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REVIEW

Has the National policy on environmental pollution control in Nigeria been neglected in the Niger Delta region? An update

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Abstract
For the last century, crude oil exploitation and exploration have occurred in the Niger Delta of Nigeria. While oil and gas account for a significant 85% of the national GDP, it has caused catastrophic effects on the environment. This is of particular concern, considering the Niger Delta is the breadbasket of Nigeria, inhabited by 31 million people. However, indiscriminate pollution has arisen from oil spills emanating from exploration activities and gas flaring. Since 2014 alone, more than 550 oil spills have been reported. To address this, the Nigerian federal government has developed environmental policies and laws targeted to regulate environmental management. However, the efficacy of these policies remains in question because of the government's unwillingness to enforce the laws. The aim of this paper is to appraise of the effect of the national policies on environmental management with emphasis on the "Guidelines and Standards for Environmental Pollution Control, 1991". We ask the following questions: What are community perceptions of the direct and indirect impacts of oil spills on ecosystems, health, livelihoods, migration and conflict? What are current and desired compensation provided by government bodies, NGOs and oil companies to support local livelihoods impacted by oil spills? What are key statutory and legal frameworks on environmental protection in Nigeria, how effectively are they performing and what are key challenges confronting compliance with regulatory guidelines and standards? To answer these questions, we recruited the activities of 11 focus groups comprising of chiefs, farmers, youth leaders, members of community and social activists groups from each Niger Delta state and engaged them on qualitative focus group discussions and interviews to identify the impacts of oil spills on settlement's socio-economic and environmental conditions. Results were then analyzed with thematic templet analytic techniques. This study reveals a high impact on settlements with diverse factors that have contributed to the increase in social aspects. Existing policies to regulate and control environmental pollution, but the enforcement of standards has been poor. Consequently, biodiversity has been impacted, affects agricultural soil, human health and the source of farming and farming livelihoods of the indigenous people has had to be abandoned by many living in this region. We argue, Nigeria's reliance on revenue generated from crude oil encourages the uninspiring and lackadaisical approach of the government to enforce these policies in the region. To this end, we recommend various environmental policies should be merged and harmonized under one by-law to ensure uniformity and there is an urgent need

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to implement the 2006 UNDP report which prioritized environmental sustainability, promotes human partnership development and upholds the goals for sustainable development.

Keywords Gas flaring · Pollution · Environmental degradation · Public policy · Niger Delta

1 Introduction

In Europe, particularly during the sixteen and seventeen centuries, the advent of the industrial revolution and the fundamental development of the modern state have had intense impact on the ecosystem (Wenibowei, 2018). The hunt for industrialization triggered the need for unravelling novel sources of production either as compliments or substitutes to the existing sources (Anago, 2002). These developments were the proponent for exploitative and exploration activities. For this reason, developing countries like Nigeria, in a bid to expedite development in thier country through industrialization promoted and invigorated explorative activities.

Crude oil, a crucial natural resource, has significantly improved the living quality of humans and its benefits can never be over emphasized. In Nigeria, it is the stronghold of the country's economy and for this reason, enormous efforts have been made to thoroughly exploit and explore it. In this regard, Nigeria has floated three petrochemical and four petroleum refineries: Kaduna refinery, Warri refinery and Port-Harcourt refineries (old and new) in order to take full advantage of foreign exchange earnings. As oil refining, production and prospecting activities increase in Nigeria, there has been a corresponding increase in the level of pollution of water bodies.

In Nigeria, all fingers usually point to the oil and gas industry whenever issues related to degradation of the environment are raised. This is so because over ninety percent of the countries revenue is generated from this sector and this sector is culpable for the devastating proportion of the nation's environmental quagmires, particularly, within the Southern part of Nigeria, where most of the oil is produced.

Most infrastructures in all the parts of Nigeria, particularly in the areas of education, transportation and creation of engineering facilities aimed at swift industrialization of the country were made possible through the proceeds obtained from the oil and gas industry (Garba, 2001). On the contrary, the southern part of Nigeria (Niger Delta region)—the fulcrum of the petroleum industry, crude oil production and the activities of oil companies has experienced severe adverse effects on its ecosystem. The environment has "become one of the most petroleum and gas polluted environment in the world" (Offiong, 2011) occasioned by irresponsible exploration of oil, dumping of toxic wastes and refuse, gas flaring, oil spills leading to land, air and water pollution amongst others. With all of those in place, the safety and conditions of the individuals living in the area have been compromised—with nothing tangible to compensate them for these losses.

According to Snapps (2011), the consequences of petroleum refining, oil exploration and gas flaring are increased environmental pollution of farmland, swamps and waters bodies. The environment guarantees the natural habitat of man and the resources therein help in the sustenance of life (Oshwofasa et al., 2012). Studies by Onwubiko and co-researchers (2013) posited that alteration in the integrity of the environment could influence the customs and norms of the society, as well as the habitual and social cognitive development of humans therein. At the current rate of environmental pollution experienced at the Niger Delta area, the United Nations report (2011) estimated that

it will take at least 30 years to properly clean up the polluted areas. Crude oil demand is the most sorted after natural resource at the moment after water but has the greatest environmental risk of refinement attached with it (Obi, 2010). On average, the Niger Delta region experiences at least one spill of oil daily with severe and incalculable cost of environmental loss (Babatunde, 2010). The severe environmental effects of crude oil spillage and gas flaring around the Niger Delta region expresses the paradox of having enough resources which have cursed more pain than gain. Despite producing more than 70% of the revenue for Nigeria, the Niger Delta region still remains largely underdeveloped and suffers incapacitating effects of local politics in the country (Orogun, 2010). Billions of oil barrels are extracted daily from these regions (Odoemene, 2011; Oguduvwe, 2013), yet the inhabitants are yet to experience the full benefit as they constantly lament paltry discharge of chemical waste, gas flaring, oil spills and diverse forms of pollution which have all resulted from inefficient production systems (Donwa, 2011). Further studies revealed social tension, tenacious health challenges, involuntary immigration and loss of agricultural farmlands as some of the undesirable impacts of oil spillage and gas flaring on health (Edino et al., 2010; Odoemene, 2011).

In view of these adverse menace perpetrated to the environment in Nigeria, the federal government of Nigeria have legislated legal instruments and environmentally allied policies like the 1991 guidelines and standards for environmental pollution and control law, National Oil Spill Detection and Response Agency (NOSDRA), National Enforcement Standard and Regulation Enforcement Agency Act (NESREA), Environmental Guidelines and Standard for Petroleum Industry in Nigeria (EGASPIN), Federal Environmental Protection Agency Act Cap 131 LFN 1990/ 1992, the endangered species decree of 1990, the oil pipeline act of 1958 among others which were specifically directed at tackling the problems. Regrettably, the southern part of Nigeria till date still suffers from the aforementioned problems even with the existence of these legal instruments and policies. Hence, this study was performed to appraise the impact of these legal instruments and policies in the Southern part of Nigeria with emphasis on 1991 guidelines and standards for environmental pollution and control policy of the federal government of Nigeria.

Irrespective of the fact that Nigeria is a member of several bodies and organizations charged with environmental sustainability, the country has shown reluctance towards implementation of environmental pollution policies (Ugboma, 2015). The continued delay in enforcing these laws against environmental degradation has degenerated the country to a pitiable state in terms of economic growth and infrastructural development around the Niger-Delta region (Obi, 2011; Omojimite, 2012).

In line with the foregoing, the indigenes of the Niger Delta region have expressed their dissatisfaction at the height of negligence by the government in enforcing environmental policies that will preserve the environment (Akhigbe, 2013). The prevalent views about crude oil pollution are that oil and gas exploration and its resultant trepidations are responsible for the decreased yield in the environment (Ebegbulem et al., 2013). Oshwofasa et al. (2012) opined that environmental pollution is responsible for the general reduction in farming activities within the region. Gas flaring and oil spills have collectively contributed to acid rain and nutrient loss which pollute underground water bodies (Edino et al., 2010).

Hence, this study analyzed the negligence of the national policy on environmental pollution control in the Niger Delta region of Nigeria. It appraised the efficiency of the laws guiding the responsible exploration of oil in the Niger Delta region. It is anticipated to contribute to the existing body of literature on environmental pollution management and assist in the enforcement of policies that will save the environment from further damage and degradation.

2 Petroleum industry

Crude oil and natural gas are the major components of petroleum. The former is a multifaceted combination of hydrocarbons (Abu & Atu, 2008; Merkl et al., 2005). The petrochemical oil refineries refine crude oil into different products (Gousmi et al., 2016) like heating fuel (natural gas, propane, heating oil, kerosene and liquefied petroleum gas), transportation fuels (jet fuel, diesel fuel, gasoline, propane and compressed natural gas), petrochemicals (building materials, clothing and feedstock for plastics (Hamza et al., 2012) and sources of electricity (residual fuel oil and natural gas). According to Adewuyi and Olowu (2012), some of the products refined from crude oil contain numerous compounds like heavy metals, hydrocarbons, corrosion inhibitors and dye additives. These products can induce high toxicity when compared to crude oil probably because of the compounds introduced to the matrix during the process of refining and variation of metal speciation. Based on the disparity in their solubility, four principal compounds of petroleum origin exist: resins, aromatic hydrocarbons, asphaltenes and saturated hydrocarbons. Hydrocarbons emanate from both manmade and natural sources (Gousmi et al., 2016). Hydrocarbons are extremely soluble and are regarded as potentially toxic compounds (Achile & Yillian, 2010; Ogunfowokan et al., 2003). Because of their inherent venomousness, aromatic hydrocarbons are of grave concern and possess the capacity to migrate through the environment, including groundwater (Eke & Scholz, 2008). These pollutants, however, are not degraded easily by the current treatment methods (Saien & Shahrezaei, 2012).

Despite the fact that the petrochemical and petroleum industries are most desirable for enhanced quality of life and national development (Nwaichi et al., 2013), the environmentally deplorable and insalubrious pollution implications of the waste from these industries are reasons for worry (Osuoha & Nwaichi, 2019; Osuoha et al., 2019).

2.1 Environmental degradation

According to Hagget, environment can be described as "the sum total of all conditions that surround man at any point in time on the earth's surface" (Aboribo, 2010). The environment is prevalently comprised of socioeconomic and biophysical components which include animals, plants, water, air and land, etc. (Wenibowei, 2018).

In other words, the environment, where man thrives is the entirety of our surroundings which comprises every element around and within us that influences or affects our living conditions and vice-versa. This underscores the correlation between humans and his or her environment which have resulted in both negative and positive effects. Particularly, the negative effects which are clearly as a result of man's activities are prevalently regarded as "environmental degradation". To this end, environmental degradation signifies the waning of the environment via human activities—this entails, introduction of contaminants that could affect the land, water and air, thereby compromising the life and safety of organisms in the environment including man (Offiong, 2011).

2.2 The Niger Delta Catastrophe

Oil exploitation and explorations activities in the southern part of Nigeria which provokes ceaseless pollutions of the water and lands of the imminent environments from oil spills on fishing waters and farmlands have made the fishing and traditional farming activities of the people domiciled in the region unprofitable and unattractive due to

degradation of waters and lands – the backbone of the populace's livelihood (Amugo, 2018).

Undeniably, from the author's personal and research experience spanning over four decades, the southern part of Nigeria, fondly known as the Niger Delta region has really suffered the indistinguishable evil of gas flaring and oil spill. Over the years, the gas flares and oil spills experienced by the populations living in this region had caused catastrophic effects in the livelihood, health and the environment. An annual report by UNDP (2009), revealed that the erstwhile natural endowment like faunas, forests, water and lands domicile in the Niger Delta region has been subjected to life-threatening degradation as a result of indiscriminate oil prospecting—impoverishing the populace. To make matters worse, the culpable oil companies and Nigerian government have done nothing or little to remediate the degraded environment and lessen the suffering of the people. For example, the village where oil was first discovered in Nigeria—Oloibiri, is still well underdeveloped with no portable water, no electricity, no good road with just one obsolete health center and government institution (Amugo, 2018).

Furthermore, the report also described the peculiar situation in the Niger Delta region as pathetic, stating that the region is battling endemic conflict, squalor and filth, abject poverty, social deprivation, severe high unemployment, putrefying social infrastructure and services and administrative neglect among others. Also noted in the report is that the Niger Delta region is among the world's simplest and most troubling illustrations of the "resource curse".

To further buttress this claim, an indigene of Bayelsa, a state in the Niger Delta region posited that oil has become a "curse" to the region instead of a blessing. According to him, crude oil has brought abject poverty to the Niger Delta as the communities have been damaged and the populace (mostly farmers) have lost their common means of livelihood due to environmental degradation (Amugo, 2018). More worrisome is that, the UNDP (2009) report also opined that 7 out of 10 persons living in the Niger Delta region live in extreme poverty while the country earns huge amount of money from the natural resources abundant in the region.

Annihilation of marine life and decline in soil quality has rendered the customary occupation of the Niger Delta inhabitants' unbeneficial, while at the same time, the Nigerian government and the oil companies who are in partnership have nosedived in their responsibility to provide substitute lucrative means of employment or livelihood for the populaces' sustainable development. Numerous youth from this region have been drastically affected and this had led to the propagation of paramilitary groups who out of frustration have risen in the quest to survive—using arms against the Nigerian government, oil companies and the enemies of their lives. Since the late 1990s, the paramilitary groups intensified aggression and terror against the Nigerian security agents and oil companies through oil bunking, annihilation of drilling platforms, rigs, pipelines and massacre of security agents deployed in the region (Amugo, 2018).

The condition of incendiary blend of environmental degradation, pollution, corruption, poverty and the choice of Nigerian government to capture oil revenues from the region were the proponents for violent rebellion by diverse youthful paramilitary groups to fight the overdue apparent prejudice and injustice. The paramilitary groups without any apology claimed that their environment has been out-rightly neglected, polluted and exploited, causing severe poverty on the populace and therefore demanded absolute control or majority of the share of the region's oil revenue back to the underprivileged region where the oil money is derived (Amugo, 2018).

The fierce insurgence was advocated by the movement for the Emancipation of the Niger Delta (MEND). The paramilitary groups commonly referred to as "militants" in Nigeria embraced guerrilla warfare tactics and embarked on annihilation of oil equipment and installation, kidnapping of oil company workers and top government officials and killing of security agents. This crisis intensified and lasted for a long time, which led to the region being designated as a territory of "intense strife". Oil production in Nigeria was disrupted and the Nigerian economy was almost crushed before the timely intervention of the then President—Late President Umaru Yar'Adua through the introduction of the amnesty program (Amugo, 2018).

2.3 Gas flaring and crude oil pollution in the Niger Delta

The southern part of Nigeria, commonly known as the Oil Kingdom is famous for the abundance of natural resources in the region. The region possesses huge hydrocarbon reserve and it accounts for the production of 2.3 million bpd of crude oil (NNPC, 2013). Globally, Nigeria is ranked as the eleven largest oil-producing nation in the world and the number one in Africa (NNPC, 2013).

The reliance of crude oil production in Nigeria is evident as it is responsible for ninety percent of the revenue the country generates. So the importance of this sector to the Nigerian economy can never be overemphasized. Every successful story or journey in this world comes with a price, the success recorded by Nigeria in this sector did not come without a price. The uncontrolled gas flaring, incessant oil spills which are responsible for the degradation of the environment is the prize Nigeria has paid for irresponsible oil exploration in this region (Wenibowei, 2018).

The prevalent pollution that ensues in this area is gas flaring and oil spillage.

2.3.1 Gas flaring

According to Edino et al. (2010), the expiration of unwanted gases through burning process without proper precaution is known as gas flaring. In the Niger Delta, gas flaring actions usually take place close to oil wells which are sited close to residential buildings and farmlands. Flaring is highly prohibited by law except in special emergency situations or situation that requires rescuing important properties (Edino et al., 2010). However, this is not obtainable in the Nigerian system because of non-adherence to the rule of law and the level of corruption which has eaten so deep in the root of government and virtually every sector (Mustapha, 2010). According to statistics provided by Edino and co-authors (2010), approximately 57,000,000 metric tons of gas are flared every day in Nigeria and this contributes to about 16% of the entire percentage of gas flaring within the globe. Though the exact damage gas flaring inflicts on the environment is yet to be fully ascertained, it is assumed that it has far unbearable consequences that outweigh the art of waste disposal. One of the consequences of gas flaring is the increase in the quantity of greenhouse gases (GHG) that are emitted into the environment. The GHG emitted from gas flaring and exploration in Nigeria alone topples the quantity emitted within the sub-Saharan African region (Kingston, 2011). Gas flaring alters the equilibrium state of the environment which results in observable climatic changes (Bayode et al., 2011). It equally affects agricultural products by inducing stunted growth to crops planted (Edino et al., 2010) and produces carcinogenic effects on people living close to oil exploration areas (Ekpoh and Obia, 2010).

2.3.2 Oil spillage

Oil spills occur due to production operations, sabotage and most importantly, corrosion of pipelines. Apparently, oil spill is a predominant environmental quagmire in the Niger Delta region because it affects the people and the whole environment unsympathetically (Wenibowei, 2018). Oil spill is the principal damage done to the environment as it affects every facet of life ranging from ecological, economic, social, political and general well-being of human existence (Aro et al., 2010; Atakpo & Ayolabi, 2009). Predominantly, oil spillage occurs due to malfunctioning of the machines and equipment, sabotage or wrong timing in operation. Oil spills leak into water bodies forming colloidal suspension and lining that coat the shore of rivers which endangers aquatic life. From the shorelines, it permeates into the soil altering soil natural biota and activities of living organisms (Atakpo & Ayolabi, 2009). Approximately six thousand oil spills (which correspond with an average of 150 per year) were recorded by the Directorate of Petroleum Resources in her 40 years of exploring oil in Nigeria (Imobighe, 2011). According to Atakpo and Ayolabi (2009), over 2.4 million barrels of oil were spilled in Nigeria between the period of 1976 and 1996 alone. Only about 550,000 were recovered while the rest was mixed with the ecosystem (Atakpo & Ayolabi, 2009).

3 Niger Delta region and the crisis level

Niger Delta region measures approximately 26,000 km^2 mostly covered with water. The biodiversity and vegetation of the area are very fragile as it comprises swamp forests, freshwater, mangrove and coastal island with many aquatic animals (Bischoff & Lambrechts, 2010; Snapps, 2011). Presently, nine states comprise the Niger-Delta region namely Abia, Imo, Rivers, Akwa Ibom, Cross River, Bayelsa, Edo, Delta and Ondo all located within the South-South, South-East and South-Western parts of Nigeria (Ihayere et al., 2014). The devastating effect of oil exploration is felt by the natural habitat (Bischoff & Lambrechts, 2010) and agricultural activities (Edino et al., 2010) carried out around the Niger-Delta region. The continued exploration of oil without proper plans for assessment of the impact it creates on the environment has produced lasting negative effects on Nigeria's most consumed commodities (yam, cassava and plantain) (Kingston, 2011). Obi in his research in 2010 implicated environmental damage at the Niger Delta as an issue that should draw global concern. The devastating effect of oil spills and gas flaring has further thrown more people in the Niger-Delta areas into poverty as most of them who are farmers and fishermen lost their means of livelihood (Kingston, 2011). At the moment, the only remedy set out to residents around the Niger-Delta region for damages done to their land and rivers is compensation which they feel isn't enough to make up for the severe damages created (Chukwuemeka-Emma et al., 2011). The people living around stated their preference for adequate environmental remediation plans rather than monetary compensation (Chukwuemeka-Emma et al., 2011).

4 Statutory and legal frameworks on environmental protection in Nigeria

4.1 Federal Environmental Protection Agency (FEPA) Act Cap 131 LFN 1990/1992

FEPA is the most significant Act on the preservation of the Nigerian environment. The Act stipulated the strategies for natural resources, agricultural and industrial actions in order to curtail the destruction of the ecosystem (Albert et al., 2018a). The agency also offers environmental standards, guidelines, specifications and criteria for the preservation of land, water bodies and air which could be vital for the protection of the welfare, safety and health of the inhabitants from environmental devastations and degradation. FEPA was also involved in the obligation of setting limits and standards for water quality, control of hazardous materials, effluent limitation, ozone protection and noise control, which in turn are targeted towards the reduction of climate change challenges in Nigeria.

Today, the Federal Ministry of Environment (FME) has assumed the full duties of the Federal Environmental Protection Agency (FEPA) to arrest, seize and gain entrance with firm punishments of fine and perhaps jail term on anybody that interferes with the activities of the enforcement officers or announce false compliance declaration (Olawale, 2015). On the contrary, owners of facilities and oil and gas operators are clearly excused from penalties, jail terms, fines and any stern liability if the oil spill incidence occurred as a result of sabotage or perhaps natural disaster (Albert et al., 2018a). The mandate of the federal environmental protection is unambiguous and profoundly clear. However, there is still a huge lacuna in the level of enforcement and compliance and this has raised numerous eyebrows. In Nigeria, the citizens believe that over 90% of ecological dilapidation in the region occurs as a result of irresponsible oil and gas production and exploitation in the region, which makes them believe that there are no guidelines guiding the production and exploration of petroleum products in the country. To this end, we bring forth the long-established guidelines and standards for the production and exploration of crude oil and other related acts compiled for the Nigerian ecosystem and its citizens (Albert et al., 2018a).

4.2 National Enforcement Standard and Regulation Enforcement Agency Act (NESREA)

The NESREA was established in the year 2007 to substitute the defunct FEPA. The agency was charged with the responsibility of providing adequate biodiversity conservation, protection of the ecosystem and sustainable development of the natural resources in the country. The duty of the agency also involves liaison and coordination of appropriate shareholders on issues of implementation of environmental policies, guidelines, regulations and standards (NESREA, 2007).

Furthermore, in the NESREA Act, section seven reveals that the agency has power: to impose compliance with standards, policies, guidelines and laws on environmental issues; (b) to implement obedience with provisions of conventions, protocols, international agreements and treaties on the environment—which includes ozone depletion, hazardous waste, chemicals, forestry, wildlife, climate change and other environmental agreements which could arise as time progresses. With all these instruments on ground, the degeneration and contamination of the environment are still on the high side which underscores lack of compliance by the concerned bodies (Albert et al., 2018a).

4.3 Environmental Guidelines and Standard for Petroleum Industry in Nigeria (EGASPIN)

There are considerable forms of guidelines or laws established for the protection of the environment in Nigeria. Interestingly, the Nigerian constitution is the basis for each law, which embraces the provision for the preservation of wildlife, forest, air and the supply of water in Nigeria. In addition, they are also complemented by the FEPA Act relative to pollution and effluent abatement as well as management of hazardous waste and solid (Albert et al., 2018a; Joseph & Inemo, 2014). Conversely, the oil and gas industry has indirectly and directly contributed immensely to the degradation of the ecosystem, even with the availability of these laws and guidelines for standard operation compiled by the DPR (Joseph & Inemo, 2014). Hence, EGASPIN stipulates that the operation of the petroleum industry is directed by federal legislation and the Nigerian Petroleum Act. The prime mandate of EGASPIN is to minimize oil pollution to the barest minimum (Joseph & Inemo, 2014). As stipulated in the EGASPIN mandate, the oil companies are mandated to start clean-up of any oil spill incidence immediately within 24 h of occurrence (Joseph & Inemo, 2014; Olawale, 2015). However, this proposal sounds very rigid and the practicability is almost impossible due to the fact that polluters, operators and oil-related agencies like NOSDRA might not be aware within that time frame. Based on this, the United Nations Environmental Program (UNEP, 2011), in their meeting endorsed that concerns and emphasis should be laid on health and social impacts on the imminent settlements affected by the spill prior to developing strategies for the remediation which could eventually take numerous years to conclude (Joseph & Inemo, 2014). The settlements and areas affected by oil spills should as a matter of urgency given due attention when it comes to health, economy and social matters and must receive adequate and fair compensation. Furthermore, other states in the federation are legally fortified by the Nigerian constitution to make directives and provisions of its policies to enhance sustainable development.

4.4 National Oil Spill Detection and Response Agency (NOSDRA)

Within the Nigerian context, when oil spill occurs, NOSDRA is the vanguard and the most substantial agency obliged with the responsibility for investigation, detection response and preparedness to oil spillages (NOSDRA, 2006). Conversely, instead of NOSDRA, Olawale (2015) noticed that numerous oil spill inquiries are carried out by the responsible oil companies alone, hence hindering the supply of the accurate information from the site where the spill occurred, in order to protect the company's image and deceive the settlements and the Nigerian government at large. This also leads to the erroneousness of information concerning the magnitude of destruction and amount of incidences reported. For instance, in 2006 and 2007 alone NOSDRA confirmed 327 and 253 sites impacted with oil spills, while the reported 588 and 419 oil spill incidents in the first quarter of 2008 (Ayawei & Abila, 2015). However, from 2015 till 2015, 1527 oil spill incidents occurred in Nigeria with many unreported cases. Interestingly, the oil companies recorded only 400 cases within the same period with preemptive strategies to stop the responsible agencies like NOSDRA from carrying out investigations (Olawale, 2015).

This rate and frequency of reported oil spill cases pose serious threat to NOSDRA in terms of preparation for rehabilitation, remediation and clean-up. Hence, NOSDRA has instigated action for the development of a National Oil Spill Compensation Rate (NOSCR)

which will function as chaperon for the oil industry with appropriate and suitable compensation to the transit and host oil settlements (NOSDRA, 2006). Apparently, there is paucity of intermediary measures and physical evidence in relation to the mitigation of oil spill disasters, reduction of environmental degradation and perhaps compensation for the affected settlements in the Niger Delta region in Nigeria. To this end, it is pertinent to state without fear or favor that among diverse environmental legislations provided for the petroleum sector in Nigeria, only the Oil Pipeline Act, Cap145, LFN 1990 made provisions regarding direct compensation from oil spill incidence (Albert et al., 2018a).

4.5 The 1991 Guidelines and Standards for Environmental Pollution and Control Policy of the Federal Government of Nigeria: an overview

In view of the established threat to animals, plants, man and biodiversity, environmental issues are now a tropical concern. In this regard, numerous environmental resolutions, declarations and international conventions with respect to the environment have been made. The meetings that involved stakeholders, subject experts and professionals, policy and decision makers provided numerous standards that are adopted when handling environmental issues. Similarly, resolutions and declarations compiled served as instruments for national governments in numerous countries for the preparation and execution of legal frameworks and national policies on the ecosystem (Wenibowei, 2018).

To this end, the Nigerian government in 1991 established the guidelines and standard for environmental pollution control in Nigeria—which was utilized as an instrument for environmental management in her country. The compiled guidelines were specifically used to regulate the rate of pollution that can occur in a given area as a result of industrial activities. In view of this, six predominant areas of environmental regulation were identified and recommendations and standards were compiled to encourage healthy and safe environmental practice.

1. Pollution reduction in industries
2. Management of hazardous and solid waste
3. Noise restriction
4. Industrial emission restriction
5. Water quality for industrial uses at point of intake
6. Effluents limitation

In Nigeria, the pollution reduction regulations law compiled by the FEPA strictly forbids the discharge of lethal or hazardous materials into the surroundings beyond the boundaries permitted by the agency. The agency stipulated some methodological approaches and requirements for unconventional discharges and mandates industries to obtain approval and permit for discharges above the tolerable limits (Wenibowei, 2018).

The Waste Management and Hazardous Waste Regulation law controls how hazardous and solid wastes are collected, treated and disposed. The industrial emission restriction and noise restriction regulations were formed to decrease the rate of industrial emission and noise in the environment.

The effluent Restriction Regulations policy mandates all industries to install anti-pollution equipment for the treatment and degradation of contaminants in the outgoing wastewater, to ensure compliance to the established levels prior to discharge (Anago, 2002).

In Nigeria, the Federal Ministry of Environment and Department of Petroleum Resources are legally responsible for compiling standards and guidelines for controlling and regulating the quality of wastewaters and the method in which the wastewaters are discharged from petroleum refineries.

The general guiding principles propounded by the Department of Petroleum Resources for the abatement of pollution in the petroleum industry in Nigeria include:

i. No industry shall discharge lethal materials into the air, land and water bodies within the Nigerian ecosystems beyond tolerable limits.
ii. The industry producing the waste should be solely responsible for collection, transportation and eventual disposal of the waste and shall be accountable for remediation, clean-up and compensation to all parties involved where necessary and applicable (Agu, 2017).

Pertinent regulations and policies relating to operations involved in the refining of petroleum are clearly indicated Petroleum Refining Regulations (Agu, 2017). In Nigeria, these established standards and guidelines mainly aim to regulate and manage the quality of wastewaters and their eventual discharge to the receiving environments from the petroleum refineries. The environmental standards and guidelines for processing hydrocarbons in Nigeria as stated by Department of Petroleum Resources are presented in Part V of the Environmental guidelines and standards for the petroleum industries in Nigeria (EGASPIN) (DPR, 2002). This section defines the characteristics and sources of waste in diverse kinds of refineries as well as the guidelines and procedures on how these wastes can be managed and treated.

The values in Table 1 represent the effluents restrictions for treated wastewater as approved by Department of Petroleum Resources for wastewater emanating from petroleum refineries in Nigeria.

The main aim of these policies and guidelines is to control and standardize quality of wastewater emanating from petroleum refineries in Nigeria. Indiscriminate pollution of the marine environment has been observed to exert deleterious effects on organisms that thrive in water. Kuehn et al. (1995) suggested a strong connection between the health status of fishes and the concentrations of PAH (from petroleum refineries wastewater) in water and sediments. Onwumere and Oladimeji (1990) observed that *Oreochromis niloticus* accumulated high concentration of heavy metals when exposed to treated petroleum refinery wastewater from Kaduna refinery which subsequently led to the development of histopathological damages (Table 2).

5 Environmental policy in the Niger Delta: effects and results

The Nigerian government could claim that they are not wholly responsible for the environmental dilapidation overwhelming the Niger Delta region of the country because they have existing regulatory guidelines and policies that protect the environment. On the contrary, over the years, despite the existence of these comprehensive and elaborate regulations and laws by the Nigerian government—the proponent for these laws, which is protection of the environment, is yet to experience any significant effect. The Nigerian government has demonstrated ineptitude in implementation of several laws she enacted (Ugoh & Ukpere, 2012). The non-compliance to the observation can be corroborated

Table 1 Restrictions for release of treated wastewater from refineries (lube oil, gasoline/fuel oil category)

Wastewater characteristics	Restrictions for Compliance: "Maximum for any 1 (One) Day Period"
Total Phenols (mgL^{-1})	0.5
Total Hydrocarbon Content (THC), mgL^{-1}	10
Chromium Cr^{+6}, mgL^{-1}	0.03
Total Chromium mgL^{-1}	0.3
Temperature (^{o} C)	30
Cyanide, mgL-1 as CN	0.05
TDS (mgL^{-1})	<2000
Pb^{+2}, mgL^{-1}	0.05
Sulphide as H_2S (mgL^{-1})	0.2
BOD_5 (mgL^{-1})	10
Hg	–
Ammonia (NH_4^+), mgL^{-1}	0.2
Total Iron (Fe) and Zn^{+2} (mgL^{-1})	1.0
pH	6.5–8.5
Odour	Unobjectionable
COD (mgL^{-1})	40
Cd	–
Cu^{+2}, mgL^{-1}	1.5

(PHRC Operational Manual, 2011)

Table 2 Emerging themes for coding template

Coding	Themes
Community Impacts (CI)	Health, water, agricultural lands environment, culture and tradition
Livelihood Support (LS)	Increased living cost, parental values-youth impacts
Influences on Restiveness (IR)	Marginalization
Jobs and Tourism (IR)	Loss of jobs
Way-out/Compensation (WC)	Infrastructural and monetary

with the degree of increasing incidence of gas flaring and oil spillages in the region and has further highlighted the feebleness of Nigerian government in handling the affairs and safety of her people and by extension the implementation of the regulatory frameworks and policies.

Furthermore, Ibaba (2010) posited that the environmental laws in Nigeria are yet to help decrease the degree of environmental degradation in the country, talk more of contributing to sustainable growth and development in Nigeria. It is not unlikely that this lackadaisical approach towards obedience of environmental laws may not be unconnected to lack of enforcement and commitment by the appropriate agency and institution (Ibaba, 2010). For example, in the Niger Delta region, over 46 billion

kilowatts of heat are released into the environment daily from 1.8 billion cubic feet of gas (Agbola & Olurin, 2003). This activity renders major sections of the locality unhealthy and inappropriate for human habitation. Numerous incidences have occurred in this region viz a viz. a liquefied natural gas pipeline in Okirika crossing through a mangrove forest leaked for about 72 h and was later set ablaze (Nenibarini, 2004) leading to massive destruction of animals and plants thriving in that region. Based on this reports, the authors posit that as long as gas flaring and oil spills are continuous and no stringent protocols are adopted to reprimand defaulters, the present environmental policies have no positive effect on the habitats and environment in the Niger Delta.

One of the major problems in Nigeria is, the government agencies like the Nigerian National Petroleum Corporation, Ministry of Environment, National Environmental Standards and Regulations Enforcement Agency and Federal Environmental Protection Agency does not possess the technical know-how and perhaps the political will to competently and effectively implement the environmental guidelines and policies in Nigeria. The oil companies in this region breach some constitutional regulations and provisions which were meant to safeguard the environment with impunity and reckless abandonment – and the Nigerian government has done apparently nothing to stop this. Numerous reasons like dependency on crude oil, lack of proper funding of agencies, lack of adequate manpower, overlapping roles between government agencies and most importantly, corruption have been reported as the reason behind the incapability of the regulatory agencies and Nigerian government to implement the environmental policies and law in the country. This current study recognizes and accepts all those factors as impediments to the actual execution of the policies and laws. However, the authors are of the view that economic factor is the most predominant factor and very essential in appreciating the non-enforcement and non-compliance of the established environmental laws and policies in Nigeria.

Petroleum is one of nature's non-renewable resources which have been of great benefit to man, especially as a source of fuel. In Nigeria, it is the mainstay of the nation's economy hence, great efforts are made to totally explore and exploit it. In order to maximize profit in terms of foreign exchange earnings, Nigeria has floated four refineries and three petrochemical companies: The Port-Harcourt refineries (old and new), Warri refinery and Kaduna refinery. The two refineries in Port Harcourt were merged into one, making it boast of highest capacity among other refineries, in the year 1993. The contribution of petroleum to the revenue generated by Nigerian government underscores the supremacy of revenue from the oil and gas industry to financial viability of the country.

It is pertinent to state that the authors believe that the lackadaisical attitude of Nigerian government towards enforcement of these environmental laws and policies is partly because this sector alone is responsible for over ninety percent of all revenues earnings in the country. Hence, the government is perhaps afraid of implementing critical laws that could perhaps have effect on the income the country generates. This is a clear case of robbing Peter to pay Paul. Unquestionably, with the way things are unfolding, it will be relatively hard for the government to implement the established policies and laws that could perhaps interfere with production of petroleum whose proceeds are needed to drive growth and development in the country. This is apparently, the fundamental reason for ineffective and inefficient implementation of the environmental policies and laws in the Niger Delta region in Nigeria.

6 Methodology

This study appraised the efficiency of the laws guiding the responsible exploitation of oil in the Niger Delta region. In other to achieve this, we evaluated the impacts of oil spills on livelihood structures and how they influenced agitation within the communities in the region. To this end, we adopted qualitative research design using diverse methods such as; interviews, secondary data, documents and focus group discussion. Whereas a case study supplies vital information and unit of analysis from numerous sources (Aripin et al., 2011; Street & Ward, 2012), a qualitative case study gives opportunity for study conveyance, description, interpretations and proper understanding (Eshlaghy et al., 2011; Street & Ward, 2012). Hence, qualitative case study enabled effective understanding of the laws guiding oil exploration and exploitation in the region which include establishment of themes to aid suggestions that will improve the policies.

6.1 Study area

The Niger Delta region was selected as the study area for performing focus groups interviews and collecting other relevant data to in this study because of its present level of pollution occasioned by gas flaring and oil spills (Odoemene, 2011).

6.2 Study design, data collection and sampling

For the sake of this study, we selected an exploratory "case study" design because it satisfied all the qualities of qualitative research (Eshlaghy et al., 2011). According to Eshlaghy and co-authors (2011), a "case study" investigator has restricted control over events, and the emphasis is predominantly on present and real-life conditions where focus lies on association and processes rather than output and outcome. Furthermore, we considered purposive sampling approach as it is among the dependable approaches of data collection methods in qualitative research (Lietz & Zayas, 2010). The process is made up of reviews of archival records, observation of the participant and semi-structured session assessment of the focus group (Noor, 2008).

We selected eleven crucial members living in selected communities purposively for a detailed interview and conversation in their diverse communities. To ensure the reliability of this case study, the instruments used for data collection comprised of focus groups gatherings recorded with the thematic template techniques with NVivo, study of archival records and participant observation (Harris et al., 2009). The archival documents obtained from company reports, non-governmental organizations (NGOs), numerous libraries and community organizations were reviewed holistically. In debating "*Sampling of Hard to Reach Populations in Qualitative Research"* Abrams (2010) stated that selection and sampling of the populace are vital in the reliability of research in social sciences.

6.3 Population and sample size determination

The population comprised of 11 crucial members who served as the focused group with at least one from each of the nine states from the Niger Delta region. They include; chiefs,

farmers, youth leaders, members of community and social activists group. These participants were selected because they were born and bred in the Niger Delta region, and they have the required experience for the research problem under investigation.

The sample size for a particular study is chosen after the researcher must have determined the cases to be studied (Abrams, 2010). The indigenes from the Niger Delta region are better placed to supply cogent information on the existing environmental policies guiding oil exploration and enhance the validity of this study. The choice of the populace and the sample size were critical to the triumph of the research and were appropriate in the provision of exhaustive examination of the efficiency of the laws guiding the responsible exploration and exploitation of oil in the Niger Delta region.

7 Results

In the course of the transcription of the conversations into word documents, we acknowledged some significant sets of themes—the observed themes were the proponent for utilizing thematic template techniques with NVivo 11 software package for analyzing the maiden observations from the group discussions and interviews. The package helped the researchers to arrange the identified themes in a useful and meaningful manner to assist the coding process. Based on the information obtained after analysis in Fig. 1a and b, the community impact theme amongst the focus group interaction and eleven contributors were the most coded theme. It represents the inclusive impacts which include; health, ecosystem, economic, agriculture, social and environmental actions as it influences the livelihood in the receiving communities. In the both categories (focus group interaction and interviews), the participants laid emphasis that oil spillages have indirectly and directly affected the whole neighborhood. More worrisome, was the fact that loss of jobs and paucity of livelihood support were established as the consequences of the prolonged effects of the adversity on the communities, which underscores the absence, implementation and perhaps compliance with regulatory guidelines and standards guiding the operation of oil-related activities.

7.1 Theme one: community impacts

Theme one explores the implication of oil spillages on select settlements to appreciate the level of the impact, the response of the government, the perpetrators and perhaps how it can be decreased. This section concerns socio-culture, agricultural land, socio-economic and environmental impact of the oil spillages on the settlements and how the situations and implications have been managed. The observations from bottom up and down within the settlement context revealed substantial deterioration on the whole structure. During the coding process, some factors demonstrated in Fig. 2 emerged as proponents for the high impact of the effects on the settlements. To this end, social and economic impact revealed higher percentage (33%) in both focus group interaction and individual interviews. This highlights the fact that socio-economic circumstances are significantly impacted by oil spill episodes with minute consideration as majority of the studies have emphasized on land and environmental issues within.

Of course, the oil spills have significantly affected the settlements negatively such that there has been lost of parental values as a result of incapacities of complete responsibilities for adolescent age, pre-school and school children. The incessant increase in cost of living

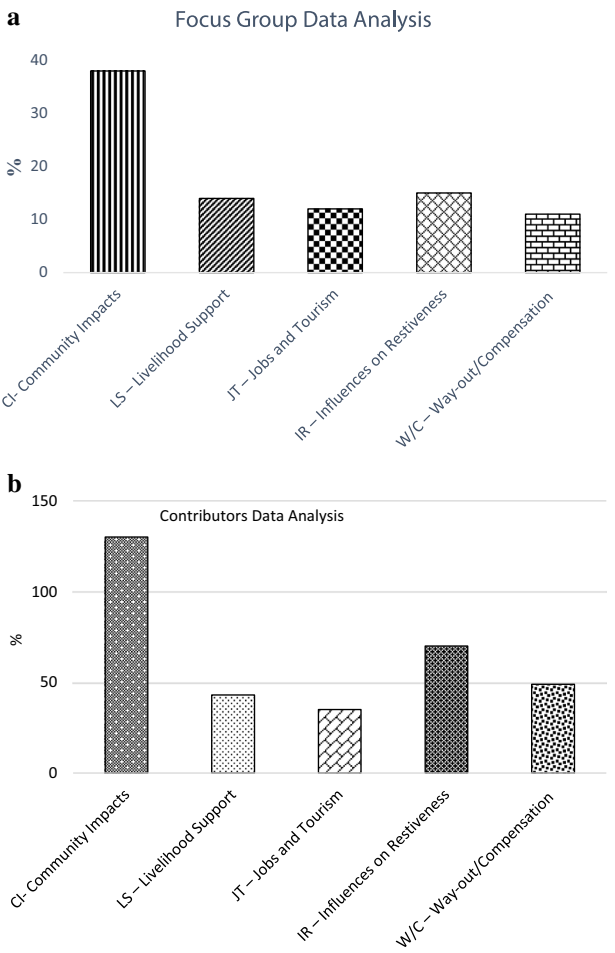

Fig. 1 **a** Focus group. **b** Individual interview

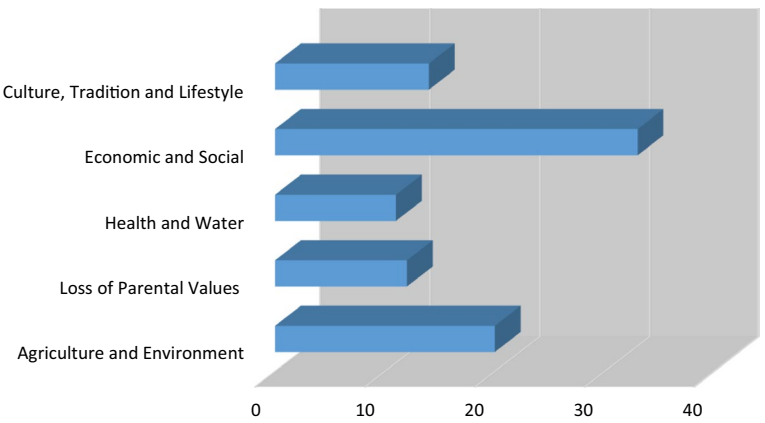

Fig. 2 Factors influencing community impact

and energy to migrate to a far location for fishing and other farming activities has gravely added to parenting incapacities. The settlements are wallowing in neglect and frustrations, as water sources have been contaminated and abandoned for numerous years. The most painful observation during the focus group interaction was when the participants unanimously said "they would have preferred to stay without the oil itself than 'having but not having' we are slaves to our community, society and environment" (Focus Group Interaction) (Fig. 3).

7.2 Theme two: livelihood support structures

In theme two, the livelihood support structure and support mechanisms from the oil companies, government and non-government organizations (NGOs) in the settlements were examined. Data from Fig. 1 reveal over 21 and 13% of coverage from the partakers, which indicates low support structures from the concerned parties. The participants highlighted the fact that ecosystem and the imminent sources of income are vehemently eradicated from their social wellbeing and culture. The absence of livelihood support has, to a great magnitude, affected migration and restiveness in the settlement.

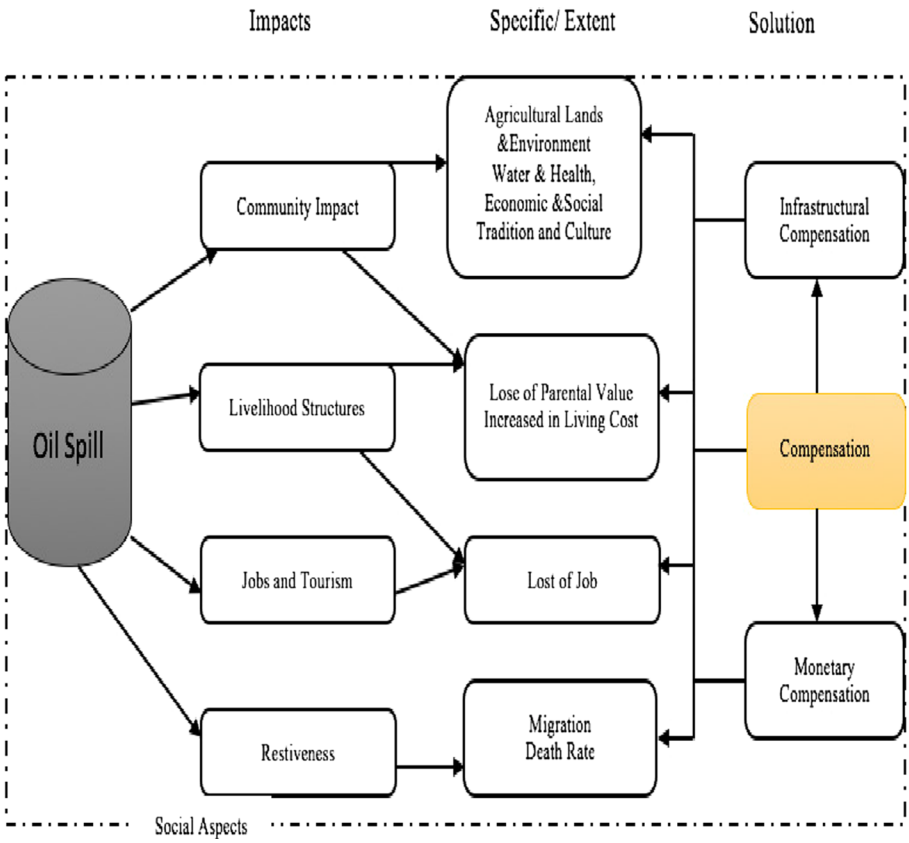

Fig. 3 Impacts flow and solution (Albert et al., 2018b)

The Paucity of livelihood support from the concerned bodies in the settlement has contributed immensely to social tension, cultism, youth restiveness and banditry. The participants complained severely stating that they are actually handicapped in the midst of wealth and now thrive in a "survival of the fittest theory" means, which has impacted their social welfare among others undesirably (Focus Group Discussion).

7.3 Theme three: tourism and Jobs

Theme three took into consideration how oil spill disasters affect tourism and job opportunities in the affected settlements. The theme arose as contributors repeatedly revealed their recreational engagements which were partially influenced by tourists through fishing festivals, swimming and local feasting. According to Fig. 1, the theme tourism and job were coded the least revealing 10 and 12%, respectively. On the contrary, the contributors believe that the severe impacts they experience are usually on social aspects, local economy and water.

7.4 Theme four: influences on restiveness

Theme four examines how oil spill disaster promotes restiveness within settlements and now it could lead to migration. This section is very important as it uncovers the relationship between migration and restiveness with the oil spill milieu. This will encourage support to develop strategies to curb restiveness in diverse settlements. According to Fig. 1, it can be observed that there was a marked influence on settlements' restiveness with important influential factors like; divide and rule and frustration, double standard games and delays in clean-up.

7.5 Theme five: Way-out/standard strategy

Theme five was more like the summary and arose as the contributors emphasized on the 'way-out' from numerous oil spill disasters, having established the significant effects it had on settlements. The loss of jobs, socio-culture, socio-economic impacts and political restiveness are some of the negative consequences that emanated from it. They unanimously proposed several strategies that could install peace and save the situation, which include but not limited to:

- Provision of monthly stipends for old persons within the oil transit and host communities
- Provision of infrastructural compensations and human capital development vis a viz. good hospitals and roads, centers for youth development and training, community involvement in oil exploration activities and
- Participation of youth in decision making.

All these if carefully introduced will drastically decrease the impacts of the oil spill disaster on settlements and its related waves.

8 Discussion

The findings from this study reveal substantial implications of oil spills on the whole livelihood sources in the settlements. It is very painful, to say the least because there are numerous laws and guidelines guiding these activities in Nigeria which has been constantly overlooked. This study posits that there is an increase in cost of living as a result of severe damages to the environment, livelihood structures and dearth of parental values (Fig. 2), forfeiture of customary learning lifestyles as a result of migrations, restive situations, socio-economic layout desolation (Fentiman & Zabbey, 2015). It is pertinent to note that, the identified effects of the oil spill disasters have been in existence for several decades, and those residents in the affected settlements have survived with numerous protests and agitations as means for looking for standard mitigation approach. To a very great extent, the oil spill disasters have led to an exponential elevation in the standard of living within the affected settlements, thereby activating social tension, killing and kidnap.

This study demonstrates elevated degree of impact on the settlement and effects on restiveness. The diverse factors that contribute to restiveness were no payment of compensations, divide and rule policy, frustrations, neglect and delays in clean-up (Chukwuemeka & Aghara, 2010). These highlighted problems were investigated further to develop lasting solutions. Hence, we discovered through the diverse interactions that provision of monthly stipends for old persons within the oil transit and host communities as well as provision of infrastructural compensations and human capital development vis a viz. good hospitals and roads, centers for youth development and training, community involvement in oil exploration activities and participation of youth in decision making will significantly decrease the huge impacts on the settlements. This study also uncovered novel observations amongst residents in the settlements—skin irritations and unexpected increase of distortion in infants. On the contrary, no empirical study is presently available to substantiate the current prevalence and distortion in newborns as we recorded all through data collation within the settlements in this study.

8.1 Challenges confronting compliance with regulatory guidelines and standards

In spite of the existing plethora of environmental policies, laws and regulations in Nigeria, sustaining the stipulated standards earmarked by the regulatory agencies has remained a serious challenge in Nigeria. The challenges that interfere with the implementation of these policies and strategies were first highlighted by Adegoroye (1994) and later on by UNEP (2011) and Elenwo and Akankali (2014). They observed that these challenges are all-encompassing cutting across socio-economic, scientific and cultural issues. Some of the salient challenges raised were:

i. Poor access to information in the surrounding
ii. Lack of availability of funds to key organizations
iii. High cost of ecological equipment and bureaucratic bottlenecks
iv. Conflicting authorities and duties between ministries

In our view, as environmental scientists tracki these environmental impacts, the overall impact of the oil industry is a menace to the local and regional environment, and is also a reason to worry about national development policy.

9 Conclusion

Apparently, it is pertinent to take cognizance of the fact the Nigerian government took a great step when the formulated environmental laws and policies targeted at conforming safe environmental practices by multinational and private organizations. Although, the suitability of these legal frameworks and policies may be hard to be condemned, however, the enforcement of these laws targeted at providing safer environment for human inhabitation is heavily flawed and has rendered the established policies and legal frameworks impotent. In reality, the major reason for the lackadaisical attitude for the Nigerian government towards the enforcement of these policies is due to the corruption level and injustice within the political system of the country which has affected the yearly revenue generation. For this reason, the feel full enforcement of these policies could drastically affect the country's income and export activities. It is a pity because the government has indirectly traded the safety and habitation of her citizens living in Niger Delta region with her economic interest in the region.

10 Limitations

There was difficulty accessing the nine states of the Niger Delta province of Nigeria with different ethnic groups. Niger Delta region covers roughly 25,640 km^2 and is the third biggest delta in the world (Akpomuvie, 2011). Time was a limiting factor for this research as the study only lasted for four weeks. Inter-and intra-community conflicts and wars emanating from communal competition by oil lords generated high degree of unrest and pose serious danger accessing the area let alone seeing someone to communicate with. Lastly, because of the predominant insecurity and high uncertainty in the province, the risk of not obtaining precise data or insufficient support from the contributors could be anticipated.

11 Recommendations

The following recommendations were made as regards the study:

(i) The various environmental policies should be merged and harmonized under one by-law whose title should be "Environmental Protection Policies of Nigeria" to ensure uniformity.
(ii) There is every need to implement the 2006 UNDP report which prioritized environmental sustainability, promotes human partnership development and upholds the goals for sustainable development.
(iii) The biodiversity which includes flora and fauna should be preserved and cared for because any form of alteration to them shifts the natural stability of the ecosystem.
(iv) There should be complete overhauling of outdated environmental laws in Nigeria and replacement with policies that address present challenges.
(v) Environmental laws like pollution abatement, oil and gas laws and international environmental laws that attend to pressing situations should be quickly implemented by the Nigerian government.
(vi) The use of underground pipes should be utilized in place of surface pipes.

(vii) Lastly, federal government should abrogate the Land Use Act of 1978 because the
(viii) Act has destroyed the use of land as a factor of production.

Decalarations

Conflict of interest The authors declare no conflict of interest regarding the publication of these manuscripts and also posit that the information contained in this manuscript were opinions obtained from diverse literature consulted, focus group interactions and individual interviews and does not represent the opinions of the Authors or any sponsored agency.

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