papadimitriou's algorithm for 2SAT.

Input: a 2SAT expression in n variables.

Guess an initial truth assignment, uniformly at random.

Repeat $C \cdot n^2$ times:

If the formula is satisfied by the actual assignment, stop and accept.

Let C be some clause not being satisfied by the actual assignment. Pick one of the (at most) two literals in the clause at random, and flip its truth value.

Update.

Stop and reject, the expression is not satisfiable.

In the next section, I will prove that this algorithm performs well even for the MAX2SAT problem, so in the Papadimitriou algorithm, all we need to modify is the definition of "satisfies" (related to an assignment), since in the context of MAX2SAT, we will not need all the clauses to be satisfied.

The MAX2SAT algorithm.

Input: a 2SAT expression with m clauses.

Guess an initial truth assignment, uniformly at random.

Repeat $C \cdot m^2$ times:

If the actual truth assignment satisfies the MAX2SAT condition, stop and accept.

Let C be some clause not being satisfied by the actual assignment. Pick one of the (at most) two literals in the clause at random, and flip its truth value.

Update.

Stop and reject, the expression is not satisfiable.

In other words, I will prove that if a MAX2SAT satisfying assignment exists, then the MAX2SAT algorithm will find it with high probability. Note that running the algorithm a quadratic number of times, in the number of clauses is stronger than running it a quadratic number of times in the number of variables. A given 2SAT expression with m clauses can have at most $2m$ variables, and at least a number of variables of order of magnitude \sqrt{m} (up to a multiplicative constant).

III. ANALYSIS OF THE ALGORITHM

In this section, I will present the main theorem. We assume that the reader is also familiar with the 3SAT to MAX2SAT reduction. For reference, see [5], theorem 9.2, page 186. A given 2SAT problem is called a reduction of a 3SAT problem if it is equivalent to a given 3SAT problem.

Theorem. Given a MAX2SAT problem, that is a reduction of a given 3SAT problem with m clauses, then with high probability, after $C \cdot m^2$ steps, the MAX2SAT algorithm will find a MAX2SAT satisfying assignment (where C is a constant and m is the number of clauses in the original 3SAT expression).

Proof. For the proof, we will use the principle of induction, following the number of clauses in the MAX2SAT expression (actually the number of clauses of the original 3SAT expression). We will consider the Markov chain approach considered in [6] and [4]. We will also consider the expected travelled distance (by the Markov chain associated to the algorithm) towards the absorbing barrier 0 (note that the direction of travel is important).

We are given a 3SAT problem with m clauses. We construct the equivalent MAX2SAT problem. The MAX2SAT problem will have $10 \cdot m$ clauses, each 3SAT clause will be replaced by a group of 10 clauses. The 3SAT problem is satisfiable if and only if its MAX2SAT reduction has a maximal truth assignment with $7 \cdot m$ satisfied clauses.

We write $P(N)$ for the statement : after $C \cdot N^2$ steps (where $10 \cdot N$ is the number of clauses in the MAX2SAT expression that is equivalent to a 3SAT expression with N clauses), the Markov chain associated to the MAX2SAT algorithm will have an expected travel distance (towards the absorbing state with Hamming distance 0) given by the square root of the number of flips performed by the algorithm (up to a multiplicative constant), on any MAX2SAT expression that is equivalent to a 3SAT expression with N clauses. So if the algorithm performs $C \cdot N^2$ steps, then the expected travel distance is $C_1 \cdot \sqrt{C} \cdot N$ (where C_1 is a constant greater than 1).

For $N = 1$, the original 3SAT expression has only one clause. By choosing the constant C large enough, it is clear that the statement $P(1)$ is true.

We want to prove that if we assume that $P(\alpha)$ is true for all integers $\alpha < N$, then $P(N)$ is also true.

Let's consider a 2SAT expression φ with $10 \cdot N$ clauses (the MAX2SAT equivalent to a 3SAT expression with N clauses). We consider the expression ψ , by eliminating a group of 10 clauses (associated to one of the clauses of the original 3SAT expression). We call this group, the special group of 10 clauses. The expression ψ will have $10 \cdot (N - 1)$ clauses. When working on the expression φ , we assume that the algorithm will touch this special group of clauses a number of times K . That means that if the algorithm takes $C \cdot N^2$ steps (where N is the number of clauses in the expression φ), then $C \cdot N^2 - K$ steps will be taken within the expression ψ , and K steps will involve the special group of clauses considered above.

We assume that the associated Markov chain will take n_1 steps within the expression ψ , then it will touch the special group of clauses considered above, then it will take n_2 steps within the expression ψ , then it will touch the special group of clauses considered above again, and so on, until it will take n_K steps within the expression ψ , then it will touch the special group of clauses considered above for the last time, and then it will take the last n_{K+1} steps within the expression ψ .

We are only interested in studying what happens if the original 3SAT expression is satisfiable.

The special group of clauses will have 3 unsatisfied clauses in the maximal truth assignment. The whole expression φ will have $3 \cdot N$ unsatisfied clauses in the maximal truth assignment. As long as the algorithm does not find a maximal truth assignment, the probability of choosing an unsatisfied clause from the special group is at most $p = \frac{3}{3N} = \frac{1}{N}$. That means that if the algorithm makes $C \cdot N^2$ steps, then the expected number of hits of an unsatisfied clause from the special group is at most $C \cdot N$. In other words, the inequality $K < C \cdot N$ will be satisfied with high probability.

From the inductive hypothesis, when the algorithm works within ψ , it will drift towards zero with an expected speed, and when it touches an unsatisfied clause in the special group of clauses, the worst it can do is to backtrack one unit (away from the absorbing state 0).

That means that we have the following equation (this counts the number of steps within ψ , and when it touches the unsatisfied clause considered above).

$$n_1 + n_2 + n_3 + \dots + n_{K+1} = C \cdot N^2 - K \tag{1}$$

The overall, expected travel distance of the associated Markov chain (when the algorithm works on φ), will be at least:

$$D = C_1 \cdot ((n_1)^{\frac{1}{2}} + (n_2)^{\frac{1}{2}} + \dots + (n_{K+1})^{\frac{1}{2}}) - K \tag{2}$$

We also work under the conditions $n_i \geq 1$, for all $i \in \{1, 2, 3, \dots, K+1\}$, and we assume that $K < C \cdot N$, as we discussed before.

We want to find the minimum value that D can take, under the constraint given by equation (1). We can apply the method of Lagrange multipliers, more precisely the Karush-Kuhn-Tucker minimization conditions, and we find that the minimum of D has the form $C_2 \cdot N$, where the constant C_2 is greater than 1 (for a suitably chosen constant C).

There is also a geometrical way to see this. We consider the variables

$z_i = n_i^{\frac{1}{2}}$, for all $i \in \{1, 2, 3, \dots, K+1\}$. We have to study the intersection of a hyperplane and a hypersphere (a K -sphere), in the region where all the coordinates are greater or equal to 1. The hyperplane is given by the equation $C_1 \cdot (z_1 + z_2 + \dots + z_{K+1}) = \text{constant}$, and the hypersphere is given by the equation $z_1^2 + z_2^2 + z_3^2 + \dots + z_{K+1}^2 = C \cdot N^2 - K$. When we perform a translation of the hyperplane, parallel to itself, eventually will hit the region where all the coordinates are greater or equal to 1 (corresponding to a slice of the hypersphere that is less than $\frac{1}{2^{K+1}}$ of the whole).

For any translation of the hyperplane further, the sum $(z_1 + z_2 + \dots + z_{K+1})$ will only increase. Let's see the values at the point $z_1 = \sqrt{C \cdot N^2 - 2 \cdot K}$, $z_2 = z_3 = \dots = z_{K+1} = 1$. We look at the equations from a strictly formal point of view (disregarding for a moment the interpretation of these values). In this case, the distance D will take the value:

$$D = C_1 \cdot \sqrt{C \cdot N^2 - 2 \cdot K} + C_1 \cdot K - K \tag{3}$$

Knowing that with high probability we have $K < C \cdot N$, from (3) we see that the drift distance D can be put in the form (when K hits its maximum value)

$$D \sim (C_1 \cdot (\sqrt{C} + 1) - \sqrt{C}) \cdot \sqrt{C} \cdot N \tag{4}$$

If $C_1 > 1$, then we have $C_2 = (C_1 \cdot (\sqrt{C} + 1) - \sqrt{C}) > 1$

We emphasize that this is only an approximation, the KKT minimization method (mentioned above) will give the exact minimum.

That means that $P(N)$ is true, and the inductive steps is proved. QED.

The MAX2SAT algorithm always finds a maximal truth assignment, not only when the maximal truth assignment satisfies all the clauses

When a literal is flipped in an unsatisfied clause that will be satisfied in the maximal truth assignment, the Hamming distance to a solution decreases by 1 with probability at least $\frac{1}{2}$. When a literal is flipped in an unsatisfied clause that will remain unsatisfied in the maximal truth assignment, the Hamming distance indeed increases by 1, but enough clauses will become unsatisfied at this step, with this flip (and these clauses will be satisfied in the maximal truth assignment), such that the deviation will be corrected at later stages of the algorithm. In general terms, this could be one reason why the MAX2SAT algorithm works in all cases, as the proof of the theorem above shows (using induction). A direct proof of the theorem above (without induction) would not be a simple matter. The general procedure will look like this. We consider a 3SAT problem. We find the equivalent MAX2SAT problem, and we run the MAX2SAT algorithm in this problem

IV. CONCLUSION

For general implications, related to efficiently solving NP – complete problems, see [1]. An interesting application is related to the problem of automated theorem proving using an efficient algorithm for NP – complete problems (see appendix). The impact of this type of algorithm in mathematics, cryptography, science in general is hard to estimate.

APPENDIX

Godel's letter to John von Neumann. In his letter, Godel writes:

“One can obviously easily construct a Turing machine, which for every formula F in first order predicate logic and every natural number n , allows one to decide if there is a proof of F of length n (length = number of symbols). Let $\psi(F, n)$ be the number of steps the machine requires for this and let $\varphi(n) = \max_F \psi(F, n)$. The question is how fast $\varphi(n)$ grows for any optimal machine” (see [2].

Now we consider this. In [3], we have theorem 13.1, at page 325, where it is proved that for each Turing machine (deterministic or nondeterministic) M that is time bounded by a polynomial $p(n)$, a log-space algorithm exists, that takes as input a string x and produces a Boolean expression E_x that is satisfiable if and only if M accepts E_x .

This means that the process of seeking a proof (of reasonable length) of a mathematical statement can be completely automatized. With the algorithm presented in this paper, Godel's vision can be made reality.

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Quality of Health Care Services Provided for Patients with Burn in AL-Sadder Medical City at Burn Unit in AL-Najaf AL-Ashraf City

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Abstract- Objective: this study aimed to assess quality of health care services provided for patients with burn at Al-Sadder Medical City/ Burn Unit. **Methodology:** A descriptive design (Quantitative) is carried out in Al-Sadder Medical City/ Burn Unit / at Al-Najaf AL-Ashraf City. The study started from November, 2nd, 2015 to September, 4th, 2016, in order to assess quality of health care services provided for patients with burn. A non-probability (purposive) of (30) Patient with burn who are admitted to Al-Sadder Medical City/ Burn Unit for treatment are included in the study sample. Data collected through using a well-designed questionnaire consist of two parts: part I consists of demographic data and part II consists of (25) items which distributed according to five domains of health care services quality. Data was analyzed by using descriptive statistic. **Results:** The results show that the burn common occurs among persons in urban residential area than in those in rural, the burn most happen in females than in male, and the burn present in married farther single one also the study reveal that most of patients are satisfied with the quality of health care services provided at burn unit especially within reliability, responsiveness, and empathy domain of health care services quality, while at the tangible and assurance the patients are partially satisfied. **Conclusion:** The study concludes that the overall assessment of HCSQ indicates that half of the patients are satisfied with the HCSQ that provided at burn unit. **Recommendation:** The nurses must measure and/or assess the quality of health care services in the burn unit continuously in order to apply the quality improvement and/or quality assurance in this unit, and Health education programs and training sessions should be implemented for nurses to increase or/and improve their abilities in managing burned patient.

Index Terms- QUALITY, HEALTH CARE SERVICES, BURN.

I. INTRODUCTION

Burns are considered as a major community health problem globally. Majority of burns happen in the third world countries⁽¹⁾. Most of burns in children are scalds because of lack of awareness, higher activity levels, and natural curiosity, this can cause morbidity and mortality⁽²⁾. Flame burns commonly happen among males (77%) versus females (23%)⁽³⁾. Electrical injury occurs most commonly in males between 30-39.9 years of age, if it happens from high voltage source, then it can be devastating and it is non- devastating if it is happen due to a low voltage source. Most electrical injuries are work-related

accidents and occur at an industrial setting. Electrical injuries which occur as accidents in the work place⁽⁴⁾. Globally, around 11 million burns require medical care. Its treatment requires a multidisciplinary approach and its major cause of sickness and death, impermanence in all age groups⁽⁵⁾. The primary health care setting provides many opportunities to promote safety measures in order to prevent burns and scalds which they are seen routinely⁽⁶⁾. Quality is becoming more prominent section of people lives. Individuals are hoping to get a better quality of care. One of human rights is to acquire high quality of health care services (HCSQ). This can lead to satisfaction for patient, staff, suppliers, and better action for the organization. When the quality of healthcare services increase, then expenses reduced, production enhancement, and best service can be offered to patients and supply longstanding functional interactions for the staff and supplier. Healthcare service quality is hard to measure because of its subjective nature and intangible properties⁽⁷⁾. All the health staff which includes medical, nursing, allied, and expertise are able to provide protection in the management of burn patient. The quality of services supports fire protection and avoidance of burn activities in the community that lead to providing best management in first aid and early resuscitation for burned patient with severe injury. Infection control is a main concern matter in healthcare services with infection surveillance techniques in position⁽⁸⁾. Nurses spend more time with their patients each day than from any other health care provider and have most interactions with patients and their families because they provide hour to hour care and promotes frequently to the family the instruction given by the physician as well as the care plan and the way of the care⁽⁹⁾. Nurses take an important part to control infection in patients with burn by nursing interventions, research investigation, and education of patient. However, numerous familiar nursing interventions to control infection depend on the belief or expert point of view but without scientific inspection⁽¹⁰⁾.

II. METHODOLOGY

Descriptive design (Quantitative) was adopted in the current study to assess quality of health care services provided for patients with burn. The research was carried out at Al-Najaf City/ Health Directorate of Al-Najaf Al-Ashraf / AL-Sadder Medical City / Burn Unit. The study was started from November, 2nd, 2015 to September, 4th, 2016. A non-probability (purposive) sampling technique was used consisting of (30) patient with burn who

were admitted to Al-Sadder Medical City/ Burn Unit for treatment. An assessment tool was adopted and developed by the researcher to assess quality of health care services provided for patients with burn. The last indicator of the study instrument consists of (2) parts:

Part I: Socio-demographic Characteristics: consists of (7) items, including gender, age, and marital status, level of education, occupational status, residency, and socio-economic status. In the socio-economic status, the researcher uses the Socio-Economic status Scale (SES) to clarify the level of participant's socio-economic status in term of Sufficient, sufficient to some extent, and insufficient. **Part II: Quality of Health Care Services Measurement Scales (Dimensions of Health Care Services):** was comprised of (25) items, to measure healthcare service quality in burn unit. The SERVQUAL scale which consists of five dimensions model including tangible, reliability, responsiveness, empathy and assurance. The five dimensions of SERVQUAL as proposed by Parasuraman *et al.* (1988)⁽¹¹⁾. A five-point Likert-type scale is used in this study, anchored by strong agree, agree, not Sure, disagree and strong disagree scored 5, 4, 3, 2 and 1 respectively on a Likert scale of 1-5. **Tangible:** This domain was measured through (7) items which represented appearance of physical facilities, equipment, personnel and communication. **Reliability:** means ability to perform the service accurately and dependability. It is measured through (5) items. The criteria for evaluating this dimension, accuracy of certified records in hospital administration,

appointments accuracy in medical procedures. Provide the service on exact time with reliably, accurately, consistently and without errors which can be relied upon, and develop solutions of the patient problems that leading to giving it a sense of confidence and providers of medical services. **Responsiveness:** Is that means willingness to help customers and provide services. It is measured through (4) items. **Empathy:** Is mean caring and individualized attention provided to customers. Its measured through (5) item. **Assurance:** Is mean employees' knowledge, courtesy and ability to convey trust and confidence. Its measured through (4) item. The data collection was carried out from March 22th, to 27th April, 2016. The data collection was done by applying of the established questionnaire and by means of structured interview with the subjects as they separately interviewed in special room, and each subject was interviewed in the same way by using the similar questionnaire for the subjects of the study sample at the Burn Unit. The participants are requested to answer the questionnaire within (20-25) minutes. Data was analyzed through the use of SPSS (Statistical Package for Social Science) version (19) application statistical analysis system and Excel application. Data analyzed through the application of a descriptive statistics approaches. **A descriptive data analysis** includes (Frequencies, Percentages, and Mean of scores), Cutoff point (0.66), Statistical figure (pie Charts) and Pearson's Correlation Coefficients (Reliability).

III. RESULTS

Table (1): Distribution of Patient with Burn by Their Socio-Demographic Characteristics.

Variable	Items	Frequency	Percent
Gender	Male	11	36.7
	Female	19	63.3
	Total	30	100.0
Age years <i>Mean = 29.26</i> <i>SD= 1.21</i>	≤ 25	15	50.0
	26 - 35	8	26.7
	36 - 45	5	16.7
	46 - 55	1	3.3
	56+	1	3.3
	Total	30	100.0
Marital Status	Single	9	30.0
	Marriage	17	56.7
	Widow	2	6.7
	Divorced	1	3.3
	Separated	1	3.3
	Total	30	100.0
Level of Education	Illiterate	6	20.0
	Able to read and to write	1	3.3
	Primary school graduate	3	10.0
	Middle school	5	16.7
	Preliminary school	7	23.3
	Institute	4	13.3
	College	4	13.4

	Total	30	100.0
Occupation	Employee	5	16.7
	Free business	4	13.3
	Retired	1	3.3
	Housewife	13	43.3
	Unemployed	2	6.7
	Student	5	16.7
	Total	30	100.0
Residence	Rural	14	46.7
	Urban	16	53.3
	Total	30	100.0
Socio-Economic Status	Sufficient	6	20.0
	Sufficient to some extent	13	43.3
	Insufficient	11	36.7
	Total	30	100.0

This table reveals the most of the study research are female (63.3%), within the first age group (≤ 25) years old (50.0%), married (56.7%), illiterates (28.7%), housewives (43.3%), urban resident (53.3%), and socio-economic status Sufficient to some extent (43.3%).

Table (2):Assessment of Dimensions of Quality of Health Care Services / Tangibility.

No.	Items	Reject Strongly (%)	Reject (%)	Neutral (%)	Agree (%)	Strong Agree (%)	Mean	Assessment
1	Burn unit location is convenient and easy access to the provision of health service for all patients	6.7	3.3	10.0	43.3	36.7	4.00	Satisfied
2	Burn unit rooms (waiting rooms and clinical testing and diagnosis rooms) are an integrated and well furnished.	23.3	26.7	16.7	23.3	10	2.70	Dissatisfied
3	In burn unit all amenities are provided such as (continuous electricity, water, sanitation, ventilation and unpleasant odors)	20	23.3	30	10	16.7	2.80	Dissatisfied
4	Burn unit have up- to-date Instruments, equipment and medical supplies	40	16.7	23.3	10	10	2.33	Dissatisfied
5	Foods are appropriate for patient	53.3	6.7	20.0	13.3	6.7	2.13	Dissatisfied
6	Burn unit provides all required medication in the pharmacy.	86.7	6.7	0	6.7	0	1.27	Dissatisfied
7	Employees in the burn unit excellent and they have a neat appearance.	10.0	0	6.7	43.3	40.0	4.03	Satisfied

Satisfied: mean of score ≥ 3

Dissatisfied: mean of score < 3

This table reveals that the subjects' response regarding tangible domains of health care services quality, the results indicate that the patients are dissatisfied with the services of unit due to these services are insufficient to meet patients requirements in the minimum

level, except the items (Burn unit location is convenient and easy access to the provision of health service for all patients) and (Employees in the burn unit excellent and they have a neat appearance) the patients responses shows they are satisfied.

Table (3): Overall Assessment of Dimensions of Quality of Health Care Services / Tangibility.

Assessment	Items	Frequency	Percent
Tangibles Domains	Satisfied	3	10.0
	Partially satisfied	18	60.0
	Dissatisfied	9	30.0
	Total	30	100.0

Satisfied M.S > 2.33; Partially Satisfied M.S = 1.67 - 2.33; Dissatisfied M.S = 1 - 1.66

This table shows that only 10% of the study subjects are satisfied from these services, while (60%) of the study subject are partially satisfied, and (30%) are dissatisfied in the tangibility domain of health care services.

Table (4): Assessment of Dimensions of Quality of Health Care Services / Reliability Satisfied: mean of score ≥ 3

No.	Items	Reject Strongly (%)	Reject (%)	Neutral (%)	Agree (%)	Strong Agree (%)	Mean	Assessment
1	The burn unit is interested in recording information about patients and their health status in the records accurately.	3.3	0	36.7	33.3	26.7	3.80	Satisfied
2	When a patient has problem, the employees will appear a sincere interest in solving them.	6.7	26.7	16.7	26.7	23.3	3.33	Satisfied
3	The unit provides promised services at appointed time.	3.3	3.3	10.0	46.7	36.7	4.10	Satisfied
4	The employees attempt to deliver services in right way at the first time.	13.3	0	16.7	40.0	30.0	3.73	Satisfied
5	The employees provide services with a high degree of accuracy and reliability.	6.7	13.3	26.7	10.0	43.3	3.70	Satisfied

This table demonstrates, the subject's responses regarding reliability domain of the quality of health care services, the study results indicate that the services of unit are sufficient to meet patient's requirements at all items in the table.

Table (5) Overall Assessment of Dimensions of Quality of Health Care Services / Reliability

Assessment	Items	Frequency	Percent
Reliability Domains	Satisfied	21	70.0
	Partially satisfied	6	20.0
	Dissatisfied	3	10.0
	Total	30	100.0

Satisfied M.S > 2.33; Partially Satisfied M.S = 1.67 - 2.33; Dissatisfied M.S = 1 - 1.66

This table shows that (70%) of subjects are satisfied, and 20% are partially satisfied, while only 10% are dissatisfied in reliability domain of health care services.

No	Items	Reject Strongly (%)	Reject (%)	Neutral (%)	Agree (%)	Strong Agree (%)	Mean	Assessment
1	The employees of burn unit telling patients exactly when services will be provide.	23.3	20.0	13.3	16.7	26.7	3.03	Satisfied
2	The employees are too busy to respond patient requests immediately	20.0	20.0	16.7	10	33.3	3.17	Satisfied
3	The employees of burn unit Simplify work procedures as much as possible to ensure the speed and ease in providing health service.	3.3	3.3	40	33.3	20	3.63	Satisfied
4	The unit organizes continuous shifts to ensure the provision of health services at all the time of day.	0	3.3	13.3	43.3	40.0	4.20	Satisfied

Table (6): Assessment of Dimensions of Quality of Health Care Services/ Responsiveness

Satisfied: $M.S \geq 3$

This table demonstrates, the subject's responses regarding responsiveness domain of health care services quality, the study results indicate that the services of unit are sufficient to meet patient's requirements at all items in the table.

Table (7): Overall Assessment of Dimensions of Quality of Health Care Services / Responsiveness

Assessment	Items	Frequency	Percent
ResponsivenessDomains	Satisfied	16	53.3
	Partially satisfied	11	36.7
	Dissatisfied	3	10.0
	Total	30	100.0

Satisfied $M.S > 2.33$; Partially Satisfied $M.S = 1.67 - 2.33$; Dissatisfied $M.S = 1 - 1.66$

This table shows that (53.3 %) of the study subject are satisfied, and (36.7%) of them are partially satisfied, while only (10%) are dissatisfied with the responsiveness of health care services.

Table (8): Assessment of Dimensions of Quality of Health Care Services / Empathy

No	Items	Reject Strongly (%)	Reject (%)	Neutral (%)	Agree (%)	Strong Agree (%)	Mean	Assessment
1	Employees put patient's best interests at introduction of their work	20	16.7	6.7	26.7	30	3.30	Satisfied
2	Employees in this unit interest understand the requirements of the patient and give him individual attention.	13.3	16.7	20	26.7	23.3	3.30	Satisfied

3	Employees have the knowledge to answer patients' questions in understandable way.	16.7	6.7	30	23.3	23.3	3.30	Satisfied
4	Employees in the unit gives enough time to caring their patients	0	3.3	10	36.7	50	4.33	Satisfied
5	Employees considerateness and respect the habits and customs for patient	0	0	13.3	20	66.7	4.53	Satisfied

Satisfied: Mean of Score ≥ 3

This table demonstrates, the subject's responses regarding empathy domain of health care services quality, the study results indicate that the services of unit are sufficient to meet patient's requirements at all items in the table.

Table (9): Overall Assessment of Dimensions of Quality of Health Care Services / Empathy

Assessment	Items	Frequency	Percent
Empathy Domains	Satisfied	19	63.3
	Partially satisfied	9	30.0
	Dissatisfied	2	6.7
	Total	30	100.0

Satisfied M.S > 2.33 ;

Partially Satisfied M.S = 1.67 - 2.33;

Dissatisfied M.S = 1 - 1.66

This table shows that (63.3 %) of the study subject response are satisfied, and (30%) are partially satisfied, while only (6.7%) are dissatisfied with the empathy of health care services.

Table (10): Assessment of Dimensions of Quality of Health Care Services / Assurance

No	Items	Reject Strongly (%)	Reject (%)	Neutral (%)	Agree (%)	Strong Agree (%)	Mean	Assessment
1	Patients feel secure during receive health care	33.3	10	3.3	23.3	30	3.07	Satisfied
2	The patient trusts with the experience, skills, and qualifications of medical and nursing staff in burn unit.	16.7	10	23.3	20	30	3.37	Satisfied
3	Employees were courteous, and treated patient with dignity and respect	3.3	6.7	3.3	30	56.7	4.30	Satisfied
4	Employees in this unit willing to help patients permanently	16.7	20	16.7	20	26.7	3.20	Satisfied

Satisfied: mean of score ≥ 3

This table demonstrates, the subject's responses regarding assurance domain of health care services quality, the study results indicate that the services of unit are sufficient to meet patient's requirements at all items in the table.

Table (11): Overall Assessment of Dimensions of Quality of Health Care Services / Assurance

Assessment	Items	Frequency	Percent
Assurance Domains	Satisfied	13	43.3
	Partially satisfied	13	43.3
	Dissatisfied	4	13.4
	Total	30	100.0

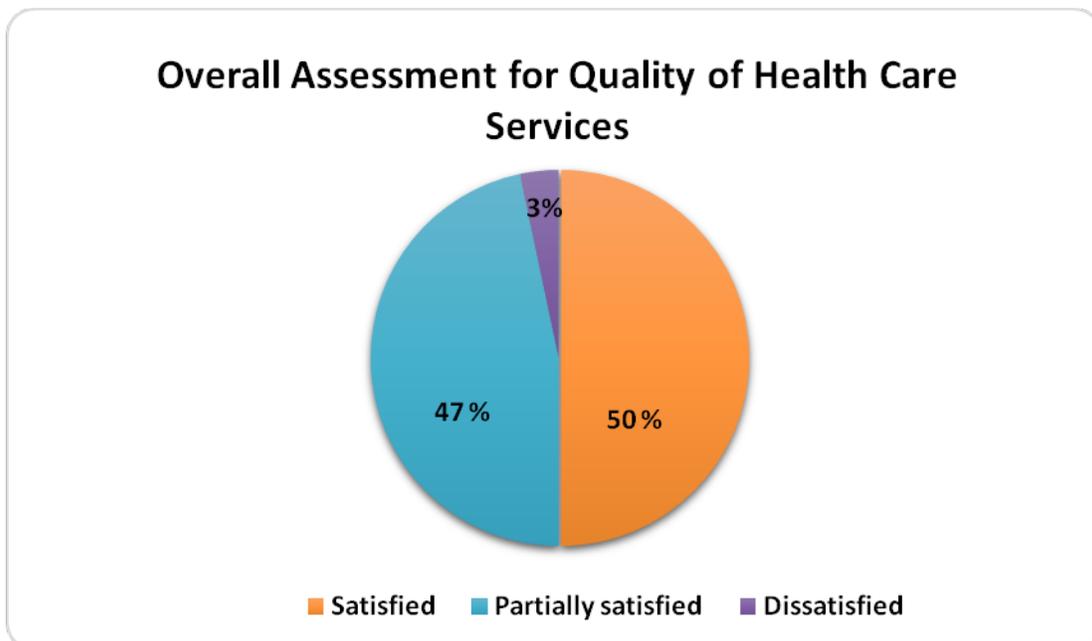
Satisfied M.S > 2.33; Partially Satisfied M.S = 1.67 - 2.33; Dissatisfied M.S = 1 - 1.66

This table shows that (43.3 %) of the study subject are satisfied and the same result for partially satisfied, while (13.3%) of the sample are dissatisfied with the assurance of health care services.

Table (12): Overall Assessment of Quality of Health Care Service

This table illustrates the overall assessment for the quality of health care services, the study results indicate that half (50%) of the study subjects are satisfied with the health care services which provided in the unit.

Main domain	Items	Frequency	Percent
Overall Assessment of quality of health care services	Satisfied	15	50.0
	Partially satisfied	14	46.7
	Dissatisfied	1	3.3
	Total	30	100.0



This Figure Shows the Assessment of the Patients' Responses Regarding Quality of Health Care Services

IV. DISCUSSION OF THE RESULT

Part-I: Discussion of Distribution of Burned Patients by Their Socio-Demographic Characteristics

According to (Table 1) in the results, the study shows that the majority of the research sample are females. This result agrees with Azizan& Mohamed, (2013) and Essiam, (2013), in their studies which involved quality of healthcare delivery, and

they found that the majority of study subject's sex are females⁽¹²⁾
⁽¹³⁾

In addition, Rayner & Prentice, (2011) give further support to the study results, they conducted a study to explore the demographic characteristics of the burned patients, they stated in their study the majority of patients are female also this result matched with result of the study done by Othman, (2010) who emphasized in his study the majority of burn injury happens in women. The researcher believes the reason for majority of the burned patients in Iraq are women who deal with most of activities inside the houses which can be sources for burn, such as cooking and cleaning, so they may be increasing risk for burns from contacting fire or scaled with hot water in the kitchen, or from contacting electrical socket which leads sometimes to electrical fault during performing some activities⁽¹⁴⁾⁽¹⁵⁾.

Regarding age, the study indicates that most of patients are within age group (≥ 25) years old. Beheshti, *et al.*, (2011) pointed in their study that the majority of the study subjects are within (16-25) age group also Goodarzi, *et al.*, (2014) emphasized in their study which is conducted to establish a standard of care and it's related with the patients' outcomes that the majority of the study subjects are within (20-30) years old, and Othman, (2010) mentions in his study that burns injury are mainly occur in adolescents. Early adolescent is a productive and discovering period and the individuals at this age have curiosity to explore their surroundings through pulling, touching and grabbing objects, or dealing with more than one activity at the same time with less experience that may lead him to forget about the electrical switch or socket on, or may forget fraying pan on the fire of the cooker or oven⁽¹⁶⁾⁽¹⁷⁾⁽¹⁵⁾.

In regards to marital status, most of the study samples are married. Concerning the level of educations the highest percent is preliminary school graduated. These results are in agreement with Al-Rubaiee, and Alkaa'ida (2011), they pointed in their study that the majority of study subjects are married and a preliminary school graduated. This result disagrees with Ramadan, *et al.*, (2013), they found in their study that most common burn injury occur in patients who are not married. In our research, very few of spouse planned to burn their wives purposefully after fight between them⁽¹⁸⁾⁽¹⁾.

About the study sample occupation, the present study shows that the majority of the research sample are housewives, which emphasizes on the opinion that indoor activities can lead to burn as most of the burned subjects are housewives. These results matched with study done by Mahmood, (2015), who emphasized in their study that the majority of the study subjects are homemakers⁽¹⁹⁾.

In addition, the study results indicate that the majority of the research sample are living in urban area. Ramadan, *et al.*, (2013) and Goodarzi, *et al.*, (2014), they revealed in their study that the majority of the study subjects are homemakers and urban residents. The researcher believes that this may be due to the life in city which is more complicated with the hug use of electrical instruments while in rural residency people have a simple life with less use of these electrical instrument⁽¹⁾⁽¹⁷⁾.

In regards to monthly income, the socio-economic status of the sample is sufficient to some extent. Karassavidou, *et al.*, (2008) they claimed that the socio-economic status of the respondents is low, so they seek on health services at the public

hospitals. Also Mahmood, (2015) mentioned in his study the majority of the study subjects are from lower socio-economic status⁽²⁰⁾⁽¹⁹⁾.

Part-2: Discussion of the Quality of Health Care Services:

Regarding tangible domain of quality of health care services table (2), that based on the subjects' responses, the results indicate that in the following items (Burn unit location are convenient and easy access to the provision of health service for all patients) and (employees in the burn unit excellent and they have a neat appearance) the responses of the study subjects are acceptable, while in the remaining responses for the services quality in burn unit are insufficient to the patients' requirements. This means that they are unacceptable for most of the subjects. The researcher suggest this result comes because the hospitals are provide an appropriate material and equipment that is enough for patients need. While not provided materials are not affect on patients satisfaction because this materials don't directly related to the patients need

In addition, the subjects' responses regarding reliability domain of the QHCS table (4), the study show that services of the unit are sufficient to the patient's requirements at all items. Also regarding responsiveness domain of the quality of health care services table (6), the study indicates that services are sufficient to meet the patients' requirements at all items. Furthermore, the subjects' responses regarding empathy and assurance domains of the quality of health care services table (8) and (10) respectively, the subjects responses are sufficient to their requirements at all items. This result matches with the result of the study done by Diab, (2016) who showed in his study that health care services that provided in public hospitals within acceptable and satisfying level, and this result reflects on many dimensions of the health care services (tangible, reliability, responsiveness, empathy and assurance)⁽²¹⁾. The researcher believe the reasoned is most of nurses how work in burn unit from institutes graduate with good knowledge and experience to caring, answer patient questions in understanding way and solving patient problem

In addition, Jenkinson, *et al.*, (2002) they stated in their study that there is a high degree of satisfaction with health care services provided at hospitals⁽²²⁾.

Part-3: Discussion of the Overall Assessment of the Quality of Health Care Services:

The study shows that patients are satisfied with the quality of health care services provided at the burn unit especially within reliability table (5), responsiveness table (7), and empathy table (9) dimensions of the health care services quality, while at the tangible table (3), and assurance table (11),, the study results indicates that the patients are partially satisfied. The researcher opinion that patients were partially satisfied because most of services in burn unit not provided to them which include (location, building, furniture, food, medication, instrument, patient trust, safety, dignity and respect. Furthermore, in table (12), the study results indicate that half of the patients are satisfied with the quality of health care services that provided at the burn unit which are in consistency with result of the study done by Al-Sharief, *et al.*, (2008) mentioned in their study that the majority of the patients are satisfied with health care services,

while only few number of patients are partially satisfied⁽²³⁾. Aman and Abbas, (2016) found in their study that the mean value of assurance domain indicating that trust in public hospitals are high. Baernholdt, *et al.*, (2014) are in agrees with the present study results, pointed in their study that the factors influencing QOC are not varying in the majority^{(24) (25)}.

Peprah and Atarah (2014) are in agreement with the present study results, they claimed in their study that overall satisfaction of patients regarding the QHCS of the hospital is good⁽²⁶⁾.

Punnakitikashemet *et al.* (2012) are in agreement with the present study results, they pointed in their study that overall service quality score is positive with health care services⁽²⁷⁾.

Yousapronpaiboon and Johnson (2013) emphasized in their study that the responsiveness domain mostly effects on patient's satisfaction, followed by empathy, tangibles, assurance and finally reliability⁽²⁸⁾.

Lim and Tang (2000) disagrees with the present study results, they mentioned in their study that the six dimensions of QHCS, (tangibles, reliability, assurance, responsiveness, empathy, assurance) need to improvements in all six dimensions⁽²⁹⁾.

Mahmoud and Asaad (2014) shows in their study that the quality of health services provided in health centers according to the dimensions of quality of health services (tangibility, reliability, power of responsiveness, empathy, trust and safety) are unsatisfied⁽³⁰⁾.

V. CONCLUSIONS

1-The study confirms that the burn common occurs among persons in urban residential area than in those in rural, the burn most occurs in females than in male, and the burn present in married farther single one

2-Most patients are dissatisfied with the services provided in burn unit regarding tangible domain of healthcare services related to (food, medication, cleanliness, physical facilities,.....etc.) .

3-There are satisfied from most of patients about the health care services level regarding the following domains of healthcare services: (reliability, empathy and responsiveness).

4-Most patients are "satisfy" to "partially satisfied" about health care services in regards to assurance domain.

5-As general the study indicates that half of patients are satisfied toward all quality of health care services domains

VI. RECOMMENDATIONS

- 1- The nurse must measure the quality of health care services in the burn unit continuously, so that we can apply the quality improvement and/or quality assurance in this unit.
- 2- The domains and items related to the quality of health care services must be educate to health worker (physician, nurse ... etc.) to learn them how can apply it in the burn units.
- 3- The basic requirements (medications equipment, electricity, water,.. etc.) in the burn unit must be

supplied in a typical method to facilitate the medical and nursing staff work and to provide the patients' needs.

- 4- Apply special courses to nursing staff about infection control and provide infection control nurse in burn unit to keep this unit free from microorganism and prevent contamination that lead to worsen patient's condition
- 5- Dietitian specialist should be provided to assess food process in the kitchen and to evaluate the services provided to the patients.
- 6- Supply the pharmacy of burn unit with the required medication for the treatment of the patient like different types of antibiotic, IV fluids, ointments etc.
- 7- Health education programs and training sessions should be implemented for nurses to increase and improve their abilities in managing burned patient.

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Factors Affecting Organizational and Professional Commitments of Internal Auditors

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Abstract- This research is intended to analyze factors that influence internal auditors' organizational and professional commitment and the relationship between both of them as well as to formulate the actions that need to be taken in order to enhance internal auditors' commitment to their organizations and profession in the midst of talent war. The data analysis uses the Structural Equation Modelling (SEM) technique with the Partial Least Square (PLS) approach. The results of this research show that, through internal auditor's job satisfaction factor, organization's support for internal audit activity factors brings positive impacts to internal auditors' organizational commitment and professional commitment with the impact measure value (f^2) that is as much as 0,13127. Internal auditors' professional commitment brings positive and significant impacts to internal auditors' organizational commitment. Based on the Stone-Geisser's Q², the structural (inner) model that is arranged is proven to have prediction relevance. The entire model fulfills the goodness-of-fit criteria.

Index Terms- internal auditor, organizational commitment, professional commitment, organization's support for internal audit activity, job satisfaction

I. INTRODUCTION

Background

While labor market generally shows unemployment (people who are not accepted in the formal sector) rate problem, people with high competence are free to choose organizations that they like as a place to work. As a situation that is known as talent war begins to emerge, organizations need to keep their high-quality talents in order to deliver their best abilities in supporting the organizations' performance by strengthening workers' commitment to their organizations which makes organizational commitment a topic that is often discussed when it comes to organization behavior. Meyer and Herscovitch (2001) give commitment definition as a force that binds an individual to a course of action of relevance to one or more targets. Meyer (2009) also adds that the force that is mentioned before is the internal force within an individual. Colquit et al. (2015) define commitment as the the desire on the part of an employee to remain a member of the organization and place this construct as the outcome to be achieved in their organizational behavior model. Organizational commitment is one of the discussion focus regarding commitment at workplace. Besides organizational commitment, another focus is professional commitment. The two

commitment focuses need to be considered by employing organizations and profession communities because a person who works in an organization can also have the status as a professional.

One of the professions that exists in modern organizations is internal auditor. Internal auditors provide assurance services (an objective examination of evidence for the purpose of providing an independent assessment) and consulting services on governance, risk management and internal control to help an organization accomplish its objectives. In accordance with the standards and the guidances that are published by the profession organization, which is the Institute of Internal Auditors (IIA), internal auditors must collect and evaluate information independently and objectively, by bringing systematic and disciplined approach, in order to get conclusions and necessary recommendations in order to support the achievement of the organization's strategic objectives, reliability and integrity of financial and operational information, effectiveness and efficiency of operations and programs, safeguarding of assets and compliance with laws, regulations, policies, procedures, and contracts. Organizations have the options of maintain its own internal audit activity or outsource it to a third party service provider. If they choose to maintain its in-house internal audit activity, which is done by many organizations in Indonesia, the internal auditors are also become employees in the organizations. An internal auditor must be competent in various aspects that match the requirements in the competency framework that has been formulated by IIA (2013a) in order to do his/her profession. The chief audit executive (CAE) must ensure that internal audit resources are appropriate, sufficient, and effectively deployed to achieve the approved plan (IIA 2013b). The adequacy of the internal audit resources is influenced by the availability of personnel to join or stay in the organizations or profession. Changing profession can be done by an internal auditor because the profession can be done by those who come from various formal educational background such as accounting, management, law, information technology and other fields that can also be alternative professions choices. Moving from an organization or changing profession is more possible if someone has competence and experience in the internal auditor profession that can be used to start his/her career in other fields or organizations.

When a competent and experienced internal auditor moves to a different organization, the organization that they leave will suffer loss. This is because the one that is left behind has paid for various costs, whether it is monetary or non-monetary, for the recruitment and the development of the related personnel but can no longer enjoy direct benefits from the professional competence

and experience that have been formed within the internal auditor. When an internal auditor changes their profession, the loss can happen to the internal auditor profession because it decreases the chance to promote the profession's contributions that can be given to the society. Both organizations and the profession community can also experience loss in the form of reputational damage if the change is caused by the internal auditor's discontent with his organization or profession. Hence, both organization and the profession community are concerned to keep the internal auditors in the organizations and the profession by decreasing their intention to move to a different organization or change profession.

Lowering the intention to move or change is not easy to do because, with easy access for information, workers can easily compare the alternatives among organization or professions nowadays in order to find the best choice for their lives. In the context of Indonesia, the increasing opportunities to become cross-country workers after the application of Southeast Asian Economic Community started in 2016 can also be a factor that support the possibility of moving to a different organization with or without changing profession. Iyer (2014) and Anderson dan Svare (2011) state that the attempt to recruit and keep high quality talents is one of the biggest challenges for internal audit management today. Harrington and Piper (2015) state that, on the global average, 20% of internal auditors intend to leave their profession in the following 5 years.

The challenge to keep the talents increases even more with the existence of online job seeking sites which make it easier for workers to move to a different organization or change profession. Data from a popular job seeking site, JobStreet.com, at the end of March 2016, shows that there were 21 Internal Audit Manager or Assistant Manager positions that were offered to job seekers. After the closing date for the job applications, the offered positions, on the average, attracted 59,89 applicants with 17,42 internal auditors (IA) among them who wish to move to a different organization. From the same site at the same time, other job vacancy information for other positions that can potentially attract internal auditors can be seen as well. The positions include Accounting or Finance Manager, Finance Controller and Fraud Prevention or Investigator which are respectively found with 164, 21 and 2 positions. From 15 examples of positions that were observed, on the closing dates, on the average, there were 92,21 applicants for every position with, on the average, there were 3,57 internal auditors (IA) among them.

In order to keep the internal auditors, it is necessary to build their commitment to the organization and the profession by knowing which factors can affect it. The results of the researches that were done by Aranya et al. (1981), Seniati (2002), Ayers (2010), Lestari (2013) and Hapsari (2015) show that job satisfaction is the main factor that influences commitment. Job satisfaction is related to the realization of the effectiveness of internal audit that needs support from the organization. Lee et al. (2000), Huang (2001), Cooper (2002) and Ayers (2010) also find the influence of work involvement on commitment. The results of the researches by Aranya et al. (1981), Huang (2001) and Cooper (2002) show that there is a positive relationship between organizational commitment and professional commitment to external auditors. The results of Kwon and Banks (2004) research show that position dimension that is related to

organizational commitment and professional commitment. Iyer (2014) states that internal auditors working for service providers have higher level of professional identification compared to in-house auditors. Previous researches show that there is an opportunity to pursue a research by analyzing the relationship between organizational and professional commitments of internal auditors, as well as analyzing organization's support for internal audit activity and job satisfaction factors by answering the following research questions:

1. How is the affect of organization's support for internal audit activity on internal auditors' job satisfaction?
2. How is the affect of internal auditors' job satisfaction on internal auditors' organizational commitment?
3. How is the affect of internal auditors' job satisfaction on internal auditors' professional commitment?
4. How is the relationship between internal auditors' organizational commitment and professional commitment?
5. What are the actions that need to be taken in order to enhance internal auditors' commitment to their organizations and profession?

Research Purpose

This research is expected to give the understanding of the factors that support internal auditors' organizational and professional commitment. Furthermore, this understanding is expected to be useful to help the stakeholders in managing the talents of internal auditors.

Research Scope

The research was conducted on the organization's support for internal audit activity, internal auditors' job satisfaction, internal auditors' organizational commitment and internal auditors' professional commitment factors. The research was done on internal auditors who were undergoing a training at Internal Audit Development Center-Internal Audit Education Foundation (PPIA-YPIA). The data collection was done from June 2016 to July 2016.

Conceptual Framework and Research Hypothesis

The conceptual framework is as shown in Figure 1 below. The conceptual framework as well as the limitations; the scope of the research are the base of the construction of the hypothesis in this research, which is:

H1: Organization's support for internal audit activity brings positive and significant impacts on internal auditors' job satisfaction.

H2: Intrinsic motivation moderates the relationship between organization's support for internal audit activity and internal auditors' job satisfaction. The higher the intrinsic motivation, the more positive the relationship between organization's support for internal audit activity and internal auditors' job satisfaction is.

H3: Intrinsic motivation brings positive and significant impacts to internal auditors' job satisfaction.

H4: Internal auditors' job satisfaction brings positive and significant impacts to internal auditors' organizational commitment.

H5: Internal auditors' job satisfaction brings positive and significant impacts to internal auditors' professional commitment.

H6: Internal auditors' professional commitment brings positive and significant impacts to internal auditors' organizational commitment.

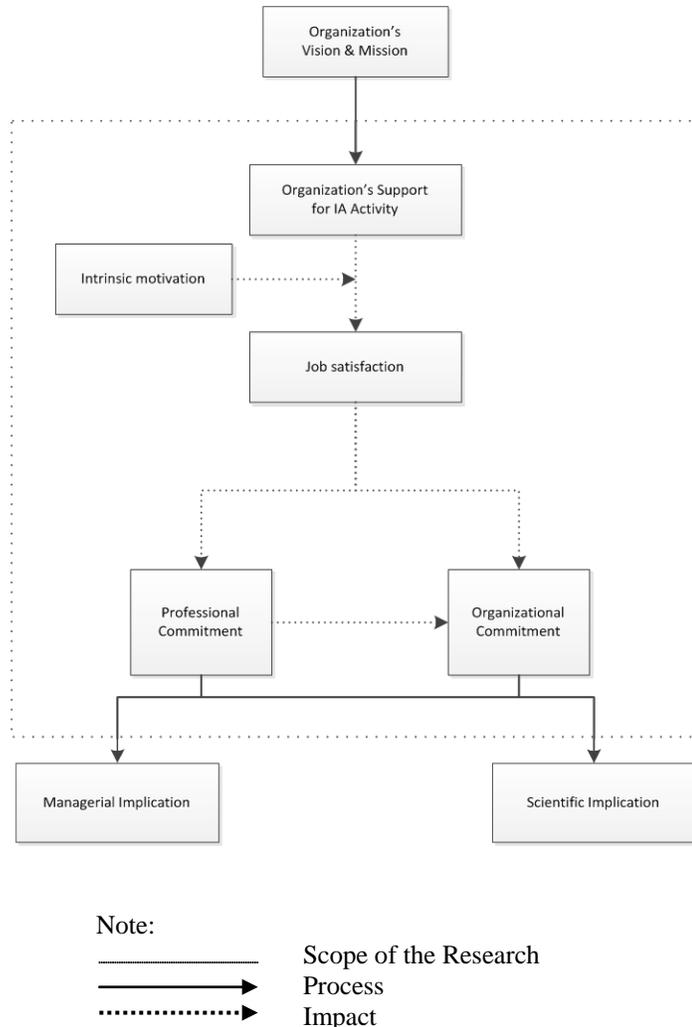


Figure 1 The conceptual framework of the research

II. RESEARCH METHOD

Research Design

This research was done to test the proposed hypothesis. The test was done through empirical studies by measuring the perception of the respondents on internal auditors' organizational commitment and professional commitment as well as factors that affect it.

Data Type and Source

The data that is used in this research takes the form of primary data and secondary data. The primary data is obtained from the answers given by respondents for the questionnaires that were distributed which were processed and analyzed by the researcher afterwards. The secondary data takes the form of

literature or references that are relevant which are taken from various sources.

Data and Information Collection Techniques

Data collection technique

This research is done by distributing questionnaires to respondents. The questions that are used are scaled response and closed ended questions.

Data analysis method

Analysis and examinations of the hypothesis are done using the Structural Equation Modelling (SEM) technique with Partial Least Square (PLS) approach by using SmartPLS Ver 2.0 M3 software. The analysis steps refer to Hair et al. (2014), Jogiyanto and Abdillah (2015) as well as Ghazali and Latan (2015) which are:

1. The specification of the model to determine the structural (inner) model and the measurement (outer) model.
2. The evaluation of the measurement (outer) model to test the validity and the reliability of the indicating variables. The validity test for the reflective indicator covers convergent validity test and discriminant validity test. The rule of thumb that was used for the convergent validity is outer loading > 0,7; AVE and communality > 0,5 (Jogiyanto and Abdillah 2015). The discriminant validity test was measured with a requirement that states that every indicator must possess higher loading for latent that is measured compared to indicator for other latent as well as higher AVE root than the latent variable correlation. The reliability test was done using Cronbach's alpha (acceptable when the value is > 0,6) and composite reliability (acceptable if the value is > 0,7).
3. The evaluation of the structural (inner) model was done by measuring the determination coefficient or R^2 test, path coefficient or T value, counting the impact scale as well as prediction relevance (Hair et al. 2014). The higher the value of the R^2 is, the better the prediction model of the proposed research model is (Jogiyanto and Abdillah 2015) with the value of 0,75, 0,50 and 0,25 respectively show the substantial, intermediate and weak levels (Hair et al. 2011, Hair et al 2014). Jogiyanto and Abdillah (2015) state that rules of thumb for the R^2 value should be $\geq 0,10$ for the justification of the PLS results. The value of the path coefficient shows significance among variables in the inner model or the hypothesis examination. The hypothesis that is used is one-tailed hypothesis with the alpha of 5 percent, acceptable if the T-statistics value is bigger than 1,64 (Jogiyanto and Abdillah 2015). The impact scale of a construct (f^2) is counted from the alteration of the R^2 value if the construct is eliminated from the model with the value limit of 0,02; 0,15 and 0,35 show little, intermediate and huge impacts (Hair et al. 2014). Positive value shows that endogenous constructs can be predicted.
4. Validation of the entire model. Ghazali and Latan (2015) explain that, on the entire model, validation can

be done with the requirement of goodness-of-fit from Tenenhaus et al. (2004). Tenenhaus et al. (2004) counts the goodness-of-fit as a root of the multiplication of the average value of communality with the R^2 mean of endogenous variable. Referring to the limit of the communality value from Jogiyanto and Abdillah (2015) and the R^2 mean according to Hair et al. (2014), goodness-of-fit is categorized as small (0,10), intermediate (0,27) and big (0,42).

The Research Variables and the Employed Measuring Instruments

Organization’s Support on Internal Audit

This construct is measured with the internal auditor’s activity position appropriateness variable (X1), the adequacy of the given resources (X2), the condition of the application of governance (X3), the condition of the application of risk management (X4) and the condition of the application of internal control (X5), the use of the conclusion of the results of the audit (X6) as well as the execution of corrective actions upon recommendation from internal audit activities (X7).

Intrinsic Motivation

This construct is hypothesized as a moderating variable that influence the relationship of organization’s support for internal

audit activity with job satisfaction. Intrinsic motivation is measured using the scales for internal motivation factors (X8, X9, X10) from *Work Intrinsic and Extrinsic Motivation Scale* (Tremblay et al. 2009).

Job Satisfaction

This construct is measured using general satisfaction (Y1), satisfaction on the job (Y2) and preference on continuing to work for the current organization (Y3) variables using the Michigan Organizational Assessment Questionnaire (Seashore et al. 1982) that is referred to by Nayak (2002).

Organizational Commitment and Professional Commitment

Each of these constructs is measured using affective commitment (Y4, Y7), continuous commitment (Y5, Y8) and normative commitment (Y6, Y9) variables using the scales that are developed by Allen and Meyer (1990) and then revised by Meyer et al. (1993).

Research path diagram is as shown as Figure 2. From the diagram in Figure 2 there are 5 paths so that it refers to Jogiyanto and Abdillah (2015), the number of samples is determined to be at least 50.

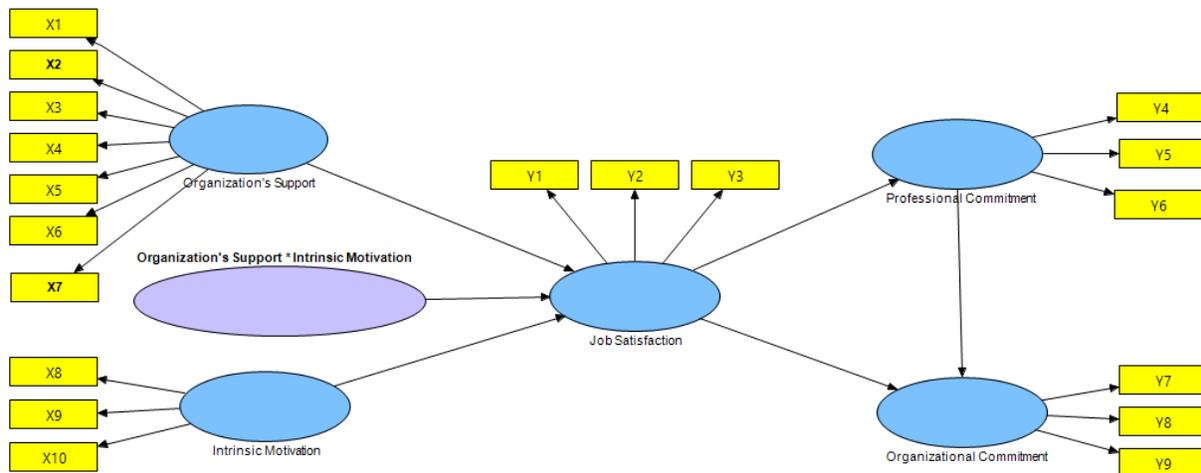


Figure 2. Research path diagram

III. RESEARCH RESULT

Training Realization and Number of Respondents

Throughout June and July of 2016, PPIA-YPIA held 11 trainings that were joined by the total of 191 participants. Questionnaires were distributed to all the participants of the trainings and 140 of them were returned.

SEM-PLS Analysis

The Evaluation of the Measurement (Outer) Model

The SmartPLS output results for the convergent validity test show that the AVE value and the communality for variables X1, X2 and X7 are less than 0,7. After re-estimation is done by eliminating X1, X2 and X7 variables, the outer loading value in every indicator is more than 0,7 and the AVE value and the

communality of every variable is more than 0,5. From the results, it can be concluded that variables and indicators that are used in the final model satisfy the convergent validity criteria. The SmartPLS results for discriminant validity test show that the loading of the indicator for the latent variable that is measured has a value that is higher than the loading of the indicator for other latent variables as well as an AVE root value that is higher than the correlation value, so the discriminant validity is fulfilled. The SmartPLS output for reliability test shows that the Cronbach’s alpha value is more than 0,6 for every latent variable and composite reliability exceeds 0,7 for all latent variables. With these results, it can be concluded that the (measurement) outer model is fulfilled.

The Evaluation of the Structural (Inner) Model

The SmartPLS results show the R² value for job satisfaction, organizational commitment and professional commitment is 0,218908, 0,370955 and 0,420476 respectively. Referring to Jogiyanto and Abdillah (2015), the results of the R² test above can still be justified even though the accuracy of the prediction of the inner model is on the weak level according to the criteria of

Hair et al. (2011) and Hair et al. (2014). The value of path coefficient for the final model is as shown in Figure 3 which is used as the base of the calculation of the T-statistics value. The T-statistics value can be seen in Table 1.

Table 1 The Calculation of the T-Statistics Value

Hypothesis	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	Standard Error (STERR)	T Statistics ((O/STERR))
Organization's Support -> Job satisfaction	0.321779	0.323143	0.077007	0.077007	4.178554
Organization's support * Intrinsic Motivation -> Job Satisfaction	-0.172610	-0.185100	0.127384	0.127384	1.355037
Intrinsic Motivation -> Job Satisfaction	0.133078	0.131452	0.097907	0.097907	1.359224
Job Satisfaction -> Organizational Commitment	0.648441	0.648012	0.059979	0.059979	10.811153
Job Satisfaction -> Professional Commitment	0.514283	0.522118	0.073572	0.073572	6.990170
Professional Commitment -> Organizational Commitment	0.226384	0.226791	0.087715	0.087715	2.580915

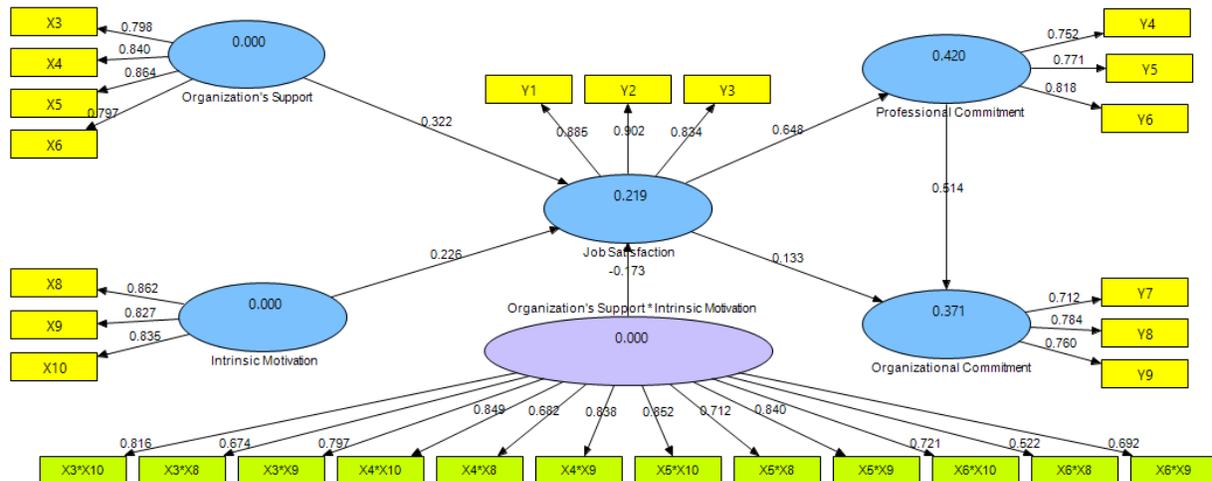


Figure 3 The value of path coefficient in the final model

In order to count the effect size (f²) on the model's capability to implement the prediction of the exogenous variable, which is organization's support for internal audit activity, this construct is eliminated from the model. The form of the model is revised by eliminating the variable of organization's support for internal audit activity as shown in Figure 4 below. The R² calculation after the model revision as it can be seen in Table 2 shows that the effect of organization's support for internal audit activity on

the model's ability to predict job satisfaction is 13,127 %. Referring to Hair et al. (2014), this value shows the effect size level of low to intermediate. The effect of the organization's support for internal audit activity variable on the model's ability in predicting organizational commitment and professional commitment is negative even though the value is very low, which is -0,03% and -0,04% respectively.

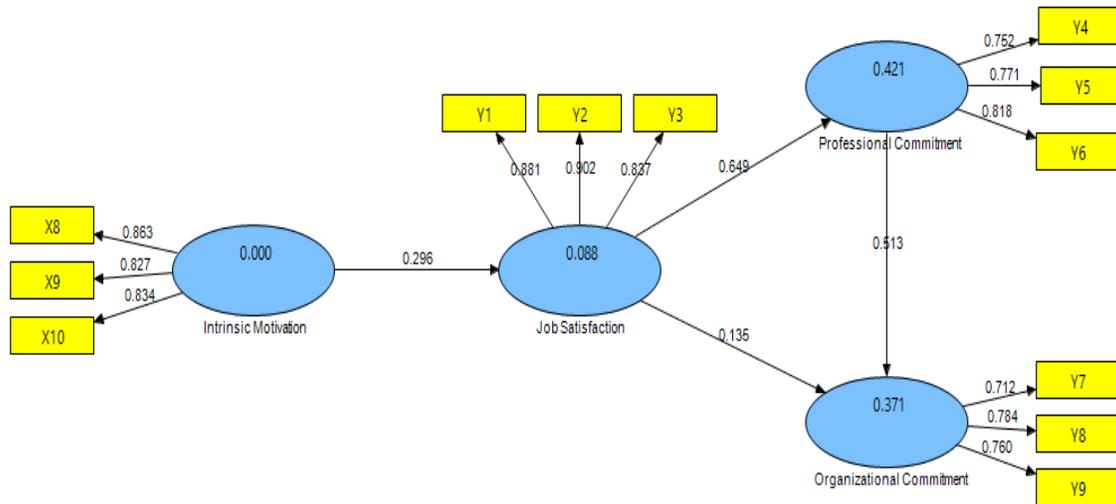


Figure 4 Model without organization support variable

Table 2 Calculation of f² value from Organization Support Variable for Each Endogenous Latent Variable

Endogenous Latent Variable	R Square (Complete Model)	R Square (Partial Model)	f ²
Job Satisfaction	0.218908	0.087643	0.13127
Organizational Commitment	0.370955	0.371291	-0.00034
Professional Commitment	0.420476	0.420921	-0.00044

The Stone-Geisser' Q² value is calculated using the blindfolding technique by reusing samples starting from the first data and eliminating the nth data from the endogenous constructs indicator. By arranging elimination distance on every 6th data, the prediction relevance number (1-SSE/SSO = Q²) is obtained

which is shown in Table 4 below. From the obtained results, it can be concluded that the model that is arranged has the ability to predict endogenous constructs.

Table 4 Calculation of prediction relevance value (Q²)

Latent Variable	SSO	SSE	1-SSE/SSO = Q ²
Organization Support	560.000000	305.723329	0.454065
Organization Support*Intrinsic Motivation	1680.000000	971.313073	0.421837
Job Satisfaction	420.000000	211.433677	0.496586
Organizational Commitment	420.000000	357.677398	0.148387
Professional Commitment	420.000000	325.927378	0.223982
Intrinsic Motivation	420.000000	323.136513	0.230627

The Validation of the Entire Model

From the communality mean value of 0.6658 and R² mean of 0.3368, goodness-of-fit is obtained as much as $\sqrt{0.6658 \times 0.3368} = 0.4735$. In accordance with the evaluation criteria limit, this value shows the validity of the entire model with large goodness-of-fit value.

Discussion on the Research Results

The discussion on the research results is done in relation with the research questions that are proposed in the Introduction part.

The effect of organization's support for internal audit activity on internal auditors' job satisfaction

The hypothesis that is formulated to answer the research questions regarding the influence of organization support for internal audit on internal auditors' job satisfaction is Hypothesis 1 (H1), which are:

H1: Organization support for internal audit brings positive and significant impacts on internal auditors' job satisfaction.

The results of the calculation of the T-statistics value for Hypothesis 1 as shown in Table 1 is 4,178554 which means that the hypothesis that states that organization support for internal audit brings positive and significant impacts on job satisfaction is accepted. These results match a statement from Hackman and Oldham (1975) that says that the meaning of a job is an important factor that influences job satisfaction as well as the results of a research conducted by Lestari (2003) which show

that a professional auditor tends to be more satisfied with his job or vice versa. In the context of the profession of internal auditor, the meaning of the job and professionalism are expected to be realized if there is organization support for the effectiveness of internal audit.

The effect of intrinsic motivation on the strength of the relationship between organization's support for internal audit activity and internal auditors' job satisfaction

From Hypothesis 1, an analysis regarding the moderating influence of the intrinsic motivation variable that is formulated in Hypothesis 2 (H2) and Hypothesis 3 (H3) is developed further, which are:

H2: Intrinsic motivation moderates the relationship between organization's support for internal audit activity and internal auditors' job satisfaction. The higher the intrinsic motivation, the more positive the relationship between organization's support for internal audit activity and internal auditors' job satisfaction.

H3: Intrinsic motivation brings positive and significant impacts on internal auditors' job satisfaction.

The results of the calculation of the T-statistics value for Hypothesis 2 and Hypothesis 3 as shown in Table 1 are 1,355037 and 1,359224 which means H2 and H3 are rejected. Hence, the research results show that:

1. The strength of the relationship between organization's support for internal audit activity and internal auditors' job satisfaction is not affected by intrinsic motivation.
2. Intrinsic motivation does not have any positive and significant impact on internal auditors' job satisfaction.

The results of this research are different from the results of a research conducted by Dysvik and Kuvaas (2008) as well as another one conducted by Dysvik and Kuvaas (2011) which find that intrinsic motivation as the moderator variable in the topic of each of the researches. These results are also different from the results of a research conducted by Stringer et al. (2011) and Raza et al (2015) which state that intrinsic motivation is a factor that influences job satisfaction.

The effect of internal auditors' job satisfaction on internal auditors' organizational commitment and professional commitment

The hypothesis that is formulated to answer the research questions regarding the influence of job satisfaction on internal auditors' organizational commitment and professional commitment are Hypothesis 4 (H4) and Hypothesis 5 (H5), which are:

H4: Internal auditors' job satisfaction brings positive and significant impacts on internal auditors' organizational commitment.

H5: Internal auditors' job satisfaction brings positive and significant impacts on internal auditors' professional commitment.

The results of the calculation of the T-statistics value for Hypothesis 4 and Hypothesis 5 as shown in Table 1 are 10,811153 and 6,990170 respectively which means that the hypothesis that states that internal auditors' job satisfaction brings positive and significant impacts on internal auditors' organizational commitment and that job satisfaction has positive

and significant impacts on professional commitment are accepted. The path coefficient in Figure 8 also shows that the effect of internal auditor's job satisfaction on professional commitment as much as 0.64856 is the biggest coefficient number in the model. This results matches with the statements from Aranya et al. (1981), Lee et al. (2000), Seniati (2002), Ayers (2010), Lestari (2013) and Hapsari (2015) that say that job satisfaction is the main factor that influences commitment.

The effect of internal auditors' professional commitment on internal auditors' organizational commitment

The hypothesis that is formulated to answer the question regarding the relationship between organizational commitment and professional commitment of internal auditors is Hypothesis 6 (H6), which is:

H6: Internal auditors' professional commitment brings positive and significant impacts to internal auditors' organizational commitment

The result of the T-statistics value calculation for Hypothesis 6 is 2,580915 which means that the hypothesis that states that internal auditors' professional commitment has positive and significant impacts on internal auditors' organizational commitment is accepted. This is an extension of the research conducted by Kwon and Banks (2004) which has not analyzed the relationship between these 2 types of commitment for internal auditors as well as researches conducted by Aranya et al. (1981), Huang (2001) and Cooper (2002) which conduct an analysis for external auditors.

IV. CONCLUSION

This research is intended to find out and to measure the factors that affect internal auditors' organizational and professional commitment. Based on the results of the research and the discussion that have been elaborated in the previous chapters, the conclusions of this research are:

1. Organization's support for internal audit activity brings positive and significant impacts on internal auditors' job satisfaction with a path coefficient value of 0,322 and an effect size (f^2) of 0,13127.
2. Evidence that shows that intrinsic motivation moderates the relationship between organization's support for internal audit activity and internal auditors' job satisfaction or brings positive and significant impacts on internal auditors' job satisfaction is not found.
3. Internal auditors' job satisfaction brings positive and significant impacts on internal auditors' organizational commitment with a path coefficient value of 0,133.
4. Internal auditors' job satisfaction brings positive and significant impacts on internal auditors' professional commitment with a path coefficient value of 0,648.
5. Internal auditors' professional commitment brings positive and significant impacts on internal auditors' organizational commitment with a path coefficient value of 0,514.
6. The model in this research can explain the variability of job satisfaction, organizational commitment and professional commitment as much as 21,89%, 37,10% and 42,04% respectively. Based on the Stone-Geisser's

Q^2 , the structural (inner) model that is arranged is proven to have prediction relevance. The entire model fulfills the goodness-of-fit criteria.

Based on the research conclusion above, the researcher suggests that employing organizations enhance internal auditors' organizational commitment and professional commitment by realizing the effectiveness of governance, risk management and internal control as well as utilizing the results of the implementation of the internal auditors engagement result. The realization of the effectiveness of the things above, despite helping the organizations achieve their objectives, is expected to enhance internal auditors' job satisfaction as the organizations' assets as well. The internal auditor's job satisfaction that comes from the feeling that their work brings impacts to the organization, that the implementation of the tasks that they are responsible for has been done as well as the knowledge that they get regarding the results of the work that they have done is expected to be able to enhance the internal auditors' organizational and professional commitment. The internal auditor profession organization (IIA) should enhance the educating role to increase awareness of the private and public organizationsto apply the above things .

Further researches can be done by extending the research samples using random statistical sampling. The next researches can also be done by adding respondents' opinions regarding the effectiveness of organizations' internal audit activity as the intervening variable between organization's support for internal audit activity and internal auditor's job satisfaction.

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Response of GA₃ to morphological characteristics of tuberose incorporated with organic manures

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Abstract-The present work was conducted at Horticultural Farm of Sher-e-Bangla Agricultural University, Bangladesh to study the morphological characteristics of tuberose as influenced by gibberellic acid incorporated with organic manures. The experiment consisted with three levels of organic manure; control, cow dung 30 t ha⁻¹ and poultry litter 20 t ha⁻¹ behind with 0 ppm, 100 ppm, 200 ppm and 300 ppm gibberellic acid were tested with three replications. Application of organic manures with GA₃ showed significant variations among the parameters. Yield of spike (3,50,000 ha⁻¹) and bulb (21.72 t ha⁻¹) was recorded in poultry litter @ 20 t ha⁻¹ with 200 ppm GA₃ compared to other treatments which was more potential for production of tuberose.

Index Terms- Cut-flower, compost, organic matter, PGRs, tuberose

I. INTRODUCTION

Tuberose (*Polianthes tuberosa* L.) is bulbous plant of the family Amaryllidaceae. It is one of the most popular cut-flower commercially cultivating in Bangladesh due to its attractive, elegant and fragrant white flowers. It has become an impediment part of decorating a bouquet for its sweet pleasant, prettiness display and long vase life (Patel et al. 2006). It has high demand in the market and its production is highly profitable. In Bangladesh, its commercial cultivation was introduced during 1980 but the production still now is not satisfactory. Plant growth and economic cultivation of tuberose are affected by many factors like smulching, fertilizer, PGRs etc. Tuberose is a gross feeder plant receives a large quantity of NPK as organic and inorganic form which have great influence on growth, flower and bulb production (Kumar et al. 2004, Sultana et al. 2006 and Rajwal and Singh 2006). Organic manures decrease soil salinity, increase the organic matter, improve the soil structure and, increase water and air permeability in soil (Ikram et al. 2012). Also, the potential use of plant growth regulator like GA₃ in flower production has created considerable scientific interest in recent years (Padaganur et al., 2005; Singh et al., 2003). In Bangladesh, it is necessary to know the real impact of plant growth regulator like GA₃ and organic manures on tuberose. So, present investigation was undertaken to modify the floral and yield contributing characters of tuberose using GA₃ and organic manures.

II. MATERIALS AND METHOD

The experiment was conducted during April 2013 to March 2014 at Horticulture Farm of Sher-e-Bangla Agricultural University, Dhaka, Bangladesh. Geographically the experimental area is located at 23^o41' N latitude and 90^o22' E longitudes at the elevation of 8.6 m above the sea level belongs to the Modhupur Tract under AEZ No. 28. This area characterized by three distinct seasons, the monsoon or the winter season from November to February and the pre-monsoon period or hot season from March to April and the monsoon period from May to October. Four levels of GA₃ @ 0, 100, 200 and 300 ppm as represented by G₀, G₁, G₂ and G₃ and three levels of organic manure; control, cow dung 30 t ha⁻¹ and poultry litter 20 t ha⁻¹ represented by M₀, M₁ and M₂ respectively were tested on tuberose in randomized complete block design with three replications. Bulbs were planted on 21 April 2013 at spacing of 30 x 20 cm. Spraying was done 40 days, 50 days and 60 days after transplanting. The spikes of tuberose were harvested when the first floret in the rachis opened during 5 August to 10 September and bulbs were on 20 March 2014. The significance of the difference among the treatment combinations of means was estimated by least significance difference (LSD) at 5% level of probability.

Table 1: Physical and chemical properties of the experimental soil

Constituents	Values
Physical properties and mechanical fractions	
Sand (2.0-0.05 mm) (%)	27
Silt (0.05-0.002 mm) (%)	43
Clay (<0.002 mm) (%)	30
Textural class	Silty-clay
Particle density (g ccG ⁻¹)	2.6
Bulk density (g ccG ⁻¹)	1.45
Porosity	44.23
Soil properties: Chemical analysis	
pH (1:2.5 soil-water)	6.1

Organic carbon (%)	0.45
Organic matter (%)	0.78
Total N (%)	0.077
Available P (ppm)	20.00
Available K (ppm)	15.63
Available S (ppm)	9.05

III. RESULTS AND DISCUSSION

Plant height

Significant variation was recorded due to interaction effect of organic manures and GA₃ in terms of plant height of tuberose (Table 2). The tallest plant (44.00 cm and 60.73 cm) was recorded in M₂G₂ at 45 and 90 DAP whereas the shortest plant was recorded in M₀G₀. It was revealed that M₂G₂ ensure maximum vegetative growth by ensuring organic manure immediate after germination that lead to the development of plants and the ultimate results was the highest plant height of tuberose. Organic manure has great influence on growth in tuberose (Yadav et al. 1985). This result is in agreement with the findings of (Wankhade et al. 2002a, Sharma et al. 2004, Rana et al. 2005, Bhalla and Kumar 2008, Kumar et al. 2008, Awasthi et al. 2012, Chopde et al. 2012, Dogra et al. 2012, Sudhakar and Kumar 2012 and Sarkar et al. 2014) where they reported that, the growth parameters of gladiolus plants were significantly altered due to the application of growth regulators.

Number of leaves plant⁻¹

Significant variation was recorded on number of leaves plant⁻¹ due to effect of organic manures and GA₃ (Table 2). The highest number of leaves plant⁻¹ (8.6 and 26.25) was attained in M₂G₂ at 45 and 90 DAP whereas the lowest number of leaves plant⁻¹ was found in M₀G₀. This result is also in agreement with the findings of (Wankhade et al. 2002b, Sharma et al. 2004, Rana et al. 2005, Bhalla and Kumar 2008, Kumar et al. 2008, Awasthi et al. 2012, Chopde et al. 2012, Dogra et al. 2012, Sudhakar and Kumar 2012 and Sarkar et al. 2014) where they reported that, the growth parameters of gladiolus plants were significantly altered due to the application of growth regulators.

Number of side shoot plant⁻¹

In case of number of side shoot plant⁻¹, organic manures and GA₃ showed no significant variation in all the data of value recorded (Table 2).

Table 2. Influence of organic manures and gibberellic acid on vegetative characters of tuberose

Treatments		Plant height (cm) at		Number of leaves plant ⁻¹ at		Number of side shoot plant ⁻¹ at	
Organic manures	GA ₃	45 DAP	90 DAP	45 DAP	90 DAP	45 DAP	90 DAP
Control	Control: Water spray	34.60 g	46.97 f	5.30 g	15.41 i	1.67	4.42
	GA ₃ at 100 ppm	38.60 b-e	53.19 de	6.30 ef	17.93 f	1.44	4.73
	GA ₃ at 200 ppm	38.60 b-e	53.59 de	6.30 ef	17.31 f	1.57	4.88
	GA ₃ at 300 ppm	36.00 fg	48.40 d	6.00 f	18.70 g	1.62	4.92
Cowdung 30 t ha ⁻¹	Control: Water spray	36.30 e-g	52.89 de	6.60 de	19.59 e	1.57	4.97
	GA ₃ at 100 ppm	38.60 b-e	55.05 cd	7.00 cd	19.88 e	1.87	4.13
	GA ₃ at 200 ppm	36.60 d-g	55.72 bc	7.00 cd	23.11 c	1.83	4.11
	GA ₃ at 300 ppm	37.60 c-f	54.15 cd	7.00 cd	16.11 h	1.96	5.25
Poultry litter 20 t ha ⁻¹	Control: Water spray	39.00 b-d	55.47 c	7.00 cd	21.05 d	1.99	5.45
	GA ₃ at 100 ppm	40.00 bc	60.61 b	7.60 b	24.92 b	2.07	5.48
	GA ₃ at 200 ppm	44.00 a	60.73 a	8.60 a	26.25 a	2.36	5.58
	GA ₃ at 300 ppm	40.30 bc	57.47 bc	7.30 bc	23.40 c	2.23	5.30
LSD (0.05)		2.10	1.75	0.36	0.65	---	---
Level of significance		*	*	*	*	ns	ns
CV (%)		3.30	3.02	4.11	4.14	6.79	5.04

* = Significant at 5% level of probability; ns = Non-significant

Flowering plant percentage

Flowering plant of tuberose varied significantly for the application of organic manures and GA₃ (Table 3). The maximum flowering plant (98.33 %) was found in M₂G₂ whereas, the minimum flowering plant (71.00 %) was recorded in M₀G₀. Organic sources have great influence flower production in tuberose. It was revealed that M₂ produced maximum flowering plant compare to other organic manure that used under this experiment. Tuberose plants treated with GA₃ at 200 ppm were found early flowering. It was also reported by (Sanap et al. 2000, Nagggar et al. 2002, Tiwari and Singh 2002, Yang et al. 2002, Hasanuzzaman et al. 2007, Devadanam et al. 2007, Dogra et al. 2012, Sudhakar and Kumar 2012 and Sarkar et al. 2014) where they stated that, PGRs promotes vegetative growth, increases the photosynthetic and metabolic activities causing more transport and utilization of photosynthetic products resulting early

flowering in gladiolus. Das et al. (2015) also found similar result in case of Bell Pepper where he reported that flowering occurs earlier in those plants where PGRs was applied and take minimum times.

Length of spike and rachis

Interaction effect of organic manure and GA₃ showed significant difference on spike length of tuberose (Table 3). The longest spike (82.00 cm) was recorded from M₂G₂ and the shortest spike (70.00 cm) was obtained from M₀G₀. The result is agreed with the findings of Kabir et al. (2011) who concluded that the increased spike length was due to use of poultry litter. Length of rachis of tuberose showed significant variation due to combined effect of organic manure and GA₃ (Table 3). The maximum length of rachis at harvest (33.20 cm) was recorded from the treatment combined of M₂G₂ whereas, the minimum length of rachis at harvest (21.56 cm) was recorded from M₀G₀. Yadav (2007) reported that length of rachis was remarkably increased with organic and poultry litter application, alone and in combination. This finding is also agreement with (Sanap et al. 2000, Manisha et al. 2002, Barman and Rajni 2004, Al-Khassawreh et al. 2006, Sharma et al. 2006, Bhalla and Kumar 2008, Mayoli et al. 2009, Dogra et al. 2012 and Sarkar et al. 2014) where they reported that spike length and rachis length were increases significantly by applying GA₃ and this might be occurs because of GA₃ encourage vegetative growth, enhances the photosynthetic and metabolic activities, causing taller plant that provide taller spike and rachis.

Number of florettspike⁻¹

Organic manures and GA₃ had no significant variation in terms of number of florets spike⁻¹ of tuberose (Table 3).

Number of spike ha⁻¹

Interaction between organic manure and GA₃ showed significant variation in terms of number of spike in thousand ha⁻¹ (Table 3). The maximum number of spike per hectare (350.00) was recorded from M₂G₂. The minimum number of spike per hectare (250.30) was recorded from M₀G₀.

Table 3. Influence of organic manures and gibberellic acid on floral characters of tuberose

Treatments		Flowering plant (%)	Length of spike (cm)	Length of rachis (cm)	Number of florets spike ⁻¹	Number of spike ha ⁻¹ (*000)
Organic manures	GA ₃					
Control	Control: Water spray	71.00g	70.00 c	21.56g	30.00	250.30 l
	GA ₃ at 100 ppm	85.67de	73.00 bc	24.66f	32.00	270.30 i
	GA ₃ at 200 ppm	86.90 d	74.00 bc	27.64 de	34.00	278.60 g
	GA ₃ at 300 ppm	81.00ef	72.00 bc	26.58ef	33.00	258.60 j
Cowdung 30 t ha ⁻¹	Control: Water spray	80.00f	73.00 bc	26.96 e	34.00	258.30 k
	GA ₃ at 100 ppm	92.00bc	75.00 bc	30.31 a-d	36.60	278.30 h
	GA ₃ at 200 ppm	93.67ab	76.00 b	31.16 a-c	41.30	298.60 e
	GA ₃ at 300 ppm	92.56 bc	75.00 bc	29.66 c-e	36.00	290.30 f
Poultry litter 20 t ha ⁻¹	Control: Water spray	88.33 cd	75.00 bc	29.97 b-d	35.30	300.00 d
	GA ₃ at 100 ppm	95.00ab	80.00 ab	32.18 ab	44.00	330.00 b
	GA ₃ at 200 ppm	98.33a	82.00 a	33.20 a	45.30	350.00 a
	GA ₃ at 300 ppm	93.83ab	76.00 b	31.11 a-c	43.30	310.00 c
LSD _(0.05)		4.820	2.07	2.60	---	5.35
Level of significance		*	*	*	ns	*
CV (%)		7.31	9.5	4.76	7.70	9.90

* = Significant at 5% level of probability; ns = Non-significant

Diameter and weight of single bulb

Non-significant variation was recorded due to combined effect of organic manure and GA₃ in terms of diameter of single bulb of tuberose (Table 4). Combined effect of organic manure and GA₃ varied significantly in terms of weight of single bulb of tuberose (Table 4). The maximum weight of single bulb (47.59 g) was observed in M₂G₂ whereas, the minimum weight of single bulb (35.59 g) was observed from M₀G₀.

Yield of bulb and bulblet ha⁻¹

Organic manure and GA₃ varied significantly on yield of bulb of tuberose (Table 4). The maximum yield of bulb (21.72 tha⁻¹) was observed from M₂G₂ whereas, the minimum yield of bulb (15.17 tha⁻¹) was recorded from M₀G₀. Statistically significant variation was recorded due to combined effect of organic manure and GA₃ in terms of bulblet yield (Table 4). The maximum yield of bulblet (26.95 tha⁻¹) was observed from M₂G₂ whereas, the minimum yield of bulblet (11.00 tha⁻¹) was observed from M₀G₀. Foliar application of GA₃ has effective effect to obtain early flowering and highest yield of good quality spikes and corm of gladiolus (Sudhakar and Kumar 2012, Rana et al. 2005 and Sarkar et al. 2014).

Table 4. Bulb yield attributes of tuberose as influenced by organic manures and gibberellic acid

Treatments		Diameter of single bulb(cm)	Weight of single bulb(g)	Yield of Bulb(t ha ⁻¹)	Yield of bulblet (t ha ⁻¹)
Organic manures	GA ₃				
Control	Control: Water spray	3.11	35.59 g	15.17 k	11.00e
	GA ₃ at 100 ppm	3.32	38.17 f	16.33 i	17.95d
	GA ₃ at 200 ppm	3.43	39.69 e	17.28 g	18.67cd
	GA ₃ at 300 ppm	3.21	35.95g	16.50 h	17.20 d
Cowdung 30 t ha ⁻¹	Control: Water spray	3.52	38.29 f	15.78 j	19.22cd
	GA ₃ at 100 ppm	3.67	42.67 d	17.28 g	22.76a-c
	GA ₃ at 200 ppm	3.69	44.09 c	17.59 f	22.90a-c
	GA ₃ at 300 ppm	3.67	42.56 d	18.84 d	22.60a-c
Poultry litter 20 t ha ⁻¹	Control: Water spray	3.63	39.65 e	18.33 e	20.24b-d
	GA ₃ at 100 ppm	3.85	46.12 b	19.33 c	22.67 ab
	GA ₃ at 200 ppm	3.93	47.59 a	21.72 a	26.95a
	GA ₃ at 300 ppm	3.75	44.37 c	20.43 b	24.46a-c
LSD _(0.05)		---	0.75	4.34	4.07
Level of significance		ns	*	*	*
CV (%)		2.22	4.06	11.52	12.04

* = Significant at 5% level of probability; ns = Non-significant

IV. CONCLUSION

In the growth pattern, flower and bulb yield of tuberose was affected significantly by the application of GA₃ and organic manures. Among them, poultry litter 20 tha⁻¹ with 200 ppm GA₃ exhibited the meaningful result considering the morphological attributes of tuberose.

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Importance of cultural tourism in the core area of Chowk, Lucknow.

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Abstract:

India has a history of about 7000 years belonging to Mesolithic period. Indian history boasts of highly developed civilizations throughout history. The paper tries to relate the tourism industry with the economic growth of all old cities of India. Throughout the world the tourism industry has been an economic generator even to conserve the heritage core areas of old cities. Today tourism has been considered to have socio economic values. Thus India, which has a rich cultural heritage has great potential to be tapped through tourism. Lucknow is known for its rich cultural heritage but lack of proper tourism guidelines the old core areas of the city has not been able to showcase its potential. Thus, the paper tries to bring the importance of heritage tourism in the core area of Chowk, Lucknow. The paper addresses the need of rehabilitation and conservation of old inner-city areas and historic monuments in the cities of the developing world through tourism guidelines.

Index Terms: Heritage, core city area, tourism, culture, economics.

I. Introduction

Tourism is the movement of the tourists from one place to another place. It is the temporary short-term movement of people to destinations outside the place where they normally live & work includes the activities they indulge in at the destination as well as all facilities and services specially created to meet their needs. Tourism does not only mean traveling to a particular destination but also includes all activities undertaken during the stay. It includes day visits & excursions. The movement can be in your country or the tourists can also travel to the foreign destinations for the tourism purpose.

Economics of tourism sector world wide

Travel & Tourism is an important economic activity in most countries around the world. Apart from its direct economic impact, the sector has significant indirect and induced impacts. The UN Statistics Division-approved Tourism Satellite Accounting methodology quantifies only the direct contribution of Travel & Tourism. World Travel and Tourism Council recognizes that Travel & Tourism's total contribution is much

greater however, and aims to capture its indirect and induced impacts through its annual research.

As per the study of WTTC, the total contribution of Travel & Tourism to GDP (including wider effects from investment, the supply chain and induced income impacts, see page 2) was USD7,170.3bn in 2015 (9.8% of GDP) and was expected to grow by 3.5% to USD7,420.5bn (9.8% of GDP) by 2016 end. It is forecast to rise by 4.0% pa to USD10,986.5bn by 2026 (10.8% of GDP).

Similarly, the total contribution of Travel & Tourism to employment (including wider effects from investment, the supply chain and induced income impacts, see page 2) was 283,578,000 jobs in 2015 (9.5% of total employment). This is forecast to rise by 2.2% in 2016 to 289,756,000 jobs (9.6% of total employment). By 2026, Travel & Tourism is forecast to support 370,204,000 jobs (11.0% of total employment), an increase of 2.5% pa over the period.

Thus, it is clear that the tourism activity has a great impact on the economy of a place.

II. Importance of Cultural Tourism in India

"India is the cradle of the human race, the birthplace of human speech, the mother of history, the grandmother of legend, and the great grandmother of tradition. Our most valuable and most artistic materials in the history of man are treasured up in India only!"

—Mark Twain

The words of mark Twain and the old history of Indian civilization makes India an attractive tourist destination in the world. India is one of the oldest civilizations in the world. Today tourism in India is a large emerging industry. The history of nearly 4000 years has many links from the rich past. Foreign tourists are often attracted in search of the glorious past of the country. In fact, one can say that all other forms of tourism in India have been off shoots of cultural tourism. The maximum foreign revenue in tourism is earned through cultural tourism in India. It is a big source of income in Indian cities. There are various examples which prove this point. Agra is one city where the maximum economy of the city is because of tourism due to

the magnificent Taj Mahal. There are many more examples in India where tourism is a major economic generator for the cities. The World Travel and Tourism Council calculated that tourism generated \$121 billion or 6.4% of the nation's GDP in 2011. It was responsible for 39.3 million jobs, 7.9% of its total employment. The GDP of the tourism sector has expanded 229% between 1990 and 2011. The sector is predicted to grow at an average annual rate of 7.7% in the next decade. In a 2011 forecast the World Travel and Tourism Council predicted the annual growth to be 8.8% between 2011 and 2021. This has given India the fifth rank among countries with the fastest growing tourism industry. India has a large medical tourism sector which is expected to grow at an estimated rate of 30% annually to reach about 9,500 crores by 2015. The Ministry of Tourism designs national policies for the development and promotion of tourism. In the process, the Ministry consults and collaborates with other stakeholders in the sector including various Central Ministries/agencies, state governments, Union Territories and the representatives of the private sector.

III. Types of tourism in India

Adventure tourism: This tourism type is the newly developed type in India. Today India has variety of options to offer to the tourists for adventure tourism. This involves exploration of remote areas and exotic locales and engaging in various activities. Adventure tourism in India involves trekking in the Himalayas, skiing in the snow clad mountains of Himachal Pradesh, white water rafting, rock climbing, para gliding etc. Himachal Pradesh, Jammu and Kashmir, Assam, Uttarakhand, Sikkim, Arunachal Pradesh, and many more states in India offer adrenalin packed activities to the tourists for adventure. Adventure tourism India has registered a formidable growth in recent years.

Wildlife tourism: India has a rich forest cover which has some beautiful and exotic species of wildlife some of which that are even endangered and very rare. This has boosted wildlife tourism in India. There are many national parks and wild life sanctuaries in India which are hot destinations for the tourists and wild life photographers across the world. Places like Jim Corbett National Park, Sunderbans wildlife sanctuary, Kaziranga National Park, Ranthambhor National Park, Sasan Gir National Park, Sariska National Park etc. offer variety of places for the wild life tourists.

Pilgrimage tourism: India has a history of nearly 4500 years and some of the oldest cities in the world. Cities like Varanasi (Kashi) is one of the oldest living city which is a hot destination for Pilgrimage tourism. India is famous for its temples and

mosques and that are the reason that among the different kinds of tourism in India, pilgrimage tourism is increasing most rapidly.

Eco tourism: Ecotourism entails traveling to places that are renowned for their natural beauty and social culture, while making sure not to damage the ecological balance. Eco-tourism pertains to a conscious and responsible effort to preserve the diversity of a naturally endowed region and sustaining its beauty and local culture. Indians have been known since ages to worship and conserve nature. So the growth of ecotourism in India is but natural. The vedic knowledge of Ayurveda, the Indian medicine system and its importance in the western world has been an attraction for the growth of eco-tourism in India.

Cultural tourism: India is known for its rich cultural heritage and an element of mysticism, which is why tourists come to India to experience it for themselves. The birth of many religious beliefs and religions, India offers a varied platter of colourful festivals and cultures in the country. The various fairs and festivals that tourists can visit in India are the Pushkar fair, Taj Mahotsav, and Suraj Kund mela etc. Cultural tourism India is the predominant factor behind the meteoric rise in the tourism segment in recent years, because from time immemorial, India has been considered the land of ancient history, heritage, and culture

Wellness tourism: Wellness tourism is one of the fastest growing forms of international and domestic tourism. This form of tourism involves people who travel to a different place to pursue activities that maintain or enhance their personal health and wellness, and who are seeking unique, authentic or location-based experiences. Wellness tourism include massages, body treatments, facial treatments, exercise facilities & programs, weight loss programs, nutrition programs, pre- and post-operative Spa treatments and mind/body programs. Places like Uttarakhand, Kerala, Himachal Pradesh, Goa etc. offer variety of wellness programs for the tourists.

Business Tourism: Business tourism can be defined as travel for the purpose of business. Business Tourism can be divided into three sections: Trading for goods to be resold on a wholesale basis, conduct business transactions e.g. visiting a client, contract negotiations Attending a conference, exhibition or event associated with their business. Today Indian economy is a fastest growing economy in the world and is a biggest business attraction for the global companies. The growth in the economy has given boost to the business tourism in India in last few years.

Heritage Tourism: India has always been famous for its rich heritage and ancient culture. India's glorious past and cultural diversity make a potent blend which attracts millions of tourists each year to its heritage tourist attractions. The government of India and the Ministry of Tourism and Culture encourage heritage tourism in India by offering several benefits to the Indian states that are particularly famous for attracting tourists. Today heritage tourism is still growing and has immense untapped potential.

Leisure Tourism: India offers one of the cheapest tourist destinations for the middle income foreign tourists. Places like Himachal Pradesh, Kerala, Goa, Varanasi, Uttarakhand etc. often find young tourists who find India to be a cost effective tourist destination for them.

Cruise Tourism: The luxury trains like palace on wheels, maharaja express, the Deccan Odyssey, The Golden Chariot etc. offer variety of options for cruise tourism clubbed with heritage tourism in India.

Sports Tourism: India is one of the few countries in the world where we find all six seasons and also variety of geographical conditions. This has helped India to develop various sports destinations right from Kashmir in the extreme north to Kanyakumari in the down south and from Arunachal Pradesh in the east to Gujarat in the west. Tourists find variety of winter sport activities to water sports in various parts of the country. India boasts of the highest cricketing stadiums in the world.

Educational Tourism: Today the world is looking towards India. The Indian higher education colleges in almost all the fields are among one of the top Colleges in the world. The Governmental subsidies and encouragement for foreign students make Indian Colleges a hot destination. Indian Government has separate quota for the SAARC (South Asian Association for Regional Cooperation) countries.

Heritage Tourism

What is Heritage Tourism? The National Trust for Historic Preservation defines cultural heritage tourism as "traveling to

experience the places, artifacts, and activities that authentically represent the stories and people of the past and present." Cultural, historic, and natural resources all make up heritage tourism sites.

A study by the Travel Industry Association in 2003 shows that heritage travelers stay longer at their destinations and spend more money there than other types of travelers. According to a survey the travelers say that trips are more memorable if they include a heritage activity where they learn something.

One of the principle objectives of cultural heritage tourism is collaboration with local organizations and the public to develop sustainable economies. Tourism creates jobs, new business opportunities, and strengthens local economies. It protects natural and cultural resources, which improve the quality of life for residents and travelers who participate in the services and attractions. Heritage tourism also promotes community pride by allowing people to work together to enhance economic and cultural development through distinct community opportunities. Studies show that travelers are more suitable to visit places with a strong community identity.

Tourism scenario in Uttar Pradesh

UP has grown in terms of tourism due to many tourist attractions. Taj Mahal in Agra, Varanasi, the Buddhist tourist trail, the wild life tourism etc. of UP are some to the many tourist attractions due to which the footfall of tourists has increased in last few years.

Today is amongst the top ranked states in terms of tourist footfalls, both domestic as well as foreigners. This surely is a sign of maturation of the industry, which can continue only with the support of state and national government. The positive trends of the last few years must surely flourish - the statistics speak for itself.

IV. About the study: Chowk, Lucknow

Cultural Tourism in Lucknow

Lucknow is the capital of Uttar Pradesh, the most populous state of India. It had a population of 2,815,601 in 2011. Located in what historically known as the Awadh region, it has always been a multicultural city. Courtly manners, beautiful gardens, poetry, music, and fine cuisine patronized by the Persian-loving

Year	Indian	Foreigner	Total (in Lacs)
2010	1447.55	23.24	1470.79
2011	1554.30	26.39	1580.69
2012	1683.82	29.89	1713.70
2013	2265.31	32.06	2297.37
2014	1828.20	29.10	1857.30
2015	1975.45	31.42	2005.87

Table 1: Details of Indian and foreign tourists who visited important tourist places in Uttar Pradesh
Source: FICCI report 'Uttar Pradesh- changing perspective', 2016

Shia *Nawabs* of the city are well known. It is popularly known as the city of *Nawabs*.

In the 18th century, Lucknow became the capital of Awadh. Under the patron of the *Nawabs*, the city flourished as a centre of a unique culture known for its exotic cuisine and its very rich language and poetry. From Chowk and Nakkhas to Aminabad and Hazratganj, the eighty-odd years preceding 1857 saw the emergence of early modern Lucknow.

Governance was the monopoly of *Nawabs* and *Taluqdars*, neither entirely modern nor democratic; tends to emerge of new desires and aspiration for new social groups. This formed the emergence of complexity in elements in everyday life in Lucknow. Lucknow has been known for its rich cultural heritage. The few things which makes Lucknow famous for the tourists are:

Food: Lucknow not only reminds for its *Nawabi* culture, craft and architecture but is also known for its impression on cuisine that developed in the city. Lucknow cuisine has carved its niche in the international tourism map. In Lucknow especially old Lucknow had a unique identity and individuality, reflecting the richness and royalty of the past. Lucknow has been related well with its *tunday kebabs*, *makkhan malai*, *sheermaal*, *paan gilori* etc. Lucknow has an immense untapped potential in the age old traditional street food which is today struggling for its existence.

Clothing and handicrafts: The city is synonymous for its intricate *zardozi* and *chikankari* embroidery. This handicraft is losing its sheen in today's fast moving technological world. However, many non-governmental organizations have come forward for the revival of these handicrafts. *Zardozi* and *Chikankari* has today started making its presence felt in the international fashion scene.



Figure 1: Zardozi embroidery work

Historical Buildings: Lucknow has a history of various time periods ranging from the Nawabi era to the Colonial era and the

post-independence time. It is a place which is known for the Indo-Saravali scenic architecture style. The *Imambaras*, the step well, the traditional *kothis* etc. are good examples of *Nawabi* era and on the other hand the Constantia of La Martiniere Boys College is today a UNESCO's world heritage site.

Literature: The 19th century was a period when the *Nawabs* of Lucknow encouraged almost all art forms in the city. Lucknow became famous for the various Urdu poets and literature. Nawab Wajid Ali Shah patronized many poets in his court. Poets like 'Baqar', 'Ahmad Mirza Sabir', 'Mufti Munshi', and 'Aamir Ahmad Amir' became famous during that time. The encouragement in the field of literature became the reason for the *nazakt* and *nafasat* in the language of the city.

Dance and performing art forms: Lucknow is the birth place of the *Lucknow Gharana* of the traditional dance form *Kathak*. The dance form got the patron ship of the Nawabs of Lucknow during the Pre Colonial era. Lucknow has been famous for the traditional story telling art form of *Dastangoi*. *Dastangoi* has its origin in the Persian language. *Dastan* means a tale; the suffix *-goi* makes the word mean "to tell a tale". In Lucknow, *dastangoi* was popular across all classes, and was regularly performed at diverse locations including *chowks* (city squares), private households, and *afeem khana* (public opium houses).

Socio-cultural heritage: Lucknow has often said to be synonym of culture. For Lucknow, culture is not just in its architecture but in its every nook and corner. It is in the language, attire, food, folklore, music and the life of its people. This culture comes across significantly whenever given a chance. But the unfortunate reality is that it has never been given even half a chance. The city carries on with the same image of just being the capital city of



Figure 2: Bara Imambara

Uttar Pradesh with a couple of significant *Imambaras* to its credit.

The cultural importance of core area of Chowk, Lucknow

Chowk is the oldest part of Lucknow located at the west side of the city, which has a rich history and heritage value. The area tells about the prosperous *Nawabi* era of the city and speaks of the rich cultural heritage of Lucknow. Lucknow has always been known for its Sham-e- Avadh, just like *Subah-e-Banaras* of Varanasi. *Shaam-e-Awadh* has been famous and much has been written about it and its atmosphere of lilting sounds of music and *ghungroo*, *mujra* dances and melodious singing of *ghazals* and *thumri* as forms of light and classical music that was associated with it. Today many of the old characteristics of the area are not seen in Chowk. However, Chowk still shows the conviviality of a commercial area surrounded by residential clusters of different communities which add on to the *Ganga- Jamuni tahzeeb* of Lucknow.

Historically since Chowk was a place which was bound to have the presence of the patrons of the *tawaifs* who were mostly aristocrats, nobles, *nawabs*, *jagirdars*, *taluqadars*, *wasiqadars*, *mahajans* (money lenders) and highly placed officers of the Nawabi administration and were supposedly connoisseurs of arts and crafts; the market had gold and silversmiths, dealers of precious stones and engravers called *nageen taraash*, ivory craftsmen, cloth merchants who dealt in *chikan*, *zardozi*, *kaarchob*, *kamkhaab* and silk items of clothing, that the rich could afford.

V. Current issues of the core area of Chowk, Lucknow

Lucknow, despite of having a glorious past has not been able to showcase itself in the global tourism map. Lucknow was once called by various names like *The Constantinople of India*, *the City of the Nawabs*, *Shiraz-e-Hind*, *the Golden City of the East*, *Choti Kashi*. The city still remains undefined, unexplored and mystic. The core area of the city, Chowk offers the variety of reasons for the enhancement of tourism but has not been able to showcase its potential. The lack of interest by the administration is a reason for the slow decay that the core city area is facing today.

Today the concern is that if this decay is allowed to happen, soon the city might lose its cultural heritage potential. The core city areas are showing signs of rapid mutations which may soon result in losing its heritage value. The survey conducted in the core area of Chowk reveals that nearly 27% of the total old buildings have been replaced by modern structures. The survey conducted shows that nearly 30% of the people in the core area have either their work place or their residences more than 4Km away from this place. It is a clear indicative that people belonging to the core

areas have started migrating to better developed areas. The transformation has resulted in the rapid change of the land use and thus are changing the built form of the original buildings and thus resulting in complete metamorphism in the architectural character which is a matter for concern.

Another issue is also a resultant of this slow migration, that the small scale industries which used to be run in each household is also reducing and we rarely find the new breed of artisans in such areas. Traffic, services, parking, waste management etc. has always been an issue in the core city areas. The streets are not equipped to handle heavy traffic. There is problem of connectivity with the newer developments of the city. Above all, there is problem of self-awareness among the people living in the core city areas. There is complete loss of participation in any conservation activity or Government policy matter for such areas. This constant mutation if allowed may result in irreversible damage to the heritage of Lucknow, both tangible as well as the intangible.

VI. FINDINGS OF THE STUDY

Benefits of heritage tourism

The promotion of heritage tourism is a win- win situation for both the inhabitants of the core city as well as the tourists who come to visit the place. The benefits of heritage tourism can be summarized as below:

- Tourists have fulfilling experiences
- Resources get needed maintenance attention by the city administration
- Hosts receive meaningful economic return
- Historic past is preserved
- Underutilized historic resources are developed
- Ways are found to make attractions out of archaeological traditional values
- Historic and cultural sites attract visitors and rehabilitation of existing buildings is often cheaper than building a new structure
- Out migration of the original residents of the core city areas is stopped
- Promotion of heritage tourism can help in conserving the tangible and intangible heritage of the core city areas

VII. CONCLUSIONS

The Dynamic Interaction between Tourism and Cultural Heritage

From the paper one can conclude that tourism continues to be among the foremost vehicles for cultural exchange, providing a personal experience, not only of that which has survived from the

past, but of the contemporary life and society of others. It is increasingly appreciated as a positive force for natural and cultural heritage conservation. One can say that tourism can capture the economic characteristics of the heritage and utilize these for conservation by generating funding, educating the community and influencing policy. It is an essential part of many national and regional economies and can be an important factor in development, when managed successfully. Planned promotion of tourism can bring benefits to host communities and provide an important means and motivation for them to care for and maintain their heritage and cultural practices. The participation and understanding between the local and/or indigenous community representatives, conservationists, tourism operators, property owners, policy makers, those preparing national development plans and site managers is necessary to achieve a sustainable tourism industry and enhance the protection of heritage resources for future generations.

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Automatic Interesting Object Extraction from Images based on Edge Information and Texture Analysis

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Abstract— Tracking moving objects in video sequence is an important problem in computer vision, with applications in several fields, such as video surveillance and target tracking. As the shadows attached along with the moving object also have the same motion that of objects, the detection of shadows as foreground objects is very common and produce large errors in object localization and recognition. This paper introduces an effective method which uses the edge information to detect moving cast shadows for traffic sequences. The proposed method initially removes the boundary of the cast shadow, preserving object's interior edges. The coarse object shapes are then reconstructed using the object interior edges. Finally, the cast shadow is detected by subtracting the reconstructed moving object from the change detection mask. The method is implemented and tested using three benchmark videos. The efficiency of the proposed method is compared with five other popular shadow detection methods and the results proved its superiority over others.

Keywords—*Saliency region extraction; visual attention; visually impaired people; saliency map; saliency cut; image enhancement;*

INTRODUCTION

Shadow is one of the common parts in the natural scenes and has become an important topic in computer vision. In many computer vision applications, shadows interfere with fundamental tasks such as moving objects segmentation and tracking. Thus it's necessary to suppress the effect of shadows. From the viewpoint of geometric relationship, shadow can be divided into umbra and penumbra [8]. The umbra corresponds to the background area where the direct light is almost totally blocked by the foreground object, whereas in the penumbra area of the background, the lighting is partially blocked. From the viewpoint of spatial relationship, shadow can be divided into static shadow and moving shadow. Static shadow is cast by the static object in the scene while the moving shadow is cast by the moving object.

A cast shadow is found mainly according to the results of change detection, static edge detection, shading change detection and penumbra detection. There are some problems in this approach. Some regions of a moving object, such as the facial part of a human, are easy to be misclassified as shadow

regions because the uniform colors there present the same characteristics as the shadow regions. The regions that are always shadowed along the sequence cannot be detected by their algorithm, as pointed out by the authors. Moreover, the computation is quite complex. So, nowadays, it is more and more necessary to establish an efficient and effective method for the shadow problem.

Facing the problem that the moving cast shadow is often misclassified as part of the moving object in change detection based video segmentation, we propose an effective approach to the detection and removal of insignificant moving cast shadows in normal indoor scenes where the camera is stationary. It is especially appropriate for the applications of indoor video surveillance and conferencing. The main contribution of this paper is that we successfully remove cast shadows from moving objects by the conditional dilation operation, where the edge and region information are used in a unified framework. Compared with the method in our approach does not require the region uniform property, and thus seldom misclassifies the uniform moving object region as a shadow region. Moreover, it can detect insignificant shadows appearing along a whole image sequence. We have compared our approach with the gradient filter method which is the most recent state of the art related to our approach, and the experimental results show that our approach improves the detection performance.

Related Works

Of the various algorithms designed for shadow detection, one way of classifying the approach for detection is provided in [1] considering whether the decision process introduces and exploits uncertainty. *Deterministic approaches* use an on/off decision process, whereas *statistical approaches* use probabilistic functions to describe the class membership. In statistical methods (see [2], [3], [4], [5]), the parameter selection is a critical issue. Thus, statistical approaches are further divided to parametric and nonparametric methods. The study reported in [2] is an example of the parametric approach, whereas [4] is an example of the nonparametric approach. The deterministic class (see [6], [7], [8] and [9]) can be further subdivided. Sub classification can be based on whether the on/off decision can be supported by modelbased knowledge or

not. The system described in [6] and [9] are examples of deterministic non model based approach. Another classification of shadow detection techniques is provided in [10]: *Model-Based techniques* and *Property-Based techniques*. Model-based techniques are based on matching sets of geometric features such as lines or corners to 3D object models, and rely on models representing the a priori knowledge of the geometry of the scene, the objects, and the illumination. In property based approach the properties such as the brightness, color or edge of shadows are used to detect shadows. Techniques based on the brightness or color properties ([11], [12], [13]) will have problems if the foreground contains objects having brightness or intensity values similar to that of shadow pixels.

In such cases the object points will be misclassified as shadow points. A technique using the edge information can overcome such limitations. Reference [10] explains an edge based method for the removal of shadows. The method solved the limitations of other color property based techniques but the method fails to detect thin shadows as well as the shadows which are far away from the camera position. These limitations are addressed and a modified edge-based shadow detection method is proposed in this paper. This paper pays attention to detection of moving cast shadows for traffic sequences, where the shadow suppression is very important to avoid misclassification and erroneous counting of vehicles on the road. The proposed method is detailed in the next section.

PROPOSED MOVING SHADOW DETECTION METHOD USING EDGE INFORMATION

In our algorithm, the edge information plays an important role for shadow removal. Canny edge is also applied for video segmentation in. However there are still several obvious differences between these two approaches. Canny edges are used to find the edge of the moving object, and then the filling algorithms can be applied to extract the whole moving object. Actually it is not an easy task to find the actual edge of the moving object by Canny edge and the initial change detection mask, so two model update schemes are proposed to handle slowly changing components and rapidly changing components respectively. Moreover, to handle the un-closed boundary, some complex filling algorithms are also implemented as the postprocessing step. However in our approach, the Canny edge is implemented based on the property of insignificant shadow, i.e. although the moving cast shadows appear in the initial change detection mask, however, the fact that the transition from the backgrounds to the shadow regions is gradual makes the edges caused by the shadow boundaries almost invisible. Thus Canny edges can be used to find some initial seed points for shadow region. So, in a word, the Canny edges are used for a different purpose, and thus in a different way.

It can be observed that the edge of cast shadows have two major properties:

- The object will have significant interior edges; however the corresponding shadow region does not have much interior edges.

- The edge of the cast shadow fastens on the boundary region of the moving foreground mask.



Figure 1. Input image and its corresponding foreground edge image.

Fig. 1.shows the input image and the foreground edge image corresponding to it.

The steps involved in the proposed shadow detection method are detailed in the following sections.

A. Foreground Region Segmentation

The easiest and common method, background subtraction, is used for segmenting the foreground region. The standard form of adaptive background is a time- averaged background image (TABI), where a background approximation is obtained by averaging a long time image sequences. The resulting background image is then used for background subtraction and the foreground image is obtained. The foreground image thus obtained contains the moving objects as well as its corresponding shadows. A binary mask, M_t , is also created from the foreground image by applying thresholding operation. The generated background image and the foreground region mask are shown in Fig. 2(b) and 2(c) respectively.

B. Edge Detection for Foreground Region

The edge image of the foreground region, E_t , is then obtained by using the classic Canny edge operator. E_t is shown in Fig. 2(d).

C. Computing Interior Edge Image of Foreground

All edges other than the boundary edges are interior edges. As the shadows do not have much interior edges, computing an interior edge image gives an edge image devoid of shadow edges.

The boundary of the foreground image, B_t , is obtained by applying Canny edge operator on M_t . And the interior edge image IE_t is obtained by

$$IE_t = E_t - DB_t \quad (1)$$

where DB_t denotes dilated B_t ; dilated with a structuring element S_1 .

The interior edge image IE_t is shown in Fig. 2(e).

D. Foreground Region Classification

From the interior edge image IE_t which contain the interior edges of different objects, we have to identify which all interior edges belong to same object.

- _ To accomplish this, IE_t is first filled horizontally to obtain IHE_t using a horizontal operation and the noise regions are removed. In horizontal operation the region inside the first and last edge points in each row is set to 1.

- _ IE_t is then filled vertically to obtain IVE_t using a vertical operation. Here instead of row the column wise operation is performed. The small noise regions present in IVE_t have to be removed.

- _ Then Blob Merging has to be done on both IHE_t and IVE_t to merge the erroneously split blobs which may occur during

the above operations. For this, first the connected components in IHE_t and IVE_t have to be labeled. Any adjacent blobs are regarded as the same foreground, if the distance between two connected blobs is less than or equal to T_d and they will be relabeled with the same number. When no further merging is possible, the procedure is terminated. The distance between two blobs in IHE_t and IVE_t is defined by number of rows and number of columns respectively. T_d is given as

$$T_d = \alpha \cdot \min\{\min_{i=1,2,\dots,M}(HL^i), \min_{j=1,2,\dots,N}(VC^j)\} \quad (2)$$

where HL^i is the number of rows of the blob labeled i in IHE_t and VC^j is the number of columns of the blob labeled j in IVE_t . M and N are the total number of blobs of both labeled images. α is a constant. $IHEM_t$ and $IVEM_t$ are the respective results of the merging operations on IHE_t and IVE_t .

$_$ The edge points corresponding to the regions which are common in both $IHEM_t$ and $IVEM_t$ are labeled with same number and they are considered to be that of the same foreground.

E. Reconstruction of the Moving Object

Each of the foreground objects has to be then reconstructed from those labeled interior edges. The procedure is as follows:

- * The horizontal and vertical operation, explained above, has to be executed to the labeled edge image. Here instead of the entire image, the operation has to be applied on each of the labeled edges individually.

- * The union of the components labeled 'i' in horizontally filled image and vertically filled

- * The i th foreground object ($i = 1,2..n$, if there are n foreground objects). Similarly all 'n' foreground objects can be reconstructed.

- * The above reconstructed objects will not contain the boundary portions as they are reconstructed from the interior edges. The boundary portions can be reconstructed by applying a dilation operation using the same structuring element S_1 used in step C. The reconstructed foreground object image is denoted as F_t and is shown in Fig. 2(f).

$$IS_t = M_t - F_t \quad (3)$$

As the perfect reconstruction of the foreground object is not possible, IS_t will contain noise regions. So noise removal has to be done on IS_t to obtain the accurate output St . IS_t and St are shown in Fig. 2(g) and 2(h) respectively. For the input frame if the detected shadow pixels are replaced with the corresponding background pixels, the shadow removed frame can be obtained.

EXPERIMENT AND EVALUATION

The proposed method has been implemented in a PC with INTEL PENTIUM IV, 3GHz processor using MATLAB 7.0. The efficiency of the method is analyzed using three different benchmark videos-*Highway I*, *Highway II* and *Campus* obtained from the CVRR database. Table 1 shows the properties of each of the benchmark videos used. The benchmark suite of video sequences and associated ground truth data (which is used for the empirical evaluation of the efficiency of the proposed method) is available at <http://cvrr.ucsd.edu/aton/shadow> (Courtesy: Andrea Prati). For simulation the constant $_$ mentioned in section III.D is taken as 0.5.

Fig. 3, Fig. 4 and Fig. 5 shows the results obtained for the proposed method for the video sequences *Highway I*, *Highway II* and *Campus* respectively. Fig. 3(a) corresponds to the input frames, where Fig. 3(a1) is frame no: 38 and Fig.3 (a2) is frame no: 115. Fig. 3(b) corresponds to the detected moving cast shadow regions, where Fig. 3(b1) is the result of Fig. 3(a1) and Fig. 3(b2) is that of Fig. 3(a2). Fig. 3(c1) and Fig. 3(c2) corresponds to the moving shadow removed frames of Fig. 3(a1) and Fig. 3(a2) respectively.

Fig. 4(a1) and Fig. 4(a2) corresponds to the input frames, frame no: 114 and 15 respectively of the *Highway II* video sequence. Fig. 4(b1) and Fig. 4(b2) are its corresponding detected moving shadow regions. Fig. 4(c1) and Fig. 4(c2) are the corresponding shadow removed frames.



Figure 2. Illustration of the Proposed Shadow Detection Method.

TABLE I. PROPERTIES OF BENCHMARK VIDEO SEQUENCES

Video Sequence	Highway I	Highway II	Campus
Sequence Type	Outdoor	Outdoor	Outdoor
Sequence Length	1074	1134	1179
Image Size	320X240	320X240	352X288
Shadow Strength	Medium	High	Low
Shadow Size	Large	Small	Very Large
Object Size	Large	Small	Medium
Object Speed (in pixels)	30-35	8-15	5-10
Noise Level	Medium	Medium	High

F. Obtaining moving Cast Shadow Regions

The foreground mask M_t contains both moving objects as well as shadows and F_t contains only the foreground objects. So with M_t and F_t we can acquire the moving cast shadow region IS_t .

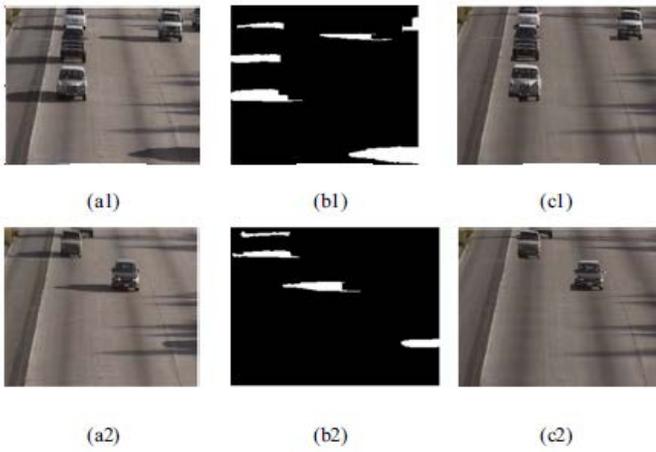


Figure 3. Results for *Highway I* video sequence.

Fig. 5(a1) and Fig. 5(a2) corresponds to the input frames, frame no: 53 and 66 respectively of the *Campus* video sequence. Fig. 5(b1) and Fig. 5(b2) are its corresponding detected moving shadow regions. Fig. 5(c1) and Fig. 5(c2) are the corresponding shadow removed frames. As the surface upon which the shadows are cast in *Campus* video sequence is highly textured, perfect shadow detection is not possible for this sequence. During edge detection this texture nature may cause interior edges to shadows which will affect the subsequent steps' efficiency.

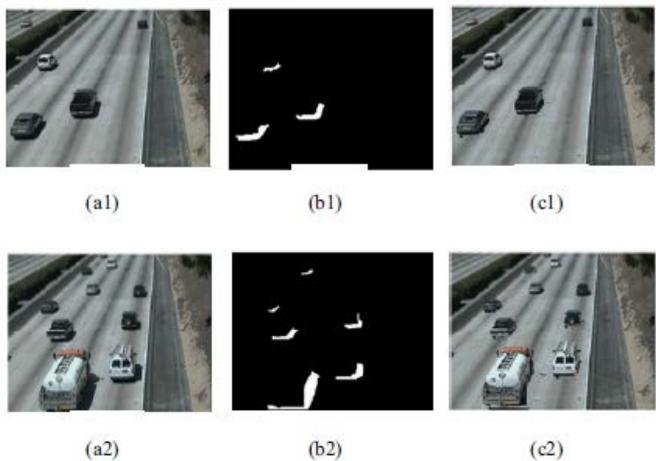


Figure 4. Results for *Highway II* video sequence.

From the results reported in Table 2 it is clear that the proposed moving shadow detection method has good superiority over other methods. In case of *Highway I* video sequence SNP and DNM2 have good detection rate, but their discrimination rates are not much impressive. The edge based method in [10] has got the highest discrimination rate but a comparatively lower detection rate. Compared to other methods, the proposed method shows good detection rate as well as high discrimination rate. *Highway II* is considered as a challenging test sequence for shadow detection methods. Almost all methods show their lowest detection rate for this video sequence. The highest detection rate for this video sequence is recorded by the proposed method along with good discrimination accuracy.

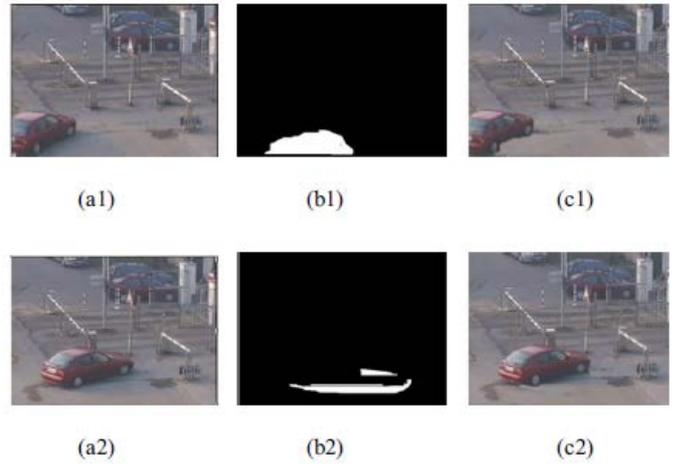


Figure 5. Results for *Campus* video sequence.

Even though *Campus* is a noisy sequence SP and DNMI achieves good detection rate but low discrimination rate. Both detection and discrimination accuracies are low for DNM2. The proposed method has quite low detection rate for this sequence. This is due to the high texture nature of the background surface upon which the shadows are cast. But the proposed method exhibits the highest discrimination rate which proves that the method is robust even to strong noise.

CONCLUSION

In this paper, an efficient method for detecting moving cast shadows using edge information is proposed. As the proposed method initially performs motion segmentation, only the moving cast shadows are detected (not any background shadows). Unless other edge-based methods the proposed method can detect even thinner shadows and shadows that are far away from camera position.

The method is implemented and tested using three benchmark videos where the shadow sizes, shadow strength, shadow orientation, vehicle size, vehicle color etc varies. The method is then compared with five other popular shadow detection techniques, of which four of them are based on the color property of shadows and the other one is based on the edge property. As the results have shown, the method performs well in almost all test sequences. Though the method is mainly proposed for traffic video sequences, the shadow detection method is still valid if the shadow areas are not at all textured or less textured.

Future work

We further discuss possible applications to simplify inner edges of important object in the natural image. For the reason that, visually impaired people may not sure about object information just touching and feeling outer boundary of object, high complex images include a lot of unnecessary edges. Therefore, we will consider simplifying inner edges and add specific features to zoom in and zoom out image edges for more detailed information.

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Determinants of Poverty Among Internally Displaced People in Puntland

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Abstract- Poverty is a common phenomenon in the developing world. In Somalia, particularly in Puntland, poverty is proliferating in the most vulnerable part of the society, particularly the internally displaced people. The study sought to investigate the determinants of poverty in IDPs in Puntland with evidence from Jowle IDP Camp, the selected variable of the study which is educational level, and how it affects poverty among IDPs in Puntland. Also in the literature review, secondary data of empirical literature was adapted, by reviewing the existing literature of educational level and how it affects poverty among Internally Displaced People. Although most of these researchers are not linked how this affects particularly in the internally displaced peoples in Puntland. Methodologically the study was quantitative in nature; the study population was the entire population living in Jowle IDP which is according to Garowe municipality 2,500 people. The sample technique was adapted by using both stratified and simple random sampling. Stratified sampling technique was used at the first stage where women and men had their sample as per gender. Meanwhile, simple random sampling was used to arrive at the portion of each gender group, a table of random numbers was used. The target population which was 250. In this case the study used Yamén's formula to get the sample size which was 154 respondents. The research instrument was primary data exclusively using only close-ended questionnaire. Pilot testing of the questionnaire was used to know whether the questions in the questionnaire are well framed, some errors in the question were replaced, research assistants were trained. Data was analyzed using SPSS or figures, tables, also Likert scale was used.

Index Terms- Determinants, Poverty, Internally displaced People (IDPs), Educational Level and effects.

I. INTRODUCTION

The main purpose of this paper is to test the effect of educational level on Poverty among the Internally Displaced People in Puntland. Poverty is one of the conspicuous features of the developing countries. Today, almost half of the world's population (about three billion people) lives in poverty, earning less than two US dollars per day, and about 1.2 billion live in extreme poverty, trying to survive on less than one US dollar per day. (UNHCR: 2011).

Illustration from Peterson and Paul (1990), notes, Poverty is the inability of getting choices and opportunities, a violation of

human dignity. It means lack of basic capacity to participate effectively in society. It means not having enough to feed and clothe a family, not having a school or clinic to go to, not having the land on which to grow one's food or a job to earn one's living, not having access to credit. It means insecurity, powerlessness and exclusion of individuals, households and communities. It means susceptibility to violence, and it often implies living in marginal or fragile environments, without access to clean water or sanitation.

Poverty exists unrestrainedly in the war-torn countries, this is due to starvation, insecurity and lack of government services to those people, in these countries poverty and vulnerability are main issues to be mentioned, there are many people who are displaced from their homes and become Internally Displaced people within their own country, they normally move from their home areas to safer areas of the country. According to (UNDP; 2012), Internally displaced people are the most affected population of Poverty in Somalia, this is due to many factors including, Low level of Education and skills, employment opportunities and Social exclusion, since Somalia has witnessed over two decades of conflict, violence, human rights violations and natural disasters, all of which have triggered repeated waves of displacement. There are still an estimated 1.1 million Somalis – approximately a tenth of the population – who are internally displaced. Most internally displaced persons (IDPs) continue to live in dire conditions in protracted displacement and devastating human lives conditions.

II. OBJECTIVE OF THIS STUDY

1. To establish effects of Educational Level on poverty among Internally Displaced Peoples living in Puntland.

2.2 Thesis statement

The exploration of this topic is motivated by several factors. It seeks to examine whether educational level among the Internally displaced people determines the poverty among them, their highest level of education, reasons for low level of education and how their low level of education affects the poverty among the IDPs. According to the (MOPIC: 2010), over 43% of the population living in Somalia are living in poverty, most of these people are the internally displaced peoples living within the country's borders, these people are mostly affected by the civil wars, drought/famine for the last two and half decades when the central government of Somalia collapsed. IDPs had faced severe poverty conditions as they tried to initiate their own

business, also they experience less employment opportunities, so their livelihoods would properly be worse than expected standard and actual residents. In regards to this, Puntland state of Somalia was regarded as the Somalia's most stable regions and it hosted hundreds or thousands of Internally Displaced people from the south-central of the country where wars and other disasters are mostly affected, these people are the poorest and most vulnerable people in the country. Studies made from this camp was done by International organization and UN agencies, there is limited academic research done with evidence from this camp, existing academic researches look at effects of IDPs in the security of Puntland (Ahmed Ali: 2004 and Gomez: 2007). Norwegian Refugee Council studies looks at effects of discrimination on the livelihoods of IDPs in Somalia (NRC:etal, moreover, these researchers' attention was IDP camps in Bosaso district and they were not focusing determinants of poverty which is huge and undeniable socio-economic problem that exists in those IDP camps in Puntland and Somalia in general. This study sought to fill this gap as it provided helpful findings on the determinants of Poverty in Internally Displaced Peoples in Puntland, and it got evidence from Jowle IDP Camp in Garowe District.

2.3 Theoretical Framework

This study is based with the framework of Human capital theory, which help in shedding light in understanding how educational level of human would lead a positive or negative aspect on human wellbeing.

Human Capital Theory (associated with the work of Gary Becker, Mark Blaug: 1987), it asserts that education creates skills which facilitate higher levels of productivity amongst those who possess them in comparison with those who do not. Educational level, then, is costly but it brings associated benefits which can be compared with its costs in much the same way as happens with any investment project.

Human capital theorists use proxy evidence of various kinds to support the above assertions. First, there is a strong, and empirically verifiable, positive relationship across all societies between the Poverty exists and the level of education which they have achieved. Using the 'normal' assumptions of competitive labor and goods markets, it follows that those with higher levels of education seem to have, on average, higher levels of productivity. Employers use educational characteristics as a

proxy for the suitability, and potential productivity, of its employees.

Human Capital Theory draws links between education and poverty in terms of education as a means of poverty reduction; another significant linkage runs the other way - i.e. the effect of macro- and micro-level poverty on levels of education. At the macro-level, it is generally the case that levels of enrolment correlate with GNP. Countries with low per capita incomes tend to have low enrolment ratios. Broadly speaking, the former implies that an effective anti-poverty strategy should incorporate the enhancement of education and skills amongst poor households. Human Capital theory desires that education is one of the main pathways out of poverty. The study thus uses Human Capital theory model to determine how the educational level determine poverty in Internally displaced people in Puntland.

III. METHODOLOGY

This study evolved primary data collection using structured questionnaire. The methods used include Likert scale questions starting from 5 points of Strongly Agree (SA) to Strongly Disagree (SD), and Close ended questionnaire. This help ed in finding out primarily how educational level among the internally displaced people affects the existing poverty among them.

IV. FINDINGS OF THE STUDY

4.1 Highest Level of education among the Internally displaced people.

Highest level of education was asked to the respondents, those who had never schooled were (65) 42.2%. About (70) 45.45% possessed Primary education, (19) 12.35 % possessed Secondary education and 0% possessed university education. The findings that majority of the respondents were illiterate comprising of 42.2%, this indicates that about half of the IDPs are illiterate, on the other hand, none of the respondents obtained university level education at any level, this emphasis the low level of education exists in the IDPs. This is consistent with findings of Datt and Ravallion (2012), who established that poor people have no access to attain higher education level and as a result of this they are poor due to lack of decent knowledge to hold high paid jobs (See table 4.1 Below).

Table 4.1. Respondents Highest Level of Education.

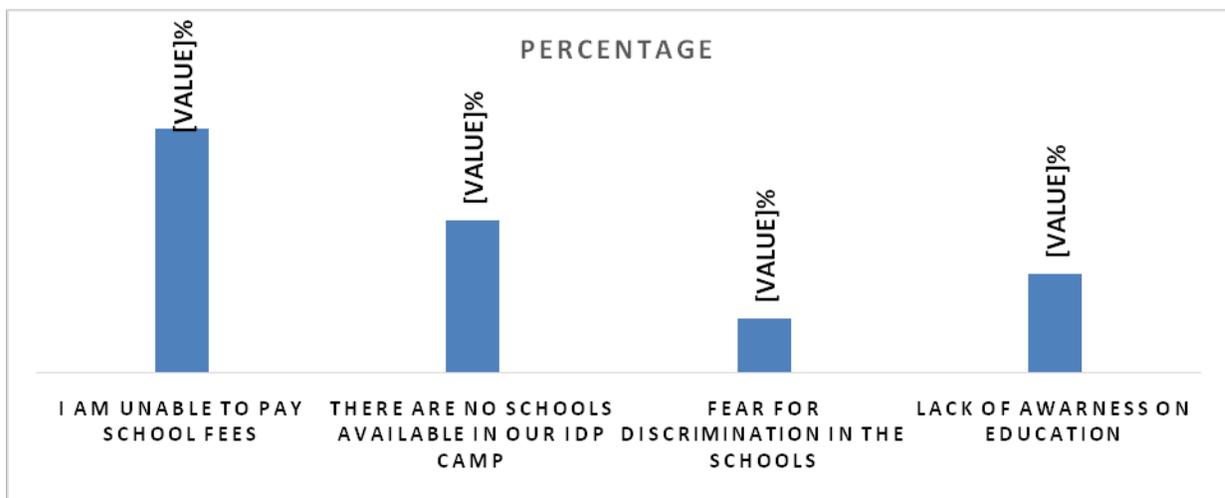
Highest Level of Education.	F.	Percentage%.
Neve Had schooling.	65	42.2
Primary Education.	70	45.45
Secondary Education.	19	12.35
University.	0	0 %
Total	154	100.0

4.2 Causes for the low level of education among the IDPs.

According to figure (4.2 Below) Respondents were also asked about the causes for the low level of education among the IDPs living in this camp, data revealed that 50 (44.6%) indicated that People living in this IDP camp cannot afford to pay school fees, while 31 (27.7%) indicated that there are no schools in the area around the IDP Camp that have made school access very difficult, also 20 (17.9%) indicated that there is a lack awareness of education in the IDP camp only 11 (9.8%) indicated that people living in this IDP camp are feared to face discrimination in the schools, hence they do not to attend schools, because they are considered as inferiors and holders of lower jobs. Hence, data revealed that due to lack of IDPs to pay school fees to educate their children and limited access to schools among the IDPs are the main cause of low level of education among the IDPs, on the

other hand, social discrimination were indicated by a fair percentage, while very few indicated a lack of willingness to educate their children as main cause of low level of education among the IDPs. This was in tandem with findings of the Kanty P Feksi and Andrew Sulley, (2011), which stablished that poor people are not educated due to fact that they are unable to pay schools with 34% of his respondents, also 30% of his respondents indicated that they are not schools available in the places where poor people are living. However, these findings contradict Kanty P Feksi and Andrew Sulley (2011) findings that 36% of his respondents are not able to go for education due to discrimination in the schools, since in my respondents only less 18% indicated IDPs fear discrimination in the schools by the hosts.

Figure: 4.2. Causes for the low level of education among the IDPs.



4.3 How low educational level effects on poverty among IDPs.

The respondents were also asked to indicate how educational level affects poverty among the IDPs living in this IDP camp. Data reveals that almost half of the respondents with 79 (51.3%) indicated that low level of education denied opportunity for the people in this IDP camp to get competitive jobs. While also about 67 (43.5%) indicated that low level of education among the people living in this IDP camp made them to be ignorant on how to make successful business in the market. Only 8 (5.2%) indicated that low level of education among the

people living in this IDP camp only obstructed them to make livelihood for their families and hence this has led for them to remain poor. These findings are in line with Datt and Ravallion (2012), findings that Low level of education blocked Poor to get opportunities in the competitive and merit based jobs, coupled by ignorance for them not be aware of the existing jobs in the market which made their livelihood difficult for them (See table 4.3 Below).

Table 4.3 How low level of educational level effect poverty among IDPs.

How Education Level Affect Poverty.	F.	Percentage%.
Low level of education blocked me opportunity to get competitive job in the market.	79	51.3
low level of education made me to be ignorant with no skills to make successful business.	67	43.5

low level of education obstructed me to make livelihood for my8 family.	5.2
Total	154 100.0

V. CONCLUSION

Based on the findings of this study, it was concluded that educational level effects poverty among internally displaced people in Puntland. there was direct relationship between educational level and poverty. Educational level is commonly used in study to measure persons’ level of poverty and wellbeing. When the educational level is high it is regarded that persons’ income level is high, hence it reduces the level of Poverty. Further, this study established that educational level had more predicting strength than the other independent variables. This aligns the argument that lack of education is the asset for human wellbeing.

This study also concluded that educational level of most of the IDPs are very low and these are favorable for high level of poverty, since from the findings all of them indicated that they have never attended university level of education and also majority of them have not attended even secondary level of education. Further the study also concluded that majority are not educated since they cannot afford to pay school fees, or there are no schools near IDP camps, and lack of awareness on education among the IDPs. Similarly, the study also concluded that low level of education among the IDPs affects their poverty among since they cannot access competitive jobs to secure livelihoods, also the study concluded that IDPs could not afford to make successful business in the market due to their ignorance in the existing opportunities in the market. Hence, the study generally concludes that education level directly effects poverty among IDPs.

5.1 Recommendations

As their level of education, skills and knowledge is relatively low, free education policy program would allow IDPs to have skills and knowledge to be able to make proper investments, and income sources based on skills and knowledge. In parallel to this, international Humanitarian organizations should also help IDPs in getting free and accessible education

programs, these programs should focus building schools, awareness raising on education and giving incentives to families who educate their children.

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Investigation of Strain energy release rate and Stress intensity factors in Slant edge pre-cracked Aluminium Plate

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Abstract- This research mainly describes the comparison of the strain energy rate of the two different materials (i.e., steel and aluminium). The aluminium can be replaced in spite of steel for in many applications. In the analytical study, pre-cracked three dimensional plate was loaded, The pre-crack was made in one edge of the plate in slant manner and outputs like strain energy release rate and stress intensity factors were taken for both the steel and aluminium.

Index Terms- Abaqus6.14, Finite element method, Strain energy release rate, Stress intensity factors.

I. INTRODUCTION

The material of the pre-cracked plate was taken as steel and aluminium (6061-T₆). The strain energy release rate was found for both the steel and aluminium (6061-T₆). Nowadays, in many of the structural engineering and mechanical engineering applications the steel was replaced by aluminium alloy in the structures. The strain energy release rate is the important parameter in analyzing the behavior of crack in the material. J integral is the measure of the strain energy release rate. In this research the strain energy release rate was found out for the slant edge pre cracked plate. Aluminium itself is a silvery-white, lightweight metal, high thermal conductivity, has excellent corrosion resistance, it is having high malleable and ductile property. Aluminium with combination of other materials (alloy) is stronger than aluminium as the single material. The possible combinations of material with aluminium are with copper, manganese, magnesium and silicon. These alloy combination is lightweight but strong enough. Aluminium is also used in the manufacturing of aero plane parts. They are the second most available materials used in the construction industry after the steel. Steel is 34% heavier than aluminium. They are also less prone to brittle fractures. The applications of aluminium in various construction elements like sunshade, chimney, doors, shutters, window frames, window walls etc. Aluminium toughness is high with higher tensile strength. They can be fabricated in to many forms. Aluminium was used in the constructions like Empire state building, New York skyscraper. By using this aluminium as the construction materials in these types of structures, the cost of the building were minimized. In this Aluminium (6061-T₆) alloy, The proportion of various components in Aluminium (6061-T₆) is Al (95.8-98.6%), Cr (0.04-0.35%), Cu (0.15-0.4%), Fe (maximum 0.7%), Mg (0.8-1.2%), Mn (maximum 0.15%), Si(0.4-0.8%), Ti (maximum 0.15%), Zn (maximum 0.25%). Aluminium (6061-T₆) alloy is used in various applications like aircraft fittings, electrical fittings, marine fittings and hardware, camera lens mounts, couplings, connectors, magneto parts, brake pistons, hydraulic pistons, appliance fittings, valve parts and bike frames. These various useful applications are due to the excellent properties like excellent joining characteristics, good acceptance of applied coatings, relatively high strength, and good workability, highly corrosive resistant. The bending effects on the crack closure faces and the resulting effects on the SIF. A plate with a pre-existing crack is taken under the action of bending moment. This crack faces contact is induced by this bending, and it further introduces extra load along the crack extension. There are few if any experimental studies of fracture in plates subjected to bending, and in particular, cyclic loading of propagating cracks in such plates. Steel sheets were used as specimens and the loading was cyclic pure bending. In this central cracked, single edge cracked, Double edge cracked were modeled and analyzed. [1]. Local stress concentrations were used to develop frequently in the stiffened plate structures such as bridges, ships which are membrane tension and out of plane bending combinations. The cracks that initiate through the thickness of the plate, this is due to fatigue rapidly grow. Modern steels are highly resistant to brittle fracture; meanwhile if the cracks are not repaired, the fatigue may tend to speedy grow of cracks [2]. Slant edge types of cracks were found in the rails of the railway lines, the longitudinal section through a railway line, with a slant crack emanating from the running band. Such a crack is named a 'squat' [3]. It has been investigated that 0.65% of magnesium adding will help to increase the mechanical properties of aluminium alloy. If same magnesium is added in excess manner (i.e., beyond 0.71%), there will be decrease in the mechanical properties of the alluminium alloy [4]. Aluminium (6061-T₆) alloy were improved by controlling processing parameters. Aluminium (6061-T₆) alloy companied with Al₂O₃ and Si C_p. These companied specimen was poured into the steel and graphite moulds, these two are having wide range in cooling rates. The results were shown as that the hardness and the mechanical wear increased in the specimen, which was poured in to the steel mould. This is due to the increasing cooling rate in steel molds. The mechanical properties were decreased while using graphite molds due to decrease in the cooling rate. But the ductility was somewhat increased at some rate

When using the graphite molds, The yield strength increased with the increase in the percentage of Al_2O_3 and Si C_p. It was also found that the hardness increases in steel mold for specimen alloyed with SiC_p particles whereas decreases with that alloyed in graphite mold [5]. The crack length may increase or decrease, it is depending upon the stress intensity factors K_I and K_{II} values. Thus the opening mode and shearing modes of crack is directly proportional to the crack length. If the main angle of the cracked plate increases, the rate of opening mode (KI) will decrease. The effects of the crack length to plate width ratio, crack inclination angle, crack location to plate height ratio on crack initiation angles were found. The first crack initiation angle mainly depends on crack length, crack location, and crack angle [6]. Based on the viewed difference in fatigue delamination response, it is discussed that the fibre bridging generated during quasi-static and fatigue loading is different and normalization of fatigue data with quasi-static SERR becomes meaningless, strain energy release should not be imposed by the bridging fibre during fatigue delamination, unless they fail. Bridging fibres actually have little contribution to the SERR. Periodically storing and releasing strain energy is the main function of bridging and it is based on loading and unloading without permanent strain energy release. Only when failure occurs in bridging fibres, strain energy is permanently released from the bridging fibres. The SERR as commonly applied is not a worth criteria to study the fatigue delamination growth [7]. In the shaft, the slant edge crack was modeled, for a cracked rotor stiffness changes are only considered, which is a main parameter for structures to study the crack and the strain energy release approach and it is used to obtain the stiffness matrix. Coupling stiffness of bending–torsion, bending–tension and torsion–tension on the shaft is caused by the slant crack; coupling stiffness of bending–tension on the shaft is caused by the transverse crack [8]. In the present situation of high speed, high axle load railway system, the derailment of trains is a major failure in railway system. Among the several possibilities, track related problems were due to the cyclic load of train movement. The maintenance of the rails in the rural area was analyzed in Australia [9]. The derivation is based on the dynamic SIF of a surface crack subjected to an antiplane moving loading. Laplace transform helps in getting the solution to solve the transient response of a surface crack subjected to a dynamically antiplane moving loading. It is obtained by superposition of proposed fundamental solutions [10]. The recent research told that the improvement of structural performance, weight and cost reductions are needed. The fracture toughness static strength, fatigue and corrosion resistance was achieved in the recent developments in high strength Al–Zn and Al–Li alloys. In Al–Cu, the research was under the damage tolerance and In Al–Li alloys the research were going on design and control of chemical composition. Improvement on mechanical properties, reduction of manufacturing, maintenance and repair costs, prevention of corrosion and fatigue and were the current research activities in the aluminium and their composites [11]. The mechanical properties of the aluminium 6061 was performed. With the help of the standard cylindrical compression specimens the compression properties of the alloy were determined. Hardness test was also conducted for the aluminium alloy using Micro-hardness Vicker’s testing machine [12].

II. RESEARCH METHODOLOGIES

The slant edge crack was modeled and designed with the help of Abaqus 6.14(the unified FEA product suite offers powerful and complete solutions for both routine and sophisticated engineering problems covering a vast spectrum of industrial applications) by giving appropriate property, loading and boundary conditions(point load of 100N,boundary condition- pinned) to the specimen which was taken. At first, the datum lines were drawn with the help of spline for making the slant edge and partitions were made. After that the seam region and crack front portions were marked for the propagation of crack. The point load, which was the load condition given at the top mid partitioned line of the specimen and pinned boundary condition at the two ends.

Table 1: Input properties for the plate

Properties	Steel	Aluminium (6061-T ₆)
Young’s modulus	2×10^5 MPa	68.9×10^3 MPa
Poisson’s Ratio	0.3	0.33
Density	7.8×10^{-9} T/mm ³	2.7×10^{-9} T/mm ³

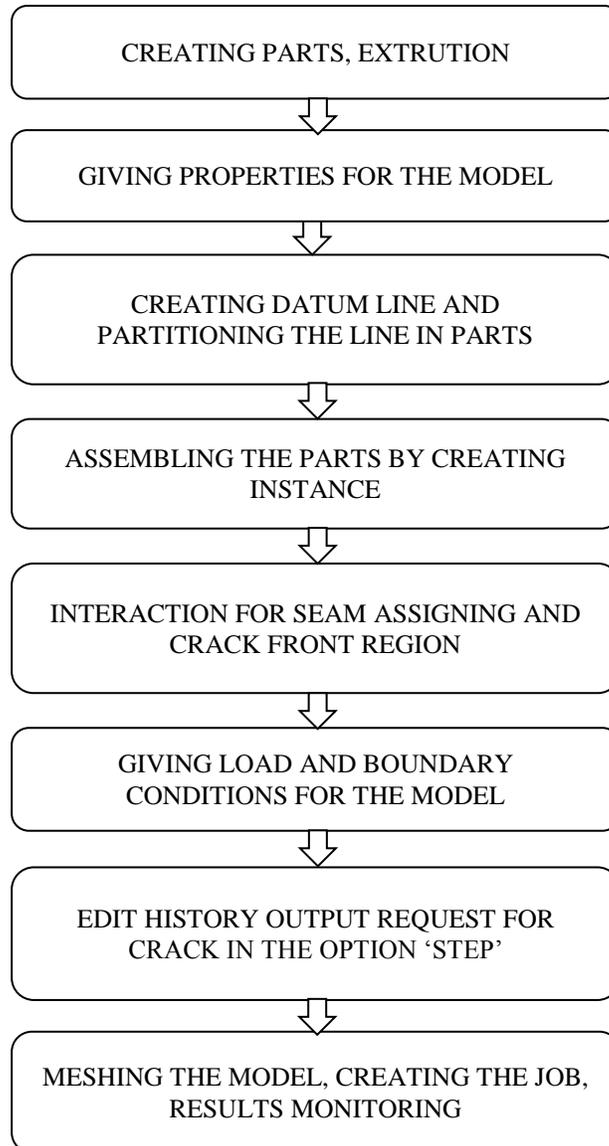


Fig 1: Flow of work in Abaqus

III. ANALYTICAL STUDY

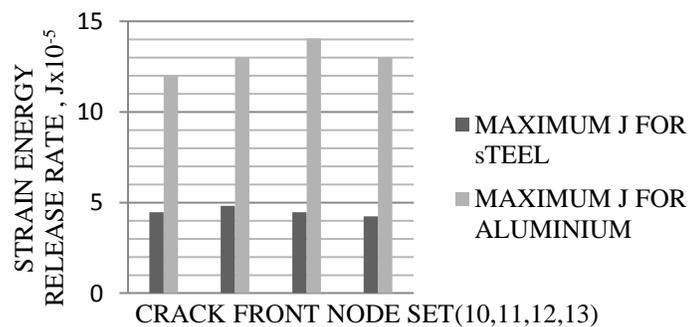


Fig 2: Comparison of max J value for both the materials

Table 2: Strain energy release rate and stress intensity factors for the material steel

MATERIAL	CRACK FRONT NODE SET	CRACK CONTOURS	J from Ks $\times 10^{-5}$		K1	K2	K3 ($\times 10^{-2}$)
			MAXIMUM	MINIMUM			
STEEL	9	10	4.24	-	2.502	-1.750	-6.914
		8	-	2.51	2.342	0.157	-8.275
	10	10	4.47	-	2.820	1.372	-1.172
		2	-	3.15	2.638	0.104	0.631
	11	10	4.81	-	2.881	1.504	0
		8	-	3.25	2.674	0.107	0
	12	10	4.47	-	2.820	1.372	-1.172
		2	-	3.17	2.638	0.104	-0.631
	13	10	4.24	-	2.502	-1.750	6.913
		2	-	2.5	2.337	0.157	8.183

Table 3: Strain energy release rate and stress intensity factors for the material Aluminium (6061-T₆)

MATERIAL	CRACK FRONT NODE SET	CRACK CONTOURS	J from Ks		K1	K2	K3 ($\times 10^{-2}$)
			MAXIMUM $\times 10^{-4}$	MINIMUM $\times 10^{-5}$			
ALUMINIUM (6061-T ₆)	10	1	1.1973	-	2.482	-1.757	-8.153
		2	-	6.97	2.314	0.1645	-9.390
	11	10	1.3	-	2.844	1.401	-1.322
		2	-	9.15	2.658	0.106	0.7144
	12	10	1.4045	-	2.917	1.533	0
		2	-	9.44	2.701	0.107	0
	13	10	1.3	-	2.844	1.401	-1.3
		2	-	9.15	2.658	0.106	-0.794
	14	10	1.1973	-	2.482	-1.757	8.154
		2	-	6.97	2.314	0.1645	9.39

IV. RESULTS

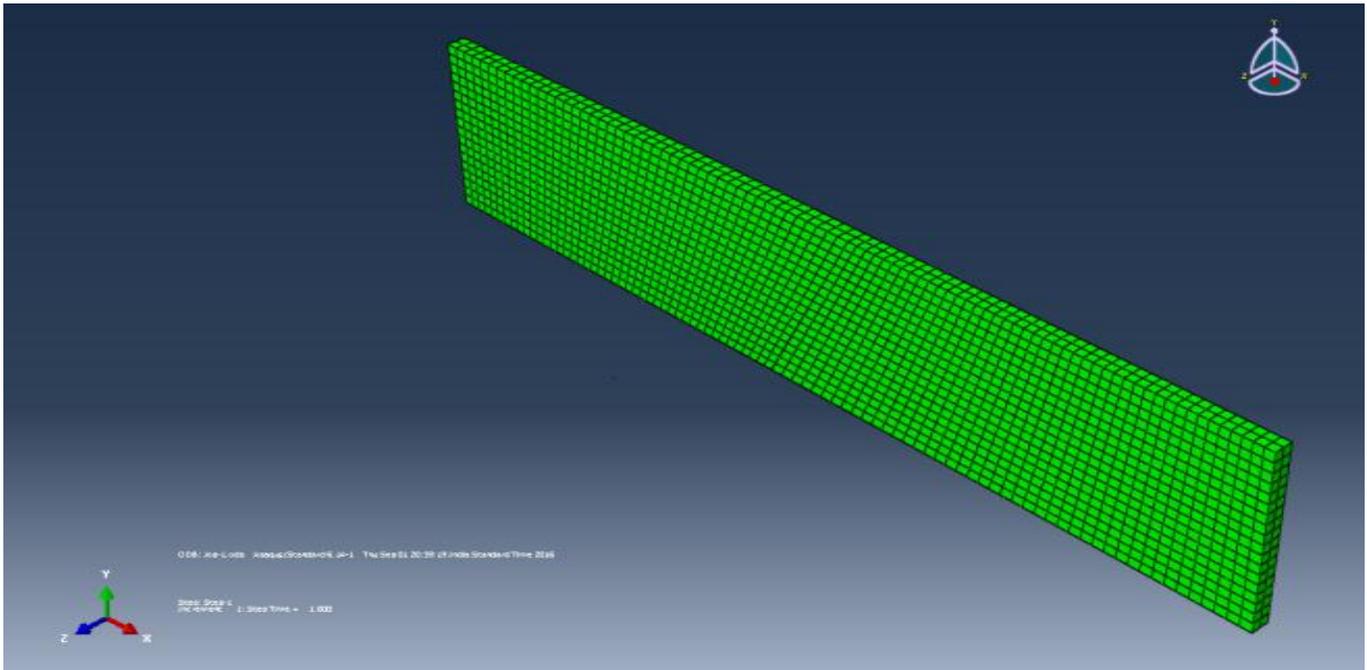


Fig 3: Meshing of plate

Table 4: Slant edge cracked plate

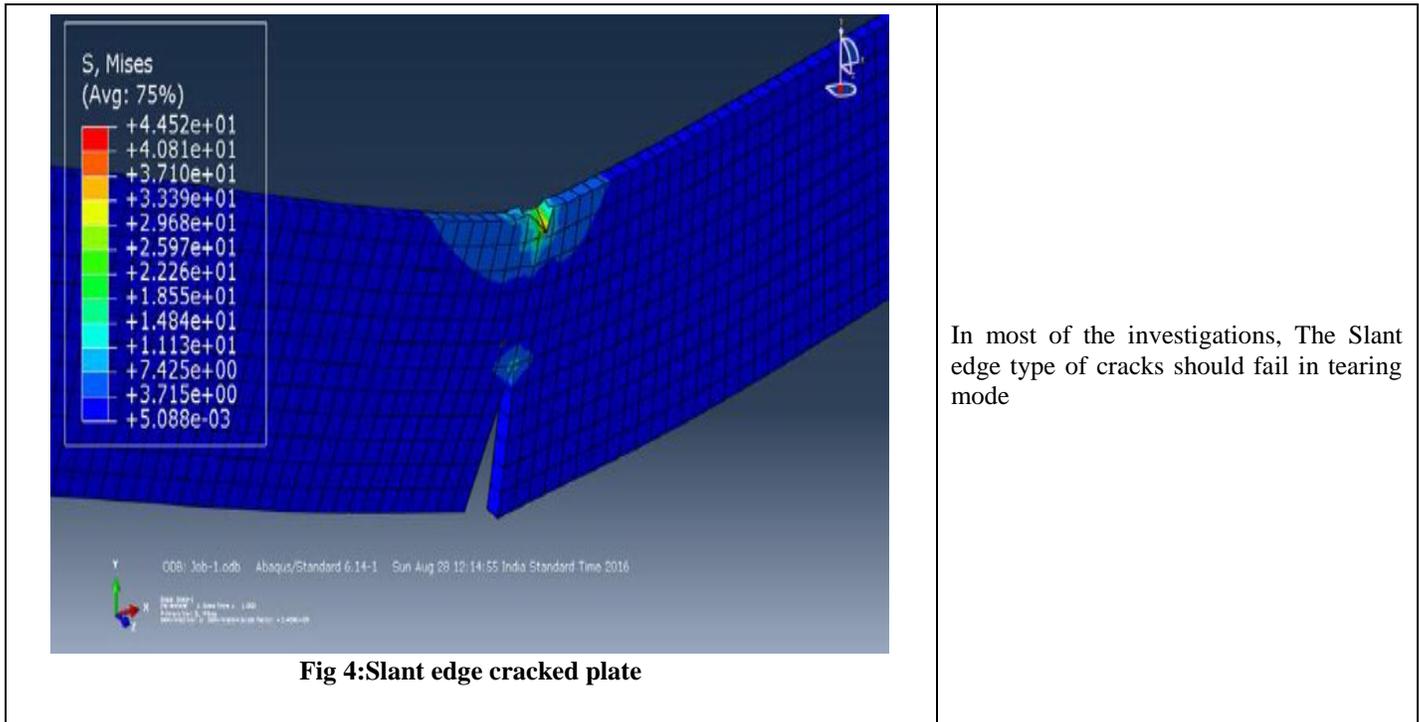


Fig 4: Slant edge cracked plate

In most of the investigations, The Slant edge type of cracks should fail in tearing mode

V. CONCLUSION

The contour integral was given as the input in abaqus, several parameters like strain energy release rate and the stress intensity factors were given as the history output reques. Strain energy release rate is maximum for the aluminium (6061-T₆) than the steel. It is essential to know that the critical crack length is an absolute number and it is not depending on the structure's size. When the crack length is a, If the crack length changes from 'a' to 'δa' then there will be some increase in the strain energy release rate. The young's modulus of aluminium and aluminium related alloy is lesser than steel. The young's modulus directly depends upon the tensile strength of the specimen. But the aluminium alloy is preferred in many high rise buildings and aircraft parts due to their light weight and high strength. Thus, the study was achieved in comparing the fracture parameters of both the steel and aluminium alloy. On comparing with the amount of energy dissipated for steel, the amount of energy dissipated for aluminium (6061-T₆) is maximum. From the table we can see, the stress intensity factor for third mode varies in higher values, therefore this type slant edge crack comes under the tearing mode. The aluminium itself is the weaker material, which cannot be used as the elements in structures.so by combining the aluminium with some alloys, it becomes very stronger. In many structures like skyscrapers, the aluminium alloys were used in the areas where there is the necessity to reduce the weight of the members. This is the reason for choosing the aluminium (6061-T₆) in this research; the strain energy release rate is higher for aluminium alloy than steel. Due to this reason aluminium alloys were not used to implement in the high load carrying capacity members. These aluminium alloys were used in the structures like windows, roofs, building facades. The usage of steel in these elements will increase the cost and the weight too. The further research is significantly expected in the fracture related problems in aluminium alloys which are used in the structural elements.

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A performance study of Vapour compression refrigeration system using ZrO₂ Nano particle with R134a and R152a

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Abstract- In this paper the performance of a vapour compression refrigeration system with ZrO₂ nanoparticles in the working fluid was studied. Nano refrigerant was synthesized on the basis of the concept of the nanofluids, which was prepared by mixing ZrO₂ nanoparticles with R152a refrigerant. The conventional refrigerant R134a has a global warming potential (GWP) of 1300 whereas R152a has a significant reduced value of GWP of 140 only. ZrO₂nanoparticles with R152a refrigerant were used in R134a refrigeration system. The system performance with nanoparticles was then investigated. The results indicated that ZrO₂ nano refrigerant works normally and safely in the system. The ZrO₂ nanoparticle concentration is an important factor considered for heat transfer enhancement in the refrigeration system. The concentration of nano ZrO₂ ranges between 0.01% and 0.06% volume concentration with particle size of 20 nm with R134a and R152a was studied. The coefficient of performance of the system was significantly improved with 33.45% when 0.06% volume concentration of ZrO₂ with R152a refrigerant was used. The discharge temperature of the R152a/ZrO₂ Nano refrigerant was nearly same as that of R134a. The usage of R152a with zero ozone depleting potential and very low Global Warming Potential provides a green and clean environment.

Key words - R134a, R152a, Nano Refrigerant, ZrO₂, COP

I. INTRODUCTION

Nanofluids are promise to significantly enhance tribological, rheological and thermal properties of fluids. They are acquired by diffusing solid nanoparticles (diameter 1 nm to 100 nm) made by metallic oxides, metals, carbon nanotubes etc. In common fluids such as water, glycol, oils and refrigerants are also at relatively low concentrations of nanoparticles, it is possible to get strong enhancements of heat exchange coefficients and thermal conductivity, through a conforming enhancement of energy efficiency of plants and components employing such fluids. Other parameters prompting the performance of nanofluids are material, size and shape of nanoparticles, pH and Zeta potential of the colloidal solution, type and concentration of dispersants. Voluminous potential applications for nanofluids in HVAC&R. As nanolubricants, they can improve anti-wear, thermal dissipation and extreme pressure properties of compressors lubricants. The dispersion of nanoparticles directly in the refrigerant can increase the thermodynamic performance of HVAC&R machines.

Choi et al. [1] first suggested coining the term “nanofluids” by depressing particles in base fluids. These nanofluids have been exposed to have additional heat transfer capabilities and have become a current research topic in heat transfer research. Many efforts have been made to study the effective high thermal conductivity, convective heat transfer, and the phase change heat transfer of nanofluids. However, inconsistent results have shown that the nanoparticles can both enhance and reduce the phase change heat transfer.

Shengshan Bi et al. [2] have investigated the basic characteristics of the TiO₂-R134a nano-refrigerants, reliability, the dispersion behavior, thermal conductivity and flow boiling heat transfer [3,4]. The performance of a domestic refrigerator with nanoparticles added was also investigated. The results indicated performance was better than the R134a and POE oil system, with 26.1% less energy consumption used with 0.1% mass fraction TiO₂ nanoparticles compared to the R134a and POE oil system. The same tests with Al₂O₃ nanoparticles showed that the different nanoparticles properties have little effect on the refrigerator performance. Thus, nanoparticles can be used in domestic refrigerators to considerably reduce energy consumption. In the former experiment, the nanoparticles were added into the refrigeration system in two different ways. In one way the nanoparticles were added to the refrigeration system by first adding them into the lubricant to make a nanoparticle lubricant mixture. Then, the mixtures were

put into the compressor as the lubricant [5]. In the other way nanoparticles and traditional refrigerant were mixed directly to make nano-refrigerant [6]. The results of both of the ways had showed the better performance of the refrigerator with nanoparticles added. Bi et al. [7] has investigated the nano refrigerant TiO₂/R600a on a domestic refrigerator and conducting an energy consumption test and freezing capacity test in that domestic refrigerator. The results indicate that the refrigerator with nano refrigerant consumed 9.6% less energy with 0.5 g/L TiO₂/R600a nano refrigerant as compared to one with base refrigerant. A nano refrigerant-based refrigerator showed reduced compressor suction and discharge pressure, and the largest reduction was observed for a concentration of 0.5 g/L. The test was conducted multiple times to ensure repeatability.

Sendil Kumar et al [8] have investigated on nano refrigerant. Nano Al₂O₃/PAG oil was used as nano-refrigerant in R134a vapour compression refrigeration system. The system performance was investigated using energy consumption test and freeze capacity test. The results indicate that Al₂O₃ nano refrigerant works normally and safely in the refrigeration system. The refrigeration system performance was better than pure lubricant with R134a working fluid with 10.32% less energy used with 0.2% Vol of the concentration used. And also heat transfer coefficient increases with the usage of nano Al₂O₃.

R. Reji Kumar [9] have investigated heat transfer enhancement was numerically on the surface of a refrigerator by using Al₂O₃ nano-refrigerants, where nanofluids could be a significant factor in maintaining the surface temperature within a required range. In the addition of nanoparticles to the refrigerant results in improvements in the thermo physical properties and heat transfer characteristics of the refrigerant, thereby improving the performance of the refrigeration system. The experimental studies indicate that the refrigeration system with nano-refrigerant works normally. It is found that the freezing capacity is higher and the power consumption reduces by 11.5 % when POE oil is replaced by a mixture of mineral oil and Aluminium oxide nanoparticles.

Subramani and Prakash [10] studied the R134a/ Al₂O₃ nano refrigerant and found that there is an enhancement in COP while nanoparticles were added to the system. They also determined the system's COP theoretically for both R134a and R134a/ Al₂O₃. They found that the COP of that use R134a increases by 10.11% while the R134a/ Al₂O₃ mixture used in the actual refrigeration cycle and enhancement ratio was 9.74% when COP determined theoretically. Saidur [11] studied the use of nanorefrigerants in domestic refrigerators to reduce the energy consumption and emissions of greenhouse gasses. They used TiO₂-mineral oil- R134a and Al₂O₃ -mineral oil-R134a with mass fractions of 0.06% and 0.1% as nanorefrigerants. The nanorefrigerants containing TiO₂nanoparticles of 0.1 wt. % displayed the highest energy savings up to 25%.

Baskaran, A. et al [12] analysed the performance of a vapour compression refrigeration system with various eco-friendly refrigerants of HFC152a, HFC32, HC290, HC1270, HC600a and RE170 and their results were compared with R134a as possible alternative replacement. The results showed that the refrigerant R152a have higher COP of 4.65% than that of R134a.

Baskaran, A. et al [13] analyzed the performance of a vapour compression refrigeration system with various refrigerants mixture of HFC152a, HC290, HC600a and RE170 and their results were compared with R134a as possible alternative replacement. The results showed that the refrigerant blend R152a / R600a (76/24 by wt. %) was found to be replacement for R134a and also the COP of this blend is 2.3% higher than that of R134a.

A.Baskaran et al [14] analyzed the energy and exergy performance of a vapour compression refrigeration system with various eco-friendly refrigerants of HFC152a, and RE170 and their results were compared with R134a as possible alternative replacement. The results showed that the refrigerant R152a have higher average COP of 4.65% than that of R134a. The exergetic efficiency of the system using R152a is 5.02% higher than that of R134a at -10°C evaporating temperature. The average exergy loss for R152a is 8.2% lower than that of R134a.

Melih Aktas et al [15] have studied five different nanorefrigerants with Al₂O₃ nanoparticles and their pure fluids: R12, R134a, R430a, R436a, and R600a. The coefficient of performance (COP) and compressor work for various evaporation and condensation temperatures are investigated. The enthalpy of nanorefrigerants is obtained through the density. The results indicate that COP is enhanced by adding nanoparticles to the pure refrigerant and maximum values obtained using the R600a/ Al₂O₃ mixture.

Even though the nanorefrigerants have been extensively studied over the years, there quiet remains scope to discuss specifically application of nano refrigerants in HVAC&R system. This paper presents the effect of nanoparticles on the thermodynamic performance of a refrigeration system. The aim of the current study is to examine the COP and the compressor work of 0.06% volume concentrations of ZrO₂ nanoparticles with R134a and R152a. The performance of the nanorefrigerants in a VCR cycle is evaluated [11, 15]. The performance parameters of the refrigeration cycle, such as the COP, compressor work, Refrigerating Effect and condenser duty were investigated for various evaporation and condensation temperatures.

II. THEORETICAL MODEL

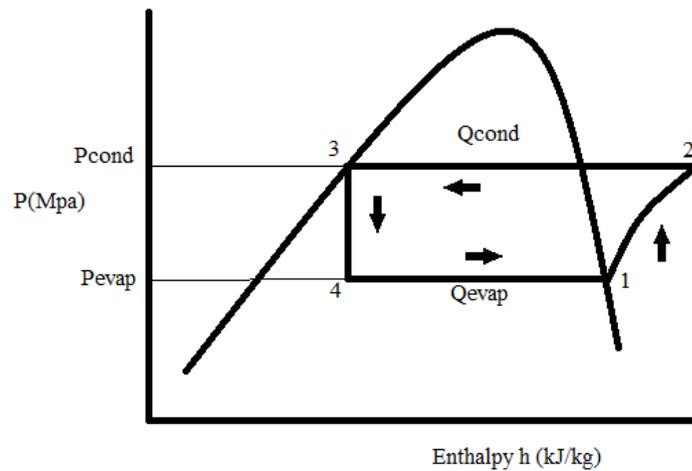


Figure 1. P-h diagram of vapor compression refrigeration cycle

Generally, the vapor compression refrigeration system consists of a condenser, an expansion valve, an evaporator, and a compressor. The vapor compression refrigeration cycle consists of four processes:

- (1-2) compressing refrigerant in compressor isentropically,
- (2-3) condensation at constant pressure,
- (3-4) adiabatic expansion in the expansion valve,
- (4-1) evaporation at constant pressure.

The pressure enthalpy diagram of was given in Figure 1. The evaporation of the refrigerant occurs at a constant pressure during process (4-1) in the evaporator. The refrigerant at the inlet of the evaporator is vaporized by removing heat from the area desired to cool. Saturated vapor at point 1 goes into the compressor at low pressure and is exposed to a reversible adiabatic compression during the process from 1 to 2 in Figure 1. During process (2-3), while the heat is rejected in the condenser at a constant pressure, the working fluid changes to a saturated liquid when exiting the condenser. Refrigerant at point 1 in Figure.1 is saturated vapor at the evaporator temperature and at point 3 is saturated liquid at the condenser temperature. The working fluid at the exit of the expansion valve enters the evaporator, and the cycle is completed. Completely vaporized refrigerant enters the compressor, and its pressure and temperature increase during the compressing process. Calculations of the comparison of pure and blended refrigerants during various refrigeration cycles can be seen in previous studies [16, 17].

The refrigeration effect (RE), also called the heat transfer rate of the evaporator (q_e) is calculated as follows:

$$q_e = h_1 - h_4 \quad (1)$$

The condenser duty, also called the heat transfer rate of the condenser (q_c) is calculated as follows:

$$q_c = h_2 - h_3 \quad (2)$$

The isentropic compression work of the compressor (W_{comp}) is expressed as follows:

$$W_{comp} = h_2 - h_1 \quad (3)$$

The isentropic efficiency of the compressor is calculated as follows:

$$\eta_{isen} = \text{Isentropic compressor work} / \text{Actual compressor work}$$

$$\eta_{isen} = h_{2s} - h_1 / h_2 - h_1 \quad (4)$$

The performance of refrigerators is determined in terms of the COP. COP is defined as follows:

$$\text{COP} = q_e / W_{comp} = h_1 - h_4 / h_2 - h_1 \quad (5)$$

The density of a mixture of nanoparticles (ρ_{NR}) and the base fluid (ρ_{PR}) can be determined based on Xuan and Roetzel [18];

$$\rho_{NR} = \omega \rho_{NP} + (1 - \omega) \rho_{PR} \quad (6)$$

III. NANO PARTICLE CHARACTERIZATION

ZrO₂ nanoparticles synthesized by either the sol-gel method (solution method) or the hydrothermal method. As the solution method presents a low cost and environmentally friendly synthetic route, most of the literature for ZrO₂ nanoparticles is based on the solution method. In addition, synthesis of ZrO₂ nanoparticles in the solution requires a well-defined shape and size of ZrO₂ nanoparticles. Further it was characterized by X-ray diffraction (XRD) and, scanning electron microscopy (SEM).

X-RAY DIFFRACTION (XRD) PATTERN

Crystallinity, crystallite phase and size of all the samples were obtained by X-ray diffract meter using CuK α radiation ($\lambda=0.1540598$ nm). Scanning range was between 10 and 80° and scan rate was 0.05°/s. In order to determine the crystallite size of each sample, Debye-Scherrer formula ($D=K \lambda / \beta \cos \theta$) was applied, in which K (=0.94) stands for shape factor, λ (=0.1540598 nm) represents the wavelength of α radiation, β is the half width of each diffraction peak, and θ stands for the half angle of each diffraction peak.

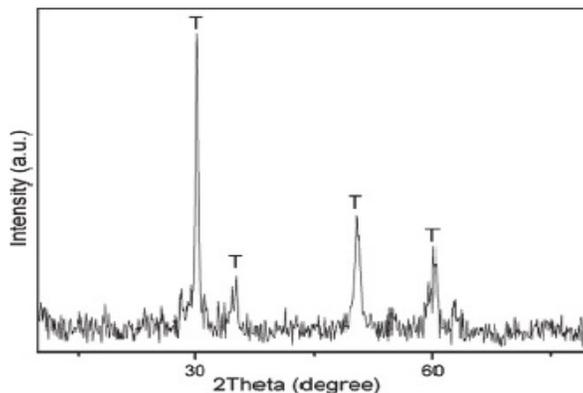


Fig: 3.1 Bulk Zirconia

Fig 3.1 shows the XRD pattern of bulk zirconia .The distinguishing characteristic peak for tetragonal occurs at $2\theta =30.5^\circ$ for the (111) reflection, and the respective peaks for monoclinic occur at $2\theta =28.4^\circ$ and $2\theta =31.6^\circ$ for the (111) reflection. The XRD pattern of the sample is shown in Fig. 1, indicating the effect of organic additives on the crystallinity of zirconia nanoparticles. As it can be seen, three characteristic peaks at $2\theta =30.22, 50.31$ and 60.12 are included which are corresponding to tetragonal phase.

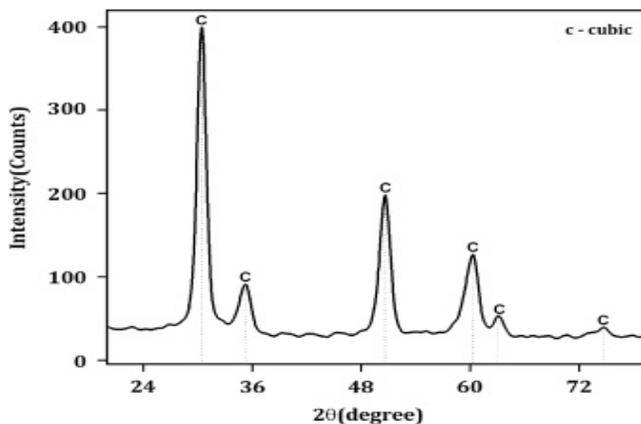


Fig: 3.2 Nano Zirconia

Fig 3.2 shows the XRD pattern of nano zirconia. The zirconia was sintered 500°C the phase transitions of the particle size is reduced and change the structure from tetragonal to cubic structure. The characteristic peaks at $2\theta =28.33, 35.80, 51.33, 60.12$ and 74.33 are included which are corresponding to cubic phase.

SCANNING ELECTRON MICROSCOPY (SEM) IMAGE

Aggregated and non-aggregated zirconia could be well distinguished from the SEM results. The SEM findings not only justify the aggregation of the particles but also show the particle morphology.

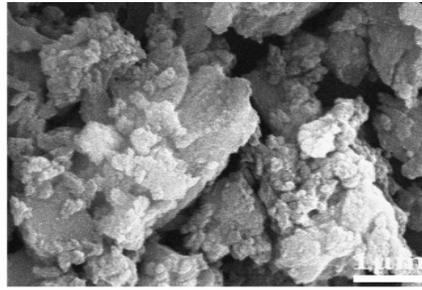


Figure 3.3 Bulk Zirconia – Cubic Morphology

Fig 3.3 shows the SEM image of bulk zirconia, that the synthesized cubic zirconia has an aggregated surface with higher particles size, compared to spherical morphology. Agglomerated surfaces are found in cubic morphology of bulk Zirconia.

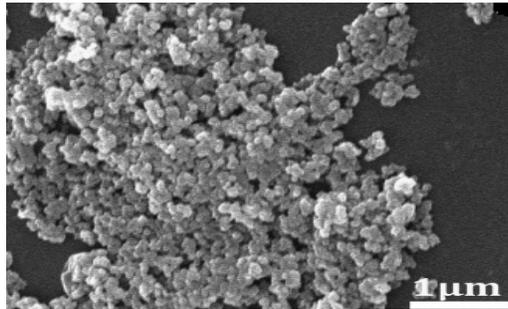


Figure 3.4 Nano Zirconia – Spherical Morphology

Fig 3.4 shows the SEM image of nano zirconia, that the disaggregated particles with almost spherical morphology.

IV. RESULT AND DISCUSSION

COEFFICIENT OF PERFORMANCE

Figure 4.1 shows the variation of coefficient of performance with evaporating temperature varies from -20°C to 10°C at 45°C condensation temperature. It was seen from the figure, the coefficient of performance of the system increases when the evaporating temperature increases. The performance of the system with ZrO₂+R152a Nano refrigerant is higher than that of R134a and R152a. This same trend is observed in 50°C and 55°C condensation temperatures as shown in figures 4.2 and 4.3.

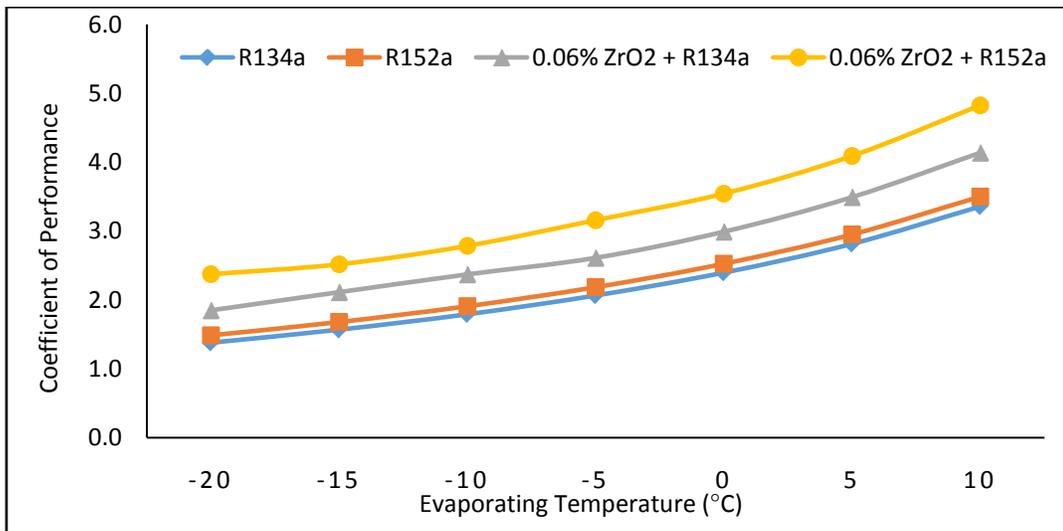


Figure 4.1 Variation of COP with evaporating temperature at condensing temperature of 45°C

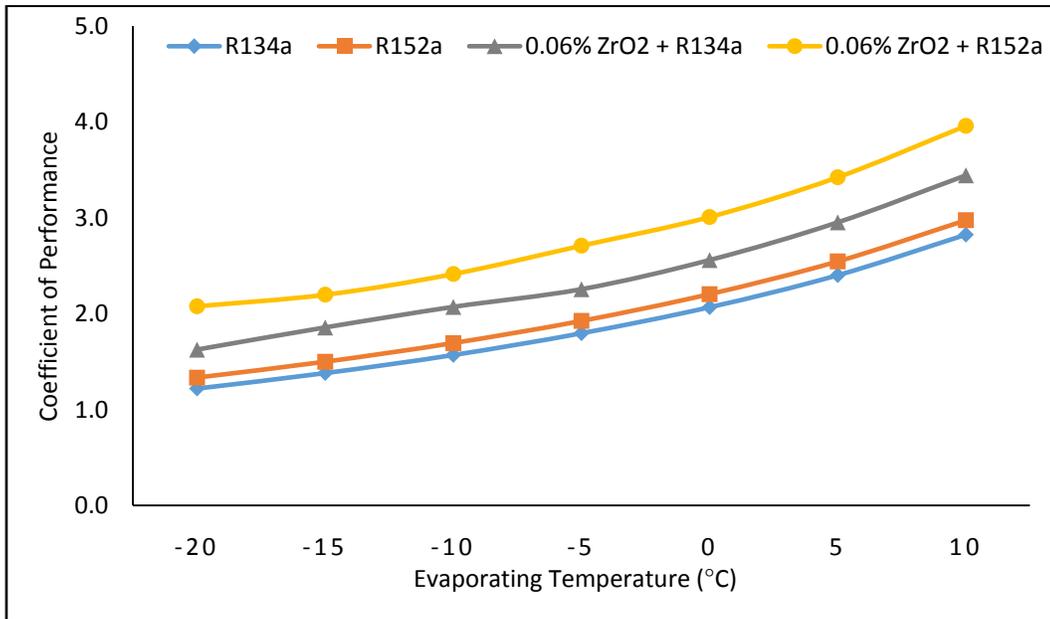


Figure 4.2 Variation of COP with evaporating temperature at condensing temperature of 50°C

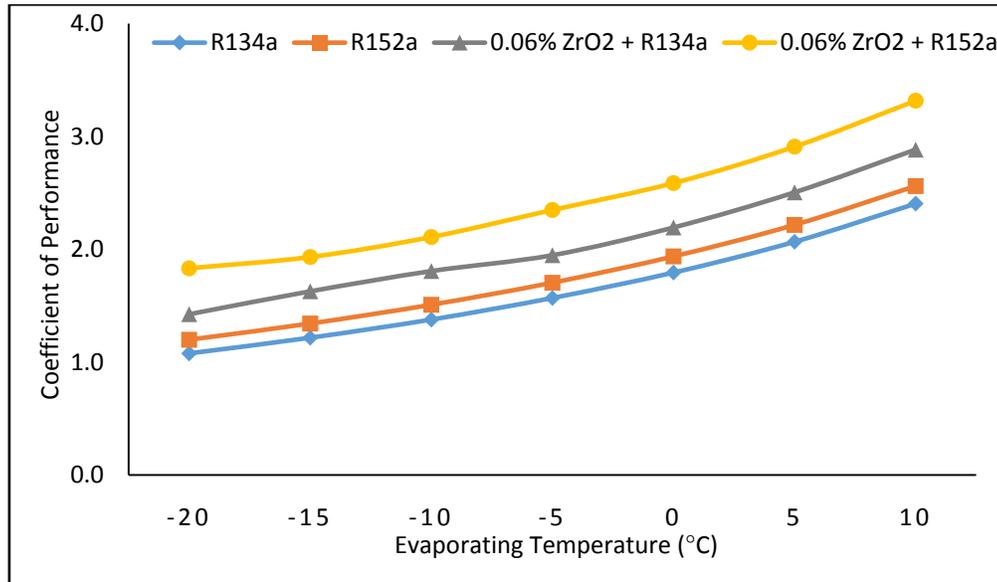


Figure 4.3 Variation of COP with evaporating temperature at condensing temperature of 55°C

COMPRESSOR WORK

Figure 4.4 shows the variation of compressor work with evaporating temperature varies from -20°C to 10°C at 45°C condensation temperature. It was seen from the figure, the compressor work of the system decreases when the evaporating temperature increases. The compressor work of the system with ZrO₂+R152a Nano refrigerant is lower than that of R152a and higher than that of R134a. This same trend is observed in 50°C and 55°C condensation temperatures as shown in figures 4.5 and 4.6.

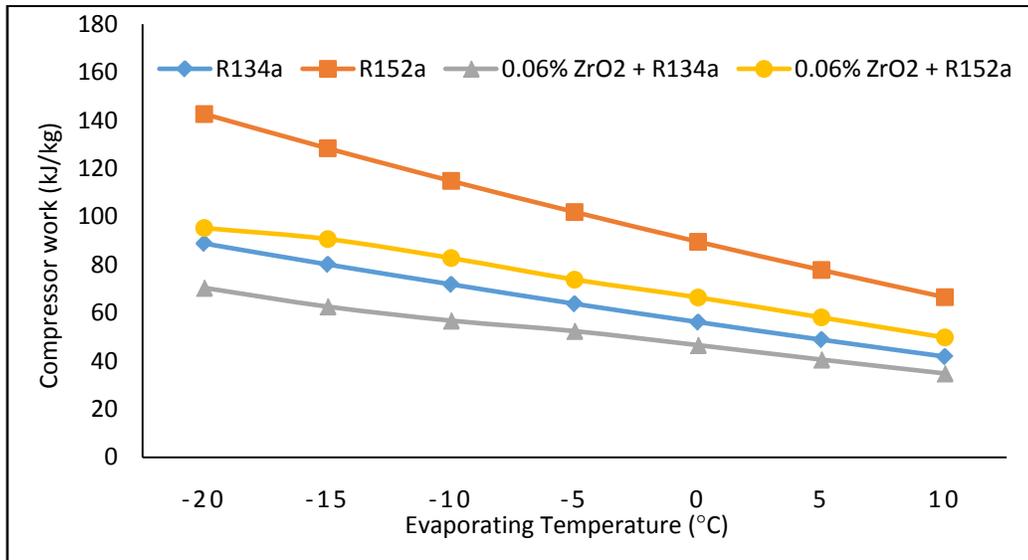


Figure 4.4 Variation of Compressor work with evaporating temperature at condensing temperature of 45°C

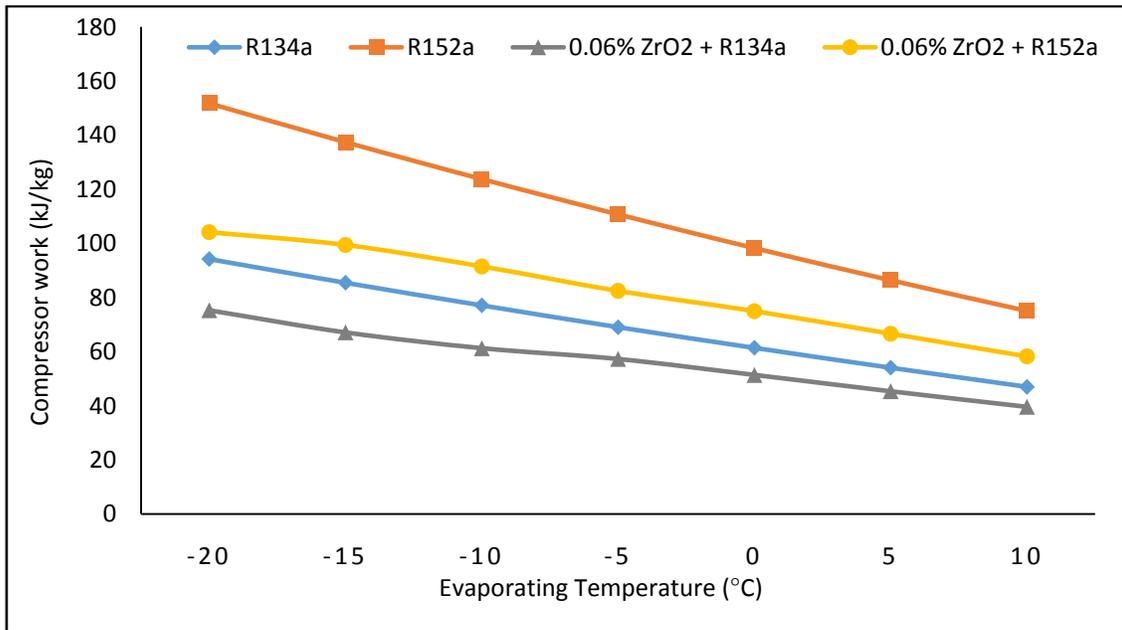


Figure 4.5 Variation of Compressor work with evaporating temperature at condensing temperature of 50°C

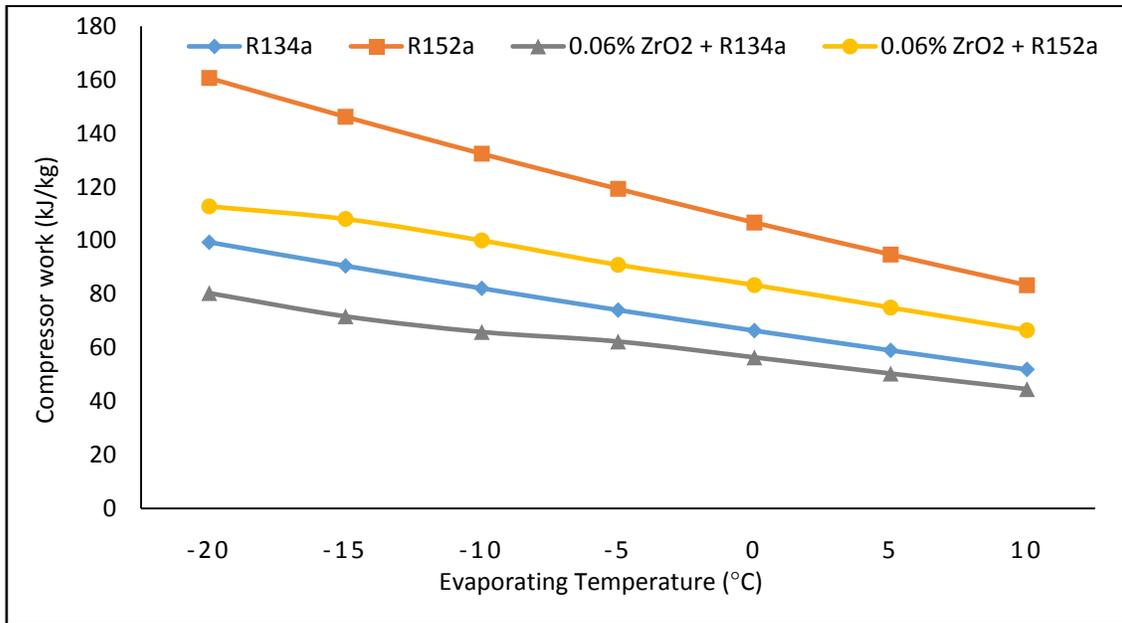


Figure 4.6 Variation of Compressor work with evaporating temperature at condensing temperature of 55°C

REFRIGERATING EFFECT (RE)

Figure 4.7 shows the variation of refrigerating effect with evaporating temperature varies from -20°C to 10°C at 45°C condensation temperature. It was seen from the figure, the refrigerating effect of the system increases when the evaporating temperature increases. The refrigerating effect of the system with ZrO₂+R152a Nano refrigerant is higher than that of R152a and R134a. This same trend is observed in 50°C and 55°C condensation temperatures as shown in figures 4.8 and 4.9.

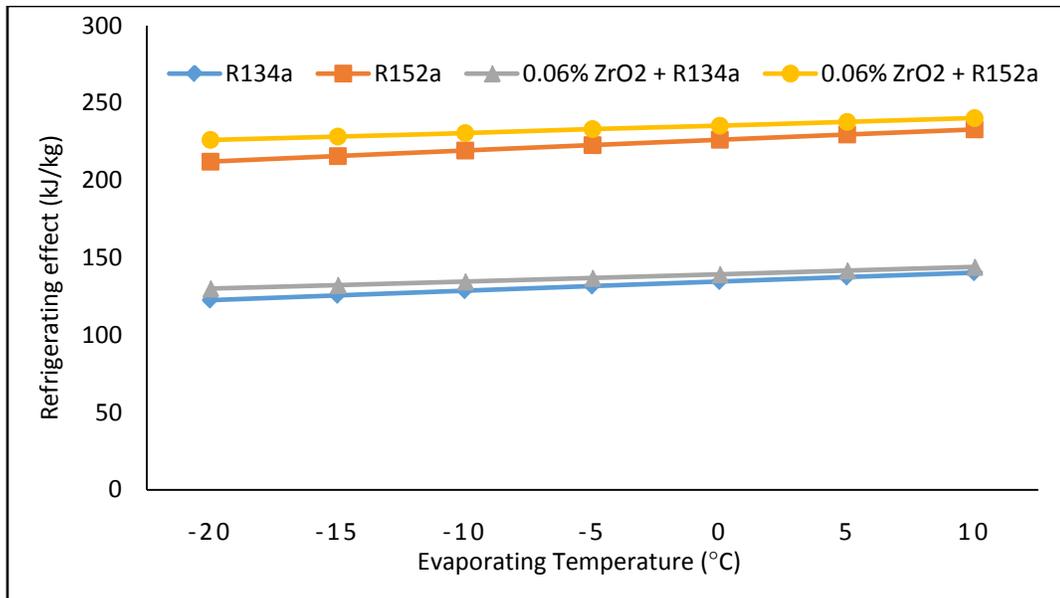


Figure 4.7 Variation of Refrigerating effect with evaporating temperature at condensing temperature of 45°C

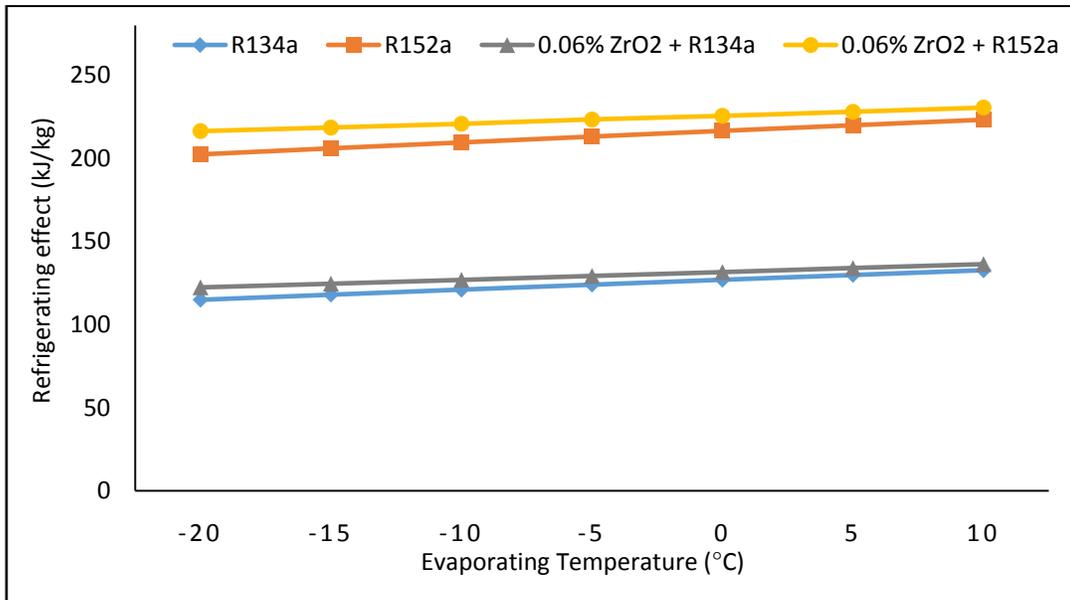


Figure 4.8 Variation of Refrigerating effect with evaporating temperature at condensing temperature of 50°C

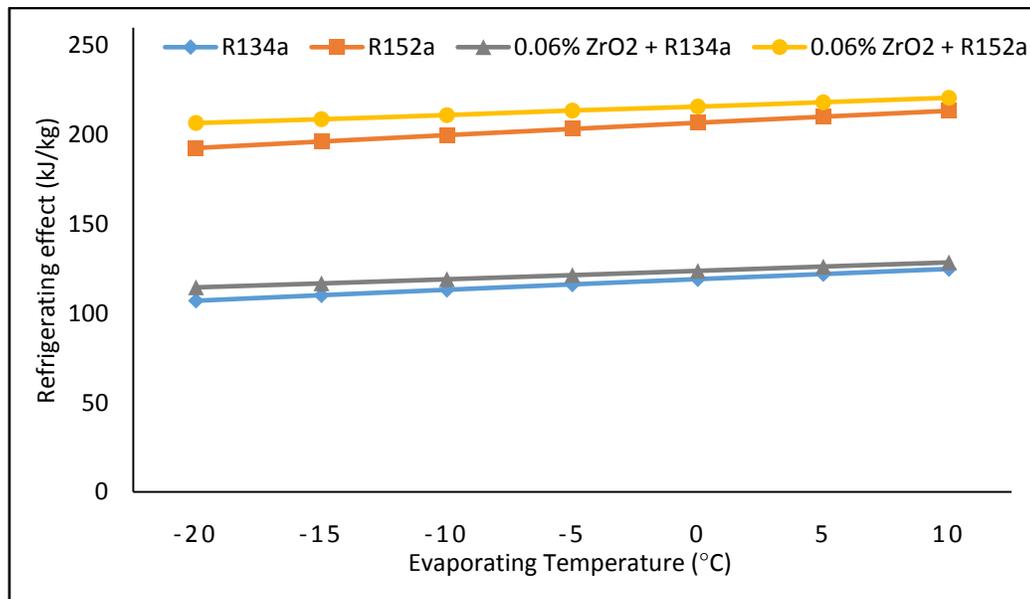


Figure 4.9 Variation of Refrigerating effect with evaporating temperature at condensing temperature of 55°C

CONDENSER DUTY (q_c)

Figure 4.10 shows the variation of condenser duty with evaporating temperature varies from -20°C to 10°C at 45°C condensation temperature. It was seen from the figure, the condenser duty of the system decreases when the evaporating temperature increases. The condenser duty of the system with ZrO₂+R152a Nano refrigerant is lower than that of R152a and higher than that of R134a. This same trend is observed in 50°C and 55°C condensation temperatures as shown in figures 4.11 and 4.12.

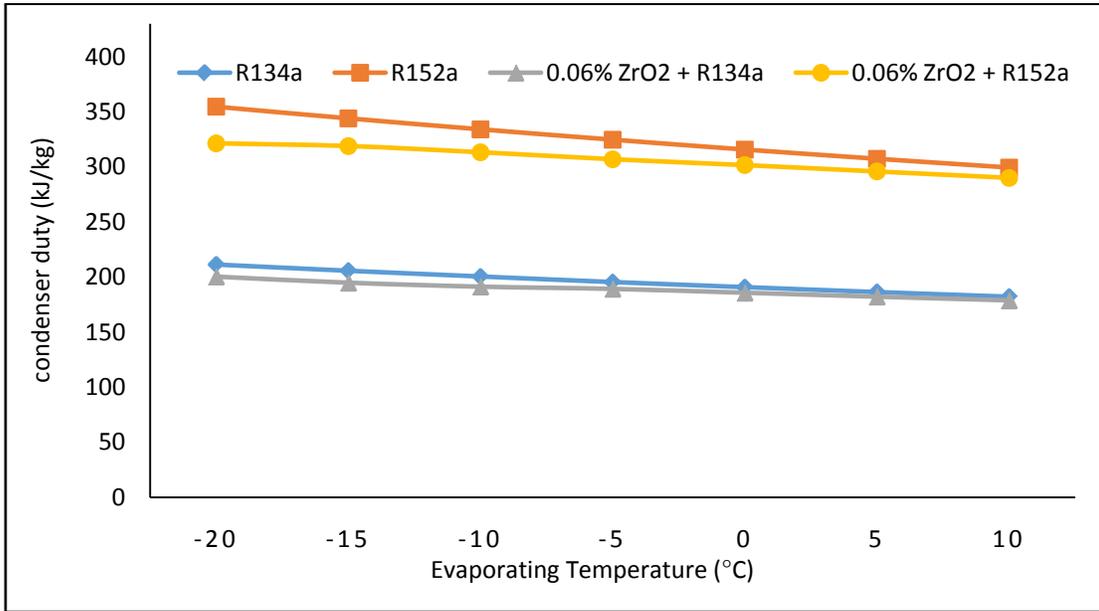


Figure 4.10 Variation of condenser duty with evaporating temperature at condensing temperature of 45°C

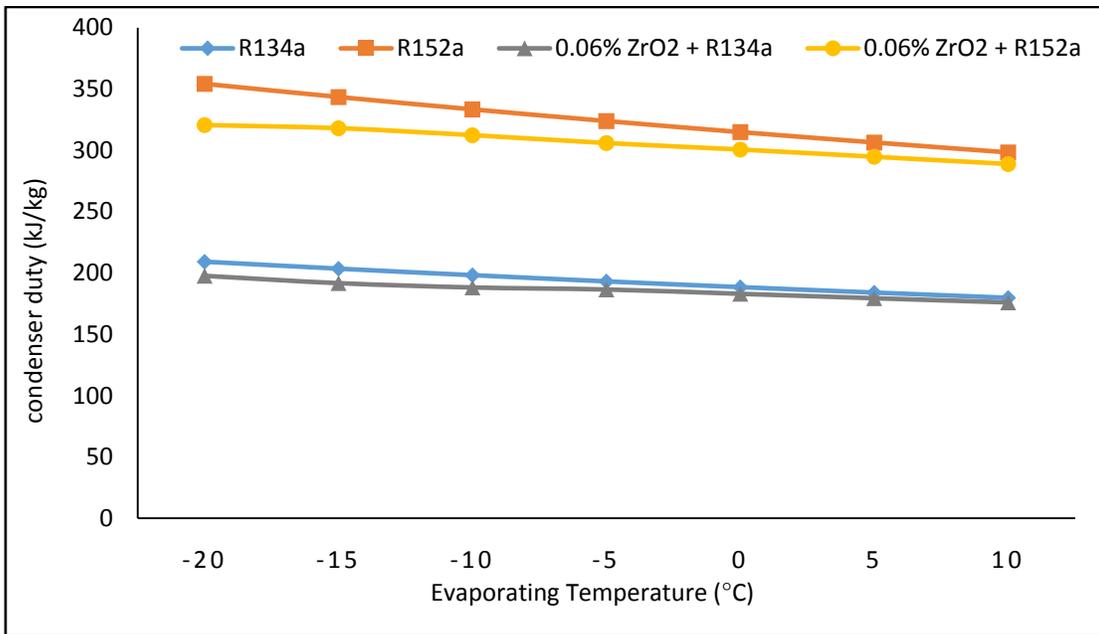


Figure 4.11 Variation of condenser duty with evaporating temperature at condensing temperature of 50°C

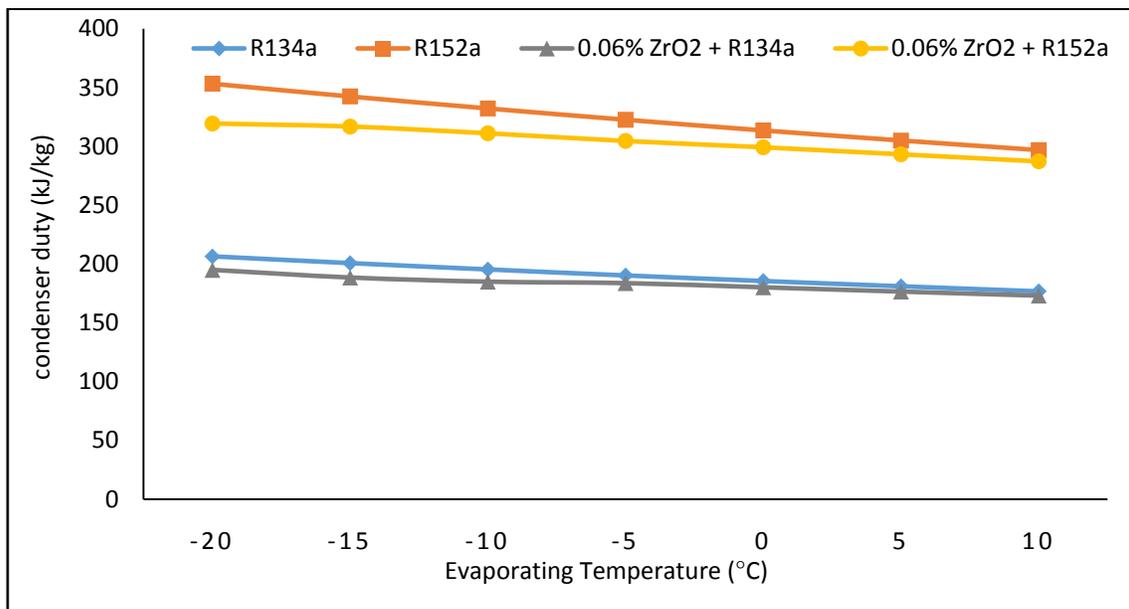


Figure 4.12 Variation of condenser duty with evaporating temperature at condensing temperature of 55°C

Some results study for the validation process of the current study can be seen in the table 1.

Table 1. The results from comparative study for the validation process of the current results.

Author's Name	Refrigerant	Study of System	T1 (°C)	Density of Nano Particle (ρ) (kg/m ³)	P1 (bar)	T2 (°C)	T3 (°C)	P3 (bar)	COP	Increase (%)
Melih Aktas et. al [15]	R134a	Theoretical	-7	—	2.25	81.21	45	11.60	1.96	—
Present Study	R152a	Theoretical	-7	—	2.038	97.79	45	10.37	2.087	6.85
Melih Aktas et. al [15]	R134a/ Al ₂ O ₃	Theoretical	-2.03	3690	2.72	76.23	45	11.49	2.29	14.41
	R134a/ Al ₂ O ₃	Theoretical	-3.96	2200	2.53	78.26	44.85	10.09	2.15	9.69
Present Study	R134a / ZrO ₂	Theoretical	0.6	5890	2.99	71.8	44.4	11.42	2.47	20.64
Present Study	R152a / ZrO ₂	Theoretical	5.87	5890	3.24	80.93	43.95	10.09	3.136	33.45

V. CONCLUSION

In this study, the effect of adding the ZrO₂ Nano particle to R134a and R152a was investigated by means of refrigeration effect, compressor work, condenser duty and COP comparisons. The prediction method based on nano refrigerant density was taken in to consideration in the calculations to define nano refrigerant enthalpies in the refrigeration cycle. R152a and R152a - ZrO₂ nano refrigerants had the highest COP under all conditions considered in this study. Although R134a showed the lowest compressor work, cannot be used in the applications anymore because of its GWP value. Results obtained using theoretical analysis were compared with the results available in the literature. The performance improvement of the refrigeration cycle by applying a nanoparticle is mainly due to heat transfer enhancement in heat exchangers and reduction of power consumption of the compressor by improvement of lubrication. These effects are included in the theoretical analysis as well.

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Performance Status of Public Elementary and Secondary Schools in the District of San Simon, Pampanga: An Analysis

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Abstract- Performance Status of schools reflects the kind of teachers and administrators that the schools have. This research used the mixed evaluation design: qualitative for statistical treatment and descriptive method as in the use of the “Performance Evaluation Instrument” and interviews to determine the relative performance of schools. The respondents of the study included 50 students from each of the thirteen elementary and five secondary schools in San Simon, Pampanga. This study used the SPSS (Statistical Package for the Social Sciences). The salient findings of the study were identified despite the fact that the survey showed satisfactory performance in the elementary and secondary level, the researcher found various gaps in all aspects: teacher’s behavior, facilities, and student’s services. The necessity to remediate and innovate as in the context of Continuous Improvement Program is emphasized. The researcher recommended various program enhancements in the spirit of continuous improvement anchored most especially on Systems Theory and Quality Management Theory in connection to the findings and conclusions to improve the performance status of public elementary and secondary schools in the District of San Simon, Pampanga.

Index Terms- Performance, School, Teachers, Administrators

I. INTRODUCTION

The quest for quality basic education evolves. The Department of Education pursuit for continuous innovation towards quality and excellence is based on its vision standards. It is aligned to the same vision and mission to deliver nothing but the best for the global Filipino.

Different factors should be considered in achieving excellence especially by schools in remote areas. It is believed that among the elements which can directly influence the performance of an institution are teacher’s behavior, facilities and student services. But of course, students are the most important element of any academic institution to whom efforts are directed and dedicated. Therefore, these aspects of the real educational arena play a very vital role to assure that students’ welfare is beyond all reasons to promote and to protect. And the best safeguard is abreast to the very fundamental step of management, performance assessment.

The performance of the school matters in the Department of Education, and every school aims to have a positive school performance. However, poor school performance still exists. Poor school performance (PSP) is defined as a school achievement below the expected for a given age, cognitive skills, and schooling.

Performance appraisal is the best source of managerial data. Both employees and employers play a vital role in the success or failure of an organization. And the only tool to scientifically address the situation is through purposive assessment and evaluation.

In Philippine Education setting, teachers’ behavior can be evaluated using the CB-PAST but it is designed for formative self-assessment and summative assessment made by the superior officer to the teachers. There are no specific tool from the DepEd to measure the same and the other two factors: facilities and student services available at the moment that is from the perspective of the students. DepEd could have forgotten the evaluation from the point of view the clientele as introduced in the 360-degree feedback to gather data in the form of school climate surveys.

According to Stronge (2007) the positive and negative behaviors exhibited by teachers determine to a great extent their effectiveness in the classroom and, ultimately, the impact they have on student achievement. Several specific characteristics of teacher responsibilities and teacher behaviors that contribute directly to effective teaching are listed for each of the following categories: The teacher as a person; Classroom management and organization; Planning and organizing for instruction; Implementing instruction; Monitoring student progress and potential; and Professionalism.

Teachers are the representatives of both their content areas and their schools. How teachers present themselves makes an impression on administrators, colleagues, parents, and students. Often a student links the preference for a particular subject to a teacher and the

way the subject was taught. A teacher who exudes enthusiasm and competence for a content area may transfer those feelings to the students.

On the other hand, it is a general rule that the physical plant and facilities of the school are such that they are adequate for the attainment of the objectives of the school. It is important to consider a good condition and adequacy of school facilities, because improving school facilities offers a feasible opportunity for improving the school performance. One of the school-related factors that greatly contribute to the performance of the institution is environment which must be conducive to learning. Stressing on a healthy-learning environment, Wong and Wong (2000) advocated that learning is most effective when it is placed in a supportive community, where there are abundant facilities which aid the learner in their progress. Students learn fast in a conducive environment.

In terms of admission, DepEd is abreast on the “No rejection Policy “ which empowered the students of a very fundamental right for basic education emphatically enumerated on the educational agenda of the President consistent to the policy on equal access.

Considering the career guidance, The Federation of According Agencies of the Philippines, “Survey Instrument for According Program in Liberal Arts, Education and Commerce, FAAP (1985) emphasizes that a sound and functional guidance program directed towards the welfare and the total personality development of the students is an indispensable student personnel service. Around us are critical conditions and situations, which are evidences of lack of direction. It is guidance services where we can find an asylum in the present stresses of our society (Santos, 2005).

It is in this light that the researcher aims to conduct a study regarding the performance of the public elementary and public secondary schools.

Conceptual Framework

The study was anchored in the system theory. This theory considers the organization as an integral purposeful system composed of a set of inter-related and thus mutually- dependent sub-systems.

These sub-systems can have their own sub-sub-systems which are interrelated and interacting components. This is an extension of the humanistic perspective that describes organizations as open systems characterized by entropy, synergy, and subsystem interdependence. An open system requires interdependence and interactions between organization and the environment for survival. While entropy is a characteristic of the system theory of organizations in a universal context to run down and die gradually. Synergy, on the other hand refers that the whole is greater than the sum of the parts as described in the work of Daft (2008). This is the basis that any change or innovation in the organization affects the other parts and therefore the school as an organization must be managed as a system with interrelated aspects and programs.

The study adopted the IPO model.

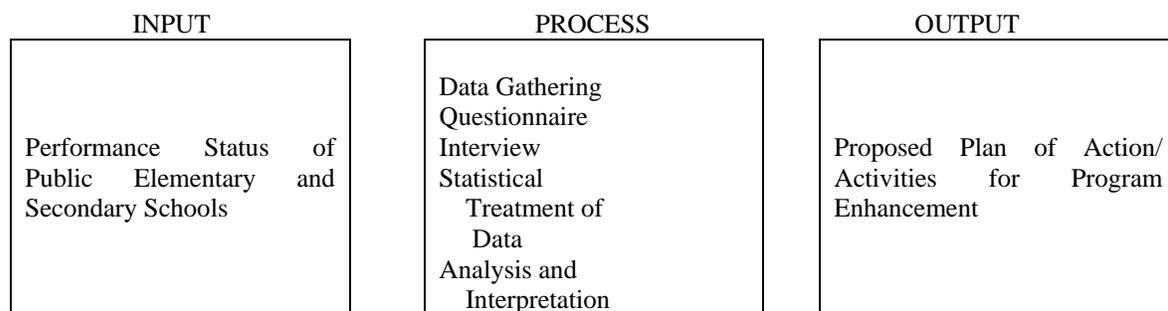


Figure 1. Paradigm of the Study

Statement of the Problem

The study specifically sought answer to the following questions:

1. How may the teachers' behavior of both elementary and secondary be evaluated?
2. What is the performance status of the District of San Simon in terms of facilities?
3. What is the performance status of the District of San Simon in terms of student services, to wit:
 - 3.1. library;
 - 3.2. security;
 - 3.3. canteen;
 - 3.4. guidance and counseling;

- 3.5. health services;
 - 3.6. admission; and
 - 3.7. student organizations?
4. What program or plan of actions can be crafted to address possible gaps among these aspects that would benefit the students?

Significance of the Study

The result of the study will be relevant to the institution in pursuing quality and excellence. It could serve as a basis for the enhancement of institutional programs to resolve existing problems in DepEd.

Specifically, this will be beneficial on the following:

Students. This study will surely benefit the students as ultimate beneficiaries of scholastic innovations in the aspects of faculty behavior, school facilities and students' services.

Teachers. This study will help teachers to identify areas which need improvements especially on their behavior while engaged in classroom interactions.

Parents, Benefactors and the Government. They will surely get equity of what they spend daily and periodically in their associations, programs and ventures towards addressing social divides and academic gaps.

School Administrators. The result of the study will serve as reflection of the holistic performance of the school administrators and to identify the aspects that need improvements.

Future Researchers. The study will serve as basis for future study and will be added to the existing body of literature regarding the performance of the schools.

Scope and Delimitation of the Study

This study involved the thirteen (13) elementary and five (5) secondary schools in the District of San Simon, Pampanga in School Year 2014-2015.

The questionnaire was limited to contain only aspect on teachers' behavior, school facilities and students' services. Other aspects relative to instructions, transparency and accountability were also delimited. The researcher strongly believed that transparency and accountability are seriously managed by COA (Commission on Audit) that any recommendation from the researcher is futile because of its independence.

II. METHODS

Research Design

The study used the mixed-method which utilized both the quantitative and qualitative methods of research in determining status of performance for the different public schools in San Simon, Pampanga. This study deals with the teachers' behavior, facilities and student services which comprise of the admission, library, security, canteen, guidance and counseling, health services and student organizations provided in CHED Memorandum Circular No. 21, s. 2006.

Mixed method aims to describe research designs that consciously blend both approaches within or across the stages of the research process (Johnson and Onwuegbuzie 2004). The use of mixed-method: quantitative and qualitative methods provide a more complete understanding of the research problems than those which use either approach alone.

Population and Sample of the Study

Elementary and secondary students were the main respondents using the survey questionnaire randomly selected students followed by the interview with some students and two teachers in each school following the purposive sampling technique. Fifty students from each school were considered as respondents as reflected on Table 1.

Table 1 presents the participants in the school climate survey from the different elementary and secondary schools in the District of San Simon.

Table 1

List of Participating Schools and Number of Student and Teacher Participants

Participating School	N (S)	n (S)	%	N (T)	n (T)	%
1. Concepcion Integrated School/ Elementary	922	50	5.42	22	2	9.09
2. Concepcion Integrated School /High School	418	50	11.96	15	2	13.33
3. Dela Paz Elementary School	834	50	6.00	20	2	10.00
4. Dela Paz High School	922	50	5.42	30	2	6.67
5. San Agustin Elementary School	282	50	17.73	7	2	28.57
6. San Isidro Elementary School	376	50	13.30	10	2	20.00
7. San Jose Elementary School	243	50	20.58	7	2	28.57
8. San Juan Elementary School	260	50	19.23	8	2	25.00
9. San Miguel Elementary School	564	50	8.87	15	2	13.33
10. San Pablo Elementary School	492	50	10.16	14	2	14.29
11. San Pedro Elementary School	981	50	5.10	24	2	8.33
12. San Pedro High School	624	50	8.01	24	2	8.33
13. San Simon Elementary School	657	50	7.61	19	2	10.53
14. San Simon High School	876	50	5.71	29	2	6.90
15. Sta. Cruz Elementary School	180	50	27.78	6	2	33.33
16. Sta. Monica Elementary School	571	50	8.76	14	2	14.29
17. Sta. Monica High School	215	50	23.26	9	2	22.22
18. Sto. Nino Elementary School	424	50	11.79	11	2	18.18

Research Instrument

The instrument of the study was based on the original standard set by UP and that from CHED Memorandum Circular No. 21, s. 2006 as shown in Appendix B. Minor inclusion and exclusion of other factors indicative of administrative duties were considered in the revised instrument of the study. The said “Performance Evaluation Instrument” was used as the Data Gathering Instrument. Availed in Kapampangan as shown in Appendix C for element schools and English for high school as shown in Appendix D.

A series of interviews were conducted to attest the results based on students’ responses during the survey.

The said instrument was used to evaluate the performance of public schools in San Simon, Pampanga in the aspect of teachers’ behavior, facilities and student services.

Data Gathering Procedure

A formal communication requesting permit to conduct survey was sent to the Office of the Schools Division Superintendent through the Record Section and was approved. The same was shown to the school administrators for this purpose. The plan was executed properly among the 13 elementary schools and 5 secondary schools in the District of San Simon for the School Year 2014-2015 as scheduled.

A series of non-formal interviews to ascertain if the responses of the students conform with the real school climate were conducted based on the scheduled plan.

Data Processing and Statistical Treatment

The statistical treatment included computation of mean to simplify the data and used the SPSS to establish the correct summaries of responses of the students from different locale followed by the series of non-formal interviews of teachers in the presence of some

students using the same Performance Evaluation Tool as guide to ascertain the responses of the students as results of the survey questionnaire tabulated accordingly containing the frequency distribution and the corresponding verbal interpretations according to the students' perception matrix.

The tabulated responses in the frequency distribution tables from the different schools weresubjected to the digital process of the SPSS (Special Package for Social Sciences)to determine the mean score of every item in the Performance Evaluation Tool . All data from the different schools were analyzed and presented in tables with their respective frequency responses. Each of the aspects in the Performance Evaluation Tool was tabulated, leveled, and numbered respectively to facilitate the analyses, interpretation and discussion separating the data of the elementary schools from the secondary schools.

Arithmetic Mean was used to provide information on the level of performance on teachers' behavior, facilities , and student services in each school following a very specific scale indicative of the respondents degree of agreement or disagreement to each of the items contained in the Performance Evaluation Tool in accordance to the 5-point Likert Scale interpreted as shown:

Scale	Descriptive Rating
5	Strongly Agree
4	Somewhat Agree
3	Cannot Agree nor Disagree
2	Somewhat Disagree
1	Strongly Disagree

III. RESULTS AND DISCUSSION

The performance status of the public schools in San Simon, Pampanga in the aspect of teacher's behavior, facilities and student services was assessed. The data on the status of performance of the different schools were gathered involving fifty randomly selected students from each elementary and secondary public school in the District of San Simon, Pampanga followed by an interview using the same Performance Evaluation Tool as guide for verification.

Findings focused on status of the performance of the schools in terms of teachers' behavior, and evaluation of facilities of the school followed by the evaluation of the student services.

Table 2
 Frequency Distribution and Descriptive Rating for Teacher's Behavior

Indicator	Mean	Descriptive Rating
Elementary	3.5	Very Satisfactory
Secondary	3.7	Very Satisfactory
General Weighted Mean	3.6	Very Satisfactory

Table reflects that in terms of teachers' behavior, elementary accumulated a mean of 3.5, which is interpreted as "Very Satisfactory", while the secondary has a mean of 3.7, which is also "Very Satisfactory. The general weighted mean of 3.5 shows that the elementary and secondary teachers' behavior are both "Very Satisfactory".

Table 3
 Frequency Distribution and Descriptive Rating for Facilities

Indicator	Mean	Descriptive Rating
Elementary	3.1	Satisfactory
Secondary	3.5	Very Satisfactory
General Weighted Mean	3.3	Satisfactory

Table 3 reflects that facilities in elementary schools are "Satisfactory" based on its mean of 3.1, while the secondary schools garnered a mean of 3.5 which is interpreted as "Very Satisfactory". Considering the general weighted mean of 3.3, the respondents indicate that the facilities are "Satisfactory".

Table 4

Frequency Distribution and Descriptive Rating for Library

Indicator	Mean	Descriptive Rating
Elementary	2.3	Fair
Secondary	2.4	Fair
General Weighted Mean	2.4	Fair

Library is described as “Fair” both in elementary and secondary schools based on its general weighted mean of 2.4. The library in elementary schools has a mean of 2.3, while the secondary school has a mean of 2.4.

Table 5
 Frequency Distribution and Descriptive Rating for Security

Indicator	Mean	Descriptive Rating
Elementary	2.9	Satisfactory
Secondary	3.3	Satisfactory
General Weighted Mean	3.1	Satisfactory

Findings reveal that the security is rated as “Satisfactory” in elementary schools based on its mean 2.9, while the secondary schools accumulated a mean of 3.3 or “Satisfactory”. It shows that the respondents assessed the security as “Satisfactory” as shown in its mean of 3.1.

Table 6
 Frequency Distribution and Descriptive Rating for Canteen

Indicator	Mean	Descriptive Rating
Elementary	3.2	Satisfactory
Secondary	3.3	Satisfactory
General Weighted Mean	3.3	Satisfactory

It is glaring from the table that the canteen services in elementary is “Satisfactory” as shown in its mean of 3.2. The secondary schools canteen services garnered a mean of 3.3 or “Satisfactory”. Findings show that the respondents assessed the canteen services with a mean of 3.3 or “Satisfactory”/

Table 7
 Frequency Distribution and Descriptive Rating for Guidance and Counselling

Indicator	Mean	Descriptive Rating
Elementary	1.5	Poor
Secondary	1.8	Fair
General Weighted Mean	1.7	Fair

It shows in Table 7 that the guidance and counselling noted a mean of 1.7 or “Fair”. Elementary rated the guidance and counselling as “Poor” or 1.5, while the secondary marked a mean of 1.8 or “Fair”.

Table 8
 Frequency Distribution and Descriptive Rating for Health Services

Indicator	Mean	Descriptive Rating
Elementary	1.8	Fair
Secondary	2.5	Fair
General Weighted Mean	2.2	Fair

Table 8 reveals that the health services in elementary and secondary are both “Fair” as shown in their mean 1.8 and 2.5 respectively, where in the general weighted mean of 2.2 is also interpreted as “Fair”.

Table 9
 Frequency Distribution and Descriptive Rating for Admission

Indicator	Mean	Descriptive Rating
Elementary	3.6	Very Satisfactory
Secondary	3.9	Very Satisfactory
General Weighted Mean	3.8	Very Satisfactory

The admission in elementary is rated 3.6 or “Very Satisfactory”, while the secondary has a mean of 3.9 or “Very Satisfactory”. Table shows that the general weighted mean of 3.8 indicates that it is “Very Satisfactory”.

Table 10
 Frequency Distribution and Descriptive Rating for Student Organization

Indicator	Mean	Descriptive Rating
Elementary	2.1	Fair
Secondary	2.7	Satisfactory
General Weighted Mean	2.4	Fair

Student organization is rated as “Fair” based on its mean of 2.4. Elementary rated the student organization “Fair” as shown in its mean of 2.1, while the secondary garnered a mean of 2.7 or “Satisfactory”.

IV. CONCLUSIONS AND RECOMMENDATIONS

Conclusions

In the light of the findings of the study, the following conclusions were reached:

1. Schools’ performances comparatively differ relative to the needs of modern educational arena in the aspects of teacher’s behavior. Both elementary with 2.5 and secondary with 3.7 performance. But gaps were found needing various interventions and innovations.
2. Schools’ performances comparatively differ in aspect of school facilities. Elementary with 3.1 and secondary with 3.5 were satisfactory and very satisfactory respectively. But gaps were found needing various interventions and innovations.
3. Schools’ performances comparatively differ in students’ services. Elementary with 2.5 and secondary with 2.8 were fair and very satisfactory respectively. But gaps were found needing various interventions and innovations.
4. Various gaps in performance needs interventions and innovations to address specific issues, concerns and social divides.

Recommendations

Based on the findings and conclusions of the study, the following recommendations are offered:

1. Consider research-based enhancement programs relative to facilities to address educational gaps and social divides in all aspects especially on modern facilities like projectors, computers and internet. Schools must consider the following program enhancements relative to facilities in the context of continuous improvement both in elementary and secondary levels
2. Improvement of the school services should be considered especially on the services that are rated as “Fair” or “Poor”.
3. Clinic for each school and guidance counsellor must be observed.
4. Similar study must be conducted to explore the variables of the research.

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Assessment of Arsenic Contamination in Relation to Soil Properties of Kustia and Rangpur Districts

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Abstract- The total arsenic (As) contents of collected soil series were determined using FI-HG-AAS (Flow Injection Hybrid Generation Atomic Absorption Spectrometry) method to find out whether the soils are contaminated or not in soil of different series in Kushtia and Rangpur, Bangladesh. Besides arsenic, the other elements vizs. soil properties like soil pH, organic carbon, total nitrogen content and exchangeable cations like Ca, K and Na were also estimated in the Soil Science laboratory at Bangladesh Institute of Nuclear Agriculture (BINA), Mymensingh. Results showed that the As level of Kushtia district ranged from 11.03 mg/kg - 21.06 mg/kg. The lowest As contaminated soil series in Kushtia district was Gopalpur 1 (11.03 mg/kg) and the highest contaminated soil series in Kushtia district was Ishurdi (21.06 mg/kg). In Rangpur district, the As level ranged from 1.80 mg/kg - 6.57 mg/kg, where all the soil series were non-contaminated. Kaunia 2 (6.57 mg/kg) and Belabo 1 (5.10 mg/kg) soil series were slightly contaminated with refers a level of 6 mg/kg and Belabo 2 (4.72 mg/kg) soil series were also slightly contaminated with refers a level of 5 mg/kg. The total As contents in the different surface soils were varied mainly due to local differences in the soil types, biogeochemical activities and farm management practices

50,000 have so far been brought under investigation by different Government and non-Government agencies. The rest are still beyond the survey. The actual picture of the severity of arsenic pollution is yet to be revealed as the entire country could not be surveyed till now.

The reasons for arsenic contamination of ground water in Bangladesh are yet to be identified. The source of arsenic contamination in the seven districts of West Bengal is noted to be geological. Bore-hole sediment analysis at several arsenic contaminated areas showed high arsenic concentration in soil layers where it was found to be associated with iron pyrites. The reason why arsenic is leaching out from the sources is not yet clear. Several studies have indicated that due to heavy extraction of groundwater, there is marked fluctuation of water level (Ali, 2009). As a result there is aeration of soil leading to decomposition of the pyrites that causes leaching of arsenic. Bangladesh is geographically adjacent to west Bengal having similar aquifers and socio-economic background.

Environmental pollution has become a major problem along with increase of the world population. Many reports (Ali, 2009) indicate the large variability of groundwater arsenic problem on both local and regional scales. After 1995, the crisis has emerged into broad public awareness. It has been estimated that water poisoning is affecting as many as 85 million people, nearly 13 million of which is contaminated with arsenic. The scale of disaster in the country is beyond that of the accidents in Bhopal and Chernobyl. It is likely that irrigation with this ground water may increase the As level in soil and this toxic element may consequently be health hazard after entering into the food chain through crop uptake.

Ground water is the source of drinking water for more than 97 percent of rural population who do not have access to public water supply system. These groups of people are at risk by exposed to arsenic pollution. So it is necessary to find out arsenic problem in the different soils of Bangladesh. Therefore, this study was undertaken with a view to assess the As concentration of Kushtia and Rangpur district's soil.

The main objectives of the study are:

- to find out the arsenic status of the soil in the studied areas; and
- to assess the arsenic contamination in soils of Kushtia and Rangpur districts in Bangladesh.

I. INTRODUCTION

Groundwater arsenic contamination is a severe problem in Bangladesh. Presently, above 50 million people in 60 districts are affected by arsenic contamination. The severely arsenic affected areas are in the southeast and southwest parts of the country. Besides domestic use (drinking, cooking, washing, etc.), a significant quantity of groundwater is utilized in agricultural sector, especially for irrigation. This toxic element may enter into the food chain (Huq *et al.*, 2006), thus posing a significant threat to human health.

Arsenic problem has emerged as a fresh blow to Bangladesh, a country of 140 million populations, known as a land of frequent natural calamities. Recent surveys showed that about 90 million people of the country are living under the risk of arsenic problem as the groundwater of a vast region contaminated with arsenic and the arsenic pollution is not only causing serious health hazard to the people, but also affecting the environment and creating social problems.

More than 2 million tube-wells are presently being used as the source of drinking water in Bangladesh. Out of those, only

II. MATERIALS AND METHODS

It deserves very careful consideration in scientific research. The methods and procedures followed in conducting this study have been presented in this chapter with a conceptual framework. A study was initiated for the assessment of arsenic status of Kushtia and Rangpur districts whether the soils have undergone any contamination or not.

3.1 Sample preparation and laboratory analysis

Air-dried soil samples were ground and passed through 100 mesh sieve and stored in a plastic bottle for laboratory analysis. Approximately 0.5 grams of air-dried soil samples were taken in a glass bottle for oven drying. After oven drying at 50^o C for 24 hours, all the samples were crushed and made into a fine homogenous powder within approximately 12 minutes using an agate mortar and a pestle. The agate mortar and pestle were cleaned with ethanol to ensure that the trace metal contamination did not originate from the grinding process.

3.2 Methods of analysis

3.2.1 Soil pH

Soil pH was determined by glass electrode pH meter as described by Jackson (1962). Twenty gram air-dry soil was taken in a beaker and 50 ml distilled water was added to it. The suspension was stirred well for several times during the next 30 minutes and allowed to stand for about an hour. Then the electrode was immersed into the partly settled soil suspension and pH was measured. The result was reported as "Soil pH measured in water" (Soil-water ratio being 1: 2.5)

3.2.2 Organic carbon

Organic carbon was determined titrimetrically by Walkely and Black's (1935) wet Oxidation method with oxidation of organic carbon with potassium dichromate (K₂Cr₂O₇). According to procedure 2 g soil along with 10 ml 1 N K₂Cr₂O₇ solution and 20 ml of conc. H₂SO₄ was taken in a 500 ml conical flask. After 30 minutes rest, about 200 ml distilled water and 10 ml conc. H₃PO₄ were added. Then 40 drops of diphenylamine indicator (C₁₂H₁₁N) was added and titrated against XN ferrous sulphate solution until purplish blue color was turned to fresh green color. The organic matter content of each sample was calculated by multiplying the content of organic carbon by Van Bemmelen factor, 1.73 (Page *et al.*, 1982).

3.2.3 Total nitrogen content

Total nitrogen content was determined by micro-Kjeldahl method. The soil was digested with H₂O₂ and conc. H₂SO₄ in presence of a catalyst mixture (K₂SO₄: CuSO₄. 5H₂O: Se in the ratio of 10: 1: 0.1) and the nitrogen in the digest was determined by distillation with 40% NaOH followed by filtration of distillate trapped in H₃BO₃ with 0.01 N H₂SO₄ (Bremmer and Mulvaney, 1982).

3.2.4 Exchangeable Ca, K and Na content

Exchangeable calcium, potassium and Sodium were determined by ammonium acetate extraction method. In this method, soil sample was saturated with NH₄Oac solution and the supernatant clear solution was separated and collected. The NH₄Oac solution was added again to make the final volume up to

100 ml for each sample. For the cation of Ca⁺⁺, K⁺ and Na⁺ the flame photometer was separately adjusted and different standard curves were prepared to find out the concentration of the cation but the extracting solution used for each sample was same. From each reading the concentration of each ion was obtained from their respective standard curves and was expressed as me%.

3.3 Analysis of arsenic

3.3.1 Reagents

All reagents were of analytical reagent grade. Distilled deionized water was used throughout. Standard solutions were prepared by dissolving appropriate amounts of As₂O₃ (Merck, Germany), standard arsenic (V) Titrisol (Merck, Germany), CH₃AsO₃Na₂.6H₂O (Carlo-Erba, Italy) and (CH₃)₂AsO₂Na.3H₂O (Sigma, USA). Standard stock solutions were stored in glass bottles and kept refrigerated. Dilute arsenic solutions for analysis were prepared daily. Cation [Dowex X-50w (H⁺ form)] and anion [Dowex-1 (Cl⁻ form)] exchange resins (Sigma, USA) were used. Sodium diethyldithiocarbamate (Merck, Germany) was used as a 0.5% (w/v) solution and purified shaking with chloroform. Ashing acid suspension was prepared by stirring 10% (w/v) Mg(NO₃)₂.6H₂O and 1% (w/v) MgO in water until homogenous.

The reducing solution was sodium tetrahydroborate (Merck, Germany) 1.25% (m/v) in 0.5% (m/v) sodium hydroxide. The HCl concentration was 5 M. Sodium acetate-acetic acid buffer at pH 5.5 was prepared by mixing acetic acid (0.2 M) until the pH was 5.5; citric acid-citrate buffer at pH 3.0 was prepared by using 40% (w/v) citric acid and adjusting the pH with NaOH solution. The buffers were purified by extraction with Na-DDTC and chloroform.

3.3.2 Speciation of arsenic content

A 250-ml aliquot of filtered preserved water sample adjusted to a pH of about 5.5 by adding dilute NaOH was transferred into a 500-ml separating funnel; 10 ml of sodium acetate-acetic acid buffer at pH 5.5 was added and the funnel was shaken; 5 ml of 0.5% Na-DDTC and 5 ml of chloroform were then added. The solution was shaken for 3 min. The procedure was repeated twice. All three chloroform extracts were combined and placed into a 50 ml round-bottom flask; chloroform was then removed by a rotary evaporator kept at 30^oC on a water bath. The dry residue was decomposed by warming with nitric acid (0.1 ml), cooled and then transferred quantitatively into a known volume (5-10 ml) with water. Then FI-HG-AAS was used for the determination of arsenic against arsenate standard. After arsenite was removed from the water by chelate extraction, the remaining arsenic was determined directly by FI-HG-AAS against an Arsenate standard or total arsenic was measured directly by injecting the aliquot into FI-HG-AAS against arsenate standard and arsenate was determined by subtracting arsenite from total arsenic. Blanks were determined under identical conditions (Gautam *et al.*, 1992).

III. RESULTS AND DISCUSSION

In this chapter, the research results with regards to evaluate the soil physical and chemical characters e.g. particle size

distribution (sand, silt and clay contents), soil pH, organic matter, total N and exchangeable cations (Ca⁺⁺, K⁺ and Na⁺) contents for the assessment of arsenic status in Kushtia and Rangpur districts.

4.1.1 Soil pH, organic carbon and total N contents in different surface soil series in Kushtia and Rangpur districts

The pH value, organic carbon and total N contents of the selected soil series are described in the study (Table 4). In Kushtia district, all the soil series were observed nearby in neutral condition and the range of pH values in Kushtia district are 6.69 to 7.49. Only Garuri 1 series were slightly acidic (pH value 6.69). In Rangpur district, all the soil series were observed in acidic in nature and the range of pH value in Rangpur district were 4.3 to 5.4. The organic carbon content in the soils of Kushtia district ranged from 0.58% to 1.76%. The highest value of organic carbon content in soil was found in Ghior soil series (1.76%). The organic carbon content in the soils of Rangpur district ranged from 0.59% to 1.25%. The highest value of organic carbon content was found in Chandra 2 soil series (1.25%). It was observed that the total nitrogen content in the soils of Kushtia district ranged from 0.084% to 0.140%. The highest value was found in Garuri 1 soil series (0.140%). In Rangpur district, the total nitrogen content ranged from 0.04% to 0.1%. The highest value was found in Kaunia 2 soil series (0.1%).

Soil pH, organic carbon and total N contents showed variations in the soils of different soil series in Kushtia and Rangpur districts. The variations in pH values might be due to the differences of the farm management practices in the studied areas. The process that can contribute to these variations might be due to the redistributions of soil pH, organic carbon and total N contents in the different sampling areas. The variations in organic carbon and total N contents were mainly due to the use of organic manures during the farming activities (e.g. different farm manures and fertilizers, etc.). The variations in the studied soils also might be due to the local differences in soil characteristics, changes in cropping systems (e.g. crop types, fertilization, irrigation, etc.) and other management practices in the farming communities.

Table 1. Soil pH, organic carbon and total N contents in different surface soil series in Kushtia and Rangpur districts

Soil series	Physiographic unit	pH	Organic C (%)	Total N (%)
Garuri 1	Ganges River Floodplain	6.69	1.25	0.140
Garuri 2	"	7.28	1.20	0.105
Sara	"	7.38	0.58	0.084
Gopalpur 1	"	7.51	1.04	0.091
Gopalpur 2	"	7.40	0.81	0.119
Ishurdi	"	7.49	1.21	0.088

Ghior	"	7.47	1.76	0.125
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4.1.2 Exchangeable cation (Ca, K and Na) contents in different surface soil series in Kushtia and Rangpur districts

The exchangeable Ca, K and Na contents in the soils of Kushtia and Rangpur districts are described in the study (Table 5). The exchangeable Ca content in the soils of Kushtia district ranged from 15.00me% to 20.00me%. The highest value was found in Ghior soil series (20.00me%). In Rangpur district, the exchangeable Ca content ranged from 0.48me% to 1.98me%. The highest value was found in Kaunia 1 soil series (1.98me%). The exchangeable K content in the soils of Kushtia district ranged from 0.41me% to 0.53me%. The highest value was found in Garuri 1 soil series (0.53me%). In Rangpur district, the exchangeable K content ranged from 0.07me% to 0.24me%. The highest value was found in Pirgacha 1 soil series (0.24me%). The exchangeable Na content in the soils of Kushtia district ranged from 1.33me% to 1.49me%. The highest value was found in Gopalpur and Ghior soil series (1.49me%). In Rangpur district, the exchangeable Na content ranged from 0.06me% to 0.20me%. The highest value was found in Kaunia 1 soil series (0.20me%). The exchangeable Ca, K and Na contents showed variations in the soils of different soil series in Kushtia and Rangpur districts. The process that can contribute to these variations might be due to the redistributions of exchangeable Ca, K and Na contents in the different sampling areas. The variations in the exchangeable cation contents in different soils might be due to the differences in the farm management activities (e.g. fertilizations, etc.). The soils of Kushtia and Rangpur districts are represented the intensity of various actions of different processes under the tropical environment and the intensification of the overwhelming human activities. The variations in the studied soils also might be due to the local differences in soil characteristics, changes in cropping systems (e.g. crop types, fertilization, irrigation, etc.) and other management practices in the farming communities. The findings of this study revealed that the natural biochemical activities played important roles in the soil texture (sand, silt and clay), soil pH, and contents of organic carbon, total N and exchangeable cations (Ca, K and Na). The study showed a wide variation in soil texture, organic carbon, total nitrogen and exchangeable cations (Ca, K and Na) within Kushtia and Rangpur districts. The soil characters might be due to the variations in the soil characteristics and management practices at the farm level.

Table 2. Exchangeable cation (Ca, K and Na) contents in different surface soil series in Kushtia and Rangpur districts

Soil series	Physiographic unit	Exch. Ca(me%)	Exch. K (me%)	Exch. Na (me %)
Garuri 1	Ganges River Floodplain	17.50	0.53	1.33
Garuri 2	"	16.25	0.44	1.43
Gopalpur	"	15.00	0.44	1.49
Ghior	"	20.00	0.41	1.49

4.2 Assessment of arsenic contents

4.2.1 General Arsenic contents in soil

The natural content of arsenic in soils is 5 mg/kg (Backer and Chesnin, 1975) or 6 mg/kg (Bowen 1979). Smith *et al.* (1998) reported a background arsenic level of 8 mg/kg for non-contaminated agricultural soils. The safe levels of arsenic in irrigation water, soils and foods are yet to be established for Bangladesh.

4.2.2 Arsenic contents of Kushtia and Rangpur districts

The arsenic contents of Kushtia district ranged from 12.03 mg/kg - 20.06 mg/kg, where all the soil series were highly contaminated (Table 6). The highest contaminated soil series in Kushtia district was Ishurdi (20.06 mg/kg). The lowest contaminated soil series in Kushtia district was Gopalpur 1 (12.03 mg/kg). In Rangpur district, the arsenic contents ranged from 1.81 mg/kg - 6.97 mg/kg, where all the soil series were non-contaminated. But according to Bowen (1979), Kaunia 2 (6.97 mg/kg) and Belabo 1 (5.15 mg/kg) soil series were slightly contaminated and Belabo 2 (4.72 mg/kg) soil series were also slightly contaminated according to Backer and Chesnin, 1975.

Comparison of total arsenic contents among the different soil series showed variations in Kushtia and Rangpur districts. The variations of the arsenic contents in the soils of different soil series might be associated with the local differences in parent materials (e.g. as-bearing minerals), farm management practices (e.g. use of arsenical pesticides), continental inputs (e.g. dry and wet deposition) and other biogeochemical activities.

Table 3. As contents of Kushtia and Rangpur districts

Kushtia district		Rangpur district	
Soil series	As level (mg/kg)	Soil series	As level (mg/kg)

Garuri 1	16.50	Pirgacha 1	3.43
Garuri 2	13.27	Pirgacha 2	4.44
Sara	16.31	Kaunia 1	3.17
Gopalpur 1	11.03	Kaunia 2	6.97
Gopalpur 2	18.28	Gangachara	3.55
Ishurdi	21.06	Belabo 1	5.10
Ghior	16.25	Belabo 2	4.72

4.2.3 Relationship between As distribution and soil properties

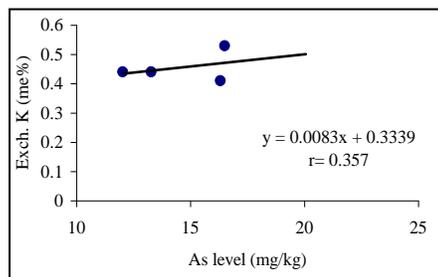
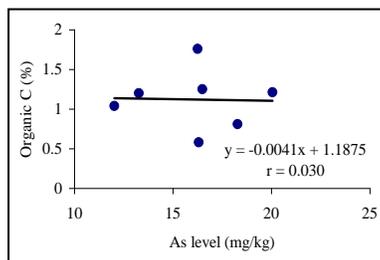
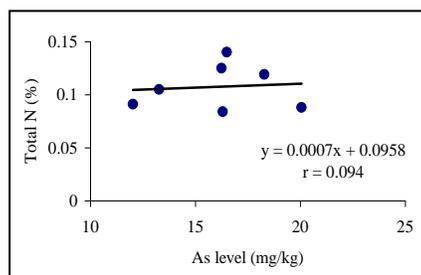
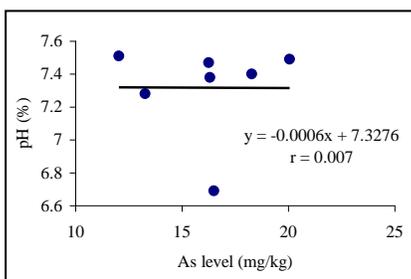
It has been reported that the soil composition such as sand, silt, clay contents, soil pH, organic carbon, total N and exchangeable cations (Ca, K, Na) are the major factors controlling trace elements in soils (Chen *et al.*, 1999). The variation in the As contents recorded in this study was, therefore, expected since the soils also varied considerably in the sand, silt, clay contents, soil pH, organic carbon, total N and exchangeable cations (Ca, K, Na) contents.

Table 4. Correlation coefficient (r) among the total As contents and the selected soil properties

Soil properties	r values	
	Kushtia	Rangpur
pH	0.007 ^{NS}	0.338 ^{NS}
Organic C (%)	0.030 ^{NS}	0.294 ^{NS}
Total N (%)	0.094 ^{NS}	0.076 ^{NS}
Exch. Ca (me %)	0.860*	0.513 ^{NS}
Exch. K (me %)	0.357 ^{NS}	0.121 ^{NS}
Exch. Na (me %)	0.476 ^{NS}	0.179 ^{NS}

* = Significant at 5% level of probability
NS = Not significant.

From the Table 7 it is found that, in Kushtia district, exchangeable Ca (r= 0.860*) was significant at 5% level of probability and other soil properties were not significant.



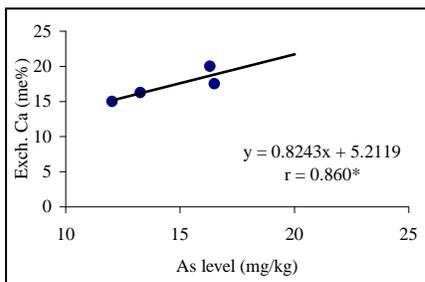


Fig.1. Relationship between As distribution and selected soil properties in Kushtia district.

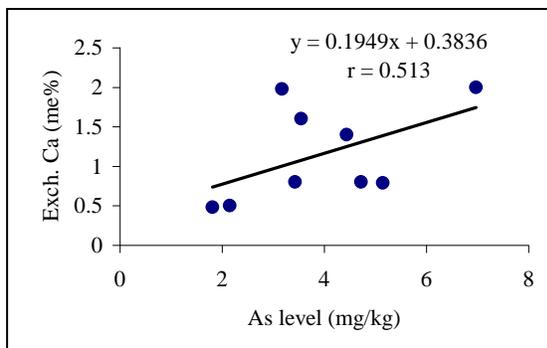
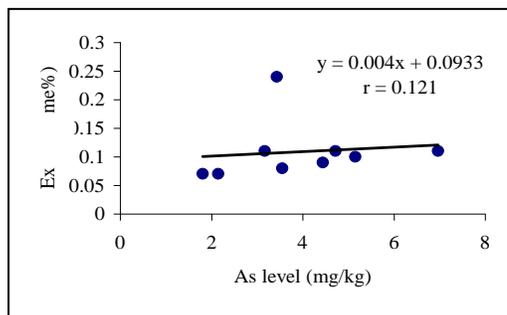
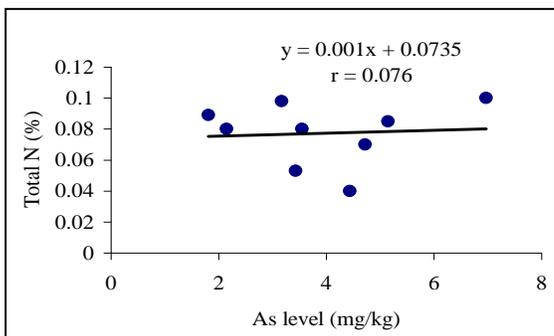
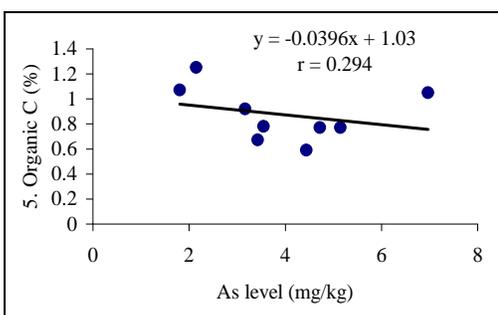
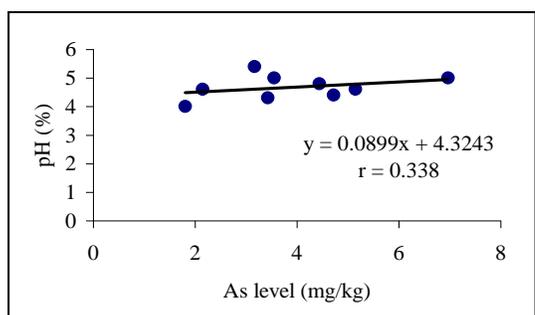


Fig.2. Relationship between As distribution and selected soil properties in Rangpur district.

IV. SUMMARY AND CONCLUSION

It can be concluded that in terms of the distribution of As in the soils of this study hold a clear benefit for the country. A clear

difference in the As contents was observed in the soils of Kushtia and Rangpur districts probably due to the differences in the soil types, biogeochemical and farm management practices. The difference in the As contents of different soil series might be due

to the variations in the landscape characteristics. In considering the present catastrophic ground water As contamination under the results of the soils of these two areas will play a significant role in Bangladesh. Routine research with wide public awareness, government participation and government regulations are essential for developing of safe and sound environment for the future.

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Rural Infrastructural Investment and Rice Production in Pakistan

An Econometric Analysis

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Abstract- This study estimated the impact of rural infrastructure investment on rice production in Pakistan by using Cobb Douglas production function for 1972-2014 in Pakistan. Different tests are used to check the stationarity of time series data. Autoregressive distributive lag (ARDL) technique is employed to estimate long run and short run relationship. It is observed that good infrastructure is encouraging the rice production in Pakistan. The study found that fertilizer usage, water availability for rice, area under rice production and health expenditure has positive whereas electricity consumption has negative effect on the rice production in the long run. However, impact of electricity on rice production is found positive in the short run but this impact is minute due to the unavailability of electricity, load shedding and some other reasons. All variables are affecting positively in the short run except fertilizer consumption.

Index Terms- Economics; Investment; Rural Infrastructural; Pakistan; Rice; Water, Electricity; Mary

I. INTRODUCTION

Agriculture sector is one of the important sectors of the economies around the world. According to FAO (2014) 2.57 billion people depends on agriculture which comprises of 42% of total population in the world. This dependence is direct as well as indirect because people use agriculture for food as well as it provides livelihood to a significant number of population around the globe.

Agriculture is highly significant in both developed and developing countries. Even agriculture is equally important in industrialized countries. As indicated by FAO (2014) agricultural export of industrial countries alone were worth about US\$290 billion in 2001. However, a clear decline in agriculture production has been seen in the past few decades. This decline is quite dominant in developing countries despite of having good climatic conditions for agriculture. According to World Bank (2013) the agriculture in developing countries like Pakistan, India and Bangladesh has drastically declined in the last two decades.

As far as Pakistan is concerned, its agriculture is an important component of GDP. It serves to fulfill the food needs and it is the main source of living for 66% of country's total population. Since Pakistan is an agricultural country thus most of its population is rural and affiliated to the farming and farm related activities. In relation to 1998 census of Pakistan, the total

population was one hundred and thirty million. Approximately 3.4 million people are adding to the population every year. This rise in population drives a concern that agriculture should also rise with the same rate.

Pakistan is majorly producing wheat, sugarcane and rice to serve the food needs of its rising population. As stated by Pakistan Federal Bureau of Statistics (2014) during the last two decades some vital infrastructural changes have been made in agriculture sector as well as crop sector of Pakistan. To increase the production of food crops like wheat, rice, livestock, sugarcane and fisheries, infrastructural changes have taken place and brought significant increase in production of some crops like wheat and cotton. Cotton is equally significant as wheat in terms of value added with 1/5 share of entire income. Rice and wheat are major crops used as food consumption. Both of the crops are equally important but still not much of the research has been done to find the ways for increasing the production of both crops. Therefore present study is focused on rice crop to fill in the existing gap in research to find out ways to increase this important crop.

Rice occupies about 11% of total cultivated area in the country and is planted on about 6.4 million acres with a production of about 6 million metric tons of milled rice. Approximately 2/3 of the production is consumed domestically and 1/3 of surplus is exported. Pakistan is the 4th largest rice exporting country in the world after Thailand, Vietnam and United States (AARI Annual Report, 2014). Annual exports of rice around 1 million ton/annum make rice yet another important crop to be highly progressive in production terms. However, about 5.541 million tons of rice was produced in 2010. This indicates that total rice produced to the set goal of 6.9 million tons.

Pakistan has experienced a decline of 19.7 percent during 2011-2012.¹ Due to this decline Pakistan's exports of rice have declined from US \$2.18 billion in 2009-10 to US \$1.92 billion in 2011-12. The target for producing rice in 2014 was set up to 6,200 (000) tons where as the total production was only 5,541 (000) tons. Therefore it is required to investigate the causes of reduction in the production and exports of rice.

Pakistan Economic Survey (2012) suggest that economic development strategies cannot be successful without giving due importance to infrastructure of agriculture sector. Moreover, agriculture has strong forward and backward linkages

1 Trade Development Authority of Pakistan

particularly with the industrial sector. According to Pakistan Economic Survey (2014), Public investment has recorded an impressive growth rate at 17.12 % as compared to negative growth of - 0.35 % during 2013. This indicates that there is a major shift in government expenditure priorities. But still there is a huge room for improvement because this amount still could not reach to the targeted number of 21.2%. This highlights that public investment is not up to the mark than required.

This is quite understandable that in developing countries like Pakistan public investment is one of the strongest instruments through which the government can achieve its development objectives in regard to production of important food crops but unfortunately reduced government development expenditure indicates that all these truths of the need of increased investment in rural infrastructure are being neglected in Pakistan from several past years (Federal Bureau of Statistics. Statistics Division, 2014). The decline in rice production point out that government attention has remained low for the provision of sufficient rural infrastructure.

Rural infrastructure can be improved through investment in two components of infrastructure i.e. social and physical infrastructure. Social infrastructure investment indicates investment in education and government health expenditures. On the contrary, physical infrastructure investment indicates investment to improve roads, electrification to villages, research and development in agriculture, provision of land, technology, irrigation facilities and market development. All these factors can play an imperative role in enhancing agricultural production in the country. There may be some drawbacks in the structural transformation of the rice production sector for the case of Pakistan. Nadeem, Mushtaq and Javed (2011) addressed these drawbacks by using social and physical rural infrastructure as an important determinant to increase the production but these studies were limited to Punjab only.

It is observed that social and physical infrastructure can increase the agriculture production. Educated and healthy farmers can produce more of the crop's output. Improved roads can help farmers to reach markets in time. Electrification to villages and subsidies on electricity can facilitate farmers for using tube wells for the production purpose. Provision of land at cheap rates can help framers to cultivate more land. The current study is important because no significant work has been done in Pakistan to find out the relationship among rice production and rural infrastructure investment in Pakistan. The present study has tried to remove the existing slit by identifying the affect of rural infrastructure investment variables on rice production in Pakistan.

II. REVIEW OF EMPIRICAL LITERATURE

Many studies on rural infrastructure empirically investigated the relationship between rural infrastructure and agriculture growth. According to these studies crop wise usage of fertilizers (Ali, 1995; Akino, 1979; Abbas, Din, Ghani & Qureshi, 1996), Water availability for rice (Binswanger & Pingli, 1988; Fan, Hazell & Thorat, 1998), area under rice crop (Akino, 1979; Froster, 1947; Hamley, 1993; Oshiro, 1985), agricultural electricity consumption (Binswanger & Pingli, 1988; Li & Liu, 2009), and rural health expenditures (Datta, 2007; Froster, 1947;

Hamley, 1993; Raymond, 2008) are important variables that effect the agriculture growth as well as rice production. Rural infrastructure increases the agriculture productivity on the whole. Dorosh (1996) found positive correlation of rural infrastructure development and agriculture as well as economic growth. Nagarbhavi (2003) studied different types of rural infrastructures and found that all types of infrastructure are important for each other and have positive effect upon agriculture and economic development. Javier (2005), Yuko and Kajisa (2012) also supported this relationship later on.

Fertilizer usage increases the rice production. Akino (1979) while doing case study of Japan found positive correlation between the fertilizer usage and agriculture production. Abbas et al. (1996) also supported these results. Ali (1995) found a negative relationship in contrast to the relationship between the fertilizer usage and rice production. The negative relationship was assumed to be due to excessive usage of fertilizer. Kouser and Mushtaq (2007) also determined a negative relationship between the two due to usage of fertilizer in off time.

Water availability is essential for rice production. Kessler and Hill (1979) during the study of Malaya found a significant importance of irrigation facilities for rice production. Kikuchi and Hayami (1983) while studying the shortage of water for crop production also found the positive impact of water supply upon production. Boyce (1988) while studying institutional alternatives in Asian rice found positive effect of water for rice production.. Fan et al. (1998) used water as a dummy variable for infrastructure and found positive impact of variable. Dutta and Bezbaruah (2006), Kouser and Mushtaq (2007) found positive correlation among water facilities and agriculture production. Faltermeier and Abdulai (2008) used the example of Ghana to state the positive relationship among agriculture production and water availability. Li and Liu (2009) in the study obtained highly significant coefficients for water supply which also showed the positive correlation. Nadeem et al. (2011) estimated the results on rural tube wells and agriculture production but data was only available for 1985-2005. To derive expenditure on water facilities, the study used percentage share of the water investment in rural areas with the total funds available for water facilities and found the positive results too.

Land is one of the important physical infrastructure variables for rice production. Forster (1947) estimated positive correlation among land and production. Scobie and Posada (1978) investigated the same relationship for the land availability and agriculture production. He also found positive results. Oshiro (1985) studying the case of Japan observed low interest loans to the farmers for buying more land increases the output. Looney (1994) found that agriculture growth and infrastructure are interlinked and rural infrastructure investment increases growth and vice versa. Wanmali and Islam (1997) and Bhatia (1999) used time series analysis to check the effect of rural infrastructure investment and total agriculture production and found that more land increases production and the areas where more subsidized land was provided had shown rapid improvement in growth.

Agriculture electricity consumption increases rice production. Rural electrification has direct effect on production. Binswanger and Pingli (1988) found the positive relationship of electricity and agriculture production in the short run but the

relationship becomes negative over time because in the long run electricity becomes expensive due to which the farmers decline the production. Sbia and Shahbaz (2013) used Co-integration and Causality Analysis from the agriculture sector of Pakistan and found that electricity is an important component for improvement in production as well as the economic growth. This study illustrated that share of energy consumption in agriculture sector has constantly turned down from 19 percent to 14 percent in 1972 and 11 percent to 1 percent in 2005 in the case of petroleum and electricity correspondingly. This decline is the major fact of expensive electricity. In order to maintain the production up to a level the government is bound to pay attention upon the infrastructure like cheap electricity provision. Li and Liu (2009) observed that electricity prices negatively effects the production. They concluded that cheap electricity increases production. Llanto (2012) used Panel data analysis of different countries that invested in electricity and showed a significant progress in agriculture. It was found that with low cost electricity farmers experience feasible options of production.

Rural health expenditures by government increase the rice production. Gramlich (1994) during the review of infrastructure investment found that rural health expenditures of government positively affect the production. Yusuf (1996) examined the response of different countries to the infrastructure investment and returns to agriculture output and found investment in rural health directly effects agriculture production. Barrett, Moser, McHugh & Barison (2004) concluded that better health facilities increase the energy level and aptitude of farmers to work for more hours on the farm. Fan et al. (1998) used farmers' health as a determinant of good production and found similar results. Jahan and Selim (2005) took share of farmers and found with more of healthy farmer's production increases. Results of both studies showed that farmers with good health positively affect the production. Ali (2005) used panel data approach for the estimation purpose by collecting data from four different villages and found positive correlation among farmer's health and agriculture production. Haggblade (2007) found positive impact of rural health facilities upon agricultural production. Datta (2007) estimated that good social infrastructure positively increase the rice production. Raymond (2008) discussed the similar results. Hamid and Ahmad (2009) assessed that for many countries human is a major capital for production. If farmers health is considered it brings about many benefits to the country. Nadeem et al. (2011) concluded that injecting investments in farmer's health helped not only framers to be physically fit and increased their livelihood but also helped the whole economy. Llanto (2012) also found that one unit increase in health facilities increases the agriculture activity more than one.

One thing can be determined from the literature review that there was a interrelationship of rural infrastructural development and production. In past studies researchers sometimes used panel data approach and mostly use time series analysis to estimate the relationship of production and rural infrastructure investment. From the reviewed literature it can be easily observed that signs of some variables varies from study to study.

This study is different be because very few studies are available for Pakistan, more specifically upon the relationship of rural infrastructure investment and rice production. Mushtaq, Abbas and Ghafoor (2007) used co-integration and causality

analysis of rice from Punjab, Pakistan and analyzed the importance of rural infrastructure for agriculture growth but the center of this study was to check the causality of infrastructure and rice production only for Punjab. Nadeem et al. (2011) checked the impact of rural infrastructure upon rice production and applied time series analysis but his study was still restricted to Punjab only therefore no study was found upon the interrelationship among rural infrastructure and rice production in Pakistan. This present study has put up the case of Pakistan to empirically examine the impact of rural infrastructure investment on rice production in Pakistan by using time series data.

III. METHODOLOGY AND DATA SOURCES

Time series data is taken from the past 42 years i.e. from 1972 to 2014 because the population increase and food decline has been seen during the past four decades (World Bank, 2014). This decline has led to the need of producing more food for the country. Rice is chosen to study the impact of infrastructure investment on its production and the results of this research are estimated partially by E. Views version 6.0 and partially by Microfit 4.0.

Estimating Model

The model of the study is stated in Cobb Douglas form as given below

The model is presented in to linear form by taking natural log of all variables².

$$\text{LNRP} = \beta_0 + \beta^1 \text{LNF} + \beta^2 \text{LNW} + \beta^3 \text{LNL} + \beta^4 \text{LNE} + \beta^5 \text{LNHE} + \beta_6 \text{FL} + \hat{u}_t \dots \text{Eq 1}$$

Where as

LNRP = Natural log of rice production

LNF = Natural log of crop wise usage of fertilizer

LNW = Natural log of water availability for rice

LNL = Natural log of area under rice crop

LNE = Natural log of agricultural electricity consumption

LNHE = Natural log of health expenditures by government

FL = Flood as dummy variable³

- (i) According to null hypothesis all rural infrastructural variables of equation 1 are assumed to be increasing function of rice production i.e. $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$, are expected to be positive The study is focused on detecting the long run and short run relationship among total rice production and independent variables. To address their relationship Pesaran and Pesaran (1995), Pesaran and Shin (1995, 2002) introduced a relatively feasible cointegration test known as Autoregressive Distributed Lag (ARDL) approach because it is used to test long and short run relationship between

2 Natural Log form of variables is taken to eliminate the non linear into linear form

3 Natural log of flood (FL) as dummy variable is not taken because its values can either be 0 or 1 and $\text{LN}(0) = -\infty$ and $\text{LN}(1) = 0$, in this case its impact cannot be determined with taking LN. Fundamentals of Linear Algebra by James B, Carrell (july,2005)

the variables. ⁴ ARDL technique is more convenient to apply upon this study because it can be applied upon variables regardless of their cointegration level.

Table 1 presents the detailed variables description, their theoretical perception and data sources.

⁴ Pesaran *et al.*, (1996, 2001)

Table 1 Variables Description, Definitions of variables, Units and Data Sources

Variable Name	Variable Description	Definition of Variables and their Units	Expected Signs	Data Source
LNRP	Rice Production	Production of rice is the yield or ending result crop cultivation. It is measured in yield per hectares	N/A	Ministry of Food and Agriculture (1972), (2014)
LNF	Crop wise usage of fertilizer	Fertilizer is a mixture of organic compounds spread into soil to increase its capacity to support crop growth. Its use is measured in nutrient tones (000N/T)	Positive	National Fertilizer Development Centre (NFDC), Planning & Development Division(2014)
LNW	Water availability for rice	Improved water source is construction of more tube wells. It is calculated in terms of number of tube wells million acre feet (MAF)	Positive	Planning & Development Division (Water) (1972), (2014)
LNL	Area under rice crop	Area under rice crop represents the land utilized to cultivate rice. It is measured in million hectares	Positive	Ministry of Food and Agriculture (1972), (2014)
LNE	Agriculture Electricity Consumption	Agriculture electricity Consumption represents the farmers consuming electricity. More consumption reflects that electricity is easily available at cheap rates. It is measured in Gigawatt Hour (Gwh)	Positive	Various Issues of Pakistan Economic Survey (PES)
LNHE	Development and non development health expenditures by government	Health expenditures reflect the expense by government for the provision of quality of medical facilities for villagers. It indicates the social rural infrastructure development for farmers. It is measured in million rupees	Positive	Various Issues of Pakistan Economic Survey (PES)
FL	Flood	Flood is an overflow of a large amount of water beyond its normal limits.	Any	National Monsoon Contingency Plan 2013, 2014(NMCP)

Flood is introduced in the model as dummy variable to undertake the sudden shocks like flood during rice production. The year 1973, 1975, 1976, 1977, 1978, 1981, 1983, 1984, 1988, 1994, 1995, 2010, 2011 and 2012, 2013, 2014 reflects the years in which flood came. The values of dummy variable FL in the given years of flood is taken as 1 and 0 otherwise. FL is taken to check whether or not floods had any effect on the total rice production in Pakistan during the years.

IV. EMPIRICAL RESULTS

The model applied in this study has empirically found the effect of rural infrastructure investment upon rice production in Pakistan. The results of Graphical plots, Correlograms, Augmented Dickey-Fuller and Phillips Perron tests results are

summarized in Table 2. After determining the stationary level ARDL is applied to estimate the long and short run relationship among the variables irrespective of the level whether I(0) or I(1). However, ARDL can collapse if variables are I(2) or higher. So it cannot be applied on the variables whose order of integration is 2. In this study all of the variables are integrated at I(1) so ARDL can be applied. ARDL use Error Correction Model (ECM) to determine short run relationship between variables. Lastly, CUSUM and QCUSUM graphs are plotted to check the structural stability of the model. The estimation of the model is started with the graphical analysis discussed in the next section. A summary of unit root test results related to order of integration is given in the following table. The final conclusion about the level of stationarity is drawn on the bases of majority test results.

Table 2 Decision about order of integration from all tests of Stationarity

Variables	Results of graph test	Results of Correlogram	Results of ADF	Results of PP	Final Conclusion
LNRP	I(1)	I(1)	I(1)	I(1)	I(1)
LNF	I(1)	I(1)	I(1)	I(1)	I(1)
LNW	I(1)	I(1)	I(1)	I(1)	I(1)
LNL	I(1)	I(1)	I(1)	I(1)	I(1)
LNE	I(1)	I(1)	I(1)	I(1)	I(1)
LNHE	I(1)	I(1)	I(1)	I(1)	I(1)

The results of Table 2 showed that all variables are integrated at 1st difference i.e. I(1). As none of the variables is integrated of higher order, so the study with no doubt has applied ARDL technique for examining rural infrastructural investment impact on rice production in Pakistan.

Results of Auto Regressive Distributive Lag Model (ARDL)

ARDL bond testing approach is performed to determine the long run relationship among the variables. The econometric ARDL model for the given study is as followed

$$\Delta LNRP = \beta_0 + a_1 \sum_{i=1}^p \Delta LNRP_{t-i} + \beta_1 \sum_{i=0}^p \Delta LNF_{t-i} + \beta_2 \sum_{i=0}^p \Delta LNW_{t-i} + \beta_3 \sum_{i=0}^p \Delta LNL_{t-i} + \beta_4 \sum_{i=0}^p \Delta LNE_{t-i} + \beta_5 \sum_{i=0}^p \Delta LNHE_{t-i} + \beta_6 FL + \gamma_1 LNRP_{t-1} + \gamma_2 LNF_{t-1} + \gamma_3 LNW_{t-1} + \gamma_4 LNL_{t-1} + \gamma_5 LNHE_{t-1} + u_t$$

The optimum lag length is selected through “Akaike Information Criterion (AIC), Schwarz Information Criterion (SIC) and Hannan-Quinn information Criterion” (HQIC). The results for the selection of optimal lag length for each model are given in Table 3. The study takes the optimum lag length of 2 as suggested by Hannan-Quinn Information Criterion and Schwarz Information Criterion (SC) for carrying on further estimation.

Table 3 VAR Lag Order Selection Criteria

Endogenous variables LNRP
Exogenous variables C LNF LNW LNL LNE LNHE FL
Date 05/22/15 Time 16 33
Sample 1972 2014
Included observations

39

Lag	LogL	LR	FPE	AIC	SC	HQ
0	60.51915	NA	0.004317	-2.610690	-2.318129	-2.504156
1	67.11135	10.61184*	0.003292	-2.883481	-2.535456	-2.761727
2	68.68792	2.460988	0.003208*	-2.911606*	-2.549125*	-2.774633*

* indicates lag order selected by the criterion

LR sequential modified LR test statistic (each test at 5% level)

FPE Final prediction error

AIC Akaike information criterion

SC Schwarz information criterion

HQ Hannan-Quinn information criterion

F statistic is obtained to test the joint hypotheses that all slope coefficients of lagged variables are equal to zero. Pesaran provide critical values based on their stochastic simulation. For this study Table 4 show that Pesaran critical values for this model are (90%, 95%).

Table 4 Bound Testing for ARDL Co-integration

Wald Test		Critical Bounds for 95% Significance		Critical Bounds for 90% Significance		Status	
Null Hypothesis	There exist no cointegration among the variables	Lower	Upper	Lower	Upper	Reject H ₀	
		F-statistic (6, 27)	Calculated F-Stat	Probability Value	2.73		3.90
Chi-square	90.17799	0.0000					

The results of diagnostic tests indicated that there is no autocorrelation and heteroscedasticity. After having the good diagnostic testing for the ARDL model the next step is to

estimate long-run coefficients of model. Table 6 presents the long-run results of the ARDL model.

Table 6 Estimated Long Run Coefficients using the ARDL Approach

ARDL(1,1,1,1,0,1,0) selected based on Schwarz Bayesian Criterion

Dependent variable is LNRP

41 observations used for estimation from 1974 to 2014

Regressor	Coefficient	Standard Error	T-Ratio[Prob]
LNF	0.010982	0.11510	0.95410[.925]
LNW	1.1186	0.35902	3.1156[.004]*
LNL	0.49228	0.25969	1.8956[.068]***
LNHE	0.57731	0.18278	3.1585[.004]*
LNE	-0.37049	0.11518	-3.2165[.003]*
FL	0.016362	0.028962	.56497[.576]
C	-0.89837	1.7224	-.52158[.606]

Note *, **, and *** show the 1%, 5% and 10% significance level respectively

The coefficient of intercept in the ARDL long run coefficients was negative. It suggests that if all other variables were equal to zero the total rice production would not be highly effected and would be reduced up to 0.898%.

The estimated coefficient of LNF which is proxy for technology showed that it had positive and insignificant effect on the LNRP in the long run. The study found that the coefficient of LNF showed that 1% change in the fertilizer usage brings about 0.010% changes in the total rice production.

There is a positive correlation between water availability for rice and total rice production. The coefficient of LNW showed that 1 percent increase in LNW resulted in 1.111% change in the total rice production. P-value of LNW is .004 which is highly significant at 1% significance level suggesting that in Pakistan the water availability or access to water supply for the famers involved in producing rice rapidly increase the total rice production. The results of LNW are similar to the studies of Ali (1995), Binswanger, & Pingali (1988), Fan, Hazell, & Thorat (1998), Kouser, & Mushtaq (2007), Li, & Liu (2009), Nadeem, Mushtaq & Javed (2011), Siddiqi (1993) analyzed that water availability and irrigation had significant impact on rice production. Kouser, & Mushtaq (2007) argued that it would have large effect on the agriculture output. This fact can be justified because mostly farmers are encouraged to cultivate rice if water is easily available for production. These results suggests in case for Pakistan the water availability or access to water supply for the famers involved in producing rice would rapidly increase the total rice production in the long run.

The results showed positive relationship between area under rice crop and total rice production. The coefficient of LNL showed that if there is 1% change in the area under rice crop and there would be 0.492% changes in the total rice production. The P-value for LNL is .068 indicating 10% significance level. Boyce (1988), Looney (1994), Musisi, (2006), Nadeem (2011), Oshiro (1985), Singh & Kalra (2002), Welch, et.al. (2010) found that the results of area under cultivation corresponds to agriculture investment have positive effect on production. Their results indicated that land is essential factor for production.

Coefficient of LNHE was positive and it was found that 1% change in the health expenditures result 0.57731% change in the total rice production. The P-value for LNHE is .004 which indicated that it was significant at 1%. Hamid and Ahmad (2009), Nadeem, Mushtaq & Javed (2011), Gramlich (1994), Barrett, Moser, McHugh, & Barison (2004), Haggblade (2007), Jahan and Selmi (2005) found health as an important driver for the production.

The impact of agricultural electricity consumption on total rice production in Pakistan is negative. P-value of LNE is 0.003 showing that it is statistically significant at 1% level. This result did not support the hypothesis because according to the null hypothesis there should be a positive relationship between agricultural electricity consumption and total rice production. The coefficient of LNE suggested if there is 1% change in agricultural electricity consumption there would be 0.37049% reduction in the total rice production. Douglas (1928) empirically found the negative relationship between electricity and rice production in the long run. The reason this study gave for the negative relation between the two is that electricity would become more expensive in the long run and for farmers profit margins decline for producing the rice crop. In this regard the farmer declines the rice production and with using expensive electricity rice production is reduced and other alternatives fuel or petroleum may be considered.

Flood in the study was expected to have negative sign but have positive sign according to the model. The ARDL long run coefficient of FL indicated that if the flood comes the rice production will be affected by 0.01636. This positive relation was maybe due to after effects of flood on rice. Flood increases soil fertility and water table that have positive effect on crops especially rice. So whenever flood comes farmers become happy due to its positive effects in the long run.

From the above analysis of long run relationship of rice production in Pakistan with water availability of rice, area under rice crop, agricultural electricity consumption and health expenditures are significant. On the contrary crop wise fertilizer usage and floods are insignificant over the selected sample.

It is important to check the relationship between rice production and explanatory variables in short run. For this purpose study estimated Error Correction Mechanism. Results of ECM were as follow.

V. RESULTS OF ERROR CORRECTION MODEL (ECM)

After having the long run parameters of rice production model the study proceeded to estimate the short run parameters for ECM equation. This is the third step for ARDL estimation. P is the suggested lag length of the model. The empirical results of short run estimates are given in table 7 The ECM equation for the rice production model is as follows

$$\Delta \text{LNRP} = \beta_0 + \alpha_{1i} \sum_{i=1}^p \Delta \text{LNRP}_{t-i} + \beta_{1i} \sum_{i=0}^p \Delta \text{LNF}_{t-i} + \beta_{2i} \sum_{i=0}^p \Delta \text{LNW}_{t-i} + \beta_{3i} \sum_{i=0}^p \Delta \text{LNL}_{t-i} + \beta_{4i} \sum_{i=0}^p \Delta \text{LNHE}_{t-i} + \beta_{5i} \sum_{i=0}^p \Delta \text{LNHE}_{t-i} + \alpha_3 \text{FL} + \alpha_2 \text{ECM}_{t-1} + u_t$$

ARDL model for ECM is (1,1,1,1,0,1,0). The estimated coefficient results of dLNF in the short run showed that it has negative but significant effect on the dLNRP in the short run.

The reasons for negative sign maybe because the farmers did not use fertilizer at right time or may have used wrong combination of fertilizer in the short run. This is happening due to the lack of information and knowledge for using the fertilizer. Another reason can also be the unavailability of sufficient funds to buy the crop booster on time. Coefficient of dLNF in short run showed that 1% change in the fertilizer usage result into 0.16925% change in the total rice production. These changes are negative. P-value of dLNF is 0.023 which showed it is significant at 5% significance level. The results of LNF are quite similar to findings of (Kouser, & Mushtaq, 2007) that there exists a negative relationship between the fertilizer usage and rice production.

In the short run there is a positive relation between water availability for rice and total rice production. The coefficient of dLNL showed that 1% change in water availability for rice would influence about 0.136% changes in the total rice production.

Table 7 Error Correction Representation for the Selected ARDL Model

ARDL(1,1,1,1,0,1,0) selected based on Schwarz Bayesian Criterion

Dependent variable is dLNRP

41 observations used for estimation from 1974 to 2014

Regressor	Coefficient	Standard Error	T-Ratio[Prob]
dLNF	-0.16925	0.070838	-2.3893[.023]**
dLNL	0.13621	0.10774	1.2643[.215]
dLNL	0.70638	0.99127	7.1260[.000]*
dLNHE	0.26018	0.10178	2.5563[.015]*
dLNE	0.038646	0.054988	0.70280[.487]
dFL	0.0073740	0.012947	0.56957[.573]
dC	-0.40486	0.76259	-0.53091[.599]
ecm(-1)	-0.45067	0.10252	-4.3957[.000]*
R-Squared	.81189	R-Bar-Squared	.74054
S.E. of Regression	.033409	F-stat. F(7, 33)	17.8808[.000]
Mean of Dependent Variable	.010662	S.D. of Dependent Variable	.065588
Residual Sum of Squares	.032368	Equation Log-likelihood	88.2789
Akaike Info. Criterion	76.2789	Schwarz Bayesian Criterion	65.9974
DW-statistic	2.3078		
R-Squared and R-Bar-Squared measures refer to the dependent variable dLNRP and in cases where the error correction model is highly restricted, these measures could become negative.			

Note *, **, and *** show the 1%, 5% and 10% significance level respectively

Positive coefficient of dLNL suggested that if there is 1% change in the area under rice crop and there would be 0.706% increase in the total rice production in the short run. The P-value for dLNL is .000 which indicated that it is highly significant at 1% significance level.

The coefficient of agricultural electricity consumption in the short run is positive but very small value of it; indicated that effect of agricultural electricity consumption on total rice production in Pakistan is very small in the short run. Result of this variable supported the hypothesis because according to the

null hypothesis. There should be a positive relationship between of agricultural electricity consumption and total rice production. The coefficient of $dLNE$ suggested that 1% change in agricultural electricity consumption resulted in 0.038% increase in the total rice production. Farmers avoid using large amount of electricity for producing rice due to which electricity does not heavily effect the rice production in the short run.

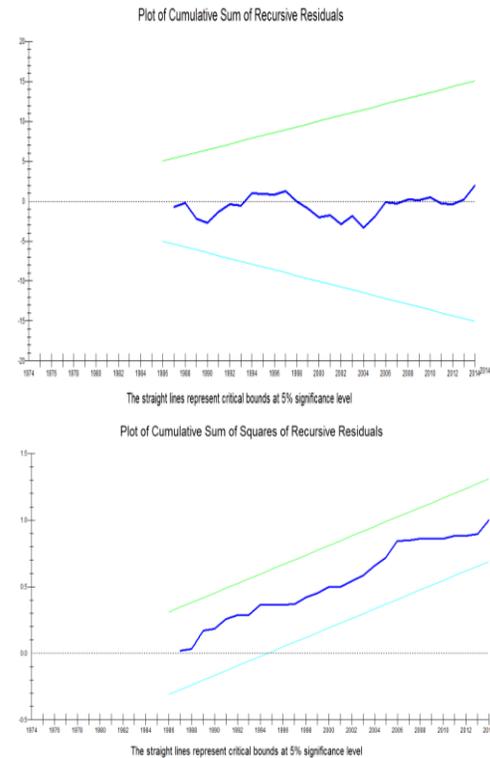
Coefficient of $dLNHE$ is also positive showing that 1% change in the health expenditures resulted about 0.2601 % change in the total rice production. The P-value for $dLNHE$ is 0.015 indicating significance at 1% level.

The ARDL short run coefficient of FL indicated that if the flood comes the rice production will be affected by 0.0073. Flood has a very minute affect upon the production of rice in the short run. The reason for the very small coefficient was may be due to the time of flood arrival. If it comes at early stages or harvesting time it will destroy the crop but if it comes in between these stages it is less harmful (Pakistan Economic Survey 2013-14)⁵. The coefficient of intercept in the ARDL short run coefficient is negative suggesting that if all other variables are equal to zero the total rice production would not be highly effected and would be reduced up to 0.40486% in the short run.

The process of short-run adjustment can be observed from the Error Correction term. In case of this model Error Correction term is -0.45067 and was statistically significant. This indicated that 45% of the disequilibrium of the previous period would be adjusted in current year. This short run process is showing speed of adjustment towards the long run equilibrium.

Results of Cumulative (CUSUM) and Cumulative sum of square (CUSUMQ)

The plots of CUSUM and CUSUMQ test supported the residual stability of the specified model of study over the sample period of 1972-2014 in Pakistan because recursive residual line is within the bounds of 5% significance level. It refers the stability of variables in long run.



VI. CONCLUSION AND POLICY RECOMMENDATIONS

On the basis of estimation the study concluded that good infrastructure can help encouraging the rice production in Pakistan. Two physical variables like water availability for rice and electricity consumption were found to be highly significant. Electricity had negative effect in the long run. Health expenditure had positive and significant effect on rice production in the long run. Floods and fertilizer usage had the positive but insignificant effect on rice production in the long run. In the short run three variables like water availability for rice, electricity consumption and health expenditure were found to be highly significant. Fertilizer usage in the short run had negative effect on rice production. On the whole these results illustrate that more of the investment should be done in improving infrastructure for production which will help the progress of country. Several types of domestic policy changes can help to increase the rice production and improve rural infrastructure investment. Some suggestions are derived from the estimated results as follow:

Investment in public goods such as demand led extension along with the regulations to stimulate more efficient water usage can go a long way in helping farmers to take full advantage of higher rice production. Land is found to be significant for rice production. Millions acres of land still remain uncultivated due to lack of irrigation and non-availability of other inputs and cheap land. Therefore, farmers should be facilitated with cheaper resources. Government should subsidize the electricity for agriculture this will encourage farmers for the production also rice crop because empirical findings have also shown that it negatively effects the rice production in the long run due to expensive electricity. Results indicate that farmer's health positively improves the rice production. If government increases

⁵ Highlights of Economic Survey of Pakistan 2013-14.

the health expenditures and health facilities for farmers health of farmers will be improved and they will be able to work for more hours. Flood used as a dummy variable also had minute but significant effect upon rice production. So the government should find some better ways to properly manage the flood water.

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Physico-chemical Characteristics of Three Mango (*Mangifera indica* L.) Cultivars in Central Sudan

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Abstract- Mango (*Mangifera indica* L) fruits are widely grown in Sudan for local and export utilization. Selected physical and chemical quality attributes of three mango cultivars Kitchener, Abusamaka and Tommy Atkins were evaluated at ripening stage during two seasons (2013-2014). The experiments were arranged in Complete Randomize Design (CRD) with three replications. Results showed that cultivars had significant differences in fruit weight, fruit length, fruit width, pulp weight, pulp thickness, seed weight, seed length, seed width, peel weight in the two seasons. Tommy Atkins obtained the maximum fruit weight, fruit width, pulp weight, pulp thickness, seed weight and seed width values in the two successive seasons and peel weight in the second season. Furthermore, Abusamaka recorded the highest values in fruit and seed length in 2013 and 2014 seasons and peel weight in first season. In the case of chemical characteristics, Tommy Atkins showed the highest Ascorbic Acid and moisture content in the two successive seasons while, Kitchener had the maximum total acidity, TSS, Ash and total sugar content.

Index Terms- Mango, Cultivars, Ripening, Phsico-chemical, Characteristics.

I. INTRODUCTION

Mango belongs to the family *Anacardiaceae*, is native to southern Asia [1]. Mango is a popular and economically important tropical fruit throughout the world, due to its excellent eating quality (bright color, sweet taste and luscious flavor) and nutritional composition (vitamins, minerals, fiber, and phytochemicals) [2]. It can play an important role in balancing human diet by providing about 64-86 calories of energy per 100 g [3] and, when consumed regularly, can be a valuable dietary source of many phytochemical compounds [4]. Also, fruit is an excellent source of vitamin C, its content ranging from 32 to 200 mg per 100 g of edible pulp [5].

World production reached 39 million tons in 2009, followed by banana, pineapple, papaya and avocado [6]. Mango is an important horticultural crop in Sudan. It has economic importance and produced almost all around the year in different parts throughout the country. It also has a domestic and international demand in markets, being a popular fruit with high nutritive value and palatable taste [7]. Mango is cultivated in about 67000 feddans in the country, representing 60% of total Sudan export of horticultural crops [8].

There are more than 30 traditional mango cultivars in addition of hundred seedling cultivars in Sudan. Most mangoes

grown in Sudan are mono embryonic cultivars such as Abusamaka. Kitchener is one of the seedling cultivars grown in Sudan. Tommy Atkins is of the newly cultivar introduced from South Africa [9].

The aim of the present study is to evaluate the physico-chemical characteristics of the introduced mango cultivar Tommy Atkins and compare it with Kitchener and Abusamaka cultivars.

II. MATERIALS AND METHODS

This experiment was carried out in the Faculty of Agriculture and Natural Resources, Department of Horticultural Science, El-Deuim – Sudan, during two successive seasons (2013 and 2014). Three mango cultivars (Tommy Atkins, Kitchener and Abusamaka) were collected from a private orchard in Kamlin (15° 04'N-33° 11'E), central Sudan. Fully matured fruits were harvested when so ever ready in each cultivar and were ripened under room temperature. Selected fruits were uniform and undamaged with no visible symptoms of infection. The experiment was laid out in randomized complete design with three replications.

The physical characters included fruit weight (gm), fruit length(cm), fruit width (cm), pulp weight (gm), pulp width (cm), peel weight (gm), peel width (cm), seed weight (gm), seed width (cm), and seed lengths (cm) were recorded.

The chemical characters included TSS, which measured by a hand refractometer, titratable acidity, ascorbic acid, moisture content. Ash (%) and total sugars were estimated following the methods of AOAC [10].

Statistical analysis

Data were subjected to analysis of variance using MStatC computer program. Mean separation was done according to Duncan's Multiple Range Test (DMRT).

III. RESULTS AND DISCUSSION

Physical characteristics

The fruit physical characteristics of the three mango cultivars in central Sudan in 2013 and 2014 seasons are shown in Table (1 and 2, respectively).

Fruit weight

Cultivars showed significant differences in fruit weight in two seasons. Tommy Atkins cultivar showed the highest value of

fruit weight in the two seasons while, the local cultivar Kitchener showed lowest fruit weight values. These findings are in agreement with [11] who reported significant differences in fruit weight between ten mango cultivars. The variability in fruit weight might be due to genotypic and management practices [12].

Fruit size

Cultivars showed significant differences in fruit length and width in two seasons. Abusamaka was obtained the highest fruit length in two successive seasons. It was noted that Kitchener had the smallest fruit length. The highest fruit width value was obtained with Tommy Atkins cultivar. There were no significant differences between Abusamaka and Kitchener in fruit width, and they showed lowest values in successive seasons.

Fruit size (length and width) major quality indices play a main role for the success of any fruit cultivars. These results are in agreement with previous research finding of [13 and 14], who reported that, the range of fruit length from 6.35 to 12 cm and fruit width from 4.26 to 7.90 cm. Furthermore, several workers have studied the fruit size of mango and stated that mango cultivars differed in fruit length and width according to their genetic makeup [11].

Pulp weight

Our results showed significant differences between cultivars in the pulp weight in the two seasons. The highest pulp weight was obtained in Tommy Atkins cultivar, and the lowest value was obtained in Kitchener cultivar. This variation may be due to varietal differences [12].

Pulp thickness

Cultivars showed significant differences in pulp thickness in 2013 and 2014 seasons. Tommy Atkins was obtained the highest pulp thickness values in two seasons.

Seed weight

There were significant differences among cultivars in seed weight in the two seasons. Tommy Atkins had the heaviest seed weight. These findings are similar to those found by [15] who reported that as the fruit weight and size in different cultivars varied, seed weight also differed within the cultivars.

Seed length

There are significant differences between cultivars in seed length in the two successive seasons. The longest seed was obtained in Abusamaka cultivar, while Kitchener obtained shortest seed length. These findings are in agreement with those reported by [16] who worked in three cultivars of mango and found significant differences between cultivars in seed length.

Seed width

Cultivars showed significant differences in seed width in the two successive seasons. The highest seed width values were obtained in Abusamaka and Tommy Atkins in seasons 2013 and 2014, respectively.

Peel weight

Peel weight varied significantly among mango cultivars in the two successive seasons. The heaviest peel weight values were obtained in Tommy Atkins and Abusamaka in seasons 2013 and 2014, respectively. These findings are similar to those found by [17] who reported significant difference in peel weight in nineteen mango cultivars.

Peel thickness

There were no significant differences among mango cultivars in peel thickness in the two seasons.

Chemical characteristics:

The fruit chemical characteristics of the three mango cultivars in central Sudan during 2013 and 2014 seasons are shown in Table (3 and 4), respectively.

Total acidity (TA)

There were no significant differences on TA among the three cultivars in the first season. There were significant differences on TA among three cultivars in the second seasons. Kitchener showed the highest TA values in the two successive seasons. These findings are in line with those reported by [18] who worked in four mango cultivars and found significant differences on TA among the mango cultivars. Along the same lines, [12], who worked on five mango cultivars in India, found that TA varied among mango cultivars.

Ascorbic Acid (Vitamin C)

There were significant differences on ascorbic acid content between the three cultivars in the two successive seasons. Our results showed that the ascorbic acid content was ranges from 123.6 mg/100g in Tommy Atkins in 2013 to 98.67 mg/100g in Kitchener in 2014 season. Tommy Atkins obtained the highest vitamin C content in the two successive seasons. These findings are in line with those reported by [16] who worked in three mango cultivars and found that Tommy Atkins have the maximum vitamin C content. Furthermore, [19] and [20] reported that the great variation in vitamin C content varied according to mango cultivar.

Total Soluble Solids (^oBrix)

TSS content is considered as a measure of quality for most of the fruits. There were significant differences between cultivars in the two successive seasons in TSS of fruit. The maximum TSS contents were detected in the pulp of the local mango cultivar Kitchener, which was consistent with the higher content of total sugar. Tommy Atkins cultivar had the lowest content of total soluble solids. These results are in line with those reported by [12 and 18] who found significant differences between cultivars in TSS content.

TSS has a strong implication on the choice of fruit for processing as well as fresh consumption, TSS of 15° Brix and above at ripe stage is recommendable for products like fruit juices, nectar and jam products [21].

Moisture percentage

Moisture content percentage varied significantly according to mango cultivars during the two successive seasons. Tommy Atkins cultivar had the highest moisture content percentage in

the two seasons (80.89% in 2013 season and 85.04% in 2014 season), followed by Abusamaka cultivar (77.29% in 2013 season and 84.51% in 2014 season) while, Kitchener cultivar had the lowest moisture content percentage (45.57% in 2013 season and 83.44% in 2014 season).

These results are in full agreement with those found by [16] they found that the Tommy Atkins mango cultivar fruits recorded the highest moisture percentage in two seasons. Along the same lines, [22] reported that the great variation in moisture percentage differed according to mango cultivar.

Ash contents

Cultivars showed significant differences in Ash contents. Maximum ash contents were noticed in Kitchener cultivar in two seasons, while the minimum ash contents were found in Tommy Atkins and Abusamaka cultivar in seasons 2013 and 2014, respectively. The present results for ash contents are in line with the results obtained by [23] who reported significant differences between three Sudanese mango cultivars in ash contents.

Total sugars percentage

Total sugars percentage differed significantly according to mango cultivars. Kitchener cultivar had the highest total sugars percentage in the two seasons (43.10% in 2013 season and

71.70% in 2014 season), followed by Abusamaka cultivar (41.78% in 2013 season and 59.75 % in 2014 season) while, Tommy Atkins cultivar had the lowest total sugars percentage (36.50% in 2013 season and 48.2% in 2014season, respectively). These results are in agreement with the findings of [24, 19 and 16] they found that the great variation in total sugars percentage differed according to mango cultivar. The variation in sugar contents between different mango varieties may be attributed to physiological changes and polysaccharides metabolism during ripening process that contribute to accumulation of sugars [25].

IV. CONCLUSIONS

The present study revealed that different mango cultivars presented different physic-chemical characteristics, which are important factors for evaluating the characterization of mango cultivars with regard to their nutritional value and potential use for different products. The introduced cultivar Tommy Atkins showed the highest value in weight and less TSS value so it can be used for fresh consumption or export while, local cultivar can be used for products like fruit juices, nectar and jam due to its highest TSS values.

Table (1): Fruit physical characteristics of the three mango cultivars in central Sudan during season 2013

Cultivars Characters	Fruit weight (gm)	fruit length (cm)	fruit width (cm)	pulp weight (gm)	pulp thickness (cm)	seed weight (gm)	seed length (cm)	seed width (cm)	peel weight (gm)	peel thickness (cm)
Kitchiner	166.43c	8.08c	6.21b	115.8 c	1.412b	31.91a	6.80c	4.01a	21.89c	0.2811
Abu samaka	261.50b	11.98a	6.46b	213.8b	2.283a	25.37b	10.43a	1.76b	31.7b	0.7800
Tommy Atkins	354.17a	9.84b	7.82a	291.1a	2.732a	31.62a	8.36b	1.84b	39.67a	0.2022
Sig.	**	**	**	**	**	*	**	**	**	NS
C.V (%)	28.03	10.26	7.46	25.04	10.78	23.69	9.15	10.96	18.95	26.89

Means within columns followed by the same letter(s) are not significantly different at P<0.05 level according to Duncan's Multiple Range Test.

*, ** and NS indicate significance at P≤0.05, 0.01 and not significant, respectively.

Table (2) Fruit physical characteristics of the three mango cultivars in central Sudan during season 2014

Characters Cultivars	fruit weight (gm)	fruit length (cm)	fruit width (cm)	pulp weight (gm)	pulp thickness (cm)	seed weight (gm)	seed length (cm)	seed width (cm)	peel weight (gm)	peel thickness (cm)
Kitchener	141.3c	8.39c	6.178b	98.93c	2.086b	25.37b	6.546c	3.906b	19.63c	0.1111
Abu samaka	235.8b	12.17a	6.022b	178.0b	2.081b	24.74 b	10.23a	3.616b	34.28a	0.1333
Tommy Atkins	275.5a	9.04b	7.611a	216.1a	3.080a	27.81 a	7.611b	4.174a	28.90b	0.1000
Sig.	**	**	**	**	**	*	**	*	**	NS

C.V (%)	15.73	5.39	7.51	12.53	12.72	11.40	6.41	8.87	13.82	29.03
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Means within columns followed by the same letter(s) are not significantly different at P<0.05 level according to Duncan's Multiple Range Test.

*, ** and NS indicate significance at P≤0.05, 0.01 and not significant, respectively.

Table (3): Fruit chemical characteristics of the three mango cultivars in central Sudan during season 2013

Characters Cultivars	Total acidity (citric acid %)	Ascorbic Acid (mg/100g)	TSS (° Brix)	Moisture (%)	Ash (%)	Total Sugars (%)
Kitchener	0.7333	108.3b	16.03a	45.57c	0.64 a	43.10a
Abu samaka	0.5867	122.8a	16.00a	77.29b	0.51b	41.78a
Tommy Atkins	0.2722	123.6a	11.29b	80.89a	0.422c	36.50b
Sig.	NS	**	**	**	*	**
C.V (%)	3.88	4.86	11.17	8.28	18.35	3.88

Means within columns followed by the same letter(s) are not significantly different at P<0.05 level according to Duncan's Multiple Range Test.

*, ** and NS indicate significance at P≤0.05, 0.01 and not significant, respectively

Table (4) Fruit chemical characteristics of the three mango cultivars in central Sudan during season 2014

Characters Cultivars	Total acidity (Citric acid %)	Ascorbic Acid (mg/100g)	TSS (Brix)	Moisture (%)	Ash (%)	Total Sugars (%)
Kitchener	0.501a	98.67b	16.06a	83.44b	0.56a	71.70a
Abu samaka	0.351b	101.7ab	9.813b	84.51ab	0.36 c	59.75b
Tommy Atkins	0.400b	103.0a	9.551b	85.04a	0.43 b	48.24 c
Sig.	**	**	**	**	*	**
C.V (%)	8.03	7.97	10.80	2.94	19.68	0.39

Means within columns followed by the same letter(s) are not significantly different at P<0.05 level according to Duncan's Multiple Range Test.

* and ** indicate significance at P≤0.05, 0.01, respectively

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Impact of Dietary Habits Upon Nutrition-related Factors of Secondary Schools Female Students at AL- Rusafa District in Baghdad City

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Abstract- Objective(s): The present study ought to identify the impact of dietary habits upon some nutrition-related factors among secondary schools female students.

Methodology: A descriptive correlational study is conducted throughout the period from November 2nd, 2015 to September 1st, 2016. A simple random sample of (250) female students is selected throughout the use of probability sampling approach, the study sample study is selected from six female secondary schools in Al- Russafa Ddirectorate. A questionnaire is developed tthrough review of the related literature and studies in order to achieve the study objectives. The instrument Content validity of is obtained through eliciting the opinions of a panel of (12) experts and internal consistency reliability is determined by the use of split-half technique through the computation of the Cronbach alpha correlation coefficient of the scale. Data are collected through utilization of the developed questionnaire and the interview technique as means of data collection. Data are analyzed through the application of descriptive and inferential statistical data analysis approaches.

Results: The results of the study present that secondary school female students have moderately experienced their dietary habits. In the meanwhile, dietary habits do not present any significant contribution to the nutrition- related factors. So, female students cannot benefit out of their dietary habits.

Recommendations: The study recommends that nutritional education and counseling can be presented to secondary schools female students for their nutritional benefits. Further studies can be conducted to involve a national standard to assess more factors that may have impact upon the nutritional status of secondary schools female students.

I. INTRODUCTION

The term eating habits (or food habits) refers to why and how people eat, which foods they eat, and with whom they eat, as well as the ways people obtain, store, use, and discard food. Individual, social, cultural, religious, economic, environmental, and political factors an influence people's eating habits⁽¹⁾.

Several facets of eating habits are different and more pronounced in adolescents than in other people and each might cause concern in older generation ⁽²⁾:

1. Skipping meals especially breakfast is the leading bad food habit for teenagers. According to the American Dietetic Association, two thirds of female teens do not eat breakfast on a regular basis. Breakfast is the most

important meal of the day. Eating breakfast upstart metabolism, which help with weight control, mood and school performance.

2. Eating snacks confectionary the major snack is usually in the 3mm, after school snacks tend to be high in "empty calories" fat, sugar and alcohol but some proved calcium like milk or vitamin C fruit. Late night snacks is a cause for weight gain because of sleeping after eating and make inactive metabolism, that lead to bum less calories than calories intake .
3. Fast, take away or carry out foods these provide some nutritious portions, but adolescents not choose balanced meals from what is offered. There is not enough accessible information about the nutrient composition of fast food.
4. Consumption of sugar-sweetened beverages (i.e., soda, vitamin water, sports drinks, energy drinks, Kool-Aid etc.) among adolescents has been raised dramatically and continues to replace milk and water. Health risks associated with this increased intake of sugar-sweetened beverages include excess sugar and caloric intake, which contribute to overweight, obesity and dental caries.
5. High-energy intakes: many adolescents go through 8 phases or eating more than adults do, sometimes up to 4000 Kcal per day. This seems to occur near the age of peak height velocity in girls around 12 years, but in boys may come later than the age of peak height velocity usually die 14 years. Presumably, the larger, more muscular male adolescent is expending more energy at this stage.
6. Low level of some nutrients: calcium accretion in the skeleton and adolescents need about 1300mg/day of calcium. Adolescents in the highest soft drink consumption category were found to consume less calcium (Sung and Story, 2005) Iron deficiency in adolescent girls who are menstruating, restricting their food intake. It may sometimes occur in boys too. Iron deficiency is more prevalent in overweight children but the mechanisms that underlie this condition remain unclear.
7. Adolescents watching TV and other media are eating more food kind of food that has relation with obesity. There are association

between television viewing and higher intakes of fast foods and pop, suggesting that a higher exposure to advertisements for unhealthy foods may increase intake of those foods.

8. Unconventional meals may be eaten in combinations and permutations other members of the family do not approve of, but they often add an adequate nutritional mix.
9. Female Adolescent dieters: their two aspects to this: overweight/obesity social eating. Obese adolescents are usually inactive and tend to have low socio-economic status. Dietary management should aim to hold weight constant while the young person continues to grow and so thin out. Increase exercise need to be emphasized and anorectic drugs she not be used.

There are factors that have been reported as contributors for poor eating habits among female adolescent' which include:

1. Easily available, low-cost, high-fat and/or high-sugar, foods, such as French fries, candy, chips or soda.
2. Limited access to healthy foods that appeal to teens at home when away from home.
3. Perception that healthy, low-in-fat, unprocessed nutrient-dense foods (high in nutrients compared with their caloric content) are inconvenient and lack taste. Some examples of healthy snacks include fresh fruit, whole grain bread, or low fat yogurt.
4. Lack of knowledge regarding appropriate nutrition and impact of poor nutrition.
5. Poor parental role modeling.
6. Lack of food handling, shopping, and preparation classes at School (e.g., home economics), resulting in the lack of relevant skills.
7. Increased incidence of disordered eating due to fear of getting fat, desire to appear more muscular and advertising is negative impact on body image⁽³⁾.

The healthy eating habits for teenagers have been reported as:

1. Eat three meals a day, with healthful snacks.
2. Eat balanced meals, including lean sources of protein, nuns and vegetables, whole grains and "good" fats.
3. Increase fiber in the diet and decrease the use of salt.
4. Decrease your child's sugar intake.
5. Use a healthful fat when frying or cooking and try to bake broil
6. Drink a lot of water.
7. Eat fruit or vegetables for a snack.
8. Use low-fat dairy products.
9. Decrease the use of butter and heavy gravies.
10. Reduce eating often more chicken and fish.
11. Limit processed foods.
12. Read ingredient lists. In particular. Look for the many different types of sugar, such as high fructose corn syrup maltose, dextrose, honey, molasses and others⁽⁴⁾.

The most predominant nutrition-related factors among female adolescents include female adolescents' body mass index (BMI); physical activity among female adolescents ; digestive

system disorders among female adolescents; health problems among female adolescents (i.e., diabetes mellitus, anemia, and blood pressure disorders and female adolescents reproductive system disorders)⁽⁵⁾.

In Iraq, There is no study has been evaluating the impact of secondary schools' female students dietary habits upon some nutrition-related factors. So, the present study ought to determine such evaluation.

II. METHODOLOGY

A descriptive correlational study is conducted for the purpose of identifies the impact of dietary habits upon some nutrition-related factors secondary schools female students throughout the period from November 2nd, 2015 to September 1st, 2016.

The study is conducted in (6) female secondary schools, which are distributed throughout Al-Rusafa District in Baghdad City. A simple random sample of (250) female students is selected from the early stated schools throughout the use of probability sampling approach.

Through review of the related literature and studies, a questionnaire is developed to be used as a mean of data collection (Appendix B). It consists of (3) major parts:

Part I: socio-demographic Characteristic

It is concerned with female students' characteristics of age, socio-economic stats and body mass index (BMI).

Part II: Dietary Habits

This part is composed of (23) items, scored and rated at three levels type of Likert Scale:

- (3) For **Always**
- (2) For **Sometimes**
- (1) For **Never**

The cutoff point = 2, (adequate > 2), (inadequate ≤ 2).

Part III: Nutrition- related Factors

They are comprised of the following:

1. Digestive System which is consisted of (9) items. All items are scored and rated at two levels; (1) for Yes and (0) for NO.
2. Reproductive System which is consisted of (4) items. All items are scored and rated at two levels; (1) for Yes and (0) for NO.
3. Health problems which are consisted of (4) items. All items are scored and rated at two levels; (1) for Yes and (0) for NO.
4. Daily activities which are consisted of (5) items. All of these items are scored rated at two levels; (1) for amount of time to do the following activities and (0) for NO for not doing these activities.
5. Exercise and Sports activities Which are consisted of (3) items and all items are scored and rated at two levels; (1) for amount of time to do these activities and (0) for not doing these activities.

Data are collected at the period from 1st of March 1st to April 15th 2016 through the utilization of the developed questionnaire

and the interview technique as a means of data collection. Interviews are conducted with female students in secondary schools. Each interview takes approximately (15-20) minutes.

Content validity for the early developed instrument is determined through a panel of (16) experts to investigate content clarity, relevancy, and adequacy of the questionnaire.

The internal consistency of the instrument is determined through split-half technique and the computation of Cronbach

Alpha Correlation Coefficient ($r=0.72$) which is indicating that the instrument is adequately reliable measure.

Data are analyzed through the application of descriptive statistical data analysis approach of frequency, percentage, and mean of scores; and inferential statistical data analysis approach of simple linear regression and analysis of variance (ANOVA).

III. RESULTS

Table (1): Dietary Habits among Secondary School Female Students (N=250)

List	Dietary Habits	Always	Sometimes	Never	M.S	Significance
1	Eating breakfast	89	131	30	2.24	M
2	Eating three main meals	110	126	14	2.38	H
3	Eating a full meal of meat, vegetables, and bread	86	142	22	2.26	M
4	Eating substantive meals	93	120	37	2.23	M
5	Eating nuts	92	138	20	2.29	M
6	Eating salad with every meal	79	148	23	2.22	M
7	Practicing physical exercise	56	131	63	1.97	M
8	Eating canned food	38	116	96	1.77	M
9	Eating frozen food	53	101	96	1.83	M
10	Eating pickles	118	90	42	2.30	M
11	Eating more fatty food	37	97	116	1.68	M
12	Eating sweets	128	90	32	2.38	H
13	Adding salt while eating food	114	89	47	2.27	M
14	Eating Food during watching TV or talking on the phone	92	113	45	2.19	M
15	Eating food when you are in bad mood	77	78	95	1.93	M
16	Do not eating food when you are in bad mood	77	92	81	1.98	M
17	Eating snacks even when you are not hungry	75	102	73	2.01	M
18	Eating red meat more than white meat	62	109	79	1.93	M
19	Drinking tea with sugar and other beverages	112	71	67	2.18	M
20	Drinking carbonated beverages	112	97	41	2.28	M
21	Drinking tea immediately after meals	57	81	112	1.78	M
22	Eating fast food	101	110	30	2.25	M
23	Caring about your weight and appearance	171	58	21	2.60	H
Total					2.08	M

No: Number, M.S: Mean of score, H: High (M. S=2.33-3), M: Moderate (M. S= 1.67-2.33), L: Low (M. S= 1-1.66)

This table reveals that dietary habits among secondary school female students are moderately significant (Total M. S=2.08). The mean of score is indicates moderate frequency among all dietary habits except eating three main meals, eating sweets, and caring about weight and appearance which are highly significant among female students (M. S= 2.38, 2.38 and 2.60).

Table (2): Nutrition-Related Factors among Secondary Schools Female Students (N= 250)

Nutrition-Related Factors			F	%	M.S	Sig.
Digestive System	Change in Appetite	Yes	193	77.2	0.77	H
		No	57	22.8		
	Allergy to Certain Types of Foods	Yes	135	54	0.54	M
		No	115	46		
	Loss of Taste Sense	Yes	23	9.2	0.09	L
		No	117	90.8		
	Dizziness and Fainting	Yes	68	27.2	0.27	L
		No	182	72.8		
	Overeating	Yes	75	30	0.30	L
		No	175	70		
	Nausea	Yes	72	28.8	0.29	L
		No	178	71.2		
Vomiting	Yes	44	17.6	0.18	L	
	No	206	82.4			
Constipation	Yes	30	12	0.12	L	
	No	220	88			
Diarrhea	Yes	31	12.4	0.12	L	
	No	219	87.6			
Nutrition-Related Factors			F	%	M.S	Sig.
Reproductive System	Menstruation	Yes	225	90.4	0.91	L
		No	24	9.6		
	Age at First Menstrual Cycle	≤ 9 years	27	10.8	2.33	M
		10 – 12 year	113	45.2		
		13 – 15 year	110	44		
16 ≤ year		0	0			
Average of menstrual cycle Days	3 – 5 days	160	64	1.38	L	
	6 – 8 days	85	34			
	9 ≤ days	5	2			
Regularity of Menstrual Cycle	Regular	153	61.2	0.61	M	
	irregular	97	38.8			
Health Problems	Diabetes Mellitus	Yes	7	2.8	0.03	L
		No	243	97.2		
	Anemia	Yes	108	43.2	0.43	M
		No	142	56.8		
	Blood Hypertension	Yes	12	4.8	0.05	L
		No	238	95.2		
Blood Hypotension:	Yes	20	8	0.08	L	
	No	230	92			
Daily Activity	Reading	None	10	4	1.57	M
		1 – 3 hrs./day	87	34.8		
		4 ≤ hrs./day	153	61.2		
	Watching TV	None	33	13.2	1.02	M
		1 – 3 hrs./day	178	71.2		
		4 ≤ hrs./day	39	15.6		
	Listening to Music:	None	65	26	0.86	L
		1 – 3 hrs./day	156	62.4		
		4 ≤ hrs./day	29	11.6		

	Using Computer or Mobile Phone:	None	44	17.6	1.06	M
		1 – 3 hrs./day	146	58.4		
		4 ≤ hrs./day	60	24		
Nutrition-Related Factors			F	%	M.S	Sig.
	Practicing House Work	None	163	65.2	0.81	L
		1 – 3 hrs./day	67	26.8		
		4 ≤ hrs./day	20	8		
Exercises and Sports	Fitness Exercise	None	190	76	0.62	L
		1 – 3 hrs./day	45	18		
		4 ≤ hrs./day	15	6		
	Walking	None	194	77.6	0.82	L
		1 – 3 hrs./day	48	19.2		
		4 ≤ hrs./day	8	3.2		
	Running and jogging Exercise:	None	193	77.2	0.57	L
		1 – 3 hrs./day	32	12.8		
		4 ≤ hrs./day	25	10		

F: Frequency, **%:** Percentage, **M.S:** Mean of score, **Sig.:** Significance, **L:** Low, **M:** Moderate. Significance levels (Mean of score) for factors are: Digestive system: L= 0-0.33, M= 0.34-0.67, H= 0.68-1; Reproductive system factors: L= 0-0.33, M= 0.34-0.67, H= 0.68-1; Health problems Factors: L= 0-0.33, M= 0.34-0.67, H= 0.68-1; Daily activities and Exercises: L= 0-1, M= 1.1-2, H= 2.1-3

Findings in this table indicates that the more frequent problems among female students related to digestive system are changing in appetite (77.2%) and allergy to certain type of foods (54%), while the other digestive system related factors show low percentages. Regarding reproductive system, most the female students are menstruate (90.4%); their menarches were between the ages of 10 to 12 year old (45.2%); the average length of menstrual cycle is (3–5) days (64%), and (61.2%) of them have regular menstrual cycle. Health-related problems are less frequently among female students in which only (2.8%) having

diabetes mellitus, (4.8%) having blood hypertension, (8%) having hypotension and anemia is the highest prevalent problem of female students spend four hours or more in reading (61.2%); they spend (1–3) hours/day on watching television (71.2%), listen to music (62.4%); using computer and mobile phone (58.4%) and performing house work (65.2%). Regarding exercises, the female students do not spend time for fitness exercise (76%) or walking (77.6%) or running and jogging exercise (77.2%).

Table (3): Linear Regression Analysis for Impact of Dietary Habits Upon Nutrition-Related Factors among Female Students

Independent Variable	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
Dietary Habits	0.021	0.039	0.036	0.525	0.60

Dependent Variable: Nutrition-related Factors, B=Regression Coefficient, Std.= Standard, t=T-test, Sig.=Significant

The analysis of linear regression on this table indicates that there is no significant impact of dietary habits upon nutrition-related factors.

IV. DISCUSSION

Part I: Dietary Habits among Secondary School Female Students

Data analysis of secondary school females student's dietary habits results shows that most items are significantly moderate (Total M.S= 2.8) . This is obvious in the following items results; eating breakfast eating a full meal of meat, vegetables and bread

eating substantive meal seating nuts, eating salad with every meal, eating canned food, eating food during watching T.V, eating sweets and eating three main meals (Table 1).

This finding depicts that those female students have experienced moderately oriented dietary behaviors which means that they do not consume food to the extreme as bad as good.

Adolescents are becoming more independent and making many food decisions on their own. Many adolescents experience a growth spurt and an increase in appetite and need healthy foods to meet their growth needs. Adolescents tend to eat more meals away from home than younger children. They are also heavily influenced by their peers. Meal convenience is important to many adolescents and they may be eating too much of the wrong types of food, like soft drinks, fast-food, or processed foods⁽⁶⁾.

Poor or inappropriate dietary habits increase the risk and/or incidence of chronic disease among female's adolescents. Of great concern is the increasing rate of obesity and obesity-related health risks, such as diabetes and cardiovascular disease. The prevalence of type II diabetes among adolescents has increased and is closely linked to overweight and obesity inadequate iron intake increases the incidence of iron -deficiency anemia, especially among those adolescents at highest risk, vegetarians, and competitive athletes⁽⁷⁾.

Consumption of soda, vitamin water, sports drinks, energy drinks...etc. among adolescents has risen dramatically and continues to replace milk and water health risks associated with this increased intake of sugar-sweetened beverages include excess sugar and caloric intake, which contribute to overweight, obesity and dental caries. Their electrolyte needs are normally met by consuming a healthy and balanced diet. Water should be the beverage of choice. However, nonfat or low fat milk can also be consumed⁽⁶⁾.

Part II: Discussion of Nutrition-related Factors among Secondary Schools Female Students

Regarding the nutrition-related factors among the female students; the findings of the digestive system- related factors indicate that change in appetit is the highly significant factor which is experienced by most of the female student and allergy to certain type of food is moderately experienced while the remaining of the digestive system- related factors are low significant among them (Table 2).

A person with an eating disorder may have started out just eating smaller or larger amounts of food, but at some point, the urge to eat less or more spiraled out of control. Severe distress or concern about body weight or shape may also characterize an eating disorder⁽⁸⁾.

Concerning the reproductive system-related factors, the majority of female students are menstruate (90.4%); their age at first menstrual cycle was 10–12 year old (45.2%); the average of menstrual cycle day are (3– 5) days (64%) and (61.2) of them are regular menstrual cycle (Table 2). This means that most of the female students are with normal menstrual cycle.

A study reports that (13.7) years old as the mean age of menarche, which is comparable to the findings of the present study. It has been also reported that (68.7%) adolescents had attained menarche between (11-13) years, (29%) in (14-16) years and (2.2 %) in (17 – 19) years of age⁽⁹⁾⁽¹⁰⁾.

Assessment of Health problems-related factors among the study sample revealed that only anemia is moderately significant (M.S=0.4) experienced by the female students and the other factors are less significant are (diabetic, hypertension and hypotension) (Table 2).

During adolescent period of human life development nutritional anemia is common and girls are more likely to be victim of the health problem for various reasons. In a family with limited resources, the female child is more likely to be neglected. She is deprived of good food and education, and is utilized as an extra working hand to carry out the household chores. The added burden of menstrual blood loss, normal or abnormal, precipitates the crises too often⁽¹¹⁾.

Daily activity related-factor shows that reading, watching television using computer and mobile phone are moderately significant and experienced by the sample, such activities are common among adolescent. While listening to music and practicing house work are less significant (Table 2).

In 2009, young Americans aged (8) to (18) years spend an average seven hours and 38 minutes consuming media in a typical day an extra one hour and (17) minutes with media per day since 2004. The research shows that this increase can be largely attributed to widespread adoption and use of new mobile and online devices, in particular media-enabled mobile phones and MP3 devices, such as the iPod. And one thing that hasn't changed is young people's devotion to music. Listening to music continues to be the second most popular media activity among (8) to (18) year olds (after watching television), and is especially popular among older teens⁽¹²⁾.

While television viewing remains the dominant and most time-consuming media activity for American youth in 2009, new media platforms have transformed the way they watch television. The study questions almost (2,500) youth aged (11 to 16) year olds about their computer, TV and reading habits. The findings show most go online daily and spend much of their time on social networks and video sharing sites, such as YouTube. This is due to the popularity of the internet; the next generation is still likely to be one of tally addicts. Around (63%) of adolescent have, a television set in their room but as the popularity of laptops increases and programs are increasingly available online⁽¹³⁾.

The last studied factor is exercise and sport; the finding indicated that such activity are low significant and most of them are not exercise or sharing in sports (Table 2).

The sharp decrease in girls' physical activity levels is really concerning because early adolescence is a time when a transition away from sport and physical activity participation is at its highest level among female youth⁽¹⁴⁾.

The World Health Organization publishes a report that find Canadian youth females are consistently less active from (11) to (15) years and females have a greater reduction in participation during the same time (WHO, 2008)⁽¹⁵⁾.

In the United States, Pate and others (2007) found that girls' participation in vigorous physical activity declined from (45.4%) in the eighth grade to (34.1) percent in grade 12. It was also found that the probability that girls would participate in several forms of vigorous physical activity in the 12th grade was directly related to participation in those activities in the eighth grade, with those less engaged likely to become non-participants⁽¹⁶⁾.

It is generally accepted that exercise is beneficial for young woman⁽¹⁷⁾.

Part III: Discussion the Impact of Dietary Habits upon Nutrition-Related Factors among Secondary School Female Students

The analysis of linear regression for the impact of dietary habits indicates that there is no significant impact of dietary habits upon nutrition-related factors among secondary schools female students at p-value = 0.05 (Table 3). This finding can be interpreted in a way that dietary habits do not present any significant contribution to those nutrition-related factors. So, female students did not benefit out of their dietary habits.

In a concluding paragraph, we can say that dietary habits among secondary school female students are moderately significant. Unfortunately, dietary habits have not made any significant contribution to the nutrition-related factors of digestive system, reproductive system, health problems, daily activity and exercises and sports.

V. RECOMMENDATIONS

Based on the study findings, the present study recommends the following:

1. Nutritional counseling and education to secondary schools students' female need to be an important component in school health services.
2. Further studies that can be conducted to involve a national standard to assess more factors that may affect nutritional status of secondary schools female students.
3. Further studies can be conducted on a regular basis to assess the prevalence of malnutrition among secondary female students.
4. Development of educational programs for students and their families regarding healthy and proper eating during adolescent period.

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Quality of life for Patients with Cholelithiasis in Baghdad Teaching Hospitals

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Abstract- Background: This study was conducted to determine the effect of gallstones disease on patients Quality of life. And association of QoL in GD patients was assessed with different factors as (Socioeconomic status, age ,gender ,level of education) in (100) patients attending to surgical wards in teaching hospitals.

Objectives: the study objective is to determine the quality of life for patients with Cholelithiasis and to find out the relationship between the demographic characteristics as (Age , gender , level of education and socioeconomic status) with the quality of life .

Methodology: A descriptive study was carried out at surgical wards and out patients clinics on patients with Cholelithiasis at Baghdad teaching hospitals .Also, started from October 15th, 2015 through July 30th, 2016. A non – probability (purposive sample) of (100)patients (66 female and 34 male) with cholelithiasis. The data were collected through the use of constructed questionnaire, which consisted of three parts (1) Demographic data form that consisted of (10) items , (2) Information concerning study sample , include : Patient's information , Medical information , Previous diseases, Surgical operations, pregnancy and childbirth, signs & symptoms , drugs & medications and food intake consisted of (5,5,15,1,3,11,13&10) items respectively.(3) Quality of life domains include (6) domains which, physical, psychological , independence, social, environmental & religious .that consisted of (17,21,15, 9, 12 &7) items respectively. Also, the direct interview technique used to information collection. Reliability of the questionnaire was determined through a pilot study and the validity through a panel of (19) experts. Descriptive statistical analysis procedures (frequency, percentage, mean score). Furthermore , inferential statistical analysis procedures (Chi-square) and (SPSS) ver (10) were used for the data analysis.

Results: The results of the study indicated that (66%) of the study sample were female & (34%) male. the majority of age groups was (40 – 49) yrs, (80.0%) of patients were married & low level of education. (84%) of the study sample were Unskilled workers as retired, housewife. (88.0%) of patients live in urban. (2 – 4) persons in each room had accounted (68%). Steroids drug accounted low response to moderate , " Aspirin, Voltarin , Valium ,Ceftriaxone ,Sandostatin ,Oral contraceptives, Menstruation regular drugs, Estrogen hormone , B12 and Vit C " registered (moderate, high, low ,high ,low , low, low, low, moderate and low) uses respectively. Physical, psychological , independence, social, environmental & religious domains had reported (high , moderate , moderate , low, moderate & moderate) negative responses respectively regarding to QoL. **Conclusion,** Assessment of QoL registered a moderate negative

response for studied patients with cholelithiasis . And a weak relationships are accounted with no significant between QoL domains with socio - demographical characteristics (Age ,gender ,level of education and socioeconomic status).

Recommendations. preventive strategies can be promoted QoL for patients with cholelithiasis as dietary modification by consumption of low fat diet ,high dietary fibers. stop smoking & drinking alcohol . regular physical activity . control of obesity and diabetes mellitus . avoiding rapid weight loss. educational program for all patients & their families also, for health workers about gallstones disease . the patients should have series note books ,booklets and periodical follow up.

Index Terms- Quality of life, Cholelithiasis

I. INTRODUCTION

Gallstones diseases represents a significant burden for health care worldwide⁽¹⁾⁽²⁾ . GD is one of the most a common disorders among the patients(Pts) admitted to the emergency rooms with abdominal discomforts, epigastric pain, loss of appetite, nausea, vomiting, etc⁽³⁾. The pain due to the obstructing by stone that causes sudden expansion of the GB is called "Biliary Colic". This typical pattern of the pain occurs at epigastric region or hypochondrial region & lasts between quarter hour to several hs commonly after a fatty meal. As the s supply is a splanchnic nerve, pain radiates to shoulder tip or right scapula & occasionally to back⁽⁴⁾ . most of the GS Pts found with severe abdominal pain requiring treatments , investigations & surgical interventions. GS are classified into: cholesterol stones (ChLS), mixed stones(MS) & pigment stones (PS). However, all the stones even pure cholesterol GS usually contain small s amount of bilirubin(Bn) . The prevalence of GS continues to elevate with age, also in females it is higher than in males . This may be due to the rise of cholesterol content in the bile(B) via the effects of estrogen. There are (3) stages of GS formation , as (super saturation, nucleation & aggregation) ⁽⁵⁾. QoL is a frequently used phrase, but it lacks a precise & consistent definition. According to WHO demonstrates many complexities in an individuals' life. A person perceives a location in life according to his goal, family, expectation of his beloved one & his own satisfaction , standard of work he can do, his enforce his weakness in the context of the value & culture . It is a concept which haven't limitation & it affects in complex way by the individuals' physical health, psychological state, social relationships & level of independence⁽⁶⁾also complexity arises with gallbladder stones. we will use an instrument for

measuring quality of life (the WHOQOL-100) items in this study that are the six broad domains of quality of life include (physical ,psychological, level of Independence , Social Relations , Environment and Spirituality/ Religion beliefs).

Objectives of the study :

1. To determine the quality of life for patients with Cholelithiasis .
2. To find out the relationship between the demographic characteristics as (Age ,gender, level of education and socioeconomic status) with the quality of life .

II. METHODOLOGY

A descriptive quantitative design was carried out through the present study in order to achieve the early stated objectives. After approval of the Council of Nursing College upon the study , the researcher submitted a detailed description including the objective and methodology of the study to the Ministry of Planning (Central Statistical Organization) for the acceptance of the questionnaire draft . The setting of the study including the Gastroenterology and Hepatology Teaching Hospital , Baghdad Teaching Hospital , AL- Imamian AL Kadimain Teaching Hospital and AL-Kindi Teaching Hospital .the study was performed on the patients with gallstones in the surgical wards and out patients clinics. A non – probability (purposive sample) of (100)patients (66 female and 34 male) with cholelithiasis and preoperative cholecystectomy who visited the four Baghdad teaching hospitals during the period from 8th March to June 2016. An assessment tool was adopted and developed by the researcher to measure the quality of life for patients with cholelithiasis . The final study instrument consisting of three parts: Part I: Demographic , Economical and Environmental Characteristics: Demographic characteristics sheet , consisted of (5) items , which included age , gender , marital status , level of education and occupation. Economical and Environmental Characteristics sheet include (5) items which included number of a house members , possessing of the house own, family type , residency and rooms number of the house. Part II: Information concerning the study sample: Patient's information was consisted of (5) items which included weight , height , smoking cigarette , drinking alcohol and number of days patients were admitted to the hospitals. Medical information was consisted of (5) items for genetic susceptibility (15) items for Previous diseases (1) item for Surgical operations (3) items for pregnancy and childbirth (11) items for sings and symptoms (13) items for Drugs and Medications and (10) items for food intake.

Part III: Quality of Life Domains :Cholelithiasis Patient's QoL questionnaire is adopted of the WHOQoL questionnaire (WHOQoL,1998)to measure the variables underlying the present study and based on (6) domains ,which were described as following: 1.Physical Domain: This domain was measured through (5) sub domains of health status which included pain and discomfort (6) items ,sleep (3) items ,rest (3) items ,energy (2) items and fatigue (3) items .the total items were (17) items for physical domain . this items rated and scored as (3 for always) , (2 for sometimes) and (1 for never) .High score = 15 (88.2%), Moderate score =2 (11.8%) 2.Psychological Domain: This

domain was measured through (6) sub domains of positive feeling (3) items ,negative feeling (5) items ,self esteem (4) items , thinking (4)items ,memory and concentration (3) items and Bodily Image & appearance (2) items .total (21) items . High score 8(39.1%), Moderate score 7 (33.3%), Low score 6(28.6%). 3. Independence Domain: This domain was measured through (4) sub domains included Mobility (4) items, Activities of daily living (6)items , Work capacity (3)items , Dependence on medications (2) items . total (15). H S=4(26.75) , MS=6(40.0%) , LS=5(33.3%) 4. Social Domain :It consists of (3) sub domains is composed of three parameters such as : Personal relationships (3) items, Social support (4) items and Sexual behavior(2) items. Total (9) items ,MS=3(33.3%) , LS=6(66.7%) 5. Environmental Domain: It consists of (5) sub domains is composed of five parameters such as : Physical safety and security (2)items , Home and material environment (3)items, Health & social care (3) items , Financial sources(2) items and Participant in the Parks & opportunities for recreation / leisure(2) items. total (12) items ,HS=6(50%) , MS=5(41.7%) , LS=1(8.3%). 6. Religious & spiritual Domain: It consists of (7) items determine the QoL of the patient with cholelithiasis. HS=1(14.3%) , MS=5(71.4%) , LS=1(14.3%). The data were collected through the utilization of developed questionnaire and the interview technique with the adult patients have cholelithiasis. data were collected during the day between 10 am to 4 pm. The determination was conducted during the period from 8th March 2016 to June 2016. **Statistical Analysis:** 1.Descriptive data analysis: a. Tables (Frequencies, Percents, and Cumulative Percents), arithmetic mean, and standard deviation. b. Summary Statistics tables including: Mean of score (MS) in light of questionnaire's items, Grand mean of score (GMS), Global mean of score (G'MS), with their Standard Deviation (SD), Relative Sufficiency (RS%) .c. Percentile D .Contingency Coefficients for the association tables. e. Graphical presentation 2.Inferential data analysis: a. Alpha Cronbach (α). B. Reliability Coefficient for the Pilot study through using Formula ⁽⁷⁾.c. Contingency Coefficients (C.C.) test. D. Chi-Square test. E . Binomial test.

III. RESULTS

Table (1): Distribution of the studied sample according to (DCv.) with comparisons significant.

Relative to age groups, majority of the studied sample was reported at the middle age (40 – 49) yrs., and they are accounted (28%) with mean value and standard deviation 44.94 and 15.38 yrs. Respectively. In regarding to gender it is noticed that two third of studied sample were female (66.0%), while male were accounted (34%). Concerning to the marital status the majority of the sample were married and accounted (80.0%). Relative to educational level the majority of the study sample (80.0%) were low level of education such as illiterate , read and write , primary and intermediate schools. Regarding to subject of occupation status , results indicated that majority of the study sample were unskilled worker as laborers, farmers , retired ,house wife ... they are accounted (84.0%). Relative to subject of residential environment the results showed the highest percentage of the study sample were lived “ Urban” (88.0%). Also the findings indicate that highest percentage of the study sample regarding to

subject of the crowding index at the second level of (2-4) persons each room and accounted (68.0%).

DCv.	Groups	No.	Cum. %	C.S. (*) P-value
Age Groups Yrs.	< 20	3	3	$\chi^2 = 29.26$ P=0.000 (HS)
	20 _ 29	14	17	
	30 _ 39	21	38	
	40 _ 49	28	66	
	50 _ 59	15	81	
	60 _ 69	12	93	
	≥ 70	7	100	
	total	100		
	Mean ± SD	44.94 ± 15.48		
Gender	Male	34	34	Bin. test P=0.002 (HS)
	Female	66	100	
Marital Status	Single	7	7	$\chi^2 = 162.96$ P=0.000 (HS)
	Married	80	87	
	Divorced	2	89	
	Widow	11	100	
Education level for patient	Illiterate	18	18	$\chi^2 = 12.80$ P=0.025 (S)
	Read & Write	24	42	
	Primary	24	66	
	Intermediate	14	80	
	Secondary institute & More	8 12	88 100	
Job of patient (Occupation)	High professional & managerial jobs	2	2	$\chi^2 = 117.68$ P=0.000 (HS)
	Lower professionals, skilled and semiskilled	14	16	
	Unskilled workers as laborers, farmers ...	84	100	
Family Types	Single	46	46	Bin. test P=0.484 (NS)
	Extend	54	100	
Residency	Urban	88	88	Bin. test P=0.000 (HS)
	Rural	12	100	
Crowding Index	< 2	26	26	$\chi^2 = 60.08$ P=0.000 (HS)
	2 _ 4	68	94	
	≥ 5	6	100	

(*) HS: Highly Sig. at P<0.01; S: Sig. at P<0.05; NS: Non Sig. at P>0.05; Testing based on One-Sample Chi-Square test, as well as Binomial test.

In Table (2): Distribution of the studied sample according to (SDCv.) with comparison significant

SDCv.	Groups	No.	Cum. %	C.S. (*) P-value
Socio-Economic Status	Low	65	65	$\chi^2 = 32.06$ P=0.000 (HS)
	Moderate	29	94	
	High	6	100	

(*) HS: Highly Sig. at P<0.01; Testing based on One-Sample Chi-Square test.

The majority of studied patients had a low responses, and they are accounted (65%), while leftover of moderate, and high level are accounted for (29%), and (6%) respectively. It could be

conclude that most of the studied patients were recorded "Low & Moderate" levels, and they are accounted (94%). In addition to that, significant difference at P<0.01.

Table(3): Summary Statistics for patients concerning "Drugs and Medications" with assessment

Drugs and Medications		Responses	No. & %	MS	SD	RS %	Ass. (*)
Steroids drug:	Hydrocortisone	Never	54	1.55	0.66	51.7	L
		Sometimes	37				
		Always	9				
	Prednisolone	Never	75	1.36	0.67	45.3	L
		Sometimes	14				
		Always	11				
	Dexamethazone	Never	41	1.67	0.62	55.7	M
		Sometimes	51				
		Always	8				
Analgesics and narcotic:	Aspirin	Never	36	2.05	0.88	68.3	M
		Sometimes	23				
		Always	41				
	Diclofenac sodium (Voltarin)	Never	9	2.64	0.64	88	H
		Sometimes	18				
		Always	73				
	Valium	Never	72	1.34	0.59	44.7	L
		Sometimes	22				
		Always	6				
Antibiotics : Ceftriaxone		Never	8	2.68	0.62	89.3	H
		Sometimes	16				
		Always	76				
Malignant drug: Sandostatin		Never	98	1.02	0.14	34	L
		Sometimes	2				
		Always	0				
Females drugs only:	Oral contraceptives	Never	51 (77.3)	1.32	0.64	44	L
		Sometimes	9 (13.6)				
		Always	6 (09.1)				
	Menstruation regular drugs	Never	49 (74.2)	1.39	0.72	46.3	L
		Sometimes	8 (12.1)				
		Always	9 (13.6)				
	Estrogen hormone	Never	55 (83.3)	1.23	0.55	41	L
		Sometimes	7 (10.6)				
		Always	4 (06.1)				
Food supplements :	Food supplements: Vitamin B12(folic acid)	Never	52	1.73	0.84	57.7	M
		Sometimes	23				
		Always	25				
	Food supplements: Vitamin C (ascorbic acid)	Never	88	1.12	0.33	37.3	L
		Sometimes	12				
		Always	0				

(*)L:Low; M:Moderate; H:High

Steroids drug accounted low response to moderate , " Aspirin, Voltarin , Valium ,Ceftriaxone ,Sandostatin ,Oral contraceptives, Menstruation regular drugs, Estrogen hormone , B12 and Vit C " registered (moderate, high, low ,high ,low , low, low, low, moderate and low) uses respectively.

Overall Assessment QoL:

"Overall Assessments", consists of sub and main domains for QoL, table (4) shows summary statistics and initial

assessments, such that, grand and global mean of score, standard deviation, and relative sufficiency, and as follows:

a. Physical domain, shows that most of studied sub main domain had a high negative responses regarding to QoL of studied patients, as well as "Energy" sub domain had a moderate response, and in light of an overall assessment, this domain had reported high negative response.

B .Psychological domain, shows that most of studied sub main domains had a moderate negative responses regarding to

QoL of studied patients, as well as "Thinking, and Bodily Image & Appearance" sub main domains had high negative responses, then finally, "Memory & Concentration" had low negative response, and in light of an overall assessment, this main domain had reported moderate negative response.

C .Independence domain, shows that sub main domains, which had high negative response regarding to QoL for studied patients are reported with "Work capacity, and Dependence on medications and treatment", while "Mobility" sub main domain of had reported a moderate response, then finally with subject to "Activities of daily living" sub main domain had a low negative response. Finally, in light of an overall assessment, this main domain had reported moderate negative response.

D .Social domain, shows that subject to sub main domains, which had reported high negative response regarding to QoL for studied patients with "Social Support", while "Personal Relationships" sub main domain had reported a moderate

response, then finally "Sexual Behavior" sub main domain had a low negative response. Finally, in light of an overall assessment, this main domain had reported low negative response.

E .Environmental domain, shows that most of studied sub main domains had a moderate negative responses regarding to QoL of studied patients, as well as "Thin Physical Safety and Security, and Financial Sources" sub main domains had high negative responses, and in light of an overall assessment, this main domain had reported moderate negative response.

F .Religious & Spiritual main domain, shows in general term trend had a moderate negative responses regarding to QoL .

G .An overall QoL assessment according to studied questionnaire items according to global mean score a moderate negative response are obtained for studied the patients.

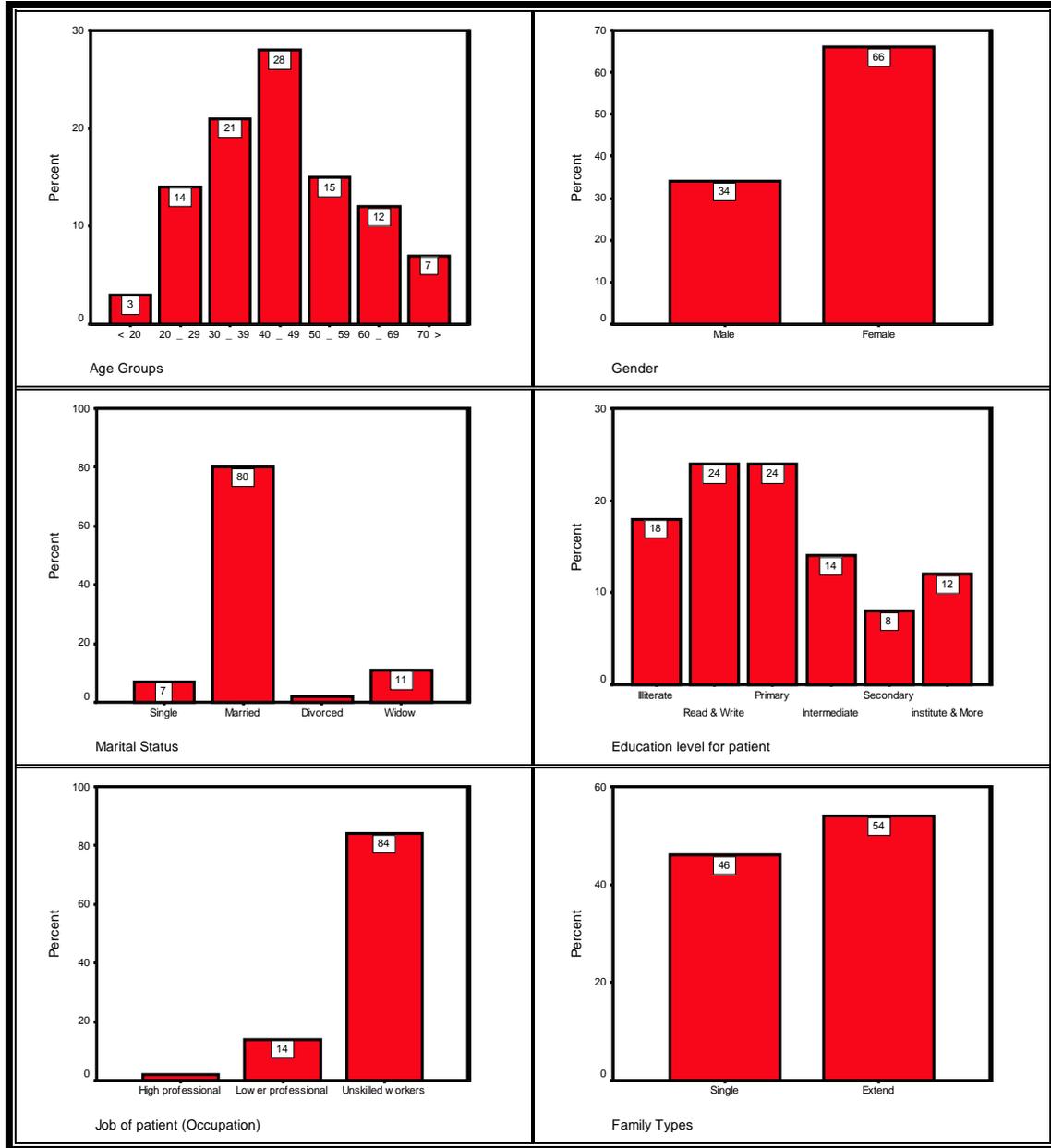
Figure (1) represented graphically percentages of the studied (DCv.)'s of the preceding table.

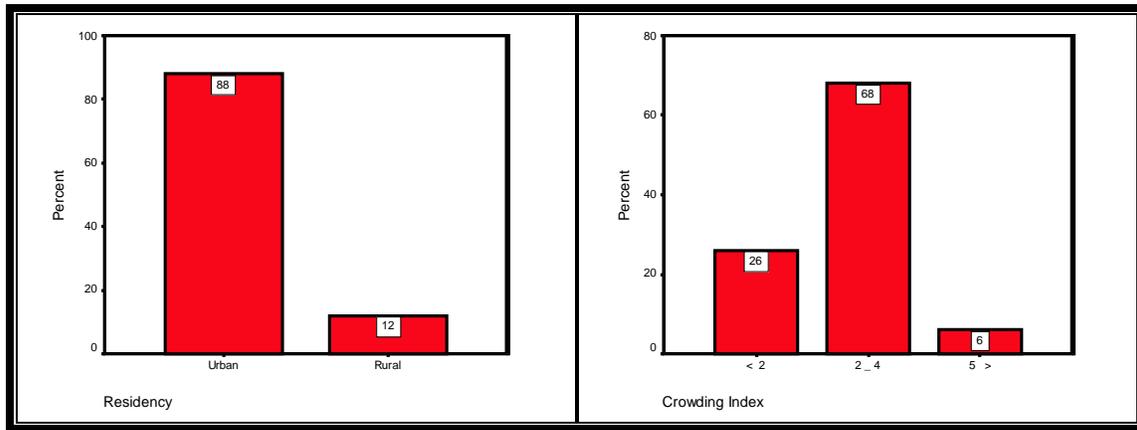
Table (4) : Summary statistics for patients with Cholelithiasis disease according to sub and main domains for studying quality of life

Sub and Main Domains of QoL	No.	MS	SD	RS%	Ass. (*)
Pain & discomfort	100	2.622	0.427	87.4	H
Sleeping	100	2.533	0.506	84.4	H
Rest	100	2.427	0.445	80.9	H
Energy	100	2.255	0.548	75.2	M
Fatigue	100	2.497	0.550	83.2	H
Physical Domain	100	2.467	0.335	82.2	H
Positive Feelings	100	2.307	0.313	76.9	M
Negative Feelings	100	2.038	0.473	67.9	M
Self - Esteem	100	2.145	0.354	71.5	M
Thinking	100	2.545	0.368	84.8	H
Memory & Concentration	100	1.627	0.567	54.2	L
Bodily Image & appearance	100	2.695	0.471	89.8	H
Psychological Domain	100	2.076	0.211	69.2	M
Mobility	100	1.910	0.292	63.7	M
Activities of daily living	100	1.583	0.655	52.8	L
Work capacity	28	2.798	0.419	93.3	H
Dependence on medications and treatment	100	2.445	0.460	81.5	H
Independence Domain	100	2.043	0.376	68.1	M
Personal Relationships	100	2.057	0.544	68.6	M
Social Support	100	2.473	0.324	82.4	H
Sexual Behavior	100	1.285	0.384	42.8	L
Social Domain	100	1.623	0.250	54.1	L
Physical Safety and Security	100	2.390	0.345	79.7	H
Home and Material Environment	100	2.253	0.370	75.1	M
Health & Social Care	100	2.115	0.460	70.5	M
Financial Sources	100	2.750	0.423	91.7	H
Participant in the Parks & Opportunities for Recreation / leisure	100	2.010	0.225	67.0	M

Environmental Domain	100	2.258	0.188	75.3	M
Religious & Spiritual Domain	100	2.051	0.328	68.4	M
Overall QoL	100	2.069	0.151	69.0	M

(*)L:Low; M:Moderate; H:High





Figure(1): Bar charts for Studied Socio-Demographical Characteristics .

Relationship of QoL main domains and (SDCv.):

Table (5) shows relationship between assessment regarding QoL for each main domains independently, such that (Physical, Psychological, Independence, Social, Environment, Religious & Spiritual) and (SDCv.), throughout contingency coefficients and their testing significant. Results shows that regarding contingency coefficients of measuring causes correlation ship throughout testing significant, a weak relationships are accounted with no significant at $P > 0.05$ between different components of

studying QoL throughout studied main domains and different patient's socio-demographical characteristics variables, except with the job of patients, which showed a highly significant relationship at $P < 0.01$.

Accordance with the preceding results, it could be concludes that studied questionnaire of studying quality of life patients with Cholelithiasis at teaching hospitals could be generalize even though differences are reported studied subjects in light of socio-demographical characteristics variables would be.

Table (5): Association between Basis Information and Socio-Demographical Characteristics variables with an overall assessments due to compact all main domains according to "Under/Upper" Cutoff point

Demographical Characteristics X Main Domains (QoL) Assessment	Physical Domain		Psychological Domain		Independence Domain		Social Domain		Environment Domain)		Religious & Spiritual Domain	
	C.C.	Sig.	C.C.	Sig.	C.C.	Sig.	C.C.	Sig.	C.C.	Sig.	C.C.	Sig.
Age Groups	0.181	0.759	0.261	0.295	0.270	0.247	0.220	0.532	0.266	0.266	0.260	0.300
Gender	0.180	0.067	0.186	0.058	0.167	0.091	0.113	0.254	0.099	0.319	0.072	0.471
Marital Status	0.199	0.248	0.120	0.689	0.206	0.218	0.136	0.597	0.154	0.488	0.186	0.309
Education level for patient	0.312	0.055	0.230	0.351	0.235	0.322	0.120	0.917	0.179	0.654	0.236	0.316
Job of patient (Occupation)	0.421	0.000	0.234	0.056	0.000	1.000	0.119	0.488	0.100	0.604	0.022	0.976
Family Types	0.040	0.688	0.138	0.164	0.080	0.422	0.061	0.540	0.169	0.086	0.132	0.183
Residency	0.021	0.837	0.173	0.079	0.122	0.218	0.139	0.162	0.108	0.276	0.098	0.322
Socioeconomic Status	0.222	0.076	0.088	0.674	0.067	0.799	0.185	0.170	0.169	0.229	0.175	0.206

(*) NS : Non Sig. at $P > 0.05$; HS : Highly Sig. at $P < 0.01$

IV. DISCUSSION

1.Discussion of the Demographic Characteristics:

Relative to the table (1)and figure (1) The most results of study patients are involved age group (28%) is found to be (40-49) yrs and the mean of the age was 44.94 yrs.

result of study sample are supported by study in Brahmapur (5),they described that the bulk of the GD (40%) found in the age group of 41-50 yrs and the mean age was 45.28. Concerning to the marital status the majority of the sample were married and

accounted (80.0%) the result is similar to Indian(6) study which estimated that 96% patients were married. Relative to educational level the majority of the study sample (80.0%) were low level of education such as illiterate , read and write , primary and intermediate schools.

Regarding to subject of occupation status , results indicated that majority of the study sample were unskilled worker as laborers, farmers , retired ,house wife ... they are accounted (84.0%).this result agrees with the Italian study in Sweden Study(8) they stated that , a higher risk of GD was found among housewives.

the highest percentage of the study sample were lived "Urban" (88.0%). This result agrees with Germany study⁽⁹⁾ suggested that Cholelithiasis plays one of the major sources of morbidity in developed countries .

2. Discussion of the Socio- Economic Status. In regarding to the socio-economic status , table (2 show that the majority of the groups had a low responses ,and they are accounted (65%). This result agrees with the a Sweden Study⁽⁸⁾ they stated that a relationship between GD and low social class.

Discussion of Overall Assessment QoL: Concerning of the "Overall Assessments QoL ", consists of sub and main domains, table (4).

1. Physical domain, shows that most of studied sub main and main domain had a high negative responses regarding to QoL of studied patients.

2. Psychological domain, shows that most of studied sub main and main domains had a moderate negative responses regarding to QoL of studied patients.

3. Independence domain, shows that sub main domains and main domain had reported moderate negative response.

4. Social domain, shows that sub main and main domains, which had reported high negative response regarding to QoL for studied patients.

5. Environmental domain, shows that most of studied sub main and main domains had a moderate negative responses regarding to QoL of studied patients.

6. Religious & Spiritual main domain, shows in general had a moderate negative responses regarding to QoL for studied patients.

7. Generally QoL assessment according to studied questionnaire items according to global mean score a moderate negative response are obtained for studied patients with Cholelithiasis disease.

These result of study sample are supported by Indian study⁽⁶⁾ they stated that the presence of chronic illness is associated with deteriorating QoL.

V. CONCLUSIONS

The majority results of the study sample were at the age group (40-49) yrs. Two third of the patients were females. Majority of patients were married , pregnant and multi parous women. Also, they had low level of education. Highest percent of group were a housewives and live with extended families at the crowded city. Furthermore ,most of them had a low socio-economic status. High percent of them were within obesity & overweight.

QoL assessment according to global mean score in 100 patients a moderate negative response are obtained for studied patients with Cholelithiasis disease. A weak relationships are accounted between different components of studying QoL throughout studied main domains and different patient's socio -

demographical characteristics variables(Age ,gender ,level of education and socioeconomic status) .

VI. RCOMMENDATION

The risk of gallstones disease may be decreased by avoiding sedentary habits with life style and dietary modification by reducing consumption of saturated fat , caloric diet , consumption of dietary fibers, stop smoking & alcohol drinking , regular physical activity , control of obesity ,control of diabetes mellitus , avoiding rapid decrease body weight and healthy dietary regimen & prevention strategies.

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Home Automation System Using Android Application

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Abstract - In today's world automation has played a key role in developing human's life and enhancing safety and security protocol. Mobile phones nowadays are very common to all people. Everyday household work like switching ON /OFF the fan or lights, decrease or increase in air conditioner temperature can be easily done using smartphone. Today home automation system (HAS) has been a key area of research in recent times. Home automation using android platform eliminates the process of individual involvement and enhancing easier and faster daily household needs for everyone. The home automation system (HAS) designed on android platform has been interfaced with 8 bit microcontroller i.e. arduino to control the home appliances using relay. Bluetooth has been used as the most reliable and efficient technology for short range communication. Different sensor has been used which are illustrated in details below. This paper provided a novel approach enhancing automation in household works and eliminating the traditional method of switching.

Index Terms- Arduino, Relay, Android, Home automation system, Bluetooth

I. INTRODUCTION

Today most home uses the electronic appliances such as fans, light, air conditioner etc. As the mobile phones are very common to all people nowadays using mobile as the key for controlling the home appliances will enhance the affordability and simplicity of the HAS. Mobile phones with android based operating system are regarded as smart phone. This smart phone has the capability of connecting to most electronics equipment. The android application needed for the operation of HAS is designed in Android platform. To increase the security feature of the android application password protection has been implemented. Arduino has been used as a microcontroller. Bluetooth has been used for the short range efficient connections. Sensors like MQ5 the LPG sensor and LM35 the temperature sensor and DHT11 the humidity sensor has also been interfaced with arduino to enhance the safety feature of the HAS [1]. The MQ5 is the most reliable gas sensor it can

detects the leakage of LPG gas and a buzzer has also been implemented to alarm the user in case of gas leakage. In case of fire breakout the temperature increases rapidly. LM35 detects the temperature and alarms the user so that possible measure could be taken to withstand a vital disaster.

II. HARDWARE PLATFORM

The hardware platform comprises of an Arduino UNO, digital computer, temperature sensor (LM35), gas sensor (MQ2), temperature and humidity sensor (DHT11), and a buzzer which are discussed below with their function in the home automation system.

A. Arduino UNO

Arduino UNO [2-3] is an 8 bit microcontroller board which is based on ATmega328P. It comprises of 14 digital input and output pins, a 16 MHz quartz crystal, USB connection for easy computer connectivity and a reset button to eliminate and restart in case of malfunction. It has an operating voltage of 5V, a flash memory of 32KB and a clock speed of 16 MHz for faster data processing.

B. Temperature Sensor (LM35)

LM35 are integrated-circuit temperature [4-5] devices which generates an output voltage linearly proportional [6] to centigrade temperature. It requires no calibration or trimming to achieve most precise output. Lower cost if the device makes it more affordable. It operates on the input voltage of minimum of -0.2 V and maximum of 35 V. It works on an output voltage of maximum of 6V and minimum of -1V.

C. LPG Sensor (MQ5)

The MQ5 gas sensor [9-10] is the best choice for LPG leakage detection as it provides a wide range of accurate LPG detection range from 200ppm to 10000 [12]ppm it works on AC or DC in $5V \pm 0.1$ [11]. It is a better choice rather than MQ2 [7-8] as it has a shorter detection range from 5000ppm to 10000ppm [12].

D. Humidity Sensor (DHT11)

DHT11 is a humidity sensor [13] utilizes a capacitive humidity sensor along with a thermistor to analyze the surrounding air to provide digital output to the data pin connected. It provides with almost accurate data in real time for every 2 seconds. Because of its low cost and high accuracy rate it makes it more popular in the weather sensing and analyzing industry.

E. Bluetooth Module

Bluetooth module HC-05 provides radio communication between almost all communications enabled devices enabling user with efficient wireless communication on an unlicensed radio spectrum [14]. It typically operates on a frequency of 2.4GHz and has a range of up to 20m to communicate with other devices.

III. SYSTEM ARCHITECTURE

In the home automation system (HAS) the user interfaced android application has been implemented in android platform enabling easy access for the user and arduino has been used as a microcontroller with relay circuit and Bluetooth module for wireless access.

A. Interfacing of instruments

A Bluetooth based mobile with android OS has been interfaced with the Bluetooth module and the Bluetooth module has been interfaced with arduino UNO. The relay circuit has been interfaced with the appliances and the relay circuit has been connected to arduino. LM35 and MQ5 and DHT11 have also been interfaced with the arduino. A detail description has been illustrated in the Block diagram below Fig1.

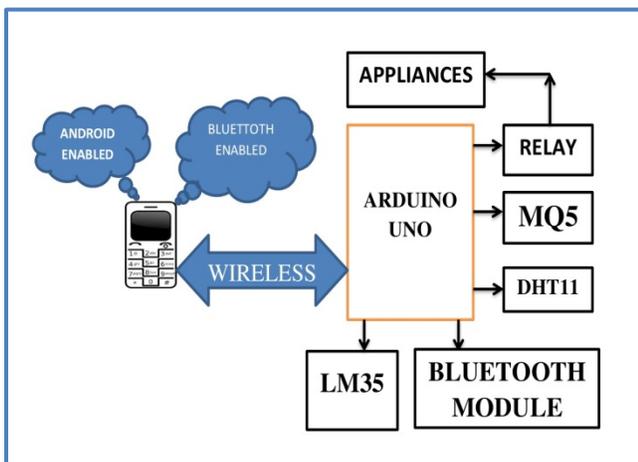


Fig1: System Architecture Overview

B. Bluetooth Application Controller for Arduino

Bluetooth application controller for arduino [15-16] is available in GOOGLE play store it serves as a six controlling devices which is touch operated android application. It makes the home automation system more

easily accessible, enhances easy operation and eliminates the tradition method of switching. It has been linked via the Bluetooth module HC-05. The control action has been done by relay. The Fig1.1 provides the snapshot of the used android application.

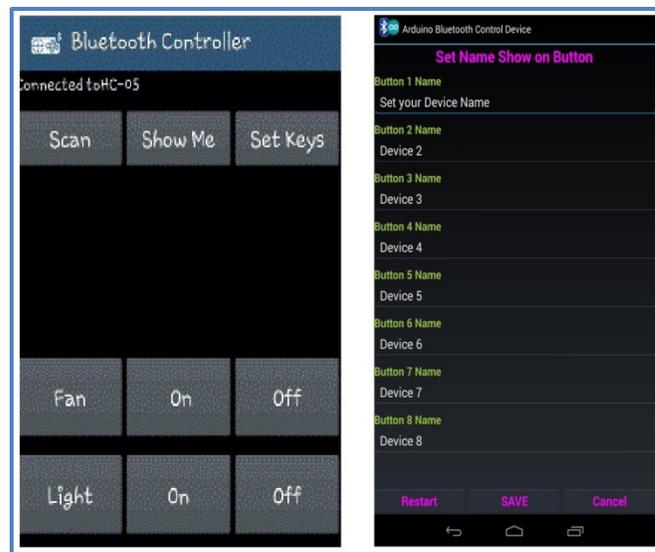


Fig1.1: Snapshot of the Application

IV. APPLIANCES IMPLEMENTATION

In this section the appliances used are illustrated. Various daily house hold required devices in day to day life are used.

The following devices used are given below:-

- Bulb
- Television
- Fan
- Refrigerator
- Music player
- Air conditioner

The appliances are simulated using relay and the dc motor drives the appliances when the command is given using the application. Below in Table1 the simulation for appliances for different input is illustrated.

Table1. Simulation Table for Appliances

SL.NO	TOUCH INPUT	OUTPUT
1.	DEVICE ON	BULB ON
2.	DEVICE OFF	BULB OFF
3.	DEVICE ON	TELEVISION ON
4.	DEVICE OFF	TELEVISION OFF

5.	DEVICE ON	FAN ON
6.	DEVICE OFF	FAN OFF
7.	DEVICE ON	REFRIGERATOR ON
8.	DEVICE OFF	REFRIGERATOR OFF
9.	DEVICE ON	MUSIC PLAYER ON
10.	DEVICE OFF	MUSIC PLAYER OFF
11.	DEVICE ON	AIR CONDITION ON
12.	DEVICE OFF	AIR CONDITION OFF

V. CONCLUSION

The home automation system using android application has been tested and successfully implemented. This system is highly reliable and efficient for the aged people and paralyzed person on a wheel chair who cannot reach the switch for the switching of ON/OFF the device and are dependent on other. This system has a wide scope development and modification. The voice control system can be implemented with accuracy in voice recognition and better pitching analysis. More devices can be simulated and timer could be set for automatic operation.

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Use of Artificial Intelligence to save energy

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Abstract- In the emerging field of Machine Learning and Artificial Intelligence, there are so much field specific researches are going on. This paper shows research over persons who love music and how the machine learning and artificial technology can come up with a boon for them. The cynosure of this paper is on the implementations of the artificial intelligence over the general life routine of people around the world. The paper is providing the ideas so that enhancements could be seen on ground zero.

Index Terms- Artificial Intelligence, Save Energy, Criteria for Sensors, Future Scopes, Cell Phones

I. INTRODUCTION

In today's world of hectic schedule each and every person needs rest, especially the quiescent peaceful mind, so everybody is in the seek of a calm sleep. We all know about the general routine of the people around the globe, there are two kinds of workers, first, those who work in shades and the other one is those who work beneath sunlight on grounds both need the real harmony in mind and "music" is the thing which can work as a stress buster. Specially the music which is mild brings peace, so here we can take a step to make people's life peaceful with energy savings. Many people around us listen music at night on their headset or on cell phones. They need the tunes until they fall asleep but what happens after that is phone is still playing its beats but the actual listener is sleeping, which can cause energy loss easily. No doubt people use timers also as according to their music players but eventually it may happen that the person fall asleep just after it and timer will play the music until it reaches its end point and in other case it may happen that if person doesn't get sleep again he/she will put it with timer and again the issue of energy loss will be there. We can work to cut these chances of unnecessary energy consumption.

To remove these kind of unnecessary energy loss we can use the special type of sensors and programs those who can detect the issue and can go ahead accordingly to abort the running of music player, same we can do for so many things in a phone. Phone can easily be found as a disturbing element in one's life at night.

We can make such technologies that so many functions are there those who are using phones battery there and which is becoming a major cause of inessential loss of energy.

II. THESIS

A normal charger has rating somewhere between 3-7 W while we charge with them. Which clearly means that even if

your cell phone takes 2-2:30 hours of charging it will be consuming only 0.0006 to 0.014 units or kWh of electricity to charge phone. This brings us to a point that if you charge your phone daily for 2 hours then it will spend only 2-5 units in the complete year.

But the point is do you keep the mobile phone on charging for only 2-2:30 hours a day? No, sometimes it went on charge for hours when you sleep after putting it up on charge and sometimes you charge it often because you use it very often that you need to charge it again and again. You are already losing so much of electricity unnecessarily then why to lose it more? There are seven artificial intelligence (AI) tools reviewed that have proved to be useful with sensor systems.

They are: knowledge-based systems, genetic algorithms, fuzzy logic, automatic knowledge acquisition, case-based reasoning, ambient-intelligence and neural network. We can make use of these sensors to solve this issue also, where activity recognition sensors could be used. There are some criterion to detect whether a person is sleeping or not.

III. CRITERIA

With the help of Artificial Intelligence we can use such sensors those who can abort such processes, where activity recognition sensors could be used. There may be some criterion to detect that somebody is sleeping. This technique will be very useful when you are heading to save electricity and phones battery life.

Generally the respiratory rates of the adult people from age group 11-65 years have 12-18 breaths per minute and this is the age group in which people do hectic work in daily routine so that they got stressed, this will create their need to listen music at work as well as before sleep. While we are awake our breathing pattern is slightly irregular because of movements, speech, posture, emotions exercise and other factors but while sleeping breathing will be steady unless the person is healthy. So, breath could be a major factor to detect whether a person is sleeping or not because while working our breath will be somewhat faster than this normal inhale.

Secondly, the body movements, this will be acting as huge measure to check that person is sleeping or not. While sleeping most of the time only stomach is the moving one on outer body because of respiration. The sensors can detect that if a person is near and is sleeping or not.

Another one is snoring, everybody here around doesn't snore but sometimes might be some people does. One reason for snoring can also be the lethargy, when somebody is really tired then the person can snore. Sound of snoring will be helpful to grasp that a person is sleeping or not.

Body temperature, increased Physiological activity during sleep and many other Parameters are there to measure the term sleep. We can easily recognise with a device in the phone so that a person is sleeping.

IV. FUTURE SCOPES

Other than the music auto off stuff, there are so many other things that should have been closed when a person sleeps. Examples are the recent applications, wi-fi or data connection etc. but we have to take care about calls and alarms. Call and alarm will ring and they will remain same vibrate as according to the users settings. This will really be a helpful step to make a pause on non-essential energy(electricity) loss. Specially we can set it work in night only. On the other hand the Wi-Fi and Data signals can cause harm unnecessarily to human body so that to prevent this it will close them off to get rid of it.

V. CONCLUSION

Challenges with the energy saving that I mentioned throughout this paper are huge and certainly affect other areas beyond the field of Artificial Intelligence and its implementation. With the help of artificial intelligence here are some small steps to save energy and provide a peaceful night for the working people from their hectic schedule. Many researchers can take this into account and can work on it.

Regarding artificial intelligence, it has been shown that it the most hot field in research sector, with a huge number of papers related to it. Moreover, the artificial intelligence sector is successfully using so many of the advances obtained by scientists.

I end this paper here and I know that so many areas of artificial Intelligence have not been specifically covered here, where researchers might find additional challenges. We are dealing with the challenges not only for the future scope but the present too.

VI. CONCLUSION

A conclusion section is not required. Although a conclusion may review the main points of the paper, do not replicate the abstract as the conclusion. A conclusion might elaborate on the importance of the work or suggest applications and extensions.

APPENDIX

Appendixes, if needed, appear before the acknowledgment.

ACKNOWLEDGMENT

The preferred spelling of the word “acknowledgment” in American English is without an “e” after the “g.” Use the singular heading even if you have many acknowledgments.

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Historical Bankline Shifting Since 1760s: A GIS and Remote Sensing Based Case Study of Meghna River Plate of Rennell's Atlas

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Abstract- Change detection is one of the most important research techniques in analyzing images that shows the interactions between human activities and the natural environment. According to time sequence of the concern area is active deltaic part of Bangladesh, particularly in the Meghna Estuary and its surroundings at Rennell's Atlas Plate-19. This research highlights the GIS and Remote Sensing approaches for shifting bankline since 1760s the Rennell's survey of the Meghna River. For fulfillment of this purpose, Rennell's map 1760s; Landsat Imagery 1988 and 2014 are identified and compared; bankline shifting is assessed. Maximum bankline shifting occurs at cross section 5 from 1760s-1988 where right bankline shifting Eastward 12.87 km. and left bankline shifting Westward 9.67 km. that shows depositional features more active than erosional features. Gradually, The Meghna River channel width is becoming narrow by 11.13 km. from 1760s-2014 due to sedimentation, water level fall etc. The methodology produces high quality map of change detection of bankline shifting map of the study area across space and time.

Index Terms - Bankline Shifting, Change Detection, Cultural Features, GIS, Landsat Imagery, Physical Features, Rennell's Atlas, Remote Sensing.

I. INTRODUCTION

Detecting change of Earth's surface features provides the foundation for better understanding of relationships and interactions between human activities and natural phenomena. Increased understanding is necessary for

improved resource management (Alex et al., 2003). Detecting change involves applying Multi-temporal datasets to quantitatively analyze the temporal effects of phenomena (Austen, 1996). Land use is influenced by economic, cultural, political, and historical and land tenure factors at multiple scales. Land use referred to as man's activities and the various uses which are carried on land (Baker et al., 2007). Major data sources for such analyses include base on Rennell's Atlas 1760s, Landsat TM 5 and Landsat 8. Landsat multispectral and temporal imagery is a particularly important source of data for observing changes in physical and cultural features (Bruzzone and Serpico, 1997). Remote sensing thus provides a unique opportunity to characterize the Spatio-temporal distribution of these changes (Bauer et al., 2003) and to collect important baseline of information that is too difficult to obtain using field-based methods. Early images paired with more recent images can be used to detect changes in the landscape over that period (Chen, 1998). Remotely sensed images are being used to address critical resource management problems, providing researchers with the ability to make rapid decisions about large spatial areas using recent data (Dixon and Candade, 2008). Dynamics operate at multiple spatial and temporal scales, requiring researchers to be able to make multi-scale observations using Satellite images (Coppin, 1994). Satellite images can easily detect and map both local and large area land use/land cover changes, and the impact they have on river processes (Chen et al., 2007). Concern about change in the size and quality of many of the world's river systems has been growing as more and more areas are

being converted to agricultural or urban use and affected by natural factors like erosion and deposition (Coppin et al., 2004).

Bangladesh, occupies the major portion of the Ganges Delta in the northern apex of the Bay of Bengal. Substantial parts in the east of the country incorporate some tertiary hills and the middle north and north is occupied by elevated tracts known as the Pleistocene terraces. The process of delta formation here started billions of years ago with the mountain building movement that created the Himalayan mountain systems (Dewidar, 2004). Change detection requires a comparison of the spectral reflectance values between two or more periods of time (Diuk-Wasser et al., 2004).

The main aim is to identify the historical changes in Bankline Shifting since Rennell's Survey of Meghna River,

- To assess the Historical Bankline Shifting Nature among 1760s, 1988 and 2014
- Comparing the Bankline Shifting among 1760s-1988-2014
- Assessing the Causes of Bankline Shifting of Meghna River

II. Material and Method

Data

The basic data used in this paper are historical map of Rennell's Atlas and satellite images of sensor, comprising of scenes for the years 1760s, 1988 and 2014. The other collateral data used in the present study are Landsat TM and Landsat 8 images (Path/Row 137/43, 137/44), which are freely downloadable from the website <http://usgs.gov/>. ERDAS Imagine 2014 image processing software has been used for processing the satellite images. ArcMap 10.2.1 GIS software has been used for analysis of the river bank data.

Methodology

Satellite images for years 1988 and 2014 have been processed to obtain the required information about the area. The following section describes the preparation of satellite images for information extraction Study area (Figure 1). Therefore, the data need to be geo-referenced before commencing the analysis. Since the Rennell's map procured from Survey of Bangladesh belongs to year 1760s, there are increased chances of error, if the map data is taken as a reference for geo-referencing the satellite images. Therefore, Landsat TM and Landsat images have been taken as reference. Map has been used for assistance in identification of features.

The Landsat images are precisely ortho-rectified with the following parameters:

- Projection Type: Universal Transverse Mercator (UTM)
- Spheroid Name: WGS 84
- Datum Name: D_Everest_Bangladesh
- Zone: _46

Landsat TM and Landsat 8 images for the study area have been downloaded and a mosaic has been prepared. Then individual image of IRS has been registered with respect to the Landsat image. For each images have been taken and geo-referencing has been carried out using second-order polynomial with nearest neighborhood resampling keeping grid size as 30 m. RMS (root mean square) error has been kept below 30m pixel. Map has been utilized for accurately identifying the GCPs on IRS and Landsat images. The geo-referenced images of the same year have been mosaiced together. Meghna River is covered with clouds for most part of the year, therefore the satellite images of one year couldn't be procured for same date or month. Therefore, radiometry of the images differ a lot. Making a mosaic without balancing the radiometry will not give good results. Therefore, radiometric normalization has been performed before mosaicing by histogram equalization and matching. This has given very good results, providing uniform brightness levels for similar features for the entire river basin. Also, feather option has been used for mosaicing to get the seamless boundaries between different images of same year. The mosaics for the years 1988 and 2014 have been prepared in this manner.

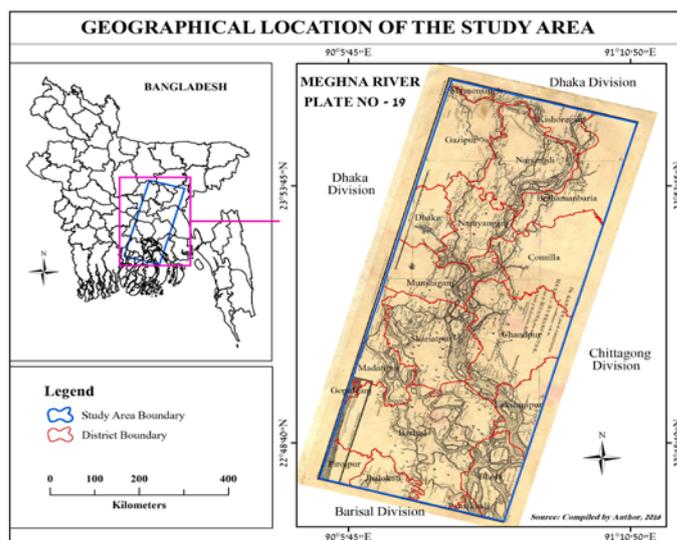


Figure 1: Study Area

Delineation/Digitization of River Bank Line

Meghna River (Plate no-19) of Rennell's Atlas is the most prominent area of Bangladesh. It is the active flood plain zone

in Bangladesh. Originated through the Lucy hill in Assam and finally meet with the Bay of Bengal. This river covers the 19 districts in Bangladesh. It has been divided into 7 strips at an equal spacing of approximately 25 km, reference cross sections 7 have been drawn at the boundary of each strip. Each of 7 cross sections has been grouped as a reach with numbering from downstream to upstream of the river. Base line of latitude 25.966°N and longitude 90°E has been taken as permanent reference line so that they maintain their identity when the morphology is changed. Table 1 shows some important locations within various reaches of the river. The river bank-line has been identified and delineated for all the satellite image mosaics of 1988 and 2014. NDWI image proved very useful in identifying the river bank line. While the shallow water channels have been considered the part of river, old and new soil/sand deposits at the river banks posed some ambiguity of interpretation as the river. A few of these soil/sand patches are at considerable distance from active water channel, but have dark tone on satellite image, indicating higher moisture. On the other hand, several soil patches very close to the active water channel bear bright signature, an indication of low moisture. NDWI has been used in delineating the soil/sand areas which have higher moisture content. It has been observed that the areas with recent soil deposits have higher moisture in comparison to other areas adjacent to river bank, due to the river related activities associated with them. Either the river was flowing through that area in the recent past, or that area was submerged in water, when there was high flow in the river. These areas have been marked as a part of river. Thus the use of NDWI image helped in delineating/demarcating the river bank line. The identified river bank lines for the left (south) and right (north) banks of the river, have been digitized using ArcMap10.2.1 software. Three river bank lines have been prepared for the years 1760s, 1988 and 2014. The length of arcs of both the left and right banks for all the above years have been calculated using GIS software. Erosion and deposition area has been estimated through area estimation using GIS software tools for polygon areas with the shifting bank-lines in study period.

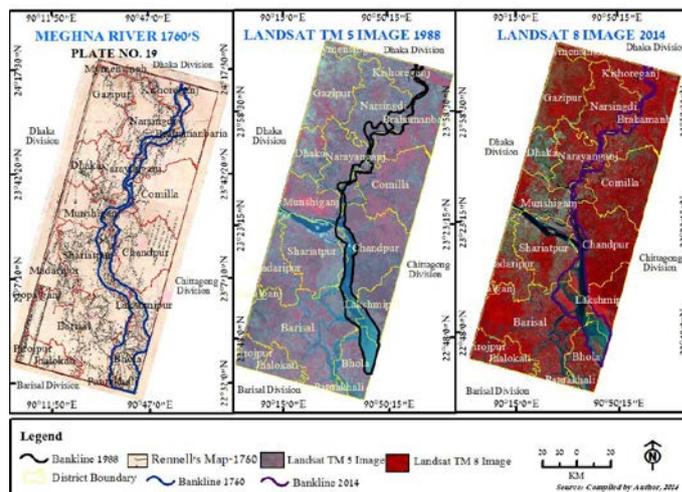


Figure 2: River bank lines have been prepared for the years 1760s, 1988 and 2014

Study Area

Meghna River (Plate no-19) of Rennell's Atlas is the most prominent area of Bangladesh. It is the active flood plain zone in Bangladesh. Originated through the Lucy hill in Assam and finally meet with the Bay of Bangle. This area Rennell's Surveyed in 1760s and it was published in 1780. This area covers the 19 districts in Bangladesh. Meghna River is also one of the major rivers in Bangladesh, especially famous for its great estuary that discharges the flows of the Ganges-Padma, the Brahmaputra-Jamuna and the Meghna itself. The downstream of SURMA River from Ajmiriganj is often referred to as the Meghna. The matter would be simpler but for the fact that from Madna downstream for about 26 km (in a straight line) one of the two channels of the Surma-Meghna is known as the Dhaleshwari. The channel from Ajmiriganj down to the confluence with the Dhanu is referred to as the Surma. This confluence is five kilometres east of Kuliarchar and north of Bhairab Bazar. Downstream from this point, the river is referred to as the Meghna.

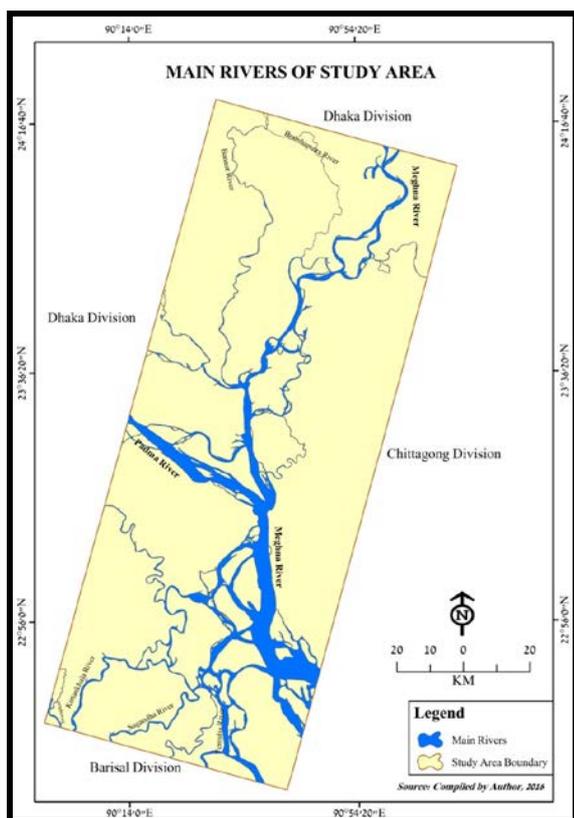


Figure 3: Meghna River

III. RESEARCH FINDINGS AND DISCUSSIONS

Fluvial channel form and its dynamics over the period of time have been a major interest of study in fluvial geomorphology. The present study deals with the fluvial morphological characteristics of the Meghna River in slightly southeast Bangladesh. Morphological and Morpho-dynamic maps of the Meghna River were prepared using Remote sensing techniques. Channel shift and width of the study area were estimated for the year of 1760s, 1988 and 2014 respectively. Results showed a remarkable change in position of bank and channel as well as bars along with their geometry and morphology over time. Result also demonstrates that the bankline is unstable and migrated continuously towards westward to eastward in the recent decades. In addition, the study reveals that overall width of the Meghna River is varied significantly during the last 254 years. Different maps and Landsat TM5, 1988 and Landsat 8, 2014 depict that the river shifting is irregular which is important for the existence of the study area people. For planning and sustainable development of Bangladesh, identification of fluvial channel morphology of a river like the mighty Meghna River is essential.

Assessing the Causes of Bankline Shifting

Geomorphological units consist of recent alluvium plain in the study area. Geomorphological features of the Meghna

River differ from one place to another in the slightly southeastern Bangladesh. It is recognized on the basis of the satellite image characteristics (e.g. tonal variation, texture, size, shape) and fluvial features. Geomorphological units are identified by different erosion processes. Remote sensing data are effective to map geomorphological units. The major causes of bankline shifting are-

Active Channel

Active channel is perpetual water flow in all over the year. This unit is the main feature of the study area (Figure 4).

Mid Channel Bar

This channel bar is ephemeral in nature and position of the bar within the channel is likely to be changed with each sizeable flood. The channel bar is located within the active channel which is exposed during the late winter and summer seasons. This bar consists of course to medium grained sand (Figure 4).

Lateral Bar Deposit

Lateral bar is connected to the main floodplain deposit. This bar is longitudinal, elongated and transverse to the stream alignment which is exposed only during the winter and summer period (Figure 4).

Old Bar Deposit

The old bar is the main geomorphological units within the channel area. This bar contains several cycles of sedimentation that forms multistoried changing sequences. This bar identifies by its geomorphic forms and light tone (Figure 4).

New Bar Deposit

New bar is small scale bar within the channel floors, which is characterized by sand waves without any vegetation covers. This bar consists of loose, light gray to white and medium to fine-grained sands. The new bar is comparatively lower than that of the older bar. In satellite images, it identifies by light tone (Figure 4).

Abandoned Channel Deposit

The unit is extended thin depressions and narrow discontinuous water courses with or without water throughout the year. It consists of silty clay, lies beneath by silty sand to fine sand deposits. Vegetation forms elongated shape like geometry (Figure 4).

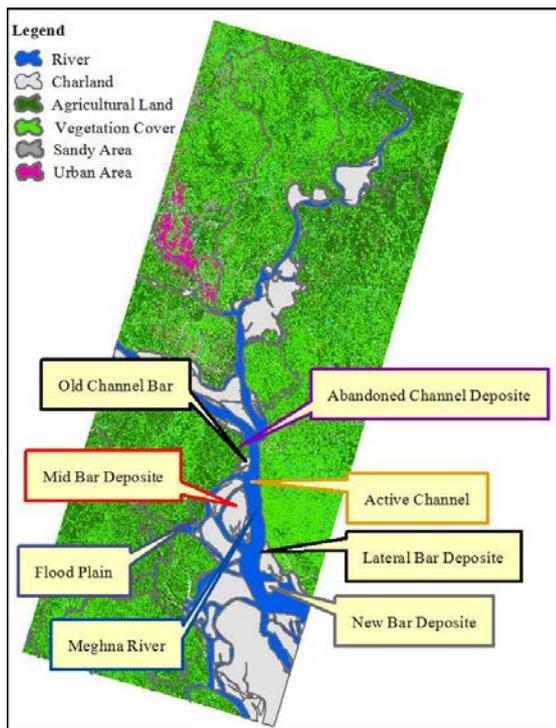


Figure 4: Assessing the Causes of Bankline Shifting Historical Bankline Shifting Nature among 1760s, 1988 and 2014

The channel pattern of the Meghna River Plate-19 of Bangladesh changes continuously; large channels being abandoned and new channels developing in a few years only are common features (GSI, 1977). It is seen from the Map, that during 1760s, 1988 and 2014. To show the changes of Meghna River Plate -19, I have taken image of 1760s, 1988 and 2014. To acquire necessary information of the changes of this plate, I drew 7 cross-sections of this river. The distance of one cross-section to another is near about 25 kilometers. It can be seen from the map that the bankline of this plate is changing from year to year, though I have not enough images to describe precise changes. According to the map of 1760s, it can be mentioned that, the changes is more 2014 than 1988.

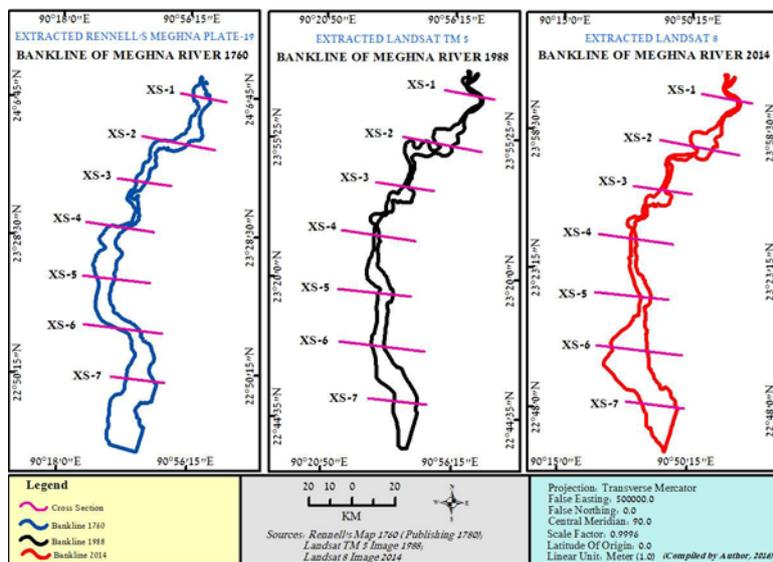


Figure 5: Bankline Shifting Nature among 1760s, 1988 and 2014

Assessing the Historical Bankline Shifting

Bank-line migration is a direct consequence of interactions and interrelationships between various aspects like extent of river activities (erosion, transportation and deposition), volume of river water during peak season, soil and geological structure including mass human interference with the river.

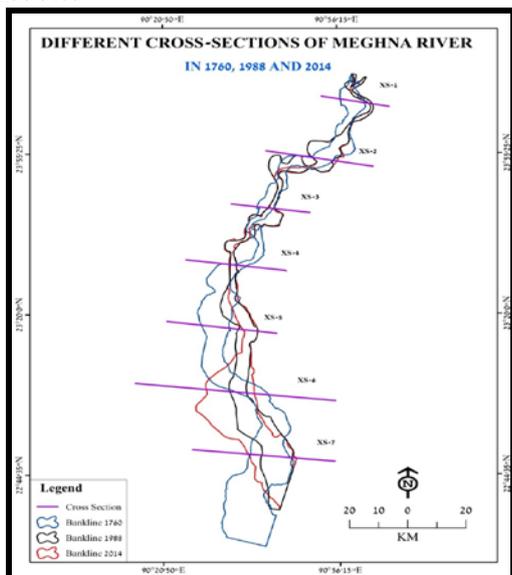


Figure 6: Different Cross Section of Meghna River

Although erosion and northward channel shift is common in north bank but it is not so as alterations and modulations in the controlling factors (structure, process and stage as envisaged by Davis) of the dynamic river tend to bring dynamism in the resultant landforms. Along the cross section (Table 7.1), the bank shift is generally from east-west to west-east for all the concerned years. But the cross-section reveals a completely different scenario 1760s and 2014.

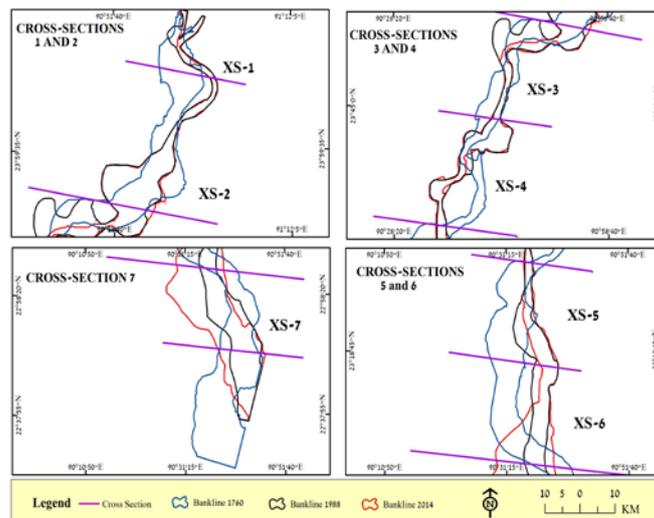


Figure 7: Different Cross Section of Meghna River
Bankline Shifting 1760s-1988

In the present study, the shifting of river course has been estimated from 1760s to 2014. To assess the channel shifting, it has been prepared 3 years maps (1760s, 1988, and 2014). To assess the channel shifting properly, this river is divided into 7 cross-sections on the basis of its bend. Here these cross-sections have been recognized as reach. First channel shifting was assessed according to cross-sections.

Table 1: Shifting along both Banks of the River from 1760s to 1988 (in km)

Cross Section	Right Bank shift (km) 1988	Left Bank shift (km) 1988	Direction of Migration
XS-1	9.85	2.63	Eastward
XS-2	2.82	0.14	Eastward
XS-3	4.15	0.61	Eastward
XS-4	2.45	-3.42	Westward
XS-5	12.87	-9.67	Westward
XS-6	-2.02	-7.47	Westward
XS-7	3.86	0.66	Eastward

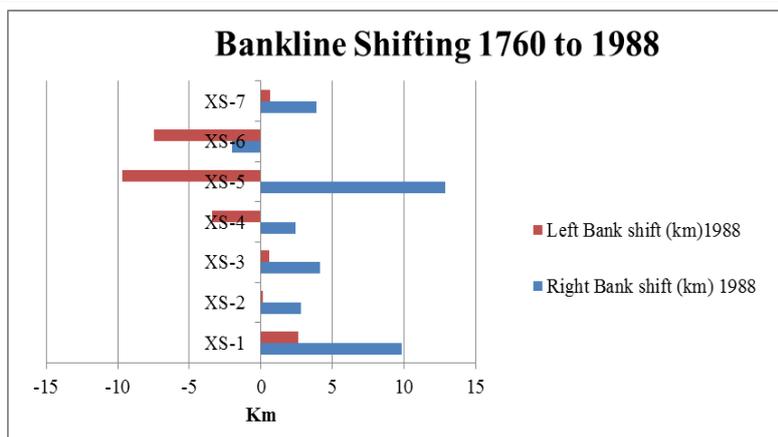


Figure 8: Changing the Bankline Shifting of Meghna River from 1760s, 1988.

During the year 1760s and 1988, the channel shifted from west to east (along the east bank) and so is the bank-line of the year 1760s-1988. But during the year 1760s-1988, the shift was from west to east direction. The negative values (-) indicate the shifting due to erosion and the positive values (+) indicate the shifting due to deposition. This clearly reveals that during

the year 1760s to 1988, there was extensive deposition along the right bank, whereas the process of erosion dominated the scene during 1760s-1988. It is noteworthy that the bank shift along the west bank is highest along the XS-5 cross-section where during the year 1760s-1988, there was eastward shifting of the bank to about 12.8kms (Table-1).

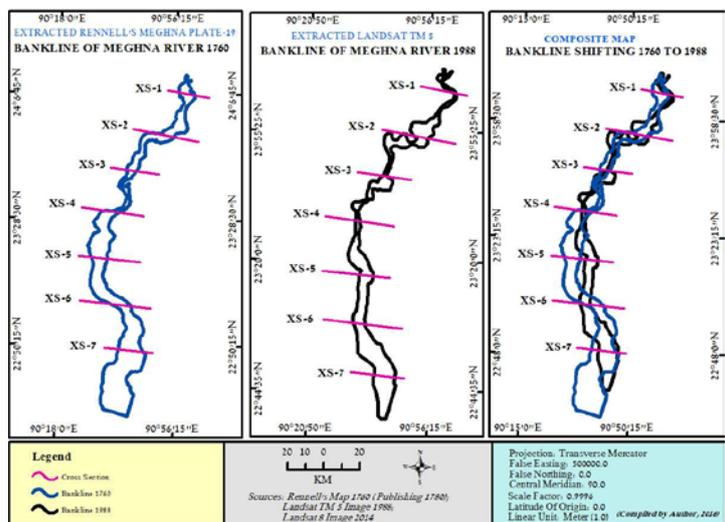


Figure 9: Bankline Shifting 1760s-1988

Bankline Shifting 1760s-2014

In the present study, the shifting of river course has been estimated from 1760s to 2014. To assess the channel shifting, it has been prepared 3 years maps (1760s, 1988, and 2014). To

assess the channel shifting properly, this river is divided into 7 cross-sections on the basis of its bend.

Table 2: Shifting along both Banks of the River from 1760s to 2014 (in km)

Cross Section	Right Bank shift (km) 2014	Left Bank shift (km)2014	Direction of Migration
XS-1	9.88	2.79	Eastward
XS-2	2.45	1.48	Eastward
XS-3	3.76	0.46	Eastward
XS-4	2.24	-3.47	Westward
XS-5	14.39	9.73	Eastward
XS-6	-10.08	-4.93	Westward
XS-7	-0.81	2.04	Eastward

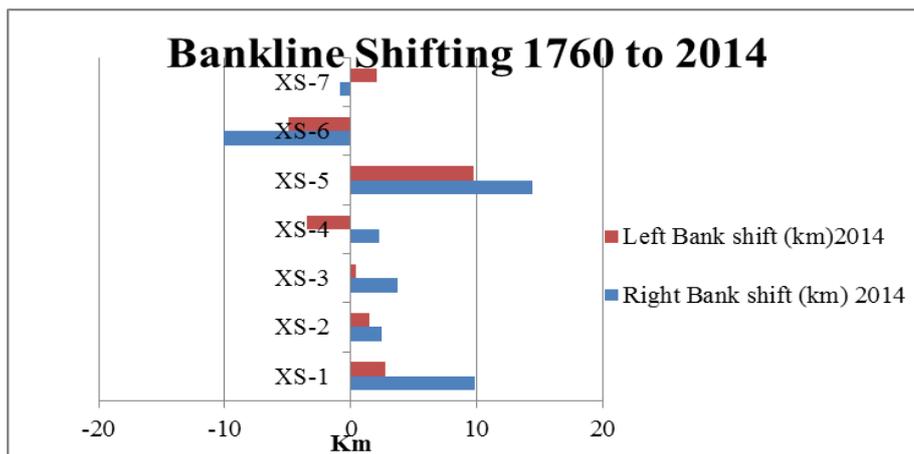


Figure 10: Changing the Bankline Shifting of Meghna River from 1760s, 2014.

During the year 1760s and 2014, the channel shifted from west to east (along the east bank) and so is the bank-line of the year 1760s-2014. But during the year 1760s-2014, the shift was from west to east direction. The negative values (-) indicate the shifting due to erosion and the positive values (+) indicate the shifting due to deposition. This clearly reveals that during

the year 1760s to 2014, there was extensive deposition along the right bank, whereas the process of erosion dominated the scene during 1760s-2014. It is noteworthy that the bank shift along the west bank is highest along the XS-5 cross-section where during the year 1760s-2014, there was eastward shifting of the bank to about 14.39 km (Table-2).

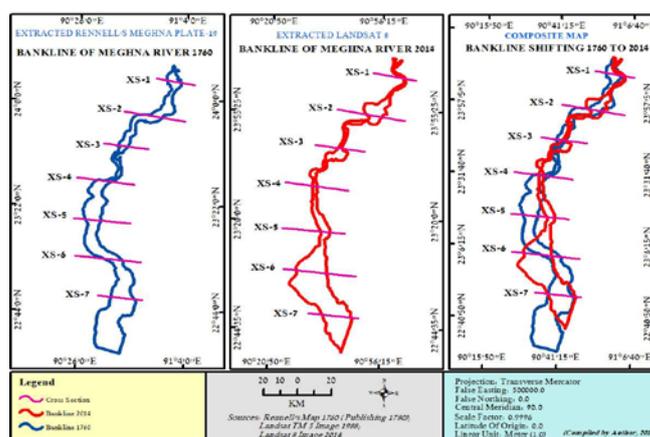


Figure 11: Channel shifting

Comparing the Bankline Shifting among 1760s-1988-2014

During the year 1760s and 1988, the channel shifted from west to east (along the east bank) and so is the bank-line of the year 1760s-1988. But during the year 1760s-1988, the shift was from west to east direction. This clearly reveals that during the year 1760s to 1988, there was extensive deposition along the right bank, whereas the process of erosion dominated the scene during 1760s-1988 in cross-section (XS), right bank XS-1 (9.85kms), XS-2 (2.82kms), XS-3 (4.15kms), XS-4 (2.45kms), XS-5 (12.87kms), XS-6 (-2.02kms), XS-7 (3.86kms) and left bank XS-1(2.63kms), XS-2 (0.14kms), XS-3 (0.61kms), XS-4 (-3.42kms), XS-5 (-9.67kms), XS-6 (-7.47kms), XS-7 (0.66kms). It is noteworthy that the bank shift

along the west bank is highest along the XS-5 cross-section where during the year 1760s-1988, there was eastward shifting of the bank to about 12.87kms.

In the year 1760s and 2014, the channel shifted from west to east (along the east bank) and so is the bank-line of the year 1760s-2014. But during the year 1760s-2014, the shift was from west to east direction. This clearly reveals that during the year 1760s to 2014, there was extensive deposition along the right bank, whereas the process of erosion dominated the scene during 1760s-2014 in cross-section (XS), right bank XS-1 (9.88kms), XS-2 (2.45kms), XS-3 (3.76kms), XS-4 (2.24kms), XS-5 (14.39kms), XS-6 (-10.08kms), XS-7 (-0.81kms) and left bank XS-1 (2.79kms), XS-2 (1.48kms), XS-

3 (0.46kms), XS-4 (-3.47kms), XS-5 (9.73kms), XS-6 (-4.93kms), XS-7 (2.04kms). It is noteworthy that the bank shift along the west bank is highest along the XS-5 cross-section where during the year 1760s-2014, there was eastward shifting

of the bank to about 14.39kms.

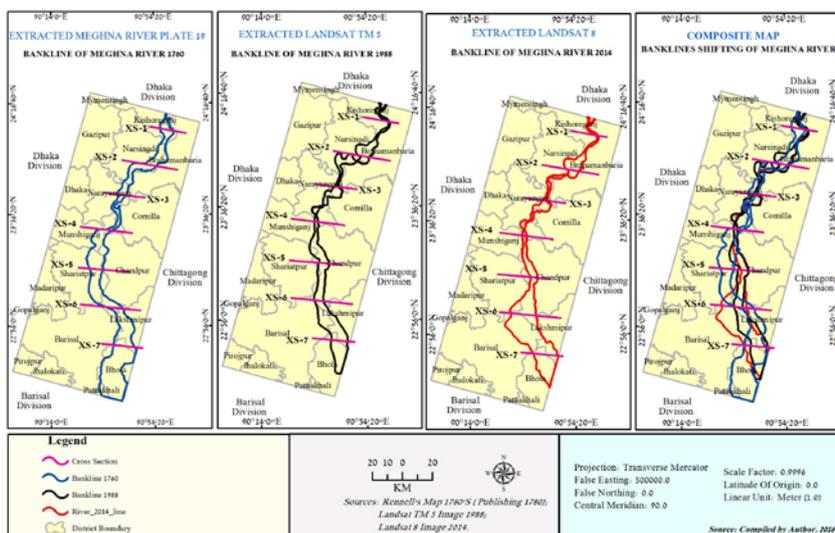


Figure 12: Comparing the Bankline Shifting among 1760s-1988-2014

Changing Channel Width

In the present study, the shifting of river course has been estimated from 1760s to 2014. To assess the channel width, it has been prepared 3 years maps (1760s, 1988, and

2014). To assess the channel width properly, this river is divided into 7 cross-sections on the basis of its bend.

Table 3: Variation of Channel Width in Different Cross-Sections

Cross Section	Channel Width 1760s (Km)	Channel Width 1988(Km)	Channel Width 2014(Km)
XS-1	8.45	1.21	1.28
XS-2	9.92	7.32	8.67
XS-3	5.6	2.18	2.33
XS-4	5.54	2.5	2.47
XS-5	9.74	6.68	5.1
XS-6	11.34	5.93	16.57
XS-7	13.76	10.51	16.8
Total	64.35	36.33	53.22

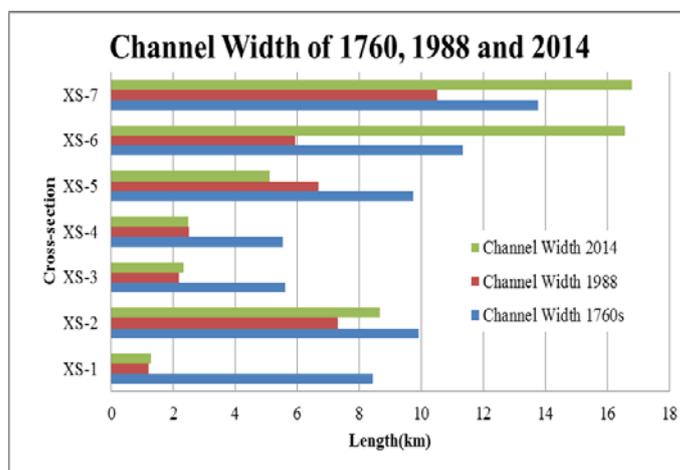


Figure 13: Changing Pattern of Width of the Meghna River from 1760s, 1988 and 2014.

The channel width of the river in cross-section in 1760s, 1988 and 2014 is 64.35kms, 36.33kms and 53.22km respectively. In 1988 the river channel decrease 28.02km from the channel width of the river in 1760s. again the channel width of the river in 2014 is approximately increase 16.89 km than the channel width of 1988.

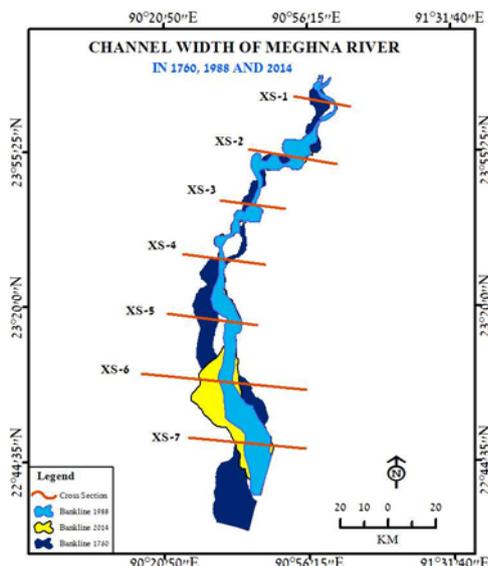


Figure 14: Changing Channel Width

IV. CONCLUSION

The present work using Remote Sensing and GIS based approaches with on multi-date satellite data has revealed sharp changes in fluvial land form in recent years resulting in considerable inhabited land loss. The Meghna River within the study reaches exhibits differential rate of erosion and deposition during 254 years (1760s-2014). It is observed that in general the river has eroded both the banks throughout its course except at a few sites where its banks are well defined as the river is constricted due to presence of rocks. River adjustment processes that affected fluvial system of the Brahmaputra include the channel control points, surmised to be the major co-actors, working in unison with other forcing functions like channel degradation and aggradation, lateral river migration, widening or narrowing, avulsion, changes in the quantity and character of the sediment load at spatial and temporal scale, intensely powerful monsoon regime, recurring earthquakes and adverse impact of anthropogenic factors. Many reaches along the Meghna River have been perceived as suffering from high erosion that endanger nearby settlements and infrastructure. The reaches have been prioritized with respect to the land area loss of the years.

There arises the need for in-depth study of interaction of geo-tectonic activities conjunctively with fluvial regime in the region to understand the complex physical processes completely for suggesting more practical result oriented river management interventions.

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Evaluation of the maintenance and operational dependability of small hydropower plant

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Abstract- Small hydropower plants located at dams are frequently used for power generation in the Czech Republic, where, the advantage of the availability of both pressure head and environmental outflow are exploited for this purpose. The performance of hydropower plants is significantly influenced by the dependability and service life of installed technical equipment. This study presents the results of dependability analysis based on the analysis of defects and failures affecting two turbines (Francis, crossflow Banki) installed on the bypass of the bottom outlets of the Sance Dam in the Czech Republic. Firstly, the quantifiers of dependability are introduced and shutdowns are defined. Empirical probability distribution curves for time to shutdown and shutdown duration are plotted for both turbine generator units based on available records of incidents and reasons for individual shutdowns from 10 years of operation. The analysis was conducted separately for each turbine generator unit and shows the average periods between shutdowns, and their duration. Period length probabilities for both periods between shutdowns and the durations of shutdowns were also evaluated.

Index Terms- small hydropower plant, dependability analysis, maintenance, probability of failure, hydro-power production

I. INTRODUCTION

The effort to increase the proportion of electric power produced using renewable sources is currently a worldwide trend. In the Czech Republic (CR), hydropower plants (HPP) represent one of the most significant means of obtaining power from renewable sources. Unfortunately, the geographic situation of the CR provides only a limited number of locations suitable for new HPP installations capable of the effective utilization of water energy. Therefore, upgrades to existing HPPs that enhance their efficiency have become important for many owners and operators. The motivation is the chance to gain higher purchase prices for the energy produced. The minimum range of upgrades to obtain is given by the requirements of the Energy Regulatory Office of the Czech Republic. Important information for the evaluation of the economic benefits of possible HPP reconstruction can be gained from the dependability assessment of existing installations.

System analysis and dependability management are quite widely-known and well-developed branches in engineering practice [2], and have already been introduced into international standards [6]. Dependability is usually quantified through reliability. As a result, engineering reliability and its application in mechanics has seen considerable development [11] and [16]. Reliability assessment is used for the optimization of maintenance strategies

and cost reduction [3], [17]. With regard to renewable energy, reliability assessment has been extensively developed especially for wind energy [9], [13] and [18]. However, wind turbines are usually grouped together into so-called wind farms consisting of large numbers of practically identical machines with the same dimensions, layout, etc. Thus, large data sets are available for incidents and failures involving wind turbines, while this is not the case for hydropower, where installations are usually unique, with different parameters and layout.

Several studies on maintenance, operation and profitability analyses in hydro power production have been made by SINTEF Energy Research in Norway [22] and [23] and USACE [1]. However, these are mainly focused on large HPPs.

Dependability quantifiers are recommended in [12], [16] and [19], these being the reliability or probability of failure for a given time interval, failure rate, mean up time, mean down time, and asymptotic availability. All of these quantifiers were derived from operational data assuming semi-Markov processes [7], [19]. A HPP is defined as a system of components. In principle, the whole system (HPP) can be divided into two main parts, namely the civil engineering structure itself and its technical equipment (also including electrical equipment). Here, the Eurocode [5] recommends a “design working life” of 100 years for civil engineering structures and 10 to 25 years for machines and electrical equipment. Based on experience gained during HPP operation described in [8], the technical lifespan of such structures is estimated to be 80 to 150 years for their structural parts, 25 to 70 years for mechanical parts and 15 to 60 years for electrical parts. Therefore, the service life of an HPP is governed mainly by the condition of its technical components, and so durability analysis has to be focused on that.

The operational dependability of a small HPP is generally considered to be the ability of an HPP to be in a state allowing it to perform a required function under given conditions at a given instant of time or over a given time interval [4], [10]. Within the text below, dependability is characterized by the reliability of the HPP, and especially of its technical parts. Reliability is the ability of an item to perform a required function under given conditions for a given time interval. Here, the said item is the technical equipment of the power plant, i.e. a turbine generator unit.

II. DEFINITIONS AND METHODS

For the purposes of the dependability assessment carried out for this study, each turbine generator unit in the HPP was assumed to be an independent serial system of components with non-zero time to restoration. Every HPP owner usually tries hard to operate their turbines as continuously operating items. However, the operation of a turbine is significantly affected by external

conditions such as a combination of discharge and pressure head, or the stability of the distribution network, which is out of control of the plant owner or operator. As a result, an HPP is considered to be an intermittently operating item (IOI). During the first step in the analysis, detailed operational data have to be evaluated and failures have to be specified [1], [15].

The following terms are used within the text:

Shutdown for any reason– stoppage of a turbine due to any unexpected maintenance activity (including the exchange, repair, dismounting or mounting of any part of the HPP) necessary to put it back into operation.

Shutdown for a significant reason – stoppage of the turbine due to a defect or the failure of any part of the turbine which calls for the repair and/or exchange of part of its equipment (typically the exchange of a runner, shaft, generator, bearings, coupling, transition part of an intake pipe, etc.).

Up time – the time interval during which the turbine is in an “up state” (a period of operation between two consecutive shutdowns).

Down time – the time interval during which an item is in a “down state” (comprises the necessary time for repair and delays due to administration, the delivery of spare parts, etc.).

The reliability of turbines in an HPP was assessed using the following quantifiers:

- mean up time MUT ,
- mean down time MDT ,
- mean failure rate λ ,
- asymptotic availability A ,
- up time $K_{(p)}$ between two adjacent shutdowns, which is expected at a given probability p ,
- down time $N_{(p)}$, which is expected at a given probability p .

The mean up time MUT between two adjacent shutdowns may be calculated as [7]:

$$MUT = \frac{1}{n} \sum_{i=1}^n UT_i, \quad (1)$$

where UT_i is the up time period between two adjacent shutdowns and n is the number of shutdowns recorded in the monitored time period.

Mean down time MDT is determined as follows [7]:

$$MDT = \frac{1}{n} \sum_{i=1}^n DT_i, \quad (2)$$

where DT_i is the down time period after shutdown.

Mean failure rate λ is the inverse of the mean up time [7]:

$$\lambda = \frac{1}{MUT}. \quad (3)$$

Asymptotic availability A holds [7]:

$$A = \frac{MUT}{MUT + MDT}. \quad (4)$$

The up time UT between two adjacent shutdowns with a given probability was expressed as a quantile of a cumulative distribution function representing the probability of failure occurrence after the time of operation UT_i from the last shutdown. Based on operational records, a vector (UT_1, \dots, UT_n) of a random variable where UT_i ($i = 1, \dots, n$) represents times between shutdowns (i.e. up time periods). The empirical cumulative distribution function for up time periods UT_i is defined as [20]:

$$F_n(t) = \frac{1}{n} \sum_{i=1}^n 1\{UT_i \leq t\}, \quad (5)$$

where

$$1\{UT_i \leq t\} = \begin{cases} 1 & \text{for } UT_i \leq t \\ 0 & \text{otherwise} \end{cases} \quad (6)$$

Then, the quantile $K_{(p)}$ (the up time between two adjacent shutdowns which is expected at a given probability p) is defined as follows:

$$P(UT \leq K_{(p)}) = p, \text{ and therefore } F(K_{(p)}) = p, \quad (7)$$

or using the inverse function:

$$K_{(p)} = F^{-1}(p). \quad (8)$$

An analogous approach was used to calculate the down time at a given probability $N_{(p)}$ by substituting UT_i by DT_i in equation (6). Empirical cumulative distribution functions for both turbine generator units were fitted with distribution functions using the mean failure rate λ (3).

III. DESCRIPTION OF THE SANCE DAM AND THE HYDROPOWER PLANT

The Sance dam is located in the north-east of the Czech Republic. It was built on the Ostravice River between 1965 and 1969. The dam body is 62 m high and consists of rockfill shoulders and a clayey core. It is equipped with an emergency spillway, two bottom outlets, an outlet tower and a stilling basin. The valve chamber at the downstream edge of the bottom outlets is joined with the powerhouse of the small hydro power plant (figure 1 and figure 2). The layout of the Sance Dam with appurtenant works is shown in figure 1. A close-up view of the entrance to the HPP is shown in figure 2.



Figure 1: Overhead view of the right abutment of the Sance Dam

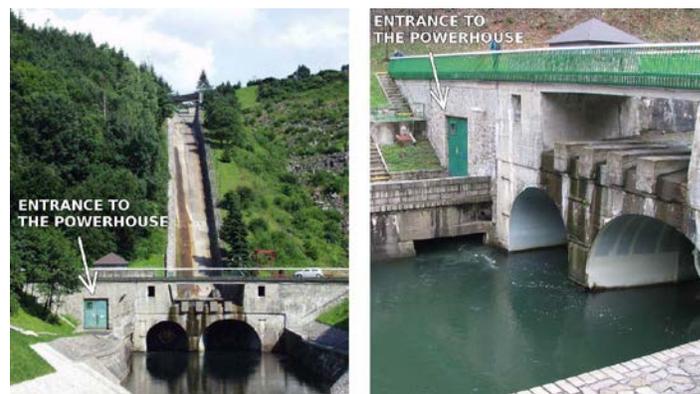


Figure 2: Close-up view of the entrance to the HPP

The bottom outlets are formed by two bypass tunnels drilled through the right abutment. The emergency spillway comprises a side weir, side channel, chute and stilling basin. The chute terminates in a ski jump and stilling basin that also serves the bottom outlets, the sanitary outflow and the outflow from the turbines (figure 2).

The small hydropower plant is equipped with two turbine generator units, HC1 and HC2. The inflow to the turbines is provided by an 800 mm-diameter diversion penstock which is driven from the left bottom outlet. The penstock is equipped with a cross-shaped distribution piece which distributes the flow to both turbines and for the raw water supply (figure 3. and figure 4).

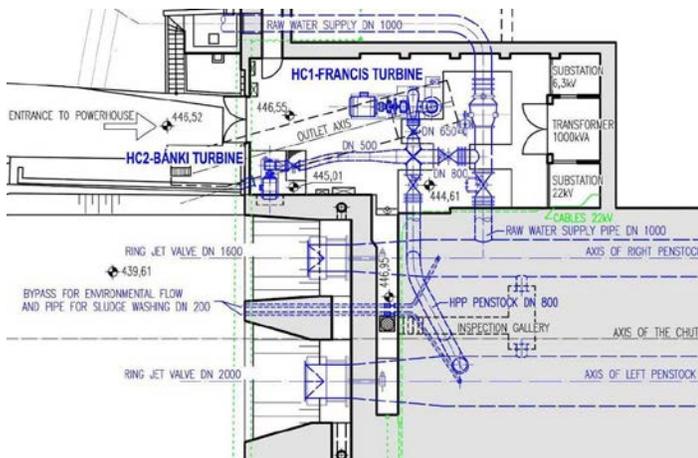


Figure 3: Ground plan of the HPP



Figure 4:View of turbines HC1 Francis (left) and HC2 Banki (right)

Turbine generator unit HC1 was installed in 1974 and is composed of a Francis F25 horizontal turbine with a runner diameter of 525 mm, a capacity of 1.6 m³/s, a gross head of 60 m and a maximum power output of 810 kW. The turbine consists of the following components: runner (stainless steel), turbine shaft, coupling, flywheel, spiral case, draft tube, wicket gate, bearings, regulating mechanism, brake and hydraulic aggregate. An asynchronous generator is connected to the turbine through the coupling. HC1 is equipped with electrical protection devices, electrical distribution boards, an oil transformer and an automatic control system.

Turbine generator unit HC2 was supplementarily installed in 1992 and consists of a Banki turbine (CINK 3.4Bx312) with a

runner diameter of 340 mm, an effective width of 288 mm, a discharge capacity of 0.624 m³/s, a gross head of 60 m and a maximum output of 243 kW. The turbine consists of the following components: turbine chamber, runner, shaft, coupling with cover, frame, draft tube, bearings, regulating mechanism and transition inlet part. A horizontal asynchronous generator is connected to the turbine through the coupling. HC2 is also equipped with electrical protection devices, a transformer and an automatic control system. The gross head to the HPP is approx. 60 m.

The view on both turbines is shown in figure 4.

IV. DEPENDABILITY ANALYSIS OF THE SANCE HPP

The dependability analysis was performed separately for each turbine generator unit (HC1 and HC2) in two steps, namely the assembly of a shutdown database, and reliability quantification.

A. Dependability Analysis of the Sance HPP

The first step of the analysis was the evaluation of operational data and the compilation of the shutdown database. The main sources of data were operation and service logs. Unfortunately, these were not available for the entire time the HPP has been in operation, and information given about shutdowns and repairs in the last decades of the 20th century was not very detailed. As a result, other sources of information were used, such as reports about repairs, invoices and related documents, and for the last ten years also logs from the control system. Based on the analysis of data sources, the operating period of each turbine within the Sance HPP was divided into three main periods related to data availability and depth of information; see table I.

Table I: Availability of operational data from Sance HPP

Description	HC1 - Francis	HC2 - Banki
No data	1974-1995	1992-1996
Limited data about main maintenance, alterations and failures	1996-2002	1997-2002
Detailed operational data	2003-2013	2003-2013

The most reliable data are available from the period 2003 to 2013, as the shutdown information is taken from several sources and may be checked. It was also possible to discuss contradictory information and several other issues with the staff responsible for the operation and maintenance of the HPP. The current reliability of the HPP was therefore assessed using data from the period 2003 to 2013.

The final shutdown database contains the dates when each shutdown commenced and ended, and the reasons why it occurred. Two data sets were prepared for each turbine generator unit (HC1 and HC2). The first of these is related to shutdowns for any reason, and the second to shutdowns for significant reasons according to the definitions mentioned above. The main reason for the division of shutdowns into two types was the fact that shutdowns for significant reasons usually lead to both a longer period of down time and higher costs, and therefore are of the greatest interest to the HPP owner. Note that shutdowns for significant reasons are a subset of all shutdowns.

Each data set starts at the time of restoration after the first recorded shutdown and ends at the time of restoration after the

last recorded shutdown. This ensures that each period is either the up time between shutdowns or the down time (duration of the shutdown), and that the number of up and down time periods within the data set is the same. The basic characteristics of the data in each data set are shown in table II.

Table II: Basic characteristics of the data used for reliability quantification

	Unit	HC1 – Francis		HC2 – Banki	
		Shut-downs	Shut-downs for significant reasons	Shut-downs	Shut-downs for significant reasons
Observed period	-	30 Jan 2003 30 Jun 2013	31 May 2003 12 Apr 2013	11 Apr 2003 27 Jan 2013	17 Dec 2003 5 Oct 2012
Total length of observed period	days	3 803.03	3 604.45	3 578.51	3 215.00
Total length of up time	days	3652.10	3496.27	3462.53	3118.01
Total length of down time	days	150.93	108.18	115.98	96.99
Number of records <i>n</i>	-	63	14	47	10

B. Reliability quantification

Values of reliability quantifiers calculated according to formulas (1) to (8) for each data set are shown in table III.

Table III: Values of reliability quantifiers for turbines HC1 and HC2

Quantifier	Unit	HC1 - Francis		HC2 – Banki	
		Shut-downs	Shut-downs for significant reasons	Shut-downs	Shut-downs for significant reasons
Minimum up time	day	0.08	4.94	0.03	2.38
Maximum up time	day	444.99	912.82	436.54	663.00
Minimum down time	day	0.01	0.07	0.01	1.99
Maximum down time	day	35.49	35.49	26.41	26.41
<i>MUT</i>	day	57.97	249.73	73.67	311.80
<i>MDT</i>	day	2.40	7.73	2.47	9.70
λ	1/year	6.30	1.46	4.95	1.17
<i>A</i>	-	0.960	0.970	0.968	0.970
<i>K</i> _(0.95)	day	155.84	713.81	242.57	650.35
<i>N</i> _(0.95)	day	11.14	21.12	11.15	24.72

The HC1 turbine generator unit (Francis) has recently become rather obsolete, corresponding to turbine design trends common when it was installed (1974). Continued operation of the turbine is possible thanks to periodic maintenance and servicing. Several significant repairs carried out on this turbine are described within operating records. These mainly consisted of a general repair made to the turbine (1995), the exchange of bearings (2002, 2004), the exchange of the generator, as well as repairs and the exchange of the pumping aggregate for wicket gate control system (1998, 1999), the modernization of the control system, etc.

The HC2 turbine generator unit (Banki) requires quite frequent servicing to keep it in operation. The main reason is the rather high loading of the runner, which is causing cavitation (figure 5). Based on the operating records it can be concluded that on average the complete exchange of the runner is necessary approximately every 12 years, but significant servicing and maintenance (the exchange of some components, welding, balancing, etc.) is necessary approximately every 7 to 8 years. The period between minor repairs is shorter: up to 2.5 years on average.

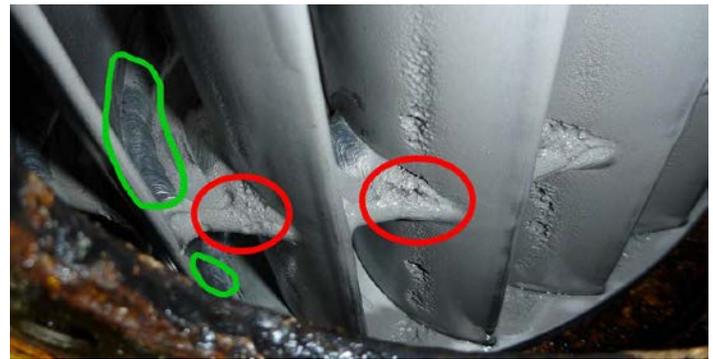


Figure 5: Cavitation on the HC2 runner (source: the PovodňOdry River Basin Authority)

The period between two consecutive shutdowns for significant reasons lasts on average 0.7 years for HC1 and 0.9 years for HC2 (table III). Such periods can be regarded as unacceptable when considering the performance currently expected from similar machines. The rather short intervals between shutdowns for significant reasons indicate the low durability of both turbine generator units. Turbine producers generally state service lives in the order of decades without significant maintenance. On the other hand, the mean down time of both turbines is quite low, which is also expressed by the availability $A \geq 0.960$. Small turbines and their parts are easy to move without special equipment like heavy cranes, which is probably the main reason why repairs are easy to execute.

Both of the empirical cumulative distribution functions (the up time between two consecutive shutdowns and the down time (duration of the shutdown)) were constructed for both turbine generator units (HC1 Francis and HC2 Banki) using equations (5) and (6). The empirical cumulative distribution functions describing the probability of up time between two consecutive shutdowns are shown in figure 6. The empirical cumulative distribution functions describing the probability of down time (shutdown duration) are shown in figure 7. Values of quantiles

representing up and down time values with the probability $p = 0.95$ are shown in table III.

Figure 6 shows the good agreement of empirical curves exhibiting exponential distribution with the mean failure rate λ , except for in the case of shutdowns for significant reasons affecting the HC2 Banki turbine (the black line in figure 6 on the right). Here, the application of uniform distribution with the parameter $k = 0.465 \cdot \lambda$ seems to be more appropriate for the approximation of empirical data. Based on the results shown in table III and figure 6 it can be concluded that for a high exceedance probability (0.95), a forced shutdown should be expected after approximately $K_{(0.95)} = 160$ days (0.4 years) of operation from the last repair for HC1, and about $K_{(0.95)} = 250$ days (0.7 years) for HC2, while a shutdown for a significant reason (a major defect) should be expected after approximately every $K_{(0.95)} = 720$ days (2 years) for HC1, and after approximately every $K_{(0.95)} = 650$ days (1.8 years) for HC2.

Table III and figure 7 only show the good agreement of empirical functions with the exponential distribution function in the case of the duration of shutdowns for significant reasons. Due to the quite frequent short shutdowns for any reason (for example, the rectification of an error in the control system, switch breakers, etc.), the cumulative distribution function is extremely steep. Here, the Weibull distribution with parameters a and b calculated as the maximum estimate of the likelihood of Weibull distribution was found to be suitable [14]. Based on the results shown in figure 7 it is possible to conclude that at a high probability of $p = 0.95$, the shutdown duration is not expected to extend for a longer period than $N_{(0.95)} = 11$ days for both turbines, while the duration of a shutdown for significant reasons is not expected to last longer than $N_{(0.95)} = 21$ days for HC1 and $N_{(0.95)} = 22$ days for HC2.

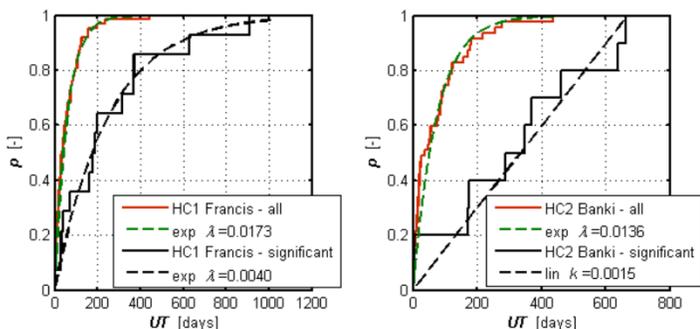


Figure 6: Distribution functions describing the probability of up time between two consecutive shutdowns

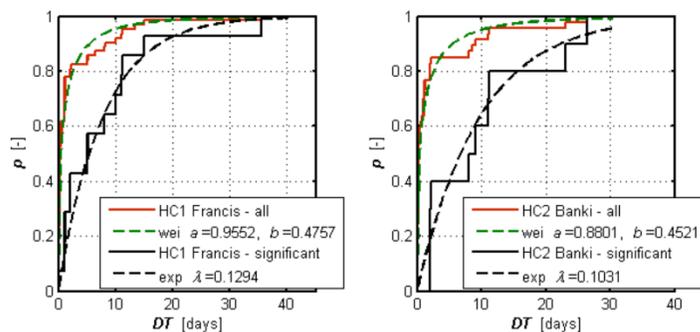


Figure 7: Distribution functions describing the probability of down time (shutdown duration)

V. CONCLUSIONS

In this paper a dependability analysis was carried out for two turbine generator units located at the Sance HPP using operating records and other reliable resources. Unfortunately, practically no records exist for the Francis turbine generator unit (HC1) during its first 19 years of operation. The following decade also provides only poor information about the performance of both turbine generator units. The analysis therefore provides relevant results only for the period of the last 10 years of operation. However, the contribution of the presented method is that it can act as a guide in the durability analysis of any HPP. The obtaining of relevant and high quality records about shutdowns is a key factor in the analysis.

The results of the analysis show quite short periods between forced shutdowns, which in general is not favourable for the HPP owner. Shutdowns for significant reasons that call for the exchange of parts may occur on average practically every year (table III). Probability analysis indicates that common forced shutdowns can be expected with a relatively high probability (70 - 80%) within about 100 days of a previous repair, though one may happen much earlier. The short intervals between shutdowns for significant reasons indicate the low reliability of both turbine generator units. Although the standard periodic maintenance activities have been performed, the current technical state of the Sance HPP only enables further operation if quite frequent repairs are performed on the technical equipment. On the other hand, the shutdown duration (i.e. down time), which in most cases may be assumed as time to restoration, is quite short. Both turbine generator units (Francis and Banki) have recently become rather obsolete. HC1 (Francis) corresponds to turbine design trends common for the period when it was installed (1974). The installation of the Banki turbine generator unit (HC2) for a head of close to 60 m causes significant detrition of the machine. A further step in the analysis should be the assessment of the economic efficiency of possible variants for future remedial works at the Sance HPP. The presented results can be used for comparison with the reliability of other HPPs.

APPENDIX

Nomenclature used in this article is as follows:

- UT_i [day] up time period between two adjacent shutdowns
- DT_i [day] down time period after shutdown

n	[-]	number of shutdowns recorded in monitored time period
MUT	[day]	mean up time
MDT	[day]	mean down time
A	[-]	asymptotic availability
t	[day]	time
$K_{(p)}$	[day]	p-percent quantile of up time
$N_{(p)}$	[day]	p-percent quantile of down time
p	[-]	probability
λ	[1/day]	mean failure rate
k	[1/day]	parameter of uniform probability distribution
a, b		parameters of Weibull probability distribution

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Association between Type of Delivery and Newborn Apgar Score Results

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Abstract- Across-sectional descriptive study is carried out at AL-Najaf AL-Ashraf City, from March 20th to June 6th 2016. to find out association between type of delivery and newborn Apgar score results. The objective of the study are to: Identify the newborn Apgar score results according to type of delivery at AL-Zahraa Teaching hospital, To find out association between type of delivery and newborn Apgar score results, and to find out association between newborn Apgar score results according to type of delivery and their general information. The number of samples about (101) infants, (54 male and 47 female), the hospital selected for the collection of this samples is AL-Zahraa Teaching Hospital in AL-Najaf AL-Ashraf City. The data are collected through the use of development questionnaire, which consists of five parts: first part is sociodemographic data that consist of 12 items, second part is neonatal part that consist of 4 items, third part is Resuscitation after birth that consist of 6 items, fourth part is Medication Administration Resuscitation that consist of 5 items and fifth part is Apgar score that consist of 5 items. Reliability of the questionnaire is determined through a pilot study and the validity through a panel of (8) experts. The data were described statistically and analyzed through the use of statistical package of social sciences (SPSS). Results: the findings of the study indicate that there is highly significant relationship between the Apgar score and resuscitation after birth . while there is a non significant relationship between the Apgar score and demographical characteristics variable that includes (delivery type, mother's age, family income, residence, medical history and child gender). The results show significant correlation between the Apgar score and the gestational age. The present study concluded that the Apgar score in the first, fifth and tenth minute in the normal delivery is better than caesarean section. The study recommended to Encourage the pregnancies women on the normal delivery, Encourage the nurses on commitment in apply Apgar score for newborns, Encourage to apply the Apgar score of women that have gestational age lower than normal and It is necessary to apply resuscitation after birth.

I. INTRODUCTION

Newborn infants should assess immediately after delivery. The Apgar score, introduced in 1952 by Dr. Virginia Apgar, is used to evaluate newborns at 1 minute and 5 minutes after birth. An additional Apgar assessment is done at 10 minutes after the 5-minute score is less than 7 points. Assessment of the newborn at 1 minute provides data about the newborn's initial adaptation to extra uterine life, Assessment at 5 minutes provides a clearer indication of the newborn's overall central nervous system status. Five parameters are assessed with Apgar scoring.

A quick way to remember the parameters of Apgar scoring is as follows appearance, pulse, reflex irritability, activity and respiratory⁽¹⁾.

Each parameter is assigned a score ranging from 0 to 2 points. A score of 0 points indicates an absent or poor response; a score of 2 points indicates a normal response. A normal newborn's score should be 8 to 10 points. The higher the score, the better the condition of the newborn. If the Apgar score is 8 points or higher, no intervention is needed other than supporting normal respiratory efforts and maintaining thermoregulation. Scores of 4 to 7 points signify moderate difficulty and scores of 0 to 3 points represent severe distress in adjusting to extra uterine life. The Apgar score is influenced by the presence of infection, congenital anomalies, physiologic immaturity, maternal sedation via medications, and neuromuscular disorders⁽¹⁾.

When the newborn experiences physiology depression, the Apgar score characteristic disappears in predictable manner: first the pink coloration is lost, next the respiratory effort, and then the tone, followed by reflex irritability and finally heart rate. Parents are eager to know their newborn's length and weight. These measurements are taken soon after birth. A disposable tape measure or a built-in measurement board located on the side of the scale can be used. Length is measured from the head of the newborn to the heel with the newborn after unclothed. Because of the flexed position and extend the leg completely when measuring the length. The expected length of a full-term newborn is usually 48 to 53 cm, Molding can affect measurement⁽²⁾.

The most frequently used method to assess the newborn's immediate adjustment to extra uterine life is the Apgar scoring system. The score is based on observation of heart rate, respiratory effort, muscle tone, reflex irritability, and color. Each item is given a score of 0, 1, or 2. Evaluations of all five categories are made 1 and 5 minutes after birth and are repeated every 5 minutes until the infant's condition stabilizes. Total scores of 0 to 3 represent severe distress, score of 4 to 6 signify moderate difficulty in adjusting to extra uterine life. Many healthy newborns do not achieve a score of 10 because the body is not completely pink. Resuscitative measures may also affect the infant's Apgar score, therefore an expanded Apgar score reflecting resuscitation measures such as endotracheal intubation, supplement oxygen administration, and chest compressions is suggested to accurately reflect the infant's condition⁽³⁾.

Vaginal delivery causes lung clearance from secretions and fluids with pressure on neonate chest. This phenomena help to neonate for better respiration. Cesarean section is an alternative method of delivery in conditions that threatened fetal and maternal life⁽⁴⁾.

But today, some mothers select cesarean section for fear of vaginal delivery pain and offspring protection. Drugs used for anesthesia during cesarean section can decrease uterine and placental circulation then it causes fetal hypoxemia⁽⁵⁾ Infants of women with one previous cesarean section were at increased risk of low Apgar score compared with infants of women with one previous vaginal delivery⁽⁶⁾.

1.2. importance of the study

Near 66.3% of infants born by normal delivery during 2015 in Al-najaf city (Al-Zahraa Teaching hospital).

And about 33.7% of infants born by caesarean section during 2015 in Al-najaf city (Al-Zahraa Teaching hospital).

Near (1157) infants born by normal delivery and about (951) infants born by caesarean section during 2015 in diyala.

1.3. Statement of Problem

Association Between Type of Delivery and Newborn Apgar Score Results at Al-Zahraa Teaching hospital.

1.4. Objectives

1- To identify the newborn Apgar score results according to type of delivery at Al-Zahraa Teaching hospital.

2- To find out association between type of delivery and newborn Apgar score results.

3- To find out association between newborn Apgar score results according to type of delivery and their general information.

II. METHODOLOGY

This chapter presents the methods of the study through the following:

2.1. Study Design

A purposive study designed to find the Association between Type of Delivery and Newborn Apgar score Results at Al-Zahraa Teaching Hospital. The study was carried out the period from March 20th to June 6th 2016.

2.2. Administrative Arrangements:

An official permission is obtained from the Ministry Higher Education and Scientific Research. Another approval is issued from the Ministry of Health /Initial agreement of Al-Zahraa Teaching Hospital in Al-Najaf Al-Ashraf governorate in order to collect the required specimen and interviewing each subject.

2.3. The setting of study:

The study was carried out in Al-Zahraa Teaching Hospital in Al-najaf Al-Ashraf governorate.

2.4. Study Sample:

Collected sample of (100) Association between Type of Delivery and Newborn Apgar score Results.

2.5. Data collection:

The collection of the data was utilized of the developed questionnaire and by means of structured assessing technique with the subjects who was individually assessing in delivery room unit and operational room by using of English version of the questionnaire and they was assessing in a similar way, by the same questionnaire for all those subjects who was included in study sample.

2.6. The study instrument:

A question was developed and modified by researchers for the present study to measure the Association between Type of Delivery and Newborn Apgar score Results.

The questionnaire consisted of five major parts: Part One: Sociodemographic Data: A sociodemographic data part consisted of (12) items. Which include mother's data, mother's age, number of previous births, gestational age, residence, related disease mother, medical history, diabetes, hypertension, other disease, family income and delivery type. **Part Two: Neonatal Data** The second part is A questionnaire consisted of (4) items. Which include gender, age, weight at birth and length at birth. **Part Three: Resuscitation after birth:** The third part of the questionnaire is comprised of (6) items. Which include none, tracheal suction, oxygen, mask/balloon ventilation, intubation and thorax compressions. **Part four: Medication Administration Resuscitation** The fourth part of the questionnaire is comprised of (5) items. Which include none, adrenaline, glucose and other medication. **Part Five: Apgar Score** The fifth part of the questionnaire is comprised of (5) items. Which include color, heart rate, reflex irritability, muscle tone and respiration.

3.7. Validity of the study:

To investigate the clarity, relevancy, and adequacy of the questionnaire in order to achieve the present study's objectives, content, validity for the early developed instrument was determined through the use of panel experts (which they have more than 5 years of experience in the job field).

A preliminary copy of questionnaire was designed and presented to (8) experts. They were all in nursing college /University of Al-Kufa. All them were asked to review the questionnaire. Results indicated that the majority of experts had agreed that questionnaire was appropriately designed and developed to measure the phenomena underlying the study.

In addition to the experts' responses, their suggestions were taken into consideration. So far, modifications are employed and the final copy of the constructed instrument is completed to be a fitting tool for conducting the study.

2.8. Statically Data Analysis:

Data are analyzed through the use of statistical package of social sciences (SPSS). The statistical procedures which are applied for the data analysis and assessment of the results included the following:

Descriptive statistics Frequencies (F). Percentages (%).

$$\% = \text{Frequencies} / \text{sample size} \times 100$$

Inferential Statistics:

- Correlation.
- Chi-square.

The formula for contingency coefficient is:

$$CC = \sqrt{\frac{X^2}{(X^2 + n)}}$$

III. RESULTS

Table (1): Observed Frequencies and Percentages for Demographical Characteristics.

Category		Frequency	Percentage %
Mother Age Group(years)	<= 25	44	43.6
	26 - 35	43	42.6
	36 Up	14	13.9
Gestational age(weeks)	<= 36	9	8.9
	37 Up	92	91.1
Delivery type	normal	53	52.5
	caesarean	48	47.5
child gender	Male	54	53.5
	female	47	46.5
Residence	urban	73	72.3
	Rural	28	27.7
family income	sufficient	38	37.6
	sufficient to some extent	55	54.5
	insufficient	8	7.9
Medical history	Diabetes	4	4.0
	Hypertension	8	7.9
	Other disease	2	2.0
	None	87	86.1
Resuscitation after Birth	None	43	42.6
	Tracheal suction	47	46.5
	Oxygen	11	10.9
number of previous birth	0	20	19.8
	1	23	22.8
	2	25	24.8
	3	16	15.8
	4	9	8.9
	5	2	2.0
	6	2	2.0
	8	2	2.0
	9	2	2.0
	Total		101

This table shows that most of the study sample (43.6%) Mother Age Group are less than <= 25years old, (91.1%) are Gestational age 37 Up weeks, (52.5%) are normal delivery, (53.5%) are male, (72.3%) of the study sample are urban, (54.5%) of the study sample sufficient to some extent socio-

economic status , (86.1%) of the study sample none Medical history,(46.5%) of the study sample Resuscitation after Birth Tracheal suction, and(24.8%) of the study sample number of previous birth.

Table (2): Observed Frequencies and Percentages for Apgar score.

Category		Frequency	Percentage %
Apgar score result in 1 minute	Greatly low	2	2.0
	Relatively low	26	25.7
	Normal	73	72.3
Apgar score result in 5 minute	Greatly low	0	0
	Relatively low	7	6.9
	Normal	94	93.1
Apgar score result in 10 minute	Greatly low	0	0
	Relatively low	0	0
	Normal	101	100
Total		101	100%

This table shows that most of the study sample(72.3%) of Apgar score result in 1 minute are normal, (93.1%) of Apgar score result in 5 minute are normal, and (100%) of the study sample of Apgar score result in 10 minute are normal.

Table (3): causes relationship between Delivery type and Apgar score result in 1 minute

			Apgar score result in 1 minute			Total	P-value
			Greatly low	Relatively low	Normal		
Delivery type	normal	Count	0	13	40	53	$X^2=2.430$ P-value=0.297 Non-sig
		%	0.0%	24.5%	75.5%	100.0%	
	caesarean	Count	2	13	33	48	
		%	4.2%	27.1%	68.8%	100.0%	
Total		Count	2	26	73	101	
		%	2.0%	25.7%	72.3%	100.0%	

This table show no significant correlation between Delivery type and Apgar score result in 1 minute at p-value (0.2970).

Table (4): causes relationship between Delivery type and Apgar score result in 5 minute

			Apgar score result in 5 minute		Total	P-value
			Relatively low	Normal		
Delivery type	normal	Count	3	50	53	$X^2=0.279$ P-value=0.597 Non-sig
		%	5.7%	94.3%	100.0%	
	caesarean	Count	4	44	48	
		%	8.3%	91.7%	100.0%	
Total		Count	7	94	101	
		%	6.9%	93.1%	100.0%	

This table show no significant correlation between Delivery type and Apgar score result in 5 minute at p-value (0.597).

Table (5): causes relationship between Mother's age (years) and Apgar score result in 1 minute

			Apgar score result in 1 minute			Total	P-value
			Greatly low	Relatively low	Normal		
Mother's age (years)	≤ 25	Count	1	14	29	44	$X^2=1.883$ P-value=0.757 Non-sig
		%	2.3%	31.8%	65.9%	100.0%	
	26 - 35	Count	1	9	33	43	
		%	2.3%	20.9%	76.8%	100.0%	

	%	2.3%	20.9%	76.7%	100.0%
36 Up	Count	0	3	11	14
	%	0.0%	21.4%	78.6%	100.0%
Total	Count	2	26	73	101
	%	2.0%	25.7%	72.3%	100.0%

This table show no significant correlation between Mother's age (years) and Apgar score result in 1 minute at p-value (0.757).

Table (6): causes relationship between Mother's age (years) and Apgar score result in 5 minute

		Apgar score result in 5 minute		Total	
		Relatively low	Normal		
Mother's age (years)	<= 25	Count	4	40	44
		%	9.1%	90.9%	100.0%
	26 - 35	Count	3	40	43
		%	7.0%	93.0%	100.0%
	36 Up	Count	0	14	14
		%	0.0%	100.0%	100.0%
Total	Count	7	94	101	
	%	6.9%	93.1%	100.0%	

$X^2=1.361$
P-value=0.506
 Non-sig

This table show no significant correlation between Mother's age (years) and Apgar score result in 5 minute at p-value (0.506).

Table (7): causes relationship between Gestational age (years) and Apgar score result in 1 minute

		Apgar score result in 1 minute			Total	
		Greatly low	Relatively low	Normal		
Gestational (years)	<= 36	Count	0	5	4	9
		%	0.0%	55.6%	44.4%	100.0%
	37 Up	Count	2	21	69	92
		%	2.2%	22.8%	75.0%	100.0%
	Total	Count	2	26	73	101
		%	2.0%	25.7%	72.3%	100.0%

$X^2=4.666$
P-value=0.097
 Non-sig

This table show no significant correlation between Gestational age (years) and Apgar score result in 1 minute at p-value (0.097).

Table (8): causes relationship between Gestational age (years) and Apgar score result in 5 minute

		Apgar score result in 5 minute		Total	
		Relatively low	Normal		
Gestational (years)	<= 36	Count	0	9	9
		%	0.0%	100.0%	100.0%
	37 Up	Count	7	85	92
		%	7.6%	92.4%	100.0%
	Total	Count	7	94	101
		%	6.9%	93.1%	100.0%

$X^2=0.736$
P-value=0.391
 Non-sig

This table show no significant correlation between Gestational age (years) and Apgar score result in 5 minute at p-value (0.391).

Table (9): causes relationship between residence and Apgar score result in 1 minute

		Apgar score result in 1 minute			Total	
		Greatly low	Relatively low	Normal		
residence	urban	Count	2	18	53	$\chi^2=0.891$ P-value=0.640 Non-sig
		%	2.7%	24.7%	72.6%	
	rural	Count	0	8	20	
		%	0.0%	28.6%	71.4%	
Total	Count	2	26	73	101	
	%	2.0%	25.7%	72.3%	100.0%	

This table show no significant correlation between residence and Apgar score result in 1 minute at p-value (0.640).

Table (10): causes relationship between residence and Apgar score result in 5 minute

		Apgar score result in 5 minute		Total		
		Relatively low	Normal			
residence	Urban	Count	6	67	73	$\chi^2=0.687$ P-value=0.410 Non-sig
		%	8.2%	91.8%	100.0%	
	Rural	Count	1	27	28	
		%	3.6%	96.4%	100.0%	
Total	Count	7	94	101		
	%	6.9%	93.1%	100.0%		

This table show no significant correlation between residence and Apgar score result in 5 minute at p-value (0.410).

Table (11): causes relationship between Medical history and Apgar score result in 1 minute

		Apgar score result in 1 minute			Total	
		Greatly low	Relatively low	Normal		
Medical history	Diabetes	Count	0	0	4	$\chi^2=3.068$ P-value=0.800 Non-sig
		%	0.0%	0.0%	100.0%	
	Hypertension	Count	0	3	5	
		%	0.0%	37.5%	62.5%	
	Other disease	Count	0	0	2	
		%	0.0%	0.0%	100.0%	
	None	Count	2	23	62	
		%	2.3%	26.4%	71.3%	
Total	Count	2	26	73	101	
	%	2.0%	25.7%	72.3%	100.0%	

This table show no significant correlation between Medical history and Apgar score result in 1 minute at p-value (0.800).

Table (12): causes relationship between Medical history and Apgar score result in 5 minute

		Apgar score result in 5 minute		Total		
		Relatively low	Normal			
Medical history	Diabetes	Count	0	4	4	$\chi^2=1.210$ P-value=0.571 Non-sig
		%	0.0%	100.0%	100.0%	
	Hypertension	Count	0	8	8	
		%	0.0%	100.0%	100.0%	
	Other disease	Count	0	2	2	
		%	0.0%	100.0%	100.0%	

None	Count	7	80	87	
	%	8.0%	92.0%	100.0%	
Total	Count	7	94	101	
	%	6.9%	93.1%	100.0%	

This table show no significant correlation between Medical history and Apgar score result in 5 minute at p-value (0.571).

Table (13): causes relationship between family income and Apgar score result in 1 minute

		Apgar score result in 1 minute			Total		
		Greatly low	Relatively low	Normal			
family income	Sufficient	Count	1	8	29	38	$X^2=1.257$ $P\text{-value}=0.869$ Non-sig
		%	2.6%	21.1%	76.3%	100.0%	
	sufficient to some extent	Count	1	15	39	55	
		%	1.8%	27.3%	70.9%	100.0%	
	Insufficient	Count	0	3	5	8	
		%	0.0%	37.5%	62.5%	100.0%	
Total		Count	2	26	73	101	
		%	2.0%	25.7%	72.3%	100.0%	

This table show no significant correlation betweenfamily income and Apgar score result in 1 minute at p-value (0.869).

Table (14): causes relationship between family income and Apgar score result in 5 minute

		Apgar score result in 5 minute		Total		
		Relatively low	Normal			
family income	Sufficient	Count	3	35	38	$X^2=0.625$ $P\text{-value}=0.732$ Non-sig
		%	7.9%	92.1%	100.0%	
	sufficient to some extent	Count	3	52	55	
		%	5.5%	94.5%	100.0%	
	Insufficient	Count	1	7	8	
		%	12.5%	87.5%	100.0%	
Total		Count	7	94	101	
		%	6.9%	93.1%	100.0%	

This table show no significant correlation between family income and Apgar score result in 5 minute at p-value (0.732).

Table (15): causes relationship between child gender and Apgar score result in 1 minute

		Apgar score result in 1 minute			Total		
		Greatly low	Relatively low	Normal			
child gender	male	Count	1	18	35	54	$X^2=3.501$ $P\text{-value}=0.174$ Non-sig
		%	1.9%	33.3%	64.8%	100.0%	
	female	Count	1	8	38	47	
		%	2.1%	17.0%	80.9%	100.0%	
Total		Count	2	26	73	101	
		%	2.0%	25.7%	72.3%	100.0%	

This table show no significant correlation between child gender and Apgar score result in 1 minute at p-value (0.174).

Table (16): causes relationship between child gender and Apgar score result in 5 minute

			Apgar score result in 5 minute		Total	
			Relatively low	Normal		
child gender	male	Count	4	50	54	$X^2=0.041$ <i>P-value=0.840</i> Non-sig
		%	7.4%	92.6%	100.0%	
	female	Count	3	44	47	
		%	6.4%	93.6%	100.0%	
Total	Count	7	94	101		
	%	6.9%	93.1%	100.0%		

This table show no significant correlation between child gender and Apgar score result in 5 minute at p-value (0.840).

Table (17): causes relationship between Resuscitation after Birth and Apgar score result in 1 minute

			Apgar score result in 1 minute			Total	
			Greatly low	Relatively low	Normal		
Resuscitation after Birth	None	Count	0	6	37	43	$X^2=18.291$ <i>P-value=0.001</i> High sig.
		%	0.0%	14.0%	86.0%	100.0%	
	Tracheal suction	Count	2	12	33	47	
		%	4.3%	25.5%	70.2%	100.0%	
	Oxygen	Count	0	8	3	11	
		%	0.0%	72.7%	27.3%	100.0%	
Total	Count	2	26	73	101		
	%	2.0%	25.7%	72.3%	100.0%		

This table show high significant correlation between Resuscitation after Birth and Apgar score result in 1 minute at p-value (0.001).

Table (18): causes relationship between Resuscitation after Birth and Apgar score result in 5 minute

			Apgar score result in 5 minute		Total	
			Relatively low	Normal		
Resuscitation after Birth	None	Count	2	41	43	$X^2=0.608$ <i>P-value=0.738</i> Non-sig
		%	4.7%	95.3%	100.0%	
	Tracheal suction	Count	4	43	47	
		%	8.5%	91.5%	100.0%	
	Oxygen	Count	1	10	11	
		%	9.1%	90.9%	100.0%	
Total	Count	7	94	101		
	%	6.9%	93.1%	100.0%		

This table show no significant correlation between Resuscitation after Birth and Apgar score result in 5 minute at p-value (0.738).

IV. DISSECTION OF THE STUDY

Part 1: Discursion of the demographic characteristics related to the Association Between Type of Delivery and Newborn Apgar Score Results

Apgar score has been used to evaluate of newborn condition. The low Apgar score indicates the adverse state of newborn. The cesarean section seems affect and reduces the Apgar score during 5 min of life. Our result showed that majority of the mother age are smaller or equal 25 years, gestational age more than 37 weeks, regarding to the gender the findings indicate that gender is male more than female (male 53.5%, female 46.5%), The findings of this study confirm that normal delivery more than

caesarean section (normal 52.5%, caesarean 47.5%), and showed the residence in urban more than rural, the majority of medical history for the mother are none, regarding to the family income the findings indicate that sufficient income to some extent is highest percentage, the results show that the percentage of resuscitation after birth is (46.5%) and our result showed the number of previous birth is 2 births is the highest percentage (7)&(8).

Part 2: Discursion of the Frequencies and Percentages for Apgar score.

Throughout the course of the present study, as shown in table (2) which refers to the statistically distribution of observed frequencies, percentage of Apgar score for all the studied sample. The study indicate that the Apgar score in the first, fifth minute

and tenth had normal value but in uneven percentages (72.3%) of Apgar score result in 1 minute are normal, (93.1%) of Apgar score result in 5 minute are normal, and (100%) of the study sample of Apgar score result in 10 minute are normal). This study Agree with ⁽⁹⁾.

Part 3: Desiccation of the correlation of all study variables and neonate Apgar score result in 1 minute. The Apgar score is A system used in the assessment of newborn heart rate, respiratory effort, muscle tone, response stimulation and skin color, the Apgar score is assessed (1-10) minutes. our study found in the first minute that no significant correlation between the Apgar score and demographical characteristics variable that includes: delivery type, mother's age, family income, residence, medical history and child gender because all the study result founded normal in tables (3, 5, 9, 11, 13 and 15). in table (7) shows significant correlation between the Apgar score and the gestational age. but the study results confirm that the Apgar score with Resuscitation tracheal suction after Birth had high significant correlation in table (17), the causes of this high significant correlation because the aspiration of fluid from trachea leading to increase relaxation breath that lead to increase oxygen blood supply so that lead the newborn to become healthy and the Apgar score become normal⁽¹⁰⁾. Our study confirm that the delivery mode that not effect on the Apgar score results because not found significant correlation between Apgar score and type of delivery. ⁽¹¹⁾.

Part 4: Desiccation of the correlation of all study variables and neonate Apgar score result in 5 minute. The study results found in the 5 minute that no significant correlation between the Apgar score and demographical characteristics variable that includes: delivery type, mother's age, gestational age, family income, residence, medical history, child gender and Resuscitation after birth because all the study result founded normal in tables (4, 6, 8, 10, 12, 14, 16 and 18) But our study confirm that five-minute Apgar score of normal delivery was a better than Caesarean section (normal delivery 94.3%, caesarean delivery 91.7%) this study Agree with ⁽¹²⁾.

V. CONCLUSIONS & RECOMMENDATIONS

Conclusions:

According to the present study, the researchers' conclusion the following:

1. The study confirms that the majority of gender are male.
2. The study indicate that the majority of delivery type are normal delivery.
3. The study indicates that the residence in urban areas more than rural areas.
4. The study results indicate that the results have been uneven between the first and fifth minutes and tenth.
5. The study results indicate that the most of newborns are need to tracheal suction.
6. The study results confirm that the Apgar score in the first, fifth and tenth minute in the normal delivery is better than caesarean section.

7. During the results of our study appeared a strong correlation between the gestational age and resuscitation after birth.
8. The study results indicate that the majority of the samples were free of medical history.
9. The study results confirm that the majority of family income are sufficient to some extent.

Recommendations:

Based on the study results and conclusion, the study researchers recommend the following:

1. Encourage the pregnancies women on the normal delivery.
2. Encourage the nurses on commitment in apply Apgar score for newborns.
3. Encourage to apply the Apgar score of women that have gestational age lower than normal.
4. It is necessary to apply resuscitation after birth.

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Conspectus of Ethno-medicinally novel plant species of Breng valley in Kashmir Himalaya, India

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Abstract- Plants have traditionally been used for treatment of human and livestock ailments in Kashmir Himalaya by different tribal groups. However, this valuable source of knowledge is not adequately documented, which impedes their widespread use, evaluation and validation. The present research work was designed to gather indigenous knowledge from tribal and nomadic people about traditional medicinal uses of plants. Indigenous knowledge was collected by interviewing people of different age groups. A total of 25 species belonging to 20 families were recorded as being used by local inhabitants for curing various ailments. The present study is of great significance as it provides a lead in documenting the knowledge of traditional herbal medicine. These ethno-medicinally important plants are un-paralled treasure of wealth and conservation of such plant species should be done by the concerned authorities. It should be realized that conservation and management of potential species are of utmost importance.

Index Terms- Kashmir Himalaya, tribal, knowledge, indigenous, wealth

I. INTRODUCTION

Ethno-botany is a multidisciplinary study involving the relationship between plants and the aboriginal people and a fair familiarity with the flora and the vegetation of the region (Santos et al., 2001). The human society has developed close association with the plant life (Berkes et al.) since time immemorial. The relationship between the indigenous people and their surroundings forms the subject of ethno-botany, a science (Awas et al., 2009), which deals with the study of plants used by tribal for food, medicine and clothing (Omoruyi et al., 2012). By the end of 19th century, ethno-botany had started to develop as a science, providing a new tool for pharmaceutical research, that focus not only on the people-plant relationship in a multidisciplinary manner, but also incorporate collection and documentation of indigenous uses, in addition to ecology, economy, public health and other disciplines.

In recent years, the herbal medicine is gaining wide currency and acceptability and the documentation of valuable indigenous knowledge about medicinal plant species is assuming urgent priority (Anim et al., 2012), due to the recent controversies of illegal Bio-piracy. According to WHO, 70% population of the world depend on Traditional Health Care System (THCS) for curing various diseases (WHO, 2002). It is well known that this system offers minimum side effects and relatively low cost as compared to other systems of medicine.

This is the reason that patients in developing countries such as Bangladesh (90%), Myanmar (85 %), India (80%), Nepal (75%), Sri Lanka (65%) and Indonesia (60%) have strong conviction in this system. The precious indigenous knowledge when supplemented and validated by the latest scientific incites can offer new holistic models of sustainable development that are economically viable, environmentally benign and socially acceptable. The Kashmir Himalayas, often referred to as terrestrial paradise on earth, is located at the north-western tip of the Himalayan biodiversity hot spot. The region supports a rich and spectacular biodiversity of great scientific curiosity and promising economic benefits owing to its topographic variations spanning from valley floor. Keeping in view the significance of the subject, present study was carried out to document of ethno-medicinally important plants in the Drang valley of Kashmir Himalaya.

II. STUDY AREA

The present study was carried out in Breng (Kokernag) valley which is geographically located at 33°34' N 75°18' E / 33°45' N 75°30' E (Fig 1). Physiographically, the Breng valley is flat surrounded by lofty mountains and act as transitional zone between Kashmir and Jammu division of J& K state. Two historically important passes namely Sinthan pass and Margan pass transcend through this valley which have been used by nomadic and other ethnic groups from time immemorial. Due its distinct geographic location, the area is inhabited by different ethnic groups such as Gujjars, Bakerwals and other nomadic people. These groups have their own knowledge of traditional herbal medicine inherited from their forefathers. These medicines are well accepted by the local people since generations have experienced their efficacy in alleviating a variety of diseases.

III. MATERIALS AND METHODS

The methods employed during the study were designed with the sole purpose of eliciting the precious wealth of information on the ethno-medicinal uses of plants practiced by the people residing in and around target site within Kashmir Himalaya. The area was visited several times for the collection of data during the year of 2015-2016. The local name and traditional uses of plants, with emphasis on medicinal uses were documented by interviewing the local elderly knowledgeable persons including local hakims. Literature concerning ethno-botany of this area has been consulted.

IV. RESULTS AND DISCUSSION

During the present survey 25 species of plants belonging to 25 genera and 20 families (Fig 2) has been recorded those are used by the tribal and non-tribal people against different diseases. The recorded plant species were enumerated alphabetically in Table 1 along with their botanical and vernacular names, families, parts used and ethno-medicinal aspects. Among the recorded species, 21 species are herbs, 01 species shrubs and 03 species are trees (Fig 3). Different plant parts are used against different ailments but dominantly rhizomes, leaves and roots are used either in raw form or as aqueous extracts.

The floral and vegetation studies of Kashmir Himalaya have been carried out since first half of the twentieth century (Kaul et al., 1997; Rao, 1961). But, here it is pertinent mention that no study has been carried out till date to document the ethno-medicinally important plant species in the target area. Hence, our study is of great significance as it provides a lead in documenting the knowledge of traditional herbal medicine inherited from our forefathers. It is felt that there is a need for the rapid documentation of the valuable indigenous knowledge in the face of the emerging threats of destructive overharvesting, habitat degradation and bio-piracy (Gadgil, 1996; Singh et al., 1994 and Utarsh et al., 1999). About 70 % of the identified medicinal plants of Indian Himalaya (PVP, 2001) are threatened by destructive harvesting. Recently, our country enacted a number of measures of legislation (IPA, 2002; IBA, 2002 and Dhar et al., 2000) in compliance with Convention on Biological Diversity (CBD) and World Trade Organization (WTO) in order to prevent the unfair exploitation of the biological wealth of the nation. These measures of legislation, inter-alia, require the immediate chronicling of the country's biodiversity and the associated indigenous knowledge.

V. CONCLUSION

From the perusal of the aforementioned discussion, it can, thus, be said that the present study reveals the traditional system of primary healthcare that utilizes the plant resources as medicines in the studied area (Brenge Valley), India. The traditional knowledge system is restricted to few identified persons in the community and this knowledge generally inherited through the oral transfer in family lineages as there is no written document. Hence, our study is of great significance as it provides a lead in documenting the knowledge of traditional herbal medicine. The present generation people are least interested to practice the traditional medicines. Due to over exploitation, alien plant invasion and habitat fragmentation many plant species are threatened. These ethno-medicinally important plants are unparalleled treasure of wealth which will act excilr for humanity.

Hence, documentation and conservation of such plant species should be done by the concerned authorities. It should be realized that conservation and management of potential species are of utmost importance.

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Table 1: Ethno-medicinally important plant species along with their local names and family documented from the Breng valley, Kashmir Himalaya.

S.No.	Plant species	Family	Vernacular name	Traditional use
1.	<i>Arnebia bethamii</i> Wall	Boraginaceae	Kah-Zaban	The extract of root is extremely useful when mixed with hair oil to prevent hair loss. The whole plant is given to lactating mothers to increase their milk production.
2.	<i>Delphinium cashmirianum</i> Royle.	Ranunculaceae	Mori	The plant upper part is diuretic and used to cure several diseases like dropsy, jaundice and spleen ailments.
3.	<i>Euphorbia wallachii</i> Wall.	Euphorbiaceae	Guri-dud	Extract of plant is purgative and digestive. Also used to treat nerve troubles and dropsy, warts and skin infections.
4.	<i>Ficus carica</i> Linn	Moraceae	Anjeer	Leaves, fruits and bark of the plant are medicinally important. Leaves and bark is helpful in treating liver and skin diseases. Fruits are extremely useful to treat heart diseases.
5.	<i>Urtica dioica</i> Linn.	Urticaceae	Soi	The leaves and root when crushed and made into a paste in oil is used to treat rheumatism and minor wounds.

				Crushed leaves are mixed with shampoo to prevent dandruff.
6.	<i>Podophyllum hexandrum</i>	Solnaceae	Wanwangun	The root and leaf extracts are used to cure septic wounds and treat gastric problems. Rhizome decoction taken at bedtime for one month is used to cure tumor. Fruit and seeds are consumed as such to treat diarrhea and constipation. The extracts of root are also helpful for treating heart diseases.
7.	<i>Cannabis sativa</i> Linn.	Cannabinaceae	Bhang	Powdered stem and leaves mixed with ghee are used against rheumatism. Leaf extract taken for few days is used to cure cholera. Leaf extract is also used to cure diarrhea. Leaf powder mixed with eggs and taken as omlet is used to cure menstrual problems.
8.	<i>Coriandrum sativum</i> Linn. I	Apiaceae	Dhaniwa	Powdered leaves are mixed with milk to treat Insomnia. Leaf extract is useful for

				stomachache
9.	<i>Datura stramonium</i> L.	Solanaceae	Dhatur	Dried leaves and seeds are made into a fine powder and then mixed with water which is consumed for a week to treat asthma. The paste of seeds in oil is applied to the hair to prevent dandruff. Seed powder is mixed with ghee to treat rheumatic pain
10.	<i>Fragaria nubicola</i> Lindley ex.	Rosaceae	Lacaita Jungli – istaber	Powdered rhizome mixed with honey is used to treat tonsils. Cut and dried rhizome is used to make tea which is used to cure rheumatism. Fruit juice is useful for Diarrhoea
11.	<i>Lavandula officinalis</i> Chaix et Kitt.	Lamiaceae	Lavander	Dried and powdered flowers mixed with mustered oil are used to treat skin inflammation. and headache.
12.	<i>Mentha arvensis</i> L.	Lamiaceae	Pudhna	Leaf extract in warm water is useful for asthma patients. Powdered leaf decoction is used to treat indigestion. Crushed leaves are mixed with milk and taken as a cure for diarrhea. Powdered leaf is also helpful for

				sore throat when taken with curd.
13.	<i>Papaver somniferum</i> L.	Papaveraceae	Khush- Khash.	Milk of the fruit is dried and used to cure pain. Seed powder is taken with milk to treat cancer. Fruit powder is mixed with salt to treat cough
14.	<i>Pinus wallichiana</i> A.B. Jackson	Pinaceae	Kayur	Resin of the plant is mixed with milk and taken to cure influenza. Resin is also applied on heels to overcome cracks.
15.	<i>Plantago lanceolata</i> L.	Plantaginaceae	Gull	Paste of leaves applied on boils. Leaf extract is useful for bronchitis. Seed extract when taken with honey is extremely useful for patients suffering from cough.
16.	<i>Ranunculus arvensis</i> L.	Ranunculaceae	Gur-sochal	Whole plant extract is useful for diarrhea and constipation.
17.	<i>Rumex nepalensis</i> L.	Polygonaceae	Aabuj	Root extract useful for constipation. Powdered roots mixed with ground nut oil and applied on joints to reduce joint pain.
18.	<i>Taraxicum officinal</i> Web.ex.	Asteraceae	Wiggers Hundh	Leaf decoction is given to anemic ladies for 10-12 days after delivery to treat anemia.

				Flower extract useful to treat fever.
19.	<i>Trigonella foenum-graecum</i> L.	Fabaceae	Meth	Mucilage of soaked seeds when taken early in the morning reduces blood pressure.
20.	<i>Aesculus indica</i>	Sapindaceae	Handoon	Oil of seed is applied on hair to keep them healthy. Leaf extract is used against fever.
21.	<i>Artemisia absinthium</i>	Astraceae	Tethwan	Plant extract used to treat abdominal pain, chronic fever and gout.
22.	<i>Bergenia ligulata</i>	Saxifragaceae	Pashanabheda	Paste of leaves is applied on wounds. Dried root powder when taken with milk reduces stomachache. Also used to treat internal injury.
23.	<i>Viburnum grandiflorum</i> Wall.	Caprifoliaceae	Kulmanch	Decoction prepared from root extract and common salt is taken orally as a laxative. Paste is prepared from roots and applied on skin to heal wounds.
24.	<i>Oxalis corniculata</i>	Oxalidaceae	Amrul	Leaf extract is used to treat diarrhea, fever and inflammation.
25.	<i>Portulaca oleraceae</i>	Portulacaceae	Nuner	Whole leaf consumed as vegetable to treat liver inflammation. Extract of whole

				plant is useful for cough.
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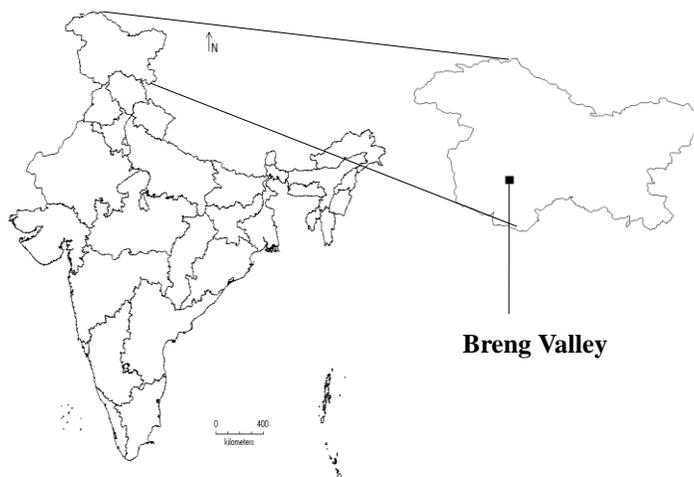


Fig 1: Map showing study site in Kashmir Himalaya, India.

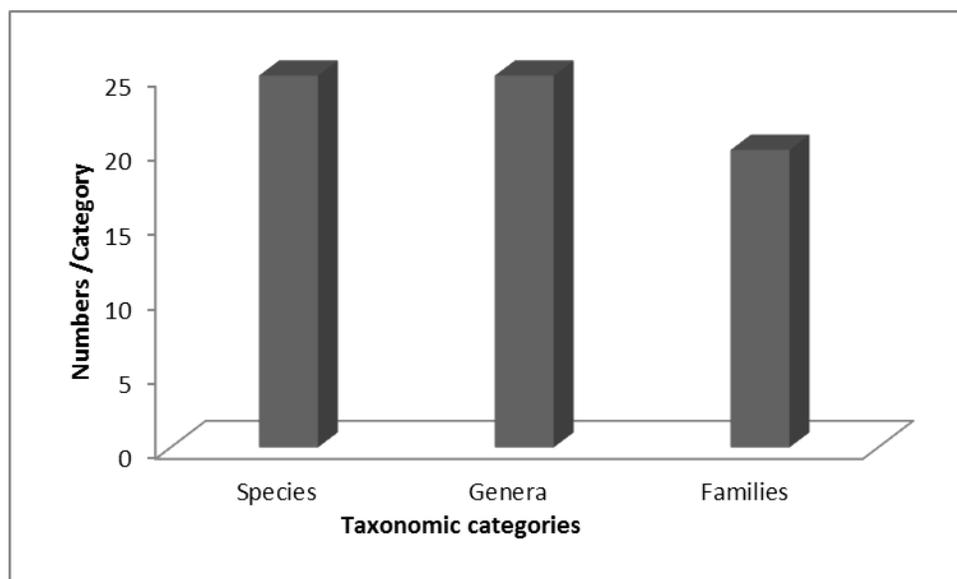


Fig 2: proportion of taxonomic categories

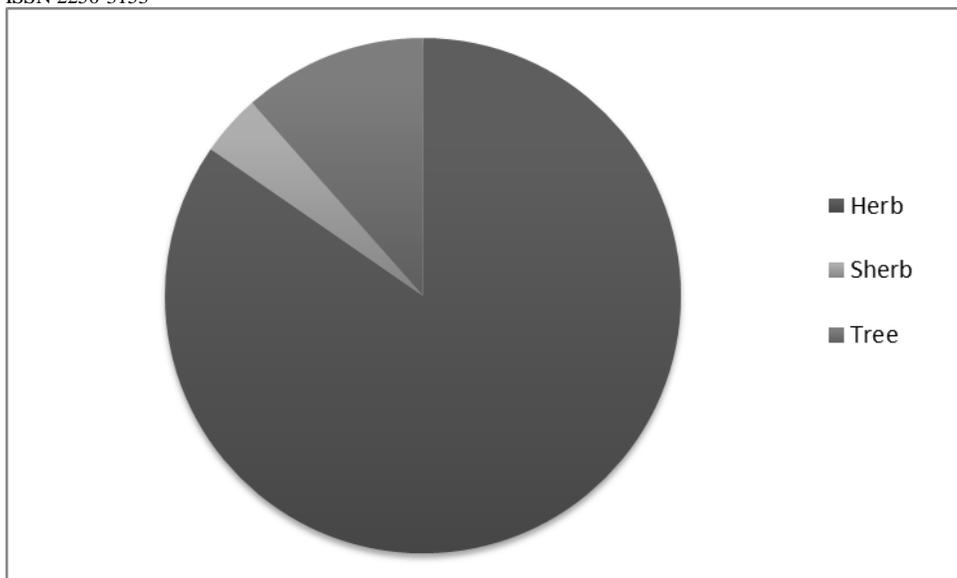


Fig 3: Life forms within the medicinally important plant species recorded during study.

REMOVAL OF METHYLENE BLUE DYE FROM AQUEOUS SOLUTION BY ADSORPTION USING LOW COST ADSORBENT OBTAINED FROM *Centella asiatica* LEAVES

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Abstract-This work deals with the study of the removal of methylene blue dye from aqueous solution using low cost adsorbent obtained from the leaves of *Centella asiatica*. Batch adsorption studies were carried out by observing the effects of various experimental parameters, such as effect of pH, adsorbent dose, dye concentration, contact time and temperature. The data were fitted into the Langmuir and Freundlich adsorption isotherm equations. Thermodynamic parameters like change in free energy, enthalpy and entropy were calculated. Results indicate that *Centella asiatica* is a promising adsorbent for the removal of methylene blue from aqueous solution.

Index terms- Methylene blue, Isotherm models, Adsorbent, Thermodynamic Parameters.

I. INTRODUCTION

Industries such as leather, paper, plastics, textiles and rubber use lot of synthetic dyes in order to colour their products. As a result, the effluents discharged from these industries contain these dyes¹. Over 10^5 commercial available dyes exist and more than 7×10^5 tonnes are produced every year. As a result approximately 7×10^4 tonnes of dyes are released into the water bodies every year. The pollution caused by the discharge of untreated effluents from these industries is a major concern. The presence of colour in water is highly visible and undesirable² as it reduces sunlight penetration into the water, thus affecting aquatic plants leading to a disturbance of the ecosystem. Once the dyes enter the water it is no longer good and sometimes difficult to treat as the dyes have a synthetic origin and a complex molecular structure, which makes them more stable and difficult to be biodegraded^{3,4}.

Generally biological aerobic wastewater systems are not successful for decolourization of majority of dyes⁵.

Therefore colour removal was extensively studied with various methods such as adsorption, coagulation, ultra-filtration, electro-chemical adsorption and photo oxidation⁶. Among these adsorption is one of the effective methods for removing dyes from waste water⁷. Granulated activated carbon (GAC) is commonly used for dye removal⁸, but its high cost limits its use. Recently, numerous approaches have been made for the development of cheaper and effective adsorbents⁹. Many low-cost adsorbents including natural and waste materials from industry and agriculture, have been employed by several workers. Some of these include Bagasse pith¹⁰, Maizecob¹¹, Coconut shell¹², Chitosan¹³, Peat¹⁴, Biomass¹⁵, Orange peel¹⁶, Papaya seed¹⁷, Tamarind fruit sheel¹⁸, Pumpkin seed hull¹⁹. In the present study we utilized the adsorbent obtained from the leaves of *Centella asiatica* for the removal of Methylene blue dye from the aqueous solution.

II. EXPERIMENTAL

Preparation of the adsorbate

Methylene blue dye (chemical formula- $C_{16}H_{18}ClN_3S$, Molecular weight-373.91 and λ_{max} 664nm) was obtained from Merck, India. 1000 mg of Methylene blue was dissolved in one litre of double distilled water to get the stock solution. Desired concentration of the dye solution was obtained from the stock solution by dilution.

Preparation of adsorbent

Centella asiatica leaves was collected locally and washed with tap water several times to remove soil dust and finally washed with DD water. It was then dried in sun shade. The dried leaves were powdered and soaked in con. H_2SO_4 (1:1, w/w), for a day, then filtered and dried. The charred mass was kept in a muffle furnace at $400^\circ C$ for 1 hour, it was taken

out, ground well to fine powder and stored in vacuum desiccators. The Characteristics of the adsorbent is presented in the table-1

pH	6.5
Moisture Content, %	13.5
Ash Content, %	10.2
Volatile Matter, %	21.3
Water Soluble matter, %	0.45
Acid Soluble Matter, %	0.89
Porosity, %	48.1
Micropore volume cm ³ /g	0.194194
Average pore width ⁰ A	28.2065
BET Surface Area, m ² /g	604.27

Table-1 Characteristics of the adsorbent

Adsorption studies

Adsorption experiments were carried out in 250ml Erlenmeyer flasks. A known weight of *centella asiatica adsorbent* was added to 50ml of the dye solutions with an initial concentration of 10mg/l to 50mg/l. Flasks were shaken in an ordinary shaker with a speed of 120 rpm at room temperature for 90min. The solution was then filtered at preset time intervals and the residual dye concentration was measured spectrophotometrically. The percentage of MB dye removal was calculated by using the following equation.

$$\% \text{ Dye Removal} = \frac{(C_0 - C_e)}{C_0} \times 100$$

Where C_i = initial concentration(mg/l), C_e = equilibrium concentration(mg/l)

The adsorption capacity Q_e (mg/g), is obtained from the following equation

$$q_e = (C_0 - C_e) \frac{V}{M}$$

Where, Q_e = adsorbent capacity(mg/g), C_i= initial MB concentration (mg/l), V = volume of the solution(l), M = mass of the adsorbent (g).

III. RESULTS AND DISCUSSION

Effect of pH

The pH is an important controlling parameter in the adsorption process. The interaction between dye molecule and adsorbent is basically a combined result of the charges on dye molecules and the surface of the adsorbent²⁰. The influence of pH of the solution on the removal of the dye was studied with an initial dye concentration of 10mg/l, adsorbent dosage of 100mg, contact time 90min, temperature 303K and 120 rpm and

varying the pH of the solution from 2 to 10. The pH of the working solution was controlled by adding 1N HCl or 1N NaOH solution. The results are presented in the fig-1. As the pH of the solution increased the percentage of the adsorption also increased and reaches the maximum at pH-6 and thereafter no appreciable change was observed. At low pH the dye is protonated and the surface of the adsorbent is positively charged which reduces the adsorption of the cationic form of the dye. In addition to that, the H⁺ ions also compete with the dye for the available vacant sites of the adsorbent. With increase in the pH of the medium the positive charge on the adsorbent surface decreases which facilitates the adsorption of the dye molecules. Maximum adsorption was observed at pH -6. Hence the pH of the medium was maintained at 6 for further studies.

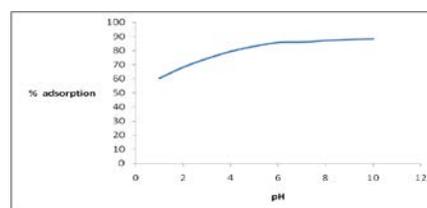


Fig:1 Effect of pH on the adsorption of MB on to the adsorbent

Effect of adsorbent dose

Effect of adsorbent dose on the removal of Methylene blue dye from aqueous solution was investigated by varying adsorbent dose from 25mg to 150mg for 10mg/l of dye concentration, keeping the other parameters constant, and the results are presented in the fig-2. As the adsorbent dose increases, the MB dye removal also increases and reaches the maximum at 100mg of adsorbent dosage thereafter there was no appreciable increase in the percentage of dye removal. Therefore the adsorbent dosage was maintained at 100mg for further studies. The increase in the dye removal with an increase in the adsorbent dosage can be attributed to increased carbon surface area and the availability of more adsorption sites. This is an agreement with already reported²¹.

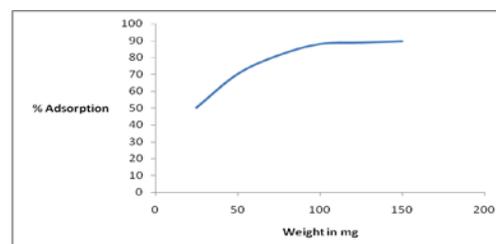


Fig:2 Effect of adsorbent dose on the adsorption of MB on to the adsorbent

Effect of dye concentration

The effect of initial dye concentration on the removal of MB dye is illustrated in fig-3. When the initial MB dye concentration increased from 10mg/l to 50mg/l, keeping the other parameters constant, the the percentage removal of MB dye decreased from 83% to 46%. As the initial concentration is increased the ratio of the number of vacant sites on the adsorbent to the dye molecules decreases. This leads to a decrease in the percentage of adsorption of the dye.

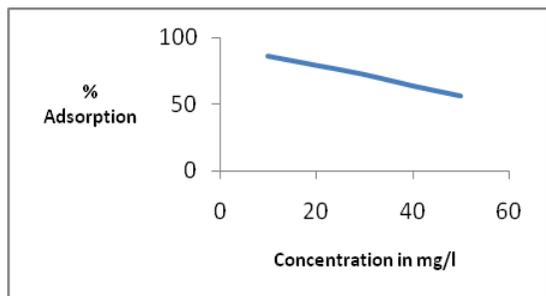


Fig:3 Effect of dye concentration on the adsorption of MB on to the adsorbent

Effect of contact time

The effect of contact time on the removal of the dye is shown in fig-4. It is observed that initially the percentage removal of dye increases rapidly and later increases in a slow and gradual manner till it reaches the equilibrium state. Maximum adsorption was found to be at 90min. This is because the initial stage is film diffusion which is very rapid followed by pore diffusion which is a slow process. Therefore, 90min shaking time was found to be appropriate for the maximum adsorption and was maintained in all subsequent experiments.

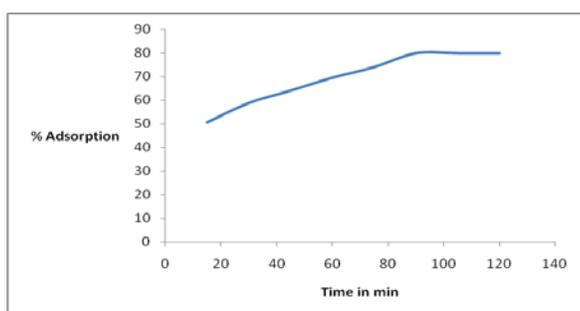


Fig:4 Effect of contact time on the adsorption of MB on to the adsorbent

IV. ADSORPTION ISOTHERMS

Langmuir Adsorption Isotherm

In our study Langmuir and Freundlich isotherms were utilized to describe the adsorption of methylene blue on to the adsorbent. The Langmuir model assumes monolayer surface coverage, equal availability of adsorption sites and no

interaction among the adsorbed dye molecules. The linear form of Langmuir equation²² is expressed as follows

$$\frac{C_e}{Q_e} = \frac{C_e}{Q_0} + \frac{1}{Q_0 b}$$

The values of Q₀ and b were calculated from the slope and intercept of the linear plots of C_e/Q_e versus C_e. Langmuir adsorption isotherm is presented in fig-5. Higher value of correlation co-efficient (R²-0.999) indicates that the experimental data fits well with the Langmuir equation. The values of Q₀ and b are given in Table-2.

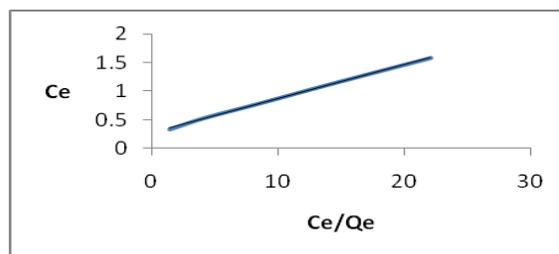


Fig:5 Langmuir isotherm for the adsorption of MB on to the adsorbent

Q ₀ (mg/g)	b	R ²
13.5135	0.2710	0.999

Table -2.Langmuir constants

The essential characteristics of the Langmuir adsorption isotherm is expressed by a dimensionless constant called separation factor. This value indicates whether the adsorption is favorable or not.

R_L is defined by the following equation

$$R_L = 1 / (1 + bC_0)$$

Where, R_L _ dimensionless separation factor²³, C_i – initial concentration , b – Langmuir constant (Lmg⁻¹), The parameter R_L indicates the type of the isotherm.

Values of R _L	Types of isotherms
R _L > 1	Unfavourable
R _L = 1	Linear
0 < R _L < 1	Favourable
R _L = 0	Irreversible

The R_L value obtained using the above equation for 10mg/l MB concentration is 0.2695. This R_L value lies between 0 and 1 indicating the favourability of the adsorption.

Freundlich Adsorption Isotherm

The Freundlich isotherm considers multilayer adsorption with interactions among the adsorbed molecules. The linear form of the Freundlich equation²⁴ is as follows

$$\log Q_e = \log K_f + \frac{1}{n} \log C_e$$

Where Q_e , amount of dye adsorbed (mg/g), K_f , (adsorption capacity) and n , (adsorption intensity). By plotting $\log Q_e$ Vs $\log C_e$, the values of n and K were calculated from slope and intercept respectively (fig-6). The values of K_f and n are given in table-3. The value of linear regression co-efficient (R^2) was found to be 0.963. This indicates that the adsorption process follows Langmuir adsorption isotherm more than Freundlich adsorption isotherm.

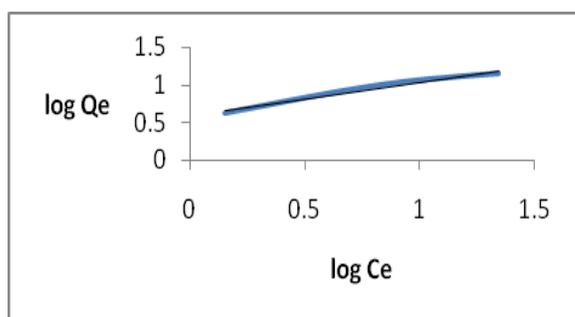


Fig:6 . Freundlich isotherm for the adsorption of MB on to the adsorbent

n	K_f (mg/g)	R^2
2.6178	3.7325	0.941

Table-3 Freundlich constants

The value of n lies between 2 and 10 indicating favourable adsorption.

V. THERMODYNAMIC PARAMETERS

Thermodynamic studies related to the adsorption process is essential to conclude whether a process will occur spontaneously or not, The fundamental criteria for spontaneity is the standard Gibbs free energy change ΔG° . if the ΔG° value is negative, the reaction will occur spontaneously. The thermodynamic parameters, standard free energy (ΔG°), change in Standard enthalpy(ΔH°) and change in Standard entropy(ΔS°) for the adsorption of MB onto the adsorbent were calculated using the following equations.

$$K_0 = \frac{C_{solid}}{C_{liquid}}$$

$$\Delta G^\circ = -RT \ln K_0$$

$$\log K_0 = \frac{\Delta S}{2.303R} - \frac{\Delta H}{2.303RT}$$

Where C_i is the concentration of the dye at equilibrium and C_e is the amount of dye adsorbed on the adsorbent

The values of ΔG° (KJ/mol), ΔH° (KJ/mol) and ΔS° (J/K/mol) can be obtained from the slope and intercept of a linear plot of $\log K_0$ verses $1/T$ and are presented in table-4.

Conc.of MG dye (mg/l)	- ΔG° (KJ/mol)				ΔH° (KJ/mol)	ΔS° (J/k/mol)
	30 ^o C	40 ^o C	50 ^o C	60 ^o C		
10	3.993	4.315	4.614	5.107	6.912	35.88
20	2.828	3.203	3.557	3.995	8.742	38.14
30	1.779	2.180	2.531	2.935	9.684	37.83
40	0.602	1.024	1.368	1.780	1.780	38.42
50	0.307	0.230	0.377	0.840	1.107	35.67

Table-4 Thermodynamic parameters for the adsorption of MB on to the adsorbent.

The negative values of ΔG° indicates that the adsorption process is spontaneous and highly favorable . The positive values of ΔS° indicates the increased randomness at the solid solution interface. The positive values of ΔH° indicates that the adsorption process is endothermic and physical in nature.

VI. CONCLUSION

The adsorption of methylene blue from aqueous solution by the adsorbent obtained from *Centella asiatica* was studied with various parameters like effect of pH, adsorbent dose, dye concentration, contact time and temperature It was concluded that maximum adsorption of MB from aqueous solutions occurred at pH 6. The experimental data were correlated well by the Langmuir adsorption isotherm. The result of this study indicates that this adsorbent can be successfully utilized for the removal of MB from aqueous solution.

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REMOVAL OF RHODAMINE B DYE FROM AQUEOUS SOLUTION BY ADSORPTION USING LOW COST ADSORBENT OBTAINED FROM *Centella asiatica* LEAVES

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Abstract: Adsorbent obtained from *centella asiatica* leaves is employed for the removal of the Rhodamine –B dye from aqueous solution. Batch adsorption studies were carried out by observing the effects of various experimental parameters such as the effect of pH, adsorbent dose, dye concentration, contact time and temperature. The equilibrium data fitted well to Langmuir isotherm model. The results indicate that the adsorbent obtained from *centella asiatica* leaves is a good adsorbent for the removal of Rhodamine-B from aqueous solution.

Index terms – Rhodamine-B, isotherm models, Adsorbent dose, Thermodynamic parameters.

I. INTRODUCTION

Textile industries use large amount of water in their production and discharge large amounts of waste water. This water contains various dyes and heavy metals¹. These dyes are mainly used as coloring agents in textile, paper printing, and leather industries. Most of the dyes are toxic and non- biodegradable, hence the removal of this dye from wastewater is important.

Numerous methods have been designed to remove dyes from waste water², and such methods can be divided into physical, chemical and biological methods. Among these, the adsorption technique using low cost adsorbents derived from various natural, agricultural and industrial wastes³ are effective in removing various dyes from waste waters

Many low cost adsorbents were prepared from waste materials such as coconut husk and bunch waste⁴⁻⁶, date stone⁷, jujuba seed⁸, garlic peel⁹, olive waste cake¹⁰, apple wastes¹¹, periwinkle shell¹², oil palm fruit waste¹³, Bengal gram seed husk¹⁴, castor bean cake¹⁵, maize stem tissue¹⁶. In this study we employed, the adsorbent obtained from the

leaves of *centella asiatica* for the removal of Rhodamine-B from the waste water.

II. EXPERIMENTAL

Preparation of adsorbate

Rhodamine B stock solution was prepared by dissolving appropriate amount of dye in double distilled water, and lower concentrations were obtained by dilution of the stock solution.

Preparation of adsorbent material

Centella asiatica leaves were collected and washed with tap water several times to remove soil dust and finally washed with DD water. It is dried in sun shade. The dried leaves were powdered and soaked in con.H₂SO₄(1:1,w/w), for a day, then filtered and dried. The charred mass was kept in a muffle furnace at 400⁰C, for 1 hour, it was taken out, ground well to fine powder and stored in vacuum desiccators. The Characteristics of the adsorbent is presented in the table-1

pH	6.5
Moisture Content, %	13.5
Ash Content, %	10.2
Volatile Matter, %	21.3
Water Soluble matter, %	0.45
Acid Soluble Matter, %	0.89
Porosity, %	48.1
Micropore volume cm ³ /g	0.194194
Average pore width ⁰ A	28.2065
BET Surface Area, m ² /g	604.27

Table-1 Characteristics of the adsorbent

Batch equilibrium studies

Batch experiment was carried out with different concentrations of dye solutions from 10mg/l to 50mg/l was

taken in a 250ml clean Erlenmeyer flasks. A certain amount of adsorbent dose was mixed with Rhodamine B dye solution and kept in an ordinary shaker with a speed of 120rpm.

Experimental parameters such as, adsorbent dosage 100mg, contact time is 90min, pH-2 to 10, initial concentration 10mg/l to 50mg/l and temperature 30°C were investigated by changing one parameter at a time, while other parameters are kept constant. After filtration, the dye solutions were analyzed by UV-visible spectrophotometer. The percentage of Rhodamine B dye removal was calculated by using the following equation.

$$\% \text{ Dye Removal} = \frac{(C_0 - C_e)}{C_0} \times 100$$

Where C_i = initial concentration(mg/l), C_e = equilibrium concentration(mg/l)

The adsorption capacity Q_e (mg/g), is obtained from the following equation

$$q_e = (C_0 - C_e) \frac{V}{M}$$

Where, Q_e = adsorbent capacity(mg/g), C_i = initial Nickel concentration (mg/l), V = volume of the solution(l), M = mass of the adsorbent (g).

III.RESULT AND DISCUSSION

Effect of pH

Effect of pH on the adsorption capacity of adsorbent dose was studied in the pH range 1 to 10. The percentage of dye adsorption was determined by varying the pH of the solution, fixing the other parameters constant and the results are given in fig-1. The pH of the solution was adjusted by adding 1NHCl or 1NNaOH solution. When the pH increased and reached a maximum at pH 6 and the decreased. At low pH the Rhodamine B molecules readily enter into the pore structure of the adsorbent surface but at high pH, the zwitter-ionic form of Rhodamine B in water aggregated to form a dimer which could not easily enter into the pores due to the bulkier structure of the dimer¹⁷. Hence the pH of the medium was maintained at 6 for further studies.

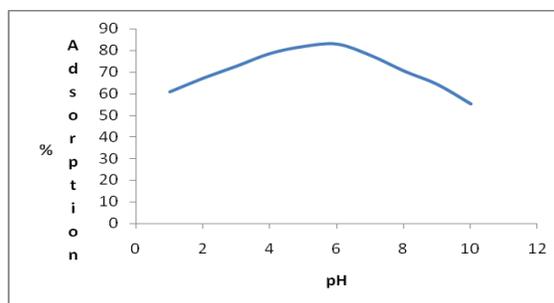


Fig:1 Effect of pH on the adsorption of Rhodamine b on to the adsorbent

Effect of adsorbent dose

Effect of adsorbent dose on the removal of Rhodamine B dye from aqueous solution was investigated by varying adsorbent dose from 25mg to 150mg for 10mg/l of dye concentration, keeping the other parameters constant, and the results are presented in the fig-2. When the adsorbent dosage was increased the percentage of adsorption increased and reaches the maximum at an adsorbent dosage of 100mg, further addition of the adsorbent dosage has no significant effect. The maximum dye uptake occurred at 100mg dose, hence it was chosen as the optimized dose.

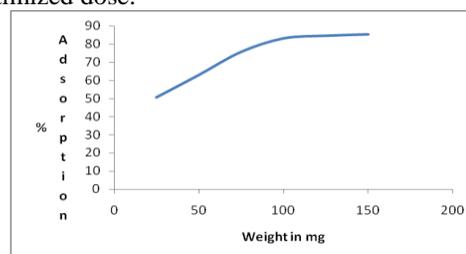


Fig:2 Effect of adsorbent dosage on the adsorption of Rhodamine b on to the adsorbent

Effect of dye concentration

The effect of dye concentrations on the adsorption capacity is shown in fig-3. When the initial dye concentration increased from 10mg/l to 50mg/l, the percentage removal of Rhodamine B dye decreased. This is because when the dye concentration increased the ratio of the number of vacant sites on the adsorbent to the dye molecule decreases.

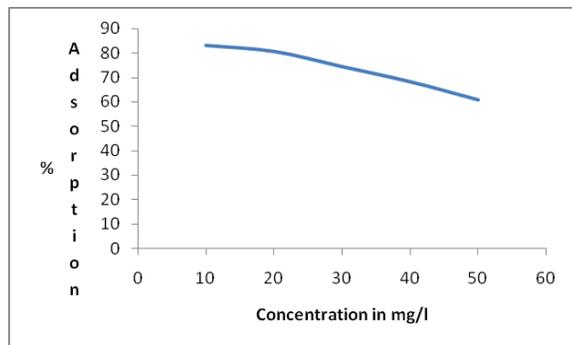


Fig:3 Effect of dye concentration on the adsorption of Rhodamine B on to the adsorbent

Effect of contact time

The effect of contact time on the removal of the dye is shown in fig-4. It is observed that initially the percentage removal of the dye increases rapidly and then increases in a slow and gradual manner till it reaches the equilibrium. This is because a large number of surface sites are available for adsorption at the initial stages and as the adsorption process continues the adsorption sites available decreases. There was no appreciable change in the adsorption percentage above 90min. Hence all the experiments were conducted for a period of 90min.

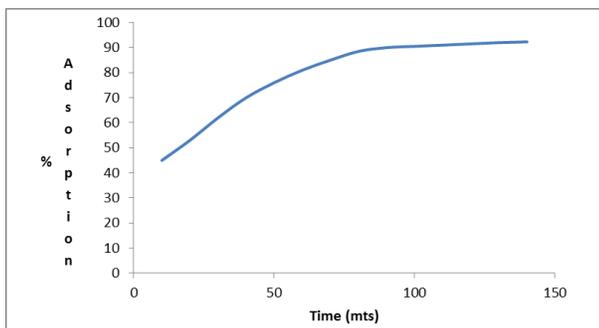


Fig:4 Effect of contact time on the adsorption of Rhodamine B on to the adsorbent

IV. ADSORPTION ISOTHERMS

Adsorption data were fitted to the Langmuir, and Freundlich isotherms and isotherm parameters were calculated .

Langmuir isotherm model

It is based on the assumption of equally available adsorption sites, monolayer surface coverage, and no interaction between adsorbed species. The linear form of Langmuir equation¹⁸ is expressed as follows

$$\frac{C_e}{Q_e} = \frac{C_e}{Q_0} + \frac{1}{Q_0 b}$$

The values of Q_0 and b were calculated from the slope and intercept of the linear plots of C_e/Q_e verses C_e . Langmuir adsorption isotherm is presented in fig-5. Higher value of correlation co-efficient (0.999) indicates that the experimental data fits well with the Langmuir equation. The values of Q_0 and b are given in Table-2.

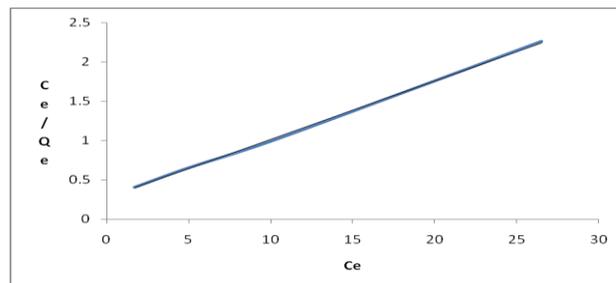


Fig:5 Langmuir isotherm for the adsorption of Rhodamine B on to the adsorbent

$Q_0(\text{mg/g})$	b	R^2
19.6078	0.1588	0.999

Table-2. Langmuir constants

The essential characteristics of the Langmuir adsorption isotherm are expressed by a dimensionless constant called separation factor. This value indicates whether the adsorption is favorable or not.

R_L is defined by the following equation

$$R_L = 1 / (1 + bC_0)$$

Where, R_L _ dimensionless separation factor¹⁹, C_i – initial concentration , b – Langmuir constant (Lmg^{-1}),The parameter R_L indicates the type of the isotherm.

Values of R_L	Types of isotherms
$R_L > 1$	Unfavourable
$R_L = 1$	Linear
$0 < R_L < 1$	Favourable
$R_L = 0$	Irreversible

The R_L value obtained using the above equation for 10mg/l Rhodamine concentration is 0.3863. This R_L value lies between 0 and 1 indicating the favourability of the adsorption.

Freundlich isotherm model

The Freundlich isotherm considers multilayer adsorption with a heterogeneous distribution of active sites, accompanied by interactions between adsorbed molecule. The linear form of the Freundlich equation²⁰ is as follows

$$\log Q_e = \log K_f + \frac{1}{n} \log C_e$$

Where Q_e , amount of dye adsorbed (mg/g), K_f , adsorption capacity, n , adsorption intensity. By plotting $\log Q_e$ Vs $\log C_e$, the values of n and K were calculated from slope and intercept respectively (fig-6). The values of K_f and n are given in table-3. The value of linear regression coefficient (R^2) was found to be 0.969. This indicates that the adsorption process follows Langmuir adsorption isotherm more than Freundlich adsorption isotherm.

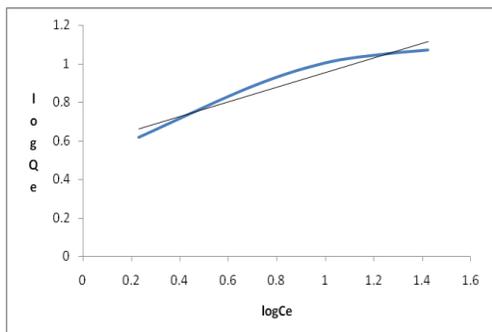


Fig:6 Freundlich isotherm for the adsorption of Rhodamine B on to the adsorbent.

n	K_f (mg/g)	R^2
2.0618	3.5399	0.970

Table-3. Freundlich constants

The value of n in the range 2-10 indicates favorable adsorption.

VI. THERMODYNAMIC PARAMETERS

The thermodynamic parameters, standard free energy (ΔG°), change in Standard enthalpy (ΔH°) and change in Standard entropy (ΔS°) for the adsorption of Rhodamine B onto the adsorbent were calculated using the following equations.

$$K_0 = \frac{C_{solid}}{C_{liquid}}$$

$$\Delta G^\circ = -RT \ln K_0$$

$$\log K_0 = \frac{\Delta S}{2.303R} - \frac{\Delta H}{2.303RT}$$

Where C_i is the concentration of the dye at equilibrium and C_e is the amount of dye adsorbed on the adsorbent

The values of ΔG° (KJ/mol), ΔH° (KJ/mol⁻¹) and ΔS° (J/K/mol) can be obtained from the slope and intercept of a linear plot of $\log K_0$ versus $1/T$ and are presented in table-4.

Conc. of MG dye (mg/l)	$-\Delta G^\circ$ (KJ/mol)				ΔH° (KJ/mol)	ΔS° (J/k/mol)
	30 ^o C	40 ^o C	50 ^o C	60 ^o C		
10	4.0770	4.8375	5.2245	6.0488	14.821	62.41
20	3.5691	4.1077	4.5294	3.1972	12.332	52.44
30	2.7526	3.1494	3.7298	4.4640	14.333	56.10
40	1.9020	2.4073	2.5998	3.3228	11.386	43.80
50	1.2546	1.6025	1.8372	2.4536	10.161	37.52

Table-4 Thermodynamic parameters for the adsorption of Rhodamine B on to the adsorbent.

The negative values of ΔG° indicates that the adsorption process is spontaneous and highly favorable. The positive values of ΔS° indicates the increased randomness at the solid solution interface. The positive values of ΔH° indicates that the adsorption process is endothermic and physical in nature.

VI. CONCLUSIONS

The equilibrium and thermodynamic studies related to the uptake of Rhodamine B dye by centella asiatica adsorbent from aqueous solution was studied. The adsorption was found to highly dependent on various parameters like adsorbent dosage, contact time, pH, initial concentration, and temperature. The adsorption data was fitted the best in Langmuir adsorption model. The result of this study indicates that this adsorbent can be successfully utilized for the removal of rhodamine B from aqueous solution.

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Impact of Technology on Employee Relations

An Article to analyze the effect of technology on relationship amongst employees

Vipul Bali *, Vishrut Bali **, Riya Choudhary ***

Abstract- This article discusses how technology is affecting the employer – employee relations in the present day fast developing technology. Employee relations involve multiple layers of communication, from employer-employee relations to interactions among the workforce itself. Perrow has given how technology can affect relations which can be divided into 2 main divisions one being Routine Technology made up of Routine and Engineering classification that is standard/same technology and the other being Non-Routine technology which is Constantly updating/New technology -Routine technology leading to mechanization and Non Routine/New Technology promoting Creativity.

Index Terms- Knowledge- technology, knowledge worker

I. INTRODUCTION

Employee relations involve multiple layers of communication, from employer-employee relations to interactions among the workforce itself. To understand the effect of technology on employee relations we have to understand how the structure of an organization changes with the type of technology being used in the organization. We have various theories to study this phenomena, these are:

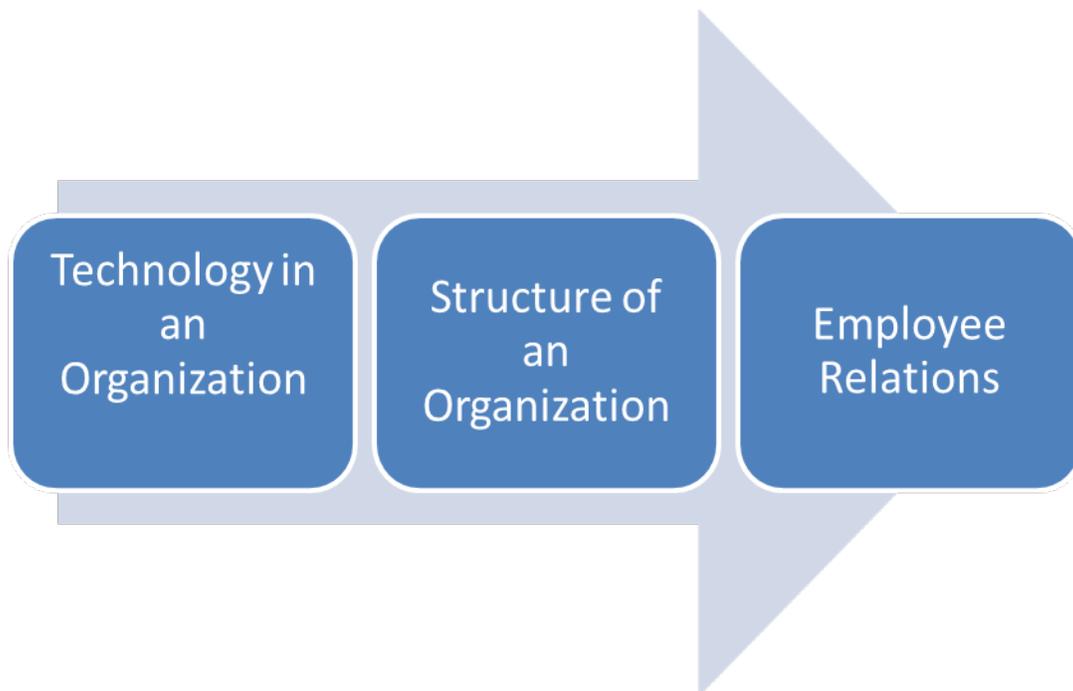


Fig 1. Technology affects Structure affects Employee Relations

- Joan Woodward's(1965) technology contribution which characterized the major technologies used in manufacturing organizations into unit, process and mass technologies. What we could derive from this theory was that routine technology (i.e. technology leading to more routiness in work) like mass meant a more formalized structure and vice versa.
- Another one was Perrow's(1967) knowledge technology contribution which divided technology into 4 types routine, non routine, craft and engineering types based on task variability and problem analyzability factors used in the technology.
- The third major contribution was Thompson's Technology structure that divided technology into Long linked, mediating and Intensive technologies, with long

linked corresponding to standardization of operations, tools, parts and machines.

Focusing on the Knowledge Technology contribution of Perrow, since the world has moved on to become a knowledge based economy. Its two main dimensions are:

- a. Task variability that describes the number of exceptions individuals encounter in their work.
- b. Problem analyzability which describes the type of search procedure employees follow in responding to exceptions.

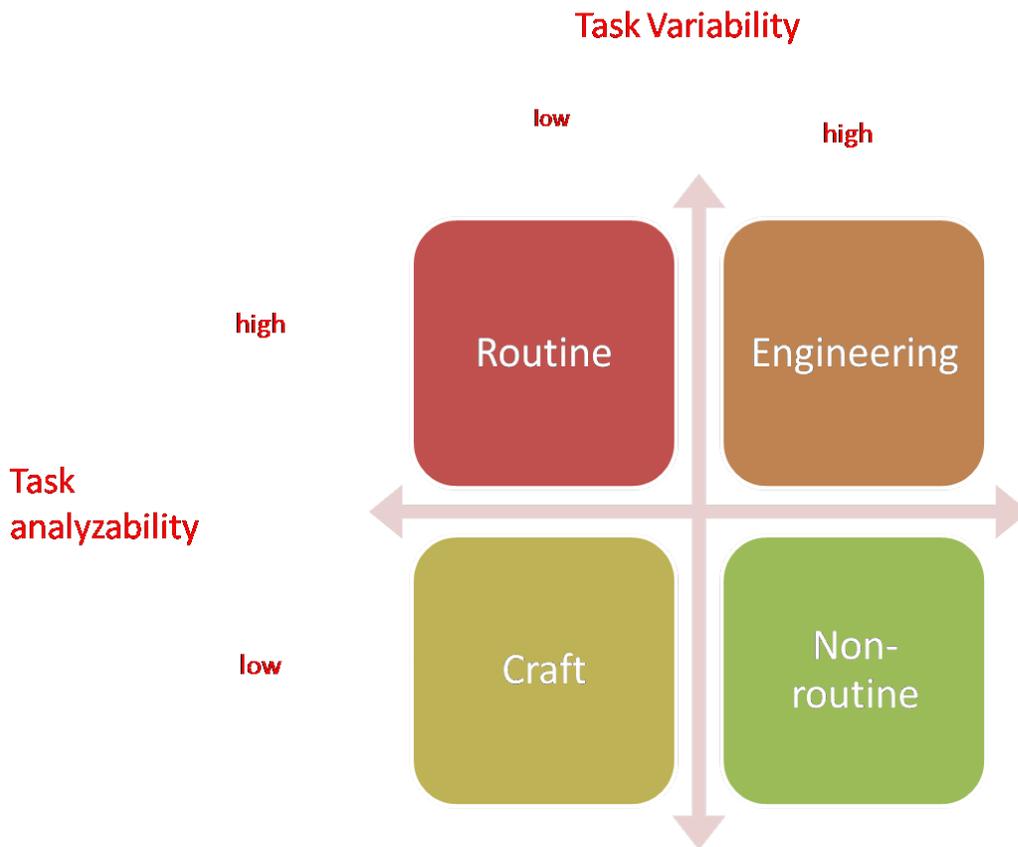
The four technology categories in his theory are:

1. ROUTINE: characterised by the lack of exceptions and its depth of comprehension. Traditional manufacturing technologies such as assembly lines belong to this category.

2. CRAFT: characterised by its lack of exceptions and unpredictable outcomes that are difficult to analyse. Construction work that demands the drafting of new designs to resolve building problems is an example of applied craft technology.

3. ENGINEERING: characterised by many exceptions and its depth of comprehension. Standard and accepted methods are available to provide solutions to problems. Accountants, most engineers and laboratory technicians use engineering technologies.

4. NON-ROUTINE: characterised by many exceptions and poor comprehension. Problems appear frequently with no existing solutions. Commercial space engineering is an example of a non-routine technology.



Based on Perrow(1967)

Fig 2. Perrow's(1967) Knowledge technology theory

II. HOW ORGANIZATION STRUCTURE AFFECTS EMPLOYEE RELATIONS?

Perrow's classification can be divided into 2 main divisions one being Routine Technology made up of Routine and Engineering classification that is standard/same technology and the other being Non-Routine technology which is Constantly updating/New technology.

1. Routine technology leading to mechanization:

Due to standardized work and repetitive tasks employees:

- Are less able to talk with each other during work – thus employees are not able to make any new friends at work. The standardized technology means that each employee has a fixed set of duties and doesn't need to talk to anyone regarding issues faced with the handling of their technology; he/she has a manual etc. to solve their difficulties.

- Tend to confine their communications to work-related matters – Since socialisation is very less, topics other than work related matters are not discussed much.
- Generally tend to make fewer friends at work and feel socially isolated – all the above factors increase stress level of the employees as they feel socially isolated and they do not have any outlet for the tensions accumulated at work time.

2. Non Routine/New Technology promoting Creativity:

Due to autonomy, the employees involved with using non-standardized technology:

- Likely to become involved in conflict with other departments - there is stress on efficiency since not using a routine technology leads to a loss in efficiency.
- The employee-employer relationship is not that congenial as there are bound to be creative differences amongst the two.

Employee Relations	Routine Technology	Non Routine/New technology
Social Isolation	High as infrequent interaction amongst employees	Low as constantly need guidance to understand latest technology
No. of Friends amongst Peers	Very few due to social isolation	More in number than in Routine technology cases
Equation with their Boss	On very good terms as efficiency is high and Work related issues are few and far between	Is not that congenial as efficiency suffers due to constant new technology related issues
Conflict within departments	Only when one department's work interferes with the other	Frequent conflict due to new technology increasing dependency amongst departments

III. HOW TECHNOLOGY STRATEGY COMBINATION CAN AFFECT EMPLOYEE RELATIONS?

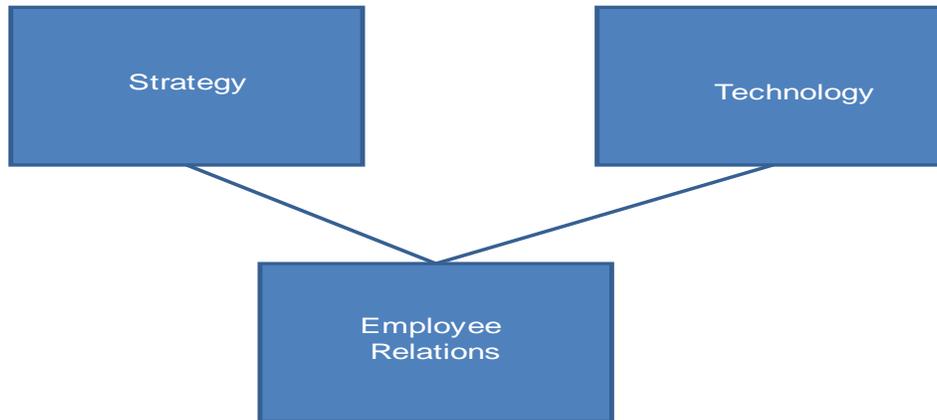


Fig. 3 Strategy and technology affecting employee relations

A combination of strategy and technology can impact Employee relations in an organization.

1. Strategy of Transparency in communication using Technology:

Exchanging information through emails, social networking software for the office employees can be a way of disseminating information amongst them. These are also an important way to improve the relation among the employees as everyone knows what is being communicated.

2. Leadership strategy using technology:

Division of work should be according to what technology the person is comfortable using. Technology can also be used to

encourage healthy competition at work as employees can be encouraged to learn latest technology or achieve mastery in the technology already in use.

3. Promoting 'Knowledge Worker' strategy in the organization:

As Peter Drucker believed that dissemination of information would be most important for the organizations working today to survive, it is imperative that technology plays an important part in making all the employees knowledge oriented workers. This would boost employee morale and help them perform better in the organization. It would also help them to improve relations

amongst themselves due to increased motivation and knowing what is going around them.

[3] <http://www.provenmodels.com/41> - Perrow's technology typology

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An Assessment on the Effects of Power Culture on Service Delivery among the Employees of Eldoret Water and Sanitation Company, Kenya

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Abstract- The aim of this study was to expand the base of knowledge and to test the relationship between the component of organizational culture that is power culture effects on service delivery. The study adopted descriptive research approach to explore the impact of power culture on service delivery. In this study, primary data was collected through questionnaires from employees. Census inquiry method was adopted involving the 225 employees. The sample in this research included departmental heads field officers and other support staff. The power culture, as a predictor significantly affect service delivery of employees at ELDOWAS. There is a significant and positive relationship between power culture and service delivery. Where $r=0.845^{**}$ and $P<0.01$. Power culture is therefore an important ingredient in effective service delivery among employees. Culture influences performance in the sense that its content can be either an asset aspect or liability aspect. The study therefore concludes that employees cannot deliver their services well in an absence of strong leadership and management in the organization. Hence the study concludes that power culture should be given a lot of emphasis this is because the person in power should poses necessary qualities that can make employees perform better.

Index Terms- Power culture, Service delivery

I. INTRODUCTION

Culture within any organization is the value system that each member of the organization believes to be important and why they believe the organization is in existence. In the past 20 years, research focus has been shifting to the organization culture paradigm with a strong belief that the service delivery is attributable, at least in part, to it (Liu, Shuibo, & Meiyung, 2006). Mahmudah, (2012) reports a significant relationship between organization culture and service delivery. Services account for more than two thirds of the Global economy accounting for 72% of the GDP of developed nations and a high GDP share in developing economies (The World Bank, 2007). Beyond their own dynamism services have a wider impact on economic growth providing support to other industries (Malhotra, Ulgado, Agarwal, Shainesh, & Wu, 2005).

Culture, in an organizational widest sense, embodies deepest beliefs about work, and guides employees decisions and actions. Creating changes in role and behavior is dependent on achieving a shift in values and attitudes, not by management

edict, but by creating a culture of a shared vision for the future. (Pattison & Williamson, 2016). According to (Kandula, 2006) the key to good performance is a strong culture. He further maintains that due to difference in organizational culture, same strategies do not yield same results for two organizations in the same industry and in the same location. In fine it can be inferred that a positive and strong culture can make an average individual to perform and achieve brilliantly conversely a negative and weak culture may negate the performance of an outstanding employee hence compromising on service delivery. Therefore organizational culture has an active and direct role in performance management (Ahmad, 2012). Organizational culture is correlated with job satisfaction (Anis et al. 2011; Sharma & Bajpai, 2010), job performance (Bergman et al., 2000; Samad, 2007; Ward & Davis, 1995; Yousef, 2000) and employee retention (Anis et al. 2011). It is therefore incumbent upon organizations to develop a positive organization culture as Job satisfaction, job performance and employee retention remains a hallmark of service delivery.

According to Handy, (1999) organizational cultures are classified into four Major types that is power culture, role culture, task culture and person or support culture. This study focused on power culture and its effects on service delivery. Power culture is observed as a political system in which those who have the power also have the right to manage it and even change it. Neboisa, (2012) points out that man is not a rational being but a political being willing to submit to the will of the more powerful. He further argues that power culture consists of the leader or management reaching a decision regarding the solving of a problem, and then communicating to their followers and organization on how, when and who will implement the change which will solve a problem which can guarantee service delivery. Handy, (1999) illustrates that power culture organizations can respond quickly to events, but they are dependent on their continued support on the abilities of the people at the Centre, succession is a critical issue. He further argues that if managers get this culture right, it can result in a happy, satisfied organization that in turn can breed quite intense commitment to corporate goals hence effective service delivery.

According to Martin, (2005) Power cultures requires that much faith is put in the individual and little in committees or teamwork. (Harrison & Stokes, 1992) Also pointed out that an organization that is power-oriented is based on biasness in access to resources, where a resource in this case may include anything one person controls that another person is in need of. This type of culture is rational when power holder is comprehends what is

anticipated of him and at the time he has the necessary qualities that will enable him to influence employees behavior in line with the organization objectives and expectation. This culture is appreciated for its ability to aid in fastest realization of results but has the disadvantage of destruction of motivation, loyalty and increase in employee turnover thus compromising on service delivery (Neboisa, 2012).

Most studies have examined the impact of culture on service delivery in terms of general western/eastern background (Mok & Armstrong, 1998). In a study of Hong Kong and Australian managers, Lok & Crawford, (2004) found a positive effect of organization culture on employee performance. (Abdul Rashid, Sambasivan, & Johari, 2003) based on a study of Malaysian companies that organization culture contributes to superior performance. However, (Aluko, 2003) found evidence on the effect of OC on the performance of textile firms. In Kenya (Njugi & Agusioma, 2014) in their study on Effect of Organisation Culture on Employee Performance in Non-Governmental Organizations found organization culture has a great influence on performance as it dictates how things are done. However non of these studies looked at the effects of power culture on service delivery leaving a gap in literature. Besides Mahmudah, (2012) reports a significant relationship between organization culture and service delivery. However (Lahiry, 1994) indicated a weak association between organization culture and performance. These points to mixed results hence the issue of examining the interactions between power culture and service delivery remains of considerable importance for both the academia and practice. It's in this premise that the study was designed to fill in the existing gap in literature by assessing the effects of power culture on service delivery.

Statement of the problem

The reason for existence of organizations is service delivery to customers which is an index of organization performance. According to Kandula, (2006) the key to good performance is a strong culture. A strong organization culture is therefore a driving force to achieve superior service delivery as it engenders confidence, commitment and adherence to ethical behaviors amongst employees while reducing stress. But According to Njugi & Agusioma, (2014) most organizations pay high premiums to the reward systems at the expense of cultural activities. Organizational practitioners continue to be bedeviled by a lot of management problems that have their roots in organizations cultures that impedes service delivery (Aluko, 2003). However most studies have examined the impact of organization culture on service delivery in terms of general western/eastern background (Mok & Armstrong, 1998). The prevailing view is that the developing countries cultural context is different from developed countries with the western culture such that western-derived and tested arguments cannot be used to explain and understand organizational problems in developing African countries (Blunt & Jones, 1992). Kandula, (2006) further maintains that due to difference in organizational culture, same strategies do not yield same results for two organizations in the same industry and in the same location. Presently there is considerable body of knowledge on the relationship between organization culture and service delivery while non on the effects of power culture on service delivery

.These altogether has motivated the design of the current study to assess the effects of power culture on service delivery amongst ELDOWAS employees.

Objective

To determine the effect of power culture on service delivery among the employees at ELDOWAS.

Hypothesis

Ho₁: Power culture does not significantly affect service delivery among employees.

II. LITERATURE REVIEW

Power Culture in Relation to Service Delivery

Power culture will normally determine the relationship between the organization and customers in the process of service delivery and how the adoption of a particular leadership styles by managers can enhance service delivery. Although employees are considered predominantly responsible for customers' perceptions of the service encountered during service delivery process the leaders' plays a big role in this case (Lytle, Hom, & Mokwa, 1998). Leaders are nevertheless able to influence employees' attitudes and behaviors to enhance service delivery (Zeithaml & Bitner, 1996). Therefore employee's attitude is very important since it will determine how they will deliver service to the organization and the impact of their services on the recipients. Customers' perceptions of service are normally made up of elements such as assurance, empathy, and responsiveness and this may be difficult to achieve if power is not well exercised by the organization.

Power culture adopted by the organization has been argued to influence the effectiveness of the service delivery, (Zeithaml & Bitner, 1996). Power culture (Bass *et al*, 1997) therefore influence employees' service attitudes and behaviours, as well as the interrelationships between these constructs and managerial service delivery inputs e.g., feedback to employees (Jaworski & Kohli, 1991). When people in power use their position in an effective way for example giving feedback to their juniors and providing assistance where necessary it create a good relationship between the senior managers and employees hence it motivate employees to seek assistance when they are facing problem.

Power culture often is seen as a key factor in coordinating and aligning organizational processes (Lewis and Mitchell 1999). As with any aspect of organizational functioning, it should focus on organizational performance and the most important, the effectiveness in achieving desired outcomes. On the other hand Power culture can, to a large extent, affect management capacity through proper design of organizational systems. People in power must assess contingency factors in the environment in tough situation, considering staff characteristics and using leaders to shape organizational climate and service delivery. Those in power can impact program capacity through the use of evidence-based practice in program design.

Power culture can affect trust and satisfaction of employees the organization and organizational citizenship behavior, further enhance the relationship between leadership style and organizational commitment directly (Podsakoff, MacKenzie, & Fetter, 1990). Smith, (1998) explained that leadership behavior of

directors is significantly positively related to productivity, work satisfaction and organizational commitment of staff. Today's organizations need effective leaders who understand the complexities of the rapidly changing global environment. Power may affect the organizational effectiveness or performance, (Nahavandi, 2002).The effectiveness of power culture is dependent on the organizational situation, (Omolayo, 2004). Smith,(1998) concluded that if the task is highly structured and those in power have good relationship with the employees, effectiveness will be high among the employees.

III. RESEARCH METHODOLOGY

Research design refers to the overall strategy that one may choose to integrate the different components of the study in a coherent and logical way. This is done in order to ensure that one effectively address the research problem (Kothari, 2004). This study adopted descriptive research design because it is used to describe characteristics of a particular individual, group, or association. The purpose of descriptive design is to collect information that describes an existing phenomenon. This study through its research findings aimed at finding out the role of Power culture on service delivery at Water and Sanitation Company limited in Eldoret.

According to Cooper & Emory, (1995), a population is the total collection of elements about which one wishes to make inferences. An element is the individual on whom the measurement is being taken and is the unit of study. The target population was 225 employees of Eldoret Water and Sanitation Company limited.

Target Population

Strata	Number of participants
Heads of departments	5
Field workers	100
Other support staff	120
Total	225

Source: HRM office: (2014)

When all items in any field of inquiry constitute a population a complete enumeration is recommended. A complete enumeration of all items in the population is known as a census inquiry (Kothari , 2006). It is presumed that in such an inquiry, where all items are covered, no element of chance is left and the highest accuracy is obtained. Since ELDOWAS has 225 employees in total, a census inquiry was adopted. The results of an inquiry in census are exact and accurate because information is collected from each and every unit without ignoring anyone. Also census makes it easy to make an extensive and detailed study of the unit is made possible, Kombo & Tromp, (2006). This study adopted census because the size of target population in the area of study was small.

Data was collected from both primary and secondary sources. The main research instrument that was used in this research was the questionnaires. Likert scale format was adopted in formulating the questionnaire.

Validity is the extent to which research findings accurately represent what is really happening in a situation that is being researched, and therefore a test is valid if it measures what the researcher claims it does (Collis & Hussey, 2003).Validity therefore, has to do with how accurately the data obtained in the study represents the variables of the study. The instrument was rated in terms of how effectively it sampled significant aspects of the purpose of the study. The content validity of the instrument was determined by the researcher who discussed the items in the instrument with the experts. Reliability is a measure of the degree to which a research instrument yields results after repeated trials, (Newman, Powell, Christensen, Lerberg, & Anderson, 2000).Cronbach's coefficient alpha was applied on the results obtained to determine how items correlate among them in the same instrument.

Data was analyzed using descriptive and inferential statistics Data was presented in tables. According to Creswell (2003) this is a technique for making inferences by systematically and objectively identifying specific characteristics of messages and using the same approach to relate trends. Multiple regression analysis was employed to test the hypotheses. All the above statistical tests were analyzed using the Statistical Package for Social Sciences (SPSS), version 20. All tests were two-tailed. Significant levels will be measured at $p < 0.01$

IV. ANALYSIS AND FINDINGS

Descriptive statistics

The objective of the study was to determine how power culture affects quality service delivery among the employees. This was obtained from the respondents views on how power culture affects service delivery as shown in the Table 4.2. From the study the most respondents with a mean score of 4.65 (sd=0.48) strongly agree that a leader should be strong, decisive and firm in order to influence the service delivery. However, the leader should be impersonal and avoiding the exercise of his authority for his own advantage with a mean score of 3.4 (sd=1.57). Most of the respondents agreed that a leader should be capable of being influenced in matters concerning the task only with a mean score of 3.65 (sd=0.97). From the study respondents with a mean score of 4.6 (sd=0.49) agreed that a leader should be concerned with and responsive to the personal needs and values of others. Respondents who strongly agree that a leader should demands from subordinates only that which is required by the formal system had a mean of 4.15 (sd=1.16). From the results the respondents who strongly agree that a leader should use their authority to obtain the resources needed to complete the job had a mean of 4.10 (sd=1.09). In a study carried out by(Smith, 1998)if the task is highly structured and those in power have good relationship with the employees, effectiveness will be high among the employees. Those in power nevertheless are also able to influence employees' attitudes and behaviours which is a good remedy to service delivered, (Zeithaml & Bitner, 1996).

Table 4.2 Roles of Power Culture on Service Delivery

Response	Mean	Std. Dev.	Skewness	Kurtosis Statistic	Std. Error
A leader should be strong, decisive and firm	4.65	0.48	-0.63	-1.62	0.36
Impersonal and correct, avoiding the exercise of his authority for his own advantage	3.40	1.57	-0.45	-1.40	0.36
Capable of being influenced in matters concerning the task	3.65	0.97	-1.28	1.21	0.36
Concerned with and responsive to the personal needs and values of others	4.60	0.49	-0.41	-1.85	0.36
He / She demands from subordinates only that which is required by the formal system	4.15	1.16	-1.29	0.77	0.36
He / she uses his /her authority to obtain the resources needed to complete the job.	4.10	1.09	-1.37	1.33	0.36

4.2.1 Influence of Power Culture on Service Delivery among the Employees

Pearson Product Moment Correlation Coefficient was used to establish the influence of power culture on service delivery among the employees. It was used to measure the degree of relationship between the two variables. There was a positive relationship between power culture and service delivery among

the employees ($r=.845, n=180, p<.01$), this indicated that an increase in power culture improves service delivery among the employees. In a study carried out by (Lewis & Mitchell, 1999)power culture often is seen as a key factor in coordinating and aligning organizational processes which will determine how services are delivered by the organization.

Table 4.3 Influence of Power Culture on Service Delivery among the Employees

		Service delivery	Power
Service delivery	Pearson Correlation	1	.845**
	Sig. (2-tailed)		.000
Power	Pearson Correlation	.845**	1
	Sig. (2-tailed)	.000	

** . Correlation is significant at the 0.01 level (2-tailed).

b. List wise N=180

There was a positive relationship between power culture and service delivery among the employees. This indicated that an increase in power leads to an improvement in service delivery among the employees. This culture type is usually found in small organisations, where everything revolves around the person in charge (Martin, 2005). Although employees are considered predominantly responsible for customers' perceptions of service encounter since they represent the organization to customers during the course of service

4.6 Effects of power culture onservice delivery

Multiple regression analysis was used to test the formulated hypotheses. First, the model summary was analyzed to establish the strength of power culture in predicting service delivery. Results presented in Table 4.10 reveal that power culture 71.2% of the variation in service delivery (Adjusted R Square = .712).Therefore, the remaining 28.8% is explained by other factors not considered in the study.

Table 4.1: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.845 ^a	.714	.712	.228	1.460

a. Predictors: (Constant) Power culture

b. Dependent Variable: service delivery

Second, the ANOVA output was examined to check whether the proposed model was viable. Results shown in Table 4.11 reveal that the F-statistic was highly significant (F= 443.871 p<0.05), this shows that the model was valid.

Table 4.2: ANOVA^b

Sum of Squares	df	Mean Square	F	Sig.
23.121	1	42.686	443.871	.000 ^a
9.272	178	23.121		
32.392	179			

a. Predictors: (Constant), Power culture

b. Dependent Variable: service delivery

The model significantly improved the ability to predict service delivery. Thus, the model was significant leading to rejection of the null hypotheses.

Multiple regression results

Results of the regression coefficients presented shows that the estimates of β values and give an individual contribution of the predictor to the model. The β value tells us about the relationship between service delivery with each predictor. The positive β values indicate the positive relationship between the predictor and the outcome. The β value for power culture (.845) which was positive. The positive β values indicate the direction

of relationship between predictors and outcome. From the results the model was then specified as:-

$$y = \beta_1 x_1 + \epsilon \dots$$

Service Delivery = .845 power culture

. Results reveal standardized regression coefficient for power culture ($\beta=0.845$), implies that an increase of 1 standard deviation in power culture is likely to result in a 0.845 standard deviations increase in service delivery.

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
	B	Std. Error	β			Tolerance	VIF
(Constant)	0.720	.051		14.013	.000		
Power culture	.535	.025	.845	21.068	.000	1.000	1.000

a. Dependent Variable: Service Delivery

V. DISCUSSION OF THE FINDINGS

From the study findings power culture has been found to have a positive and significant correlation with service delivery and contributes 71.2 % to service delivery .This is because this type of culture has the capacity to improve on employee dedication, social behavior role clarity and satisfaction. This is pegged on strong leadership, responsiveness to personnel needs and values and only demanding from employees what is required by the formal system which also have the capacity to influence

employee satisfaction .This is underpinned by the arguments of Podsakoff, MacKenzie, & Fetter, (1990) that Power culture can affect trust and satisfaction of employees, organizational citizenship behavior, further enhance the relationship between with the leadership and organizational commitment directly.All these remain predictors of service delivery .Power culture if adopted by an organisation has been argued to influence the effectiveness of the service delivery process, resulting in greater levels of service delivery being provided to organizational customers(Zeithaml & Bitner, 1996). Power is often seen as a key factor in coordinating and aligning organizational processes

(Lewis & Mitchell, 1999). Good coordination will always keep employees on track in whatever they are doing and also be in a position to consult in areas where they experience difficulty in the process of service delivery. The other strength of power culture is that decisions can be made very quickly hence efficient and effective service delivery. The thesis of this research is therefore that organizations need to adopt power culture in order to achieve high levels of service delivery. But the caveat is that the success of power culture is largely dependent upon the abilities of the person in power, or people at the centre of power.

5.3 Conclusions and Recommendation

From the findings this study makes a number of conclusions. It was also noted that a leader who is concerned with and responsive to the employees needs and values his employees enhances service delivery as the employees feels that they are more important to the organization. It is also important to note that while enhancing service delivery among the employees power culture should be given a lot of emphasis this is because the person in power should possess necessary qualities that can make employees perform better. The organization should therefore have somebody in power that is capable to influence employee's deliver.

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A New Multi Kernel Hybrid Support Vector Machine Data Classification Algorithm

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Abstract- The objective of this paper is to propose a new multi kernel hybrid support vector machine data classification algorithm to classify data. This paper also focuses on comparing various data classification algorithms such as Support vector machine algorithm with linear kernel, Radial basis Kernel, Neural network feedforward back propagation algorithm with the proposed algorithm to measure the accuracy in classification of data collected for evaluating the website quality and usability of various online shopping websites such as Flipkart, Amazon, Jabong and Snapdeal by taking into consideration various quality parameters such as functionality, reliability, security, navigation, information quality, presentation, visual interface etc.

Index Terms- Data classification, Support vector machine, Website quality

I. INTRODUCTION

Businesses and researchers have been generating huge amount of data which has led to the need for fast, accurate and robust algorithms for analyzing the data for meaningful interpretations and inferences. Classification is one of the crucial tasks for various applications like text categorization, tone recognition, image classification, micro-array gene expression, proteins structure predictions, data Classification etc. The existing supervised classification methods can provide the best results only for finite samples. However the samples generated by real time applications such as credit card transactions etc are huge and unbalanced and this leads to non linear relationship between predictive variables and such samples are easily classified by support vector machine data classification algorithms. Support Vector Machine (SVM) is a classification and regression prediction tool that uses machine learning theory to maximize predictive accuracy while automatically avoiding over-fit to the data.

II. DATA CLASSIFICATION USING SVM

SVM is a useful technique for data classification. Even though it's considered that Neural Networks are easier to use than this, however, sometimes unsatisfactory results are obtained. A classification task usually involves with training and testing data which consist of some data instances¹. Each instance in the training set contains one target values and several attributes. The goal of SVM is to produce a model which predicts target value of data instances in the testing set which are given only the

attributes. Classification in SVM is an example of Supervised Learning. Known labels help indicate whether the system is performing in a right way or not². This information points to a desired response, validating the accuracy of the system, or be used to help the system learn to act correctly³. Support Vector Machine algorithm supports various kernels like linear kernel, Radial basis kernel, Gaussian kernel etc to classify data.

III. RESEARCH FINDINGS

A new multi kernel hybrid data classification algorithm by combining linear and radial basis kernel was proposed and was used to classify the data collected for evaluating the website quality of various online shopping sites such as Flipkart, Amazon, Jabong and Snapdeal. The proposed algorithm was compared with support vector machine with linear kernel algorithm, support vector machine with radial basis kernel algorithm and feedforward back propagation neural network algorithm to test the accuracy of the data classification.

Pseudo Code for the proposed Multi kernel hybrid data classification Algorithm

Input: Training set $(v_1, I_1), \dots, (v_N, I_N)$

Output: Multiclass SVM and RBF Classifier

Training: Binary SVMs and graded relevance scores

For $j = 1$ to $(k - 1)$ do

STEP1: For all samples from C_1 to C_j classes, set labels to $(+1)$ and all samples from C_{j+1} to C_k , set labels to (-1)

STEP2: Train j th binary SVM

STEP 3: Classify the training samples

STEP 4: if $(j > 1)$, compute scores for all training samples classified as $(+1)$ and define $(j - 1)$ thresholds by splitting the curve of sorted relevance scores into equally spaced intervals.

STEP5: if $(j < k)$, compute scores for all training samples classified as (-1) and define $(k - j - 1)$ thresholds by splitting the curve of sorted relevance scores into equally spaced intervals.

End for

The results are tabulated below:

Comparative analysis of Performance of proposed multi kernel hybrid data classification algorithm, SVM linear Classification algorithm, RBFSVM algorithm and feed forward back propagation neural network algorithm for Functionality factor

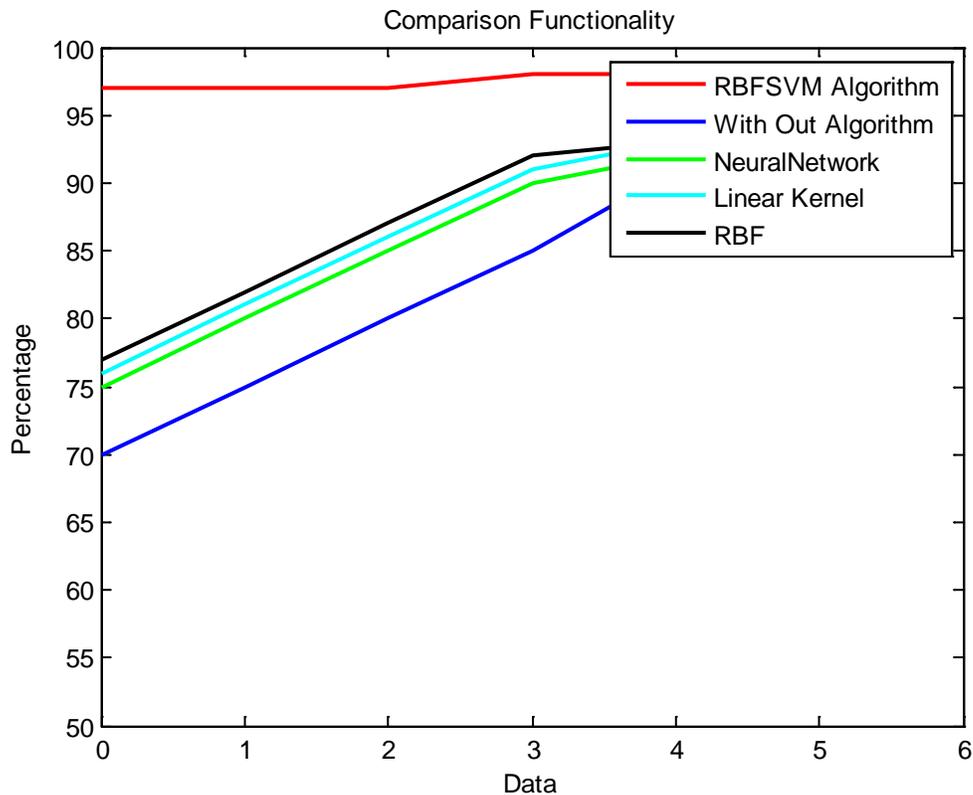


Figure 1: Graph –Comparative Performance Analysis of algorithms for Functionality Factor

TABLE 1: Comparison of accuracy of various data classification algorithms

Parameters	Accuracy measure of classification Algorithms (in Percentage)			
	Linear kernel	RBF Kernel	Neural Network	Proposed Multi Kernel Hybrid
Functionality	70	78	75	83
Reliability	77	78	75	95
Efficiency	77	78	75	95
Security	76	78	75	95
Navigation	76	78	75	94
Information Quality	77	78	75	95
Visual Interface	76	77	75	92
Interactivity	76	77	75	93
Presentation	76	78	75	92
Satisfaction	76	77	75	92
Trust	76	77	75	90
Usability	76	77	75	90

IV. CONCLUSIONS

The research findings indicate that the performance of the proposed multi kernel hybrid data classification algorithm in terms of accuracy was improved and better when compared to the other existing data classification algorithms such as linear kernel, radial basis kernel and feed forward back propagation neural network data classification algorithms.

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