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Research article

ENVIRONMENTAL IMPACT OF OIL SPILLAGE AND DEGRADATION IN THE NIGER DELTA REGION OF NIGERIA

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ABSTRACT

This paper examines the environmental impact of oil spillage and degradation in the Niger Delta region of Nigeria. Oil spillage is one of the greatest environmental problems, Nigeria is currently battling with especially in the Niger Delta region.Oil communities have been at the receiving end of this environmental problem. The problems has generated a lot of concern within the coastal area of the Niger Delta region which is the home to oil explorations and exploitations in Nigeria. The main source of oil spill on the Niger Delta are: vandalization of the oil pipelines by the local inhabitants; ageing of the pipelines; cleaning of oil tankers on the high sea. By far the most serious source of oil spill is through the vandalization of pipelines either as a result of civil disaffection with the political process or as a criminal activity. This paper addresses the Environmental impact of oil Spillage and Degradation in the Niger Delta region of Nigeria.The causes, consequences, solutions to the problem of oil spill incidents and remediation measures were articulated to ameliorate this problem and assist oil communities. It was concluded with few suggestions made; that the Nigerian Agip Oil Company should direct to improve on the management of waste at the terminal especially (the waste sludge etc) that enters the canal.The containment equipments within the canal should be improved in order to properly contain the oil within the canal and adequate compensation should be paid to the affected communities.**Copyright © WJSWAP, all rights reserved.**

Key Words: Environment, Oil Spillage, Degradation, and Niger Delta Region

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Introduction

Niger Delta is situated around the tributaries of the Niger River, into the Southern Atlantic Ocean and the core south- south of Nigeria. (Achebe,2012).). The region is about 20,000sq/km as it is the largest wetland in Africa and among the third largest in the world (Powell, etal., 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.

TheNigerDelta region, which is roughly synonymous with the Niger Delta province in location and the contemporary heart of the petroleum industry, and was a zone of dense cultural diversity and is currently inhabited by roughly forty ethnic groups speaking an estimated 250 dialects. Some of the more relevant ethnic groups in the western part of the Niger Delta region includes the Ijaw, Itsekiri, and Ogoni, while the Eastern Niger Delta region has the Efiks people(Annang/ Efik/ Ibibio who are all related with a common language and ancestors were all referred to as EfiksCalabar people in early Nigerian history). Niger Delta region is one of the most blessed deltas in the world, in both human and material resources.

An environment simply connotes our surrounding. It is the totality of man's surrounding which contribute either directly or indirectly, positively or negatively to human beings including other organizations through their interaction with the environment. Thus the environment has been recognized as an important contributor to the attainment of good health or ill health (Roche, 2003). Nwankwo (1995) states that, the environment contains all the factors that can act on man from outside, affecting the life and development of a person, an organization or a society, These vital factors that promote conducive living in an environment include: air, water, light, land, noise etc. According to Carla (2000) Oil spills are the uncontrolled discharge of oil or its by products including chemicals and wastes, into the environment. When oil spill occurs, the oil being less dencse than water floats. Spillage: is a process of leakage or escape or over flow of any substance from its area of confinement or container. It could be crude oil or process oil which could be as a result of corrosions, equipment failure, sabotage etc. While degradation: is loss of quality, a decline in the quality or performance of something(Adelana, 2011).

Oil spills are categorized in four groups; minor, medium, major and disaster (Nwilo&Badejo, 2007). Minor spills take place when the oil discharge is less than 25 barrels, in inland waters or less than 250 barrels on land that does not pose any threat to the public health. Medium spill is about 250 barrels or less on the inland waters or 250-2,500 barrels on land. While the Major spill, the discharge to the inland waters is in excess of 250 barrels on land, off-shore or coastal waters. The disaster refer to any uncontrolled well blowout, pipeline rupture or storage tank failure which poses an imminent threat to the public health or welfare (Ntukepkpo, 1996).

Oil spillage has become of increased relevance in recent times because of the magnitude with which it occurs, the effects it has on the environment, and the quality of life of people residing in the affected areas.Oil spillage affects both living and non-living components of the environment which in turn affect man directly and indirectly Suffice to say that the unfavourable manner, in which these resources have been harnessed over time, is the bane of the regions predicament today . Thus, the people of the region are prone to a number of health hazards and socio –economic constraints which for long has made the people more volatile, resulting in youths restiveness: conflicts between youths and community leaders, youths and multinational companies and so on. Attempts by government and multinational companies (operating in the area) to address this ugly scenario of wanton destruction of lives and property of crude oil, refining and distribution of petroleum products has not yielded the desired result (Times Magazine, 1999).

Today some of the problems confronting the various communities in the Niger Delta region includes: Environmental degradation, poor health facilities, inadequate, and in some cases lack of transportation facilities, land and poor

housing, infertile soil and lack of portable drinking wateras a result of crude oil exploitation,. While the health implications of oil spillage, include; gastro-intestinal, dermatological and neurological effects on human beings and the impact on the environment. It advocates for better environmental-friendly and sustainable techniques, particularly in resource-limited communities, where the socio-economic, physical and invariably the health consequences will be least mitigated and most severe. Effective response and mitigation are necessary to cushion the adverse effects of inadvertent spills on the populations around effected regions.

Aim and Objectivesof the Paper

The aim of this review was to examine the Environmental Impact of Oil Spillage and Degradation in the Niger Delta region of Nigeria. Specifically it seeks to understand the deleterious impact of oil spillage on the physical environment of the Niger Delta region of Nigeria. Secondly to determine the possible solutions to the problem of oil spillage and degradation in the Niger Delta region of Nigeria.

Theoretical Frame Work

This is anchored on the Legitimacy theory. Suchman (1995) considers that“ Legitimacy is a generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, and beliefs. In the concept of this paper, legitimacy theory has the role of explaining the behavior of organization in implementing and developing voluntary social and environmental disclosure of information, in order to fulfill their social contract that enables the recognition of their objectives and the survival in a jumpy and turbulent environment. This implies that the people in the fuel producing areas should be involved in policies affecting them to ensure full compliance when policies are adopted. This will make members of the public bear the pain in the invent of environmental degradation from associated organizational activities.

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, 2005b). The region has huge oil and gas reserves, and ranks the sixth world’s largest exporter of crude oil (OmofonmwaandOdia, 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. The Niger Delta region has merged as one of most ecological sensitive regions in Nigeria. Since the discovery of oil in the region, the Niger Delta is highly susceptibleto adverse environmental changes. Conclusive reports have stated that due to oil exploration and exploitation activities, the area has become an ecological wasteland.

Oil Spillages

All over the world, environmental pollution is an issue of great concern because of what the environment, is to the human survival and indeed, the survival of the earth itself. The issue of oil spillage is a common phenomena in the Niger Delta region, more than any other part of Nigeria. According to Ikporukpo, (2000), 98% of the transportation of crude oil in Nigeria, take place within the Niger Delta region because of the numerous oil fields, flow stations and terminals, through which crude oil flows. About 25% of total spills in Niger Delta between 1976 and 1999 was in

the swamps, 69% offshore while 6% was recorded on relatively dry land (Niger Delta Environmental Survey, 1997). Similarly, Ikporukpo (2000), observed that the three largest spills in Nigeria have been the Forcados terminal incidence of 1979 in which about 570,000 barrels were spilled; the Apoi North, 20 spill of 1980 in which 280,000 barrels were spilled, and the Idoho spill of 1998 in which about 40,000 barrels were spilled.

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; (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 EtiamaNembe 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). Most of these o[l spill incidences occur in the Niger Delta on land, swamp and the offshore environment (Nwilo and Badejo,2005).

Causes of Oil Spillage in the Niger Delta

According to Nwafor (2006), the sources of oil spillage in the areas affected comprises; spills, discharges and explosions both accidental and operational as well as sabotage- inspired by disgruntled and unhappy rural host communities along the dense network of the oil pipelines which crisscross the Niger Delta and the nationwide links to inland refined petroleum depots.

Oil companies have often blamed most spills on sabotage, however, the following shows the ranking of causes of oil spills in the Niger Delta: 42% of failures were mechanically induced, 18% by corrosion, third party activity contributed 24%, 10% through operational error, and 6% by natural hazards (Gas and Oil Pipeline Standards [GOST] of Nigeria cited by Achebe, 2012). It is also noted that,ofthe sour line failures, about 86% were leaks and 14% were ruptures (Achebe, 2012). Achebe contends that the severity of spillage, measured by the amount of oil spilled, is higher in the Niger Delta than in Western Europe. The reason could be poor contingency planning for rapid response to spills; poor detection procedures; long distances between emergency shutdown valves; or the larger average diameter of pipelines" (Achebe 2012).

The most common causes of oil spillage include:

1**. Corrosion or leakage of pipelines:** A reason that corrosion account for such a high percentage of all spoils (50%) is that as a result of the small size of the oil field in the Niger Delta, there is an extensive network of pipeline between the fields as well as numerous small network of flow line- the narrow diameter pipes that carry oil from well- heads to flow stations- allowing many opportunities for leaks.

2. **Bunkering practices:** Whereby the saboteur attempts to tap the pipelines. In the process of extraction, sometimes the pipe line is damaged or destroyed.

3. Anderson and LaBelle (2000). also opined thatoil spillage occur as a result of the use of outdated pipes in the oil fields, willful vandalism by the host oil communities,leakage from supper ocean tanker carriers, andyouths restiveness leading to destruction of pipeline, hostage taking and, equipment failure.

Impact of Oil Spillage on the Environment:

Nwankwo and Ifeadi(1988) identified the following factors as some of the pollution problems associated with oil exploitation and production resulting to spillage in the Niger Delta.

1. **Contamination of streams andnearby rivers**, making it hazardous to drink.This due to the fact that in the course of oil exploitation and production in the Niger Delta, various materials are released in to the environment. The major constituents of drill- cutting such as barytes and bentonites clay when dumped on the ground prevent plant growth until natural processes develop new top soil. In water according to Nwakwo and Ifeadi (1988), These materials disperse and sink, killing marine animals. Worgu, (2000), also stated that exploration, drill cuttings, drill muds and fluids are used for stimulating production.ThusSpills in populated areas often spread out over wide area, destroying crops and acqua-culture through contamination of the ground water and soils. The consumption of dissolved oxygen by bacteria feeding on the spilled hydrocarbons also had an adverse effect on aquatic life, which has become contaminated, in turn having negative consequences for human health from consuming contaminated seafood. The oil spillage which emanated from Idu, Well 5, one of the Nigerian Agip Oil Company Limited (NAOC) facilities was said to have devastated effect on farm lands, fish ponds and the only source of drinking water in the area.

   According to Ndiwari Von Ebimobowei'sappealreport to Agip oil Company and Bayelsa State government on THIS DAY 4th August, 2009, an intermittent rainfall, aggravated the impact of the spill in the last two days, with flowing unchecked the polluted water into Taylor Creek. Everywhere you go, you see dead fishes and layers of crude oil and cash crops worth millions of naira have been destroyed by the oil spillage, which he described as the "worst of its kind' in recent times. He lamented as follows:

   > "*We do not have pipe borne water here. Our only source of drinking water is the surrounding streams and creeks. But we can no longer drink the water. State Government should please come to our aid by giving us good water to drink as well as the payment of adequate compensation to those whose farmlands and crops were destroyed by the oil spillage"*

2. Degradation of the surrounding environment because of the toxicity of the oil causing adverse effect to the soil, plants and loss of aquatic lives.

3. Health problems; several cases of poor vision, cough and skin diseases, diarrhea and vomiting amongst others have become rampant.

4. Destruction of vegetation and Agricultural land as seen on the different pictures on pages 7-9.

Ecological Devastation

There is ecological devastation as oil spills destroy vegetation, mangrove forests, food/cash crops, fishing ground/marine life, reduce nutrient value of the soil, induce land fragmentation, and, in isolated cases, set communities on fire (Opukri and Ibaba, 2008). Oil spills also have a significant impact on vegetation, water supply, and marine life and local livelihoods dependent on agriculture (EIA 2003). A crude oil spill can have either acute or chronic toxicity, or a combination of both, on the soil properties and micro-flora (Odu 1972, Odu and Udo, 1975, Amadi and Antai 1992a, b; Isirimah et. al. 1989, *in*Amadi, Abbey and Nma, 1996).

Internal Displacement

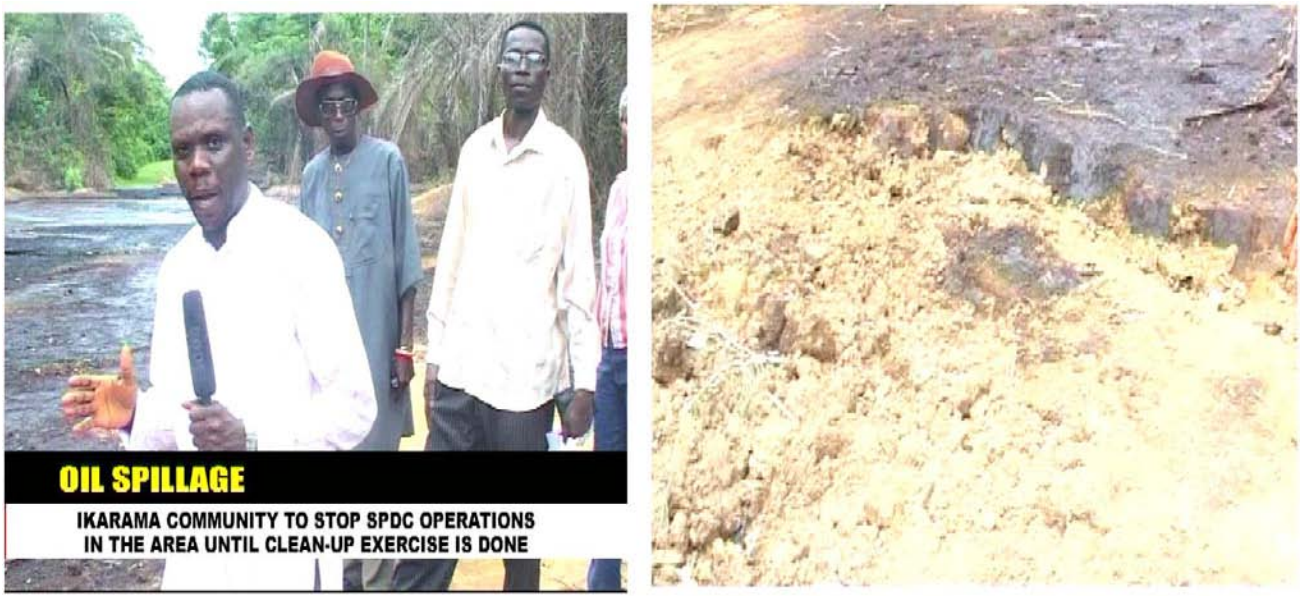
In the findings of Opukri and Ibaba(2008), environmental degradation arising from oil spills result in internal displacement of communities in the Niger. This tends to diminish the productivity of farming and fishing in the community. This causes its members, as a group, to relocate and also results in occupational and income losses that leads to both voluntary and involuntary migration. Consequently, loss of ancestral homes, familiar surroundings, and religious and other cultural artifacts are the psychological and social problems associated with displacement (NDES, 1997 *in*NwiloandBadejo, 2006). Hence, environmental degradation, caused by the Oil industry does not only have the potentials of exacerbating the tragedy of internal displacements in the Niger Delta, but is responsible for many of the dislocations experienced in the area.

The Ogoni people, for instance, in their experience, sum up the impact of oil spills and related activities as:

Completely devastated by three decades of reckless oil exploitation or ecological warfare by oil companies. An ecological war is highly lethal, the more so as it is unconventional. It is omnicidal in effect. Human life, flora, fauna, the air, fall at its feet, and finally, the land itself dies (Human Right Watch, 1999).

Health Hazards

The health implications of oil spills are many. Generally, people in the affected areas complain about health issues including breathing problems and skin lesions. Many have lost basic human rights such as health, access to food, clean water, and an ability to work (Anderson and Labelle, 2000).



Impact of Oil Spillage on the Environment

Effect of Oil Spillage on the Environment

Impact of Oil Spillage on the Rivers

Women Lamenting about Impact of Oil Spillage on Farm Lands

Women Expressing Their Grievances Due to Effect of Oil Spillage on Crops

Youths' Restiveness

Effect of Oil Spillage on Aquatic Lives

Site of Pipelines Corrosion and Oil Spillage

Solutions to the Problem of Oil Spills in Niger Delta Nigeria

Development literature clearly shows that the environment is the basis for the sustenance and survival of man (Emeribe, 2000). Around the world, environmental resources give meaning to man's productive activities. For this reason, man's productivity largely depends on the quality of the environment. Thus, development cannot subsist upon a deteriorating environmental resource base (National Report for the 1992 Rio de Janeiro Conference on Environment and Development). Indeed, no reasonable and sustainable developments have been achieved in the Niger Delta.

Thus oil spillage can be controlled through the following strategies: Total and satisfactory involvement of host oil communities. Adherence to standard operational procedures for oil exploration and exploitation should be pursued, such as the use of updated equipments in laying pipes and replace as at when due, regular monitoring of pipes to checkmate Bunkers, prompt remediation of the area of land affected, to detect and promptly report leakages, employ the due process of the law, use proper containment measures in the oil fields and resource control should be revisited. Modern technologies of extraction should be adopted by these companies to reduce the negative impacts of their activities on the environment and people.

Category of Response Option	Example: Technology
* Natural Method	Natural attenuation
* Physical Method	Booming, Skimming, Manual removal, Washing, Tiling, Sediment Relocation
* Chemical Method	Dispersants, Demulsifiers, Solidifies, Surface Film-Chemical
* Remediation Measures	Bio remediation, Bio augmentation, Bio stimulation

Response to Oil Spills / Remediation Measures

CONCLUSION

The impact of oil spillage on the environment of the Niger Delta has been very glaring in terms of its negative effect on the region.Since the discovery of oil in the Niger Delta region of Nigeria, the environment has never known any peace, safety or comfort. The impact of oil spills has been demonstrated to be manifold, involving both human and environmental tragedy. The greatest impact to the Niger Delta people is the loss of their traditional source of livelihood, namely agriculture and substantial or nearly all about the environment is lost to untold pollution that has poisoned both underground water, soil and the sea (for fishing). There is need for effective policy by the Nigerian Government to protect and clean up the Niger Delta if it is to be conducive for human abode in the nearest future.The enabling objectives when carried out appropriately or applied to, can result to a good Terminal Performance Objective. That is, it will bring about a positive control of oil-spillage and there will be no reduction of the quality of the environment, which includes human beings, fishes, animals, and plants.

Recommendations.

1. Public participation in policy formulation should be considered paramount: whereby people in the fuel producing areas should be involved in policies affecting them, to ensure full compliance when policies are finally adopted. This will make members of the public to bear the pain in the invent of environmental degradation from the associated activities.

2. The Nigerian Agip Oil Company should be directed to improve on the management of the waste at the terminal especially (the waste sludge etc). that enters the canal.

3. The containment equipments within the canal should be improved in order to properly contain the oil within the canal.

4. Adequate compensation should be paid to the affected communities.

5. Use of updated equipments in lying pipes and replacement as at when due.

6. Modern technologies of extraction of oil, should be adopted by the companies to reduce the negative impacts of their activities on the environment.

7. Prompt remediation of the area of land affected, to detect and promptly report leakages.

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