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THE ADVERSE IMPACTS OF HYDROCARBON EXPLORATION AND EXPLOITATION ON LIVELIHOODS IN DELTA STATE, NIGERIA

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Abstract: **Hydrocarbon exploration and exploitation in Delta State and export of oil and gas resources by the petroleum sector has substantially improved the nation's economy over the past six decades. However, activities associated with crude oil production are not unconnected to having adverse impacts on the livelihoods and environment. This study assesses the adverse impacts of hydrocarbon exploration and exploitation on livelihoods in Delta State, Nigeria. Data from Focus Group Discussions (FGDs), Key Informant Survey (KIS) derived from the inhabitants were collected and analyzed. A total of 388 questionnaires were used to collect data for the study. Relative Importance Index (RII) was the statistical technique used for the analysis of data. The results reveal that petroleum exploration and exploitation are being experienced and oil spillage and its attendant consequences are conspicuous in the study area; and that the inhabitants' occupations are being affected negatively. It further shows increasing rate of vandalization of crude oil pipelines in areas where major exploration and exploitation activities are on-going and in areas where crude oil pipelines pass through which constitute pollution. Socio-economic conditions of the people were also observed to be adversely affected. Most of the people, therefore, fall within the low socio-economic status. It was also observed that poor and inadequate livelihood conditions, mainly ubiquitous in the study area, also reveal the undesirable effects of petroleum exploration and exploitation on people's means of livelihoods. Besides, findings in the Focus Group Discussions (FGDs) and Key Informants Survey also showed that petroleum exploration and exploitation activities have adverse effects on the inhabitants' means of livelihoods. The implications of the study are numerous, including but not restricted to the facts that petroleum exploration and exploitation have severe negative effects on the livelihoods of the people in Delta State and there is absence of valid and reliable corrective measures to nip these problems in the bud. In accordance with the research findings, the study recommends economic diversification policy drive to be thoroughly rooted and focused in Delta State, among other workable recommendations proffered with a view to mitigating the adverse impacts of hydrocarbon exploration and exploitation on livelihoods in Delta State, Nigeria.**

Keywords: **Hydrocarbon exploration, petroleum sector, Focus Group Discussions (FGDs), Delta State.**

1. INTRODUCTION

Hydrocarbon mainly Crude Oil is found in Nigeria and other parts of the world in liquid state in natural underground reservoir, and has been formed from dead pre-historic animals. It is measured in barrels, each containing about 42 gallons. The hydrocarbon oil is a source of energy wealth for nations (Ebeku, 2005). Oil has played a key role in the economic development of many developing economies. It has conferred some considerable wealth on some nations and individuals blessed with this natural resource or are enterprising enough to be at forefront of the technology to tap and

distribute its various forms as an energy source. Because of its ease of transportation, it is the residual form of energy similar to coal, nuclear and solar energy. Furthermore, petrochemical industries which have also contributed to global development are crude oil-based. However, along with all the benefits derivable from oil comes the risk of environmental pollution (Saliu, Luqman and Abdullahi, 2007; Eyitsede, 2010 and Ezemenaka, 2014).

Nigeria is a country that plays major role in Africa and the world based on its natural resources ranging from crude oil, natural gas and coal production among others, yet the measures adopted to clean up the mess of human effects on the environment through industrialization remains a major problem. Examples of effects of industrialization which distort the ecosystems and in turn affect the environment of Nigeria can be seen in the crude oil spillage in the Niger Delta region. The resultant effects of the problems caused by oil spillage which adversely affect the livelihoods and environment of societies can also be seen in Niger Delta communities where crude oil is produced in large quantities. Emphasis on the effects of crude oil production on livelihoods and environment cannot be overemphasized, but allowing the problems to overwhelm us as human is the choice we make. Imagine how the environment has been negatively affected (Saliu *et al*, 2007 and Ezemenaka, 2014).

Decades after the first gush of oil in the creek-side village of Oloibiri, located at the present day Bayelsa State was discovered in 1956, petro-businesses have transformed the remote Niger Delta wetland into an industrial wasteland. Owing to government complacency and, most importantly, connivance, there has been a total disregard for the social, political, economic and environmental sensibilities of the Niger Delta people by petrobusinesses operating in the region including Shell, Chevron, Agip, Total, Elf and Mobil. Since 1956, they have been adopting substandard practices thereby subjecting them to untold inhumanities and injustices. It is axiomatic to note that all stages of oil business activity – exploration, drilling and transportation – result in the destruction of natural environment and the livelihoods of the local inhabitants dependent on the environment for survival. Though oil seems to be important to the country's economy, the people of the Niger delta perceive its discovery in their homeland as a threat to their life-support system (Onosode, 2001 and Saliu *et al*, 2007).

Livelihood is an increasingly widely used concept today in contemporary writings on poverty and rural development. Livelihood is dynamic and universal. People adapt and change their livelihoods with internal and external stressors. However, the adverse impacts of weather and climate events increasingly threaten and erode basic needs, capabilities, and rights, particularly among poor and marginalized people, in turn reshaping their livelihoods (Adger, 2010; Quinn, Ziervogel, Taylor, Takama, and Thomalla, 2011; Abdulkarim, Balarabe, and Oladipo, 2013; Olsson *et al*, 2014 and Abaje 2016). This scenario, no doubt, is obtainable in Delta State, Nigeria, where, in this case, the adverse impacts of hydrocarbon exploration and exploitation increasingly threaten, erode and negatively reshape the livelihoods of the people.

Livelihood is the means, activities, entitlements and assets by which people (both the poor and the rich) pursue to make a living. Assets, in this particular context, are defined as not only natural/biological, but also social, human, financial, and physical. Livelihood is defined as being "concerned with people's capacities to generate and maintain their means of living, enhance their well-being, and that of future generations" (Olsson, 2014). A popular definition is that provided by Chambers and Conway (1992) that a livelihood is a collection of capabilities, assets (including both materials and social resources), and strategies activities required for a means of living by the rural communities. Livelihoods, thus, do not mean just income; they encompass social institutions, gender relations, and property rights required to support and sustain a given standard of living. Livelihoods are considered sustainable when they can cope with, and recover from, stresses and shocks and maintain or enhance their capabilities, assets and capacities to meet a people's needs both now and in the future, while not undermining or compromising the natural resource base (Carney, 1998 and Onakuse and Eamon, 2000). This present study, therefore, focuses on the adverse impacts of hydrocarbon exploration and exploitation in Delta State, Nigeria.

2. MATERIALS AND METHODS

2.1 Study Area

Delta State covers a landmass of about 18,050km^2 of which more than 60% is land. The state lies approximately between longitude 5^{o}00 and 6^o 45^l East and latitude 5^{o}00 and 6^o 30^l North. It is bounded in the North and West by Edo State, the East by Anambra, Imo, and Rivers States, South -East by Bayelsa State, and on the Southern Bank is the Bight of Benin which covers about 160 kilometres of the state's coastline (Fig.1).According to the 2006 population census, the state has a population of 4,098,291 persons (Males: 2,674,306 Females: 2,024,085)(Delta State, 2010)..

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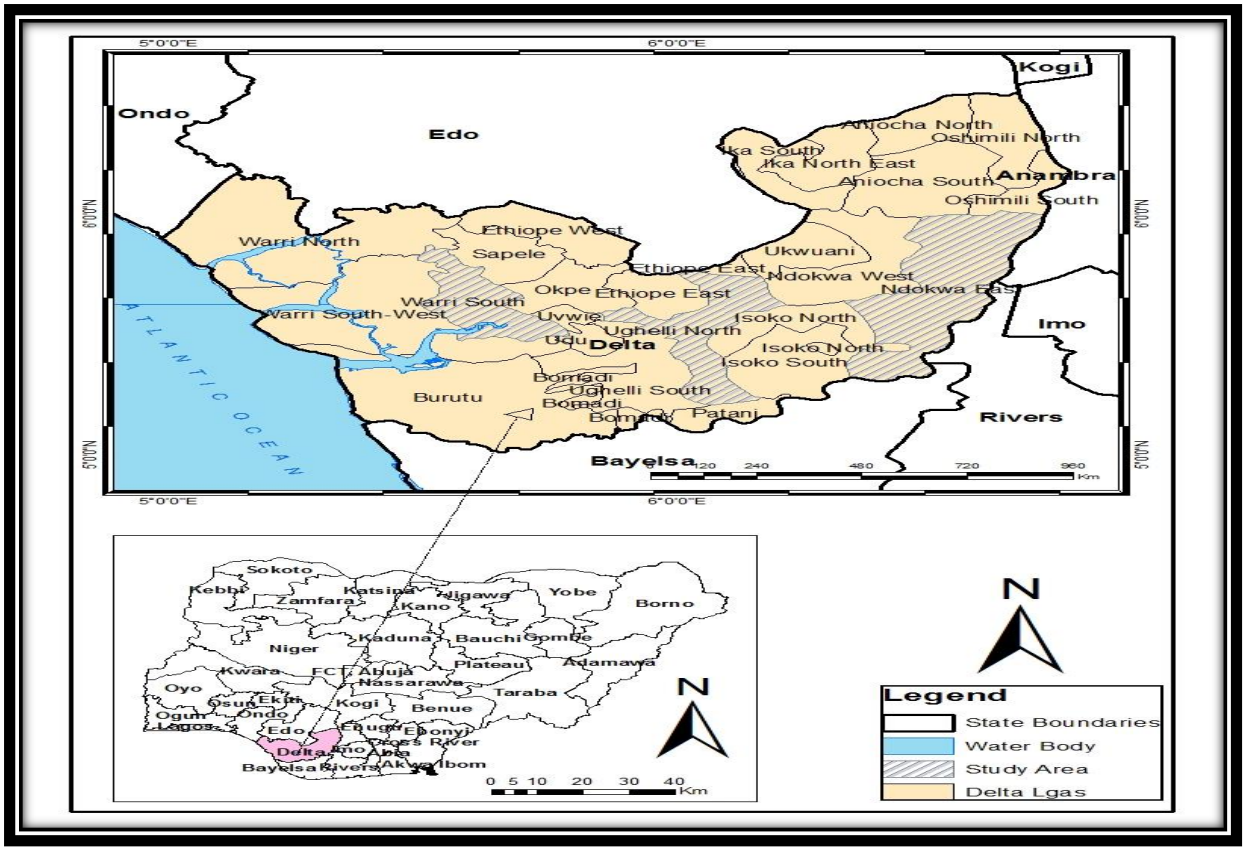

Figure 1: Study Area

Source: Adapted and modified from the administrative map of Delta State

2.2. Data collection

There are two principal sources of data that were adopted for this work. These were primary and secondary sources of data. Surveys were employed in this study in form of questionnaires, Focus Group Discussions (FGDs), Key Informant Survey (KIS) and field observations which were used to form the primary sources of information for this work. The secondary data involved the use of relevant literature reports from Journals, textbooks, relevant government agencies (Niger Delta Development Commission, Federal Ministry of Environment, State Ministries of Environment, National Bureau of Statistics), documents from the Health Safety and Environment Departments of Oil Companies operating in the Niger Delta region, reports from Non-governmental and community based organizations and internet websites were reviewed and used in this research. Data were also obtained from the National Population Commission (NPC) and the Independent Electoral Commission (INEC) publications, analytical reports and other commissioned papers. Downloaded online articles and reports of conferences on national and international agencies from several websites were used. The information from the above sources accounts for the secondary data employed in this research.

Delta State during the 1991 census had a population of 2,570,491 with an annual growth rate of 3.00% (National Population Commission, 1991). This figure was projected to year 2015 for the purpose of this study using the population projection formulas expressed in equation (3.1) as $Pr = Po\ (1 + R/100)^{n}$:

(1.1)

Where: Pr = Population in the current year

Po = Population in the base year

r = Annual growth rate

n= Time interval

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The basis for using the 1991 census instead of 2006 was due to the fact that the 2006 population census' document has no locality population. The population of the sampled LGAs and wards were also projected for the year 2015 (Tables 1 and 2).

Table 1: Projected 1991 Population of Selected Local Government Areas

S/NO	LGAs	1991 POPULATION	PROJECTED 2015 POPULATION
1.	NDOKWA WEST	182827	514450
2.	ETHIOPE WEST	105861	297878
3.	SAPELE	142652	401403
4.	UGHELLI SOUTH	139748	393231
5.	ISOKO NORTH	111919	314924
6.	WARRI SOUTH	236750	666181
	TOTAL	919757	2588067

Source: Author's Compilation, 2015

Table 2: Projected 1991 Population of Sampled Wards

S/NO	WARDS	1991 POPULATON	PROJECTED 2015 POPULATION	SAMPLE SIZE
1.	ASE	11420	32134	34
2.	UKPAI	16320	45922	51
3.	OGHARA II	5782	16720	18
4.	JESSE I	6322	17789	20
5.	SAPELE URBAN I	10414	29303	32
6	SAPELE URBAN V	8311	23386	26
7.	EWU II	10112	28452	31
8.	JEREMI III	7542	21222	23
9.	IYEDE I	6366	17913	20
10.	OTOBIO	5340	15026	17
11.	0Z0R0 II	6342	17845	20
12.	KOKO II	18520	52112	59
13.	OGHEYE	15,335	43,150	49
	TOTAL	**121804**	**360525**	**400**

Source: Author's Compilation, 2015

Similarly, Yamane (1967) provides a simplified formula to calculate sample size with 95% confidence level and 5% sampling error assumption: expressed as equation (1.2).

$$n = \frac{N}{1 + N(e)^2} \quad (3.2)$$

Where:

n= Sample size

N= Population

e= Level of significance (set at 0.05 for the study)

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Using the above model, a sample size of 400 respondents was arrived at. Therefore, 400 respondents were used for the study. In order to determine the proportion of the respondents, Yamane (1967) sampling method for determining proportion of the respondents was used and expressed as equation (1.3).

$$\text{Sample size per ward} = \frac{\text{Ward Population} \times \text{Sample Size}}{\text{Total Wards Population}} \quad (1.3)$$

2.3 Data Analysis

The statistical tool used for data analysis is the Relative Importance Index (RII). The purpose of its use was for coding and ranking the perceived effects of crude oil production on livelihoods of the inhabitants in terms of their severity. The software used for the analysis is SPSS 16. Respondents were required to select from the list of variables that provided the effects of crude oil production. To achieve this objective, a three-point likert rating scale was used. Each respondent was required to indicate opinion by checking any of the three options i.e. agree, disagree and undecided. Values that were assigned to these options were 3, 2 and 1 respectively. The contribution of each of the factors to the perceived effects of crude oil production in the study area was examined and the ranking of the attributes in terms of their criticality as perceived by the respondents was done by use of Relative Importance Index (RII); depicted as equation (1.4).

$$RII = \sum W/A = N(0 \leq RII \leq 1).$$

Where W – is the weight given to each factor by the respondents,

A – is the highest weight and;

N – is the total number of respondents. (1.4)

The guide for RII rating is given as: very significant= 0.76 above, Significant =0.67-0.75, fairly significant=0.45-0.55, not significant=0.44

3. RESULTS AND DISCUSSION

Table 3: Inhabitants' Perceived Adverse Impacts of Hydrocarbon Exploration and Exploitation on Livelihoods

DELTA STATE								TOTAL
Adverse Impacts of Hydrocarbon Exploration and Exploitation on livelihoods								
	1	2	3	∑f	∑fx	x̄	RII	R
RIA	12	136	240	388	1008	2.6	0.88	1
RIPIA	40	148	200	388	892	2.3	0.77	7
LFG	30	98	260	388	970	2.5	0.84	3
LIPL	65	53	270	388	931	2.4	0.80	4
PRU	43	100	245	388	1005	2.6	0.88	1
CPPA	58	95	235	388	935	2.4	0.80	4
LCYSP	73	110	205	388	896	2.3	0.77	7
HMAO	40	195	235	388	900	2.3	0.77	9
CNAML	39	60	190	388	930	2.4	0.80	4

Legend: 1= Neutral, 2= Disagree, 3= Agree

Source: Fieldwork, 2016

RIA=Reduction in Inhabitants' Income from Agriculture; **RIPIA**=Reduction in Inhabitants' Participation in Agriculture; **LFG**=Loss of Fishing Grounds; **LIPL**=Loss of Indigenous People's Land; **PRU**= Poverty and Rural Underdevelopment; **CPPA**=Change from Primary Production Activities; **LCYSP**=Low Crop Yields due to Soil Pollution; **HMAO**=High Mortality of Aquatic Organisms; **CNAML**=Change to Non-Agricultural Means of Livelihoods

The high adverse impacts of hydrocarbon exploration and exploitation cannot be unconnected to the factors analyzed above. The results show that crude oil production leads to loss of fishing grounds 0.84. This indicates that crude oil production actually constitutes loss of fishing grounds. This finding is in conformity with the UNEP (2011) investigation in Ogoniland which found that the surface water throughout the creeks contains hydrocarbons with floating layers of oil varying from thick black oil to thin sheens. The highest reading of dissolved hydrocarbon in the water column, of 7,420 µg/l, was detected. Fish tend to leave polluted areas in search of cleaner water, and fishermen must therefore also move to less contaminated areas in search of fish. When encountered in known polluted areas, fishermen reported that they were going to fishing grounds further upstream or downstream. Similarly, the results show that crude oil production activities expose the environment to the impact of environmental pollution causing great loss to both farming and fishing practices. This finding is similar with the study carried out by Chindah and Braide, (2000) affirming that oil spillage has affected soil fertility in Udu Area of Delta State. The study also revealed that oil spillage adversely affects crops productivity in the area (Ahmadu, *etal* 2013). This in turn affects the livelihoods of the people because they are predominatly agrarian society.

Besides, the results reveal that hydrocarbon exploration and exploitation activities result to loss of indigenous people's/ peasants' land as (0.80). This finding is in line with the study of Osuji and Nwoye (2007) and Aaron (2006) which opine increase in the phenomenon of land fragmentation owing to the fact that loss of fertile land to crude oil pollution compelled available land to be further fragmented among family members with its attendant consequences on agricultural productivity. This has increased cases of land disputes owing to the fact that owners of agricultural land affected by oil spillage sometimes result in laying claims on other people's land. This form of land encroachment into other people's land results to increase in cases of farmland conflicts in the study area. This is not unexpected in a situation where incessant oil spillage activity results to loss of farmland. Farmlands polluted and made infertile are not suitable for agricultural activities, thus, people tend to compete for the few available fertile land not affected by oil spillage, all of which constitute negative effects on the people;s livelihoods.

The results of the interviews and FGDs conducted show some of the respondents who claimed that the loss of indigenous people's land owing to oil spillage and its attendant land disputes and other associated consequences have led many people to their untimely death because in the process of fighting for the available land, some people commonly result to fetish means of eliminating their opponents. They also lamented the economic implications of pursuing legal redress which owing to incessant court cases pending; huge amount of money is lost as people proceed to courts seeking legal redress.

In line with the above, the KIS revealed that the predominance of legal suits has further entrenched high rate of poverty in the study area. The major reason is that a community as a whole would contribute funds in order to seek redress in court against the multinational oil companies. These seemingly unending court cases with their attendant consequences on the inhabitants financially, further exacerbates poverty in the study area. The situation is so worrisome to the extent that family members, clan members, village members, at any of these units, people continue to contribute money to fund court cases against oil companies locally and internationally. Thus, the money that would have been utilized in improving inhabitants' means of livelihoods is spent in seeking legal redress, coupled with the usual delays and adjournments of legal proceedings in the Nigeria justice system. This finding as it relates to the economic consequences of seeking legal redress is in consonance with the study of Maitland and Chapman (2014) which posited that huge amount of money is lost by the people who in the bid to fight for their rights legally, put in all their financial resources with a view to securing justice in the Nigerian justice system, ironically, the Nigerian justice system, as is well known, is bedevilled with justice delayed which is tantamount to justice denied. Huge resources that would have been used for economic development of the people and the study area are lost.

The result in Table 3 further reveals that hydrocarbon exploration and exploitation activities have adverse impacts on the major occupation of the people which is primary production activities as indicated by RII 0.77 (Table 3). This finding is in agreement with the work of Getter, Ballou and Koons, (1985) and Abbas (2011) which posited that spillage problem necessitates the change of people livelihood means mostly from their main agricultural sources of livelihoods owing to the fact that their farmlands being the ground of all forms of agricultural practices have been polluted and have become infertile. Therefore, it is imperative to note that the incessant occurrence of spillage constitutes a severe agricultural predicament on the farmlands, and, this adversely affects their livelihoods.

This dimension is in line with the finding of Ordinioha and Sawyer, (2008) which posited that crude oil spill also resulted in the reduction of the quantity and quality of food available to households in the impacted communities. This could result in an up to 24% increase in the prevalence of childhood malnutrition and several hours of hunger pangs. These situations were said to be exacerbated in the Niger delta region by the near total absence of outside relief effort, such that members of the impacted communities were often left unassisted by the government and the oil companies.

It was also shown that hydrocarbon exploration and exploitation activities cause high mortality of aquatic animals as (0.77) (Table 3). This corresponds with Akpofure (2008) who posited that the oil activities in the area have resulted to situations whereby complete polluted water is bequeathed to the children. This was further collaborated by Eghe and Thompson (2010) who opined that the communities ' shorelines have been washed away or eroded due to the high volume of the deep sea exploration and exploitation activities with the expansion of oil production, the incidence of oil spill has greatly increased the pollution of water and death of the aquatic organisms.

In addition, the result in Table 3 reveals that hydrocarbon exploration and exploitation activities are associated with the aftermath of poverty and rural underdevelopment and bitterness. This is supported with the RII of 0.88. This finding corresponds with the findings of World Bank (2006), which opines that poverty is hunger. Poverty is being sick and not being able to see a doctor. Poverty is not having access to school and not knowing how to read or write. Poverty is not having a job, is fear for the future, living one day at a time. Poverty is losing a child to illness brought about by unclean water. Poverty is about powerlessness, lack of representation in decision making in the society and lack of freedom to express oneself. The above definitions from the World Bank typically depict the poverty situation in the study area. The critical issue in the Niger Delta is not only the increasing incidence of poverty, but also the intense feeling among the people of the region that they ought to do far better. This is based on the considerable level of resources in their midst, and the brazen display and celebration of ill-gotten wealth in Nigeria, most of which derives from crude oil wealth (Jike, 2006). This explains why there is so much frustration and indignation, which has led to series of hostage taking of oil workers and other conflicts in the region.

Impairment of Human Health has a RII of 0.73 which suggests the dangerous adverse impacts of hydrocarbon exploration and exploitation on human health. Considering the fact that the health condition of an individual and his or her production capacity are inseparable as the former greatly influences the latter; the relationship between livelihood and health cannot be underestimated. This finding corresponds with Human Rights Watch (1999) that carried out a study of flares in the Niger Delta and found that air, leaf and soil temperatures were increased up to eighty or one hundred meters from the stack, and species composition of vegetation was affected in the same area. In other cases, inefficient technology in the flares means that many of them burn without sufficient oxygen or with small amounts of oil mixed in with the gas, creating soot that is deposited on nearby land and buildings, visibly damaging the vegetation near to the flare. Respiratory problems among children as a result are reported (Olsgard and Gray, 1995).

3.1 Occupations Affected by Hydrocarbon Exploration and Exploitation Activities

Hydrocarbon exploration and exploitation activities do not occur without leaving behind conspicuous presence of its aftermaths, particularly on the occupations or livelihood means of the inhabitants of the area. The socio-economic consequences of such impacts cannot be underestimated as the results revealed (Table 4).

Table 4: Occupations Affected by Hydrocarbon Exploration and Exploitation

Responses	Frequency	Percent
Agriculture-related occupations	**185**	**47.7**
Non-agriculture-related occupations	**174**	**44.8**
Undecided	**29**	**7.5**
Total	**388**	**100**

Source: Fieldwork, 2016

The results in Table 4 reveal respondents' responses on their agriculture-based occupations being affected by hydrocarbon exploration and exploitation activities. It was revealed that 47.7% are of the opinion that their agriculture-related occupations are being affected by crude oil production, 44.8% of the respondents were of the view that their non-

agriculture-related occupations were affected, while 7.5% could not decide on the issue. On the whole, it implies that the inhabitants' occupations are affected by crude oil production. This is also similar to the outcome of studies conducted by Tolulope (2004), and Country Analysis Brief (2009) which opine that oil pollution caused by spillages from the oil industry located primarily in the Niger Delta region has caused massive destruction to farmlands, sources of drinking water, mangrove forest, fishing grounds and declination of fish, crabs, molluscs, periwinkles and birds. Large areas of mangrove forest have been destroyed over a wide area affecting terrestrial and marine resources. Some past spills have necessitated the complete relocation of some communities, loss of ancestral homes, pollution of fresh water, loss of forest and agricultural land, destruction of fishing grounds and reduction of fish population, which is the major source of income for the Niger Delta people.

3.2 Reasons for Respondents' Change of their Previous Occupations

There is no doubt that the existence of hydrocarbon exploration and exploitation activities in a geographical area could constitute the need for the inhabitants of such an area to change their previous occupations. It was revealed that 33.3% of the respondents changed their previous occupations because they got better employment opportunities; this was followed by 30.7% who changed their previous employments because of the effects of crude oil production (Figure 2).

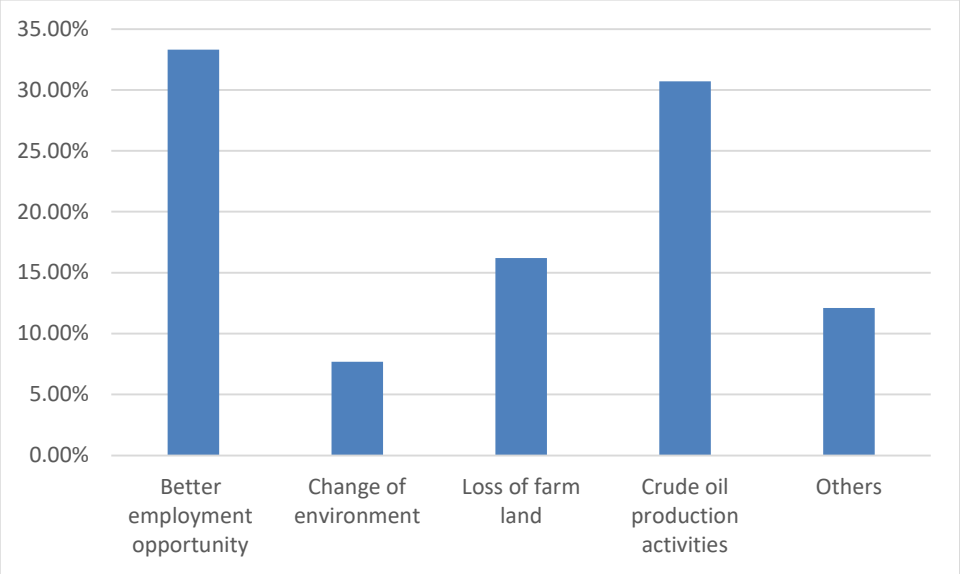

Figure 2: Reasons for respondents change of occupation

Majority of the people were previously engaged in agricultural related occupations. However, the prevalence of hydrocarbon exploration and exploitation activities caused many of them to abandon agriculture. Some left agriculture to take up employment with the multinational oil companies. Those with reasonable level of education were employed to man clerical, secretariat, and administrative jobs among other sections of the crude oil production companies. Others were employed at the crude oil processing stage, output stage and distribution stage of crude oil production. Another category was employed as security personnel to secure the various installations of the multinational oil companies. Thus, this first category comprises those who have better employment opportunity brought about mainly by the presence of the multi-national oil companies as reasons for changing their means of livelihoods.

The category that chooses the adverse impacts of hydrocarbon exploration and exploitation as a reason for changing their means of livelihoods constitutes another significant category. This group of respondents was basically of the opinion that oil spillage on their farmlands, which constitutes soil degradation, infertility of soil and low crop yields compelled them to go for alternative means of livelihoods. Among this category, some were able to secure civil service jobs especially with the springing up of government establishments such as the local and state government agencies and federal government ministries, departments and agencies found in the study area, these provide alternative means of livelihoods. Others take to artisan occupations such as carpentry, tailoring, shoe making, plumbing, welders, electricians, automobile mechanics, tillers, among others, at the neglect of agriculture which has been affected by crude oil production because of its influence in compelling people to change their previous occupations which in most cases were agriculture related.

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The foregoing findings in Figure 2 boil down to the fact that where a good government exists, the exploitation of oil resources is expected to generate larger revenues to foster development and reduce poverty for the people. But a weak government characterized with ineffectiveness, corruption, and conflicts, poverty will certainly strive. These findings revealed that the Nigerian oil industry has affected the country in a variety of ways at the same time. On one hand, it has fashioned a remarkable economic landscape for the country, on the other hand, when considered in respect of its negative impact on the socio- economic life and the environment of the immediate oil bearing communities and its inhabitants, it has left a balance sheet of ecological and socio-physical disaster. This finding corroborates Genova and Falola (2003) who argued that oil resource has both positive and negative contributions to the Nigerian socio-economic life of the people. Oil ' exploration' has over the past four decades had a ruinous impact on the physical environment of the oil bearing communities in Delta State, extremely threatening the subsistence peasant economy, the environment and the entire livelihood and basic survival of the people. Their farmlands and vegetation have been damaged, the ecology distorted and depleted their natural landscape; eroded and degraded. This corroborates Getter *et al*, (1985) and Odeyemi and Ogunseitan (1985) who all agreed with the considerable adverse effects of the toxic nature of chemicals discharged from oil spills on soil, water, resource and animal life.

3.3 Respondents' Occupations Related to Hydrocarbon Exploration and Exploitation

The inhabitants of the study area engage in different types of occupation. However, the predominance of hydrocarbon exploration and exploitation activities in the study area may likely influence the linkages among the different occupations the people engage in as their means of livelihoods. It was revealed that there exist relationships between the occupations the inhabitants engage in and crude oil production as 27.8% of the respondents responded that the occupations they engaged in are related to crude oil production while 56.7% respondents' occupations did not relate to crude oil production (Figure 3). This indicates that large number of people engage in occupations that are related to crude oil production. Some of the respondents responded that their occupations are related to the various stages of crude oil production which include the exploration, processing, output and distribution stages.

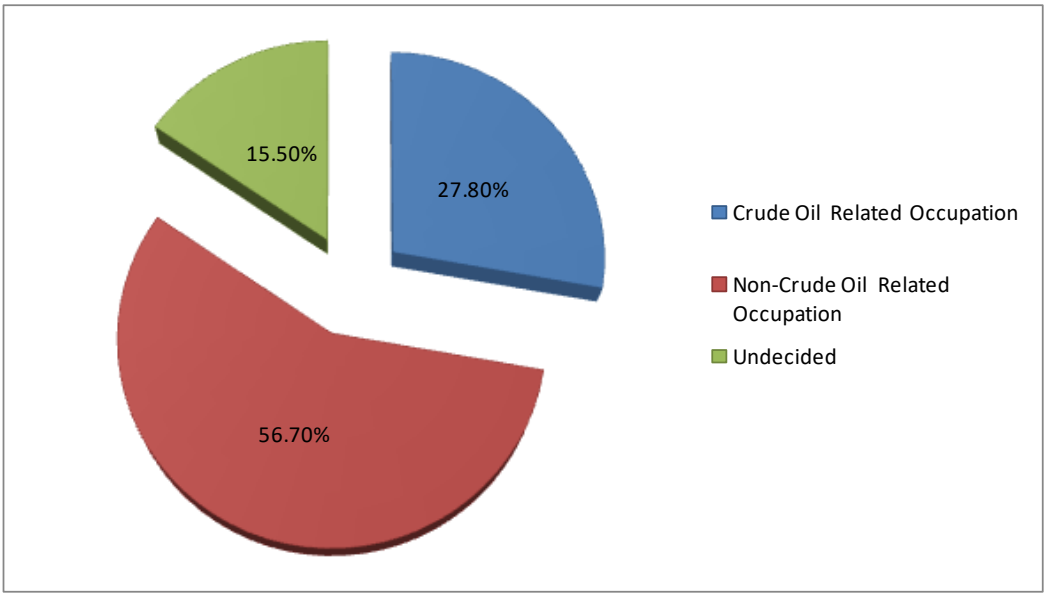

Figure 3: Respondents' Occupations related to Hydrocarbon Exploration and Exploitation

The reason for having a high connection or link between people's occupations and hydrocarbon exploration and exploitation may not be unconnected to the fact that hydrocarbon exploration and exploitation is a common occupational activity that exists in diverse stages and its products exist in diverse forms. The interviews and the FGDs carried out derived information from the respondents revealing the fact that majority of the people are employed by the Nigerian National Petroleum Company (NNPC) and the multinational oil companies as staff at both permanent and casual staff capacity and some are employed as security guards protecting the various oil installations of the multinational oil companies while others are engaged in the oil companies diverse operations in the study area. Other people are found employed at the exploration, processing, production and distribution stages of crude oil production. This finding

correlates with that of Onakuse and Eamon, (2007) which posited that although the oil industry creates employment for the teaming population of the Niger-Delta region, the environmental degradation consequences are overwhelming and outweigh the supposed benefits of crude oil production in the oil producing communities who bear the brunt.

In all the FGDs, participants reported about recent increase in the adverse impacts of hydrocarbon exploration and exploitation on livelihoods. They perceived that, in recent years, owing to increase in hydocarbon exploration and exploitation, the adverse impacts of hydrocarbon exploration and exploitation on the people's means of livelihood have increased and the number of people whose occupations have been affected negatively also increased. This is in agreement with the report of Ahmadu and Egbodion (2013) that in areas where crude oil exploration and exploitation take place the original occupations of the inhabitants of the hydrocarbon production area would be drastically altered, first, because most of the people would follow suit to participate, and be beneficiaries of the benefits derivable from hydrocarbon production and; while on the other hand, others' occupations are negatively affected due to the negative impacts of hydrocarbon production in the area (Ahmadu and Egbodion, 2013).

Most of the participants reported that many people have abandoned their previous occupations, seeking new means of livelihoods as influenced by hydrocarbon exploration and exploitation in the study area. The respondents' perception that means of livelihoods are affected is in line with the results of the effects of hydrocarbon exploration and exploitation on livelihoods which shows that 47.7% respondents are of the opinion that their occupations are being affected by hydrocarbon exploration and exploitation, 44.8% disagreed while 7.5% could not decide on the issue (Table 4). This corroborates Getter *et al*, (1985), Odeyemi and Ogunseitan (1985); Tolulope (2004); Odjuvwuederhie *et al* (2006); Oludaro (2012); and Ordinioha and Brisibe (2013), they all agreed to the considerable adverse effects of toxic nature of chemicals discharged from oil spill on soil, water, resource and animal life; these components, constitute the primary production activities in the study area, and when these are affected owing to crude oil production, it implies that the livelihood structure of the people has been altered mainly negatively.

Basically, their initial occupations were related to agriculture, thus, when the land is polluted owing to oil spillage, the water bodies are polluted, aquatic organisms both flora and fauna affected, and the land becomes infertile for crop cultivation and for trees to grow for lumbering purposes thus affecting agriculture which is the economic mainstay of the people in all ramifications. In such a pathetic situation, the people have little or no option than to seek for alternative means of livelihoods usually outside agriculture. The responses derived from the interviews and FGDs conducted give credence to the above findings some of the respondents agreed that their major occupations were previously farming, fishing and lumbering as the case may be but the land having been affected by spillage and made infertile compelled many of them to take to artisan occupations such as carpentry, plumbing, welding, automobile mechanics, security guards, small and medium scale entrepreneurial occupations among other occupations that are not related to agriculture which guarantee their means of livelihoods no matter how inadequate or small.

According to some of the respondents of the FGDs and interviews, the recent yields of farming/fishing activities have not been very good. They attributed this to the oil exploration activities going on in the area. Most of them complained about frequent oil spills that enter the creeks and rivers, and eventually cause massive fish kills. This had made fishing in some of the rivers in the area impossible, thereby affecting their livelihoods. The spills also destroy the farmlands by rendering them unproductive for the crops that normally grow in the study area.

Another FGDs respondent, an elder and community leader, who spoke through an interpreter on the effects of gas flaring on livelihoods, said:

When the company started some years ago, we didn't know the thing (gas flare) was affecting us negatively; some neighbouring communities were even envious of us because they felt it was a good thing to have in our community. They called it 'Shell-fire' which gave light at night where public power supply was unreliable or absent. Then, we gradually realized that our maize plants just grow unusually tall only to produce very small ears or nothing at all at the end of day. It is almost the same with the cassava and yam (Arhodoro, D.)

This finding is in tandem with that of Niger Delta HD Report, (2006) which opines that with its concentration of informal sector activities, the urban sector plays a growing role in the economy of Delta State. Trading (17.4 %), services (9.8%) and miscellaneous activities (11.1 %) are the most important areas of employment for the people in the region, after agriculture, fishing and forestry (Niger Delta HD Report, 2006). In addition, a strong informal sector economic base is growing in the rural areas of the Delta State.

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3.4 Respondents' Occupations Related to Agriculture

Previous to the advent of hydrocarbon exploration and exploitation in the study area, agriculture was the major occupation of the people. With the prevalence of crude oil production activities, agriculture still competes greatly with crude oil production as a means of livelihood of the people. Although, the results show a large percentage of the inhabitants still engaging in agriculture related occupations, however non-agriculture related occupations which include hydrocarbon exploration and exploitation activities have a higher percentage response (Figure 5).

It was revealed that the inhabitants occupations are related to agriculture as 53.6% of the respondents engage in agriculture related occupations while 36.3% engage in other non-agriculture related occupations including hydrocarbon exploration and exploitation (Figure 4). The large percentage of people who engage in agriculture related occupations shows that despite the effects of crude oil production on agricultural activities, agriculture still thrives as a primary occupation of the people in the study area.

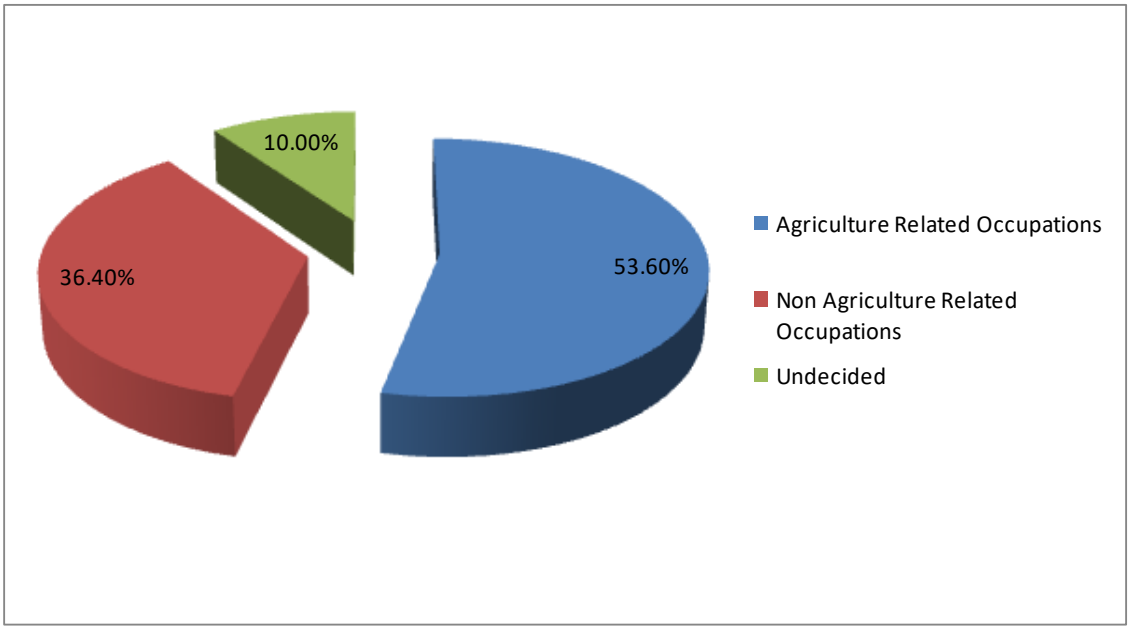

Figure 4: Respondents' Occupations Related to Agriculture

Agriculture continues to be the mainstay of the inhabitants of the study area. Even as the production of crude oil makes many people to be engaged in hydrocarbon exploration and exploitation related occupations as revealed above, the role of agriculture as a means of livelihood cannot be underestimated. Consequently, many individuals still rely on agriculture related occupations as their means of livelihood. Notwithstanding the effects of crude oil production on agriculture as a primary livelihood means of the people. This is in line with the findings of Onakuse and Eamon (2000) which reported that agriculture remains an indispensable means of livelihood to the people of Nigeria's Niger Delta despite the negative impact of crude oil exploration and exploitation on the region basically because agriculture is the sole source of food. Respondents' responses from the interviews and FGDs revealed that majority of the people engage mainly in farming, fishing and lumbering aspects of agriculture as means of livelihood.

This is in conformity with the findings of Gbadegesin, (1997) and Ihejiamaizu (1999) which posited that agriculture as a means of livelihood of the people of the Niger Delta is basically structured into farming owing to the vast fertile land present, though currently polluted by crude oil activity, fishing due to the massive expanse of water bodies the region is characterized with and lumbering because of the large forest available in the region.

4. CONCLUSION

In conclusion, there is no doubt the fact that hydrocarbon exploration and exploitation yields numerous economic benefits to the country. However, Delta State being one of the prominent producers of hydrocarbon suffers severe environmental effects of crude oil exploration and exploitation which in turn negatively affects the ecosystem which supports the agricultural means of livelihood. This implies that the people's means of livelihoods become unsustainable. The

atmosphere, land, water and human health conditions are all affected. Many individuals have abandoned agriculture as means of livelihood which the study area was endowed with before the advent of oil exploration and exploitation. The associated consequences of oil spillage and land pollution, among others, render the agricultural soil infertile and, therefore constitute a neglect of fishing and farming which hitherto were the people's fundamental means of livelihoods. There are severe environmental and socio-economic consequences of hydrocarbon exploration and exploitation in the study area. This area produces the crude oil used to develop the other parts of the country but the area remains neglected, underdeveloped and left to suffer the environmental and livelihood consequences of hydrocarbon exploration and exploitation.

5. RECOMMENDATIONS

The following recommendations are made in accordance with the findings of the research:

(1) The livelihood means of the people have been severely impacted negatively, all of which constitutes dwindling livelihood opportunities, thus, requiring urgent sustainability measures. Therefore, the government should evolve Hydrocarbon development banks to take up the challenge of catering for the direct development of the critical sectors of the economy in the study area as well as engaging in operations that can cater for the welfare of the inhabitants such preoccupation of the development banks should concern funding of developmental projects and industrial undertakings in the economy of the study area. By so doing, facilitating the funding of projects that improve the material well-being of people, particularly those living in poverty which is prevalent in the study area.

(2) There is the urgent need for government at all levels to create sustainable alternative means of livelihoods in the study area. A robust economic growth should be put in place with a view to achieving well focused poverty alleviation programmes. These programmes must be articulated in such a way that the people of the study area would have access to factors of production and credit. The latent capacity of the poor for entrepreneurship should be enhanced by the provision of micro-finance services, which will enable them to engage in economic activities and be self-sufficient. This will also lead to increase in employment opportunities in the economy of the study area particularly via small and medium scale enterprises, provision of loans to people engaging in entrepreneurship economic activities, establishment of industries in the study area and provision of infrastructural facilities in the area.

(3) Multinational oil companies should as part of their social responsibilities establish Small and Medium Entrepreneurship Schemes (SMES)– while the financial institutions take the lead, the multinational oil companies also should embark on this important projects in order to spread the entrepreneurship opportunities. This concept can be very vital for youth empowerment, job creation and also serves as an avenue for micro credit financing of projects that will change the life of the youths from restiveness to peaceful coexistence among their peers. Oil companies in the study area should put in place such economic empowerment schemes through their collaboration with the Federal Government of Nigerian's opportunity for industrialization on youth skill acquisition initiatives to train various youths on different skills ranging from welding, fabrication, computer operation and tailoring, among others.

(4) Oil companies, and cooperate organizations need to establish projects that truly deal with the needs of the people. Such projects should include health facilities, institutions/training centres, communication facilities, good roads, electricity, and pipe borne water. This should involve the peoples' participation. The dominance of private and multinational sectors in the area notwithstanding, the Federal Government should on its part, have the political and economic will to ensure greater involvement of the people of the oil producing areas. Sustained job creation for the youth, provision of social amenities and infrastructures, will on one hand reduce unemployment, youth restiveness, and activities of doubtful values, and on the other hand, enhance peace and stability in the area. Environmental degradation problems have been here for several years. It should not be sustained for the next generation to handle. Efforts to solve them should be taken more seriously. It is the responsibility of the government to protect the vulnerable group of the society

(5) The various ministries, parastatals and other government agencies saddled with responsibilities of facilitating the development of the area must be closely monitored by the federal government to nip in the bud the problems of corruption and inefficiency bedevilling most of these organizations such as the Nigerian National Petroleum Corporation, the Ministry of Environment, the Ministry of Niger Delta, the Niger Delta Development Commission, over the years, have not lived up to expectations, thus, unable to fulfil their mandates.

REFERENCES

[1] Aaron, K. K. (2006). Human rights violation and environmental degradation in the Niger- Delta. In Porter, E. and Baden, O. (Eds). *Activating human rights*. Oxford, Bame, New York.

[2] Abaje, I.B. (2016). Assessment of rural communities' perceptions, vulnerability and adaptation strategies to climate change in Kaduna State, Nigeria. An Unpublished Ph.D Dissertation Department of Geography, Faculty of Sciences, Ahmadu Bello University, Zaria.

[3] Abbas, I. (2011). Land-use land-cover changes and their implications on land resources in Mahin area of the Niger Delta region of Nigeria. An Unpublished PhD Dissertation, Department of Geography, Faculty of Science, Ahmadu Bello University, Zaria, Nigeria.

[4] Abdulkarim, B., Balarabe, M.l. and Oladipo, E.O. (2013). Building resilience: Adaptive strategies for livelihoods most at risk to climate change impacts. Climate Change Research Unit, Ahmadu Bello University, Zaria, Nigeria.

[5] Adger, W.N. (2010). Climate change, human well-being and insecurity. *New Political Economy.* 15(2), 275-292

[6] Ahmadu, J., and Egbodion J. (2013). Effect of oil spillage on cassava production in Niger Delta region of Nigeria. *American Journal of Experimental Agriculture*. 3(4):914- 926

[7] Akpofure, E.A. (2008). Oil spillage in the Nigeria Niger Delta. Psychomorphological and Emperical Overview, International Association of Impact Assessment. Opulence Environmental Service Limited.

[8] Carney, D. (1998). *Sustainable rural livelihoods: What contribution can we make?* Department for International Development, United Kingdom; and Hammer, Lucia, Elizabeth Lovell.

[9] Chambers, R. and Conway, G. (1992). Sustainable rural livelihoods: Practical concepts for the 21st century, *IDS discussion paper 296, IDS,* Brighton, UK.

[10] Chindah, A.C. and Braide, S.A. (2000). The impact of oil spills on the ecology and economy of the Niger Delta. *In Proceedings of the Workshop on Sustainable Remediation Development Technology.* Held at the Institute of Pollution Studies, Rivers State University of Science and Technology, Port Harcourt.

[11] Delta State (2010). Evolution of Delta State, Nigeria. Retrieved 12th March, 2014 from http//:www.wikipedoa.org/ wiki/Delta state

[12] Egbe, R.E. and Thompson, D. (2010).Environmental challenges of oil spillage for families in oil producing communities of the Niger Delta region. *JHER Vol. 13, Dec. 2010, pp 24-34.*

[13] Eyitsede, T.S.N. (2010). Oil pollution management and environmental assessment in the Niger Delta: A case study of operations of Chevron Nigeria limited in Ugborodo community. An Unpulished MSc Thesis, Department of Environmental Sciences; University of South Africa (UNISA).

[14] Ezemenaka, E.K. (2014). UN climate summit: How should Nigeria respond? (2). Retrieved 25th March, 2015 from leadership.ng/opinions/384340/un-cli…

[15] Genova, A, and Falola, T. (2003). Oil in Nigeria. *A Bibliographical Reconnaissance History in Africa,* Vol. 30, pp. 133-156.

[16] Getter, C.O., Ballou, T.G. and Koons, C.B. (1985). Effects of dispersed oil on mangroves: Synthesis of a seven year study. *Marine Pollution Bulletin,* 16: 318-324..

[17] Human Rights Watch (1999). The price of oil. Available:www.hrw.org/reports/1999/nigeri a/ Nigew991-05.htm (Accessed 15th April, 2016).

[18] 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 (5) (May), 686-701.

[19] Maitland, A. and Chapman, M. (2014). Oil spill in the Niger Delta: Proposal for an effective non-judicial grievances mechanism. Stakeholders Democracy Network (SDN). *Justice and Empowerment Initiatives Nigeria (Jei).*www. stakeholderdemocracy.org>2015/04

[20] National Bureau of Statistics (2005). Report of Nigerian living standard survey 2003/2005. Abuja

[21] National Population Commision [NPC] (2009). Federal Republic of Nigeria. Official Gazette. Lagos. The Federal Government Printer, No. 24 Vol.94

[22] National Population Commission [NPC] (1991). Census 1991: Final results - Delta State. National Population Commission, Abuja, Nigeria.

[23] Odeyemi, O. and Ogunseitan, O.A. (1985).Petroleum industry and its pollution potential in Nigeria. Oil and Petroleum Pollution 2:223-229. England, Elsevier Applied Science Publishers Limited, 0143-7127/85.

[24] Odjuvwuederhie, E.I., Douglason, G.O. and Nkem, F.A. (2006). The effect of oil spillage on crop yield and farm income in Delta State, Nigeria. *Journal of Central European Agriculture.* Vol. 7(2006) No. 1(41-48).

[25] Olsson, L., Oponfo, M., Tschakert, P., Agrawal, A., Eriksen, S., Ma, Perch, L. and Zakieldeen, S. (2014). Livelihoods and poverty, climate change 2014: Impacts, adaptation and vulnerability. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change.

[26] Onakuse, S. and Eamon, L. (2000). Livelihood systems and rural linkages in Niger-Delta region of Nigeria. Centre for Sustainable Livelihoods National University of Ireland, Cork.

[27] Onosode, G.O. (2001). Oil pollution and environmental management: Issues arising. Keynote address at the 1st International Conference on Oil Pollution and Environmental Management. House of Representatives, National Assembly, Abuja, Nigeria.

[28] Ordinioha, B. and Brisibe, S. (2013). The human health implications of crude oil spills in the Niger Delta, Nigeria: An interpretation of published articles. *Nigerian Medical Journal* 2013 Jan-Feb; 54 (1): 10-16. Doi:10.4103/0300-1652.108887 PMCID: PMC 3644738

[29] Osuji, L.C. and Nwoye, I. (2007). An appraisal of the impact of petroleum hydrocarbons on soil fertility: The Owaza experience.*African Journal of Agricultural Resources. 2:318:24.*

[30] Quinn, C.H., Zierrogel, G., Taylor, A., Takama, V. and Thomalla, F. (2011). Coping with multiple streses in rural South Africa. *Ecology and Society*, 16(3) 2.

[31] Saliu, H.A., Luqman, S. and Abdullahi, A.A. (2007). Environmental degradation, rising poverty and conflict: Towards an explanation of the Niger Delta crisis. *Journal of Sustainable Development in Africa* 9 (4), 275-290.

[32] Tolulope, A.O. (2004). Oil exploration and environmental degradation: *The Nigerian experience.* International Information Archives, 2: 387-393; International Society for Environmental Information Science.

[33] United Nations Environment Programme (UNEP) (2011). Environmental assessment of Ogoniland, Nairobi, Kenya, UNEP

[34] World Bank (2006). Defining an environmental development strategy for the Niger Delta, Nigeria.

[35] Yamane, T. (1967). Statistics: An introductory analysis. 2nd Edition, New York: Harper and Row.