



# Environmental Stress and Ecological Imbalance in the Niger Delta of Nigeria: Our Experiences

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## Abstract

When the word “environment” is mentioned, what readily comes to mind is its devastation. This is not strange because what we see around us is nothing but uncleanness arising from human activities. What has contributed to this ugly scenario is none other than man himself. Nature naturally would always want to retain its naturalness. The forces of nature that ordinarily brings about earth quakes, landslide, flood and other natural events are but the balancing of these forces to maintain stability, but human activities have brought about artificial events, the effects of which we now call devastation and pollution. Even though, the natural forces tend to equilibrate these unnatural events arising from human activities, these are stretched beyond their limits. It is the human being who should and could assist in this direction that attempt at remediating the environment

## Introduction

The improper exploration and exploitation of Nigeria’s rich natural resources is having negative impact on the social and economic health of the citizens, the land resource and ecosystem integrity. While some of the northern states are being ravaged by drought and desertification, exuberated by human activities, some of the Southern (Niger Delta) parts were constantly threatened by massive erosion [1]. Increased incidences of flooding across the region constitute clear evidence of stress and ecological imbalance in the environment of many of our communities today. The key environmental challenge is to combat land degradation, deforestation, drought and desertification, loss of biodiversity, flooding, erosion, urban decay and municipal waste disposal and the adverse effects of climate change [2]. When properly managed, the environment could catalyse sustainable growth and development.

Conversely, if poorly managed, the environment can become hazardous and threatening human survival. But where human interaction with the environment results in degradation, depletion of renewable and non-renewable resources and massive pollution Uyigue and Agbo [3], it can be a significant source of economic loss upon human society. Therefore, environmental managers at the National, State and the Federal levels are charged to address these highlights and also ensure that environmental concerns were

effectively integrated into development process at sub-national levels of government to ensure sustainability.

## Contribution of Land Subsidence

Land subsidence has been reported as a possible factor contributing to flooding in the Niger Delta. Several factors, including natural geologic processes and hydrocarbon extraction, may be the cause. Land subsidence can cause: (1) Coastal flooding, (2) Coastal erosion from increased wave penetration inland, (3) Forest inundation and (4) Saltwater intrusion. The extensive oil and water extraction from subsurface layers, and the reduction in sediment input by upstream dams may have accelerated local subsidence. However, since oil extraction occurs at very deep levels (4,000 - 8,000 m below the surface) it is unlikely that subsidence from that level will be significantly manifested on the surface.

## Loss of Sediment Increased Flood and Erosion

During the last 20 years, the Niger river and its tributaries have been dammed for irrigation at various locations and the water flow has been manipulated extensively. It is estimated that around 70% of the sediment transport via these rivers into the sea has been lost because of the dams. The loss of sediment input to the delta via the rivers is exacerbating coastal and riverbank erosion. In many areas

in Ibeno and Utaewa in Ikot Abasi, the erosion caused by waves, currents and other oceanic processes is estimated to range from tens of meters per year to over 100 m per year [4]. In other areas, coastal erosion is pronounced in selected areas particularly Brass, Bonny, and Sangana. Estimates of coastal erosion at Brass range from 16-19 meters annually [5]. Construction of breakwaters and

jetties also caused coastal recession. For instance, at the mouth of the Escravos river, Ogborodo beach have receded by 20 m per year since breakwater construction Abam [6] Tidal erosion occurs in the Southern parts of the Delta as a result of high tides in combination with waves that had affected a number of townships and islands Figure 1.



**Figure 1:** Plate 1. Incidences of flooding threatening township streets in some areas.

Other factors that contribute to coastal erosion are sand and gravel mining, dredging, reclamation of land, as well as oil, gas and water abstraction and the removal of vegetation (mangrove). It is estimated that close to 400 ha of land is lost annually to riverbank erosion [1]. With the present trend, about 40% of the current inhabited land will be lost within 30 years and about 750,000 people displaced. Since riverbank levees are the most populated areas and are intensively cultivated, riverbank erosion results in loss of some of the most valuable land in the delta.

## Renewable Resources Degradation

### Fisheries exploitation

The preservation of the freshwater swamp and mangrove ecosystems is crucial for the viability of a large coastal and wetland fishery. Fluctuation in captures, decreasing sizes of fish, and observations from fishers give evidence of declining stocks from over exploitation and habitat degradation [7]. The delta, being predominantly a flood plain habitat is a very productive water body for fisheries and a crucial nursery for offshore and upstream ecosystems. Habitats of particular importance for the coastal and estuarine fisheries are the mangroves and sea grasses. In locations where the oil exploration is carried out, environmental stress

ranging from inappropriate sewage and waste disposal, cutting of mangroves for fuel to degraded mangroves to various degrees near most villages, towns, and cities. Damage has also occurred in the immediate surroundings of oil production sites.

### Forest exploitation

The majority of mangroves, the third largest mangrove forest in the world and the largest in Africa are in the Niger Delta [8]. The activities in the Niger Delta are eliminating approximately 3.5% of the forest annually [9]. If this rate of deforestation continues; the remaining forests of the region will be eliminated in less than 20 years. As an ecological zone, very little remains of the lowland rainforest. Only a few of the forests left are significant in size and species diversity. For example, Ogoni land used to be covered with a rainforest but has been largely converted to degraded bush and farmland Figure 2. The remaining forest stands in the lowland rainforests are contained in relic shrine forests, which may include only a few individual trees, or are managed by local communities along riverine areas. The Barrier Island Forests, the smallest of the ecozones in the Delta are freshwater forests found between the coastal beaches and the estuarine mangroves. The forests are degraded in accessible areas, but large areas of high-quality forest

with high concentration of biodiversity exist. The mangroves are the least disturbed of the forest zones. Only an estimated 5-10% has been lost to urban growth, industrial development, and oil

activities. In the Freshwater and Barrier Island Forests, forest utilization is second only to agriculture as the most significant economic activity in the freshwaters wamp forest zone.



Figure 2: Ogoni land used to be covered with a rainforest but has been largely converted to degraded bush and farmland.

## Infrastructure

Canal and roads are critical for improved transportation and communication in many isolated communities in the Niger Delta. However, their construction has precipitated some of the most extensive environmental degradation in the region. The greatest environmental concerns are not the canals and roads per se, but farmers who establish new plots in the natural forests and loggers who gain better access to the forests. As well as agricultural and logging expansion, forest ecosystems are degraded by professional hunters and to a lesser extent by farmers hunting to supplement their diet and income. Requiring extensive transportation networks, oil companies, as well as government agencies, have greatly contributed to agricultural encroachment by building hundreds of kilometers of roads through the freshwater swamp forest zone. Improved transportation and selective road construction are undoubtedly required for development in the delta. but must recognize ecological differences and minimize its environmental impact. Lack of Environmental Impact Assessment (EIA) and funding, limit the quality of road construction and damage ecosystems. In the long term, construction of adequate roads would be less expensive than chronically rebuilding poor roads. Current examples of environmental degradation include oil company's

and Niger Delta Development Company's (NDDC) roads that block streams and flood plains creating stagnant ponds of water, killing forests, and flooding fields.

Canal projects are also widespread in the delta especially in the mangrove forests. Designed to improve transportation between settlements or gain access to oil installations. The canals can have substantial effects on water flow patterns and ecosystems. As with roads, hunters and timber contractors follow the canals into new areas.

## Mangroves Habitat Destruction

Mangrove clearing is especially problematic because of the very slow regeneration rates. A few meter wide of Seismic lines cut over a decade ago are still visible by air. In addition to the cleared mangroves, a large number of mature *Rhizophora* spp (mangroves) (Figure 3) near flow stations are dead, possibly from oil clogging roots and suffocating the roots. Pipelines, flowlines, and to a lesser extent seismic lines fragment forests and open them up for better access for hunters, but unlike roads do not attract farmers in their wake. The clearance required for some of the lines can be very large: a 6-inch flowline requires that a swath of forest 5 m wide be cut. Drilling operations require the construction of slots and in some

cases wider transportation canals. Dredge spoils of acid sulphate soil, because of their high acidity when dry, can decrease yields and

severely disrupt natural regeneration of forest edges.



**Figure 3:** Dead *Rhizophora* spp (mangroves) due to roots suffocation at location close to flow line

Within the delta, biological diversity is concentrated in the freshwater and barrier island ecological zones. The extreme hydrological conditions of the mangrove forests limit their biological richness. While the lowland rainforests were historically the most biologically diverse of the delta ecozones, severe deforestation has greatly reduced both the number of species and the diversity of the ecosystems [10]. The two principal threats to biodiversity are habitat destruction and hunting. Both factors are directly tied to road and canal construction, increasing access of farmers, loggers, and hunters to forests.

### Pollution from Oil Activities

From extraction of oil in the Niger Delta to arrival at a terminal or refinery, a number of potential pollution outlets from the oil stream can be identified. The outlets can be categorized as air emissions, water effluents, and waste generation [11]. Air emissions mainly originate from gas flaring in relation to gas and crude oil separation. Water effluents mainly originate from separation of production water and oil. While waste generation mainly originates from hazardous sludge from separation of crude oil and water; drilling sludge; household waste, scrap and worn out equipment.

Probably no other aspect of environmental contamination has been as carefully studied as petroleum hydrocarbon pollution, particularly its impact on the marine environment. Obviously, oil industry operations in the delta involve a large number of activities that may cause environmental effects in addition to oil spills.

### Conclusion

Every human being on the surface of the earth must be concerned with the happenings of our time, the earth planet, be it under the groupings of government, NGOs, civil society, legislative arm of government, the government, and in fact every individual, all have roles to play. The task is enormous and it requires the economist, the ecologists, biologist, sociologists, politicians, layers, who define social aspersions and have to plan, steer and drive through the transition from today's growth economy to an ecologically balanced economy, where agriculture will operate more naturally without pesticides and inorganic fertilizers, factories will produce in an environmentally friendly manner. Then would the forces of nature work symbiotically with us human.

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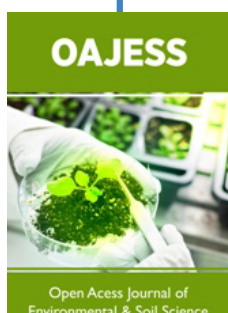


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