

## Oil Exploration and Spillage in the Niger Delta of Nigeria

Adati Ayuba Kadafa

Department of Environmental Management, Faculty of Environmental Studies, Universiti Putra Malaysia.  
43400 Darul Eshan, Selangor, Malaysia. \*Email:kwaala@yahoo.com

### Abstract

Colonel Drake drilled a 70 feet well in Titusville, Pennsylvania and discovered oil. In 1956, Shell British Petroleum discovered crude oil in the Niger Delta within Nigeria and since then oil exploration and exploitation have been ongoing for several decades. The Niger Delta consists of highly diverse ecosystems supportive of numerous species of terrestrial and aquatic fauna and flora and is the largest wetland in Africa. The oil spillages ongoing for several decades have characterized the area by contaminated rivers, stream and forest, which constitutes the major income source for the majority of the local population inhabiting the region, which are mainly dependent on ecosystem services. Approximately 1.5 million tons of oil has been spilled within the Niger Delta region over the span of several decades, most of which was partially cleaned or not cleaned totally, making some areas wastelands. Statistical analysis carried out for oil spillage quantities and incidence between 1976-2000, showed decrease in oil spillage quantity and increase in oil spillage incidence. These results were based on figures the oil companies submit to the government and one would not expect them to represent the actual figures. Reliable data could not be obtained for the most recent spills, more extensive evaluation is required.

**Keywords:** Oil, Spillage, Niger Delta, Nigeria

### 1. Introduction

Oil spillage is a global issue that has been occurring since the discovery of crude oil, which was part of the industrial revolution. The total spillage of petroleum into the oceans, seas and rivers through human activities is estimated to range 0.7-1.7 million tons per year ([www.science.irank.org](http://www.science.irank.org)). Oil spills have posed a major threat to the environment of the oil producing areas, which if not effectively checked can lead to the total destruction of ecosystems. The Niger Delta is among the ten most important wetland and marine ecosystems in the world. The oil industry located within this region has contributed immensely to the growth and development of the country which is a fact that cannot be disputed but unsustainable oil exploration activities has rendered the Niger Delta region one of the five most severely petroleum damaged ecosystems in the world. Studies have shown that the quantity of oil spilled over 50 years was a least 9-13 million barrels, which is equivalent to 50 Exxon Valdez spills (FME, et. al. 2006).

In 1956, Shell British Petroleum (now Royal Dutch Shell) discovered crude oil at a village Oloibiri in Bayelsa state located within the Niger Delta of Nigeria (Anifowose, 2008; Onuoha, 2008) and commercial production began in 1958. As of 2006, there are eleven (11) oil companies operating one hundred and fifty-nine (159) oil fields and one thousand four hundred and eighty-one (1,481) wells in the Niger Delta in Nigeria (The Guardian, 2006). Human activities and those of oil exploration and exploitation raise a number of issues such as depletion of biodiversity, coastal and riverbank erosion, flooding, oil spillage, gas flaring, noise pollution, sewage and wastewater pollution, land degradation and soil fertility loss and deforestation, which are all major environmental issues. Oil exploration and exploitation has been ongoing for several decades in the Niger Delta. It has had disastrous impacts on the environment in the region and has adversely affected people inhabiting that region. Odeyumi and Ogunseitan (1985) wrote a paper on the growth and development of the oil and petrochemical industry in Nigeria with emphasis to the notable cases of pollution disturbances during the 25 years of its existence, highlighting causes and effects on the social, economic, agricultural and ecological characteristic on human and other biotic occupants of the oil region. Recommendations were given as guide, for the activities of the Nigerian National Petroleum Corporation (NNPC) in the prevention, control, treatment of oil and petrochemical pollution. Celestine (2003) discussed the effects of intensive oil resource extraction on the environment of the oil bearing Niger Delta communities and environmental problems such as resource degradation, pollution and poverty in the Niger Delta communities. Tolulope (2004) wrote on the oil spillage incidences in Nigeria with its negative implication to the environment, emphasizing on the extent of hazards and the tendency of petroleum products to pollute the environment. Twumasi and Merem (2006) explored the application of GIS and remote sensing in the tropical coastal zone environment with emphasis on the

environmental impact of development in the Niger Delta region. The paper presented a vivid overview of issues, environmental effects and factors. The results showed decline in water bodies, mangrove forest and several cases of oil spills. Chukuezi (2006) wrote a paper on the implications of oil exploration and environmental degradation to sustainable development in the Niger Delta. Explaining this has culminated into poverty, restiveness and human insecurity in the region.

In general, the assessment of other researchers into this issue acknowledges that the oil industry has undoubtedly brought economic benefit to the Nigerian state but has left environmental pollution problems with visible physical destruction. The prevention of environmental degradation is a task that must be pursued vigorously. Amu (1997) said that the identification of problems, design and applying appropriate sanctions is a major issue that needs to be resolved and has to start with change in the present judicial system and attitude towards the litigation of environmental issues as well as a reform in environmental policies.

## **2. Background on Nigeria and the Niger Delta Region**

Nigeria has a coastal line of approximately 85km towards the Atlantic Ocean lying between latitude 4°15' to 4°50' and longitude 5°25' to 7°37' with a land mass of about 28000sq/km area within the coastal region. The surface area of the continental shelf is 46300sq/km. The coastal areas consist of freshwater swamp, mangrove swamp, beach ridges, sand bars, lagoons marshes and tidal channels. Nigeria has a total land mass of 923,768sq/km; 918,768sq/km being terrestrial land and 13000 sq/km being aquatic (CIA World Fact Book). The coastal area is humid with a mean average temperature of 24-32°C and coastal area has an average annual rainfall ranging between 1,500-4,000mm (Kuruk, 2004). Nigeria has two large rivers; the Niger-Benue and the Chad River. There are several rivers that channel into the Atlantic Ocean directly, all other flowing waters flow into the Chad basin or into the lower Niger to the sea eventually (Kuruk, 2004). The Niger Delta is located in the Atlantic coast of Southern Nigeria and is the world's second largest delta with a coastline of about 450km which ends at Imo river entrance (Awosika, 1995). The region is about 20,000sq/km as it is the largest wetland in Africa and among the third largest in the world (Powell, et al., 1985; CLO, 2002; Anifowose, 2008; Chinweze and Abiola-Oloke, 2009). 2,370sq/km of the Niger Delta area consists of rivers, creeks, estuaries and stagnant swamps cover approximately 8600sq/km, the Delta mangrove swamp spans about 1900sq/km as the largest mangrove swamp in Africa (Awosika1995). The Niger Delta is classified as a tropical rainforest with ecosystems comprising of diverse species of flora and fauna both aquatic and terrestrial species. The region can be classified into four ecological zones; coastal inland zone, freshwater zone, lowland rainforest zone, mangrove swamp zone and this region is considered one of the ten most important wetlands and marine ecosystems in the world (FME, et al., 2006; ANEEJ, 2004).

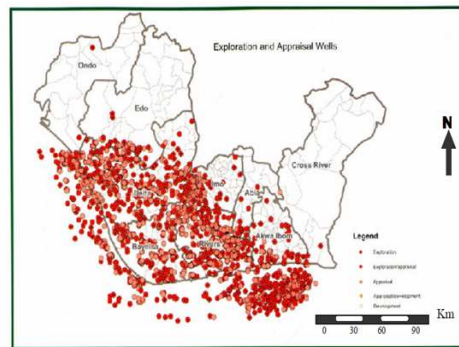
The Niger Delta consist of the following states Abia, Akwa Ibom, Bayelsa, Cross River, Delta, Edo, Ondo, Imo and Rivers respectively. As of 1991 from the National Census estimated about 25% of the entire Nigerian population lives within the Niger Delta region (Twumasi and Merem, 2006; Uyigüe and Agho, 2007). The Niger Delta region has a steady growing population of approximately 30 million people as of 2005, accounting for more than 23% of Nigerias total population Twumasi and Merem, 2006; Uyigüe and Agho 2007).

## **3. Oil Production in Nigeria**

Nigeria has been a member of Organization of Petroleum Exporting Countries (OPEC) since 1971. It has the largest natural gas reserve in Africa, has the second largest oil reserve in Africa and is the African continents primary oil producer. As of the 1980s oil revenue provided 90% of Nigeria foreign exchange earnings and 85% of the government revenue (Odeyemi and Ogunseitan 1985), with estimated reserves extending beyond 20-30 years (NNPC, 1984). Shell D'Arcy the pioneer oil company in Nigeria, which started commercial production in 1958 with a production rate of 5100 barrels per day and a peak production of 2.44 million barrels per day over the next few years (Amu, 1982). According to NNPC (1984) through OPEC, production rates dropped to 1.5 million barrels per day from the activities of 10 international companies working 122 fields, containing over 970 oil wells.

Nigeria has four oil refineries with an estimated total refining capacity of 445,000 barrels per day (Onuoha, 2008; 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 (Odeyemi and Ogunseitan 1985;

Ukoli 2005). Anifowose (2008) and Onuoha (2008) cited in their studies that the region has about 606 oil fields with 355 situated onshore; 251 situated offshore with 5,284 drilled oil wells and 7,000km of oil and gas pipelines.



Source: NDRDMP, 2006

Figure 1: Niger Delta Showing the Distribution of Onshore and Offshore Oilfields

The Warri refinery commissioned in 1978 with an initial capacity of 100,000 barrels per day of light crude oil, the refinery was later expanded in 1986 to a capacity of 125,000 barrels per day (Odeyemi and Ogunseitan 1985). The Kaduna refinery being the largest refinery is inland built. Operations began in 1980 with an initial capacity of 100,000 barrels per day, which was later upgraded in 1986 to a capacity of 110,000 barrels per day (Odeyemi and Ogunseitan, 1985). The Kaduna refinery is the largest refinery, fed with crude oil through a 600km pipeline from the NigerDelta oil fields (NNPC, 1984). Previously the majority shares of the refineries were held by Shell and British Petroleum, with the Federal and Defunct Eastern Region Government having majority shares (Ukoli, 2005). The four refineries came under the ownership and management of the NNPC in 1986. Numerous Niger Delta region oil wells also have taps to large quantities of natural gas, with reserves estimated at 1422 billion cubic meters (Odeyemi and Ogunseitan, 1985). Extensive gas flaring has been continuous in the Niger Delta region since 1970 (NNPC 1984). In 2001, Nigeria proven oil reserve was approximately 30 million barrels (Ukoli, 2005). As of January 2009 the Oil and Gas Journal (OGJ) estimates that Nigeria has 36.2 billion barrels of oil reserve with present oil exploration and production concentrated in the NigerDelta basin and continental shelf (Ukoli, 2005). Activities mainly in the onshore dry or swamp lands of the NigerDelta basin and deep offshore locations of the Dahomey Basin (Ukoli, 2005). Small fields characterize Nigeria crude oil production which produces 500-5,000 barrels per day, 65% of the oil produced being light sweet crude which is a very high quality crude with an API –gravity of 35°C and above. Shell produces over 50% of Nigeria crude from over 100 fields and Shell has an oil reserve of over 11 billion barrels per day followed by mobile and chevron combined. Mobile operates offshore from Eket in Akwa Ibom state and chevron also operates offshore with an operational base at Escravos in Delta State.

The World Bank estimated that the oil sector accounts for 95% of Nigeria export earnings and 85% of the governments revenues as of 2009. Currently in 2010 the International Monetary Fund (IMF) estimates that the oil sector accounts for over 95% of Nigeria export earnings and about 65% of the government's revenue. According to OGJ Nigeria has an estimated 36.2 billion barrels of proven oil reserves as of January 2010. The majority of the reserves 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 (Country Analysis Brief 2009). In 2008 EIA estimates 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 (Country Analysis Brief 2009, 2010).

Nigeria exported most of its 2.17 million bbl/d of oil produced in 2008, approximately 1.9 million bbl/d was exported (Country Analysis Brief 2009, 2010). In 2009 Nigeria still exported approximately 1.9 million bbl/d of its than 2.2 million bbl/d total production (Country Analysis Brief 2009, 2010). Nigeria has six export terminals; Forcados and Bonny operated by Shell, Escravos and Pennington operated by Chevron, Qua Iboe operated by ExxonMobil and Brass operated by Agape. The major foreign producers in Nigeria are Chevron, ExxonMobil, Total, Eniagip, Addax Petroleum, ConocoPhillips, Petrobras and Statoilhydro. Nigeria is the 5th largest foreign supplier to the United States and also supplies Europe, Brazil, India and South Africa. In terms of natural gas, as of January 2009 the Oil and Gas Journal estimates Nigeria's proven natural gas reserve at 184 trillion cubic feet. Presently the OGI as of January 2010 estimates the proven gas reserve to be 185 trillion cubic feet. Nigeria is the eighth largest natural reserve holder worldwide and the largest in Africa (Country Analysis Brief 2010). In 2007 Nigeria produced 1,204 billion cubic feet (Bcf) of natural gas of which the state consumes 456 Bcf and exported 749 Bcf. In 2008 Nigeria produced about 1,400 Bcf of natural gas making it the 23rd gross producer in the world (Country Analysis Brief 2010). According to the National Oceanic and Atmospheric Administration (NOAA) Nigeria flares most of its natural gas, in 2007 Nigeria flared 593 Bcf of natural gas and 532 Bcf of natural gas in 2008 due to lack of infrastructure to produce and market (Country Analysis Brief 2010).

#### **4. History of Oil Exploration and Exploitation in the Niger Delta Region**

The British discovered oil in the Niger Delta in the late 1950s and crude oil was discovered in commercial quantity by the Shell British Petroleum, which is now called Royal Dutch Shell at Oloibiri. A village in the Niger Delta and in 1958 commercial production began with a production of about 6,000 barrels a day (Uyigue and Ogbeibu, 2007; Nwilo and Badejo 2005a). The region has huge oil and gas reserves, and ranks the sixth world's largest exporter of crude oil and ranked as the third world's largest producer of palm oil after Malaysia and Indonesia (Omofonmwa and Odi, 2009). Oil from the Niger Delta region accounts for more than 90% of Nigeria's exports and about 80% of the government's revenue, from as far back as December 1981. In these present times the overall contribution of the oil sector to the national economy grew from 84% in 2000 and 95% in 2002 to about 96.7% in 2003 (Twumasi and Merem, 2009). The Niger Delta region has emerged as one of the most ecologically sensitive regions in Nigeria. Oil and gas from the region are the main source of revenue for the Nigerian state, accounting for about 97% of the country's total export. Since the discovery of oil in the region, oil has dominated the country's economy. The Niger Delta is highly susceptible to adverse environmental changes, occasioned by climate changes because it is located in the coastal region. Conclusive reports have stated that due to oil exploration and exploitation activities, the area has become an ecological wasteland.

#### **5. Oil Spillages**

An estimated 9 million- 13 million (1.5 million tons) of oil has been spilled in to the Niger Delta ecosystem over the past 50 years; 50 times the estimated volume spilled in Exxon Valdez oil spill in Alaska 1989 (FME, NCF, WWF UK, CEESP-IUCN 2006). The first oil spill in Nigeria was at Araromi in the present Ondo state in 1908 (Tolulope, 2004). In July 1979 the Forcados tank 6 Terminal in Delta state incidence spilled 570,000 barrels of oil into the Forcados estuary polluting the aquatic environment and surrounding swamp forest (Ukoli, 2005; Tolulope, 2004). The Funiwa No.5 Well in Funiwa Field blew out an estimate 421,000 barrels of oil into the ocean from January 17th to January 30th 1980 when the oil flow ceased (Ukoli, 2005; Gabriel, 2004; Tolulope, 2004), 836 acres of mangrove forest within six miles off the shore was destroyed. The Oyakama oil spillage of 10th may 1980 with a spill of approximately 30,000bbl (Ukoli, 2005). In August 1983 Oshika village in River state witnessed a spill of 5,000 barrels of oil from Ebocha-Brass (Ogada-Brass 24) pipeline which flooded the lake and swamp forest, the area had previously experienced an oil spill of smaller quantity; 500 barrels in September 1979 with mortality in crabs, fish and shrimp. Eight months after the occurrence of the spill there was high mortality in embryonic shrimp and reduced reproduction due to oil in the lake sediments (Gabriel, 2004). The Ogada-Brass pipeline oil spillage near Etiama Nembe in February 1995 spilled approximately 24,000 barrels of oil which spread over freshwater swamp forest and into the brackish water mangrove swamp.

The Shell Petroleum Development Company (SPDC) since 1989 recorded an average of 221 spills per year in its operational area involving 7,350 barrels annually (SPDC Nigeria Brief, May 1995:3). From 1976-1996 a total of

4647 oil spill incidences spilling approximately 2,369,470 barrels of oil into the environment of which 1,820,410.5 (77%) were not recovered. Most of these oil spill incidences in the Niger Delta occur on land, swamp and the offshore environment (Nwilo and Badejo 2005a, 2005b, 2004; Twumasi and Merem, 2006; Uyigüe and Agho 2007). NNPC estimates 2,300 cubic meters of oil has spilled in 300 separate incidences annually between 1976-1996 (Twumasi and Merem, 2006).

The Punch Newspaper on February 20, 1991:2 reported a total of 2,796 oil spill incidences recorded between the periods of 1976-1990 leading to 2,105,393 barrels of oil spilled. The UNDP 2006:181 also reported that between the period of 1976-2001, 3 million barrels of oil were lost in 6,817 oil spill incidences of which over 70% of the spilt oil was not recovered. In 2001 the western operations of the Shell Petroleum Development Company (SPDC) recorded a total of 115 incidences of oil spills in which 5,187.14 barrels of oil were spilled and 734,053 barrels of the spilt oil representing 14.2% were recovered (SPDC Nigeria Brief, May 1995). In January 1998, 40,000 barrels of crude oil was spilled by Mobil in Eket but the largest spill in Nigeria was the offshore well blowout in January 1980 with a spill of approximately 200,000 barrels of oil into the Atlantic Ocean from an oil facility which damaged 340 hectares of mangrove forest (Nwilo and Badejo 2005b)

The Niger Delta has a complex and extensive system of pipelines running across the region and large amounts of oil spill incidences have occurred through the pipelines and storage facility failures, these failures could be caused by material defect, pipeline corrosion, ground erosion but the oil companies blame most of the spills on sabotage. The Department of Petroleum Resources contends that 88% of the oil spill incidences are traceable to equipment failure, main causes of oil spills in the Niger Delta are vandalism, oil blowouts from the flow stations, accidental and deliberate releases and oil tankers at sea (Nwilo and Badejo 2004, 2005a).

#### 5.1 Case Study: Ogoniland in the Niger Delta

Shell International has carried out oil exploration and production activities in the area since 1950s, drilling 96 wells (SPDC) but operations in Ogoniland were halted in the 1990s due to disputes although shell petroleum still has transit route pipelines passing through the area. Ogoniland is now characterized by oil fields and installations that have remained dormant, past spills, lack of maintenance, oil trapping and damages to oil infrastructure for over 15 years without remediation or partially remediated (UNEP).

UNEP has been commissioned by the Nigerian government with collaborations with the United Nations Development Programme, Community Organizations, River State Government, Laboratories, Land Owners and Universities, but sponsored by SPDC to carry out environmental studies at Ogoniland with the hopes that it will provide a basis for proper cleanup of the environment. The UNEP has identified over 300 potentially contaminated sites from information provided by NOSDRA, SPDC and satellite imagery. The findings of the assessment will be used for remediation to aid the rehabilitation of Ogoniland to meet international standards.



Figure 2: Oil Impacted Site in Ogoniland showing one of the oil fields





Figure 3: Oil Impacted Site in Ogoniland showing oil damages with loss of vegetation cover



Figure 4: Oil Impacted Site in Ogoniland showing oil contaminated stream



Figure 5: Oil Impacted Site in Ogoniland an showing oil contaminated river



Figure 6: Oil Impacted Site in Ogoniland showing loss in vegetation cover



Figure 7: Spilt Oil in Ogoniland



Figure 8: Ogoniland showing gas flaring at one of the oil facilities.  
Source: [www.unep.org](http://www.unep.org) October 2009



Figure 9: Oil pipelines in Okrika, near Port Harcourt  
Source: Ed Kashi

## 5.2 Gas Flaring

The Energetic Solution Conference (2004) estimates that the Niger Delta region has about 123 gas flaring sites. Agbola and Olurin (2003) stated that about 45.8 billion kilo watts of heat is discharged into the atmosphere from 1.8 billion cubic feet of gas everyday in the Niger Delta region, leading to temperatures that render large areas inhabitable. Complete utilization of produced associated gas, reduction of flaring and production greenhouse gas is one of the policies that oil companies are expected to comply, with the stoppage of gas flaring completely by 2004 or 2008. Still 84.60% of total gas produced is still flared with 14.86% only being used locally (Ukoli, 2005). From 1970-1986 a total of 125.5 cubic meters approximately of gas was produced in the Niger Delta region, 102.3 (81.7%) million cubic meters was flared, 2.6 million cubic meter was used as fuel by the oil producing companies and about 14.6 million cubic meters was domestically consumed (Awosika, 1995).

In 2004 Nigerian Liquefied Natural Gas pipeline transversing through Kala-Akama, Okrika mangrove forest leaked and set ablaze and burnt for three days. The local plant and animals within the areas where engulfed (Nenibarini, 2004). Apart from this fire incidence over several decades there have been many well documented cases of fire incidences that have resulted in a large number of human fatalities.

Acid rain is another problem within the Niger Delta region caused by gas flaring which has lead to loss in biodiversity, with forest and economic crops being destroyed. The dominance of grasses and shrubs in some parts of the region is indication of loss of natural forest, this may be due to acid rain but other factors maybe the cause such as agricultural activities and the exploration and exploitation of oil companies (Uyigüe and Agho, 2007; Opukria and Ibaba, 2008). The concentration of acid in rain water appears to be higher in the Niger Delta region and decreases further away from the region (Uyigüe and Agho, 2007).



Photo by: Claire Tavor

Figure 10: Gas flaring site at Rumueke community in Cross River State

The heat generated from gas flaring kills vegetation around flaring area, destroys mangrove swamps and salt marshes, suppresses the growth and flowering of some plants, induces soil degradation and diminishes agricultural productivity (UNDP, 2006; Mba, 2000:223). A study by Salau (1993) and Adeyemo (2002) about the impact of gas flaring on agriculture showed a direct relationship between gas flaring. Gas flaring is related oil spillage and UNDP, 2006 estimates that Nigeria flares 75%of the gas it produces which is more than any other country in the world.

Apart from the above issues the toxicity to humans causing respiratory illness, leading to kidney disease, neurological disease and potential death (Ndubisi and Asia 2007). Oil exploration and exploitation activities such as this have significantly contributed to the environmental degradation of the Niger Delta region in spite of government measures to stop gas flaring by 2008 and the existence of monitoring agencies, regulations and standards, the flaring activities in the area is still a problem. Gas flaring in the area is a major source of Cox, Nox, Sox and particulate matter and the cumulative environmental impact of these flaring activities result in contaminant build up on land, shallow ground water, greenhouse effect and general global warming and have also caused high concentration of acid rain within the region.

## 6. Materials/Methods

This research adopted comparative study method which involved obtaining data from past and present studies, government and non- government bodies and existing literature (Twumasi and Merem, 2006; Uyigüe and Agho, 2007; Uyigüe and Ogbeibu, 2007).The study relied on secondary data, the secondary data was obtained from The Nigerian National Petroleum Cooperation, World Bank Reports, National Bureau of Statistics, United Nations Environmental Protection Programme, Amnesty International, International Monetary Fund, Published and UnPublished materials, Books, Newspapers, Conference and Seminar Papers, Journals and the internet. The data obtained was analysed using quantitative and descriptive method and from the analysis, logical deductions and sequential presentation of facts from the data obtained. The analysis will give a clear picture of the problem and trends. Obtaining recent data proved difficult from 2000-to date. Data was not available from any of the relevant government websites Annual oil spill and oil spillage incidence data was obtained from 1976-2000, the data was analysed using Excel statistical software and the trend will be used to give a clear basis for comparison.



6.1 Statistical Analysis

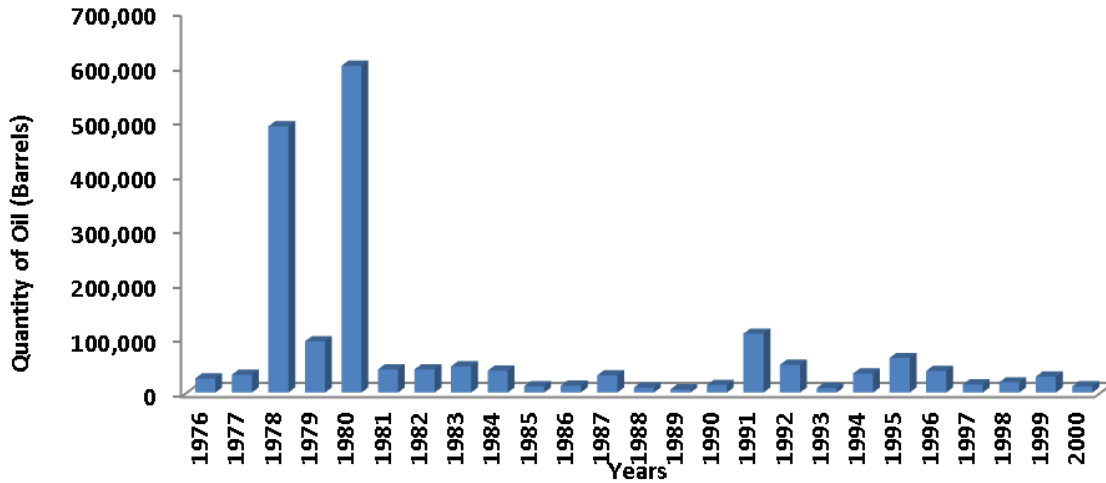


Figure 11: Annual Quantity of Oil Spill

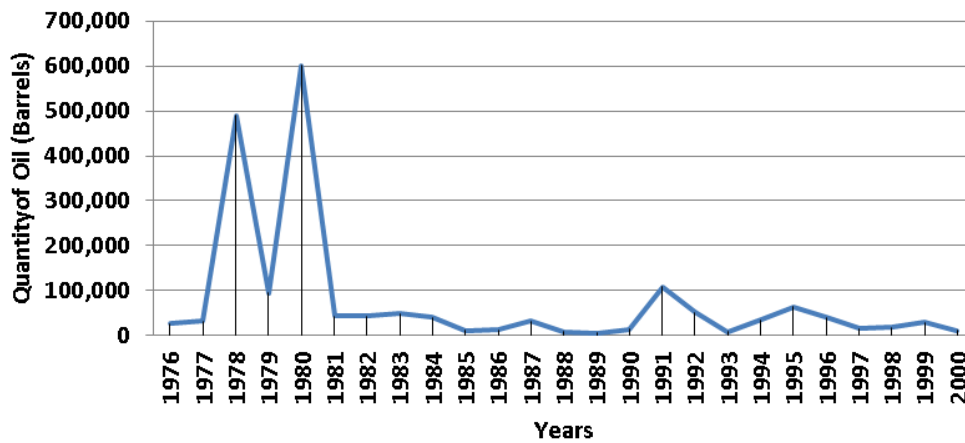


Figure 12: Annual Quantity of Oil Spill

From the Figure 11 and Figure 12 above, it can be seen that from 1978-1980 were the largest oil spill recorded with a slight increase in 1991.

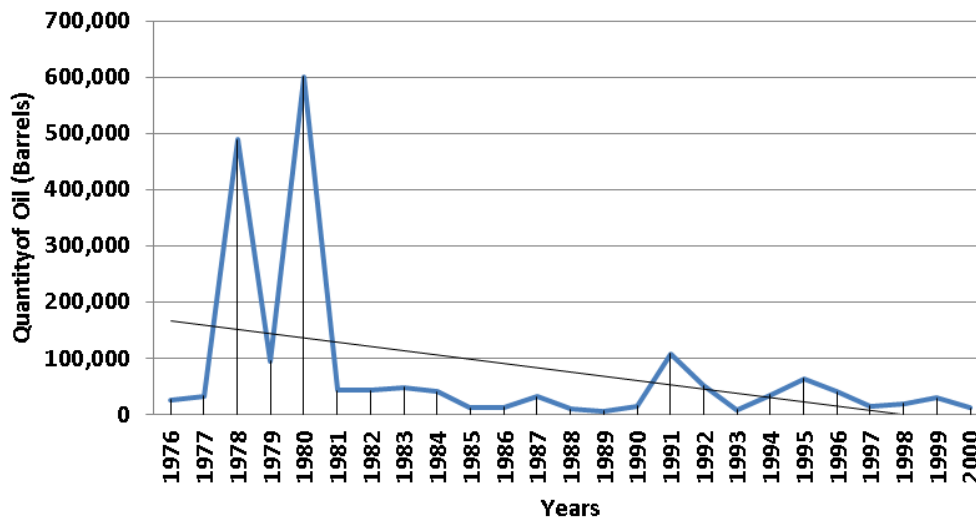


Figure 13: Trend Annual Quantity of Oil Spill

From

Figure 13 the trend clearly shows a continuous decline in oil spill quantities from 1981-2000.

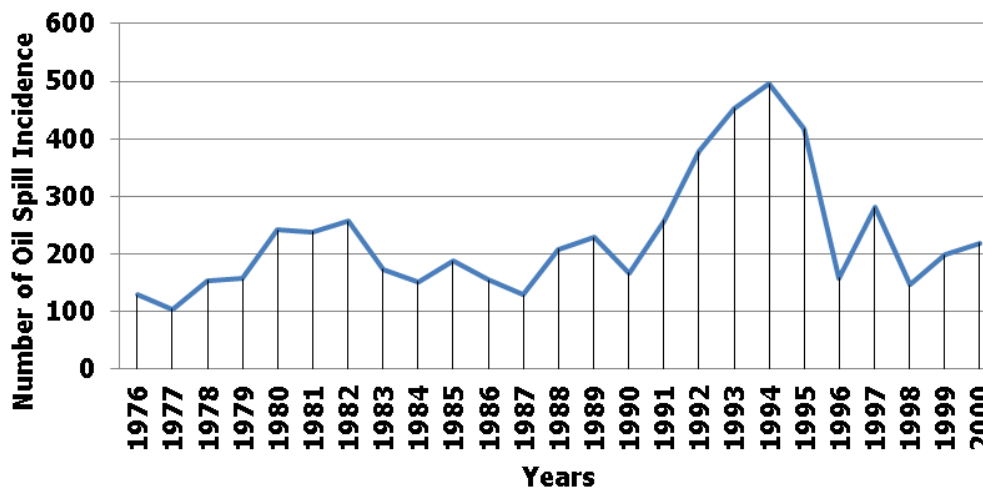


Figure 14: Annual Number of Oil Spill Incidence

From Figure 14 the incidence of oil spills has been relatively high with maximum occurrence between the periods of 1991-1996.

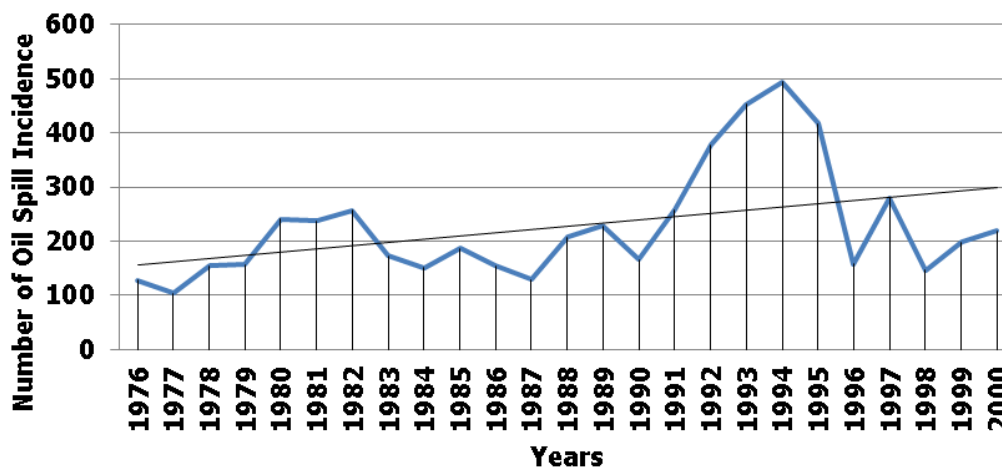


Figure 15: Trend Annual Number of Oil Spill Incidence

From Figure 15 the trend clearly show a steady increase in oil spillage incidence yearly.

Apart from the oil spillage incidences stated above there are several that have occurred from 2001-2010 that accurate estimate could not be obtained for this study; April 29, 2002 oil spill from a pipeline burst at Royal/Dutch Shells Yorla oilfield in Ogoniland. The oil flowed for days several meters into the air drenching surrounding vegetation and farmland before the pipeline was repaired (Aigbedion, et al., 2007) and the Goi Trans Niger pipeline oil spill in 2004 (Nenibarini, 2004).

### 7. Results

Show that the annual oil spillage quantity has significantly decreased but the annual oil spill incidences are increasing yearly. There is no significant improvement because the incidences are increasing with less quantity being spill. It should be noted that the quantity and occurrence of oil spills are based on the records submitted by the oil companies to the NNPC, so one would hardly expect that all incidences are reported and the quantities reported represent the actual figure. A major limitation of this study was obtaining recent oil spillage data from NNPC these data are public records and should be easily accessible.

In terms of analysis and evaluation of oil exploration in the Niger Delta it can be seen from the literature review from the beginning of the oil exploration and exploitation activities in Nigeria, oil development activities have contributed to the growth and development of the country in general. Although, the activities that come with the oil exploration and exploitation causes alterations to the environment. Which significantly have negative effects, some of the effects that come with petroleum development can be reduced or prevented basically by taking some steps in terms of prevention.

In terms of monitoring, the location of the oil companies; the terrain, the accessibility, revenue, man power availability for the monitoring agency, qualified personnel isn't available. This restricts the ability and efficiency of monitoring by the government. Updating the legislations, revising the legislation, license and putting new conditions to the oil companies and reviewing the fines will go a long way in ensuring compliance, even though the government cannot systematically or frequently monitor these sites.

The government should be commended in that now they are tackling the problem with the UNEP with collaborations with UN (United Nation), which are taking steps towards finding a permanent solution or remediation for Ogoniland. The SPDC has to be commended also for the sponsorship of this activity and their readiness finally in taking steps into the remediation of Ogoniland.

## 8. Conclusion

Oil exploration in Nigeria has had severe environmental and human consequences for the indigenous people who inhabit the area surrounding oil extractions. The social and environmental cost of oil production has been extensive. They include destruction of wildlife and biodiversity, loss of fertile soil. Pollution of air and drinking water, degradation of farmland and damage to aquatic ecosystem, all of which have caused serious health problems for the inhabitants of the area surrounding oil production.

Environmentalists and people generally give blame to the oil companies but the Federal Government provides the laws, legislations and license, which the oil companies must adhere to. The Federal Government has to take steps, which they have started with NOSDRA, NDDC, UNEP, UN SPDC and NGOs. Improvement has begun in terms of achieving sustainable development in the Niger Delta, the government should continue to allocate more revenue into the Niger Delta for steps toward finding a permanent and lasting solution.

## References

- Adeyemo, A.M. (2002). The Oil Industry Extra-Ministerial Institutions and Sustainable Agricultural Development: A Case Study of Okrika L.G.A. of Rivers State, in Nigeria. *Journal of Oil and Politics*, 2(1)
- Aigbedion, I., Iyayi, S. E. and Agbeboh, G.U (2007). Prospect Assessment and Risk Analysis: Example from Niger Delta, Nigeria Basin, *World Applied Science Journal*, 2(6):569-574.
- Aloja, I., and Ekeh, P. (2002). A Photo Gallery of Oil Spills Oil Fires, Fires Images Gas Flares. *Urhobo Historical Society*.
- Amu, L.A.O (1997). A Review of Nigeria's Petroleum Industry. NNPC, Lagos.
- ANEEJ (2004). Oil of Poverty in the Niger Delta. A publication of the African Network for Environment and Economic Justice.
- Anifowose, B (2008) Assessing the Impact of Oil & Gas Transport on Nigeria's Environment. U21 Postgraduate Research Conference Proceedings 1, University of Birmingham UK. .
- Awosika, L.F (1995) Impacts of global climate change and sea level rise on Coastal resources and energy development in Nigeria. In: Umolu, J.C., (Ed). *Global Climate Change: Impact on Energy Development*. DAMTECH Nigeria Limited, Nigeria.
- Celestine, A (2003). Hydrocarbon Exploitation, Environmental Degradation and Poverty: The Niger Delta Experience. *Diffuse Pollution Conference*, Dublin.
- Chinweze, C. and Abiol-Oloke, G (2009). Women Issues, Poverty and Social Challenges of Climate Changes in the Nigerian Niger Delta Context. 7th International Conference on the Human Dimension of Global Environmental Changes, UN Campus, Bonne, Germany.
- Chukuezi, C (2006). Oil Exploration and Human Security in Nigeria: A Challenge to Sustainable Development. 2006. Federal Ministry of Environment Abuja, Nigerian Conservation Foundation Lagos, WWF UK and CEESP-IUCN Commission on Environmental, Economic, and Social Policy, May 31 Niger Delta Resource Damage Assessment and Restoration Project.
- CIA, Central Intelligence Agency (2005). Accessed August 10 2010 [The World Fact Book-Nigeria.htm](http://The World Fact Book-Nigeria.htm)
- CLO, Civil Liberties Organization (2002). Blood Trail: Repression and Resistance in the Niger Delta, Ikeja. Country Analysis Brief <http://www.eia.doe.gov/cab/index.html.pds>



Federal Ministry of Environment Abuja, Nigerian Conservation Foundation Lagos, WWF UK and CEESP-IUCN Commission on Environmental, Economic, and Social Policy, May 31,(2006). Niger Delta Resource Damage Assessment and Restoration Project.

Gabriel, A.O (2004). Women in the Niger Delta: Environmental Issues and Challenges in the Third Millennium. [www.jsd\\_africa.com](http://www.jsd_africa.com)

Kuruk, P (2004). Costomary Water Laws and Practices: Nigeria. <http://www.fao.org/legal/advserv/FOA/UCNCS.Nigeria.pdf>

Mba, C.H (2000). Environmental Protection and National Development: Towards Optimal Resolution of Conflicting Measures and Strategies. in: Aja Akpuru-Aja and Emeribe Augustine C., Policy and Contending Issues in Nigerian National Development Strategy. John Jacob's Publishers, Ltd, Enugu, Nigeria.

NDRDMP, Niger Delta Regional Development Master-plan, (2006). Facilitated by the Niger Delta Development Commission (NDDC) in partnership with the nine states' governments, LGAs, Oil Companies, Civil Society Organizations and Communities in the Niger Delta.

Ndubuisi, A.L. and Asia, I.O (2007). Environmental Pollution in Oil Producing Areas of the Niger Delta Basin, Nigeria: Empirical Assessment of Trends and People's Perception. *Environmental Research Journal*1, (1-4):18-26. ISSN 1994-5396.

Nenibarini, Z (2004). Impacts of Extractive Industries on the Biodiversity of the Niger Delta. National Workshop on Coastal and Marine Biodiversity Management. NNPC, Nigerian National Petroleum Cooperation, Monthly Petroleum Information. September, Lagos, Nigeria, 1984:53

Nwilo, C.P. and Badejo, T.O (2004). Management of Oil Dispersal along the Nigerian Coastal Areas. Department of Survey & Geoinformatics, University of Lagos, Lagos, Nigeria. [www.oceandocs.org/handle/1834/267](http://www.oceandocs.org/handle/1834/267)

Nwilo, C.P. and Badejo, T.O (2005a) Impacts and Management of Oil Spill Pollution along the Nigerian Coastal Areas. Department of Survey & Geoinformatics, University of Lagos, Lagos, Nigeria. [www.fig.net/pub.figpub36/chapters/chapter\\_8.pdf](http://www.fig.net/pub.figpub36/chapters/chapter_8.pdf)

Nwilo, C.P. and Badejo, T.O (2005b) Oil Spill Problems and Management in the Niger Delta. International Oil Spill Conference, Miami, Florida, USA.

Odeyemi, O. and Ogunseitan, O.A (1985). Petroleum Industry and its Pollution Potential in Nigeria. *Oil & Petroleum Pollution*, Elsevier Applied Science Publishers Ltd, England, 2: 223-229

Oil Spill- Oil Pollution, Accessed August 10 2010. <http://science.irank.org>

Onuoha, F.C (2008). Oil Pipeline Sabotage in Nigeria: Dimensions, Actors and Implications for National Security L/C. *African Security Review Institute for Security Studies*, 17(3). [www.issso.co.za](http://www.issso.co.za)

Omofonmwan, S.I. and Odia, L.O (2009). Oil Exploitation and Conflict in the Niger Delta Region of Nigeria. *Journal of Human Ecology*, 26(1):25-30.

Opukri, O.C.O. and Ibaba I.S (2008). Oil Induced Environmental Degradation and Internal Population Displacement in the Nigeria's Niger Delta. *Journal of Sustainable Development in Africa*,10(1)

Powell, C.B., White, S.A., Ibiebele, D.O., Bara, M., Dut Kwicz, B., Isoun, M. and Oteogbu, F.U. Oshika Oil Spill Environmental Impact; effect on Aquatic biology. Paper presented at NNPC/FMHE International Seminar on petroleum industry and the Nigerian Environment 11 – 13 Nov. 1985, Kaduna, Nigeria, 1985:168 – 178.

Salau, A.J. (1993). Environmental Crisis and Development in Nigeria. Inaugural Lecture, No.13 University of Port Harcourt, Choba, Nigeria.

(SPDC), Shell Petroleum Development Company, People and the Environment. Annual Report. 1995.  
The Guardian Newspaper, Oil 50 years on. 2006;Tuesday June 13 p16

Tolulope, A.O (2004). Oil Exploration and Environmental Degradation: the Nigerian Experience. International Information Archives, International Society for Environmental Information Science. EIA04-039, 2: 387-393.

Twumasi, Y. and Merem E (2006). GIS and Remote Sensing Applications in the Assessment of Change within a Coastal Environment in the Niger Delta Region of Nigeria. International Journal of Environmental Research & Public Health, 3:1, 98-106. [www.ijerph.org](http://www.ijerph.org)

Ukoli, M.K (2005). Environmental Factors in the Management of the Oil and Gas Industry in Nigeria. [www.cenbank.org](http://www.cenbank.org)

United Nations Development Programme,. Niger Delta Human Development Report. Abuja, Nigeria, 2006:185&186

United Nations Environmental Programme Accessed August 10 2010. [www.unep.org](http://www.unep.org)

Uyigüe, E. and Agho, M (2007). Coping with Climate Change and Environmental Degradation in the Niger Delta of Southern Nigeria. Community Research and Development Centre Nigeria (CREDC).

Uyigüe, E. and Ogbeibu A.E (2007). Climate Change and Poverty: Sustainable Approach in the Niger Delta Region of Nigeria. [www.2007.amsterdamconference.org/....AC2007\\_uyigueogbeibu.pdf](http://www.2007.amsterdamconference.org/....AC2007_uyigueogbeibu.pdf)