

## **Implications of Land Degradation, Reclamation and Utilisations in the Oil Producing Areas of Nigeria: Perspectives on Environmental Sustainability and Development**

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### **Abstract**

*This work is an assessment of perpetuated land degradation phenomenon and the attendant consequences in the oil producing areas of Nigeria. Certainly, following the oil production, is the emergence of squalors, generally run down environmental settings, erosion problems, general environmental degradation, pollutions among others. Thus, land reclamation efforts for effective uses constitute as a major panacea to the problems of land degradation in the oil producing areas in Nigeria. Essentially, the factors of creating environmental awareness, application of policy frameworks and the adoption of environmental education will largely assist the successful implementation of land reclamation efforts.*

**Keywords:** Land degradation and Reclamation, Environmental Sustainability and Development

### **Introduction**

Man's relationship with his environment has always changed with time, depending on his understanding and knowledge of the physical environment. However, the natural environment is generally endowed with variable quantity and quality of resources within the space. Thus, man has come to regard his environment as a depot housing his needs and therefore always seeking for ways of extracting the resources within it but always to the sad neglect of the environmental sustenance and consequently the emergence of a number of environmental stresses (Ezeaku et al 2008). The pattern of the relationships can be discussed in three phases of ages. These phases include the Palaeolithic, Neolithic and the Modern ages.

The Palaeolithic era marked the age of environmental determinism, where the environment essentially decided to provide for man. In essence, man depended on what the environment provided. This relationship is due to the low level of man's technological development as the degree of man's impact on the environment was minimal. The Neolithic era is the Iron age when equipment were fabricated with metals. This was due to some remarkable improvements in man's technological development. Thus, there was a marked interaction between man and his environment. Also, man tended to develop some options of need outside what the environment offers and proceeded to develop ways of accomplishing such set objectives.

Finally, the modern age marked the jet age where man decides on what to do within and outside his environmental setting. Indeed, this period epitomized a number of destruction inflicted on the environment, many of which were put in place inadvertently.

From the perspective of physical and cultural landscapes, the physical or natural environment indicates that the environment is in its natural state and the features of the physical environment include rivers and water bodies, trees, hills/mountains, mineral resources such as iron-ore, gold, manganese, diamond, silver, columbite and petroleum among others. The cultural landscape on the other hand denotes that an interaction has taken place between man and his environment. Such activities that are human based include agriculture, mining operations, sinking of bore holes, wells, tree felling, and constructions of bridges, houses, road networks and railway among others (Ayoub 1994). Thus, every organism sees the environment as a resource store where he can conveniently fall back to, for all his needs. However, efforts made by man to harness these environmental based resources have translated into different forms of land degradation.

By this second component of the environment, it is clear that due to growth in human population, the desire for a better condition of living has ensued. In meeting this drive, the earth's natural plant and animal life have been replaced with economically more productive species. This development is certainly in conflict with the natural conditions. One of such conflicts is the emergence of land degradations, which is the subject of discussion in this paper. Essentially, land degradation relates to the depreciations in the qualities and quantities of vegetation, soil resource, air, water resource among others. However, land degradation can be viewed more succinctly to mean a downward trend in the environmental resource such that their level of use in the human societies equally decreases at an increasing rate (FAO 1994).

### **Types of Environmental Degradation**

Land resources cover a wide spectrum of soil resource, vegetation, minerals of all types and grades, water resource including sea animals and fishes, animals among others. The issue of land degradation comes in to play when these resources either dwindle in sizes as in the case of sea animals, land animals and vegetal covers. In this regard, the term 'land degradation' is adopted to describe the scenario. Importantly, the constituents of land degradation includes: soil erosion, deforestation, animals facing extinctions (loss of biodiversity), among others (Isirimah, 2003). In any case, the form or type of land degradation in any area may assume a form of chemical and biological degradations, aerobic or anaerobic biotransformation and issue of mineralisation processes (Osuji et al 2007). The position here is that, all of these forms of environmental degradation relates to the gradual exchanges between soil minerals and the complex interactions between the fauna and other micro organism in the soil.

### **Factors of Land Degradation**

The issue of land degradation has assumed a global perspective. That is, there is no place in the world today that is not faced with one form of land degradation or the other. The magnitude of the incidence differs greatly. In any case, basic to the discussion of the factors initiating land degradation is the anthropogenic activities. Man by nature is gregarious and is out basically to capture all opportunities to his advantage and in most cases disregarding the consequent reactions of the environment to the activities (Table 1). From this table 1, it is evident that man is into a number of activities capable of degrading the land quality (FAO, 1994). This is probably because, due regard is never accorded the environment after exploitations (Odu et al 1985).

**Table 1: Percentage distribution of Land use types in Nigeria**

Land use types	Percentage Occupied
Open grassland	18.56
Wood grassland	26.13
Woodland	4.61
Forest	4.34
Swamp forest	3.18
Good farmland	23.00
Marginal farmland	18.72
Plantation (timber, rubber, oil palm)	0.32
Water and urban areas	1.13
Total	100.00

Source: Federal Department of Forestry (1980) as cited in Okafor (1988)

More specifically, a traditional approach to the utilisation of land is the tilling of soil in the form of agricultural practices (see Table 1). By this uncontrolled efforts to open up virgin land, the consequences of rainfall - land interactions is usually one of splash erosion with the attendant cataclysmic effects on soil nutrient status and the general suitability for a number of other agricultural related uses (Jimoh 1988). Closely related to this is lumbering activities with the attendant consequences of forest destructions, loss of biodiversity and the general exposure of soil resource to desiccations and thus limiting its uses. Further, the harvesting of water resources such as fishes and other sea animals. In most cases, chemicals such as gamalin 20 are used to capture the fishes. These chemicals normally render the water resource unfit for human consumption and wiping the fishes out of extinction. Put succinctly, this singular application of chemical to harvest the water-related resource provokes the incidence of water pollutions. Also, the incidents of petroleum extraction are yet another serious issue especially in the oil producing areas of Nigeria. In these areas, oil spills are frequent and the attendant problems are several and hazardous on the environment, the resources and man (Osuji et al 2005) (see Table 2).

**Table 2: Environmental impact of fossil energy resources**

S/N	Mining Activities	General Effects	Specific Impacts
1.	Exploration	Landscape disturbance	Aesthetic deterioration of landscape, path construction and tramping in wilderness.
2.	Mineral extraction	Land degradation and ecosystem destabilisation	Land surface devastation (including erosion), land subsidence, disruption of drainage systems, deforestation, excessive water draw down and lowering and contamination of the water table.
3.	Processing, Transportation, storage and consumption	Gas leaks, oil spills, noise and pollution of the air, soil and water.	Thermal body of water ways, increase in $CO_2$ and $CO$ , ozone layer depletion, acidification of air, soil and water, weather modifications, toxicity hazard to plants and consumers, death of terrestrial and marine life, loss of crops and livestock, impairment of atmospheric visibility, vehicular accidents, damage to buildings and machinery, nervous disorder, respiratory diseases, cardiovascular illness, cancer and food poisoning.

Source: NEST (1991)

Thus, table 2; depict the rates of the environmental problems due to man's uncontrolled resource exploitation efforts in the Nigerian environment.

Generally, the incidence of land degradation is provoked early by the anthropogenic factor, which considerably explains the preponderance of their problem in the Nigerian environment.

### **Patterns of Land Degradation**

Certainly land degradation has assumed a definite pattern in Nigeria. For example, in the former eastern parts of Nigeria, erosion has virtually ravaged much of the vast lands in the area. In this area, both active and inactive gullied surface areas range from 0.7km for Ohafia and 1.15km for Abiriba in Abia State. The width of the gullies ranges between 2.4km for Abiriba and 0.4km for Ohafia. Further, a minimum depth of 120km gullied surface has been recorded at Abiriba. Also, problems of widespread sheet wash erosion explain the failure of agricultural activities. This is to say clearly why soil erosion is a stress on soil resource, which has some far reaching consequences on man and his environment. In the northern axis of Nigeria, erosion is equally serious especially in places like Shendam and Western Pankshin of Plateau state, Efon Alaaye in Ondo State, Ankpa and Okene in Kogi State of Nigeria.

Again, sporadic rainfalls in 1994 rendered people homeless in Kastina State, Nigeria while properties worth over 400 million Naira and apart from lives were lost. Generally, the observation of the patterned nature of land degradation reveals that no part of Nigeria is spared from this wreckage (Asadu etal 2004). However, the range of the land degradation is more in the eastern axis and closely followed by the northern axis of Nigeria.

### Oil Producing Regions in Nigeria

The oil producing regions in Nigeria includes the Niger Delta, which covers the regions extending from Benin River on the west to Imo river on the East. Also, Niger Delta equally covers Abia, Akwa Ibom, Bayelsa, Cross River, Delta, Imo, Ondo and River States. Essentially, these oil producing areas are in total squalor in terms of infrastructural provisions, environmental degradations, and pollution issues among others. Thus, there is the need to promote land reclamation efforts with a view to enhancing convenience and quality of life too. Thus, the oil producing regions in Nigeria where such efforts are most desirable are as indicated by fig.1 below.



**Fig 1:Map of oil producing areas in Nigeria**

Key: 1. Abia, 2. Akwa Ibom, 3. Bayelsa, 4. Cross River, 5. Delta, 6. Edo, 7.Imo, 8. Ondo, 9. Rivers

### Land Reclamation Issues in the Mineralised areas of Nigeria

This term 'land reclamation' refers to a conscious effort at wresting back areas of 'wasted' parcel of land either by nature or man. Essentially, land reclamation emanates from either of the followings: One, the occurrence of volcanic eruptions and earthquake waves vibrations. This incidence is capable of completely destroying the scenic appearance of a landscape, the vegetal covers and human lives among others. For example, volcanic eruptions have almost completely destroyed the ecosystems along the Circum-Pacific region (Pacific Ring of Fire) of the world and other areas too. On the other hand, earthquake waves vibration have equally destroyed both lives and properties in places such as in San Francisco in 1906, Great Lisbon in 1755, Tokyo and Yokohama in 1923 among others. Also, the case of the island of Krakatoa in 1809 is another classic example of this type of incident. However, several years back the area started to experience a revegetation naturally. But, the destruction of human lives and the scenic appearance of the landscape remain to be reclaimed.

Secondly, man's numerous interference with the environmental system. Such uncontrolled man's efforts may be mining operations especially at the Tin mining area in Jos Plateau State of Nigeria. Also, the oil producing communities of Delta state of Nigeria etc. This effort usually leaves behind a whole scale destruction of land areas either in terms of destroying the scenic appearance or polluting the soil resources. For example, the Tin mining area in Jos and erosion disaster areas in the former eastern states of Nigeria among others.

Precipitating the incidents of land reclamation is the dare need to subject parcel of land into a number of competing land use mixes and usually a follow up from the socio-economic activities within the human environment which ranges from agriculture, construction works such as road networks, bridges, mining operations, tree felling for a number of use etc. However, these varied uses depend on the user and the availability of the land resource. In other to accommodate some of these uses, there is therefore the need to attempt at reclaiming the land resource already lost to such use. For example, the Tin mining area in Jos area of Nigeria can be reclaimed and put into a number of other use rather than being left to waste away and at the same time constitute as mosquitoes breeding points or sports. By this development more infrastructure and other artifacts that are beneficial to man's survival on the earth surface will come into existence. By this development, the seemingly inaccessible land areas are made accessible through reclamation efforts. For example, in some of the Scandinavian countries, land reclamation is a common issue often embarked upon. Usually, this effort involve filling a would be reclaimed area, compressed and put into some other use(s) when found to be hard enough to support the use too. Generally, given the level of land use mixes in existence within the human environment, the evolvement of the concept of land reclamation is a super panacea towards making more land available for a number of use for human existence.

### **Impacts of Environmental Sustainability and Development Efforts on the Problems of Land Degradation and Reclamation Issues**

The concept of environmental sustainability is almost defiled of a universally acceptable definition. Olawepo (2004) reference this scenario as been a complex pedigree. However, environmental sustainability that easily translate into development can be explained to entail as representing the emergence from a primitive state through progressive advancement to sustained socio-politico-economic growth and stability to improved standards of living for the citizenry (Adeyemi, 2002). But, (Holberg & Sambrook, 1992) explains environmental sustainability to mean either that the per capital utility or well being is increasing overtime with free exchange, or substitutions between the natural and manmade capital or well being is increasing, subject to non declining natural wealth. Essentially, sustainable development is in its simplest form represent a process of improving the quality of human lives which involves raising the standard of living of the people (income and consumption level of food, medical services, education, and other infrastructural development) ; creating social, political, and economic systems and institutions which promote human dignity and respect, and increasing freedom of choice and services. Essentially, responses to any problem of any nature depend on the perceptions of the problem. Thus, the following environmental restoration efforts (environmental sustainability and the accompanying development efforts) can be adopted with a view to ameliorating the conditions of the degraded, reclaimable mineralised areas and therefore improving the peoples quality of life and that of the general environmental setting as follows in Nigeria

### **Enactment of Related Laws and Regulations on Petroleum Exploitations**

This effort falls within the jurisdiction of the government of the day. By this, it is expected that policy statements or guidelines be made available to all and sundry as to what constitute an offence when an area is being degraded whether knowingly or inadvertently. This should equally provide for appropriate punishments in such documents. For example, in Canada, the Government policies exist on land reclamation procedures i.e. MLRP permitting process. Also, efforts at monitoring the policies equally exist too. Thus, in Nigeria it is being suggested that Government should endeavour to prepare policies on both land degradation and reclamation efforts too. This is because; such effort will go along way to guiding against land degradation problems and the adoption of the appropriate land reclamation procedures.

Specifically, the Federal Environmental Protection Agency, Lagos Nigeria, have provided the following relevant national laws and international agreements in effect as follows:

- a. Endangered Species Decree Cap 108 LFN 1990.
- b. Federal Environmental protection Agency Act Cap 131 LFN 1990.
- c. Harmful Waste Cap 165 LFN 1990.
- d. Petroleum (Drilling and Production) Regulations, 1969.
- e. Mineral Oil (Safety) Regulations, 1963.
- f. International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage, 1971
- g. Convention on the Prevention of Marine pollution Damage, 1972
- h. African Convention on the Conservation of Nature and Natural Resources, 1968

i. International Convention on the Establishment of an International Fund for the Compensation for Oil Pollution Damage, 1971.

### **The Introduction of Environmental Impact Assessment (EIA) decree No 86 of 1992**

This decree No 86 of 1992 was promulgated to protect and sustain our ecosystem. The law makes the development of an EIA compulsory for any major project that may have adverse effects on the environment (Ntukekpo, 1996; Olagoke, 1996). It sought to assess the likely or potential environmental impacts of proposed activities, including their direct or indirect, cumulative, short term and long term effects, and to identify the measures available to mitigate adverse environmental impacts of proposed activities, and assessment of those measures. (Ozekhome, 2001).

### **Application of Geographic Information System on the Environment**

GIS tool environment is capable of effectively monitoring human based activities within her environmental setting. This is with a view to having access to the problem(s) especially at their incipient stages before they degenerate into malignant stages. This is possibly done as it is a characteristic of GIS tools in its environment to efficiently map issues of interests in any environment. This development will avail access to information and thereby facilitating quick decision making processes.

### **Creating Environmental Awareness**

The existence of environmental degradation and the need to go for reclamation has warranted a number of discussions between both the elitist and the non-elitist classes. Thus, there is therefore the need to explore the possibilities of reaching out to people that really matter with a view to finding solutions to the problem. Such efforts may assume the form of public enlightenment campaign, lectures, distribution of pamphlets, posters, workshops and media houses too.

### **The adoption of environmental education**

Environmental education relates to a proper manner in which the environmental system should be interacted with. Essentially, environmental education spells out the expected environmental reactions vis-a-vis the human interactions. Against this backdrop therefore, individuals should avail themselves the opportunity of clear understanding of what the concept of 'environmental education' entails. Further, to perpetuate the adoption of environmental education, the concept should be adopted in the schools curriculum especially from primary to tertiary levels of educational programmes in Nigeria. The overall impact of these suggestions is towards maintaining and sustaining a healthy sustainable environmental development worthy for human habitation.

### **Conclusion**

The issue of land degradation is in place due essentially to pressure on land for one thing or other with disregard to the tolerant thresholds of such parcels of land.. Eventually, land resource then begins to react negatively to the subjected use usually in the form of soil erosion, sedimentation problems, flooding events among others. Thus, a means with which such land can be reclaimed for more effective use should be sourced. This essentially constitutes an area of focus where attention should be diverted when resources are being exploited from an area. In any event, various approaches at sustaining and maintaining the environmental quality will undoubtedly translate into developments capable of improving on the living standards of the people and the general environmental quality as well.

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