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The Human Perception of Land Degradation in a Section of Niger Delta, Nigeria

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Abstract This study looked at the perception of the people of the Niger Delta on the issue of land use-land cover changes and degradation that has been reported by several scholars to be wide spread in the study area as a result of anthropogenic factors and climate change. As a result of this, the study therefore used questionnaire and personal observation to investigate what the people thought about the land use-land cover changes, degradation, its causes, implications and how they are coping with it. It was found out that degradation such as erosion, flooding, saline water intrusion, devegetation, toxicity, subsidence, badlands, oil spillage and oil pollution were prevalent in the area. It was also discovered that the people were highly vulnerable as a result of poor coping strategies to the degradation and little or no assistance from the concerned authorities and multi nationals.

Keywords Perception, Degradation, Land use-Land Cover, Implications

1. Introduction

The increasing concern for the management of natural resources has been necessitated by the increasing demand for wealth and demographic pressures resulting in serious environmental stress and ecological instability. In the last 300 years, the impacts of land use-land cover changes (LULCC) have assumed dimension of significant proportions[1]. These impacts and changes have been found to be more profound in the developing countries, due to the high population growth rate and the subsequent resource over-exploitation.

As a result of poverty, people are forced to overexploit resources such as fisheries, forests and water in other to survive. The impacts of these environmental problems are serious both in the short and in the long term. In the short term food security, human vulnerability to hazards, health and safety are adversely affected; in the longer term the viability of the earth as a whole is being threatened[1].

The environment is so valuable and the inhabitants so precious that the future needs not be left to chance hence the need for regular auditing.

LULCC is driven by set of proximate and underlying factor elements central to environmental processes, change and management through their influence on biodiversity, heat and moisture budgets, trace gas emissions, carbon cycling, livelihoods and a wide range of socio-economic and ecological processes[2].

The proximate causes of land use- land cover changes (LULCC) explain how and why local land cover and ecosystem processes are modified directly by anthropogenic factors, while underlying causes explain the broader context and fundamental forces underpinning these local actions. In general, proximate causes operate at the local level (individual farms, households, or communities) and underlying causes originate from regional (districts, provinces, or country) or even global levels, though complex interplays between these levels of organization are common.

Studying land use dynamics is essential for the understanding of various ecological and developmental consequences of LULCC over a space of time. This makes land use mapping and change detection relevant inputs into decision-making for implementing appropriate policy responses[2].

LULCC detection allows for the identification of major processes of change and, by inference, the characterization of land use dynamics. The reason for such consequence is as a result of over-dependence on primary resources with direct effect on biodiversity; land use and land cover dynamics, terrestrial ecosystem and climate (atmospheric composition, vegetation, temperature changes and occurrence of extreme climatic events). With rapid urbanization and a finite land area, the available land per individual is shrinking on a daily basis. This calls for an urgent need for proper geo- management of land that is dependent upon the availability of a detailed, accurate and up-to-date data.

LULCC is central to environmental processes,

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environmental change and environmental management through its influence on biodiversity, water budget, trace gas emissions, carbon cycling, livelihoods[3], and on a wide range of socio-economic and ecological processes[4] which on the aggregate affect global environmental change and the biosphere. LULCC also plays important role in detecting emerging spatial patterns and the direction of land degradation, land fragmentation, decline of agricultural productivity, rural poverty and depopulation and environmentally-induced migration of people[3].

Land degradation is an integral part of environmental change process on land which leads to loss of valuable land resources. It also indicates a reduction in the resource potential of a land through the actions of those processes that may force the conditions of the land to become unpleasant and less useful to man. Such processes include water erosion, wind erosion, flood hazard, drought and desertification, devegetation, salinization, alkalization, loss of fertility, long term reduction in diversity of natural vegetation, reservoir sedimentation, toxicity hazards, moisture stress, pollution, saline intrusion, subsidence, and permanent inundation of land among others[5]. These processes cause degradation of ecosystems services, reduction in the stability and resilience of the ecosystems, reduction in biological productivity potentials and ability of the land to withstand further disturbances, and impairment of ability to support human population and biodiversity. Land degradation resulting from unsustainable land use practices increases the disaster susceptibility of an area, and by implication the risk of the people living in such vulnerable areas[6].

Several scholars have established the fact that land use-land cover changes and degradation are widespread in the study area. Such scholars include[7; 8; 9; 10; 11; 12; 13; 14; 15; 16; and 17]. As a result, the researcher decided to investigate the perception of the inhabitants of the Niger Delta to this serious issue of land use-land cover changes and degradation using questionnaire and field observation. This will in turn help planners in solving the problem in such a way that the inhabitants will be carried along.

1.1. The Study Area

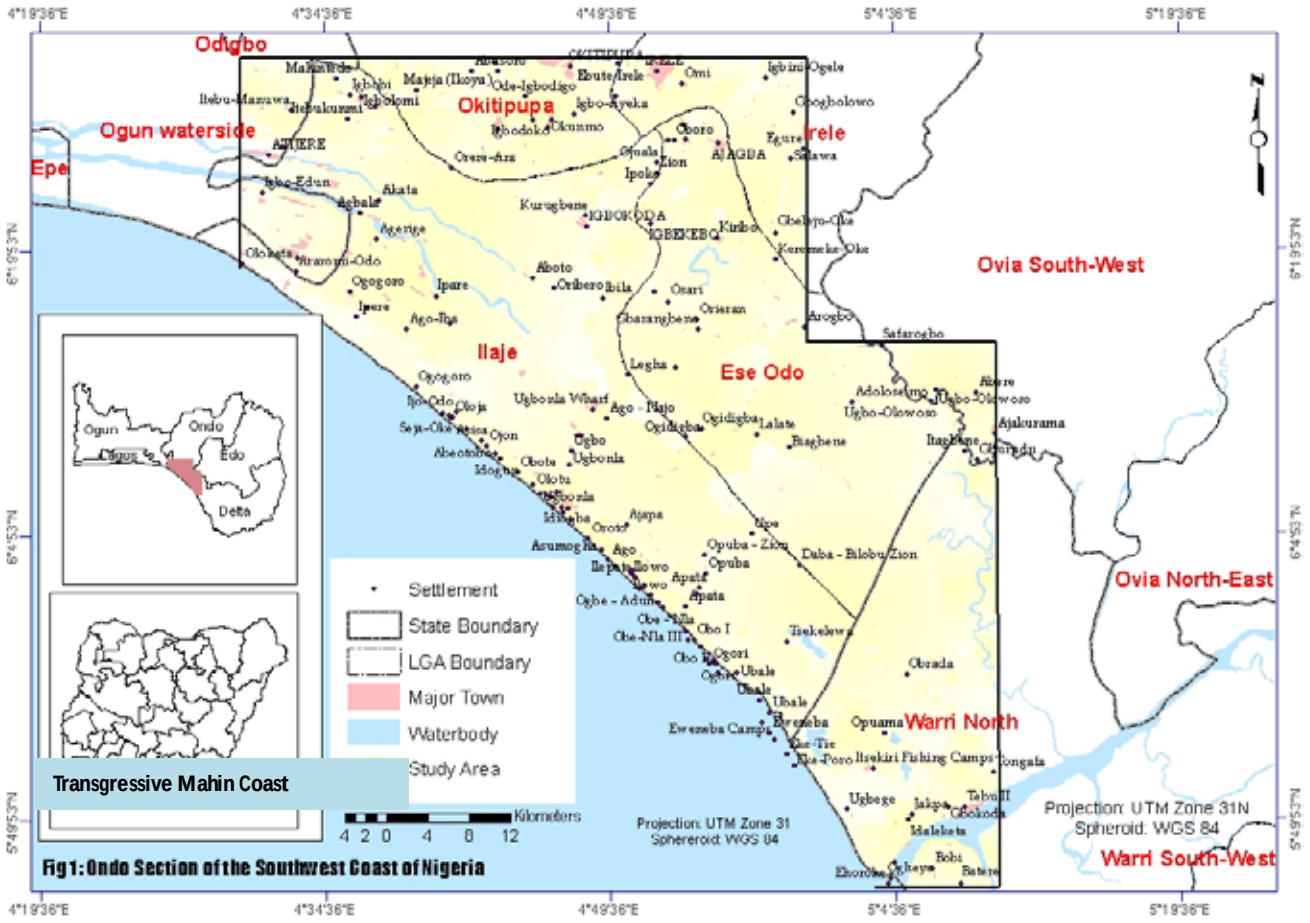

Figure 1. Transgressive Mahin Coast

The study area is the Transgressive Mahin coastal area of the Niger Delta, Nigeria (figure 1). It lies approximately between latitudes $5^0 45^1$ and $6°30^1$ north of the Equator, and longitudes $4^0 30^1$ and $5^0 07^1$ East of the Greenwich. It covers an area of about 3,301km^2, with a mud coastline distance of 88km and an inland distance of 50km and 19km respectively at its farthest and closest stretches from the Atlantic coastline. The area which extends to the lower parts of the Nigerian tar sand (bitumen) zone covers principally communities in Ilaje and Ese-Odo local government areas (LGAs) of Ondo state. It also extends to small parts of Ikale (Okitipupa) and Irele LGAs in Ondo state, Ogun waterside LGA in Ogun state, Warri North LGA in Delta state and Ovia Southwest LGA in Edo state.

The transgressiveMahin coastal area is bounded in the East by River Benin in Edo state, in the West by Ogun state coastline and in the North by Okitipupa and Irele local government areas. This area is parallel to Nigeria's South-West coastline, which is characterized by extensive lagoons and river- delta system. It is part of the 853 kilometre length of the Nigerian coastline.

2. Materials and Method

Data on the perspective of the inhabitants of the Mahin coastal area on the implications of LULCC (land degradation and vulnerability) was sourced through the use of questionnaire. The questionnaire contains fifteen (15) open and close ended questions that asked about thesocio-economic characteristics of the population, the impacts of LULCC (hazards) on livelihood; and the peoples' vulnerability and coping strategies to these hazards. However, only the relevant questions to the study were analyzed. One thousand five hundred and sixty (1560) questionnaires were administered to the inhabitants of the area. Firstly, Stratified sampling technique was used to divide the study area into three strata. The first stratum (Stratum A) involved settlements within 0 to 15km from the coast that is densely populated with high rate of LULCC. The second stratum (Stratum B) consists of settlements within 15 to 30km from the coast that is sparsely populated due to the forest reserves and also of less LULCC. The third and the last stratum (Stratum C) contained settlements within 30 to 50km from the coast because the population is equally high due to availability of land for farming activities and also of high LULCC. 725 questionnaires were given to people in stratum A and 700 returned, 315 questionnaires were administered to people in stratum B with 300 returned while 520 questionnaires were administered to people in stratum C and 500 returned. In all, a total of one thousand five hundred (1500) questionnaires constituting 0.003% of the population of the area were returned and analyzed.

The settlements selected from each stratum were selected by purposive sampling technique while the respondents were selected by accidental sampling technique. The justification for the use of 0.003% of the population and the use of the different sampling techniques was based on the nature of the terrain (creeks and lagoons); dispersed settlement pattern; inaccessibility of a large part of the study area by road and most importantly availability and the need to capture as much data as possible. The collected questionnaires were analyzed using descriptive statistics.

3. Results and Discussion

The perception of respondents to the questionnaire administered to them and the observation of the researcher in the field is as presented. Descriptive analysis is the basis for the questionnaire analysis.

Table 1. Income Distribution

Income (N)	Absolute No	Frequency %
<5,000	110	7.3
5000 – 10000	145	9.8
11,000 – 15000	506	33.7
16000 – 20000	425	28.3
>20000	314	20.9
Total	1500	100

Table 1 reveals that people with monthly income of <₦5, 000 were 7.3 %, monthly income of N5,000 – N10, 000 were 9.8%, monthly income of N11, 000 – N15, 000 were 33.7%, monthly income of N16, 000 – N20, 000 were 28.3% and monthly income of more than N20, 000 were 20.9%. The implication of this statistic is that the poverty level was high in the study area with 79.1% of the population living below N20, 000 (less than 150 dollars per month).

Table 2. Occupation

Occupation	Major No	Frequency %	Minor No	Frequency %
Farming	388	25.9	489	32.6
Fishing	421	28.1	359	23.9
Wine Tapping	124	8.3	88	5.9
Civil Servant	300	21	-	-
Trading / Business	212	14.1	524	34.9
Others (Artisan)	55	3.6	40	2.7
Total	1500	100	1500	100

The occupations of the people of the study area were farming, fishing, wine tapping, trading/business, civil service and artisan. From table 2, it can be observed that the major occupations were fishing (28.17), civil service (20.0%), trading / business enterprise (14.1%), wine tapping (8.3%) and others (artisan) 3.7%. The minor occupations in the order of engagement were trading / business enterprise (34.9%), farming (32.6%), fishing 23.9%) wine tapping (5.9%) and others (artisan) 2.7%).

Nobody was engaged in civil service job as a minor occupation. Putting all of those (major and minor occupations) together, it shows clearly that the dominant occupations were farming (29.2%) fishing (26%) and trading / business enterprise (24.5%). The others were civil service job (10%), wine tapping (7.1%) and others (artisan) 3.2%.

Table 3. Educational Status

Education	Absolute No	Frequency %
No formal Education	500	33.3
Primary	217	14.5
Secondary	234	15.6
Tertiary	423	28.2
Others	126	8.4
Total	1500	100

Table 3 shows that about 60% of the respondents in the study area went to school with the level of educational attainment being primary education (14.5%), secondary education (15.6%), others (8.4%) and tertiary education being 28.2%. Those who did not go to any school at all were 33.3%.

Table 4. Duration in study area

Duration (years)	Absolute No	Frequency %
<10	383	25.5
10 – 20	664	44.3
>20	453	30.2
Total	1500	100

Table 4reveals that majority of the people (75.57%) in the study area had stayed there for more than 10 years. This shows that majority of the respondents had the needed information about the area which the researcher needed. Only (25.5%) of the respondents had stayed in the study area for less than 10 years.

From table 5, 28.7% of the respondents reported that they were staying in the area because they were indigenes of the area, 36.4% responded that they came there to work, 30.9% said they came there as a result of trading / business enterprise while 4% said they were there for other reasons.

Table 5. Reason for Staying in study area

Reason	Absolute No	Frequency %
Indigene	430	28.7
Work	546	36.4
Trading / Business	464	30.9
Others	60	4.0
Total	1500	100

Table 6. Ever experienced any of these degradation hazards

Experienced	Absolute No	Frequency %
Erosion	650	43.3
Flood	865	57.7
Salt water Intrusion	375	25
Devegetation	924	61.6
Oil spill / Oil pollution	688	45.9
Sand excavation as a bad land	365	24.3
Canalization (dredge spoil)	500	33.3
Toxicity hazards	320	21.3
Subsidence (land sinking)	264	17.6

Based on the information contained in table 6, it can be observed that a respondent chose more than one hazard making the total to be more than 1500. 43.3% of the respondents had experienced erosion, 57.7% had experience d flood, 25% had experienced salt water intrusion, 61.6% had experienced devegetation. 45.9% had experienced oil spill / oil pollution, 24.3% hadexperienced sand excavation, 33.3% had experienced canalization as a result of pipeline routing, 21.3% had experienced toxicity hazard (disposal of chemicals) while 17.6% had experienced subsidence (sinking of land). This result shows that they had experienced all the land degradation types as defined by[5].

Table 7. Frequency of hazard experienced

Hazard	Occasionally		Frequent Interval		Seasonally		Regularly		**Total**	
	No	Freq %	No	Freq %	No	Freq %	No	Freq %	No	Freq %
Erosion	-	-	-	-	166	11.1	-		166	11.1
Flood	-	-	-	-	173	11.5	-		173	11.5
Salt water intrusion	-	-	-	-	184	12.3	72	4.8	256	17.1
Devegetation	-	-	-	-	-	-	200	13.3	200	13.3
Oil spill / Oil pollution	30	2.0	-	-	-	-	269	17.9	299	19.9
Sand excavation	19	1.3	-	-	-	-	-	-	19	1.3
Toxicity hazard	15	1.0	-	-	-	-	-	-	15	1.0
Subsidence	23	1.5	-	-	339	22.6	-	-	362	24.1
Canalization	10	0.7	-	-	-	-	-	-	10	0.7
Total	97	6.5	-	-	339	57.5	541	36.1	1500	100

Table 8. Degree of Hazard Impact on Resources (Vulnerability)

Resource	Severe Impact		Less Severe Impact		Moderate Impact		Total Abs. No	Total Freq.
	No	Freq. %	No	Freq. %	No	Freq. %	No	Freq %
Drinking and Domestic Water Sources	542	36.1	696	46.4	262	17.5	1500	100
Fishing	747	49.7	348	23.3	405	27	1500	100
Farmland/farming	246	16.3	879	58.6	375	25.1	1500	100
Forest resources	579	38.6	246	16.4	675	45	1500	100
Economic Activities	976	65.1	478	31.9	46	3.1	1500	100

Table 9. Coping strategies to hazards

Hazard event	Nothing (Leave with it)		Tried to stop it		Abandoned the place and moved		Complained to Government		Complained to Oil companies		Total No	Total Freq. (%)
	No	Freq.%	No	Freq. %	No	Freq. %	No	Freq.%	No	Freq. %	No	Freq. %
Erosion	27	1.8	68	4.5	26	1.7	44	2.9	-	-	165	11
Flood	203	13.5	65	4.3	69	4.6	30	2	-	-	367	24.5
Salt Water Intrusion	87	5.8	-	-	150	10	36	2.4	-	-	273	18.2
Devegetation	206	13.7	32	2.1	45	3	-	-	-	-	283	18.9
Oil Spill / Oil Pollution	36	2.4	-	-	24	1.6	15	1	4	0.3	79	5.3
Sand Excavation	84	5.6	-	-	-	-	-	-	-	-	84	5.6
Canalization	87	5.8	-	-	21	1.4	-	-	-	-	108	7.2
Toxicity Hazards	33	2.2	-	-	15	1	-	-	9	0.6	57	3.8
Subsidence	36	2.4	-	-	30	2	18	1.2	-	-	84	5.6
Total	799	53.2	165	10.9	380	25.3	143	9.1	13	0.9	1500	100

From table 7, it can be observed that erosion (11.1%) and flood (11.5%) were experienced seasonally especially during the rainy season. Salt water intrusion (17.1%) and devegetation (13.3%) were experienced regularly in the study area while oil spill / oil pollution (19.9%), canalization for pipeline (0.7%), sand excavation for oil drilling (1.3%), toxicity hazards (disposal of chemicals) 1.0% and subsidence (sinking of land) 24.1% occurred occasionally.

From table 8, about 36.1% of the respondents claimed that their drinking water and water for domestic sources were severely affected by the various hazards. About 46.4% claimed that the impact was less severe while 17.5% claimed it was a moderate impact.

For fishing ponds, about 49.7% said they were severely affected, 23.3% said they were less severely affected while 27.0% claimed they were moderately affected. For farmlands/farming, 16.3% of the respondents said they were severely affected, 58.6% said they were less severely affected while 25% said they were moderately affected. Moreover, about 38.6% of the respondents believed forest resources were severely affected; 16.7% were of the opinion that it was less severely affected while 45% said it was moderately affected. Concerning economic activities / livelihood sources, 65.1% of the respondents were severely affected, 31.9% said they were less severely affected while 31% claimed they were moderately affected. This shows that
the land degradation hazards were impacting them greatly especially their means of livelihoods

3.1. Coping Strategies to Hazards

The response to coping strategies to the hazards by the people of the study area is as shown in table 9.

Table 9 reveals that for erosion, 1.8% of the respondents reported that they did nothing since they were not empowered, 4.5% said they tried to stop it in their own way,1.7% said they abandoned the place and moved to new land while 2.9% complained to the government. In the case of flood, 13.5% did nothing, 4.3% tried to stop it, 4.6% abandoned the place and moved to new area and 2% complained to the government. For saltwater intrusion, 5.8% did nothing while 10% abandoned the place and moved to new lands while 10% complained to the government.

When devegetation happened, 13.7% did nothing, 2.1% tried to stop while 3%, abandoned the place and moved to new lands. For oil spill / oil pollution, 2.4% did nothing, 1.6% abandoned the place and moved to new lands while 1% complained to the government. In respect of sand

excavation for oil drilling, 5.6% did nothing. In the case of canalization, 5.8% did nothing while 1.4% said they reported the incidence to the government. For toxicity hazards, 2.2% did nothing, 2% abandoned the place for new lands while 1.2% reported to the government. During subsidence, 4.4% did nothing. From the above it is very obvious that the adaptive and coping capacity of the inhabitants of the study area to the various hazards was very low.

In summary, from the questionnaire analysis, it is obvious that the inhabitants were exposed to several land degradation
hazards as a result of land use land cover changes necessitat ed mainly by the activities of the oil exploration/exploitatio n in the study area, developmental projects and climate change effects. It is also worth noting that as a result of the numerous types of land degradation the inhabitants faced grave challenges of threat to their means of livelihood especially with very low adaptive/coping capacity.

3.2. External Assistance

The source of assistance to the people of the study area as contained in their responses is as shown in table 10.

Table 10. Source of Assistance

Source	Assistance			
	Yes	Freq. %	No	Freq. %
Government	50	3.3	1450	96.7
OSOPADEC	1368	91.27	132	8.8
NDDC	806	53.7	694	46.3
Oil Company	735	49	765	51
NGO	37	2.5	1463	97.5
Community Based Organization	10	0.7	1490	99.3
Individuals	63	4.2	1437	95.8

Table 10 reveals that, 3.3% received assistance from the government, 91.27% received assistance from OSOPADEC, 53.7% had received assistance from NDDC, 49% received assistance from oil companies, 2.4% from NGOs, 0.7% from community based organizations and 42% from individuals, especially politicians. This implies that the sources of assistance were mainly from OndoState Oil Producing Area Development Commission and Niger Delta Development Commission.

Source:[18]

In summary, from the questionnaire analysis, it is obvious that the inhabitants were exposed to several land degradation hazards as a result of land use-land cover changes necessitated mainly by the activities of the exploitation and exploration and non-sustainable developmental projects by the various government agencies in the study area coupled with climate change effects as shown in figure 2.The flooding resulted from multiple of causes such as erosion (note the shoreline on the top side of figure 2), low lying topography and sea level rise[3]. It is also worth noting that as a result of the numerous types of land degradation the inhabitants were vulnerable to various disasters due to loss of settlements and livelihoods.

Figure 2. Flooding of Aiyetoro community along the Transgressive Mahincoast

4. Conclusions

The problem of LULCC leading to land degradation and human vulnerability were as a result of anthropogenic factors especially oil exploration and exploitation activities in the study area. It is also observed that the various developmental projects by the Niger Delta development Commission and other agencies such as Ondo State Oil Producing Area development Commission had also contributed to the degradation witnessed in the study area as a result of poor planning and non-completion of projects. It is also note stating that the effects of climate change were visible in the study area. The implications of the degradation as expressed by the people were really biting hard and there is an urgent need by the government and all concerned to do something to stem the conditions of the people before a serious disaster is witnessed in the study area.

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