

## ASSESSING THE NATURE OF ECOSYSTEM DEGRADATION CAUSED BY OIL SPILL IN Ogoniland, Rivers State

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### Abstract

*This study assessed the nature of ecosystem degradation caused by oil spillage on the socio-economic livelihood of Bodo Community, Rivers State of Nigeria with the view to determine its adverse effects on head of claims for damages. To effectively assess the nature of ecosystem degradation, research questions were formulated and analyzed. The instruments used for data collection were the questionnaire, interviews and personal observation based on a five point likert scale. A total of 36 questionnaires were retrieved from the respondents at Sugi (Patrick waterside) Bodo representing 55.5% of the sampled population. The sample size were selected purposively that cut across the chiefs, household heads, fishers and farmers including landowner. Descriptive statistics were used for analysis such as percentage and weighted mean scale with its criterion mean of 3.00 acceptance level. The results of the study showed that oil spillage has damaged wetland in Bodo as the result of ecosystem degradation affecting their socio-economic livelihood negatively. The study further revealed that the head of claims to compensation payment applicable in Bodo was based on land, water, vegetation and ecosystem goods and services which were underpaid in the compensation estimation. It will take the effort of stakeholders (oil companies, community and government) to institute measures on oil spills and proper attention should be given to the remediation processes on the contaminated sites.*

**Keyword:** Ecosystem, Socio-economic, Degradation Oil Pollution, Environment

### 1.0 INTRODUCTION

Bodo is a community in Gokana, Rivers State, one of the oil producing and agro-ecological area in the Niger Delta region of Nigeria, a region with abundant natural resources including good weather and wetland for agriculture (fishing and farming). Although the level of agricultural activities in the area is very low given the abundant resource endowment, it is the largest oil producing zone in the country.

It is the base of Nigerian oil and gas industry, generating over 90% of the nations' economy, Abii and Nwosu, (2009). Oil exploration and its activities have been

concentrated in this Niger Delta region which has over 1,000 production oil wells and over 47,000 km of oil and gas flow lines (Ngobiri, Ayuk and Awunuso, 2007).

Oil exploration and expectation has impacted negatively on the Niger Delta environment, these negative impact of the oil activities includes destruction of wild life, lost of fertile soil, pollution of air and water and damage to the ecosystem of the host communities (Aghalino, 2000).

The ecological problems of oil spill as observed include brownish vegetation and soil erosion, diminishing resources of the natural ecosystem, fertile land turned barren, oil particles floated on water surface and adverse effect on the life, health and economy of the people (Robert, 1997).

Oil spill is an unintentional release of liquid petroleum hydrocarbon into the environment as a result of human activities, which are usually or mostly caused by accidents involving oil tankers, barges, refineries, pipelines and oil storage facilities (Abii and Nwosu, 2009). These accidents can be caused by human mistakes or carelessness and sometimes by natural disaster such as earthquakes, deliberate acts by terrorists, militants or vandals (Abii and Nwosu, 2009). In Nigeria, the major cause of oil spill is lack of regular maintenance of the pipelines and storage tanks, because most pipelines from the flow stations are absolutely being more than 20 years old making them subject to corrosion and leakage (Oyem, 2001). Some of these pipes are laid above ground level without adequate surveillance, exposing them to wear and tear and other dangers (Oyem, 2001). Another major cause of oil spill here is sabotage which involves bunkering by some unpatriotic elements in the society, where they damaged pipelines in the attempt to steal oil from them (Department of Petroleum Resources, (DPR), 1997). DPR (1997) petroleum annual report indicated that over 60,000 spills have occurred in Nigeria during her 40 years of oil exploration. Between 1976 and 1996, the spill of  $2.4 \times 10^8$  barrels of crude oil occurred from 647 incidents; only 54706038 barrels were recovered implying that 1,802,040,666 barrels of oil were lost to the ecosystem (Abii and Nwosu, 2009).

The growth of oil industry combined with population explosion and lack of environmental regulation have caused substantial damage to the environment

of the Niger Delta (Abii and Nwosu, 2009). After several years of ignoring or giving little or no attention to the adverse effect of oil spill, the Nigerian government has begun to take steps to mitigate the damage, most especially in Bodo. The role of the environmental agency in checking and documenting oil spills is getting stronger as a new wave of combating oil spill have been scarce in order to address the issues of oil spillage through the payment of fair compensation fair value.

Although a number of studies have been conducted on the socio-economic effects of oil spills and the operations of oil companies in the host communities, the independent studies on the environmental impacts of oil spill have been scare. The present study attempts to address the nature of ecosystem degradation caused by oil spill affecting wetland in Bodo community.

### **1.1 Aim and Objectives of the Study**

This paper focused on assessing the nature of ecosystem degradation caused by oil spills in Bodo, Gokana, and Rivers State. The objectives of the paper are to:

1. Assess the effects of oil spill on the ecosystem
2. Ascertain what constitute head of claims for damages.

## **2.0 Literature Review**

### **2.1 Impact of Oil Pollution on Bodo Land**

The intense interest in fishing and agricultural profession, their economy had led to increase in population; very large amount of rainforest that once occurred covered the whole area to grow their food together. The advent of Christianity has not discontinued Ogoni Indigenous culture and religion. Ogoni believed that land is a god which must be worshipped, Furthermore, when Ogoni took ill; they still make use of the tree leaves for herbs to cure their illness. (Boele, 1995). The beliefs of the Ogonis in their custom and tradition had helped in protecting and preserving their environment for generations. The land and rivers are regarded significantly with deep spiritual beliefs by the people (Legbosi, 2007).

What is responsible for greater number of oil pollution incidents that had

occurred in Ogoni communities are due to extraction of mineral resources having negative effects on their environment. Most of the oil wells in Ogoni of Rivers state are operated by Shell Petroleum Development Company of Nigeria (SPDC) with over 9000km of flow lines and pipelines, 71 Producing oil fields, 87 flow stations, 9 gas plants and 2 major oil terminals with a capacity to produce an average of over one million barrels of oil per day (Shell 2002a). According to Ite (2004), Shell accounts for 40% of the country's oil Production, and 53% of Nigeria hydrocarbon reservation which has led to series of joint environmental hazards put together in the host communities for oil spills and environmental degradation. Karl (2004) stated that there are many factors responsible for oil spill: pipeline explosions resulting from oil theft, or corroded pipeline or pipeline interdictions (Anifowose et al, 2011). Shell reports explained that between 2006 and 2011 the company recorded up to 820 cases of oil spillage amounting to approximately 295,000 barrels of crude oil spilled in Ogoniland within the period (Shell 2012b). It is against this backdrop that the people of Ogoni in 1990 staged a peaceful protest against the social economic, and political marginalization of the people and the level of environmental degradation that have occurred in the region requesting for fair compensation from Shell and the Federal Government of Nigeria. That led to suspension of exploration activities in the region by Shell in 1993 which was referred to as "Ogoni Uprising" that forced Shell to withdraw from the area.

### **2.1.1 Economic Impacts of Oil Spill Agriculture in Bodo**

Bodo People are predominantly fishers and farmer, they generate their income through farming and fishing (Pegg and Zabbey 2013) suggest that Bodo household should diversify their economic activities into other sources of business .The impacts of oil affected businesses was massive because of over dependence, less household capacity to diverse faces of business. Therefore an impact on agricultural land and water will in turn affect the entire resources of the farmer. The impact affected the overall economic activities of farmers and fishermen in the communities. The farmer reveals that oil spill had altered the ecosystem which support mixed method of farming primarily for subsistence purposes, with surplus being sold. Examples of crops which are been sold includes: yam, cassava, maize, cocoyam, millet etc. The problems encountered

with the mixed method of farming due to oil spill have affected household's income and overall productivity. The farmers, mostly women also believed that the soil infertility as a result of oil spills has also led to local food shortage in the community.

### **2.1.2 Economic Impacts on Fish Depended Households in Bodo**

Geographically, Bodo is located at economic advantage than other neighboring communities by utilizing the wetland for its agricultural practices (fishing and farming). The low lying areas in Bodo would be suitable for fishing activities because it is link to Atlantic Ocean. Bodo creeks drain directly into the sea. The sea serves as additional economic opportunity to the people these areas, utilizing this strategic location to sustain their livelihood as Bodo is well known in the entire Ogoni for its fresh fish production.

However, the low lying wetland serves as fishing zones and also the sitting of oil pipelines used for transporting crude oil to Bonny makes the zones susceptible to incidents of oil spill. The wetland (low-lying) areas in Bodo are prone to oil spillage and environmental degradation because of the peculiarity of the zone. The combination of loss of local biodiversity, reduction of local food sources due to the oil spill and the reduction of economic activities due to The recurrent occasion of oil spillage has affected the people living in the wetlands to abandon their homes and sources of livelihood to seek alternative up-land area in the community or in other neighboring communities for their survival.

### **2.1.3 Impacts on Local Food Sustainability in Bodo**

The decline in plant species used for food production is connected to environmental degradation and oil spillage. Bodo Community as a in Rivers State is known for its massive food production through fishing and farming, with its long tradition in garri production (local food made from cassava). Garri is one of the stable foods produced and consumed in the entire area because it is relatively cheap, many households can afford for their daily meal. The high yield of cassava cultivated for food production is supported by the specific nature of the soil level and type. The level of soil has decreased, hindering subsistence and commercial agricultural practices by most household in Bodo Community.

The oil spill has caused the stunt growth in cassava from garri production, palm oil, palm wine, citrus tree, yam, potato, cocoyam and cocoa due to soil contamination on land having a serious implication on the livelihood of the household and the entire community and economic situation of the state due to the quantum of the areas badly affected by oil spill.

#### **2.1.4 Social Effects of the Oil Spill in Bodo**

There are three categories of degradation impacts (environmental, economic and social) The highest impact experienced clustered around economic activities and the net effects on the economic goods in the environment such as land, water, ecosystem, plant species, economic trees, like palm trees, cocoa tree, kola tree, banana tree, cotton tree, orange tree, raffia tree, are to be valued and adequate compensation paid.

#### **2.1.5 Cultural Effects of Environmental Degradation in Bodo.**

Considering the cultural shift that oil spills have brought upon men, women, youth, and the entire rural dwellers of the Bodo Community the devastating effects, damages and hazards brought on people has been destructive and reducing the community's spiritual beliefs, been described by scholars as people losing their sense of belonging in the community . Loss of cultural heritage such as shrines, grave side, tradition halls used for meeting at intervals were lost due to activities of oil exploration.

Apart from loss of cultural heritage, there was a decline in spiritual values due to oil spills affecting the natural assets that are very important element of the culture and tradition of the people. Natural assets like land, forest and rivers are seen as places of spiritual significance where their gods and ancestor lives by their beliefs and claimed that are been destroyed. The activities of Shell in the area with continuous oil pollution is by extension desecrated the sacred places for their gods and ancestors, which are the reasons for their economic challenges the people are facing by a of punishment they received from their gods and ancestors for allowing such level of oil activities and desecration of sacred sites.

## **2.2 Oil Pollution and Compensation Determination**

According to Akujuru and Less Ruddock (2015), defined compensation for compulsory acquisition as the effort to return or place the injured party to its original state before the accident occurs. Therefore, the following authors had written significantly on the topic of compensation (Famoriyo 1984, Syagga and Olima 1996, Ogedengbe 2007, Kakulu 2008, Otegbulu 2009, Oluwamotemi 2010, Kakulu and Nuhu 2012).

Akujuru (2015) narrowed down elements of the ecosystem that must be compensated during oil spill ecosystem degradation; the land itself, all improvement on the land, crops planted, value of financial privileges or potential value that could yield future interest are alone standing the propounded principles in many legal quarters that compensation should be guided by the objectives of equity and equivalence which means sufficiency of compensation should be measured against the note that people are nether impoverished or enriched Keith, McAuslan et al 2008).

USA adopted the market value approach in valuation, while UK assumed compensation to be based on the market value to the owner including any losses suffered by the claimant (Denyer-Green, 2009). Notwithstanding there are some common problems relating to the methods of valuation;

- i. Problem of private rights over land
- ii. Problems of multiple layers of rights

Akujuru (2005) opined that the interest of some specific claimants is been omitted or excluded in the estimation of the compensation assessment. He stated the methods that are completely obsolete or completely inadequate as a method of compensation assessment. Inability of professionals like the microbiologists, soil scientists, marine biologists, and health and safety experts to give their professional test analysis result has made the basis of such compensation, unacceptable.

Furthermore, the second error which constitutes the basis for inconsistency in such compensation approach based an equivalent reinstatement cost method for small intangible goods such as fishing right, using one of the best method for judgment. Also the oil producers trade section prices (OPTS) lack legal footing as it operation is based in Lagos by Lagos chamber of commerce and industry

not representing the National framework for compensation assessment (Otegbulu, 2009). Finally, the third category of error which make such compensation vague is the use of improvise or subjective data in estimating compensation value (Otegbulu, 2009).

### **3.0 Research Methodology**

The study was conducted in Bodo Community in Gokana Local government Area located in Rivers State in the South-south Nigeria. Bodo as a semi-urban a community is located in Gokana Local Government Area of Ogoniland, Rivers State hosting Shell Petroleum Development Company and Trans Niger pipelines. Bodo oil spill as part of the Niger Delta communities was caused by operational problems which recorded about 4,000 barrels of oil spill per day for 10 weeks. Bodo has an estimated population of 62,000 people according to 2006 National Population Census Figure ([www.riversstate.gov.ng](http://www.riversstate.gov.ng)). And over 30 villages and 84 households which include: Kpor, Biara, Mogho, Bera, Sugi, K-Dere, B-Dere, etc. The major occupation of Bodo people is fishing and farming due to its wetland environment. Although some engages in petty trading, artisan and craft work.

The study domain is Sugi (Patrick Waterside) with a cross sectional survey research design adopted. Due to the effectiveness of the study seeking the views of individual respondents on the assessment of the nature of ecosystem degradation caused by oil spills, the study uses questionnaire and interviews as the sources of primary data collection.

The instrument for data collection was on a five point likert scale questionnaire distributed and 36 questionnaires were retrieved representing 55.5% of the sampled population. The sample size chosen for the study cut across chiefs, opinion leaders head of households, farmers, fishers and landowners purposively selected for the study. Descriptive statistics such as frequency, tables, mean statistic was use for analysis, conclusions were drawn and some recommendations were made.

### **4.0 Results discussion and Analysis**

#### **4.1 The Effect of Oil Spillage on Bodo Socio-Economic Livelihood**



To answer this research question the mean and standard deviation for each of the five items (i.e. items 1-5) were computed. The results obtained are summarized and presented as in Table 1 below:

Table 1 show that for Bodo the mean scores for the items ranged from 3.06 to 3.26 for item 1 and 5 respectively. It also shows that items 1, 2, 3, 4 and 5 were identified as the effects of oil spillage on socio-economic livelihood. This is because mean scores of all the items were above the criterion mean of 3.00. Hence the effects of oil spillage on socio-economic livelihood in Bodo, Rivers State are: damage to land, negative impact on finances, contaminated water, and increased cost of transportation and prevention of good yields from farms, fishing etc.

In considering the responses from Bodo in Rivers State, the items mean score ranged from 3.26 to 3.44 for items 4 and 5 respectively. It was also shown that items 1, 2, 3, 4 and 5 were identified as the effects of oil spill on socio-economic livelihood in Bodo in Rivers State. To support the above, when the responses from Bodo in Rivers State were combined, all the items were also accepted as the effects of oil spillage on socio-economic livelihood.

**Table 1: Effect of Oil Spillage in Bodo (N=36)**

S/N	Items Statement	Mean	SD	Result
1.	The oil spillage has damaged the land	3.36	0.69	Accept
2.	It has impacted on our finances negatively	3.14	0.84	Accept
3.	The spilled oil has contaminated the water source of the community	3.06	0.90	Accept
4.	The spilled oil on the road prevents easy transport to town for business, hence increases cost of transportation and cost of living	3.26	0.70	Accept
5.	The oil in the soil prevents good yields from the farms and destroys fishes in the water making self-help difficult	3.18	0.71	Accept

**Legend = >3.00 Agree, <3.00 Disagree**  
**Source: Author's Field Survey, 2018**

## 4.2 Various Head of Claims to be claimed for Damage

**Table 2: Various Head of Claims to Compensation Payment as Applicable to Activities in Bodo Community.**

Ranking	X		1	2	3	4	5	Percentage	Total
SUGI	Land	f	6	4	2	1	2		
	Fx		6	8	6	4	10	94.4%	34
	Water	f	4	3	4	2	1		
	Fx		4	6	12	8	5	97.2%	35
	Vegetation	f	4	4	3	1	1		
	Fx		4	8	9	4	5	75%	30
	Ecosystem	f	3	3	4	2	0		
	Fx		3	6	12	8	0	81%	29
	<b>Average</b>							<b>102%</b>	<b>128/4 32</b>

**Legend: <30 Compensation Unfairly paid, <35 Compensation fairly Paid , > 35 Just Compensation paid**

From table 2 the result show at a glance the compensation payment for ecosystem goods and services 29 out of 36 and less than 30 legend reveals that payment for air, fauna, oxygen and pure hydrogen which are products of the environment and ecosystem are poorly inappropriate. From the table it reveals that the plants in the terrestrial habitat (vegetation), such as Oil Palm, Cassava, Yam, Cocoyam, Banana and Coconut were underpaid in the compensation estimation. Furthermore, from the table it reveal that the legend of 35 out of 36 for compensation valuation of lives and resources in the water habitat shows that shrimps, crayfish, Cat fish and other aquatic resources were adequately valued and paid for as individual are concerned.

## 5.0 Conclusion and Recommendations

This study assessed the nature of ecosystem degradation caused by oil spills in impacted area of Bodo Community in Ogoniland. Environmental degradation as a result of oil pollution has continued over the years unchecked had impacted on the loss of livelihood in Bodo Community. The improper management of the ecosystem could spiral into hopelessness especially among the farming and fishing communities. Additionally, the rate of damages to the environment is no doubt has the substantial destruction of the wetland and its natural resources. The study was conducted to determine the extent of oil pollution, ecosystem

degradation and compensation payment to the relevant stakeholders in the affected land areas in Bodo community.

The impact of oil pollution on land destroy crops and damage the quality and productivity of the soil used for farming, while in the same vein on water, damages fisheries and contaminate water used for drinking and other domestic purposes as expressed by the indigene of Bodo Community. Damages from oil pollution are therefore chronic and cumulative acting in severely to impair coastal ecosystem as the case of Bodo, compromising their livelihood by impoverishing the residents.

The study shows the extent of oil pollution and the release of toxic hydrocarbon into the land, water, and entire environment of Bodo in Gokana local government area of Ogoni land, thereby posing economic hardship as a result of lost of fish ponds to fishers, lost of farmlands to farmers, discouraged investors from massive investment in the area, it has also led to poor health condition of the rural community.

Based on the findings, it was deduced that various farmers and fishermen in Bodo community suffered high level pollution and environmental degradation based on the continuous exploration and exploitation of crude oil on their land and vegetation compensation was paid but was not evenly distributed to the sufferers. The study thus recommends the payment of fair compensation to affected persons and the authorities concerned should implement and improve on the remediation processes to reclaimed the impacted sites.

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