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## Consequences of Water Pollution and the Way Forward Among Local Communities in Nigeria

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### **Abstract**

*The paper focuses primarily on the causes, consequences and ways of mitigating the ongoing fresh water pollution problems among Nigerian communities. Adequate supply of safe and sanitized fresh water is an inevitable factor for human and economic development. Although the recent global attention focuses on how the current and foreseeable water crisis and associated consequences would be addressed, lack of education, low budgetary funding, inefficient government policies, corruption, drought and other anthropogenic factors are increasingly contributing to the pollution of domestic water in Nigeria. The homes, local markets, abattoirs, oil and agricultural activities are consistently severing the limited fresh water sources through disposal of harmful wastes. This led to the emergence of several diseases and heavy metals poisoning across the country. The only ways forward are the proper sanitary, awareness and waste management education, adequate funding of water resources and health sectors, effective implementation of judicial measures and adoption of lessons from key developed countries like United Kingdom. A “collective” approach is required for successful implementations.*

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**Keywords:** Local communities, water, pollution, causes, effects, Nigeria.

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### **INTRODUCTION**

Water covers 70% of the Earth's surface and makes up over 60% of the human body. Water pollution affects marine ecosystems, wildlife health, and human well-being. The answer to solving pollution is to make changes in our daily habits and pay more attention to the types of products we consume.

Significance of water to human and other biological systems cannot be over emphasized, and there are numerous scientific and economic facts that, water shortage or its pollution can cause severe decrease in productivity and deaths of living species (Garba et al., 2008; Garba et al., 2010). Reports by Food and Agricultural Organization (FAO) of U.S.A revealed that in African countries, particularly Nigeria, water related diseases had been interfering with basic human development (FAO, 2007). The common sources of water that are available to local communities in Nigeria are fast being severed by a number of anthropogenic factors, of which pollution remain the most dominant problem. Water pollution occurs when unwanted materials with potentials to threaten human and other natural systems find their ways into rivers, lakes, wells, streams, boreholes or even reserved fresh water in homes and industries. The pollutants are usually pathogens, silt and suspended solid particles such as soils, sewage materials, disposed foods, cosmetics, automobile emissions, construction debris and eroded banks from rivers and other waterways. Some of these pollutants are decomposed by the action of micro-organisms through oxidation and other processes.

In 2010, UN General Assembly recognized “the right to safe and clean drinking water and sanitation as a human right that is essential for the full enjoyment of life and all human

rights” (UN [2010b](#), p. 2). The General Assembly’s Resolution (64/292) brings significant international political weight behind the notion that access to clean and safe drinking water and sanitation is an independent human right.

Globally, 768 million people lack access to an improved water source, and more than 80 % of these people live in rural areas (WHO and UNICEF [2013](#)). Poor water access is associated with many water-related illnesses, food insecurity, lost productivity, and poor school attendance, especially for women and girls. Daily access to clean water is necessary to satisfy basic needs of drinking, cooking, washing, and bathing—i.e., domestic uses of water. In rural areas, water is also critical for livelihood activities, such as horticulture and crop irrigation, livestock-raising, brick-making, and small-scale commercial activities. These activities increase a household’s income and food security. In peri-urban areas as well, water is necessary for a range of livelihoods (Kurian and McCarney [2010](#)). With rapid urbanization, urban agriculture is becoming particularly important (Zezza and Tasciotti [2010](#)): already in the 1990s, 15–20 % of the world’s food was estimated to be produced in urban areas (Armar-Klimesu [2000](#)).

### **What is water pollution?**

Water pollution can be defined in many ways. Usually, it means one or more substances have built up in water to such an extent that they cause problems for animals or people. Oceans, lakes, rivers, and other inland waters can naturally clean up a certain amount of pollution by dispersing it harmlessly. If you poured a cup of black ink into a river, the ink would quickly disappear into the river's much larger volume of clean water. The ink would still be there in the river, but in such a low concentration that you would not be able to see it. At such low levels, the chemicals in the ink probably would not present any real problem. However, if you poured gallons of ink into a river every few seconds through a pipe, the river would quickly turn black. The chemicals in the ink could very quickly have an effect on the quality of the water. This, in turn, could affect the health of all the plants, animals, and humans whose lives depend on the river.

The following lists display causes of water pollution and the effects it has on human health and the environment.

### **Causes of Water Pollution in Nigerian local communities**

- Sewage from domestic households, factories and commercial buildings Sewage that is treated in water treatment plants is often disposed into the sea. Sewage can be more problematic when people flush chemicals and pharmaceutical substances down the toilet.
- Dumping solid wastes and littering by humans in rivers, lakes and oceans. Littering items include cardboard, Styrofoam, aluminum, plastic and glass.
- Industrial waste from factories, which use freshwater to carry waste from the plant into rivers, contaminates waters with pollutants such as asbestos, lead, mercury and petrochemicals.
- Oil Pollution caused by oil spills from tankers and oil from ship travel. Oil does not dissolve in water and forms a thick sludge.
- Burning fossil fuels into the air causes the formation of acidic particles in the atmosphere. When these particles mix with water vapor, the result is acid rain.
- An increase in water temperature is caused by global warming and thermal plants that use lakes and rivers to cool down mechanical equipment.

### **Effects of Water Pollution**

- Groundwater contamination from pesticides causes reproductive damage within wildlife in ecosystems.

- Sewage, fertilizer, and agricultural run-off contain organic materials that when discharged into waters, increase the growth of algae, which causes the depletion of oxygen. The low oxygen levels are not able to support most indigenous organisms in the area and therefore upset the natural ecological balance in rivers and lakes.
- Old Roofs can cause pollution if they are not properly maintained. If water is being held on roofs the water can become polluted and then run down the home and cause more pollution to the water table. If you invest in a green roof from Allstate Roofing you can help reduce the water pollution from your home.
- Swimming in and drinking contaminated water causes skin rashes and health problems like cancer, reproductive problems, typhoid fever and stomach sickness in humans. This is why it's very important to make sure that your water is clean and safe to drink.
- Industrial chemicals and agricultural pesticides that end up in aquatic environments can accumulate in fish that are later eaten by humans. Fish are easily poisoned with metals that are also later consumed by humans. Mercury is particularly poisonous to small children and women. Mercury has been found to interfere with the development of the nervous system in fetuses and young children.
- Ecosystems are destroyed by the rising temperature in the water, as coral reefs are affected by the bleaching effect due to warmer temperatures. Additionally, the warm water forces indigenous water species to seek cooler water in other areas, causing an ecological damaging shift of the affected area.
- Human-produced litter of items such as plastic bags and 6-pack rings can get aquatic animals caught and killed from suffocation.
- Water pollution causes flooding due to the accumulation of solid waste and soil erosion in streams and rivers.
- Oil spills in the water causes animal to die when they ingest it or encounter it. Oil does not dissolve in water so it causes suffocation in fish and birds

Water pollution has a dual effect on nature. It has negative effects on the living and also on the environment. The effects of pollution on human beings and aquatic communities are many and varied. Water pollution causes approximately 14,000 deaths per day, mostly due to contamination of drinking water by untreated sewage in developing countries. An estimated 700 million Indians have no access to a proper toilet, and 1,000 Indians children's die of diarrhea every day and so many other countries too. Nearly 500 million Chinese lack access of safe drinking water. Definitely with all these, we can expect that there is going to be a reduction in productivity. Biomass and diversity of communities are to be expected when large amount of toxic materials are released into the streams, lakes and coastal waters in the ocean. Much of aquatic pollution involves sewage in which organic waste predominate. This waste can increase secondary productivity while altering the character of the aquatic community. Most fishes especially the species desired as food by man are among the sensitive species that disappear with the least intense pollution. Water pollution leads to damage to human health. Disease carrying agents such as bacteria and viruses are carried into the surface and ground water. Drinking water is affected and health hazards result. Direct damage to plants and animals nutrition also affects human health. Plants nutrients including nitrogen, phosphorus and other substances that support the growth of aquatic plant life could be in excess causing algal bloom and excessive weed growth. This makes water to have odour, taste and sometimes colour. Ultimately, the ecological balance of a body of water is altered. Sulphur dioxide and nitrogen oxides causes acid rain which lowers the PH value of soil and emission of carbon dioxide cause ocean acidification, the ongoing decrease in the PH of the Earth's Oceans as CO<sub>2</sub> becomes dissolved.

The effect of water pollution can be catastrophic, depending on the kind of chemicals, concentration of the pollutants and where there are polluted. Many water bodies near urban areas (cities and towns) are highly polluted. This is the result of both garbage dumped by individual and dangerous chemicals legally and illegally dumped by manufacturing industries, health centers, schools and market places. Eventually, humans are affected by this problem as well. People can get disease such as hepatitis by eating seafood's that has been poisoned. In many poor nations of the world, there is always outbreak of cholera and diseases as a result of poor drinking water treatment from contaminated waters.

### **Fresh Water Sources in the local communities of Nigeria**

Water is a basic resource that guarantees the life of all living beings on the planet. However, its scarcity and pollution cause millions of people to have poor access to this much-needed asset. Although there are processes such as water treatment or desalination that facilitate its treatment, use and consumption in areas with quality or supply problems, it is first necessary to avoid its contamination

Although the demand for fresh water is fast increasing at a rate greater than the world's population growth, access to safe water supply is a serious issue across the globe. Recent statistic indicates that 1.2 and 2.4 billion people suffer from lack of safe water supply and secure sanitation respectively. In many developing countries, Nigeria in particular, more than half of the population is affected. Water resources available in Nigeria can be broadly classified into fresh and marine water resources. The former constitute the fraction that should ideally be accessible to all communities. They comprise of water from lakes, hand dug wells, taps, boreholes, streams, rivers and their plains, wetlands and those available in underground reservoirs. Fresh waters represent the main sources of safe water for household, agricultural and even industrial applications. They are required for drinking, cooking, recreational activities, farming, fishing e.t.c, making them unavoidable for the evolution of society and civilization (Orubu, 2006). However, in Nigeria today the fresh water sources available to the local inhabitants are either unsafe or difficult to obtain and are severely stressed by poor management. These make access to clean water a serious problem, in some instances women and children need to walk for hours to fetch ordinary drinking water. Our preliminary survey between 2007 and 2010 indicates that, there are many villages that have never seen the so called "treated tap water" in their communities. Despite the scarcity and the foreseeable global water crisis as previously warned by the United Nations, the available domestic water in the communities is increasingly polluted daily. The estimated 140 million people are continuously drinking water containing all kinds of germs, heavy metals, bacteria and dust particles capable enough to cause various diseases.

### **The human being is the main responsible for water pollution**

Humans are the main cause of water pollution, which is triggered in many ways: by the dumping of industrial waste; due to temperature rise, that cause the alteration of water by reducing the oxygen in its composition; Or due to deforestation, which causes sediments and bacteria to appear under the soil and therefore contaminate groundwater.

In the same way, the pesticides used in agricultural fields filter through underground channels and reach the consumption networks; and also as a result of accidental spillage of oil.

Heavy metals poisoning is also a serious health and environmental problem, that in most Nigerian reports, results from absorption in contaminated water or via associated food. Recently Ibeto and Okoye (2010) as cited in the report of Galadima et al. (2011) conducted a study on 240 people, comprising of children, pregnant/nursing women and men in Enugu

state. Nickel, manganese and chromium were detected with concentrations exceeding the allowed limits permitted by WHO, in the blood samples of the respondents. The poisoning was generally believed to be occupational and water-based. In a related development, more than 400 children from seven villages around Gummi and Bukkuyum Local Government areas of Zamfara state, died from Lead poisoning within just six months in 2010. Medical experts' reports from the state Ministry of Health and Medicines Sans Frontiers (MSF) described the affected children to show devastating symptoms such as; "gastro-intestinal upsets, skin rashes, changes of mood; some were lethargic, some partially paralyzed, some had become blind and deaf. The worst affected were coming into the small Ministry of Health clinic with seizures that could last for hour and would sometimes lead to coma and then often to death.

### **The Way Forward**

It has clearly been established that, pollution of domestic water is an ongoing problem in most Nigerian communities, especially the government-ignored villages. The tragedy is seriously crippling human development, proper identification of preventive and control measures would be very useful.

The key ways forward in this respect are the proper education of local people on the important of water sanitation and good waste disposal methods, establishment of water treatment plants and good regulatory strategies. Adequate budgetary funding is therefore necessary. In the early democratic days (1946-1956), up to 15.1% of the national budget is expended on water supply by the colonial administration. With the exception of 1994, when 14.9 % was allocated, the percentage expenditure fell drastically. Although there are signs of improvement under the current Millennium Development Goals (MDG), low financing of water sector, in a country where 69 and 103 million people (more than half of the population) lack safe drinking water and adequate sanitation facilities respectively, is a great mistake with crippling consequences for human development and economic growth.

Oil pollution problems could be successfully addressed by ensuring that corruption-free "safety and operability procedures" are fully implemented by all oil stakeholders, lessons and program development options from United Kingdom (UK) offshore and onshore safety strategy would be very useful. Companies operating offshore are the major water polluters; they should therefore be forced to be practicing safety procedures similar to those in UK, where "safety case" and Health and Safety Executive (HSE) policies are efficiently applied. Where oil spill has already taken place, the best management and recovery options to ensure that reasonable risk assessment is carried out by experts and emergency procedures, involving the use of approved international techniques and equipments should be adopted. Lack of efficient law-enforcement instrument has significantly resulted to waste disposal into fresh waterways by sellers of different food and cosmetics in our markets. This could be fully addressed by improving awareness and ensuring total compliance with the applied laws and practices. Prosecution of defaulters would be very important here. As the current agricultural and environmental policies are either deficient on the laws governing the disposal of agricultural wastes by farmers or lack good enforcement mechanisms, the three tiers of government in the country should ensure that "effective agricultural waste disposal methods are promulgated". Farmer education through extension services and attractive media forums are required. Judicial measures could similarly be employed in certain complex cases. Fishers that adopt chemicalised-fishing system, polluting rivers and lakes, should be educated, treated with warm cautions and legal actions for defaulting. Regarding the diseases infection issues, adequate funding and proper health education in all communities are necessary. The current state of the system, involving very few "Community Health Extension Workers (CHEW)"

per locality should be fully funded and enhanced by ensuring that, many youths enrolled into community health studies. This could be achieved by standardizing Schools of Health Technologies, Nursing and Universities at large. A decision by UNICEF and many nongovernmental organizations gave emphasis also to improved water and environmental sanitation program. For example, diarrhea infection, the most childhood killer disease in Nigeria, can be successfully reduced by 50% if water quality is improved. Coupling sanitation (proper disposal of human and animal feces) with health education, improved water quality measures, enhanced hygiene techniques and adequate funding the disease could be a history. Conclusively, none of the aforementioned measures could yield any positive result, except the serious corruption problem in the country is addressed with full implementation, involving not only the poor but the leaders, wealthy and their associates (i.e. collective approach).

### **Conclusion**

Water pollution is an environmental problem that is of major concern to us in Nigeria and the world at large. Human contribution to water pollution is enormous by way of defecating; dumping of refuse, industrial wastes and washing of clothes etc. (Egilabor, 1998) apparently, environmental education is of immense importance to use particularly in schools and should have a place in the school curriculum. In this way they will be less inclined to pollute our waters.

### **Recommendations**

It is pertinent that environmental education is introduced in schools and be made compulsory. Federal, State and Local Government should establish agencies to monitor our environment and equally to be sure that our environment is kept clean and free from refuse dumps. Industrial homes or family should equally inculcate a hygienic environment particularly in their vicinity, according to be adage that says charity begins at home. Our industries should go advance in trying to recycle these wastes instead of dumping them for rain water to sweep these refuse into our rivers and streams making them undrinkable.

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