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WATER POLLUTION IN NIGERIA AND ITS EFFECT ON AGRICULTURE: A CASE STUDY OF NIGER DELTA

Kehinde Adeola OLUFUNKE¹

ABSTRACT:

THE PLANET KEEPS NUDGING US WITH INCREASINGLY EXTREME DROUGHTS, REMINDING US THAT WATER IS LIFE. WATER COVERS 70% OF THE EARTH'S SURFACE AND MAKES UP OVER 60% OF THE HUMAN BODY. IT IS AN ESSENTIAL RESOURCE UPON WHICH ALL LIVING BEINGS DEPEND AND IT IS CRUCIAL TO ALL SOCIAL AND ECONOMIC DEVELOPMENT AS WELL AS ENERGY PRODUCTION AND ADAPTATION TO CLIMATE CHANGE. WATER BODIES CAN BE POLLUTED BY A WIDE VARIETY OF SUBSTANCES, INCLUDING PATHOGENIC MICROORGANISMS, PUTRESCIBLE ORGANIC WASTE, PLANT NUTRIENTS, TOXIC CHEMICALS, SEDIMENTS, HEAT, PETROLEUM AND RADIOACTIVE SUBSTANCES. WATER IS UNIQUELY VULNERABLE TO POLLUTION. KNOWN AS A "UNIVERSAL SOLVENT", WATER IS ABLE TO DISSOLVE MORE SUBSTANCES THAN ANY OTHER LIQUID ON EARTH. IT'S THE REASON WE HAVE KOOL-AID AND BRILLIANT BLUE WATERFALLS. IT'S ALSO WHY WATER IS SO EASILY POLLUTED WATER POLLUTION AFFECTS MARINE ECOSYSTEMS, WILDLIFE HEALTH, AND HUMAN WELL-BEING. WATER POLLUTION IS AN INTERNATIONAL PHENOMENON AND ONE OF THE FUNDAMENTAL ISSUES IN MANY DEVELOPING NATIONS INCLUDING AFRICA. IT IS ALSO A NOTABLE ENVIRONMENTAL PROBLEM OF THE NIGER DELTA, NIGERIA. THIS PAPER INVESTIGATES THE PROBLEM OF WATER POLLUTION IN THE NIGER DELTA REGION, CAUSES AND SOURCES OF WATER POLLUTION, THE EFFECT OF WATER POLLUTION ON AGRICULTURE AND MADE RECOMMENDATIONS FOR SAME.

KEY WORDS: WATER, POLLUTION, NIGERIA, NIGER DELTA AREA, ENVIRONMENT

INTRODUCTION

British poet W.H. Auden² once noted, 'Thousands have lived without love, not one without water'. Water is a basic resource that guarantees the life of all living beings on the planet. In 2010, UN General Assembly through Resolution 64/292 recognized the right to safe and clean drinking water and sanitation and acknowledged that clean drinking water and

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² W.H. Auden (1957) First Things First. <https://www.google.com/url?q=https://genius.com/W-h-auden-first-things-firstannotated&sa=U&ved=2ahUKEwiSt7m1vZj1AhXKz4UKHccHBwYQFnoECAkQAg&usg=AOvVaw1gNmjV7But0NwydFIHvBna>. Accessed 4 January 2022

sanitation are essential for the full enjoyment of life and all human rights.³ However, its scarcity and pollution cause millions of people to have poor access to this much-needed asset. Unsafe water kills more people each year than war and all other forms of violence combined. Although there are water treatment processes such as drinking 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. The World Health Organization (WHO) says that polluted water is water whose composition has been changed to the extent that it is unusable.⁴ In other words, it is toxic water that cannot be drunk or used for essential purposes like agriculture, and which also causes diseases like diarrhea, cholera, dysentery, typhoid and poliomyelitis that kill more than 500,000 people worldwide every year. 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.⁵ Water pollution occurs when harmful substances, often chemicals or microorganisms contaminate a stream, or other body of water, degrading water quality and rendering it toxic to humans or the environment.⁶ Water pollution is a change caused in the chemical, physical or biological properties of the water that has the capacity of hurting the living organism. According to Lawrence Atsegbua, water pollution is another key aspect of environmental pollution.⁷ He further identifies the main type of water pollution in Nigeria especially in the riverine areas as oil pollution. In relation to this, Owa stated that water is polluted if some substances or conditions are present to such a degree that the water cannot be used for specific purpose.⁸ Damilola Olawuyi⁹ also defines water pollution as the contamination or change in the quality of water that has harmful effect on any living thing that drinks, uses or lives in it. Salu¹⁰ also posits that as a result of oil losses vast tracks of agricultural have been laid waste, thus becoming unproductive, surface water and river courses are invariably contaminated and polluted, rendering the water undrinkable. The result is great hardship for the inhabitants who become impoverished and deprived.

CLASSIFICATION OF WATER POLLUTION

Water pollution can be classified into two which include:¹¹

³ UN (2010) International decade for action 'water for life'2005-2015 https://www.un.org/waterforlifedecade/human_right_to_water.shtml, Accessed 4 January 2022

⁴ Melissa Denchak, (2018) Water Pollution : Everything you need to know <https://www.google.com/url?q=https://www.nrdc.org/stories/water-pollution-everything-you-need-know&sa=U&ved=2ahUKEwiHsaz2vpj1AhUuzIUKHXuiC5UQFnoECAQQAg&usg=AOvVaw3P-dDnDqcq5I9kpSzNs97E>. Accessed 4 January 2022

⁵ Suleiman H.A. & AbdulKadir H.,(2017) *Consequences of Water Pollution and the Way Forward Among Local Communities in Nigeria. The International Journal of Geography and Environmental Management*, Vol.3 No.3

⁶ Melissa Denchak, (2018) Water Pollution : Everything you need to know <https://www.google.com/url?q=https://www.nrdc.org/stories/water-pollution-everything-you-need-know&sa=U&ved=2ahUKEwiHsaz2vpj1AhUuzIUKHXuiC5UQFnoECAQQAg&usg=AOvVaw3P-dDnDqcq5I9kpSzNs97E>. Accessed 4 January 2022

⁷ Atsegbua, L.A.(2003) *Environmental Law in Nigeria. Theory and Practice*, (Lagos)

⁸ Owa F.D., (2013) Water Pollution: Sources, Effects, Control and Management. *Mediterranean Journal of Social Science* Vol.4 No.8 Italy

⁹ Damilola Olawuyi,(2012) Legal and Sustainable Development Impacts of Major Spill. *Consillence: The Journal of Sustainable Development*; (9) (1)

¹⁰ Abimbola O. Salu,(1999) Securing Environmental Protection in the Nigerian Oil Industry *MPJFIL* (3)(2);337

¹¹ Environmental guidance for your business in Northern Ireland & Scotland, <https://www.netregs.org.uk/environmental-topics/water/preventing-water-pollution/causes-of-water-pollution/> accessed November 3 2021.

- Point Source Water Pollution
- Diffuse Water Pollution

Point source water pollution occurs where pollution comes from a specific, identifiable source, such as sewage pipe or factory wastewater pipe.

Diffuse water pollution also known as the non-point source is caused by various sources, which are often hard to identify. Individual sources may be relatively small, but the combined effect of numerous sources can be damaging. Diffuse pollution has a greater impact on the water than any other source of pollution.

Trans-boundary pollution- a boundary line cannot contain water pollution on a map. Trans-boundary pollution happens when contaminated water from one country spilled into other countries' waters. It can result from a disaster like an oil spill or the slow, downriver creep of industrial, agricultural, or municipal discharge.

ISSUES THAT CAN ARISE DUE TO WATER POLLUTION.

There are three major areas to consider:

- **Health:** According to the United Nations, every year, there are more deaths caused by polluted water than all types of violence combined, including war. Waste from humans and animals that contaminates water carries bacteria and viruses that cause the spread of diseases such as typhoid, cholera and giardia
- **Environment:** All the species in an ecosystem rely on each other in order to survive. Outside substances, such as pollutants found in wastewater, can disrupt the complicated relationships between species that an ecosystem needs in order to survive.
- **Economy:** Polluted water can have many negative effects on the economy. It directly impacts sectors such as commercial fishing, recreational businesses, tourism and even property values, all of which rely heavily on clean water. Polluted water can also cause treatment costs to rise, which in turn makes the cost of drinking water rise as well.

CAUSES OF WATER POLLUTION

Water is one of the most important elements on earth when it comes to sustaining life. Unfortunately, it is also extremely susceptible to pollution. This is largely because water is a universal solvent that can dissolve many substances. Water pollution has damaging effects on the environments, humans, plants and animals. Pollution can occur if your business discharges substances into surface waters or groundwater without prior treatment or by accident, e.g after a spill. Humans are the main cause of water pollution, which is triggered in many ways and they include:¹²

- **Sewage or waste water;** The waste from households, factories or agricultural land gets discharged into rivers or lakes. This waste can either be in the form of liquid waste, garbage, or sewage. The harmful chemicals oozing out of this waste can damage aquatic life.
- **Dumping;** Most water bodies get converted into dumping grounds by nearby localities, and this cause a huge problem because the dump contains everything from plastic, aluminium to glass e.t.c. All these waste takes different time to degrade in the water, they tend to harm the aquatic life until degraded.

¹² Environmental guidance for your business in Northern Ireland & Scotland...

- **Oil pollution;** One of the worst types of water pollution is oil pollution. This is because the oil spills from tankers and ships tend to create a thick layer above the water in seas or oceans. The fact that oil doesn't dissolve makes the sludge stays forever.
- **Industrial waste;** Industries and industrial sites across the world are a major contributor to water pollution. Industrial waste is filled with lead, asbestos, petrochemicals, and even mercury. Industrial waste from agricultural sites, mines and manufacturing plants can make its way into rivers, streams and other bodies of water that lead directly to the sea. The toxic chemicals in the waste produced by these industries not only make water unsafe for human consumption, they can also cause changes in the temperature of the freshwater. In essence, all of these chemicals are highly hazardous for both humans and aquatic life.

GENERAL EFFECT OF WATER POLLUTION

- **Diseases:** in humans, drinking or consuming polluted water in any way has many disastrous effects on our health. It causes typhoid, cholera, hepatitis and various other diseases
- **Destruction of Ecosystems:** Ecosystems are extremely dynamic and respond to even small changes in the environment. Water pollution can cause an entire ecosystem to collapse if left unchecked.
- **Eutrophication:** Chemicals in a water body, encourage the growth of algae. These algae form a layer on top of the pond or lake. Bacteria feed on these algae and this decreases the amount of oxygen in the water body, severely affecting the aquatic life there.
- **Effects the food chain:** Disruption in food chains happens when toxins and pollutants in the water are consumed by aquatic (fish, shellfish, animals etc) which are then consumed by humans.¹³

EFFECT OF WATER POLLUTION ON AGRICULTURE

Water pollution is an appalling problem, powerful enough to lead the world on a path of destruction. Water is a natural solvent, enabling most pollutants to dissolve in it easily and contaminate it.¹⁴ The effect of water pollution is directly suffered by the organisms and vegetation that survive in water, including amphibians.¹⁵ On a human level, several people die each day, due to the consumption of polluted and infected water.

Developing means of farming and agriculture is the reasons human live in the world they do today. It is a necessary means of survival, without which there would be famines all over the world. Over the years, agriculture was a natural process that did not harm the land upon which it was practiced. As a matter of fact, farmers were able to pass down their land for many generations and same would still be fertile as ever. Modern agricultural practices, however, has caused the degradation of the ecosystem, land, and environment due to the modern-day-by-products of agriculture.

Water quality in agriculture, otherwise known as water pollution from and to agriculture, is a focus area for Food and Agriculture Organization of the United Nations

¹³ Environmental guidance for your business in Northern Ireland & Scotland...

¹⁴ Sources and causes of water pollution. <https://www.conserve-energy-future.com/sources-and-causes-of-water-pollution.php>. Accessed 4 November 2021.

¹⁵ Sources and causes of water pollution...

(FAO), under which different global and national projects and programs are identified.¹⁶ FAO looks at agriculture as a cause and victim of water pollution. The impact of agriculture on surface and groundwater is determined as negative. Agriculture accounts for 70% of total water consumption worldwide and is the single largest contributor of non-point-source pollution to surface water and groundwater. Pollution caused by agriculture can contaminate water, food, fodder, farms, the natural environment and the atmosphere. Pesticides and fertilizers used in agriculture can contaminate both groundwater and surface water, as can organic livestock wastes, antibiotics, silage effluents, and processing wastes from plantation crops. The pollution is always as a result of agriculture intensification. Agriculture intensification is often accompanied by increased soil erosion, salinity and sediment loads in water and by the excessive use or misuse of agricultural inputs such as fertilizers to increase productivity.¹⁷

With increasing demand for agricultural commodities, farmers are looking increasingly at non-conventional water sources of marginal quality including wastewater.¹⁸ Waste water however, can present an attractive option because of its high nutrient content especially when conventional water resources are lacking or scarce. The unsafe use of non-conventional sources of water, especially waste water in agriculture, can lead to the accumulation of microbiological and chemical pollutants in crops, livestock products, soil and water resources. Thereby, ultimately leading to severe health impacts among exposed food consumers and farm workers. It may also exacerbate antimicrobial resistance, if adequately treated and safely applied. In essence, waste water can be a valuable source of both water and nutrients.¹⁹

WATER POLLUTION AND NIGER DELTA AREA OF NIGERIA

Niger River Delta located in Nigeria supplies the economic necessities which situates it firmly in the Comity of Nations and sustains its enviable position in the world map as Africa's largest economy and the most endowed country of the world.²⁰ This natural endowment, which expectedly should have enhanced the regional peoples' welfare has unfortunately become a trouble. To say that the Niger Delta is suffering would be such a mild interpretation to the gross disaster which has been plaguing not just its human population but other inhabitants (all living creatures) of all other habitats. The Niger Delta is home to much of Nigeria's oil industry as about 2 million barrels of oil are extracted from the area each day and it has become the site of major pollution from hydrocarbons. Between 1976 and 2001, there were nearly 7,000 incidents involving oil spills. The spills contaminate the water, air and land with carcinogens like polycyclic aromatic hydrocarbons. A 2013 article estimates that widespread pollution from the spills could have an impact on crops and lead to a 24% increase in childhood malnutrition.²¹

¹⁶ Food and Agriculture Organization of the United Nations, 'Inspire action to achieve the 2030 Agenda (2017)'. <https://wateractiondecade.org/2017/12/09/water-pollution-from-and-to-agriculture/> Accessed 4 November, 2021.

¹⁷ Food and Agriculture Organization of the United Nations, 'Inspire action to achieve the 2030 Agenda (2017)'

¹⁸ Food and Agriculture Organization of the United Nations, 'Inspire action to achieve the 2030 Agenda (2017)'

¹⁹ Food and Agriculture Organization of the United Nations, 'Inspire action to achieve the 2030 Agenda (2017)'

²⁰ Abonyi Nicodemus Nnaemeka, Environmental pollution and associated health hazards to host communities (case study: Niger Delta region of Nigeria).

²¹ Ways to combat the Water Pollution in the Niger Delta Region. <https://tunza.eco-generation.org/ambassadorReportView.jsp?viewID=42806> accessed November 22nd 2021.

The major bulk of Nigeria's economic harvest comes from its Niger River Delta region no doubt. The core of the harvest according to widespread belief is its vital oil. Nigeria's Niger Delta region which is undoubtedly maximally endowed with the world's most sought-after natural resource has over time become the scene of crisis, wars, tears, sorrows and a theatre of blood. Health hazards from environmental pollution due to oil exploration, drilling and associated production activities have cut short many lives and often thrown the nation into the darkest sides of global news. In the Niger Delta's coastal communities, oil pollution of the marine environment has depleted the fishing and water resources that people have traditionally depend on for their livelihoods. This has led to a pattern of conflicts in the region since the late 1990s.²²

Pollutants constitute major threats to both plant and animal life. In man's living space, health and wellness are often determined by the safety of the environment, often affected by their activities. Environmental pollution implies issues with pollutants that alter the natural course of and adversely affect the environment. Pollution occurs in many ways which include but are not limited to air, water, land and noise pollution, etc. In Nigeria's Niger River Delta Region, lives have been endangered and lost in unquantifiable numbers due to health hazards emanating from environmental pollution. The activities in the oil sector which is the predominant economic activity of the region daily produce tons of environmental nuisance. Poor management of these wastes coupled with neglect for the sanctity of human life and other regrettable factors have seen the region clamoring for survival in more ways than one. These have become a grave threat to the region.²³ The major persistent environmental pollution problems bedeviling the Niger Delta come from two sources which are oil spillage and air pollution via gas flaring.

The Niger Delta region of Nigeria is facing a challenge of portable water supply. The region is bounded by the Atlantic Ocean to the south and has a huge network of water sources and vast reserves of oil and gas.²⁴ Drilling of boreholes and traditional dug wells to access underground water is meeting a new phase of challenge. Some areas are experiencing an increase in the salt content of their drilled water. This could be attributed to the nature of water aquifers and the rate of exploitation, which results to a reduction in thickness and the effective head of the freshwater wedge leading to salt water intrusion into fresh water aquifers.²⁵ Besides the intrusion of salt water, the indiscriminate discharge of refuse, untreated industrial waste and the proximity of septic tanks to drinking water sources are

²² Abosede Omowumi Babatunde (2020), How oil and water create a complex conflict in the Niger Delta; University of Ilorin.

<https://www.google.com/url?sa=t&source=web&rct=j&url=https://theconversation.com/amp/how-oil-and-water-create-a-complex-conflict-in-the-niger-delta-135105&ved=2ahUKEwi3nYD97fzzAhUYAWMBHc4UAcQQFnoECCoQAQ&usg=AOvVaw3-4btKM70DGYMNV019WAFz&cf=1>. Accessed 3 January 2022

²³ Abonyi Nicodemus Nnaemeka, Environmental pollution and associated health hazards to host communities (case study: Niger Delta region of Nigeria). (2020) *Central Asian Journal of Environmental Science and Technology Innovation vol 1 issue 1* https://www.cas-press.com/article_95591.html. Accessed 4 January 2022

²⁴ Likpoemugh Elo Imiete & Nadezda Viacheslovovna Alekseeva.,(2018) Reverse Osmosis Purification: A case study of the Niger Delta region. *Water Science* 32:1, 129-137 <https://www.tandfonline.com/doi/pdf/10.1016/j.wsj.2018.04.001>. Accessed 4 January 2022

²⁵ H.O. Nwankwoala & S.A Ngah ,(2014) Groundwater resources of the Niger Delta: quality implications and management considerations. *International Journal of Water Resources and Environmental Engineering* Vol 6 (5).

<https://academicjournals.org/journal/IJWREE/article-full-text-pdf/5FE7BD944836>. Accessed 4 January, 2022

some of the problems faced by the region. It is assumed that all the water sources in the region are contaminated or have the tendency of being contaminated in the future.²⁶

The dominant industry in the Niger Delta region, which is the source of water pollution is the petroleum industry. The country's crude oil contains heavy metals and contamination of water sources with hydrocarbons and heavy metals in part is associated with this industry.

GOVERNMENT'S RESPONSE TOWARDS WATER POLLUTION IN THE NIGER DELTA

The role of diverse local actors in environmental and conflict landscape have been downplayed by analysts and it is important to grasp how all the players (locals, oil companies and government) have contributed to the protracted insecurity.²⁷ Oil Spills, gas flaring, and other activities of oil companies have led to massive degradation of land and marine resources. Environmentalists and scientists have provided varying estimates of the magnitude and frequency of oil spills in the region.²⁸ Local people blame the oil multinationals and the Nigerian government for the environmental degradation, and feel they have not been properly compensated for its impact. However, communities have also developed conflicts within and between themselves over these issues.

The Nigerian government has failed to compel oil multinationals to adhere to local environmental protection regulations. This is not surprising since the government benefits from oil revenue, the mainstay of the Nigeria. The damage to the natural environment as a result of oil activities has exposed the region's people to poverty. The high rate of poverty in the Niger Delta in contrast to the enormous oil wealth has been clearly depicted in the 2015 United Nations' Multi-Dimensional Poverty Index.²⁹ Oil related activities have also damaged sources of clean water. This has fuelled conflict over the limited available especially the actions of aggrieved locals (including attacks on oil facilities and pipeline vandalism) have made the situation worse.

LAWS REGULATING WATER POLLUTION IN NIGERIA

Water supply is on the concurrent legislative list, which poses a challenge to coordination and definition of roles.³⁰ Presently, the following Federal laws, namely: Water Resources Act 1993, Minerals Act 1990, NIWA Act 1997, RBDA Act 1990 as well as state water Edicts and customary laws are relevant in the development and management of the nation's water resources. There are also institutional framework for water resources in Nigeria and they include;

²⁶ Likpoemugh Elo Imiete & Nadezda Viacheslovovna Alekseeva.,(2018) Reverse Osmosis Purification: A case study of the Niger Delta region. *Water Science* 32:1, 129-137

<https://www.tandfonline.com/doi/pdf/10.1016/j.wsj.2018.04.001>. Accessed 4 January 2022

²⁷ Abosede Omowumi Babatunde (2020)., How oil and water create a complex conflict in the Niger Delta; University of Ilorin.

<https://www.google.com/url?sa=t&source=web&rct=j&url=https://theconversation.com/amp/how-oil-and-water-create-a-complex-conflict-in-the-niger-delta-135105&ved=2ahUKEwi3nYD97fzzAhUYAWMBHc4UAcQQFnoECCoQAQ&usg=AOvVaw3-4btKM70DGYMNV019WAFz&cf=1>

Accessed 3 January 2022

²⁸ Abosede Omowumi Babatunde (2020)., How oil and water create a complex conflict in the Niger Delta

²⁹ Abosede Omowumi Babatunde (2020)., How oil and water create a complex conflict in the Niger Delta

³⁰ I.J. Goldface – Irokalibe Water Management in Federal and Federal –Type Countries: Nigerian Perspectives. <https://www.africaportal.org/publications/water-management-in-federal-and-federal-type-countries-nigerian-perspectives/>. Accessed 4 January 2022.

- The River Basin Development Authorities (RBDAs) which came into existence following the promulgation of Decree 25 of 1976. The current law on RBDAs is the RBDA Act Cap 396 Laws of Federation of Nigeria, 1990.
- The National Water Resources Institute (NWRI). Its enabling law is the NWRI Act, Cap 284 LFN 1990.

The following are list of Statutes on water resources in Nigeria:³¹

1. The Waterworks Act of 1915, shortly after Amalgamation in 1914 the law was passed specifically to keep water from being polluted. It prohibits the pollution of water in Nigeria by noxious or harmful matters.
2. The Minerals Act of 1917 (as amended) vests the Head of State of Nigeria with power to make regulations for the prevention of pollution of any watercourse.
3. The Public Health Act of 1917 prohibits the fouling of water and vitiation of the atmosphere.
4. The Oil in Navigable Waters Act, 1968 prohibits water pollution by oil spillage.
5. The Environmental Impact Assessment (EIA) Decree, No. 86 of 1992 seeks to protect the physical and aquatic environment.
6. The 1999 Constitution of the Federal Republic of Nigeria as amended.

There are other regulations on water resources in Nigeria and they include:

1. National Policy on Environment 1989 deals with the protection of the environment.
2. National Guidelines and Standards for Environmental Pollution Control in Nigeria 1991 – pollution control in watercourses as part of the environment.
3. National Effluent Limitation Regulation 1991 – control of discharge of industrial waste and sewage into watercourses.
4. Pollution Abatements in Industries and Facilities Generating Wastes Regulation 1991 – control of industrial pollution
5. Waste Management Regulations 1991 deals with waste management

CONCLUSION

Over time, water quality in many of Nigeria's watercourses (including creeks and lagoons) has deteriorated. Water quality deterioration in Nigeria is caused by the generation and disposal of residue by both producers and consumers. Consumable goods are produced and residuals, the byproducts that are not used in the process are often disposed of in water. Man's activities often generate wastes such as agricultural leachates, industrial (petroleum) discharges, sewage, disposable bottles and cans, carbon monoxide, newspapers, old motor vehicle bodies, and trash. All of these may end up in, and pollute water. Many of these wastes can and should be put to other valuable uses. When residuals are disposed of in the nation's watercourses, they cause a degradation of water quality and thereby may render the water unsuitable for other purposes.

RECOMMENDATION

The general welfare of the Nigerian nation requires that the water resources of the country be put to beneficial use to the optimum level of which they are capable; that wastage or unreasonable use or unreasonable method of use of water be prevented. Many reports have

³¹ Goldface – Irokalibe Water Management in Federal and Federal...

openly claimed that by 2025, two-thirds of the world will face water shortages. Half of the world's inhabitants will live in water scarce areas as every drop of polluted water today is an irreparable loss of tomorrow.

Likely the most effective way to reduce water pollution is by treating some of the water before it is reintroduced into the waterways. This is a highly effective solution because wastewater treatment facilities are able to remove nearly all pollutants in wastewater via a chemical, physical, or biological process. Sewage will be taken through several chambers of the facility to slowly reduce its toxicity levels.

Going further, to help reduce the amount of plastic waste that gets cycled into the environment, it's recommended that we avoid using plastics whenever possible. Therefore, we should seek alternatives for plastic bottles, plastic utensils, and straws. Whenever plastic is used, we should make sure it is recycled.

Nevertheless, let it be said that the best water resources law and environmental management strategy must be backed by effective regulation, enforcement and implementation in the field. Laws and regulations should be put in place to prevent, reduce and control pollution emanating from exploration and production of oil in the Niger Delta Area of Nigeria. The appointment of the Minister of Petroleum Resources should not just be political but should be a position occupied by an expert, for effective and efficient functioning. Monitoring committees/taskforce should be constituted by professionals in the field, to carry out inspections of facilities and operations since they are technical functions that require technical expertise.

Pollution of the water in the coastal areas should be viewed as crime against humanity, therefore a violation of human rights; this is because people living in the coastal areas depend on the waters for drinking, bathing, and fishing which is their major source of livelihood. Therefore, companies and individuals should be held liable for water pollution

An active oil industry bill is required to serve to protect and improve the coastal waters of Nigeria and the totality of the environment as stipulated under Section 20 of the Constitution of the Federal Republic of Nigeria. This provision should be made justiciable. The legislature, judiciary and the different agencies saddled with the responsibilities of safeguarding the environment must be ready to do all that is required to enhance sustainable practices, to manage the environment today and for the future generation.

Abbreviations:

EIA: Environmental Impact Assessment

NWRI: National Water Resources Institute

RBDA: River Basin Development Authorities

NIWA: National Inland Waterways Authority

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- 4 The Waterworks Act of 1915
- 5 The Minerals Act of 1917 (as amended)
- 6 The Oil in Navigable Waters Act, 1968