

## ENVIRONMENTAL DEGRADATION AND SUSTAINABLE DEVELOPMENT IN NIGERIA'S NIGER DELTA REGION

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### ABSTRACT

The Niger Delta region of Nigeria is regarded as the reservoir of oil and gas for exploitation and exploration. Discovered over five decades ago, oil became and has remained the backbone of the Nigerian economy, accounting for over 90% of the country's foreign exchange revenue. Today, however, despite the enormous resources that are abound in the region; the large revenues accrued from the region have barely touched the Niger Delta region: the region is marked with deprivation, underdevelopment and unemployment, with majority of its people living in poverty. Similarly, the environment is heavily defaced as a result of crude oil spillages during exploitation and transportation and oil leakages from obsolete pipelines with delayed remediation processes. The development of the area has remained a major challenge for the Nigerian State, with local communities expressing their dissatisfaction with Government efforts. Similarly, exploration activities, which have largely been unsustainable, have resulted in deterioration of the region; with marked effects on land degradation, water pollution and loss of mangrove via oil spillages. These effects have subsequently created restiveness among the youths and crisis between the youths of the region and the Nigerian Government. Establishment of spill centres along coastlines, undertaking actions to minimise risk of oil spills, elimination of gas flaring and more importantly, supervision of the conduct of oil companies licensed to explore oil in the region, implementation of development programmes, provision of infrastructure and basic amenities, among others have been noted to bring about sustainable development and stability in the region.

**Keywords** – Niger Delta, oil exploration, oil exploitation, oil spillage, environmental degradation, sustainable development.

## **INTRODUCTION**

Nigeria, Africa's most populous country, is the continent's largest producer of oil. Nigeria's vast oil resources are mostly concentrated in the onshore and offshore areas of the volatile Niger Delta region (Omeje, 2007). This region has been described as the seat of oil and gas production in the country and placing the country as one of the top ten (10) leading oil producing nation in the world is no longer news (Egberongbe, Nwilo & Badejo, 2006). Oil, being the mainstay of the Nigerian economy, plays a vital role in shaping the economic and political destiny of the country (Ajiboye, Jawande & Adisa, 2009; Ejibunu, 2007; Odularu, 2008). Although Nigeria's oil industry was founded at the beginning of the century, it was not until the end of the civil war (1967-1970) that the oil industry began to play a prominent role in the economic life of the country (Odularu, 2008). With over 40 billion barrels of proven oil reserves and a daily production of about 2.4 million barrels, the country has become one of the major petroleum exporters in the world (Osuoka, 2007). Ranked as the 6<sup>th</sup> petroleum giant in the Organisation of Petroleum Exporting Countries (Enemugwem, 2010), its recoverable reserves are estimated at 35 billion barrels (Odularu, 2008).

Nigeria generates about 95% of its total revenue from oil and gas exports and has earned over \$400 Billion as oil revenue since the early 70s (Agwu, 2013). In 2006, the Nigerian Government estimated it was earning about \$36 billion each year from the petroleum industry (Osuoka, 2007). Despite the vast wealth created by petroleum, the benefits have been slow to trickle down to the majority of the population, who since the 1960s have increasingly abandoned their traditional agricultural practices; for instance, annual production of both cash and food crops dropped significantly in the latter decades of the 20th century: cocoa dropped by 43% (Nigeria was the world's largest cocoa exporter in 1960); rubber dropped by 29%; cotton dropped by 65% and groundnut dropped by 64%. In spite of the large number of skilled, well-paid Nigerians who have been employed by the oil corporations, the majority of Nigerians and most especially the people of the Niger Delta states and the far north have become poorer since the 1960s (Osungade, 2008). The Nigerian economy has thus become almost entirely dependent on oil, with less emphasis been placed on agriculture and other sectors which, prior to oil discovery, were the main stay of the economy. Dependence on oil has been paradoxical in its socio-economic effects on the Nation. While it can be well spoken of in terms of revenue generation, the "curse of oil" has been evident in the Niger Delta oil-rich communities where exploration and exploitation take place; with land degradation and loss of marine lives been predominant, which has subsequently led to unemployment, crisis, and environmental deterioration, among others.

## **NIGERIA'S NIGER DELTA AREA**

The Niger Delta area is the southernmost region of Nigeria. Although it occupies 90% of the Nigerian coastline, it is specifically between the Mahin river estuary in the west and the Cross river estuary in the east (Enemugwem, 2010). A geographical area measuring over 70,000sq km with a population of over 31 million inhabitants, it is broadly viewed to comprise about 16,000 communities in the nine (9) oil producing states of Abia, Akwa Ibom, Bayelsa, Cross Rivers, Delta, Edo, Imo, Ondo and Rivers; with over 40 different ethnic groups who speak more than 250 languages and dialects (Amaechi, 2009). It is the third largest wetland in the world and boasts of the 4<sup>th</sup> largest mangrove area (Stewart, 2006). The delta is described as the home of extraordinary biodiversities, and is also endowed with several mineral deposits. The region has huge oil and gas reservoirs (World Bank, 2008), ranking as the 6<sup>th</sup> world's largest exporter of crude oil and 3<sup>rd</sup> world largest producers of palm oil after Malaysia and Indonesia (Omofonmwan & Odia, 2009). For many decades, the

region has remained the backbone of the Nigerian economy, accounting for over 90% of the country's foreign exchange revenue (Niger Delta Regional Development Master Plan, 2006).

The Niger Delta region produces immense oil wealth and has become Nigeria's 'economic engine'. A total of 57 Multinational and private Nigerian companies have been licensed to explore and produce oil in the region (Samiam, 2007). Government and Multinational oil companies earn substantial revenues and profits from oil and gas exports. Today, however, despite the enormous resources that are abundant in the region, the region still has majority of its people living and dying in poverty (Omofonmwan & Odia, 2009). The region has been described as suffering from "administrative neglect, crumbling social infrastructure and services, high unemployment, social deprivation, abject poverty, filth and squalor, and endemic conflict" (UNDP, 2006). Unemployment, in particular, is a core problem in the Niger Delta region that has many graduate job seekers to take to under-paid and menial jobs. Poverty has become a major socio-economic in present day Nigeria. A disturbing observation about poverty in Nigeria is that it is on the increase, both in incidence and intensity; and despite the wide variety of national and international measures, has been attributed to a multiplicity of causes, of which the most frequently mentioned and emphasized include: inadequate conceptualizations of poverty and development, failure to identify the root causes of the problem, lack of adequate organizational requirement for effective programme implementation, wrong prescriptions given as solution to the problem of poverty and various combinations of these shortcomings (Bassey & Simon, 2012). This area, where the country's wealth is derived from, has been neglected since the 70's when Nigeria's oil became noticeable in the global market (Ajiboye *et al*, 2009). With millions of barrels of oil harvested per day, and over 90% income to Nigeria, the Niger Deltans feel infuriated when their environment remains undeveloped, with few or no infrastructure in health, schools, transportation, industries, Federal and State Government presence, etc. They feel angered, realising that the resources from their own territory are being used to develop the Federal Capital Territory and places outside their territory, to finance bureaucracies and personalised-individualised conspicuous consumption, and official and non official corruption (Oтите, 2008). It performs poorly in comparison with the rest of the country on social indicators such as education, health and the quality of the environment; for instance, it has the highest level of infant mortality; some estimates place the level of youth unemployment at 40%. Statistical estimates suggest that 80% of children in the Niger Delta attend primary schools. The quality of education received by these children has however been declining in recent years, mainly due to a serious shortage of quality teachers, the lack of teaching materials and the disrepair of school facilities (UNDP 2006) .

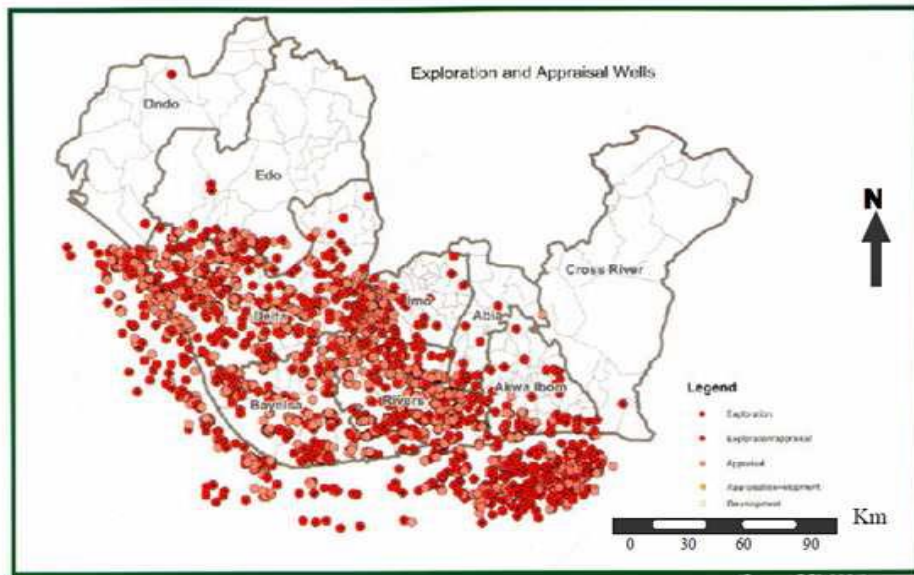
In addition to the aforementioned, the Niger Delta region is disadvantaged by:

- the difficult geographical terrain which increases cost of infrastructure
- poverty in the area (about 54% of the inhabitants live on less than one US dollar per day)
- oil exploration and exploitation which has led to deforestation and ecological degradation, threatening the renewable natural resources in a number of ways (World Bank, 2008)

## **THE UPSTREAM OIL SECTOR OF THE NIGERIAN ECONOMY**

The upstream oil sector is a term commonly used to refer to the searching for and the recovery and production of crude oil and natural gas (also known as exploration and production sector). The history of oil exploration could be traced to the first decade of the last century when oil seepages were first seen at Araromi in the present Ondo State in Nigeria (Udosen, Etok & Geroge, 2009). Encouraged by this occurrence, a German company (the Nigerian Bitumen Corporation) started exploration in that area in 1908 in the very first attempt to search for hydrocarbons in Nigeria. Unfortunately, this

pioneering effort did not last long, and the company terminated its operations at the outbreak of the First World War in 1914. After many years of search, crude oil was discovered at Oloibiri in 1956, and commercial production began in 1958. Today, there are 606 oil fields in the Niger Delta (figure 1); of which 360 are on-shore and 246 offshore (Egberongbe *et al.*, 2006). The majority of the oil reserves are located along the Niger Delta River, offshore Bright of Benin, Gulf of Guinea and the Bright of Bonny. The current exploration activities focused in deep and ultra-deep offshore and some activities in the Chad Basin located northwest of Nigeria. In 2008 Nigeria's crude oil production averaged 1.94 million bbl/d making it the largest oil producer in Africa, with current production slightly over 2.2 million bbl/d as of 2009 (Kadafa, 2012). In 2008, the U.S EIA estimated that Nigeria's production could have reached 2.7 million bbl/d. Recent offshore developments combined with the restart of some shut-in onshore production have boosted crude oil production to an average 2.03 million bbl/d as of 2010 (U.S. EIA, 2012). While it is expected that countries with an abundance of natural resources should prosper (Udosen *et al.* 2009), over the years, it has been observed that nations rich in oil, gas or mineral resources have been disadvantaged in the drive of economic progress. In the Niger Delta area, oil discovery has been a paradox. While it could be conceded that oil exploration and production has engendered massive revenue inflow for Nigeria, for the people of the oil-rich region, "oil" has been described as a curse; at best, a hemlock (Aghalino, 2009). Nigeria exports over a million barrels of oil, mainly to the United States. Oil exports provide over 90% of Government foreign revenue. Federal annual budget from oil revenue as at 2004 was estimated at \$1.78 trillion. In 2008, this figure rose to \$2.8 trillion. In 2005, the Oil and Gas Journal estimated Nigeria's proven oil reserves as 32.5 billion barrels in the Niger Delta area (Egberongbe *et al.*, 2006). Nigeria has four oil refineries with an estimated total refining capacity of 445,000 barrels per day (Anifowose, 2008). The first and oldest being the Port Harcourt refinery, commissioned in 1965. It had an initial capacity of 35,000 barrels per day, which was later expanded to 60,000 barrels per day of light crude oil. The Port Harcourt refinery has a second refinery with a capacity of 150,000 barrels per day (Ukoli 2005). The Warri refinery was commissioned in 1978 with an initial capacity of 100,000 barrels per day of light crude oil. This was later expanded in 1986 to 125,000 barrels per day; while the Kaduna refinery which had an initial capacity of 100,000 barrels per day in 1980 was later upgraded to 110,000 barrels per day in 1986 (Adeyemi & Ogunseitan, 1985). However, in spite of the large oil revenues and available refineries, premium motor spirit for local consumption is imported at nearly 100% (Udosen *et al.* 2009). There has been a significant higher rate of oil spill in the area than in the developed nations. The environmental cost of oil exploitations are said to be inevitable: mangrove losses, gas flaring, industrial wastes, acid rain, oil pollution and heavy metal contamination are known to bring about physical deterioration of the Niger delta region (Moffat & Linden, 1995). The gas flaring in the Niger Delta causes more greenhouse gases than all of sub-Saharan Africa combined (Samiam, 2007). With the recently reported oil spillage in Ogoniland (an oil-rich community), the United Nations reported that its restoration could prove to be the world's most wide-ranging and long term clean up exercise ever undertaken (with estimates of 25-30 years) if contaminated drinking waters, lands, creeks and important ecosystems are to be brought back to full productive health (UNEP, 2011).



Source: NDRDMP, 2006

**Figure 1: Niger Delta Showing the Distribution onshore and Offshore Fields**

### **OIL SPILLAGE IN NIGERIA**

Oil spill is categorised into four groups: minor, medium, major and disaster (Egberongbe *et al.*, 2006). The minor spill takes place when the oil discharge is less than 25 barrels in inland waters or less than 250 barrels on land, offshore or coastal waters that does not pose a threat to the public health or welfare. In the case of the medium, the spill must be 250 barrels or less in the inland water or 250 to 2,500 barrels on land, offshore and coastal water while for the major spill, the discharge to the inland waters is in excess of 250 barrels on land, offshore or coastal waters. The “disaster” refers to any uncontrolled well blowout, pipeline rupture or storage tank failure which poses an imminent threat to the public health or welfare (Ntukekpo, 1996).

In Nigeria, 50% of oil spills are due to corrosion; 28% to sabotage; and 21% to oil production. Only 1% is due to engineering drills, inability to effectively control wells, machine failures and inadequate care in loading and unloading oil vessels (Nwilo & Badejo, 2005). Oil spill incidents have occurred in various parts of the coastal areas. Records between 1976 and 2001 alone indicate that 6,817 oil spills occurred in Nigeria, resulting in the loss of approximately three million barrels of oil (UNDP, 2006). This represents an average of 273 oil spills and 115,000 barrels/year spilled during the aforementioned period. Some major spills are the Escravos spill in 1978 of about 300,000 barrels; SPDC’s Forcados Terminal tank in 1978 of about 580,000 barrels; Jesse fire incident in 1998 of about 40,000 barrels, etc (Egberongbe *et al.*, 2006). In August and December 2008, two major spills disrupted the lives of approximately 69,000 people living in Bodo, a town in Ogoniland in the Niger Delta. Both spills continued for weeks before they were stopped. Estimates suggest that the volume spilled was as large as the Exxon Valdez spill in Alaska 1989. The most publicised spill in Nigeria occurred in 1980 when a total of 37 million litres got spilled as a result of a blow-out at Funiwa 5 offshore station (Nwilo & Badejo, 2005). According to DPR, between 1976 and 1996, a total of 4,647 incidents resulted in oil spill of approximately 2,369,470 barrels. Of this quantity, an estimated 1.8 million barrels (about 77%) were lost to the environment (Egberongbe *et al.*, 2006; Nwilo & Badejo, 2005). Mobil’s Idaho blows in January, 1999 resulted in spilling

of 40,000 barrels of oil (Abosedo, 2010). Similarly, Shell reports that it spilled 7,350 barrels of oil between 1989 and 1994; and a total of 221 spills occurred in the course of its operation (Aghalino, 2009). It is however not unlikely that these figures are under-reported. Grevy (1995) noted that oil companies tend to under-estimate the incidence of oil spillage and the total spillage might be ten times as high.

According to Nigeria's National Oil Spills Detection and Response Agency (NOSDRA), approximately 2,400 oil spills have been reported between 2006 and 2010 that resulted from sabotage, bunkering and poor infrastructure. The amount of oil spilled in Nigeria has been estimated to be around 260,000 barrels per year for the past 50 years according to a report cited in New York Times (Elendu reports, 2011). Available data indicates that approximately 6%, 25% and 69% respectively of total oil spills were in land, swamp and offshore environment (Galadima, Garba, Leke, AlMustapha and Adam, 2011).

### **IMPLICATIONS OF OIL EXPLORATION IN THE NIGER DELTA REGION**

The effect of oil resource extraction on the Niger delta environment has been very glaring in terms of its negative effect on the region (Celestine, 2003). Over the last four decades, oil exploration and exploitation has impacted disastrously on the socio-physical environment of the Niger delta oil-bearing communities, massively threatening the subsistent peasant economy and the environment and hence, the entire livelihood and basic survival of the people (Eregha & Irughe, 2009). Similarly, oil prospecting and exploitation processes pollute underground water (Ojarokutu & Gilbert, 2010). The amount of deprivation and damages the Multinational companies which are into crude oil explorations have caused in most of these communities are numerous. Notable among them include pollution, environmental degradation leading to low agricultural yield, destruction of aquatic lives, home displacement, etc (Omofonmwan & Gilbert, 2009).

There is no doubt that the Nigerian oil industry has affected the country in a variety of ways. On the one hand, it has fashioned a remarkable economic landscape for the country. On the other hand, oil exploration has adversely affected fishing and farming, which are traditional means of livelihood of the people. If the oil industry is considered in view of its enormous contribution to foreign exchange earnings, it has achieved remarkable success. However, when considered with respect to its negative effects on the socio-economic life and the environment, it has left a balance sheet of ecological and socio-physical disaster (Celestine, 2003).

Some of the environmental and social implications of oil exploitation have been identified:

- Contamination of streams and rivers
- Oil spill (destroying mangrove, marine lives, farmlands, etc)
- Forest destruction and biodiversity loss
- Environmental effect of gas flaring
- Youth restiveness and hostage taking
- Effluent discharge and disposal
- Gross socio-economic underdevelopment
- Conflict between host communities and oil companies
- Army and police brutality
- Intra and inter community conflict, amongst others (Celestine, 2003).

The presence of the aforementioned implications of oil exploitation in the region created room for restiveness of the youths, which subsequently brought crisis in the region.

## **CRISIS IN THE NIGER DELTA REGION**

Peace and security in the Niger Delta region have been topical issues in political and developmental circles, not only within the Nigerian nation itself but outside its borders. The presence of oil resources in developing countries presents a huge paradox. On the one hand, oil and gas discoveries make the eradication of poverty and the development of strong economies a possibility. On the other hand, the “curse of oil” is evident in many oil-rich countries worldwide: a high incidence of corruption and violent conflict, and low scores in education and health service and economic strength is usually observed within the oil-rich states (Ejibunu, 2007).

The Niger Delta region of Nigeria is been described as a heterogeneous, multi-cultural, ethnically diverse region. These features indicate that the region is an area for potential *Hobbesian* competition and conflict (Ajiboye *et al.* 2009). The oil producing communities have thus been characterised with fierce violent conflict for over a decade; the conflict being between successive Nigerian Governments and their corroborating oil companies, and militant groups from the region (Unabia, 2010). It is now no longer in doubt that there is a crisis of monumental proportions in the Niger Delta and that this crisis needs to be resolved because of its implications for development and socio-cultural relations in the Niger Delta (Iyayi, 2008). This socially devastating and economically disruptive crisis raises fundamental concerns about how the Western Multinational companies behave towards their host country people, environment and Government (Peel, 2005). It has been argued (Aboribo, 2008) that the insecurity/crisis recorded in the region is largely due to the inability of the Governments and Multinational oil firms to channel sufficient resources in the area.

What is today known as the Niger Delta crisis is a culmination and expression of pent up anger by a people from whose lands and rivers the bulk of the nation’s revenue is exhumed in the form of oil and gas, which translates to billions of petro-dollars yearly, but with the people of the area left in squalor, neglect, abject poverty and in a general state of underdevelopment (Amaechi, 2009). The violence in the region has worsened as weapons have flowed into the region and community members have become more deeply involved in taking oil from the pipelines to sell on the black market—a practice commonly known as ‘oil bunkering’ (Peel, 2005). This practice has subsequently led to pipeline damage, causing loss of production, pollution and forcing companies to shut-in production (U.S EIA, 2012). Central to the Niger Delta crisis is poverty and unemployment amidst unimaginable oil wealth. The oil producing communities do seek to control their oil or at least participate actively in decision making on matters affecting their areas (Omojemite, 2012). Factors observed to be responsible for the crisis have been noted, viz :

- Structural injustices (this led to the marginalisation of the region)
- Environmental damage via oil spillage, gas flaring, oil pipeline explosion, etc
- Lack of development and unemployment
- Human rights violation
- Infrastructural development
- Bad governance/corruption, amongst others (Ejibunu, 2007)

Another factor observed to have further fuelled tension in the region is the failure of the Multinational corporations to meet with their earlier promises to their host communities (Omofonmwan & Gilbert, 2009). The sense of relentless crisis

in the area deepened when a group of armed rebels under the name of Movement for the Emancipation of the Niger Delta (MEND) intensified attacks on pumping stations operated by Shell oil. The incidence of crisis has been a topical issue both within and outside Nigeria. Of interest have been ecological degradation, human rights violation and strangulation of the ethnic means of survival. Towns and villages in the area have continued to experience the ravaging effect of oil exploits: roads have been destroyed, rural farming, fishing and hunting ventures stifled (Ejibunu, 2007). This unfortunately has been the daily experiences of the inhabitants of the Niger Delta area. Also, prior to the Federal Government's introduction of the amnesty programme, the persistent incidence of oil-workers hostage taking, blockage of oil facilities, oil pipeline vandalization and human rights violations with subsequent damage to corporate reputations have had a negative impact on both government revenue and corporate profit.

### **ENVIRONMENTAL DEGRADATION, ENVIRONMENTAL STABILITY AND SUSTAINABLE DEVELOPMENT IN THE NIGER DELTA REGION**

The Niger-Delta region is dominated by rural communities that depend solely on the natural environment for subsistence living (Eregha & Irughe, 2009). More than seventy percent of the people depend on natural environment for living and non-living livelihood (UNDP, 2006). In general, many developmental activities in developing nations were leaving growing number of people poor and vulnerable: poor people are vulnerable to environmental dynamics because social, political and economic exclusion indicates they are left with few choices about where they live (Aluko, 2004). Hence, they bear the adverse effects of natural hazards, biodiversity loss and forest depletion, pollution and the negative impact of industrialization vis-à-vis oil exploration. Environmental degradation is thus, a major cause of productivity losses and poor human health in the Niger Delta (World Bank, 1995).

It is widely accepted that if the environment is insignificantly being degraded and the degradation is not accounted for, then development will be wrongly measured. The availability of abundant human resources, if utilized, could serve as a great catalyst to sustainable development but if otherwise, could exert negative influence on the economy. Sustainable development is not therefore just about protecting the environment but about how we can make best productive use of our natural resources in order to eliminate poverty and improve human welfare and quality of life (Aluko, 2004). Although there is no universal agreement as to the definition of sustainable development, certain elements common in most definitions have been identified:

- Concern for economic and social viability of future generations
- Poverty alleviation
- Positive impact on the environment and resource use
- Local participation in the planning and execution of developmental projects
- (Aluko, 2004).

Before the advent of commercial oil production in the Niger Delta over fifty years ago (in 1958), the region was essentially a pristine environment which supported substantial subsistence resources for the mostly sedentary populations. These included among other things, medicinal herbs and barks, fish and shrimp, crabs and clams, wood for energy and shelter, as well as a stable soil for farming and habitat for exotic wildlife. There was the Delta elephant, the white crested monkey, the river hippopotamus, as well as a colourful array of exotic birds, crocodiles, turtles and alligators. The region also accounted for a large percentage of Nigeria's commercial fisheries industry (Afinota &



Ojatorotu, 2009). With increasing exploitation and drilling activities, the environment has been heavily defaced as earlier mentioned. Its development has thus remained a major challenge for the Nigerian State with local communities increasing their expression of dissatisfaction with Government efforts to abating the present problem (Osuoka, 2007).

The World Bank (1995) described environmental degradation as a major cause of productivity losses and poor human health in the Niger Delta region. The major causes of environmental degradation are provided in table 1 below. A significant feature of environmental degradation is that it is largely the outcome of pollution and unsustainable exploitation of natural resources (Ibaba, 2010). The FEPA Act (1990) stated that there are numerous environmental laws which seek to conserve, guide, control and manage the exploitation of natural resources along with the controls prohibition. To this end, the unsustainable exploitation of the Niger Delta environment is blamed on the inability/failure of the environmental laws to correct acts as well as attitudes and beliefs which negatively impact the environment (Ibaba, 2010). The isolation of environmental laws from development programmes and policies of the state, faults in the implementation strategies, and inadequate penalties for violation, non-involvement of citizenry in the formulation and execution of the laws are seen as factors which have become obstacles to proper execution of the law. In all however, lack of enforcement of the law stands as the most fundamental cause of the inability of the legislation to protect the Niger Delta environment (World Bank, 1995). This is blamed on inadequate funding, corruption, lack of operational facilities, low involvement of professionals, uncooperative attitudes of multi nationals and the centralisation of legislative powers (Ibaba, 2010). Meanwhile, funds available for developing the region are grossly inadequate; the poor state of infrastructure makes life expensive in terms of road network and transportation; poverty also

**Table 1: Major causes of Environmental degradation in the Niger Delta**

<b>Problem type</b>	<b>Problem</b>	<b>Direct Causes</b>	<b>Indirect Causes</b>
<b>Land Resource Degradation</b>	Erosion- coastal	Sediment loss Infrastructure Construction	Upstream dams, Population pressure, Weak enforcement, Natural and human induced and subsidence, sea rise level
	Erosion- riverbank	Heavy rainfall Unsustainable farming Sediment loss	Upstream dams, population pressure, weak enforcement, natural and human induced and subsidence, Sea rise level
	Flooding	Heavy rainfall Agricultural expansion Reduced upstream water retention	Upstream dams Population pressure, Weak enforcement, Natural and human induced and subsidence, Sea rise level
	Sea rise level		International air emission
	Agricultural land	Climate change	Population pressure, Upstream dams
	Degradation	Unsustainable farming Decreased sedimentation Excessive flooding Increased erosion	Lack of inputs
<b>Renewable Resource Degradation</b>	Fisheries -stock depletion \	Fishing techniques Fishing intensity Poor harvest losses	Population pressure Weak enforcement Open access (limited)
	-habitat degradation	Trawling pollution  Oil activities	Post harvest Losses Weak enforcement  Open access, upstream dams
	Forestry -deforestation, degrading	Nutrient loss	Population pressure, weak enforcement, infrastructure expansion, open access (limited)
		Agricultural expansion Infrastructure expansion	
	Biodiversity loss	Indiscriminate logging	Incomplete markets Population pressure, Infrastructure expansion

<b>Environmental Resource Degradation</b>	Exotic species	Hunting	Weak enforcement, Open access (limited)
	Expansion-	Habitat loss	Incomplete markets
	1) water hyacinth	Introduction (1,2), Forest degradation	Weak enforcement, Open access (limited)
	2) Nypa palm water contamination		Weak enforcement, Incomplete markets
	-Oil		Weak enforcement, Open access (limited), Incomplete markets
		Inadequate wastewater management	
	-Industrial	Spills and leaks	Weak enforcement Open access (limited), Incomplete markets
		Inadequate wastewater management	
	-Toxic and hazardous substances		Weak enforcement, Open access, Incomplete markets
		Inadequate wastewater management	
-Others	Inadequate urban infrastructure	Weak enforcement Open access, Incomplete markets, , Subsidies	
	Inadequate sewage treatment	Population pressure	
Air pollution		Weak enforcement	
-gas flaring, industrial vehicular	Industrial population vehicular emissions	Open access, Incomplete markets	
Solid waste			
-industrial, municipal	Inadequate waste management Inadequate urban infrastructure		

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Source: World Bank, 1995

leads to unsustainable exploitation of natural resources as the rural dwellers use fuel woods for domestic purposes, which subsequently leads to deforestation. Unemployment and persistent poverty have been identified as the major hindrances to sustainable development programmes in the region (Bassey & Simon, 2012).

In recent times, there has been a paradigm shift in the ideals of development across the international community. The new focus of economic development is sustainability. Sustainable development is a goal that emphasizes a long term (intergenerational) and holistic perspective, integrating economic, political, social, cultural, technological and environmental dimensions (Omojemite, 2012). The concept of sustainable development is related to the need for the institutionalization of best business practices by companies, corporations and sundry business concerns as well as governments in processes of production, distribution and consumption, vis-à-vis their economic, socio-political and environmental spheres of activity (Afinotan & Ojajorotu, 2009).

Sustainable development has been described as that development that meets the needs and aspirations of the present generations, without compromising the ability to meet the need of future generations. According to a World Bank report (1995), sustainable development in the Niger Delta region requires a balance between accelerated economic growth and environmental protection to ensure that people living in the area benefit as much as possible from the exploitation of their resources. Sustainable development is not just about protecting the environment but about how best productive use of natural resources can be made in order to eliminate poverty and improve human welfare and quality of life (Aluko, 2004). The methods of achieving sustainable development include: effective waste management, afforestation programmes, pollution control, conservation of natural resources and proper environmental management plan while the principles of sustainable development include: due care, due diligence, environmental management plan, integrating environmental management plan into project life cycle and good housekeeping (Agwu, 2013).

Measures taken so far to achieving sustainable development in the Niger Delta have been noted to include:

- The Wilkins' Commission in 1958
- The establishment of Niger-Delta Board in 1961
- Niger-Delta Basin and Rural Development Authority(NDBRDA) in 1976
- Oil and Mineral Producing Areas Development Commission (OMPADEC) in 1992
- Niger-Delta Development Commission (NDDC) in the year 2000 and lastly,
- Ministry of the Niger-Delta in the year 2008 (Onwuebele, 2012)

Despite these efforts, the quality of life and the environment has continued to worsen thereby calling for a new development pathways. The problem of environmental degradation and how it has hardened the sustainable development and led to the impoverishment of the Niger Delta people has been acknowledged by people in both national and international circles, scholars, Government and NGO's, oil companies, etc. It is however sad to observe that in spite of this acknowledgement of issues involved in environmental degradation, nothing much has been done to address the plight of the people of the Niger Delta (Aluko, 2004). A significant feature of environmental degradation is that it is largely the outcome of pollution and unsustainable exploitation of natural resources (Ibaba, 2010). The issue of environmental sustainability cannot be overemphasized in the Niger-Delta region as this is fundamental to the overall well being and the development of the area, especially the well being of future generation which is an important aspect of environmental economics (Eregha & Irughe, 2009). In Nigeria, there are numerous environmental laws which seek to

conserve, guide, control and manage the exploitation of natural resources along with the controls prohibition. To this end, the unsustainable exploitation of the Niger Delta environment is blamed on the inability/failure of the environmental laws to correct acts as well as attitudes and beliefs which negatively impact the environment (Ibaba, 2010).

The enthronement of sustainable development in Nigeria is a national objective that is highly ranked. To this end, state legislation on the environment has become a major instrument in the quest for sustainable development; and the laws seek essentially to correct acts and attitudes which degrade the environment and at the same time guide and control natural resource exploitation. It is however clear that environmental law have failed to protect the environment; and this subsequently led to the establishment of NESREA in 2006 and the Ministry of Niger Delta Affairs in 2008. Meanwhile, the effectiveness of the laws has impeded the development of the Niger Delta area.

Seeking peace and security in the region should best be conceived as an inevitable outcome of sustainable development of the Niger Delta region. Within the context of sustainable development, the role of physical infrastructure is an important one. Sustainable infrastructure is one that would avoid bottlenecks and service disruptions and would support a range of production and consumption and it encompasses the energy, transport, water and telecommunication sectors. These sectors with respect to infrastructural sustainability have been previously reported (Omojemite, 2012). Although sustainable infrastructure should form the bedrock of sustainable development in the Niger Delta, the ultimate strategy is sustainable development of the economic sectors. In other words, ensuring quality infrastructure is not an end in itself but a means to an end. The end being, the 'wellbeing', through sustainable development of the economic sectors. The Niger Delta region is not yet industrialized although it holds high potentials for industrialization. Given the wide and diversified agricultural base of the region, the potential for agro allied industries are high. Agricultural feed mills, rubber processing, soap making, body creams and lotions, food canning, palm oil and palm kernel mills etc., are either absent or are inadequate in number in this region. This has led to the inability of farmers to preserve their farm products from year to year. This has led to the situation where farmers have to sell their produce at relatively low prices during the harvest seasons. Agro-allied industries that would add value to the farm products are needed in the Niger Delta region. The oil and gas rich Niger Delta also has potential for petroleum and gas related industries. At present the bulk of the oil and gas produced in the region is exported. There are only three refineries in the region as a whole. More refineries and petrochemical plants are needed in the Niger Delta so that the oil and gas resources of the region could have a forward and backward linkage effects in the region (Omojemite, 2012).

From another developmental perspective, Ibaba (2010) suggested that the most likely option on the way forward for sustainable development in the Niger Delta area was the institution of good governance (at all levels of Government): a government that is predicated on transparency, accountability, frugality in the management of natural resources, sincerity, discipline and commitment to national development objective. In addition, with a proper view of achieving sustainable development, the three parties namely: the host communities, the Multinational oil companies and the Federal Government have their various roles to play:

The Federal Government should:

- Consider more seriously increasing the revenue allocated to the Niger Delta region as well as allowing them controls their resources.
- Ensure that all State Governments in the Niger Delta region allow their budgeting process executing and monitoring have communal inputs.
- Effectively apply and enforce anti-pollution laws and regulations necessary to bring about desirable objectives; no matter how they appear to be.
- Incorporate international principles on human rights and the environment into domestic legal systems.
- Provide social infrastructures in order to enhance the quality of life
- Implement development programmes
- Institute mechanisms at state and local Government levels to curb corruption
- Supervise the conduct of oil companies since Multinational companies are sources of conflict.
- Initiate attractive programmes of rehabilitation and re-integration of militants
- Dialogue with relevant stakeholders with a view to resolving crisis (Ejibunu, 2007)
- Establish spill centres along coastlines
- Initiate the use of GIS to identify spill response and provide information about the closest resource of oil spill response equipment and personnel (Nwilo and Badejo, 2005).
- Make adequate reparations for environmental devastation to move the people of the area from threshold poverty (Osuoka, 2007)

Armed conflicts and hostilities in the Niger Delta area are mutually exclusive to sustainable development. Thus to conduct business in the area in a sustainable way, the Multinational oil companies should ensure that:

- Consultation of the host communities is effective and should cooperate fully with authorities, inquiring into the causes of oil spills and ensure rapid cleanup after oil spills; and a further step to provide prompt and adequate compensations to the victims of the oil spills.
- Adequate compensation should be paid wherever there are oil spills and the pollution cleared within stipulated time.
- They undertake preventive actions for the future to minimise risk of oil spills such as investing in new pipelines and undertaking regular and adequate maintenance.
- Gas flaring is eliminated.
- They comply with international best practices to ensure the protection of natural habitats through uncompromising implementation of the demands of the doctrine of corporate social responsibility.

The aforementioned recommendations are not imperative for the Federal Government and the Multinational oil companies alone; the host communities have their roles to play in moving towards achieving a sustainable Niger Delta:

Basically, the host communities should insist on planned and controlled production to ensure the progressive replacement of the non-renewable resources by a renewable product that is free of environmental hazards (Stewart, 2006).

## CONCLUSION

Oil has played a major role in development dynamics of the Nigerian State. However, Nigeria's oil wealth has brought more ruin than blessing to the natural environment. Today, the rising cost of the world's oil is blamed on the unrest in the Niger Delta (Samiam, 2007).

Crisis in the Niger Delta region has of recent gotten international attention because of the strategic importance of the region to global oil supply and energy. In view of this, coupled with the fact that the crisis, if not checked, could have serious debilitating effect on Nigeria and stability of the West African sub-region, there is the need for its swift resolution (Ejibunu, 2007). The insecurity witnessed in the region could be attributed to its neglect in terms of sustainable development by Government on one hand, and on the Multinational oil companies on the other (Omojemite, 2012). Oil exploration and production has resulted in serious damage to agricultural life and land degradation. This has subsequently brought poverty and hunger to the people and also produced militancy and restiveness on the parts of the youths.

The Niger Delta area remains one of the poorest and most volatile places on earth. For as long as these problems persist, the world oil would be affected by events from the Niger Delta area. A rather quick response in ensuring peace, energy security, energy exploitation and exploration and ensuring sustainable development of the Niger Delta region is thus necessitated for a stable national economy. For the attainment of these objectives, a complete re-orientation and change in the attitude of the Nigerian Federal Government and licensed oil companies involved in oil activities towards their host oil-rich communities is a sine qua non. It has been suggested that sustainable development of infrastructure and economic sectors in the region would create employment opportunities for the militant youths thus, diverting their attentions from criminality to productive enterprise. The newly created Ministry of the Niger Delta Affairs should be provided with enough funds to execute its master plan and to carry out integrated sustainable development programmes in the oil producing communities to revitalize the Niger Delta economy by providing viable options to combat unemployment and poverty that will help the Federal Government achieve sustainable development, peace, human and environmental security in the Niger Delta region.

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