

Occurrences of Clean Water Problems in Africa

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Abstract- From 1990 to date, Africa has seen great progress in terms of the provision of safe and quality water to its populace. The inadequacy of this important (water) resource in the continent affects not only the health of populace but also the development of the area, especially in industrial, urban and agricultural sectors. The African continent is the under-developed in terms of the use of modern technologies for water treatment in all its forms. Protection and management of the effects of climate change is hindering the management of this water resource as well. Factors that affect the quality of water on the African continent should be addressed by all stakeholders. This in effect, would provide lasting solutions to the menace in order to enable the continent which is full of other natural resources to realize its full potentials in modern technology.

Index Terms- African Continent, Water pollution, Drinking water, Resources, Technology

I. INTRODUCTION

Large population around the world does not have enough water to sustain their livelihoods. More than 1.1 billion people in the world are affected by water scarcity or lack of safe drinking water, meaning that one in every six people lacks access to safe drinking water. Inadequate access to water is a sign of poverty and it affects people's basic needs, health, food security, and livelihoods. Africa, the second largest continent, with 55 countries with about 30,221,532km² area [1], which is about 20.4% of the Earth's land area [2]. With about 1.033 billion people [3], it is the second-most populous continent, accounting for 15% of the world's human population [4]. It's no wonder that this population makes Africa experience water problem. The biggest problem is the inability to find clean, adequate water for drinking anytime. Most people in Africa depend on surface water and don't have the technology or the necessary finances for the traditional methods of water use. As we know about African continent climatic conditions are arid in some regions, surface water evaporates often, and this has placed a strain on the water bodies by a large population which proves the lack of groundwater in Africa continent.

Between dirty water and no water at all which one is better?

Lacking water has enormous consequences on individuals and communities. The population needs water to survive, do not have it or in insufficient quantity, will cause them to be in a dangerous state, threats or dehydrates. Even if we have abundant water but polluted, at first sight it is as, we do not have any because it

cannot be used, but it seems better than not having any at all. Of this polluted water a new challenge begins, that of the treaty, to make it clean water to serve for ends.

II. WATER SITUATION IN AFRICA

The Millennium Development Goal on sustainable access to drinking water was reached in 2010. The objective of ensuring that 88% of the world's population has a reliable supply of safe water. However, the objective of drinking water has not been reached by the continent, only 20% improvement in access to clean water has been noted. In the style of lives of African countries, the rich people in urban city are more privilege to quality and safe drinking water than rural residents. It is sad to note that, a large part of African population still continue to use improper source of drinking water. *Sanitation: Halve the proportion of the population without sanitation between 1990 and 2015*[5]

The sanitation issues condition the quality of the water that we have from various sources, even if today noticeable improvement is felt, many disadvantaged areas with difficult access near water source increases the risk of water pollution. The populace's good hygiene manners should be practical point to attain access to improved sanitation for the Africans. Some of usual bad practices such us: open defecation, the deposit of garbage in the environment without any precaution should be a significant challenge to solve. It is true that sanitation situation in rural Africa area and using adequate clean water has critical view in the past than today [6], but others aspects like the lack of communication, research, publications that the continent suffers to cope with the ills it has. Also not only there is difficult access to clean water, even if water is available, there are some risks of contamination due to many factors. Sometimes, the groundwater use technic requires a lot of developed water sanitation facilities, according to the limited financial resources, the maintenance of these technic is poorly managed. Examination of water quality is not done as it should be, and inexistence of education among for people who are using water leads them think that as long as they can receive water from a well, it is no mater. Usually, after building a well for people demand, the population makes more attention for quantity of water than quality of this water used [7]. Of this large expanse of water in the African continent, few of them are available to be a good source of water for consumption. Rainwater sources are usually polluted, and adequate hydraulic work to drive water from clean sources to areas in need is too

expensive Groundwater is adequate resource to provide clean water to all the areas in Africa, especially in disadvantaged areas to avoid costly installations of the usual treatment systems, and this has the advantages of being naturally saved from bacterial pollution. However, Africa's limited technical capacity to secure natural water resources must prioritize public awareness. It is noted in some localities that water from sources close to the population is sometimes boiled or added some of the pharmaceutical products for domestic purposes. This archaic practice embodies a lack of knowledge of the risks of contamination and infections. Groundwater is not a good water resource guarantee, either, when it comes to giving clean water. Water pollution is caused by heavy metals, bacteria, and others, they contaminate not only the water sources but also the environment, which entrains the death of fish and the destruction of vegetation. In that case, it would be nice to protect groundwater be monitored frequently, which is expensive and requires a technical approach that most of the times are not present in rural areas [7].

Developed areas are confronted with different challenges to procure clean water and sanitation. The necessary control of the overcrowding in urban cities requires to ensure the quality in additional water supply source, the human waste generate in these agglomerations, are all factors that the continent should face to improve, their wastewater management systems. Because, these factors can create the pollution of natural water bodies, the dirty water use in irrigated agriculture, usual water supply, and environmental concerns for aquatic life due to the high concentration of pollutants into water bodies [8].

Access to water

African countries have seen various evolution towards the Millennium Development Goal on water although on the same continent. North Africa has 92% coverage and was on track to meet its 94% target before 2015. However, 40% of the 783 million of Sub-Saharan Africa population experiences show that they live without access to an improved source of safe water from their area. Although the sources of drinking water are limited in Africa, the budget for the total coverage of this water is another problem, it is true that it requires great processing technology and precise techniques, but the continent must refer to his own realities while drawing inspiration from developed countries. Sub-Saharan Africa was behind on the objectives from the MDG meeting on water with just 61% water coverage for the population demand and with the non-resolution of this slow pace did not reach the 75% target set for the locality [9].

Research of 35 countries in Africa shows significant differences between the poorest and richest fifths of the population in both areas (rural and urban areas). The access to improved water sources is only possible for Over 90% of the richest people in urban cities, and most of them have piped water in their houses. Piped-in water was non-existent in 40% of poorest households in rural areas, and less than half of the population use all kind of dirty source of water in Figure 1 [9].

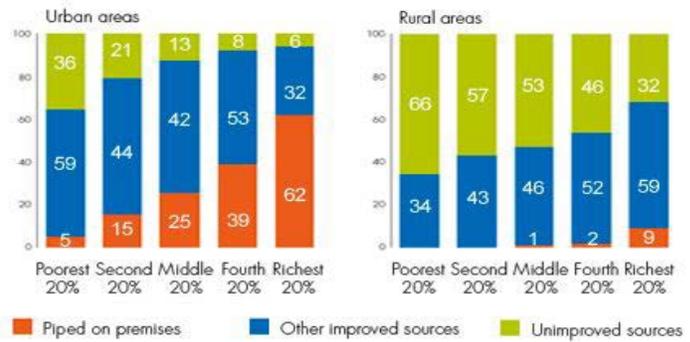


Figure 1: The Millennium Development Goals Report 2012 [9]

Access to sanitation

Africa regions had the least improvement in progressing the MDG on sanitation. Although North Africa had a coverage of 90%, sub-Saharan Africa covers only 30% with an increase of 4% compared to 1990 in Figure 2. Cause of largest of human health and environment pollution due to basic unhealthy sanitation like wastewater disposal, open defecation, poor management of solid waste, and all these issues become a serious concern for the African government. The common practice of open defecation would be the important cause of fecal-oral transmission of disease with children being the most concern.

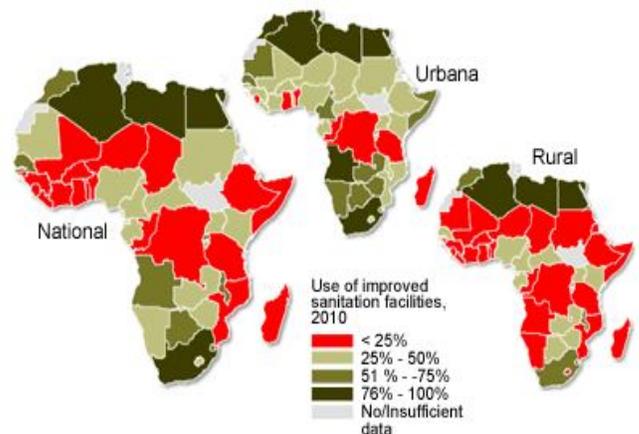


Figure 2: snapshot of Drinking Water and Sanitation in Africa. 2012. [10]

Although efforts and approaches are being made to provide a good quality of drinking water to the population in Africa, sanitation and hygiene systems led to various health complications, the spread of microbes by causing death within the localities [11]. For some of part in Africa (West/Central Africa), the clean water and sanitation situation need special urgency, as these localities have the biggest under-five mortality rate of all developing regions. Recurrent illness of cholera in both urban and rural areas underlines the poverty of this locality's basic living condition. The question of sanitation should not be about poverty but rather about education and how African population organizes his solid waste. Before it becomes an important issue, a concern of government for the protection of water sources, it should be the subject of daily habits. The

continent needs more than ever contributions and experiences of other developed countries.

III. REASONS OF WATER POLLUTION IN AFRICA

In African countries, there are many reasons analyzed behind the widespread of water pollution, come from people waste management to the industrial dumping in Figure 3.

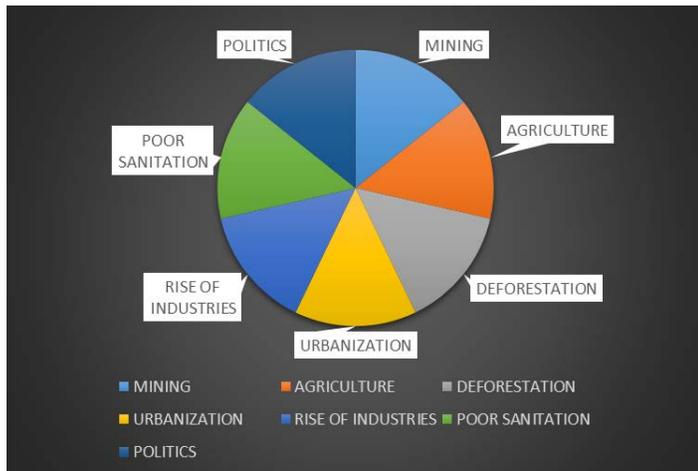


Figure 3: Different reasons of water pollution in Africa

Mining: African continent's potential of producing many of the most precious minerals, has an advantage over other continents in the world. Although these benefits the respective African countries, the extraction process of these resources have seriously led to a poor quality of water source, because of the mismanagement of the process causes harmful substances to be observed in the water source. Thereby increasing the water pH and murkiness because of the mineral and salt present in the extractives making drinking water becoming unfit for human consumption.

Agriculture: Middle-income and emerging economy countries in Africa, agricultural pollution dominates contamination of water bodies compared pollution generated from settlements and industries. In general most of the chemical contaminant in the world's groundwater aquifers is nitrate from agriculture [12]. Most African economies rely on agriculture this explains hence the highest contributor to water pollution in the continent. Overgrazing, bush clearing and plowing of soil, etc. has resulted in soil erosion. The economy of African countries is mostly based on agriculture for the majority not yet mechanized and often not far from water sources. This approximation to the water sources that sometimes facilitates irrigation causes contamination of the soil, water sources during rainfalls. Besides, the use of excreta and fertilizers in the agriculture production leads to vast amounts of phosphate and nitrates in water bodies. The pesticides on the other hand used in the farms also get carried into water bodies by surface runoff of the non-point source of pollution.

Deforestation: This phenomenon is being experienced in the world. However, deforestation is more rampant in African countries as they open more land for farming, settlement

especially urbanization and charcoal burning. Giving more explanation, deforestation is the process through which forests are cleared or destroyed without being replaced (Reforestation). This practice has caused negative environmental impacts, such as soil infertility which led to fertilization of soil using chemicals hence pollution of water through surface runoff. Noted also, Africa is one of the world's leading timber exporters, increasing the deforestation phenomenon and exposing the continent to the consequences of climate change.

Urbanization: Overpopulation in urban areas complicates even more control disease outbreaks to ensure environment sanitation. The exposure to wastewater is noted that the less affluent population pays more water consumption than the rich, while rich urban areas are highly subsidized, that means the rich peoples are charged less for cleaner water [13]. Every year many people are moving from village to urban city. Normally, before 2030 Africa urbanization rate is predicted to attend the 50% mark. Even if this statistic of progress should be good news for African countries, it is worth pointing out that it also contributes to water pollution. Wastewater treatment might also become a problem as the urban population grows.

The Rise of Industries: Where waterborne sewerage systems are used to dispose of human excreta, the system tends to be used also for disposal of industrial waste, especially liquid discharges. Municipal sewage sludge may contain high concentrations of heavy metals, such as cadmium, lead, and chromium. Poisons in industrial discharges can quickly exceed the safety limit: levels about 10 or 20 times higher than those of municipal waste only [14]. Disposal of industrial waste by incineration or land-fill may also contaminate water sources if the waste filters into groundwater or drains to rivers. Heavy metals eventually accumulate in filter-feeding shellfish and plants.

Poor Sanitation: The waste treatment is the most important issue for most African countries, they do not have adequate technology to treat their wastes. Most of the households collect their waste to clog stagnant streams in alleys, which is driven by runoff water to public piping, to end up in water sources. Despite this unhealthy practice and non-coverage of proper water in those regions, these waters exposed to pests, bacteria, and other pollutants are used by populations. They also used it for other needs adding some pharmaceutical products this leads to loss human life.

Politics: Politics also plays a greater role in water problems in Africa. There are often many water sources that are shared by many countries. This has led to some conflicts, for example when one country has the dam construction project on a shared river. All decisions taken by African countries in sharing a source of water must be subject to co-management, in order to take into consideration all parameters of its security.

IV. EFFECTS OF WATER POLLUTION IN AFRICA

The implications of inadequate clean water and access to adequate sanitation are widespread. Young children die from dehydration and malnutrition, results of suffering from diarrheal illnesses that could be avoided by clean water and good hygiene [15]. Disease such as cholera is spread rampantly during the wet season. Women and young girls, who are the main role-players in accessing and carrying water, are prevented from doing income-generating work or attending school, as the majority of their day is often spent walking miles for their daily water needs. They are also at an increased risk for violence since they travel such great distances from their villages on a daily basis, and are even at risk when they must go to the edge of the village to find a private place to relieve themselves.

Various adverse effects come from water pollution which African continent suffers, such us:

Limited Access to Clean Water

In general, streams that are close to residents, industries, fields of plantations or farms are more polluted by human activities. This means that there is the presence of chemicals products or other toxic substances into both ground and surface water that makes water inconsumable.

In other words, water pollution makes it unsafe for human use. With the increased rate of Africa population, without available clean water, water issue causes more damage we can think.

Agricultural and Food Supply

When the polluted water runs through farmlands, the soil will become contaminated with harmful toxins that will affect the growth of plants already in the farms and those yet to be planted. Deforestation and urbanization also cause soil erosion which carries away the top fertile soil layers, stripping the soil of the essential nutrients needed by plants to grow. Above all, lack of sufficient water will make it impossible for plants to grow, and in most cases, they'll eventually dry out. Considering that agriculture is the backbone for most of the Africans countries. The effect of water pollution on farmland will cut short their food supply and leave many of them starving.

Health Effects

The African population as we know despite its increase, is decimated by a high mortality rate, especially the layer of children and adolescents. Lack of good hygiene, the unclean practices associated lack of sanitary infrastructure for needs, are the causes of most of the diseases in the continent. We are going to list the most common water-related infections in Africa:

Cholera: Cholera with his devastating effects: leg cramps, vomiting, and diarrhea, this causes dehydration effect within a short time on those that it affects. The ability to finish with cholera disease is still far from achievement in the continent, but notable progress has been observed in the Africans leaders actions to eradicate this evil that kills the youth of the future of the continent.

Dengue Fever: With effects like high fever, headaches, rashes, and pain, it is not as devastating as the previous. This fever is

caused by mosquitos sting. Even not presenting enough cases of death, it leaves complications that affect the liver.

Hepatitis: It is a treatable disease especially with medical progress, but some of the African localities where water pollution is high, have difficult access to health care. It causes one to lose weight significantly, suffers from a lot of discomfort and pain and leads to fever. It is also known to cause diarrhea.

Parasites: Parasites that exist in water which is untreated are known to be many. Water laying around in not well-sanitized conditions can be the habitat for parasites such as ringworm, scabies, and hookworm among others. If a person is exposed for a long time to these water sources or drinking from them regularly, they fall at risk of getting sick. Livestock also falls at risk of being infected as well, and they may pass on the parasites to people who eat the meat from them.

Malaria: Malaria is one of the biggest health challenges that Africa is facing. It is spread by the mosquitos that breed in the many dirty water pools. Swamps are one of them. Malaria is known to affect all, but the ones who are at most risk are children below five years as well as the pregnant mothers. They don't have the strong immunity to fight the disease. Shocking statistics on Water Situation in Africa.

Facts of the Water Situation in the African Continent:

☐ Out of the 55 counties in Africa, 14 of them experience severe water shortage issue, and 11 more are expected to have the same experience in a few years to come. In simpler terms, it means that nearly 50% of the continent's population will be facing limited access to clean water

☐ In this continent, a total of 650 people lose their lives every day due to diarrhea that's water related. Most of the victims are pregnant women and underage children.

☐ In most of the African countries, you'd be surprised to find out that an average person consumes around 2.6- 5.2 gallons of water in a day. This is unlike the 158 gallons consumed by an average person in developed countries like the US. This is to mean that Africa doesn't always wash their hands, food or clothes to save the water for drinking/cooking. This might be a good source of poor hygiene infection across the continent.

☐ Out of all the rivers and lakes in Africa (Africa is home to 677 lakes btw), 80 are shared by more 1-2 or more countries. This often leads to political stress, where the parties interested to keep conflicting over the ownership/usage of the resources. And this makes the states unable to keep the water clean or readily available to its citizens.

☐ Of the entire (huge) population residing in sub-Saharan Africa, only 16% enjoy access to clean water through the dedicated taps in their homes and yards. Part of the remaining population relies on community wells while the others gather the surface water from the nearby sources. Keeping in mind that this water isn't clean/filtered and might easily pose health risks to the entire population that relies on it.

One of the biggest problems facing Africa right now is lack of access to clean water that's safe for drinking/cooking. This comes from the fact that most of the continent's water is getting contaminated by various human activities- like mining,

urbanization, deforestation, industrial dumping, poor sanitation, agriculture, and even politics.

V. RESEARCH APPROACHES OF SOLUTIONS

Based on the above analysis, we propose approaches of solutions to preserve and maintain access to quality and safe drinking water for African populations in the future:

Good governance of African institutions in charge of water management.

South-south cooperation between African states which have the same watercourse in common; for the sake of self-sufficiency while developing major joint projects, such as: dams, drinking water treatment plant for consumption.

A good policy of African countries on water management: water security, treatment, and distribution.

Raising awareness among the population, especially those living in deprived areas with limited access to drinking water, on the use and protection of this water resource

The development and enforcement of laws to regulate industries and those of the agricultural sector so as not to be a source of pollution

Extend the water management sector to other private international structures in order to share their know-how and expertise in the field with African states in view of the difficulties encountered in the sector; and where states will act as controllers and observers

And finally, to remove industrial facilities and farms from water sources

VI. CONCLUSION

It is obvious that the realities of one continent to another are different, as are those of the two bordering countries, but science and technology are always the same anywhere. Africa in these realities and purging in its culture must be able to find the best ways to address and sensitize its population of the good ground of the preservation and the use of water for the well-being of all. The technical contribution of supplying water quality is the responsibility of the government in its water resources management policy. It is true that the financial capacity of African states often does not allow the realization of large-scale hydraulic projects, the option of a win-win partnership with the outside world must be considered.

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