

THE ROLE OF LAW IN REDRESSING THE CHALLENGES OF WATER QUALITY FOR SUSTAINABLE DEVELOPMENT IN AFRICA

Irene, Airen Aigbe*
&
Eric Omo Enakireru

Abstract

The article examined the role of legal system in the regulation of water quality for sustainable development as a pattern of resources use that aims to meet human needs while preserving the natural environment so that these needs can be met not only in the present, but in the indefinite future, the term sustainable development was used by the Brundtland Commission which coined what has become the most often quoted definition of sustainable development as development that “meets the needs of the present without compromising the ability of the future generation to meet their own needs. The field of sustainable development can be conceptually broken into three constituent parts; environmental sustainability, economic sustainability and social-political sustainability. The research will impacts on governance for sustainable water resources, quality of water suitable for intended uses and also result in effective legislations prior to ascertainment of the quality of water sources. The article recommend and encourage planning, development, implementation and administration of water quality management policies and effective legal instruments for adequate protection of surface water for sustainable development through legislation guided by empirical facts.

Keywords: Water quality, environment, management, pollution, regulations

1. Introduction

Water is a universal resource which is often taken for granted and abused particularly in the third world nations like Africa where information is neither readily accessible nor disseminated to the society. Water quality is a term used to describe the chemical, physical, and biological characteristics of water, usually in respect to its suitability for an intended purpose. The role of legal system in redressing the issue of water quality for sustainable development is founded on effective legislations and this cannot be made without prior ascertainment of the quality of the water resources. The scope of the research is limited to environmental sustainability, water quality for sustainable development and seek ways in which the laws enacted would help us to achieve that desired goal. The desire learning outcomes of the research would have direct impact on different levels with coherent overview and review of the present legal regime on water quality, governance for sustainable development and the resultant impact on the overall society. These results and impacts include the followings; the impact is wide ranging and varied but include; legal impact, socio-economic impact, policy influence, change and environmental impact.

The principle of sustainable development is an international environmental law principle that has appeared in international environmental law scenes, to mitigate environmental pollution activities caused by industries and non-industrial activities. This work seek to examine the concept of sustainable utilization of environmental resources for the benefits of our future generation which has been metered down by developing countries and due to the quest for more energy by developed economies. The research seek to examine the problem of unsustainable use of water, water conservation, abusive use of water resource, methods of management of water quality, regulatory framework for water quality management, challenges militating against water quality management in Africa and sustainable development of natural resource in the environment with a view to proposing legal and institutional framework, for advancing water quality for sustainable development. The article critically examine but not limited to the following institutional framework governing best sustainable development principles, World Health Organization (WHO), European Community (EC), the Convention on Biological Diversity, the United Nation Framework for Combating Climate Change, the International Convention to Combat Desertification, the European Union Directives, the Environmental Impact Assessment Principle, the Montreal Protocol on Substances that Deplete Ozone Layer, and thereafter, recommend appropriate pragmatic and preventive policies and measures towards utilizations of sustainable environmental development in African.

The place of legal redress, regulatory provisions, judicial control for water quality and governance for sustainable development is a global concerns, over two third of the earth's surface is covered by water, and not more than a third is taken up by land and 97 percent of that water is saltwater. Only 3 percent is fresh, so as the earth's population increases, the people continue to put pressure on the planets water resources of our ocean, rivers and other inland waters are being squeezed by human activities- not only that they take up less room, but also their quality is reduced, poorer water quality which means water pollution endangering environmental sustainability and development in developing countries.

The purpose of this article are clearly outlines as follows:

- A. To explore a redressing measures that will advance water quality and governance for sustainable development by eliminating toxic or radioactive and waste that are considered hazardous to health and impairs the ecological system;
- B. To proffer legal remedies and policies combating the pollution of underground and surface water cause by industrial and non-industrial factors;

- C. To balance the conservation of nature's resource with the need for development which means improving the quality of human life while living within the carrying capacity of supporting ecosystems;
- D. The need to proffer an integrated, coherent and a more robust all-encompassing framework and a well-focused water quality regime to serve as core principle legislations in developing economies;
- E. To strengthen institutional capacity to execute effective principal enforcement of legal provisions relating to water quality for sustainable development.¹

2. Conceptual Framework

Water is a universal resource which is often taken for granted and abused. This view is true, particularly in the third world nations like Africa where information is neither readily accessible, nor disseminated to society. Abundant as it may seem, water in its clean state, is often hard to come by². Therefore; water quality is a term used to describe the chemical, physical and biological characteristics of water, usually in respect to its suitability for an intended purpose.³ These characteristics are controlled or influenced by substances which are either dissolved or suspended in water; scientific measurements are used to define the quality of water because it is not a simple thing to conclude that "this water is good, or "this water is bad" it is also instructive to note that the quality of water needed or required to wash cars; plates, clothes etc. is not the same quality that would be required for drinking.

Water quality refers to the physical chemical and biological characteristics of water⁴. It is a measure of the condition of water relative to the requirement of one or more biotic species to any human need purpose⁵. The water quality is mostly

* **Irene, Airen Aigbe** (Mrs.) B.A (Hons), MBA, LL. B (Hons), LL.M, B.L (Hons) Lecturer, Department of Business Law, Faculty of Law, University of Benin. Email: Irene.aigbe@uniben.edu or irene_aigbe@yahoo.com Telephone 08023271876, 07055744758

E. O. Enakireru, PhD, Lecturer, Delta State Polytechnic, Otefe- Oghara. E-mail: ericomo61@yahoo.com, 08050617977, 07062041722.

¹ Accordance with the requirement of agenda 21.

² D.O. Omole & E.O Longe,. "An Assessment of the Impact of Abattoir Effluents on River Illo, Ota, Nigeria" (Journal of Environmental Science and Technology, 1(2008), 54 – 56.

³ N. Diersing "Water quality frequently asked questions" Available at <http://floridakeys.noaa.gov/scisummaries/wafag.pdf-Floriday> Keys national Marine sanctuary, key West, ft accessed 21st January 2020.

⁴ N Diersing. "Water Quality frequently asked questions ibid note 13.

⁵ D.L Johnson and Others. "Meanings of Environmental Terms" Journal of Environmental quality

used to refer to a set of standards against which compliance be assessed. The mostly used of the standard is one that relate to health of the ecosystems, safety of human contact and drinking water content. However, in Nigeria the water quality standard acceptable is the one, the state adopted and complied with National standard and regulations Enforcement Agency Act (NESREA) and its regulations approved ambient standards for water bodies. The standard covers the use of the water body and the water quality criteria which must be met.⁶ Water quality criteria means elements of the water quality standard expressed as constituent concentration levels or narrative statements representing a quality of water that supports a particular use⁷. Water can be soft or it can be hard in quality so, there are different qualities of water, depending on the source of such water; and it sorely depends on the amount of magnesium or calcium salts water contains⁸.

The management of water quality standard are those rules, policies, regulations and laws set out for the effective monitoring, supervision, maintenance and implementation of water quality standard. The setting of standards; shows that agencies make political and technical/scientific decisions, about how the water will be used, different uses raise different concerns and therefore different standards are considered⁹. That is why law makers and environmental lawyers work to define legislation with the intention that water is maintained at an appropriate quality for its identified use¹⁰.

The vast majority of surface water on the planet is neither potable nor toxic. This is a fact, even when the salty seawater is not counted. Therefore, the quality standard will depend on the designated use. The water quality criteria are developed by scientists and provide basic information concerning the effects of water pollutants on specific water. These criteria are based on variables that characterize the quality of water, the bottom sediment and the biota. These quality criteria set a maximum level for the concentration of a substance in a particular medium such as

(USA) Lonsbon print 1997 in www.futo.edu.ng/school/c/health/public accessed 29th January, 2014.

⁶ Regulation 35 of National Environmental (surface and Ground Water Quality) Regulations 2011.

⁷ *Ibid.*

⁸ M.A. Rosalind. Guidebook to Environmental Law (London; Sweet & Maxwell, 1994) 169.

⁹ <http://www.businessdayonline.com/NG/Index.php/analysis/editorial/34814-need-for-quality-drinking-water-in-nigeria> accessed 20th January, 2020.

¹⁰ *Ibid.*

water, sediment, biota) which will be harmful when a specific medium is used continuously for a single specific purpose.

3. Causes of Poor Water Quality

In Nigeria, there are number of activities that could result in the causes of poor water quality, water resources are divided into two broad categories, the surface and the ground water. Surface water is found in the lakes, rivers, and streams and is drawn into the public water supply by an intake. This water is usually not high in mineral content, and is often called soft water. Surface water is exposed to many different contaminants, such as animal waste, pesticides, industrial waste and others, while groundwater is located underground in large aquifers and must be pumped out of the ground after drilling a deep well. Surface water causes are contamination which has to do with the improper disposal and handling of toxic waste, improper disposal of sewage, indiscriminate dredging activities and improper use of agricultural fertilizers and pesticides. Instances of the foregoing can be inform of effluents from brewery industry, soap and detergent industry, pharmaceutical industry; paper mill industry, textile industry, palm oil industry, oil companies. Other instances are effluents from abattoir or livestock farm housing estates, hotels; commercial facilities, waste management facility and hospitals. Effluents are waste water generated by industries as a result of their operation and processing¹¹.

Under the ground water causes we have the ground water contaminant and toxic waste¹². This pertains to abusive utilization of ground water such as indiscriminate drilling of boreholes especially close to pit toilet, mining activities burning of refuse amongst other. One very important feature of the ground is that it is recharged by water that infiltrates at the earth's surface and percolates down through the earth to the water table while percolating particulars including bacteria and other microbes are generally filtered out. This makes most ground water suitable for drinking. However, the water tends to carry materials that dissolve as it percolates through the earth, because the ground soil is not fine enough to remove industrial ions or molecules as the water passes through it.

¹¹ K. Iyeoma et al, "Industrial Effluents and their Impact on water Quality of receiving Rivers in Nigeria" <http://www.trisanita.org/jades> (accessed 21st January, 2020).

¹² S Yang., Strategies for Controlling Industrial Waste water pollution in Beijing in the urban Environment (U.S.A Library Congress, 1995) 166.

It is not worthy that any chemical or material that is used, disposed of or stored in the earth has potential to dissolve and be carried by percolating water contaminate ground water. With this fact, then it will not be difficult to recognize that there are innumerable sources of chemicals threatening ground water.

However, there are a number of toxic chemical sources currently recognized as the most threatening and they are:

- A. Inadequate landfills or other unprotected facilities where chemical waste have been dumped or disposed of and from which may leach or escape into the ground.
- B. Leaking underground storage tanks or pipelines
- C. Pesticides and fertilizers used in agriculture or on lawns and gardens.
- D. Sewage or waste water
- E. Transportation spills and oil spills from oil companies.

3.1 Sewage and Water Quality: - sewage effluent in water consumes a lot of oxygen into the course of its decaying process and as it decays it use up a lot of oxygen and so the oxygen will not be enough for the fish that are competing with the decaying leaves and thereby, leading to their death. Water quality can degrade due to this reason of the presence of sewage effluent in water. This is one reason when pollution of the rivers occurs, the fish are subsequently found floating on the surface. It should be noted that sewage sludge contains residue matter which might be harmful to living things¹³.

3.2 Abattoir Effluents and Water Quality: - In Nigeria, Abattoir industries provide livestock's meat for about 150 million people, but the facilities for the treatment of abattoir effluents are lacking, in Nigeria just like every other developing countries, but unlike the developed countries where these facilities are adequately provided for among other¹⁴. Nevertheless, potential risk from water borne pathogens can exist in water contaminated by abattoir effluent, run off, feed lots dairy farms, grazed pastures, fallow with poultry litter, and sewage sludge¹⁵. Much contamination of water bodies by abattoir waste discharged into water bodies can subsequently be absorbed to sediments and when the bottom stream is disturbed

¹³ *Ibid* at note 8

¹⁴ C Obgonnaya, Analysis of groundwater pollution from abattoir waste in Minna, Nigeria Research Journal of Dairy Science Vol. 2 No. 4, 74 – 77 2008.

¹⁵ WD Nafarnda and A. Yaji and HI Kubbomawa, "Impact of abattoir waste on aquatic life a case study of Yola Abattoir" Global Journal of pure and Applied Sciences (2006) vol. 12. 31 – 33 in <http://www.lexology.com/library>. Accessed 21st January, 2020.

the sediment releases the bacteria back into the water column which constitute significant environmental pollutions and public health Hazards¹⁶.

3.3 Agriculture and Water Quality: - water bodies such as rivers, lakes, reservoirs, groundwater and marine water may be polluted by agricultural activities which could give rise to contamination of drinking water, and also have harmful effects on aquatic ecosystems, resulting in damage to aquatic organism. Farming practice has a lot of impact on water quality; also the impact is always very significant, it includes spreading fertilizers and livestock manure across fields and small livestock farms. Nutrient such as oxygen and phosphorus from fertilizers and livestock pesticides, soil sediments, salt and pathogens are the main pollutants transmitted into water bodies from agriculture, through soil run off and leaching but also discharge from livestock operations and irrigation systems.

4. Abusive Use of Water Resources

In Nigeria, due to illiteracy and lack of information and enlightenment of the citizenry, there are a number of activities that result in the abusive use of water resources and they include the following:

4.1 Indiscriminate Drilling of Bore holes:

Due to the failure on the part of government to provide portable drinking water to the populace in Nigeria, boreholes drilling are fast becoming a common place in our everyday life. This is why mostly in the urban areas (big cities), almost everybody or house has a borehole facility attached to it. This undoubtedly led to a number of problems, such as underground water pollution for example; the permission of the relevant authority is not sought before sinking the borehole; and the right drilling depth not known and some are sunk very close to pit toilets and septic tanks which poses danger to lives and property.

4.2 Improper Waste Management:

The improper disposal of waste products from our homes, offices could contaminate nearby water. This is so, because, most waste management companies lack the requisite equipment to properly treat these waste before disposal. Dumping sites also, ought to get approvals before they are used for a particular type of waste.

¹⁶ Water Servicing the Abattoirs were from boreholes, well and streams water at Deidei Karu and Kuje abattoirs, while borehole and well water was discharged directly into water bodies as used at Gwagwalada and Kubwa abattoirs and these discharges into streams, rivers and drainage that are used for drinking, bathing, washing of clothes, home utensils, watering of crops and animals and other domestic purposes Downstream of a close distance near the abattoir.

Clear instances of such wastes are waste water, solid waste, electronic waste, the disposal of these wastes could constitute groundwater pollution. The implication of this is the attendant hazard it could pose on human health. Where such waste are dumped on water causes, it could constitute real threat to the existence of aquatic life¹⁷.

4.3 Oil Spills in the Oil Industry:

Oil spill is one of the major sources of water pollution in the Niger delta, cause by equipment failure, oil theft, sabotage ruptured pipelines etc. the consequence of oil pollution in our waters are devastating. It is capable of destroying the entire aquatic biodiversity. According to late professor Ambrose Alli:

... as a result of oil loses, vast tracts of agricultural land have been laid waste, thus becoming unproductive, surface water and river causes are invariably contaminated and polluted rendering the water undrinkable, and the aquatic life is destroyed. The result is great hardship for the inhabitants who become impoverished and deprived. These unfortunate citizens are therefore compelled to migrate to other towns and villages in search of decent life¹⁸.

The world population had tripled within the past century, while the global demand for water has increased six fold¹⁹, today, more than a billion people lack safe drinking water and almost half a billion live without access to sanitation system²⁰. Also, half of all ill health suffered by people in developing countries is caused by lack of access to clean water and sanitation²¹.²² Water is very important to public

¹⁷ Onne, Port Harcourt, Nigeria: Industrial Effluent containing a high level of ammonia from NAFCON, a fertilizer company, was discharged into the Okrika river, this resulted in massive fish killing and Socio-Economic problems for the fishing industries in the surrounding villages. Over ₦30 million compensation was claimed.

¹⁸ See late professor A.F.Alli "Ceremony Opening address" in the petroleum Industry and the Nigerian Environment proceeding of the 1981, international Seminar in Port Harcourt, Nigeria p. 2.

¹⁹ UNFPA, Population Issues (1999) "Population and sustainable development" at www.unfpa.org/modules/6_billion/populationissues/development.htm. accessed 22nd January 2014.

²⁰ UNDP, Millennium Development Goals, at <http://www.undp.org/mdg>. accessed 22nd January, 2014.

²¹ UNDP Human Development Report, 2006; Beyond Scarcity: power, poverty and the Global water crisis JMP2004 (WHO/UNICEF). Report of the UN Integrated Task force on Gender and water o\at the 12¹ session of the commission on sustainable development, April, 2014.

health need. Therefore, without water human beings cannot live more than a few days. Because of the importance of water, water must be accessible and safe²³ because contaminated water, whether such water is drink or used in cooking of food, will certainly impact negatively on people's health²⁴.

5. Water Quality Management in other Countries

5.1 United State of America

Various sources of effluent which includes industries, business, sewage plant etc were set up as standards²⁵ for Clean Water Act in 1979 and Water Pollution Act in the United States of America²⁶.

Also, the Safe Drinking Water Act (SDOVA) of 1974 was passed to protect the public from the risk of toxic chemicals contaminating drinking water supplies due to non-secure disposal of toxic waste amongst others., without the right monitoring of the water supply, and if specified toxic chemicals are found in the water; supplies may be closed until adequate purification procedures are adopted or until pollutants are flushed out in order to protect the people.

The Clean Water Act of 1979 was created to prohibit the discharge of pollution without permit issued under the National Pollutant Discharge elimination System (NPDS) by the Environmental Protection Agency (EPA)²⁷. This Act is based on pollution control program mandated to set goals for a water body by designating its uses, setting criteria to protect those uses and establishment provisions such as anti-degradation policies to protect water bodies from pollutants²⁸. Section 304(1) of the Clean Waters Act (CWA) provides guidance for states and tribes to use in adopting water quality standards²⁹.

²³ Right to Water. World Health Organization for human Rights Health and human rights publication series. No. 3 world Health organization 2003 p. 6.

²⁴ J. Scamlon, and A. Cassar and N. Nemes. Water as a human Right. Paper presented at the IUCN/UNEP Western European Judges Symposium, Rome, Italy and the IUCN/UNEP Eastern and Central European Judges Symposium, Iviv Ukraine (May 2003) p. 105.

²⁵ Such as Best Practicable Technology (BPT) currently available, Best Conventional Pollutants Control Technology (BCT) Water Quality Based Effluent Limited (WOBEL).

²⁶ <http://www.lexology.com/library>, accessed on 20th January, 2020

²⁷ www.eng.gov/satech/surguidance/standards/index. water quality standards for surface waters – USA accessed January 19th 2014.

²⁸ National Recommended water Quality in www.epa.gov/waterscience/criteria/wgenteria.htm accessed 20th January 2020.

²⁹ Standards, Risk Management at www.epa.gov/ogurdw/standard accessed 20th January, 2020.

Unlike Nigeria NESREA regulations, the USA (EPA) uses the best available technology in attaining their standards. They also set rules for testing, schedules and methods that water system must follow³⁰. Under the comprehensive Environmental Response Compensation and Liability Act of 1980 which was popularly called superfund; had a cleanup initiative, where by the polluting companies pay tax and fund is provided for clean up in the event of pollution.

5.2 The United Kingdom

In United Kingdom; the Drinking Water Inspectorate was formed in 1990 to provide independent re-assurance that water supplies in England and Wales are safe and the water quality acceptable to consumers. The Inspectorate also provides independent scrutiny of water company activities for drinking water to consumers in England and Wales. They have the power to take samples of water or effluent which may later be used as evidence in court to substantiate a criminal case³¹. However, in the United Kingdom, the Environmental Agency in 1998, successfully prosecuted 262 cases of which 185 incidents occurred; representing about 1% of the total number of substantial water pollution incidents. Under the strict liability of water pollution, the defendant cannot put up a successful defence due to the strict liability laws/rules, the vast majority of cases of the Environmental Agency Secures Conviction³².

6. Regulatory Framework for Water Quality Management in Nigeria

There are a plethora of regulatory laws enacted in order to ensure sustainability of water quality in Nigeria. Consequently, most of these offences have been criminalized and appropriate penal sanctions and fines imposed. This is to identify offenders, prosecute these offenders and convict them, and ultimately send them to jail as a deterrent³³ to others who will want to flout the laws. Specific provisions that aim to deter water pollution are highlighted below:

³⁰ S. 108 of EA 1995. See also W. Syman. *et al*, principle of Environmental Law (London. Cavendish publishing Limited 2005) 3rd edition p. 86.

³¹ See press release on seventh rent water limited. Pleads guilty to multiple offences of water supply in 13th September 2012. www.dwi.gov.uk. Accessed 20th January 2020.

³² Cap. H, LFN 2004.

³³ *Ibid*, note 1.

6.1 The National Environmental Standard and Regulations Agency (Establishment) Act ³⁴

The National policy has by its Regulation 2 been given the responsibility for the protection and development of the environment, biodiversity conservation and sustainable development of Nigeria's natural resources in general and also on matters of enforcement of environmental standards, regulations rules, and laws.³⁵ Under regulation 7(d)³⁶ the function of the Agency includes to enforce compliance with policies, standards legislation and guidelines on water quality, environmental health and sanitation, including pollution abatement. Also by Regulation 7(f)³⁷, it is mandated to enforce compliance with any legislation on sound chemical management, safe use of pesticide etc. furthermore in Regulation 8(d)³⁸ the Agency shall have power to prohibit processes and use of equipment or technology that undermine environmental quality.

In line with all these the agency shall in Regulation 8(k)³⁹ submit for the approval of the minister, proposals for the evolution and review of existing guidelines, regulations and standards on environment other than in oil and gas sector including among others effluent limitations water quality, waste management and environmental sanitations, erosion and flood control coastal zone management, other forms of pollution and sanitation and control of hazardous substances and removal control methods.

In order to ensure proper management the agency furthermore by regulation 29⁴⁰ shall consult and cooperate with other government agencies for the removal of any pollutant excluding oil and gas related of any pollutant excluding oil and gas discharged into the Nigerian environment and shall enforce the application of best clean up technology currently available and implementation of best management practices as appropriate.

³⁴ Known as the (NESREA) ACT 2007.

³⁵ Regulation 2 (NESREA).

³⁶ Regulation 7(d) NESREA.

³⁷ Regulation 7(f) NESREA.

³⁸ Regulation 8(d) NESREA.

³⁹ Regulation 8(k) NESREA.

⁴⁰ Regulation 29 NESREA.

Still further under part vii⁴¹ - miscellaneous provisions, Regulation 30(1) – (5) (a) (b)⁴² specifies monitoring ways in which an officer of the agency can enforce compliance with these regulations which includes among others to enter, search, examine and carry out analysis, take a sample or specimen, seize and detain, obtain an order of the court for the purpose of monitoring the policies and regulations spelt out.. All these other pollution abatement regulations are related and intertwined to ensure the proper management of water quality standard, for example it therefore means that proper control of effluent from chemical, pharmaceutical, soap and detergent manufacturing industries will lead to increase in the efficiency of management of water quality standard in the environment etc. Some of these regulations are; National Environmental (Chemical, Pharmaceutical Soap and Detergent manufacturing Industries) Regulation 2009⁴³.

This Regulation by its Regulation 12 specified that no facility under this shall discharge, because to be discharged any effluent, or oil, in any form, into water system, public drains or underground injection and land without a permit from the agency. Regulation 12(d) that no facility shall release hazardous waste or toxic substances in the water of Nigeria’s ecosystem beyond the permissible limits Schedule 1 provides for parameter of chemical content unit and maximum permissible limits which effluent must comply with before it can be discharged into water bodies⁴⁴. Regulation 13 states that there shall not be contamination arising from leakage of surface or underground oil or fuel, or chemicals storage tank likely to cause pollution of the environment including surface water and ground water. All these discharge are however must be treated (there must be prior treatment⁴⁵.

6.2 National Environmental (Surface and Ground Water Quality control) Regulations 2011⁴⁶

It is important to state here that in order to enhance the standards for water quality as specified under the Act, the Honorable Minister for Environment in exercise of the powers conferred on him by section 34 of the Act made this regulation the purpose of this regulation is to restore, enhance and preserve the physical, chemical

⁴¹ Part vii NESREA.

⁴² Regulation 30(1) – (5) (a) – (b) NESREA.

⁴³ Statutory Instrument No. 36 of 2009.

⁴⁴ Regulation 18, 50(1) etc. NESREA.

⁴⁵ Regulation 17(4) NESREA.

⁴⁶ Statutory Instrument No. 22 of 2011.

and biological integrity of the nation's surface waters and to maintain existing water uses⁴⁷.

This regulation provides for standards for the protection of surface waters from pollutants. It prohibits the discharge of pollutants, urban runoff, hazardous waste and hazardous substances and also oil, petroleum products, solvents, discharges from sewage into Nigeria waters except in compliance with Regulation and with the approval of the Agency⁴⁸. According to Regulation 6, 7 and 8, which spelt out activities that amounts to violation of water quality standards, activities that would cause degradation of the water qualities is also prohibited and new discharges will be allowed as far as they don't impair existing uses and attainment of designated uses. For example, new discharges into water that are not drinkable water can take the form of discharge of storm water⁴⁹.

Regulations 32(1)(2)(3) and 33(1)(2)(3) and (4) provides for enforcement processes of the regulations which include service of improvement notice on the offender ordering compliance with the provisions of the regulations, Regulation⁵⁰ 34(1)(2)(3) provides for offences and penalties on offenders. Regulation 34(2) provides that any person who contravenes any of the provisions of these regulations commits an offence and on conviction shall be liable to fine not exceeding one year or to both such fine and imprisonment where the offence is committed by a corporate body, it shall on conviction be liable to a fine not below 500,000 and to an additional fine of 10,000 for each day the offence subsists.

It is instructive to note that the penalties provided for, under the regulations is well improved on as compared to that of NESREA Act⁵¹. Where the maximum fine was 50,000 naira which of course is ridiculous vis a vis the hazards posed by the offence committed. The 200,000 naira penalty provided for under the Regulation⁵², yet enough to deter offenders considering the health implications posed by such violations and hence the subsistence of poor water quality in Nigeria.

⁴⁷ Regulation 1.

⁴⁸ Regulation 13 of National Environmental (Surface and groundwater quality control) Regulations, 2011.

⁴⁹ *Ibid*, note 48 Regulation 6, 7, 8 and 10.

⁵⁰ Regulation 13 of National Environmental (Surface and groundwater quality control) Regulations; 2011.

⁵¹ NESREA Act, 2007.

⁵² Regulation 13 of National Environmental (Surface and ground water quality control) Regulations; 2011.

However, the effectiveness of the agency with regards to water management has not been very impressive, as the agency had been affected with so many factors including under funding and the dearth in technical expertise and man power⁵³. Regulation 22(7) prohibits pollution of underground water through disposal of water by landfills or barrow pit. Also Regulation 24, states that in order to ensure safe drinking water, permit has to be gotten from the agency before drilling of boreholes or wells. This is to eliminate the consequences of rampant abandonment of wells/boreholes, barrow pits, which act as direct paths for contaminants to reach underground and percolates and adversely deteriorate the quality of ground water within and outside the vicinity of the abandonment.

Section 34(1 – 3) provides for offences and penalties, that a person who contravenes or fails to carry out any requirement of the improvement notice commits an offence and shall on conviction be liable to fine not exceeding ₦200,000 or for a term of imprisonment not exceeding one year or to both such fine and imprisonment, but where the offence is committed by a corporate body, it shall on conviction be liable to a fine not below ₦500,000 and to an additional fine of ₦10,000 for each day the offence subsists.

6.3 National Environmental (Soil Erosion and Flood Control) Regulation 2011⁵⁴

The major objectives of these regulations is to control soil erosion, flooding and sediment deposition in water bodies and water sources in order to prevent pollution of these water bodies⁵⁵ and also specifically to protect water and habitat quality in all water courses and bodies from silt laden water to ensure free flow of rivers, streams etc. throughout the country⁵⁶.

The agency shall enforce all storm coater management programmes through⁵⁷:

- a) Establishment of procedures for public participation and

⁵³ A.A Adedej. and R.T. Ako, Hindrances to effective Legal Response to the problem of Environmental Degradation in the Niger Delta, *Nnamdi Azikiwe University Law J.* 5(1) 2005. 437.

⁵⁴ Statutory Instrument no 12 of 2011.

⁵⁵ *Ibid* regulation 2 (c).

⁵⁶ *Ibid* note 83 Regulation 2(4) (f).

⁵⁷ *Ibid* note 83 Regulation 6(3).

- b) Monitoring and ensuring compliance with the flood and erosion technical guidelines⁵⁸ set out by the federal ministry of Environment (2005) and any amendment thereof.

Section 19(1) – (2) is the offences and penalties section, which provides for any person who violates any of the provisions of these Regulations commits an offence and shall on conviction be liable to a fine not below one million naira (₦1, 000,000) or to imprisonment for a term not exceeding two years or to both such fine and imprisonment and an additional fine of ten thousand naira (₦10, 000) for everyday the offence subsists. For a corporate body that violates any of the provision of these regulations, shall on conviction, be liable to a fine not below five million naira (₦5, 000,000) and an additional fine of fifty thousand naira (₦50, 000) for everyday the offence subsists. And the offender shall be responsible for the remediation of the damage to the environment and for any affected properties therein

6.4 National Environmental (Textile, Wearing apparel, Leather and Footwear Industry, Regulations 2009

In line with water management and quality of water,⁵⁹ Regulation 12 states that there shall not be contamination arising from leakage of surface or underground oil fuel or chemical storage facility likely to cause pollution of the environment including the surface water and groundwater⁶⁰

6.5 . Petroleum Act:

this stipulates that licensee⁶¹ or lease shall adopt all practicable precautions including the provision of up to date equipment approved by the Director of Petroleum Resources to prevent the pollution of inland waters, rivers, water courses, territorial waters of Nigeria by oil and or other fluids or substances that might contaminate the water bank or shore line or might cause harm or destruction to fresh water or marine life and where such pollution occurs or has occurred prompt steps have to be taken to control it⁶².

⁵⁸ The Federal Ministry of Environment of Works in line with NESREA in some areas to ensure and protect the environment.

⁵⁹ Statutory Instrument No. 34 of Regulation 2009.

⁶⁰ See Regulation 11(2) (d) 7, 15(1), 2(a), 8,16 (1), 17(1), 2(d), 49(b). penalties for offence has been spelt out under the penalty part.

⁶¹ Cap p.10 LFN 2004.

⁶² Regulation 25 of Petroleum (Drilling and productions) Regulation 1969.

7. Challenges Militating against Water Quality for Sustainable Development

Despite the plethora of regulatory laws meant to regulate/protect water quality for sustainable development in Nigeria, water quality remain poor and unabated, this is due to the following:

7.1 Poverty and Corruption

The staff monitoring and collecting samples are often bribed by individual and corporation which they willingly accept or forcefully demand for at the expense of their responsibilities to protect the environment.

7.2 Lack of Awareness and Poor Public Enlightenment

Stakeholder's involvement in the process of environmental monitoring and management is not practically involves despite the fact that the provision of the laws recognized their input. Investigation will reveal that never at any time have regulatory agencies embarked on any form of periodic collection of samples or data or environmental management programme in the communities. The provision of the Environmental Impact Assessment (EIA) Act and the NESREA regulations on public participation and review of draft of EIA documents stipulating how environmental monitoring should be done are often bye-laws, local communities do not have access to environmental studies documents stipulating how environmental monitoring should be done to prevent pollution.

7.3 Improper Waste Management

The Improper disposal of waste products from our homes, offices, industries etc could contaminate nearby water. Most waste management companies lack the requisite equipment to property treat these waste before disposal. Dumping sites ought to get approvals before they are used for a particular type of waste. Examples of such wastes are waste water, solid waste, and electronic waste. The disposal of such waste could also constitute ground water pollution. The implication of this is the attendant hazard it could pose on human health, where such waste is dumped on water causes, it could constitute a real threat to the existence of aquatic life⁶³.

⁶³ O. Obinna the State of Environmental Monitoring in Nigeria. A case study of Niger Delta a thesis report Submitted to the Environmental Policy group Environmental Science. Wageninten University in Partial Fulfillment of requirement for the Award of Masters of science (M.Sc.) Degree. September 2011 also see in [www.wur.academiaed/ObinnaOkafor/prayers/the state of Environmental monitoring in Nigeria and ways to improve its case study of Niger Delta](http://www.wur.academiaed/ObinnaOkafor/prayers/the%20state%20of%20Environmental%20monitoring%20in%20Nigeria%20and%20ways%20to%20improve%20its%20case%20study%20of%20Niger%20Delta) (accessed 20th January 2014. Ibid

7.4 Relationship between Environmental Quality and Data Availability

Data samples are not readily and periodically available on the state of affairs of environment relating to water quality. It is only hypothetical conclusions that could be made based on observation. The regulatory agencies cannot provide documented information on monitory works that they have collected.

8. Recommendations on the Challenges on Water Quality for Sustainable Development

Management of water quality and its challenges can be improved by the adoption of the following recommendations.

8.1 Improve method of Measuring Water Quality: - One of the primary responsibilities of the government agencies in charge of water resources is to collect data for the provision of social amenities for the communities. This function is carried out by state ministers and federal ministries. If there is a unitary system of source of drinking water, it will be easier to maintain a unified standard for water quality for drinking for all citizens. By this method private boreholes will be down away with as most of them are below the required standard and are drilled without permit from the agency and are not purified before use. If this is done, it will be easier to monitor and the criteria and standard for quality of drinking water just like other countries e.g. U.S.A.

8.2 Adequate means of Waste Management: The methods of disposal of hazardous waste and wastes generally is by disposal in landfill, this method is very common, it involves the practice of burying the waste; but it is not environmental friendly because when they are buried, their toxic content seep into the ground and contaminate underground water. The management of solid and Hazardous waste regulations provides for factors that should be considered before permits for landfills are granted; one of which is the construction of a leachate collection and renewal system operated to remove accumulated liquid from the system as quickly as possible., many landfills across the country do not comply with any of the requirements under the regulation as they usually start without obtaining the prerequisite permit.

Another method is incineration – here, the wastes are burnt thereby converting the materials into heat, gas, steam and ash. When wastes are being incinerated, clouds of black smoke are seen in the air and the stench of burning substances fills the air. This method of waste disposal has multiple effects on the environment. When these wastes are burnt; it causes land, air and water pollution, the heat from burning

depletes the ozone layer which in turn leads to climate change. The soil nutrients in the ground on which the wastes are burnt are also negatively affected so also is under ground water when the hazardous substances seep into the ground and cause water pollution.

Depositing at dump sites is another method of Waste disposal; these wastes are deposited at designated sites. This is the commonest way of disposing of wastes in Nigeria an example is the Lagos dump sites. Since Nigeria does not have a computer recycling facility, wastes are dumped round the country. Therefore, government should build functioning waste recycling companies to reduce the release of toxic and hazardous waste in our environment.

8.3 Appropriate funding: deficiencies of availability of data and poor quality of data and waste management could be due to poor funding of government of agencies responsible for environmental management, water quality management and those in charge of enforcement of trans-boundary movement of hazardous waste regulating therefore, to reverse this trend of poor management, government should engage in proper funding of these agencies for appropriate discharge of its responsibility.

8.4 Stringent penalty should be made:- the amount to be paid by offenders should be commensurate with the offence committed. Stiffer sanctions that would effectively curb environmental infractions by deterring intending environmental polluter to the regulatory laws should be reviewed to provide stiffer penalties.

8.5 Formal Education for all: there should be proper education of the populace on the importance of water sanitation, good waste disposal method, and the danger hazardous wastes. Farmers and industrialize should also be educated through extension services on the dangers of certain chemicals used by them (pesticides, herbicide).

9. Conclusion

The essence of water to life has been made well pronounced in this paper. It is predominantly required for all beings that live and for all things which breathe. Its use cuts across home, industries, agriculture and recreational activities. Premised on the foregoing, the abuse of water which is facilitated by the trans boundary of hazardous waste into the country from the developed countries. Also, non-environmental integrity of our people constitutes a monumental concern. The major source of this abuse is environmental waste dumping, born out of the quest for

economic growth, technological advancement, and higher standard of living and over population. The environmental degradation which mainly emanates from industrial activities is strengthened by the weak legal framework and regulatory infrastructure, thereby leading to the pollution of our water resources and by way of extension, destruction of fauna and flora and ultimately, deterioration of quality health conditions. These conditions are more present in Africa. As such, proper formulation and implementation of the various environmental laws becomes a panacea for these problems in order to enable us have a healthy environment.