

THE EFFECTS OF OIL SPILL IN AQUATIC LIVES AND PROPERTY IN KALABARI IN RIVERS STATE OF NIGERIA

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ABSTRACT: This study investigates the causes and impacts of oil spill in Kalabar region in Rivers state of Nigeria to identify the suitable land management systems that will control oil spill so as to reduce its impacts on the Niger delta region of Nigeria. The study adopts a qualitative and quantitative research through interviews, fishermen, periwinkle (Isam) pickers and the youths to identify oil spill impacts on community socio-economic conditions. The collection of data involves the use of both qualitative and quantitative approaches concurrently. This was possible because the study focused on the effects of oil spill on aquatic lives and property. Purposive sampling Techniques, and Snow Ball sampling was used in selecting the sample size (where one-person links to another). (189) questionnaire were distributed in nine communities affected by the oil spill in Kalabari region, Rivers State out of which 138 questionnaire representing 122.45% of the total was retrieved and triangulated with data Snow ball sampling techniques, interview of selected people affected. The primary data was analysed using Statistical Package for Social Sciences (SPSS version 20).

Key Word: Oil spill, aquatic lives, environment and properties Kalabari region

I. INTRODUCTION

This research is centred on the effect of Oil spillage on aquatic lives and property value as it relates to the escape of crude oil and related products into the environment.

Oil spill is a form of pollution described as the release of a liquid Petroleum hydrocarbon into the environment, especially marine areas, due to human activities. Oil spills may be due to release of crude oil from tankers, pipelines, railcars, offshore platforms, drilling rigs and wells, as well as spills of refined petroleum products and their by-products, heavy fuels used by large ships such as bunker fuel, or the spill of any oily refuse or waste oil. Spilled oil can penetrate into the structure of the plumage of birds and the fur of mammals, reducing their insulating ability and making them more vulnerable to temperature fluctuations and much less buoyant in the water Ismail & Lewis, 2006; Jernelov, (2010).

1.2 The Concept of Oil Spillage

Since the discovery of oil in the 1950s in the Niger delta region of Nigeria, there have been varying adverse environmental implications brought about by oil production activities in the region. The rapid development and production of crude oil has elevated population in the oil producing area and it has affected the ravage of producing state like the Kalabari region of Rivers state. (Badejo and Nwilo, 2004) Earlier surveys in Rivers state have shown an increasing number of recorded oil spills leading to the damage of environment. According to the National Environmental Study Team (NEST) (1991), the greatest single environmental problem connected with petroleum exploitation in Rivers state is oil spillage, both onshore and offshore. Oil spillage can be said to be the process of oil, accidentally coming out or seeping out from pipe or any other container containing oil, oil spill is an accidental or intentional discharge of oil which may water bodies or any part of the land.

In Kalabari region of Rivers State vandalism of pipeline and thefts of oil are serious problems in the Kalabariregion of rivers state, Some people damage pipes while trying to steal small quantities of oil for sale at local markets or for personal use. According Ekpenyong and Udofia (2015) , One of the major causes of oil spill is lack of impatient of the youths.

This was earlier noted by Etikerente (2000) when the said occurrence of oil spillage can never be ruled out completely even if government provides employment. Oil spillage is an event that cannot be totally eliminated in the course of oil production activities, it is a necessary event that must occur in the oil exploitation and exploration activities. Oil spillage has caused fishing output to decline, due to widespread

pollution environmental challenges include coastal erosion and rising sea level, which has led to a large portion of landmass being eroded, which damage roofs and respiratory and other medical problems.

According to (Ngene 2014) such lands also become no useful for real estate development process. This has resulted to project abandonment in some cases and even collapse of buildings in others, thereby resulting in loss of value of land.

Omuofine(2005) labelled oil spill as discharge of Petroleum products to the surface of water or oceans.

The United Nation Environment Program UNEP(2011) Opined that when there is an oil spill all the aquatic lives tends to leaves the polluted areas in search of cleans water while Fishermen also, move to other area in search of fishes and other aquatic lives, and set up fishing ponds which they later come back to their area to sell and it affects property value.

According to Takon (2014)who observed that oil spillage which involves blowouts is caused by the youths,equipment failure, human error and releases crude oil to the Environment.Bearing similar opinion is Atubi (2015) alsoobserved that oil operations includethe release of toxic chemicals that affects aquatic lives and property value.

According to Osuji, (2004),oil spill is a release of a liquid petroleum hydrocarbon into the environment due to human activity, such as bunker fuel which is form of pollution, Oil spills include releases of crude oil from tankers, offshore platforms, drilling rigs and wells as spills of refined petroleum products (such as gasoline, diesel) and their by-products.

According to Ifunanya(2010) who opined that Oil spillage are caused by transportation of crude oil which release unwanted pollution and affects resources, marine life and also human health.Akpokodje andSalanu(2015).Study that oil spill is the greatest occurrence that hinder all activities in the affected communities.Also,Suji and Ezebuio, (2006). Stated that Oil spill occurs as Petroleum substance that is uncontrollable, release of waste petroleum into the environment as a result of equipment failure, operational mishaps, or intentional damage to facilities. (Blank, 2003). Suggest that the poor are often illiterate, in poor health, and may have short life span due the evaporation of gas flare and of which they have no access to basic necessities and to meet socio economic and laws. Lack of skills are unable to use their skill as in the case of the fishermen, periwinkle (Isam) pickerswhich led to lack of unemployment.

Nwankwo and Ifeadi (1988). Identified oil spills contaminate in the streams and rivers; forest destruction and biodiversity loss; property, the effect of gas flaring as some of the pollution problems associated with oil exploration and production in the Kalabari region in Rivers State which has affected development of the communities.Oil spill may be due to release of crude oil from tankers,offshore platforms,drilling rigs and wells as well as spills of refined petroleum products such a gasoline, diesel and their by product, heavier fuels, used by large ships such as bunker fuel.

According Aina (1992) stated that Oil spills is the highest factor affecting property value of all environmental degradation.

1.3 Causes of oil spillage

Okechukwu (2012) Noticed new causes of oil spillage and the reasons why pipelines are damaged from 1990s to date, the causes of oil spillage observed, are the sabotage by the youths who are angry for lack of employments from government and that of the existing companies which refuse to pay stipends,vandalisation of pipeline to make money from multinational oil and gas companies or disrupt oil production and distribution. The militant groups who are involved in oil bunkering for economic benefits. Omajemite reported in (2012) that within 1993 to 2006 several cases of vandalisation has occurred with several reasons. Vandalisation of the pipeline by the by the local inhabitant(Nwilo and Badejo 2005).Oil spill is divided into four groupsaging of the pipelines,oil blow outs from station, cleaning of cleaning of tanker on high sea,disposal of used oil into the sea,tanker accident. Oil spills causes destruction to the livelihood of many inhabitants in the oil producing areas. Egbe and Thompson (2010) have identified eight causes of oil spills as follows;

- **Blowout:** Oil well blow out occurs when the well is not well kept under control that is to be behave in such a way that the hydrostatic mud head counter balances the formation pressure and prevents the formation fluid from entering the well formation during drilling operations.
- **Sabotage:** When the cause of spill is mischievously deliberate and not accidental.
- **Corrosion:** when the causes of leakage is rusty equipment.
- **Ageing of oil pipeline:**is the outdated age of pipeline.
- **Operation/Maintenance Error:** Bad oil operation practices like untrained personnel and lack of maintenance of the equipment.
- **Natural causes: Oil spillage:** Oil spill could result as a result of natural causes; they are causes which are not manmade or induced thus, occurring without any faulty of man (Examples motion of tectonic plates, rain,flood,)

- **War:** This is another causes of the oil spills in communities most communities within the Kalabari regions are very rich in oil, sometimes led to unending fight between the militants and government soldiers. This has led to the disruption of normal activities in the communities. In additional due to many oil wells hence, smuggling has been a key financial route for the militants. This has caused massive oil spills.

Unknown Causes

Oils spill have been blamed for numerous adverse environmental impacts on the soil, water, plants and animals ecosystem of the oil producing communities. Oil exploration and production activities affect the physical biological and aesthetic value of the environment and the economics life and health of the people in Kalabari region.\

Worgu (2000). Note that oil spill in rural communities such as Kalabari region can have serious effects on lives of residents in the those communities. Oil spill affects land fertility, agriculture in different aspects.

According to (Islam and Tanka 2004). The disaster of oil spills can be effective based on the quantity of oil spill that floats to the river.

Elum (2016).Observed that oil spill affects the socio economic to the environment and infrastructure. Spills and the attendant youth restiveness resulting from deprivation.

Table 1: Reported oil spill 199-2001

Year	Total numbers reported oil spill	Quantity in Barrel
1997	339	59.272
1998	390	-
1999	319	-
2000	637	84,072
2001	412	20.976

Table 1.gives an illustration of the numbers of oil spill and the reported volumes of oil spilled into the ecosystems over the period (1997-2001). The major causeof oil spill in Kalabar region in Rivers State are vandalisation of pipelines by the youths,ageing of the pipeline,oil blow out from the flow station,equipment failure.

1.4 Factors Responsible for the Causes of Oil Spill

The causes responsible for oil spill are due to several reasons for control of where possible. Poverty, Unemployment Policy and Negligence are also the factors of oil spills in the environment.

According to (Nwilo and Badejo 2005) Lack of livelihood has essentially contributed to youths restiveness, cultism, thief. Social tension,they live in survival of the fittest theory which have negatively affects the people. The people are physically mental and emotionally frustrated and there enmity and lack of trust and transparency between communities and oil companies which hugely influence factor restiveness.Also, the divide and rule and double standard theory by the oil companies where they engage youths and some comprised elders to protect them and their facilities by equipping them with weapons has contributed to restiveness.

According to Omuofine (2005). Describe an oil spill as the release of petroleum into the surface waters'' .oil spill contribute negatively to our environment and it also affects property causing deterioration on building, causing easily dilapidation on buildings.

According to (Mba,2013) Observe that in oil affected areas of the Niger Delta , after all the damages of pipelines and sabotage by the youths ,compensation and clean up contract from companies or government of the environment is the only way the people can achieve their benefits.The activities of illegal bunkering by the youths and companies are major causes of oil spillage in the regions.

World Bank (2005) Describe that air pollution is the atmosphere of contaminated environment which dissipate (such as dust,fumes,odor smokes or vapour) .The atmosphere halts enjoyment of habitant property.

1.5 Oil Spillage and its effects

The effects of oil spill on property is the leakage and vandalising, sabotage of oil pipelines which cause properties to easily dilapidation before life span of the property. Properties devalue without a correct validation certificate. Oil spills soaks the brickwork or stonework of building can spread through the drain and affects the operation of sewage treatment works and septic tanks, it spreads through the ground and affects properties, pollute rivers, stream and ground water surrounding properties.

According(Aina 1992). Oil spill is one of the highest factor affecting property value.Oil spill have degraded aquatic lives and reduces property value which has turned productive areas into waste lands, causes destruction of properties, the effects compel both indigene and non-indigene to abandon their lands with or without adequate compensation and seek alternative means of livelihood in other nearby communities.

1.5.1 Effects on Mangrove and Aquatic Life

Kalabari communities are all surrounded by water creeks and ponds from which they fish, bath and consume. The pollution of these sources of water by oil operation results in dire consequences for inhabitants. Contamination affects both fresh and underground water. For example, if rivers, streams and wells that provide water are contaminated, the people in the area will not only find it difficult to access portable water but the fishes and other water bodies will also be destroyed. The report of the United Nations Environment Programme (2011) indicated that water taken from wells in communities in Kalabari region is higher than the Nigerian drinking water standard.

1.5.2 Effects of Oil Spill on Economic Activities

Majority of the people of Kalabari engage in fishing and farming for sustenance and also for trading but threats to this source manifests in the depletion of aquatic lives, reduction and abandonment of farm lands and loss of biodiversity resulting from over exploitation of existing resources and the resultant pollution. Fishing and farming produce have reduced drastically as oil and gas operations in the region gained ascendancy (Egbe, 2012). Almost all the riverine dwellers relocate to another communities or state to seek for alternative means of survival. Akujuru (2014) identified that the impact of oil operations on economic activities includes:

1. Loss of arable land, vegetation and forest resources.
2. Increase in land and water transportation with attendant consequences like aggravation of shore erosion, disturbances between life and fishing activities.
3. Improper disposal of dredge spoils along water ways, channels causing blockades to bush paths and waterways used for access to fishing farming parts and timber logging areas.
4. Oil pollution which pollutes drinking water sources destroys fisheries and farms and generally destroys the ecosystem.

1.5.3 Effects on Health

Oil operations are known to have deleterious effects on human health especially gas flaring and oil spillage which contaminates the air, land and water. In Kalabari region do not have access to portable water but depend on water from ground water and rain water for sustenance. The hydrocarbons released into the environment and gases such as CO and CO₂ have negative effect on human health. Skin contact with certain chromium compounds can cause skin ulcers and ingesting large amounts of it can cause stomach upset and ulcers, kidney and liver damage and even death. According to (Egbe and Thompson, 2010) Environmental pollution caused by oil spill can cause health problems like respiratory problems, increased blood pressures, heart rhythm changes, stomach irritation, muscle weakness, changes in nerve reflexes, swelling of brains and liver, lungs diseases and cancer, kidney and heart damage, diarrhoea, asthma, eye infections, bronchitis, skin infection, headaches, dizziness, nausea, vomiting, eye and throat irritations, as well as breathing difficulties.

1.5.4 The Effects of Oil Spill in Aquatic Lives in the Kalabari region in Rivers State

The effects of oil spill in the region have caused a negative perceptiveness" Akpan and Akpabio (2003) The people of the region depend on aquatic life for daily living, mostly in the form of fishing farming, and other marine ecosystem. Ever since the discovery of oil spill in the region of Kalabari in 1956 the regions have been suffering the negative impact of environmental consequences of oil spill. According to Okonkwo (2014) points made are the effects of oil spills covers violence and frustration, reduction in tourism and hospitality industries. The harmful effect of oil spill on the aquatic ecosystem are many, the fishing production is an essential part of the region because it provides income for the people. Olujimi *et al.* (2011) Observed that Kalabari region, pollution of rivers through oil spill have resulted in massive extermination of fishes thereby threatening the social and economic life the communities whose livelihood depends on the contaminated water. Ibaba (2001) observed that in the affected area where oil spill occur the aquatic life is virtually castrated by many years of oil prospecting and exploration. Garrity and Leving (1990). Oil settle on beaches and kills organism that live there, it also settle on oceans floor and kills benthic bottom-dwelling organisms such as crabs and other marine ecosystem." Nwilo and Badejo (2005). In Kalabar region at large area the mangrove was once a source of firewood for indigenous people and habitat for the area biodiversity but is unable to survive the oil toxic.

Ogbogbo (2004) stated that the consequences of oil spillage are massive pollution of land, rivers and streams in the Niger delta. He argued that the aquatic environment and the ecology of the area, which constitute a major resource for the people, are destroyed

1.5.5 Effects of oil spillage on Real Estate and the Environment

The oil exploration activities have both negative and positive effect on the property of our environment. The greatest positive contribution of oil to the development of our environment is through the improvement of the economy.

Afomata (1997) opined that the whole process contributing to the economy, the whole process of petroleum exploration service; refining and marketing provided employment for thousands of people.

Udo (1981) suggest in addition to providing road, health facility which have been immense value to the Nigeria, they contribute to the trailing of mechanics, drillers, seismic operators and laboratory operators, thus developing the human resources. Not forgetting the availability of energy resource such as petrol, kerosene, diesel ,oil heavy fuel oil and bottled gas made possible by oil explorers in the state at a relatively low price if compared to those country that do not have the natural resource. However, the negative effects have outwit the positive effects hence imputing in the layman that the oil wealth is a curse.

Eteng (1997) avers that oil exploration and exploitation has over the last four years impacted disastrously on the socio-physical environment of Kalabaribearing region massively threatening the subsistent peasant agricultural economy of this region and the environment and hence the entire livelihood and basic survival of the people. It is well known that the people of Kalabari region rivers state of Nigerian are known for fishing production and other ecosystem and is a major source of income to the dwellers. Oil usually cause a lot of damage to land and buildings, vegetation marine life and other aquatic animals. The resultant effects of this is that aquatic potentials of the place is greatly minimize leaving the oil producing communities with the little or nothing to do by way of making a living.

Consequently, Oil spillage on water has grave socio economic effects on the affected communities in Kalabari region of rivers state in Nigeria. The affected are can easily be identify but the aquatic ecosystem cannot be identify easily for value (Omuojine.2005). The effects of oil spillage are;

- Damage to or destruction the ecosystems
- Delayed of new fingerlings from the affected area.
- Prevention of natural air leading to death of fishes and others aquatic organism.
- Damage to fishing equipment and ponds.
- Contaminations of ground water.

All these can be summarized in three factors which are:

- Loss of income
- Threaten to human life
- Creation of potentials jeopards

In all the extent of the potential damage that could result from oil pollution which resulted from oil spills depends on the severity of oil spillage, the toxicity of the oil and the types of environment.

1.5.6 Effects on the General Population and reasons why property value is reduce

The effects of oil spills on humans may be direct and indirect, depending on the type of contact with the oil spill.

Direct exposure to oil spills – occurs close to where people live or work and where they may come in contact with oil spill components:

Indirect exposure to oil spills - even when people live in places far from where the actual oil spill took place:

- By bathing in contaminated water - for example swimming in a contaminated water stream - even when an oil sheen may not be visible, dissolved oil contaminants may exist in the water if it was impacted by an oil spill.
- By eating contaminated food - some oil compounds bioaccumulation in living organisms and may become more concentrated along the food chain. Humans may become exposed to concentrations of contaminants in the food that could be orders of magnitude higher than in the contaminated environment. This is especially problematic since residents could be exposed even if they live far away from an oil spill if they consume food coming from a spill affected area.

The main oil spill effects include a variety of diseases, negative economic impact, pollution with crude oil or petroleum products (distillates such as: gasoline, diesel products, jet fuels, kerosene, fuel oil, as well as heavy distillates like hydraulic and lubricating oils) and the aesthetic issues that affect the residents of the affected areas in multiple ways.

1.5.7 Effects of Oil Spill on Water Quality in the Kalabari region

Kalabari region in rivers state is a wetland and the people of depend on the wetland for food and source of livelihood. According to Emuedo *et al.* (2014) oil spills into wetlands have a base the water quality in Kalabari region. According to Emuedo *et al.* (2014), the water quality in Kalabari region is unhealthy for human consumption.

2.1 Management System of Controlling Oil Spill in Kalabari Region

There are many strategies taken by government and non-governmental agencies to effectively manage oil spill incidents in the region. Some of the measures taken to control oil spill include, setting up of the Niger Delta Development Commission to tackle the ecological and environmental problems. There have also been laws regulations introduced to control oil spill exploration and exploitation, The Environmental Impact Assessment (EIA) decree No. 1992 was form to protect and sustain our ecosystem. The law enables the development of an EIA compulsory for any major projects that have adverse effects on the environment. According to

Ntukekpo, (1996) and Olagoke (1996). If enhanced to influence on activities including their direct or in direct, cumulative, short term and long term effects and to identify the measures available to reduce the environmental impacts of proposed activities and assessment of those measures. Non-governmental agencies, and the oil companies themselves, have also contributed efforts to curb destruction of biodiversity in the Kalabari region. In National Petroleum Corporation (NNPC), formed the Clean Nigeria Associates (CAN) to help prevent and control oil spills in the region (Nwilo and Badejo, 2005).

According to Akankali, J. A. (1998) there should be a monthly allowance for age people within the communities affected, also infrastructural compensation such as centres for youths training and development, good roads, and good hospitals, youth participation in decision making and security agency on pipelines.

Eteng (1997) suggests that oil exploration and exploitation has over the last four years impacted disastrously on the socio-physical environment of Kalabari bearing region massively threatening the subsistent peasant agricultural economy of this region and the environment and hence the entire livelihood and basic survival of the people. It is well known that the people of Kalabari region rivers state of Nigerian are known for fishing production and other ecosystem and is a major source of income to the dwellers.

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2.2 Sources of Oil spillage in Kalabari Region in Rivers State

Oil spill incidents have occurred at different times along the Kalabari region. Between 1976 and 1996, a total of 4647 incidents resulted in the spilling of approximately 2,369,470 barrels of oil into the environment. Of this quantity, an estimated 1,820,410.5 barrels (77%) were not recovered. Available records for this period indicate that approximately 6%, 25%, and 69% respectively, of total oil spilled in the Kalabari region area, were in land, swamp and offshore environments.

3.1 Research Philosophy and Research Methodology

Creswell (2003) referred to research philosophy as the researcher particular way of thinking about the subject matter and this orientation is based on the premise that human experience make sense to those who lived in it prior to all interpretation and theorizing "Whereas Saunders et al (2009) stated "research philosophy is concerned with the way in which things are viewed in the world". Hence, the researcher sees research philosophy as a framework for observation and understanding which shape our thinking about the phenomenon of investigation.

3.2 Research Design and Strategy for the Study

According to Robert (1999) research design is the integrated of plan, structure an strategy for the purpose of investigating and preferring solution. It is proposed plan of action involving data collection, presentation, analysis and eventual drawing of valid conclusion. Qualitative and quantitative methods are often used in exploratory studies (Cooper &Schindler,2003). The combination of qualitative and quantitative methods of data collection and analysis commonly called mixed method is the current trend on social research(Cresswel,2003.This research adopt since it has the capacity to provide detailed and comprehension data in order to achieved the research objectives and answer the research questions. It enables us to identify all the affect areas in Kalabari region where oil spillage affected and the purpose of this research is to investigate the effect of oil spillage on aquatic lives and property value which involve visiting the affected communities, administration of questionnaire and discussing with local government chairman, fishermen, youth's leaders and the youth involved in the illegal bunkering.

3.3 Population of Study

The population for this study are fishermen, periwinkle(Isam) pickers, and youths because they are the only people who depends on marine ecosystem. According to Amanyie (2006) the people have been known for fish farming activities as their source of livelihood but the land and water on which they depend on have been threatened by oil spill, leaving the people without any means of livelihood. The chosen population also possesses the relevant experience for the research question under investigation, having lived and experienced different kinds of oil spills and operation of the oil and gas industries within the boundary and shores of the region.

In the Kalabari region, there are three (3) Local Government Area. For the purpose of this study three (3) communities each were identified for investigation. The total population for this study is 189 respondents made up of seven (7) periwinkle farmers, seven (7) fish farmers and seven (7) youths selected from each of the local governments follows:

Table 3.1: Population Distribution for the Study

LGA/Communities	Fishermen	Periwinkle Pickers	Youths	Total
ASALGA				
- Buguma	7	7	7	21
-Abalama	7	7	7	21
- Ifoko	7	7	7	21
AKULGA -				
Soku	7	7	7	21
-Idama	7	7	7	21
- Obonoma Ama	7	7	7	21
DELGA -				
Oguru-Ama	7	7	7	21
-Bukuma	7	7	7	21
-Kes	7	7	7	21
Total Population	63	63	63	189

3.5 Sample Size and Sampling Techniques

This study examined the opinion of a cross section of fishermen, periwinkle(Isam) pickers, and youth. In determining the sampling techniques, the researcher used purposively sampling techniques to select nine communities of Kalabari region affected by oil spillage and the Snowball sampling to elicit information from respondents because it enables the researcher to get one respondent who lead the researcher to get the next for interviewed. This trends continue uniformly for the rest of the respondents. The snowball sample was used in selecting 7(seven) respondent each from amongst periwinkle farmers, fish farmers and youths in each of the three communities of Asalga, Akuku Toru and Delga. In all total of 189 respondents were selected and interviewed.

3.6 Instrumentation and Data Collection

Data is the basic input to any decision making process in a research study. Data collection involves how data needed for a research are gathered or brought together in order to achieved the objectives of the research, it is the process by which the researcher collects the information needed to answer the researcher problem. Instrumentation refers to the parameters and instruments used for collecting /gathering the relevant data needed to achieve the objectives of the study or answer the research questions.

In this study two types of data were used, which are the primary source data and secondary source data. The primary data includes suitable information from interview, questionnaire and physical inspection and observation. The secondary source data includes information obtained from journals, textbooks, published and unpublished works from the internet that relate to the research topic.

3.7 Source of Data Collection

The source of data collection with regards to this research was derived from both primary and secondary sources to answer the research questions and achieved the objectives of this study.

i) Primary Source Collection

Primary data refers to data are collected from field work under and the control and supervisor of the researcher. Primary data is the original data that has been collected specifically by the researcher for the purpose of the mind, they are generally first-hand information which may be source from methods namely the formal "etic" method and the formal "etic" This classification is based on the degree of formality of research design. At the formal end of the spectrum the researcher issue questionnaire survey while the informal methods of generating primary data includes human observation (participant observation /direct observation), structural or focus group discussion as well as case studies. This adopy questionnaire survey and structural interviews to elict information relevant to the study.

ii) Secondary Sources

Secondary source data provide data that are already collected and presented in particular forms and which could be useful to a large of interested uses. In other words, it involves analysis of data from existing documents or records. Secondary data are obtained by reviewing textbook, seminar/conference papers. Journals, websites documented reports etc. relevant to the study or the researcher.

Questionnaire

In this research, a structure survey was conducted with residents (household heads) and fishermen periwinkles farmers and youths face to face. The questionnaire developed for the study was developed with direction from the research questionnaire of Andre and Venise (2014). It was designed with closed ended, partially closed-ended and a 5-points Likert scale for the purpose of extracting the residents, perception and expectation of the Kalabari fish folk and others.

The research adopted the philosophical stance of social construction since it is aimed at finding the effects of oil spills on aquatic lives and property. A mixed method approach involving the stimulation use of both interviews and questionnaire survey was adopted elicit information from the study population. The unit of analysis was the people who have lived in the communities of all their lives. A case study strategy was used which allows for the collection techniques analysis. Data for this study was from primary and secondary sources and the study adopt a purposive sampling technique which allows the researcher to sample of objectives of the research.

4.1 Preliminary Survey Details

The sample size for this study is 189 comprising Periwinkle picking members, Fishermen and youths from nine (9) communities across the three Local Government Area of Kalabari Region. A total of 189 semi structured questionnaires were administered, out of which 138 questionnaires representing 73.02% were retrieved and used for the analysis.

4.2 Analysis of Field Data

In order to analyse the results from the field work, the collected data from the field were organized and analysed. Data was analysed using descriptive statistics. Frequency table were drawn and from these the data was presented in chart bars. The questionnaire were rated on a 5- -point Likert scale arrange in ascending order of 1,2,3, 4 and 5 respectively. Strongly agree is rated the highest and assigned a value of 5 while strongly disagree rated the least with a value of .one were made simpler with the application of a computer programme called Statistic Package for Social Science (SPSS Version 21) and Excel software package and closed end-questions.

Table 1: Educational Qualification of Respondents

CATEGORY	Frequency	Percentage
Gender		
Females	63	45.65%
Males	75	54.35%
Duration of Stay in the Region		

10-15	30	21.74%
18-20	62	44.93%
22-30	46	33.33%
Jobs Types		
Fishing farming	43	31.16%
Periwinkle farmers	45	32.61%
Youths	50	36.23%
Educational Background		
Primary	38	27.54%
Secondary	60	43.49%
BSC	40	28.96%

Respondent Profile 2020

Figure 1: Distribution of Respondent’s Educational Background

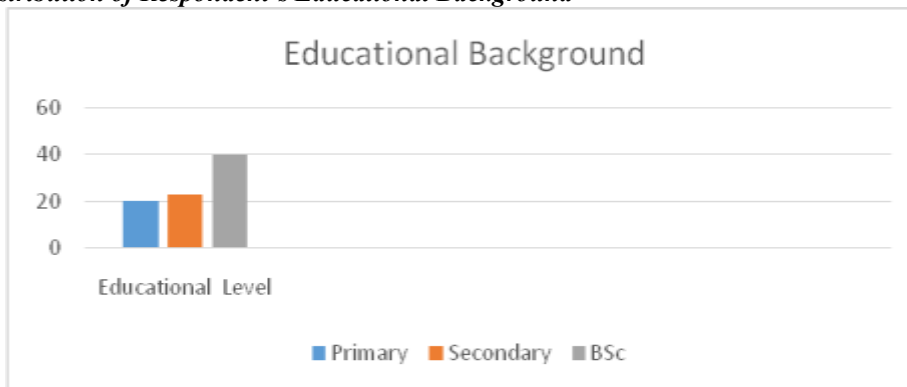


Figure 1: revealed the educational status of respondents that; 60% of the respondents are graduates with both B.Sc/OND, while 70% had went to secondary school, and 59% had primary school completed. This means the respondents are relatively literate. It could be agreed that the rate of unemployment and economic hardship in Kalabari region is the parent reason for this illegal bunkering and petroleum pipeline vandalism by the youths who aggressive by government and the oil producing companies. Odalonu (2015) observe that the causes of illegal bunkering is restive of the youths who are annoy by government neglect of oil producing communities. Sabotage and theft of oil are serious problems in the Niger Delta. However, international oil companies are overstating the case in an effort to deflect attention away from the many oil spills that are due to corrosion and equipment failure. Moreover, securing oil infrastructure against such acts is – to a substantial extent – the responsibility of the operator.

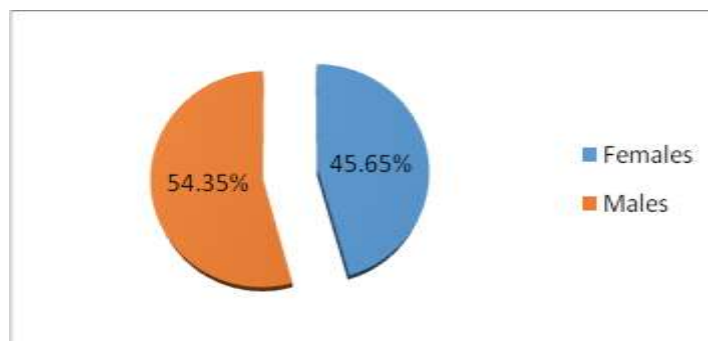


Figure 2: Distribution of Respondent’s Gender

Figure2: Revealed that 54.35% of the respondents were males, while 45.65% of the respondents were Females. This shows that majority of the respondents were male.

Figure 3: Distribution of Respondent's Duration of Stay**Figure 3: Distribution of Respondent's Job Type**

Figure 4 Reveals that 50% of the population fishing famer.

Research Objective 1: To Investigate the various Causes and impact of Oil Spills in the Kalabari region?

To investigate the various causes and impact s of oil spill in the Kalabari region, respondents were asked to state the factors that are majorly responsible are shown in table 4.2 below:

Table 2: The Causes of Oil Spill in Kalabari Region.

Factors	Yes		No	
	Frequency	Percentage	Frequency	Percentage
Sabotage	127	92.03	11	7.97
Equipment failure	49	35.51	98	71.01
Corrosion	36	26.09	102	73.91
Leakage of pipeline	111	80.43	27	19.57
Maintenance error	17	12.32	121	87.68
Ageing of pipeline	18	13.04	120	86.96
Blowout	104	80.43	34	24.64
Natural causes	16	11.59	122	88.41

From the above Table 4.2 shows the responses of the respondents on the various factors causing oil spill in Kalabari region. On 127 respondent representing 92.03% said yes ,while 11 respondents representing 7.97 said No. On Equipment failure 49 respondents representing 35.51%.said Yes, while 98 respondent representing 71.01% said No. On corrosion 36 respondent representing 26.09% said Yes and 102 respondent representing 73.91% said No. On leakage of pipeline 111 respondents representing 80.43% said yes and 27 respondent representing 19.57 % said No. On maintenance 49 respondents representing 35.51% said Yes and 98 respondent representing 71.01% said No. On Ageing of pipeline 18 respondent representing 13.04 said Yes and 120 respondents representing 86.96% said No. On Blowout 104 respondent representing 80.43% said Yes while 34 respondent representing 24.64 said No. On Natural causes 16 respondents representing 11.59% said Yes while 122 respondent representing 88.41% said No.

Table 3: The impacts of oil spill in Kalabari region.

Rating	Frequency	Percentage
Strongly Disagree	5	3.62
Disagree	5	3.62
Undecided	7	5.07
Agree	50	36.23
Strongly Agree	71	50.72
Total	138	

In the table above show the impacts of oil spill in Kalabari region 71 respondent representing 50.72% Strong agree that oil spill has huge negative impacts in the Kalabari region, 50 respondent representing 36.23% Agree that the oil spill has huge negative impact in the Kalabari region, 7 respondents representing 5.07% Undecided that oil spill has negative effects in the region, 5 respondent representing 3.62% Disagree that oil spill has negative effects in the Kalabari region and 5 respondent representing 3.62% Strongly disagree that oil spill has huge effect in Kalabari region.

What are the Effects of Oil Spill on property in the region?

Table 4: The effect of oil spill on property in the region.

	Yes		No	
	Frequency	Percentage	Frequency	Percentage
Reduce property value	100	72.46	38	13.04
Turning productive land into waste	120	86.96	18	42.03
Compels indigene to abandon their land property	95	68.84	43	31.16
Destruction in property	90	65.22	48	34.78
Discolouration of roofs	110	79.71	28	20.29

The data above shows that there are various effects on oil spill on property value in Kalabari region 120 respondent representing 86.96% said yes that oil spill affect property by causing discolouration of roofs while 18 respondent representing 42.03% said No that it does not cause discolouration on roofs. 100 respondents representing 72.46% said yes that oil spill has reduce property value while 38 respondent representing 27.54% No that oil spill does not affects property . 95 respondent representing 68.84% said Yes that oil spill compel indigene to abandon their property ,while 43 respondent representing 31.16% said No. 90 respondent representing 65.22% said Yes that oil spill has effect on destruction on property, while 48 respondent representing 34.78% said No that oil spill has no effect on property value (RESP3). That oil spill cause discolouration of buildings, and reduces property value and can be easily depreciated before the life span. We therefore agree that many people have moved to nearby communities and state due to the pollution of black sots as it also affects their health

What are the effects of oil spillage on aquatic lives

Effects	Yes		No	
	Frequency	Percentage	Frequency	Percentage
Reduction in tourism	120	86.96	18	13.04
Destruction of mangroves	128	92.75	10	7.24
Loss of fishes	138	100	0	0
Kill organisms	115	83.33	23	16.67

The above table shows the response of the respondent on the various effects of oil spill on aquatic lives in Kalabari region. On loss of fishes in the Kalabari 138 respondent representing 0% said Yes that oil spill has no effect, while nobody said No that oil spill has caused loss of fishes in the Kalabari region. On destruction of mangrove 128 respondent representing 92.75% said Yes that oil spill has destruction of mangroves, while 10 respondent representing 7.24% said No that oil spill has no destruction of mangroves in Kalabari region. On reduction of tourism 120 respondent representing 86.96% said Yes that oil spill has effect on the reduction on tourism, while 18 respondent representing 13.04% said No that oil spill has no effects on tourism. On kills organism 115 respondent representing 83.33% said yes that oil spill kill organism in the marine, while 23 respondent representing 16.67% said No that oils spill has no effects on killing of organism.



Plate 1: Effects of Oil Spill on Aquatic Lives

What are the management systems that can address oil spills challenges in the Kalabari region?

Table 6: Shows the Management System for Addressing Oil Spills Challenge in Kalabari Region in Rivers State.

Management system for addressing oil spill challenges	SA	A	U	D	SD
Youth involvement	58 (42.02)	50 (36.23)	30 (21.73)	0	0
Creation of employment for the youth	80 (57.97)	20 (14.49)	10 (7.24)	10 (7.24)	18 (13.04)
Care of the age elders	40 (28.98)	40 (28.98)	38 (27.53)	10 (7.24)	10 (7.24)
Protecting the environment from pollution activities	50 (36.23)	49 (36.03)	39 (28.26)	0	0
Legislation	8 (5.80)	30 (21.74)	40 (28.98)	39 (28.26)	21 (15.21)

Sources: Researchers' Field Survey 2021

Table 6 shows that 58 respondents representing 42.02% strongly agree that Youth involvement is a Management control system for addressing challenges of oil spill in the region, 50 respondents representing (36.23%) said agree, while 30 respondents representing (21.73%) were unsure. On Creation of employment for the youth, 80 respondents representing (57.97) strongly agree, 20 respondents representing (14.49) agree, while 10 respondents representing (7.24) were unsure, only 10 and 18 respondents representing 7.24% and (13.04%) disagree and strongly disagree respectively.

Similarly on Care of the age elders, 40 respondents representing 28.98% strongly agree, 40 respondents representing 28.98% said agree, while 38 respondents representing 27.53% were unsure, only 10 and 10 respondents representing (7.24 & 7.24 %) disagree and strongly disagree respectively. Furthermore on Protecting the environment from pollution activities, 50 respondents representing (36.23) strongly agree, 49 respondents representing 36.03 agree, while 39 (respondents representing 28.26 were unsure.

Finally, on Legislation, 8 respondents representing 5.80% strongly agree, 30 respondents representing (21.74) agree, while 40 (respondents representing 28.98 were unsure, only 39 and 21 respondents representing (28.26) and (15.1) disagree and strongly disagree respectively. However, (RESP 3) said "Federal Government and oil companies should involve youths as security agencies on pipeline matters and also create employment". Another furious youth stated that "the only way to management the region is to pay compensation on monthly bases as long as oil spill occurs that shell companies has stopped paying saying the youths are the cause of oil spill".

4.3 Impacts of Oil Spillage in the region.

Major oil spills contaminate coastal shoreline, causing severe localised ecological damage to the near-shore communities. Ever since the discovery of oil spills in the region in 1956 in Rivers state, the region has been suffering disastrous consequences of oil spills.

Oil spills in Kalabari region have been a regular occurrence, and the resultant degradation of the surrounding environment has caused fears between the people living in the region and companies operating there. It is only in the past years that environmental groups the Federal Government and foreign companies operating in the region takes steps to mitigate the impacts. Large area of the mangrove ecosystem has been destroyed.

4.4 Interpretation and Discussion of Finding

This results obtained from the analyses of the questionnaires.

What are the various Causes and Impacts of Oil spills to environment in the Kalabari Region?

The causes of oil spill are instigated by oil companies, sabotage, equipment failure, corrosion, leakage of pipeline, maintenance error, ageing of oil pipeline, blowout, Oil spill have a great impact in Kalabari region has affect the wellbeing of the people, The negative impact of oil spill in Kalabari region. (Table 4.2). This study investigate that region have lost their tradition, culture, local economic value and means of livelihood (fishing and periwinkle farmers) to oil spills, these economic losses aggravate the poverty level in the region. (Plate 4. 1). Ever since the discovering of oil in Kalabari region the people have been suffering the negative impact of oil spill, oil spill in Kalabari region have been a regular occurrence and between the people living in the region. It is only in the past years that environmental groups, the Federal Government and the foreign companies mitigate the impacts. The mangrove was once a source of firewood for the indigenous people and a habitat for the area's oil spill contributes negatively to our environment and it also affects property causing deterioration on building, causing easily dilapidation on buildings.

According (Nwilo and Badejo (2005) Oil spills has degradation the livelihood of many inhabitants in the communities affected. Most spillages occur as a result of corrosion in the pipelines, sabotage and illegal bunkering.

(Garrity and Levings, 1990). Oil settles on river and kills organisms that live there; it also settles on ocean floor and kills organisms such as crabs. Oil poisons algae, disrupts major food chains and decreases the yield of edible crustaceans (Nwilo and Badejo, 2005; Agunobi, 2014). In the Kalabari area, large areas of the mangrove ecosystem have been destroyed.

(Anifowose, Aroh, 2010 and Jike, 2004). Poor governance has been attributed to the region, with weak governance and poor management of resources can encourage deliberate attacks on its infrastructural facilities. This is because, these are the major challenges' most oil producing state are facing. They are the institutional factor whose inefficiencies can encourage deviant behaviour, especially among the youths.

What are the Basic Factors Responsible for Oil Spills in Kalabari Region?

Oil spill is one of the threatening environmental problems prevalent in the environment which pollution caused by oil exploration and exploitation by oil companies within area and sabotage, theft and illegal bunkering carried out by the youths. The factors responsible for oil spill are due to several reasons for control of where possible. Poverty, Unemployment, youth restiveness, cultism and Negligence by government are also the factors of oil spills in the environment. (Table 4.3) of Basic factors responsible for oil spill in the region. Poor management, legal factors, poor governance, and environmental degradation are the major factors responsible that cause oil pipeline vandalism in the Kalabari region of Nigeria.

The popular argument is that it could only be fair if these groups of people are appropriately compensated. According to (Nwilo and Badejo 2005) Lack of unemployment, negligence has essentially contributing factors to youths restiveness, cultism, thief. Social tension, they live in survival of the fittest theory which have negatively affects the people.

Okonkwo (2014). State that social impacts of oil spill covers violence, frustration, reduction in tourism. Imosemi, Abangwu, and Nwano (2013) and Onuoha (2007) Finding stated that the weak laws and inadequate compensation to victims of whose properties were damaged can encourage crime..

Research Question 3: What are the Effect of Oil Spill on Property.

Oil spill basically has affected property due to reduction property value, turning productive land into waste, compel indigene to abandon their land property, destruction of property and discoloration of roofs. Bunkering activities evaporate black dust which pollute the air and great effect on property, sometime oil flows to the land where human are supposed to be occupied. Oil spills dilapidate properties before the life span. The effect of oil spill on property (Table 4.4)

According to Ngene (2014). Such lands also become no useful for real estate development process. This has lead to project abandonment in some cases and even collapse of buildings in others, thereby resulting in loss of value of land Aina (1992) described that generally, Oil spills is the highest factor affecting property value of all environmental degradation.

What are the effect of oil spill on Aquatic Lives?

The effects of oil spill in the region have resulted to negative perceive on aquatic lives and causes reduction in tourism, destruction of mangrove, loss of fishes and kills organism, of which the people depend on aquatic lives the effects of oil spill in aquatic lives (Table 4.5) Akpan and Akpabio (2003) State that the people of the region depend on aquatic live for daily living, mostly in the form of fishing farming, and other marine ecosystem. The effects of oil spill on aquatic (plate 4.3) and (Plate 4.4). The harmful effect of oil spill on the aquatic ecosystem are many, the fishing production is an essential part of the region because it provides income for the people. Olujimi *et al.*, (2011) Observed that Kalabari region, pollution of rivers through oil spill have resulted in massive extermination of fishes thereby threatening the social and economic life the communities whose livelihood depends on the contaminated water, Ibaba (2001) observed that in the affected area where oil spill occur the aquatic life is virtually castrated by many years of oil prospecting and exploration. In survey carried out by Nwoko (2014) on the impact of pollution in the region 87% of people agreed that fish yield has decline due to pollution in their communities. Garrity and Leving (1990). Oil settle on beaches and kills organism that live their, it also settle on oceans floor and kills benthic bottom-dwelling organisms such as crabs and other marine ecosystem. Nwilo and Badejo (2005). In Kalabar region at large area the mangrove was once a source of firewood for indigenous people and habitat for the area biodiversity but is unable to survive the oil toxic.

Ogbogbo (2004) stated that the consequences of oil spillage are massive pollution of land, rivers and streams in the Niger delta. He argued that the aquatic environment and the ecology of the area, which constitute a major resource for the people, are destroyed. Oil spills in Kalabari region has a frequently have been a regular occurrence, and this result degradations of the surrounding environment has cause damage between the people living in the communities affected. It is was actually in the past decades that environment organisation the Federal Government and the foreign oil companies that operate in the communities takes step to stops the impacts. The large area of the mangrove ecosystem have been destroyed. The mangrove forest was in a major source of firewood for the indigenous people.

Oil that is spilled in the rivers or oceans affects the livelihood of the people because they depend on the ecosystem. Akankali (1998) stated that the impact of oil spillage on the environment can be highly dangerous with numerous socio-economic impacts, aquatic and terrestrial impact. These impacts include loss of fish, degradation of aquatic resource and ecological damage. When on land, their crops are destroyed and farmlands rendered desolated, whereas if it is a spill from an oil tanker, the rivers, streams, creeks and waterways are massively polluted and aquatic life endangered if not obliterated (Ogbogbo 2004). He argued that people are suffering from their traditional economic activity without any alternative. With time hunger, misery, joblessness and a feeling of hopelessness pervades the communities. He further noted that the negative externalities of oil production are borne solely by the oil producing communities without adequate compensation.

What are the management systems used in controlling oil spills in the Kalabari region?

A number of management measures to control oil spill already exist in the state different policies and mechanics are being put in place to avert or react to oil spill giving instruction to oil exploitation and exploitation activities enact with regard to oil spill incident. To manage and control the system of oil spill in Kalabari region particularly as a result of vandalisation, sabotage, illegal bunkering causing oil spill in the region, Federal Government should be part of the responsibilities of the commission, provide infrastructure, pay

compensation, clean up and employment for the youths which will reduce restive. In the same vein, the oil companies must ensure that the communities are adequately compensated whenever there is an oil spill. Also, alternative sources of livelihoods should be identified and strengthened, but this will require capacity building. Furthermore, in this era of participatory development, the oil companies should not single handily proffer solutions to oil spillage; they need the active participation of the rural communities. Their cooperation is cardinal to the successful implementation of any remedial measures. (Ntukekpo, 1996). State that the Federal Government should set up a new commission, the Oil Detection and Response Commission to managing oil spill problems in oil producing area. Federal Government should reinforce Clean Nigeria Associates (C.N.A.) the C.N.A. is a combination of eleven oil companies operating in Nigeria, including N.N.P.C. The primary purpose of establishing the C.N.A is to maintain a capability to combat oil spills.

The Environmental Impact Assessment (EIA) decree No. 1992 was form to protect and sustain our ecosystem. The law enables the development of an EIA compulsory for any major projects that have adverse effects on the environment.

5.1 Conclusion and Recommendation

This chapter presents an overall summary of the research, it is basically on the concluding and proffers recommendations on the effects oil spill on aquatic lives and property.

5.2 Conclusion

Since the discovery of oil in Kalabari region in Rivers State of Nigeria the people have been suffering from the negative environmental consequences of oil development. Oil spill has affected the region drastically including human and environmental degradation. The people of this region have lost their traditional means of livelihood fishing farming, periwinkles pickers and other aquatic foods, including the deterioration of property to oil spills, these economic losses aggravate the poverty level in the region rather than alleviate it. This the study concluded as follows:

- (1) Oil spillage has had a major negative impact in Kalabari region of Nigeria, and the affected communities as a whole. This can result conflict between the oil companies and youths in the communities resulting in frustrations, finger pointing, clashes, general resentment and mistrust.
- (2) Management and control of spills have been handled poorly and this has directly contributed to an escalation of the negative impacts on all involved. Central to the poor state of affairs are the largely obsolete laws and regulations in Rivers State which have been outpaced by the prevailing technology for crude oil development and use.
- (3) Oil companies should monitor worn-out pipelines and replace them appropriately. Facilities for storing petroleum products should always be maintained to best quality. Outdated pipelines and other drilling and related infrastructures should be upgraded to the latest and best facility. The study conclude that there is an increase of living cost due to damages to the environment, waterways, livelihood structures findings indicated that the age structure of the residents showed the people are within the productive age . With respect to educational the people are literate also Investigations revealed that many of them abandoned their education because their parents' major source of income (fishing) has been badly affected by oil spillage. Presently, the dominant occupation in the study area is fishing, which together with local government council jobs are monthly workers.

Loss of traditional learning lifestyles due to restive situations, migration and socio-economic format devastation. The identified effects on the communities have existed for decades, hence the communities have.

5.3 Recommendations

Bryman (2008) opines that is appreciable to suggest tactics and commendation from the investigation and finding concerning an issue or a phenomenon. This study offered the following recommendations.

In order to ensure effective management of oil spills in Kalabari regions, the Federal Government and Federal Environmental Protecting Agency should ensure that those responsible are held to account under the law whenever a major oil spill incident pollutes the ecosystem. Although there have been an existing regulation in the state but both state Government and state Government should step up its campaign against pipeline vandals by prosecuting all people caught in this criminal act. The activities of the newly set up Niger-Delta Development Commission should be closely monitored and supervised by the Federal Government. This will ensure transparency, honesty and fairness to all in the Kalabari region;

- (1) Digital maps should be made from the newly launched ideas to capturing Images from the satellite and other satellites in orbit could that also be used for managing oil spill incidents in the country.
- (2) State Government should please comprehend with the people, whereby, creating avenue for employments, carrying out clean up and also pay compensation to the communities as whole according to the Oil Pipelines Act (Cap 145 LFN 1990).

- (3) There is urgent need for the government to expedite action and put necessary measure in place to control and prevent oil theft for illegal refining, sabotage and to carry out regular maintenance and replacement of ageing oil pipelines which causes environmental pollution. The oil companies and the government to provide socioeconomic activities including health care programmes, economic and social empowerment scheme.

REFERENCE

- [1] Akpan, N.S., Akpabio, E.M. (2003). Youth Restiveness and Violence in the Niger Delta region of Nigeria: Implications and Suggested solutions. *International Journal of Development Issues*, 2(2), 37-58.
- [2] Akpokodje, J., Salua, S. (2015). Oil Pollution and Agriculture Productivity in the Niger Delta of Nigeria, *Journal of Environmental Economics*, 6(4), 68-75
- [3] Atubi, A.O. (2015). Effects of Oil Spillage on Health in Producing Communities of Delta State, Nigeria. *European Journal of Business and Social Science*, 4(8), 14-30
- [4] Badejo, O.T., Nwilo P.C., 2004: Management of Oil Spill Dispersal along the Nigerian Coastal Areas. ISPRS Congress 2004, Istanbul, Turkey.
- [5] Ebegbulem, J., Ekpe, D. and Adejumo T.O. (2010), Oil Exploration and Poverty in the Niger Delta Region of Nigeria: A Critical Analysis. *International Journal of Business and Social Science*, 4(3), 279-287
- [6] Egbe, R. E., Thompson, D. (2010). Environmental challenges of oil spillage for families in oil producing communities of the Niger Delta region. *JHER*, 13, 24-34.
- [7] Egbe, O.D. (2012). Environmental and Challenges of Development in the Niger Delta Region, *Journal of Home Economic Research*, 13, 24-34
- [8] Ekpenyong, N. S., Udofia, U. S. (2015). Oil Pollution and its impact on Water Quality in Ibeno Community. *Studies in Sociology of Science*, 6(2), 8.
- [9] Eteng, I. A. (1997), "The Nigerian State, Oil Exploration and Community Interest: Issues and Perspectives", University of Port Harcourt, Nigeria, p. 4.
- [10] Etikerente (2000) Effects of Oil Spills on Fish Production in the Niger Delta. Related Articles
- [11] Etukekpo, D S (1996). Spillage: Bane of Petroleum. Report Published in Ultimate Water Technology & Environment.
- [12] Garrity, S.D., Levings, S.C. (1990). Effects of an Oil Spill on the Gastropods of a Tropical Intertidal reef flat. *Marine Environmental Research*, 30(2): 119-153
- [13] Ibaba, I. S. (2005). Understanding the Niger Delta Crisis. Port Harcourt. Harvey Publishing Company, International Conference on the Nigerian State, Oil Industry and the Niger Delta.
- [14] Ibaba, S. (2001). Understanding the Niger Delta crisis. Port Harcourt: Jiral Publication Company
- [15] Ibaba, S. I. (2005). Understanding the Niger Delta Crisis. Port Harcourt: Amethyst and Colleagues Publishers, 83.
- [16] Imosemi, A., Abangwu, N., & Nwano, T. (2013). Climate change mitigation: An assessment of global legal responses: So far so good? *Journal of Research and Development*, 1, 79-96.
- [17] Jike, V. T. (2004). Environmental degradation, social disequilibrium, and the dilemma of sustainable development in the Niger-Delta of Nigeria. *Journal of Black Studies*, 34, 686-701.
- [18] Jike, V.T. (2010). Oil companies and host communities: A probable scenario for reciprocal empowerment. *Journal of Human Ecology*, 30(2), 131-142
- [19] Niger Delta Development Commission (NDDC) (2001). NDDC profile, Niger Delta Development Commission, Port Harcourt, Nigeria. Retrieved October 12, 2018 from, <http://www.nddc.gov.ng>
- [20] Niger Delta Development Commission (NDDC) (2006). *Niger delta regional development master plan*, Port Harcourt, Nigeria: NDDC.
- [21] Niger Delta Development Commission (NDDC) Act (2000). (Establishment, ETC) Act, 2000 No.6 Retrieved September 12, 2018 from: <http://extwprlegs1.fao.org/docs/pdf/nig42654.pdf>
- [22] Niger Delta Environmental Survey (NDES) (1996). The Niger Delta environmental survey: Terms of reference. Lagos: Environmental Resources Manager Limited
- [23] Niger Delta Environmental Survey (NDES) (1996). The Niger Delta Environmental Survey: Terms of reference. Lagos: Environmental Resources Manager Limited.
- [24] NNPC. (2013). *NNPC annual statistical bulletin* (First edition). Corporate Planning and Strategy Division. Retrieved from www.nnpcgroup.com
- [25] Ntukekpo, D.S. (1996). Spillage: Bane of petroleum, ultimate water technology and environment. *Environment Resources Journal*, 6(2), 100-105
- [26] Nwankwo, J. N., Ifeadi, C. N. (1988). Case studies in the environmental impact of oil production and marketing in Nigeria. In Sada, P. O., & Odemerho, F. O. (Eds.), *Environmental Issues and Management in Nigeria* (pp. 208-228). Ibadan: Evans Brothers Nigeria Limited.

- [27] Nwilo, Badejo.O.T.(2005).Impacts and management of Oil Spill Pollution along the Nigerian Coastal Area.International Oil Spill Conference,Miami,Florida,USA
- [28] Nwilo, P. C, Badejo O. T. (2005). Oil spill problems and man-agement in the Niger Delta. Paper presented at International Oil Spill Conference, Miami, Florida, USA, May 2005
- [29] Nwilo, P. C., Badejo, O. T. (2006). Impacts and management of oil spill pollution along the Nigerian coastal areas. *Administering Marine Spaces: International Issues*, 119, 1-15.
- [30] Ogbogbo, CBN. 2004. The Niger delta and the resource control conflict since 1960–1995 *Ph.D. Dissertations*, Institute of African Studies, University of Ibadan, Nigeria.
- [31] Okonkwo, E. C. (2014). Oil spills in Nigeria: Are there social and economic impacts?. In International Oil Spill Conference Proceedings Vol. 2014, No. 1, p. 300289. American Petroleum Institute.
- [32] Okpo, O. C., &Eze, R. C. (2012). Vandalization of oil pipelines in the Niger Delta region of Nigeria and poverty: An overview. *Studies in Sociology of Science*,3(2), 18.
- [33] Omajemite, BU. (2011). The Economic Dimensions of the Niger Delta Ethnic Conflicts. *African Research Review*, 5(5), 46-55
- [34] OMPADEC,(1996). Legislating Development in Nigeria Oil producing Region.
- [35] Onuoha, F. (2007). Poverty, Pipeline vandalisation/Explosion and Human Security: Integrating Disaster Management into Poverty Reduction in Nigeria. *African Security Review*,16, 94–108.
- [36] Osuji, L. C., Ezebuio, P. E. (2006). Hydrocarbon contamination of a typical Mangrove forest in Niger Delta, Nigeria. *International Journal of Environment and Sciences*, 3(3), 313
- [37] Udoudoh, F.P. (2011).Oil Spillage and Management Problems in Niger Delta Nigeria. *Journal of Environmental and Safety*,. 2, 137- 155.
- [38] Ugochukwu, C. N., Ertel, J. (2008). Negative impacts of oil exploration on biodiversity management in the Niger De area of Nigeria. *Impact assessment and project appraisal*, 26(2), 139-147.
- [39] Ugochukwu, CNC., Ertel, J. (2008). Negative impacts of oil exploration on biodiversity management in the Niger Delta area of Nigeria. *Impact Assessment and Project Appraisal*, 26(2):139–147.
- [40] United Nations Environment Programme UNEP. (2011). *Environmental assessment of Ogoniland First published in 2011 by the United Nations Environment Programme*. United Nations Environment Programme.
- [41] United Nations Development Programme (UNDP) (2011). Niger Delta human development report. 229pp.
- [42] United Nations Development Report (UNDP). (2006). *Niger-Delta Development Human Report*. Abuja: United Walter & Pettigrew.
- [43] Zabbey, N 2004. Impacts of extractive industries on the biodiver-sity of the Niger Delta region, Nigeria. Paper presented at National Workshop on Coastal and Marine Biodiversity Management, Calabar, Cross-River State, 7–9 September.