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RESEARCH ARTICLE

ENVIRONMENTAL IMPACT ANALYSIS OF OIL EXPLOITATION IN THE NIGER DELTA REGION, NIGERIA

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ABSTRACT

A review of the effects of actions and transactions considered in the decision-making processes on oil exploitation projects in the Niger Delta region has been carried out. These effects are identified, assessed, and evaluated against the economic advantages arising out of a given action and transaction. There are 606 oil fields in the Niger Delta region, out of which 360 are on-shore and 246 are offshore and Nigeria is at present the largest oil producer in Africa and the sixth largest in the world.It is reported that there have been several oil spill incidences in Nigeria over the years, ranging from minor spills to over half a million barrels in one single incident. Oil spillage had given rise to unproductive soil and polluted water systems thereby destroying the agricultural and fishing activities in the region, thus affecting the socio-economic activities of the people, inducing antagonistic relationship between the oil companies and the host communities. It is recommended that there should be community participation and involvement in policy making, and Government should undertake a review of laws and policies affecting the relationshipbetween the oil companies and their host communities including the Land Use Act.

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INTRODUCTION

After the Second World War concerns for pollution, quality of life and environmental stress causing rapid loss of natural resources. Projects were affecting the environment, resources, raw materials and people in the 60sand thenUSA established a National Environmental Policy Act in 1970 for environmental protection. USA became the first country to enact legislation on EIA. All developed countries have environmental laws whereas most of the developing countries are still adopting it (Lee, 1995; Ogola, 2007).Convention on Environmental Impact Assessment (EIA) in a Trans-boundary Context was established by The Espoo Convention 1997 (Ogola, 2007). Apart from stipulating responsibility of signatory countries with regards to proposals that have trans-boundary impacts, it describes the principles, provisions, procedures to be followed and list of activities, contents of documentation and criteria of significance that apply.Rio Declaration on Environment and Development calls for use of EIA as a national decision making instrument to be used in assessing whether proposed activities are likely to have significant adverse impact on the environment.

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Multilateral and bilateral financial institutions that safeguards the environment are Investment banks like African Development Bank (AfDB), Asian Development Bank (ADB), European Bank for Reconstruction and Development (EBRD), European Investment Bank (EIB), Japanese Bank for International Cooperation (JBIC), World Bank (WB) have environmental safeguards to ensure that financing of projects is not only based on the precautionary principle, preventative action rather than curative treatment but sustainable development (WBCSD, 2005). EIA is a procedure used to examine the environmental consequences or impacts, both beneficial and adverse, of a proposed development project and to ensure that these effects are taken into account in project design. The EIA is therefore based on predictions. These impacts can include all relevant aspects of the natural, social, economic and human environment. The study therefore requires a multi-disciplinary approach and should be done very early at the feasibility stage of a project. Scoping is used to identify the key issues of concern at an early stage in the planning process (Ahmed and Sammy, 1987) as enumerated:

- Identify concerns and issues for consideration in an EIA
- Ensure a relevant EIA

- Enable those responsible for an EIA study to properly brief the study team on the alternatives and
- On impacts to be considered at different levels of analysis
- Determine the assessment methods to be used
- Identify all affected interests
- Provide an opportunity for public involvement in determining the factors to be assessed, and
- Facilitate early agreement on contentious issues
- Save time and money
- Establish terms of reference (TOR) for EIA study
- Predicting the magnitude of a development likely impacts and evaluating their significance is core of environmental assessment process (Ogola, 2007).

The geopolitical definition of the Niger Delta region is based on all oil producing states like Abia, Akwa-Ibom, Bayelsa, Cross River, Delta, Edo, Ondo, Imo and Rivers. The region has a rich cultural heritage, harbors various ethnic groups that speak different languages and dialects among which are Efik, Ibibio, Annang, Oron, Ijaw, Itsekiri, Igbo, Ika-Igbos, Isoko, Kalabari, Urhobo, Ogoni, Ikwerre, Etches, Ekpeye, Ogba, Engenne, Obolo, Isoko, Nembe, Okrika, Ndoni, Oron, Ibeno, and Yoruba among others, (Niger Delta Regional Development Master Plan Chapter One; Odjugo, 2011).There are 606 oil fields in the Niger Delta region, out of which 360 are on-shore and 246 are offshore and Nigeria is at present the largest oil producer in Africa and the sixth largest in the world, averaging 2.7 millionbarrels per day (bbl/d). (Nigeria Country Analysis Brief, 2005).

Today, environmental and social impact have become strong yardsticks for projects, hence the triple bottom-line approach (economic, environmental and social) to project viability (Ogola, 2007). Due to the devastating impact of oil exploration on the human, environment and health, there is therefore a compelling need for appropriate EIA and clean-up of the region. The aim of this study is to carry out anenvironmental impact analysis of oil exploitation in the Niger Delta Region, Nigeria.

MATERIALS AND METHODS

This study looked into the negative impact of oil exploration on the environment and people of the Niger Delta region. Secondary data used in this study were obtained from studies and reports by government and non-governmental organizations like Niger Delta Development Commission, Shell Petroleum Development Company, World Bank, etc. The data obtained wereanalyzed using descriptive method to obtain logical deductions and presentation of facts from the data obtained to give a clear picture of the problem and viable solutions.

RESULTS AND ANALYSIS

Some of the negative impact of oil exploration and production in the Niger Delta are asgiven in Tables 1-4, the top 20 gas flaring countries in the world,monthly oil spill incidentsand volume of oil spills / month are shown in Figs. 2,3 and 4 respectively.

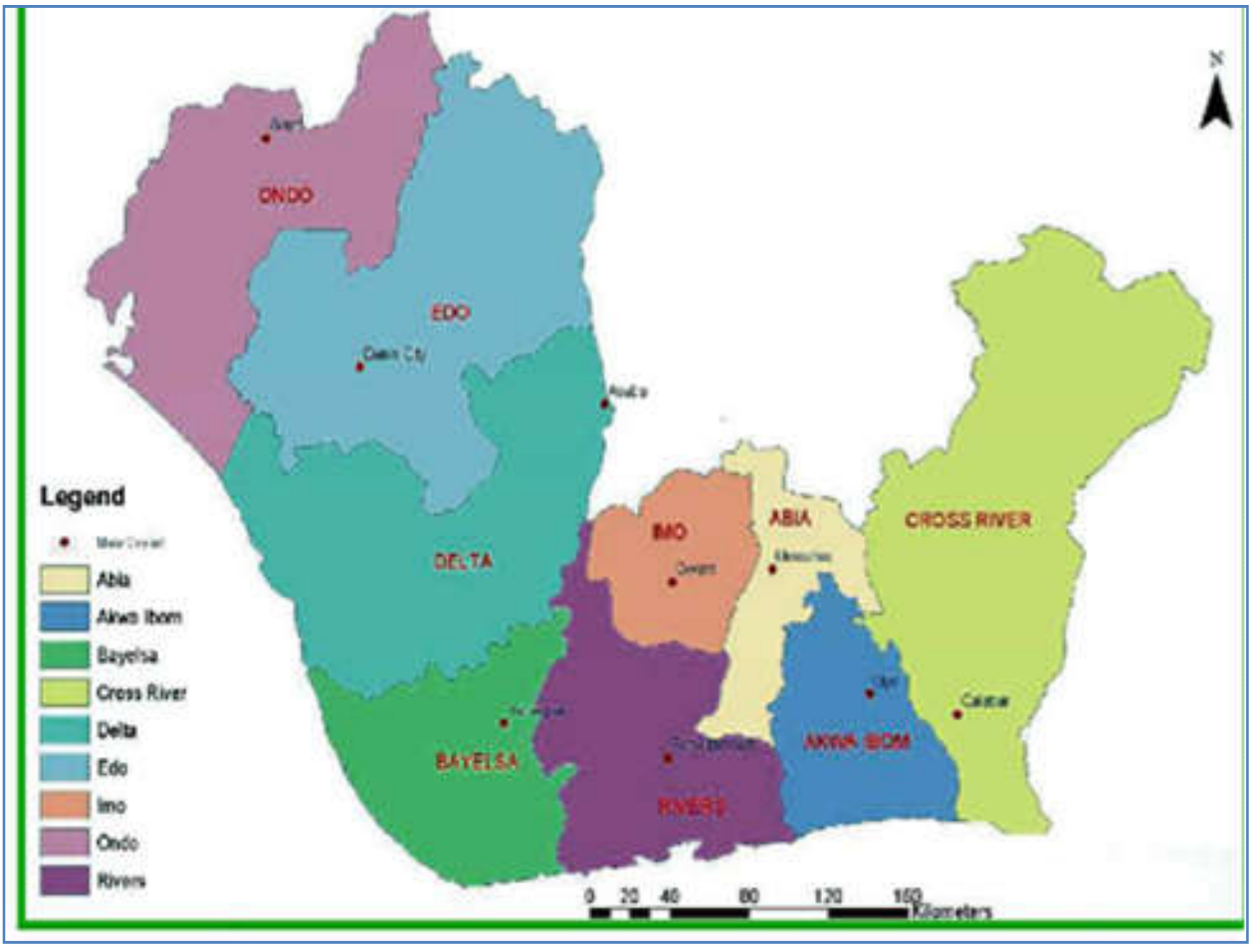

Fig.1. Niger Delta Region.Source: (Niger Delta Regional Development Master Plan Chapter One; Odjugo, 2011)

Table 1. Some Oil Spills in the Niger Delta (1979 – 2005)

S/N	Episode	Year	State	Quantity spilt (barrels)
1	Forcados terminal oil spills	1979	Delta	570,000
2	Funiwa No.5 well blow out	1980	Rivers	400,000
3	Oyakama oil spillage	1980	Rivers	10,000
4	System 2C Warri – Kaduna Pipeline rupture at Abudu	1982	Edo	18,000
5	Sohika oil spill	1983	Rivers	10,000
6	Idoho oil spill	1983	Akwa-Ibom	40,000
7	Jones creek oil spill	1998	Delta	21,000
8	Jesse oil spill	1998	Delta	10,000
9	Etiama oil spill	2000	Bayelsa	11,000
10	Ughelli oil spill	2005	Delta	10,000

Source: United Nations Development Programme (UNDP), Niger Delta Human Development Report, Abuja, Nigeria, 2006, P:184.

Table 2. SomeSeverely Oil Polluted Sites in the Niger Delta

Location	Environment	Impacted Area (ha)	Nature of Incidence
Bayelsa State			
Biseni	Freshwater Swamp Forest	20	Oil Spillage
Etiama/Nembe	Freshwater Swamp Forest	20	Oil Spillage & Fire Outbreak
Etelebu	Freshwater Swamp Forest	30	Oil Spill Incidence
Peremabiri	Freshwater Swamp Forest	30	Oil Spill Incidence
Adebawa	Freshwater Swamp Forest	10	Oil Spill Incidence
Diebu	Freshwater Swamp Forest	20	Oil Spill Incidence
Tebidaba	Freshwater Swamp Forest Mangrove	30	Oil Spill Incidence
Nembe creek	Mangrove Forest	10	Oil Spill Incidence
Azuzuama	Mangrove	50	Oil Spill Incidence
9 sites			
Delta State			
Opuekebe	Barrier Forest Island	50	Salt Water Intrusion
Jones Creek	Mangrove Forest	35	Spillage & Burning
Ugbeji	Mangrove	2	Refinery Waste
Ughell	Freshwater Swamp Forest	10	Oil Spillage-Well head leak
Jesse	Freshwater Swamp Forest	8	Product leak/Burning
Ajato	Mangrove		Oil Spillage Incidence
Ajala	Freshwater Swamp Forest		Oil Spillage Incidence
Uzere	Freshwater Swamp Forest		Oil Spillage Incidence
Afiesere	Freshwater Swamp Forest		Oil Spillage Incidence
Kwale	Freshwater Swamp Forest		Oil Spillage Incidence
Olomoro	Freshwater Swamp Forest		QC
Ughelli	Freshwater Swamp Forest		Oil Spillage Incidence
Ekakpare	Freshwater Swamp Forest		Oil Spillage Incidence
Ughuvwughe	Freshwater Swamp Forest		Oil Spillage Incidence
Ekerejegbe	Freshwater Swamp Forest		Oil Spillage Incidence
Ozoro	Freshwater Swamp Forest		Oil Spillage Incidence
Odimodi	Mangrove Forest		Oil Spillage Incidence
Ogulagha	Mangrove Forest		Oil Spillage Incidence
Otorogu	Mangrove Forest		Oil Spillage Incidence
Macraba	Mangrove Forest		Oil Spillage Incidence
20 sites			
Rivers State			
Rumuokwurusi	Freshwater Swamp		Oil Spillage
Rukpoku	Freshwater Swamp		Oil Spillage

Source: FME, NCF, WWF UK, CEEP-IUCN 2006 Niger Delta Resource Damage Assessment and Restoration Project.

Table 3: The Impact of Gas Flaring on Agricultural Output

Distance of Farmland from Flare site (m)	Percentage Loss in Yield of Crops (%)
200	100
600	45
1000	10

Source: Salau, 1993:19-22, Adeyemo, 2002:69

Table 4. UNEP's recommendations for monitoring

Monitoring sector	Monitoring approach	Frequency
Preventive	Aerial scouting	Weekly
surveillance	Surveillance from boats	Weekly
	Surveillance of facilities and incident sites	Weekly
Groundwater	Household visits in impacted communities	One-off
	Wells around impacted sites and facilities	Monthly
Water bodies	Surface water	Monthly
	Sediments	Quarterly
	Fish	Quarterly
	Benthic organisms	Quarterly
Vegetation	Transects in creeks and oilfield sites	Once a year
	Mangrove fauna	Once a year
	Analysis of satellite imagery	Once a year
Air quality	Particulate measurements, hydrocarbons	Monthly
Public health	Cohort registry of highly exposed communities	Yearly
	Public health registry of entire Ogoniland community	Yearly

Source: UNEP (2011).

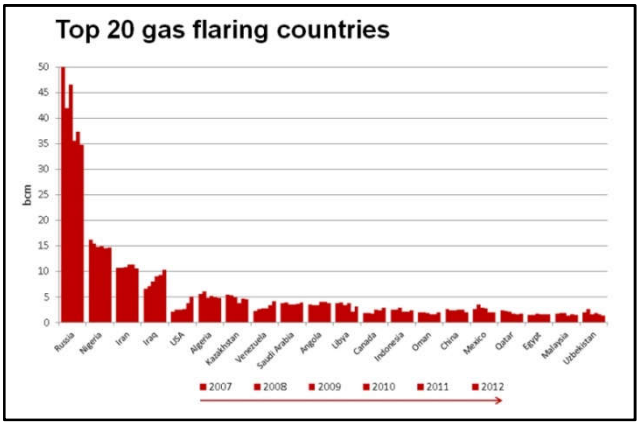

Fig. 2. Gas Flaring Countries. Source: (World Bank Initiative on reduction of Global Gas Flaring, 2014)

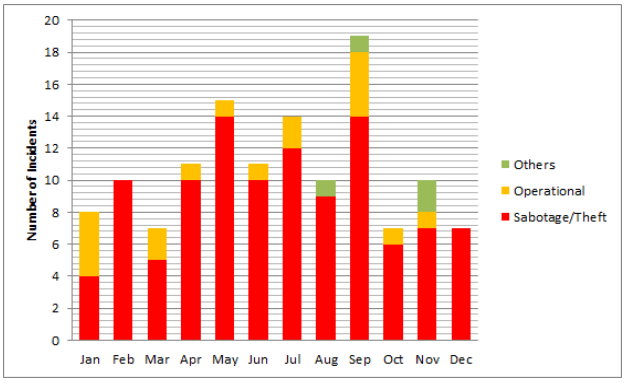

Fig. 3. Monthly Oil Spill Incidents - 2015 (Shell, 2015)

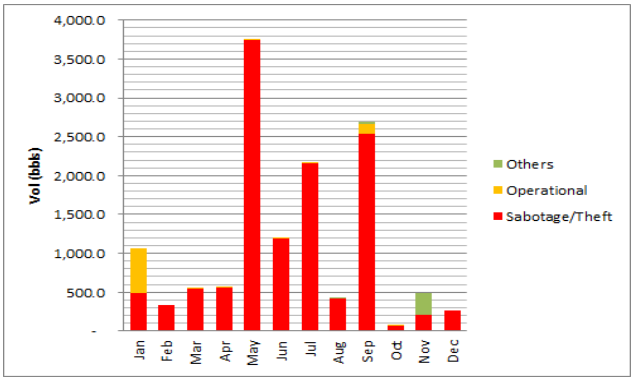

Fig. 4. Volume of oil spills / month (bbl) – 2015 (Shell, 2015)

From Table 1, oil spillage occurs in farmlands, rivers and streams and adversely affects the environment and the economic activities of the people mainly farming and fishing, poisoning the fishes leading to their death according to Bayode*et al.*, (2011) and Mmom and Igwe, (2012). From Table 2 and according to studies carried out by Kadafa (2012); Elum*et al.*, (2016) oil exploitation has increased the rate of environmental degradation and has perpetuated food insecurity as a result of death of fish and crops as well as loss of farm lands and viable rivers for fishing activities leading to loss of livelihood. Table 3 shows the environmental impact of gas flaring to nearby farmlands which corresponds to the studies carried out by Ubani and Onyejekwe (2013); Ogwu (2015) which reveals thatair pollution has been identified as one of the most critical environmental problems confronting the Niger delta Area impacting on socioeconomic, ecosystems, health, properties and climate adversely.

Table 4 shows some of the recommended activities of EIA monitoring approach according to UNEP (2011); Elum*et al.,* (2016). From Fig. 2, a significant amount of Nigeria's total associated gas produced, about 50% is flared by oil companies, translating to about 850 billion cubic feet per year (Bcf/y) according to Ereghaand Irughe (2009); Ismail and Umukoro (2012); Ubani and Onyejekwe (2013). According to Mmom and Igwe (2012); Ubani and Onyejekwe (2013), flaring also gives off huge amount of unwanted heat and light, affecting nearby communities and surroundings flora and fauna. About 45.8 billion kilowatts of heat are discharged daily into the atmosphere from burning 1.8 billion cubic feet of gas flaring contributes to emissions of carbon monoxide, nitrogen (II) oxide, oxides of sulphur and methane and soot. Gas flaring immensely contributes to concentration of greenhouse gases (GHGs) through the emission of carbon dioxide (CO_2) and methane (CH_4), leading to global warming and hence climate change and this adversely affects the living conditions on earth according toAkpomuvie (2011); Ismail and Umukoro (2012); Ubani and Onyejekwe (2013). Figs. 3 and 4 show monthly oil spillage and volume for 2015 with adverse environmental consequences as reported by Bagheb*et al.,* (2012);Ladan (2013);Maren *et al.*, (2013). From this study it is recommended that proper EIA studies should be carried before any project execution and that a monitoring team be put in place to promptly report and ensure effective remediation exercise for environmental management and protection.

CONCLUSION

From the above study,EIA certainly has a crucial role to play in addressing environmental issues surrounding project development. The integration of environment into development planning is the most important tool in achievingsustainable development. Environmental protection and economic development must thus be dealt with in an integrated manner. EIA process is necessary in providing an anticipatory and preventive mechanism for environmental management and protection in any development. It is recommended that there should be community participation and involvement in policy making, and Government should undertake a review of laws and policies affecting the relationshipbetween the oil companies and their host communities including the Land Use Act.

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