Towards a Conceptual Framework for Environmental Pollution and Management Policy in Nigeria

Nicholas I. Obi[1], Francis O. Okeke[1] and Andrew E. Okosun[2]*
[1]Department of Architecture, University of Nigeria, Enugu Campus, Nigeria
[2]Department of Urban and Regional Planning, University of Nigeria, Enugu Campus, Nigeria

Abstract. Environmental pollution is a global problem facing Nigeria and other countries of the world. It has huge negative impacts on the basic components of the environment namely; lithosphere, atmosphere, hydrosphere, and biosphere. Nigeria as a developing country needs to exploit its natural resources to tackle the socio-economic needs of the people. However, increasing environmental pollution has been witnessed as a result of rapid urbanization, massive industrialization, proliferation of agro based chemical wastes, leading to resources depletion and uncontrolled destruction of the flora and fauna. This exploitation is done without adequate environmental management policies to curtail the impact on human health and on the environment. The emission of harmful substances of gaseous, solid and liquid wastes requires effective environmental management policy to prevent health hazards. Using a qualitative research approach and employing the technique of literature review, this study aims to examine and develop a conceptual framework for an effective environmental management policy for Nigeria, targeted towards reducing environmental pollution to the barest minimum. Its research results note inadequate and weak implementation of existing environmental and planning laws. It concludes and recommends that policies, which embrace enabling laws and focus on reduction, recycling and re-use of waste products, enforce industrial standards of production, waste taxation such as "pay as you pollute" and environmental impact assessment (EIA) of complex projects should be implemented to safeguard the environment and human health.

Keywords: environmental laws, health hazards, environmental pollution, industrialization, waste product

Introduction

The 1970s was the period of high export earnings from crude oil sales in Nigeria which accounted for a remarkable foreign exchange income. The period witnessed rapid industrialization drive notably with the establishment of food and beverage processing factories, among other manufacturing outfits. New urban infrastructure, intercity highways, pipelines, social amenities and communication routes were created across the tropical forests. Large numbers of power generating sets, automobiles and finished goods were massively imported into the country due to high level of economic growth. However, these rapid economic growth and activities were not supported with any initiatives to protect the environment. Urban centers in Nigeria witnessed increased exposure to extreme weather conditions such as heavy rainfall, flood, erosion, drought, high winds and desert encroachment. The risks from these events pose serious destruction of urban infrastructure and disruption of human activities. Other health risks include absence of disaster-preparedness and the inadequacies or poorly managed responses after the disaster event. This is corroborated by the studies of Udeh and Okeke (2018) that highlighted them as critical problems facing the Nigerian cities in recent times. The importance of the environment for man's survival was brought into focus in the 'Agenda 21'of the Earth Summit in 1992, in which all nations where required to include environmental planning as an integral part of their development process.

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* Corresponding Author

Environmental planning as viewed by Munn (1975) are those comprehensive planning activities relating to the preservation or enhancement of environmental quality. However, most developing countries, including Nigeria have over the years made various environmental planning and articulated laws and institutional framework to address certain environmental problems, but not all have been successful in alleviating those problems (Bell & Russell, 2002).

Though the problem of environmental pollution in Nigeria had been part of various governments' policies. For instance, the third and fourth National Development Plans 1981–1985 highlighted some strategic policies for management of the environment and natural resources in the country. They dwelt on issues of land, water, river basins, forestry, sewage, food and drugs production, waste disposal, public health, factories and industrial establishments. Also, the defunct Federal Environment Protection Agency (FEPA), in 1988 drafted some enabling laws and guidelines to tackle the impacts of environmental pollution. Furthermore, non-governmental organizations and international groups showed remarkable interest during the period. Evidence in literatures and media publications have identified that major pollution sources in the country include gas flaring in Nigeria's Niger Delta; uncontrolled emissions from industrial and manufacturing activities; smokes from power generating sets; open solid waste incineration and from slash-and-burn agriculture. Major identified pollutants that degrade air quality include sulphur dioxide, hydrogen sulphide, nitrogen oxide, cement kiln dust and other particulate matter and metals, resulting from anthropogenic causes, i.e. man. Industrial activities and intensive urbanization were suggested to have led to increased discharge of industrial and domestic effluents (Okeke et al., 2020; Anierobi et al., 2021).

From the foregoing it can be observed that the exploitation of the environment for economic development is in conflict with the ecologists' tendency to save it from extinction. Therefore, the focus of this paper is on the environmental challenges facing human and economic development, which requires an effective environmental management policy to address them. Several empirical studies have also been carried out on environmental hazards and the need for planning and control of the Nigerian environment. These include industrial solid waste in Enugu (Uchegbu, 2002); flooding (Obi & Ubani, 2014); biodiversity (Phil-Eze, 2001); soil erosion (Ofomata, 2001); urban solid waste management (Omuta, 1988; Ajakadike, 2001) among others. The legal framework for environmental pollution control has been examined by Udotong and Ikpang (2003). Nwafor (2006) argues that the development and proper application of legal instruments in the field of environment is essential for the achievement of an environmentally sound and sustainable development. Even, Arunsi (1998) had earlier suggested inclusion of legislation on the control of hazards from exploration to implementation stages as possible strategies for environmental resource planning. Specific areas he mentioned include land use/planning control, zoning, and public participation in policy formulation, environmental education and enlightenment as well as cost-benefit analysis of any action.

This current study through the review of literature aim to examine the conceptual framework for environmental pollution and management policy in Nigeria. The objectives were to: (i) examine the environmental problems associated with climate change and human activities; (ii) examine how economic production can be done for food, drugs, energy, water resources and infrastructure development for the teaming population without causing damages to the environment; (iii) examine the management policies that will take into account the complexity of the phenomenon of climate change and human activities; (iv) examine the legal framework that should be put in place for environmental management policies in Nigeria.

This paper surmises that an effective institutional framework for private sector participation, environmental education and public awareness campaign, adequate budgetary allocation and a well-articulated national policy for Nigeria are necessary for a realistic

environmental management. It suggests that any environmental management policy should be backed by a well-spelt fundamental legal framework, in order to avoid unhealthy and unpleasant environment. This study is considered valuable because it's expected findings will enable policy makers formulate effective environmental management policy and enact environmental laws, standards and legislations to protect the citizenry from health hazards in line with principles of environmental sustainability. It therefore concludes and advocates governments' initiative in setting up in large cities, both institutional and legal frameworks that will control and guide development and environmental hazards.

Area of Study

Nigeria, the area of study is located in the western part of Africa, between latitudes 4 16′N and 13 52′N; and between longitudes 2 49′E and 14 37′E (see Figure 1 below). It occupies a total land area of 923,768km^2 with a population of over 200million consisting of diverse ethnic group, religion and culture who engage in both primary, secondary and tertiary production activities. The Nigerian climate is influenced by the interaction between the pressure belt of South Atlantic Ocean and the Sahara annually. A highly weather pressure from northern hemisphere develops over the Sahara and the South Atlantic Ocean with dry harmattan wind flowing over the whole of West African regions, with resultant air convergence known as Inter-Tropical Boundary (ITB) which moves over the country. The harmattan air is characterized with dusty and dry daytime weather and cold nights caused by radiation cooling as well as low humidity. While relative humidity ranges between 50-80 percent in the southern part of the country, it is as low as 10 percent in the northern region. During the summer period, the moist maritime air – the Southern Monsoon winds brings rainfall which spreads from the Atlantic coastal region to the northern part with annual rainfall totaling to about 2,200mm. The mean annual rainfall ranges from about 450-700 mm in the northeast to about 3,500-4,300 mm in the coastal south-east, with rains falling within 90 to 290 days respectively. The mean annual temperature ranges from 21^{0}C in the south to 30^{0}C in the north with extremes of 14^{0}C and 45^{0}C.
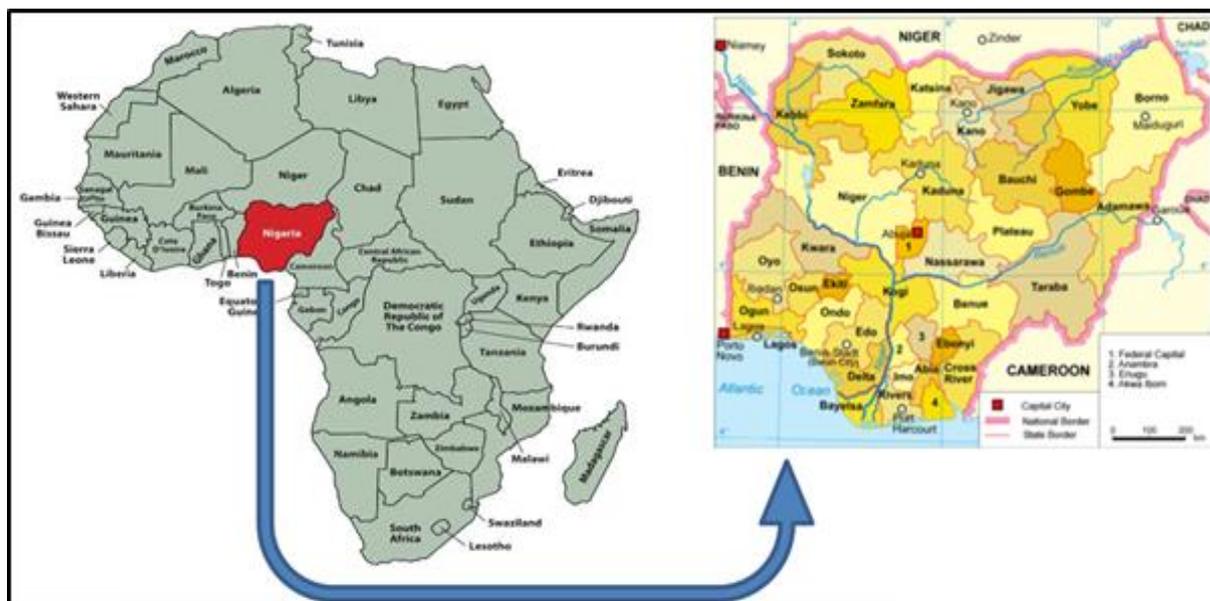

Figure 1. The study area (Map of Nigeria and Africa)
Source: Geographical Map of Nigeria (2018)

Literature Review

The term environment has been viewed from different perspectives. Sada (1988), conceived the environment as a system within which living organisms interact with the physical elements. Briggs (2003), explained environmental pollution, as the presence of agents in the environment which has the potentials of damaging either the environment or human health. He explains that pollutants take many forms such as chemical compounds, forms of organisms and biological materials, including energy in its various forms, for example, noise, radiation and heat. Potential pollutants in the atmosphere are essentially countless in number, accounting for about 30,000 chemicals in common use today, with no less than 1% of these responsible for high level of toxicity and health risks while biological pollutants in this regard is unquantifiable. According to Antonescu and Mateescu (2001), Takahashi et al. (2000), and reported by Oke (2004), environmental pollution is classified by the English language literature into artificial or anthropogenic and natural groupings. Anthropogenic results from human activities which can be *completely artificial for* example the use of chlorinated gasoline products or the use of lead aerosols from gasoline; or it can be *substantially artificial* for example, oil from oceans and phosphate from running water (Oke, 2004). While, Natural sources occur from excessive radiation from the sun, erosion and flooding from rainfall. Environmental pollution is said to be natural and anthropogenic induced changes in the environment which is harmful to man and other organisms and cause changes to natural environment. It is the discharge or emission of harmful and destructive substances into the environment of air, water, and land, which have negative impacts on living and non-living organisms (Obi & Ubani, 2014). About 8–9% of the total disease burden globally may be attributed to pollution, but considerably more is felt in developing countries due to unsafe water, poor sanitation and poor hygiene which are major sources of exposure, coupled with indoor air pollution.

Air Pollution

Empirical evidence from other literatures include Agele (2016), who reported that gas flaring in Nigeria started since the discovery of crude oil in 1959 with about 10 – 40% of associated gas with crude oil production flared into the environment mainly in the Niger Delta region of Ondo, Edo, Delta, Bayelsa, Rivers, Abia, Imo, Akwa Ibom and Cross River States (Ede & Edokpa, 2015) (see Figure 2). This region blessed with mangrove swamp vegetation is faced with ecological disaster with the presence of 131 gas flaring sites (Dung et al., 2008; Edino et al., 2010). Flaring according to Emam (2015) is a common method of disposing gaseous and liquid hydrocarbons through combustion at oil and gas production and processing facilities and sites (Figure 3). Global output of flared gas accounts for about 143 billion cubic meters (BCM) in 2012, which is about 3.5% of total gas production globally. This can be evidenced from Fawole et al. (2016), reporting that Nigeria loses about 5 to 11 billion dollars to gas flaring annually. The World Bank (2016) also reported that the volume of gas flared (15.1 BCM) in Nigeria was equivalent to one-sixth of total gas flared in the world.

Figure 2. The nine states of Niger Delta region of Nigeria
Source: Ede and Edokpa (2015)

Gas flaring from oil exploitation in Nigeria's Niger Delta region had produced adverse effect on the environments (Ede & Edokpa, 2015), notably from release of noxious gases, heat and noise. The adverse effect of flaring gas is supported by Ana et al. (2012) and Edwards et al. (2013) who in their report identified several pollutant gases which pollute the environment to include nitrogen dioxides, sulfur dioxide, volatile organic compounds like benzene, toluene, xylene, polyaromatic hydrocarbons, hydrogen sulphide, benzapyrene and dioxins and particulate matter. According to Agele (2016), gas flaring and oil spillage, has strongly impacted ecosystem components (soil, water and air) and health due to exposure to temperature elevation, vegetation/floral diversity, acid rain in the Niger Delta of Nigeria with implications for agriculture productivity and human health.

Figure 3. Gas flaring showing emissions from turbulent diffusion flames, Niger delta
Source: nairametrics.com

The prevalence of gas flaring has been linked with poor policy framework, poor technological and infrastructure development as reported by Obanijesu et al. (2009), Fawole et al. (2016). A good number of published papers in varying degrees has been captured, for example, implication of air pollutants from gas flaring and its negative effect on natural vegetation, biodiversity and global warming through reduction of plants' CO_2 intake by Abua and Ashua (2015); loss of vegetation and death of plants by acid rain (Ezenwaji et al., 2013); decline in productivity and growth of some major food crops and cash crops and loss of soil fertility (Seyabor & Izah, 2017). In addition, the deposition of acid precipitation and acidic

particles on different ecosystems has impacted aquatic life and soils micro-organism communities. Around the vicinity of gas flaring facilities in the Niger Delta, pronounced loss in forest cover and vegetation diversity decline with a massive loss of 469,731ha, 8% of the vegetation cover of the region had been reported.

Water pollution

Literature on water pollution have made mention of the risk elements associated with surface oil spillage and other pollutants that contaminate water. A careful look into the works of some scholars on this aspect of research has been the clarion call for the protection of water bodies from pollution by contaminants. Prominent studies in the area of water pollution include Wright 1981, Adedeji and Ako (2008), and Jeantheau (2009). Emphasis was made on the eutrophication towards growth of aquatic plants – especially the phytoplankton plants which grow on the surface of the water and affect the water sanitation, hinder the food chain cycle which adversely affect the fish population and health, increase the turbidity of water, and prevent the necessary solar transmission for emergent vegetation growth. Wright (1981) on Chemical and Industrial Pollution stated that Water can simply host the chemical substances due to its particular physical and chemical properties. Chemical and industrial disposals are frequent pollutants of the water as they have the ability to dissolve in the water molecules (Adedeji & Ako, 2008). An obvious example is the disposal of industrial waste into the lagoon from Lagos metropolis which adversely affected the aquatic life and the aesthetic view of the metropolis (Onaji, 1989), hence, bluish green is the current colour of the affected water, with high level hydrogen (PH) potential and non-preferable sodium and lead components (Odeh, 2006, cited in Adedeji and Ako 2008). Jeantheau (2005) and (2009) focused on pesticides as part from insects killing in farms and suburban areas. Again Wright (1981) reports that pesticides reach and contaminate both surface water and ground water via runoff – with rain or irrigation water - from adjacent farmlands, roadsides or countryside lawns. Wright (1981) concludes that point and non-point pollutants are common in Nigeria because they direct sewer discharge into the rivers, streams and sometimes into lakes and ponds. The substances from point source pollution are almost the highest ranked contaminants of the water in Nigeria, mostly in the Niger Delta region along the coast of Nigeria (see figures 4 and 5). According to the Shell annual report for 2007, their "overall spill volumes were higher because spills due to sabotage are on increase. Moreover, Mathiason (2009) mentioned that more than 9 million barrels have leaked in Nigeria over the last half century. Therefore, water is certainly polluted by oil spills which have numerous effects on the aquatic mammals and fish species.

Figure 4. Water pollution sites at Niger Delta area
Source: voanews.com

Figure 5. Crude oil from a shell pipeline spill accumulation
Source: voanews.com

The effects include destruction and mortality in fish species which is considered as a loss of biodiversity. Other various studies on environmental pollution relating to water include works done by Ize-Iyamu et al. (2007) and Jeantheau (2009) stating that usually, pesticides are toxic chemicals which are dangerous if contained in the ingested food. They carried an analytical research study conducted at Ogba, Ikoro and Ovia rivers in Edo State and concluded that certain degrees of pollution of fish and water are recorded in the samples taken. Human health is endangered by rapid rising of contamination thus; the report recommends serious monitoring and control of the water species while the three rivers are major supply of the seafood in the state (Ize-Iyamu et al., 2007). To further buttress health implication of polluted water, Jeantheau (2009) reported that pesticides have much effect on human health like destroying the nerve system and cause chronic diseases. Hasan (2010) dwelt on pollution from small scale illegal mining activities in some parts of Northern Nigeria, for example Mabilla Plateau, Mabu in Kebbi State. In the same vein, literature points out the report of Ugeh (2009) on pollution from other revenue generating minerals exploitation such as uranium, coal, gold and iron discovered in some states in Nigeria. Particles of these minerals mostly uranium became harmful substances that pollute water bodies when transported by rain water or by other means into surface and ground water sources. Contamination has been found to have health implications such as skin blisters because of its acidity (Jeantheau, 2008). Nitrogen and phosphorus are the major nutrient elements to cultivate aquatic plants. However, overgrowth of these organisms, consequence on the increment of nutrients, is destructive to water by eutrophication. The eutrophication drive towards a rapid overgrowth of aquatic plants, especially the phytoplankton plants which grow on the surface of water – affect the water sanitation and hinder the food chain.

Land pollution

Land is polluted when it contains an abnormal concentration of chemical compounds potentially dangerous to human health, plants or animals. Different attempts have been made to investigate land pollution. The major studies carried out in this area include; Zhang et al. (2009), on agricultural activities; Navarro et al. (2008), on mining activities; Ashraf et al. (2014), on waste disposal and on land deforestation by Gabriel and Ayuba (2006). They studied pollution issues to determine the effects of human activities on land. The results indicate that the land have been heavily polluted and suggested avoidance of littering and to properly dispose of waste, which is an essential measure against land pollution both households as well as industries. The source of land pollution comes from human elements such as littering, and waste that is washed ashore from boats, oil rigs, and sewage outlets. Others are induced by the improper disposal of waste, mining, urbanization, agricultural chemicals and soil erosion. Various causes of land pollution identified by other researchers focused on deforestation,

landfills, industrialization, and construction activities. Disposal of large quantities of household waste, many of which could be recycled or degraded find their way on land. Some are either incinerated or dumped in landfills, causing air and soil pollution respectively.

Figure 6. Landfill site Enugu
Source: openaccessgovernment.com

Zhang et al. (2009) identified the use of highly toxic fertilizers and pesticides to get rid of insects, fungi and bacteria from agricultural produces which results in contamination and poisoning of soil**.** The most common chemicals involved are dichlorodiphenyltrichloroethane (DDT) and petroleum hydrocarbons, polynuclear aromatic hydrocarbons (such as naphthalene and solvents, pesticides, lead, and other heavy metals). The concern over soil contamination stems primarily from health risks, from direct contact with the contaminated soil, vapour from the contaminants, or from secondary contamination of water supplies within and underlying the soil, while deforestation and forest fires, destroy soils vegetation cover. Consequently, erosion process becomes accelerated, creating soil degradation. Urbanization is another source of land pollution which fragments natural habitats, ecosystems and landscapes, affecting biodiversity. Moreover, due to increased demand for lands landfills and brown fields are practiced and this cause land pollution.

Figure 7. Landfill site Lagos
Source: conservationinstute.org

Figure 8. Oil spill on land Niger delta
Source: cnn.com

In summary, while urbanization makes a remarkable alteration to the landscape elements that can lead to land pollution in different ways, in some cases the upper layer of the soil or the topsoil's composition is damaged or becomes altered (Mbagwu, 2003). Construction activities discharge huge waste materials such as wood, metal, plastic debris of blocks and concrete that can deface visual landscape. Mining waste is usually left behind in the form of spoil tips. Mining activities lead to extraction of minerals, in the process, several land spaces are affected on and beneath the surface leading to distortion of land surfaces (Mwesigye et al., 2016; Odumo et al., 2014; Rodríguez Martín et al., 2014). Industrial wastes are toxic and led to soil contamination (Salles et al., 2016; Ajmone-Marsan & Biasioli, 2010; Biasioli & Ajmone-Marsan, 2007). Acid rain result in the decline in productivity and growth of crops, forest trees and may alter properties (physical, chemical and biological) of soil and water resources. Over-exploitation of available forest resources for meeting the ever-increasing demand for food, fuel and fiber which has led to loss of soil nutrients and environmental degradation is a worrisome development (Gabriel & Ayuba, 2006). Chemicals which are improperly disposed of on the land or storages, could sometimes end up in the groundwater system (Fawell et al., 2003). Accidental oil spills or equipment failure at petroleum drilling sites can contaminate soils with the release of drilling fluids, crude petroleum and refined petroleum products used for the equipment (Pinedo et al., 2013).

Environmental Problems Associated with Climate Change
Climate change is caused by "global warming" which denotes increases of the mean temperature of earth's atmosphere by increasing heat trapping greenhouse gases emitted or discharged in the atmosphere (IPCC, 2001). This assertion is corroborated by Montgomery, (2009) who reported that climate change is brought about by the effects of increasing emission or discharge of greenhouse gases mainly carbon-dioxide CO_2, methane ($CH4$), oxides of nitrogen (NO_2) and Sulfur (SO_2), Water vapor (H_2O) and chlorophlorocarbons (CFCs) into the atmosphere. These gases have the ability to trap sun radiation that strike the earth's surface from re-radiating back to the upper atmosphere and hold it on the earth's surface, thus increasing atmospheric temperature. Environmental problems arising from climate change include rise in sea level, flooding, erosion, drought, desertification and urban heat Island. These are natural aspects of pollution associated with climate change as reported by other writers, implicating its vulnerability to flooding (Obi & Ubani, 2014), natural disasters (Galeemul, Huq & Remero, 2007) and drought (Nwafor, 2006). Increases in concentration of greenhouse gases

are likely to have caused most increases in global average temperature. Flooding occurs when rainfall intensity becomes higher than soil infiltration because of the proliferation of impervious urban ground surfaces. Again, scientific studies have shown that the chlorine released by CFCs into the upper atmosphere destroys the ozone layer. Ecological disasters, environmental degradation such as sheet and gully erosion are common in Eastern Nigeria, flooding in Lagos and the issue of drought, deforestation in the Northern States and the pollution of land, air, and water are common in the industrialized West-east axis. These are the identified physical problems that challenge environmentalists and policy makers in Nigeria

Environmental Problems Associated with Anthropogenic Activities

Anthropogenic sources of pollution identified by this study include – oil spillage, waste generation from industrial production, agro-based production, manufacturing, oil exploration and refining, mining, domestic waste, and other socio-economic activities including noise pollution and deforestation. Others include burning of fossil fuel, vehicular emission (transportation) power generation and gas flaring.

Agriculture. Many agro-chemicals are applied to improve yield and protect crop plants, animals and fishes. Unfortunately, Osibanjo and Jenson (1980) stated that the use of these chemicals has potentials to cause some harmful effects on non-target plants/animal species, some micro-organisms and man. The active compounds used in the formulation of these chemicals have potential that may lead to the extinction of aquatic species – fish, plants, plankton and other micro and macro-invertebrates.

Institutional and Legal Framework for Environmental Planning in Nigeria

Environmental planning efforts in Nigeria can be traced to the period of Colonial rule between 1854-1960 when environmental protection was promulgated through the colonial by-laws. The main laws during this period were on water pollution and it included the Criminal Code of 1958 with section 246 aimed at controlling burial in houses, the Public Health Act of 1958 which aims to control the spread of diseases, slaughtering of animals and disposal of night soil and refuse. Thus, the regulation was characterized by the absence of clear scientific criteria and standards on toxic wastes and on pollution levels, while the enforcement of basic environmental and household hygiene depended largely on qualitative legal rules (Chokor, 1993). In 1979, the Federal Constitution focused on environmental hygiene, with emphasis on refuse clearance, and the management of liquid and solid wastes in abattoirs, residential homes and streets, all of which came under the supervision of local government councils. Therefore, it can be argued that budget allocations to environmental development and protection remained very low, being generally under 2% of the National budgets until recently. The setting aside of 3% of the Federation Account in the 1999 constitution (from 1% in 1991) as ecological fund for natural disasters of flood, erosion etc, represents the most formal allocation to environmental activities (Chokor, 2005). In Nigeria, efforts at bringing about a cleaner environment have relied on the philosophy of pollution control. This has in some cases involved costly measures and controversial political decisions. Consequently, some stakeholders, poor communities and financially constrained enterprises have often argued that the environment is an expensive luxury that diverts resources from more productive uses (Adelegan, 2005). According to him, the Nigerian method of environmental policies and implementation had not produced the desired result. One of the significant outcomes of Nigeria's participation in the United Nations Conference on Environment and Development (UNCED) was the signing of the Convention. Nigeria, thus assumes obligations under the provision of the treaty in accordance with customary international law. Section 20 of the constitution of the Federal Republic of Nigeria contains the country's environmental objectives that are meant, 'to protect and improve the environment and safeguard the water, air, land,

forest and wildlife'. In recognition of the need to protect her resources, Nigeria has put in place a number of legislations including the Forestry Ordinance, the National Parks Decree, and the Federal Environmental Impact Assessment Decree, among others. The foregoing clearly indicates government's policy and legislation initiative and efforts in promoting environmental planning and protection in Nigeria since the early 1990's. The report of the 1987 World Commission on Environment and Development (WCED) on a major toxic waste dump at Koko, a small Port town in the then Bendel State, Nigeria, stimulated Government's resolve to fully and rapidly embrace the tenets of environmental protection (Bankole, 2006). The national policy on conservation and sustainable use of land is an integral part of the national policy on environment. The policy was first developed in 1989 following the promulgation of the Federal Environmental Protection Agency (FEPA) decree no 58 of 1988 and revised in 1999. The decree provides the legal framework for the implementation of the policies on environmental protection, natural resources conservation and sustainable development (Bell & Russell, 2002). The Federal Environmental Protection Agency (FEPA) was thus established by Decree No. 58 of 1978. In 1992, the Agency's mandate was expanded by Decree No 59 to cover conservation of natural resources and biological diversity. By 1998, each of the 36 states and the Federal Capital Territory had established their specific Environmental Protection Agencies. A new civilian administration in 1999 gave environmental matters top priority attention, by creating for the first time, a Federal Ministry of Environment in June 1999 which absorbed and took over the functions of the existing Federal Environmental Protection Agency. In order to have a holistic and coordinated approach to environmental management, the relevant Departments/Units from other Ministries were transferred to the new Federal Ministry of Environment. In the same vein some of the States have now created full-fledged State Ministries of Environment to replace their existing Environmental Protection Agencies (Adelegan, 2005). This led to the establishment of the National Policy on Environment, in 1989 and revised in 1999; the National Agenda 21 (published in 1999); the National Guidelines and Standards for Environmental Pollution Control in Nigeria (published in March, 1991); National Effluent Limitation Regulation of 1991; Pollution Abatement in Industries; and Facilities Generating Wastes Regulations of 1991; Waste Management Regulations S.I. 15 of 1991; Environmental Impact Assessment (EIA) Decree No. 86 of 1992; National Guidelines on Environmental Management Systems in Nigeria (June 1999); The Nigerian Urban and Regional Planning Law of 1992 and National Guidelines on Registration of Environment Friendly Products and Eco-labeling (June 1999). In spite of these environmental laws in Nigeria by various successive governments, still environmental problems in Nigeria are on the increase due to poor implementation or enforcement of the various laws. It is against this background that this paper focuses on the problems of effective management and implementation of environmental planning laws in Nigeria.

Research Methodology

The aim of this study is to examine the conceptual framework for environmental pollution and management policy in Nigeria, and focus is on the environmental challenges faced with economic development which requires an effective environmental management policy to address; has highlighted the fact that the research is interdisciplinary, thus needs a combination of methods as noted by Wang and Groat (2009). Therefore, the research design embraced a qualitative research approach and adopted review of relevant literature on pollution and management policy in the environment. Data for the study were derived from electronic sources and indexed journals that were later critically analyzed and summarized. Subsequently, data from relevant bodies and agencies that regulate the Nigeria's environment and health matters provided the study with strong basis for analysis. Analysis were based on thematic

content and deductions made on the conceptual framework for environmental pollution and management policy in Nigeria.

Results

The Management Policies that will redress the problems of Climate Change and Human activities
   Environmental Management Policy
   The environmental management in many countries especially the developing countries is achieved through environmental legislation which are enforceable in the court of law and through administrative orders, technical standards which are applied through the three tiers of government i.e. the Authority (Local Government) the Board (State) and the Council (Federal). There is need for a balance between developments aimed at upgrading the quality of life and the conservation of our environmental quality. To close this gap, it would be pertinent to develop, through necessary research mechanisms and policies to encourage optimal resource allocation, to minimize the potential adverse impact of development and maximize benefits and provide adequate safeguards and standards in project planning, formulation and implementation.
   Current Government Intervention Programs
   The United Nations Conference on the Human Environment held in Stockholm in 1972, laid emphasis on sewage treatment for which many governments were blamed for showing little concern. Since then Nigeria's attempts to focus attention on environmental management have not made much impact. Sewage disposal still go into rivers, streams and drainage channels. There is the Water Ordinance of 1913 and the Federal Health Ordinance of 1958, and the Oil Pipeline Act 1958, with particular reference to the oil industry. Also, the Oil in Navigable Water Act No. 34, 1958, the Petroleum Act of 1969, are among few others. But these laws are inadequate and not comprehensive enough to be effectively applied as environmental laws. The defunct National Assembly created the Federal Environmental Protection Agency (FEPA) (similar to that of the United States) vested with powers to monitor and control the Nigerian Environment but the agency did not make much impact. In contrast to what is obtainable in other countries, there is no well-established environmental research centres in Nigeria. Huge sums of money are spent annually to provide drugs and health care without serious inputs in preventive measures. Preservation of environmental quality requires new ideas, new outlook and new vision to be integrated into our development process.
   Environmental Impact Assessment (EIA)
   An Environmental Impact Assessment (EIA) is an analysis of the predicted environmental consequences of a proposed project. The EIA study will enable environmental base line data to be established for any site and also provide a reference point for assessing future discharges into air, water and land media when the industry is in operation. The requirement of government statutory bodies has been reflected in Principle 17 of the Rio-Declaration on Environment and Development. Environmental Impact Assessment (EIA) should be carried out and linked to the cost-benefit analysis to ensure that environmental aspects are addressed and potential problems are foreseen at the appropriate stage of project design. This implies that EIA should be envisaged as an integral part of the planning process and initiated at the project level from the start.
   Environmental Education
   UNESCO's Medium-term Plan (1984-89) recognizes environmental education as lacking in environmental management and planning. Our environmental education program should aim at propagating incorporation of environmental education program into our school

curricula and rouse desire for active participation in multidisciplinary approach, involving the natural sciences, engineering, political science and law.

How Economic Production can be done for Food, Drugs, Energy, Water Resources and Infrastructure Development for the Teaming Population without Causing Damages to the Environment

Economic production can be done for food, drugs, energy, water resources and infrastructure development without environmental pollution through Environmental Management Systems (EMS): An EMS is a tool for managing the impacts of an organization's activities on the environment. It also paves the way for organizations to become ISO 14001 certified. This occurs through a prioritization of activities and processes involving rating factors such as frequency of activity, severity or degree of impact, potential scope of an impact, probability of an adverse impact, legal risk, and resource consumption. Waste reduction begins at the design phase through pollution prevention and waste minimization. At the end of the life cycle, waste is reduced by recycling (Sroufe, 2003).

Developing Legal Framework for Environmental Management Policies in Nigeria

Current situation concerning environmental policy in Nigeria should be seriously enforced, backed by environmental legislation and effectively administered by different organizations such as, National Environmental Standards Regulations and Enforcement Agency Act 2007 (NESREAA) and the 33 Regulations made by the Minister of Environment under section 34 of the Act. This statute was created under the 1999 Constitution of the Federal Republic of Nigeria (section 20) and repealed the Federal Environmental Protection Act 1988. The NESREA, the major federal body responsible for protecting Nigeria's environment is responsible for enforcing all environmental laws, regulations, guidelines, and standards. This includes enforcing environmental conventions, treaties and protocols to which Nigeria is a signatory. There is also Environmental Impact Assessment Act (Cap E12 LFN 2004) which sets out the general principles, procedures and methods of environmental impact assessment in various sectors of the economy. Harmful Waste (Special Criminal Provisions) Act (Cap H1 LFN 2004) for the carrying, depositing and dumping of harmful waste on land and in territorial waters needs to be mentioned. Others include, Endangered Species (Control of International Trade and Traffic) Act (Cap E9 LFN 2004) for the conservation and management of wildlife and the protection of endangered species, as required under certain international treaties; National Oil Spill, Detection and Response Agency Act 2006 (NOSDRA) for the co-ordination and implementation of the National Oil Spill Contingency Plan for Nigeria to ensure safe, timely, effective and appropriate response to major or disastrous oil pollution; National Park Services Act (Cap N65 LFN 2004), which makes provision for the conservation and protection of natural resources and plants in national parks; Nigerian Minerals and Mining Act 2007 which repealed the Minerals and Mining Act No. 34 of 1999 and re-enacted the Nigerian Minerals and Mining Act 2007 for the purposes of regulating the exploration of solid minerals, among other purposes; Water Resources Act (Cap W2 LFN 2004) which aims at promoting the optimum development, use and protection of water resources; Hydrocarbon Oil Refineries Act which is concerned with the licensing and control of refining activities; Associated Gas re-injection Act which deals with gas flaring activities by oil and gas companies; Nuclear Safety and Radiation Protection Act which regulates the use of radioactive substances and equipment emitting and generating ionizing radiation; Oil in Navigable Waters Act which prohibits the discharge of oil from ships into territorial waters or shorelines.

Discussion

Environmental problems were traced from two sources in this study. First, naturally from Climate Change brought about by global warming and secondly, from anthropogenic activities by the effects of increasing emission or discharge of greenhouse gases which increase atmospheric temperature on the earth's surface. Economic growth in the country has been solely dependent on the exploitation of oil and other natural resources which most often destroy the habitats. Rapid industrial activities and urbanization were identified to be responsible for increasing emission and discharge of industrial and domestic wastes to the environment and this finding agrees with the previous studies of Okeke et al. (2020) on fragile cities. The major pollutants identified from literature include toxic metals, organic and inorganic solids, liquid generated from industries and greenhouse gases such as carbon dioxide from burning of fossil fuel, bush burning, and respiration, methane from decaying of organic matter, fermentation of animal dung, sewage disposal, landfills and petroleum exploration, nitrogen oxide from vehicle exhausts smoke, fertilizer manufacturing, plastic manufacture and power generating stations. Others include chlorofluorocarbons from refrigerators, general solvents and foam. There are also natural causes such as volcanic eruptions that discharge a large volume of sulphur dioxide (SO_2). As highlighted from literature review section the program of environmental protection focused on colonial economic development policies and plans which witnessed weak regulatory framework to protect the environment from degradation. The paper is of the view that environmental management policy, backed by environmental legislation is necessary in order to strike a balance between developmental activities for economic advancement and the conservation of our environmental quality. It suggests that, to close this gap, it would be ideal to develop, through necessary research mechanisms and policies capable of encouraging optimal resource exploitation, while minimizing the potential adverse impact of development by providing adequate safeguards and standards in project planning, formulation and implementation. Viewed against this background, an effective conceptual framework for environment management in Nigeria which targets at minimum disruption of ecological process through adequate control mechanism should be pursued. Government has enacted various environmental laws to guide usage and protection of the environment on water, oil exploration, sewage disposal among others, but these laws are not adequate and comprehensive. The major challenge facing the Nigeria's situation is the inability to effectively implement environmental laws. This finding supports the assertion of previous authors like Adeyemi (2002), Fagbenle and Oluwunmi (2010), Oyedele (2018) and Okeke et al. (2020) who have blamed Nigeria's environmental issues on weakness of various arm of government and its implementing agency.

Environmental Impact Assessment (EIA) was envisaged to be an integral part of the planning process and should be initiated right from project commencement while environmental education program was suggested to be incorporated in school curricula. The paper views that economic production can be done for food, drugs, energy, water resources and infrastructure development without causing damages to the environment through environmental management systems (EMS). This can be achieved by compelling organizations and manufacturers' activities on the environment to be ISO certified, which entails waste reduction through prioritization of activities involving rating factors, giving room for waste recycling at the end of life cycle of any product. The paper identified the main problems of implementation of environmental planning and protection laws in Nigeria to include the limitation of the legal framework, institutional bottleneck and corruption, inadequate funding, inadequate environmental impact assessment (EIA) and ignorance. Acts intended to protect the environment seemed to be inconsistent and with no regard for fundamental human rights, due to failure to guarantee access to a healthy environment. Thus, organizations and individuals who pollute the environment are greeted with liberal charges, which have little or no effect on

the organizations, society, or the individuals. Even institutions created by law to monitor the industry's compliance with environmental standards have failed woefully to enforce the rules due to institutional bottlenecks and corruption. The environmental impact assessment law requires all major development projects to undertake environmental impact assessments; but no meaningful enforcement of this law has taken place. Gross inadequacy of funding is another major problem facing the implementation of the various environment laws. For example, whereas huge sums of money were actually earmarked by various State Governments for the execution of environmental projects, only very small amount is actually released to the implementing agencies for actual operations.

Suggested Approaches for Effective Implementation of Environmental Planning Laws in Nigeria

- Review of environmental laws and its regulatory institutions to reflect basic fundamental human rights to healthy environments
- Review of the established liberal charges and taxes issued against violators of environmental laws and to incorporate the policy of "pay- as -you- pollute" principle to serve as deterrent to offenders
- Utilizing micro-gas turbines, re-injection for reduction of gas flaring should be vigorously pursued as part of a new agenda for responsible governance in Nigeria
- The functions of Federal, State and Local Governments in the administration and implementation of environmental planning laws should be streamlined in order to avoid overlapping of their respective functions.
- Corruption among enforcement officers should be checked through proper methods such as direct bank payments/ mandatory sanitation fees.
- Environmental impact analysis should be made compulsory for all major projects in order to provide relevant data for all stakeholders and policy makers.
- Government should provide adequate funding and ensure that resources released for environmental management programs are judiciously utilized for the purpose for which it was released.
- Poor environmental education calls for government attention to mount strategic environmental campaigns to raise public awareness through the various existing media in Nigeria. Environmental education should also be part of the curriculum of the social and behavioral sciences in Nigerian institutions of learning.

Conclusion and Recommendation

Nigeria's economy heavily depends on the oil and gas sector, which in 2008 contributed 97.5 percent of export revenues and 81 percent of government revenues. This huge prosperity has significant impact on water pollution, especially oil mining operations and activities associated with shipping and drilling in the seabed as well as oil spillage in the water as the study showed. Numerous pollution sources, involving waste disposal, atmospheric nitrogen oxides, chemical fertilizers used in agriculture and fossil fuel uses, contain nutrients. Literature reviewed points out that laws and institutional framework to address environmental pollution were not successful in solving the problems. Some empirical studies carried out on environmental hazards planning and control of the Nigerian environment covered different areas such as industrial solid waste, flooding, biodiversity, soil erosion and urban solid waste management among others. Some researchers argued that proper application of legal instruments in the field of environment should not be ignored for the achievement of sound and sustainable environment. The paper concludes the deteriorating level of pollution being experienced in Nigeria today lies in the non-enforcement of environmental legislation. Poor funding and the low level of environmental awareness were also identified. Redressing the

situation requires a holistic approach from the Federal, State and Local Government levels, BY putting political, economic, and social dimensions of livelihoods into consideration in the formulation of policies, as required by Agenda 21 of the Earth Summit. Having recognized that our environmental degradation is a factor of poverty, underdevelopment and economic activities, we must wisely exploit our environmental resources for economic growth. To achieve this, some strategies are recommended to be incorporated into our development process to enhance pollution prevention and abatement. They include;

- Adopt the concept of Reduce, Recycle and Reuse and recycle those that cannot be reused.
- Reduce the use of pesticides and fertilizers in agricultural activities.
- Buy biodegradable products and reduce or cut down on the use of non-biodegradable materials.
- Avoid littering the environment by proper disposal of waste.
- Organic gardening and eating of organic food grown without the use of pesticides or insecticide should be encouraged.
- Disruption of harmony of land creatures and their habitat should be avoided.
- Education of the masses on the adverse effects of land pollution and the way to mitigate them will make a significant contribution to save our environment.

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