

## Deforestation and Sustainable Development in the Tropics: Causes and Effects

Sodienye A. Abere

*Faculty of Agriculture  
Rivers State University of Science and Technology Port Harcourt Nigeria*

Jacinta A. Opara

*School of Environmental Studies Universidad Azteca Chalco-Mexico*

### Introduction

The problems of an ecologically degrading world have focused new attention upon naturally existing forest ecosystems. This is necessitated by the fact that there has to be a check and balance in man's activities in order to maintain and sustain his natural environment for his well-being.

In the tropics, forest ecosystems are the key life zones which pose a new range of problems to the application of modern technology and often constitute a controlling factor in the planning and execution of large scale projects. This brings about the need for conservation and the fight against deforestation which is a major threat to the existing, few natural forests. The approach of seeking solution to the problem of deforestation by studying its causes and effects is thus being employed. This presentation is therefore focused on the causes and effect of deforestation in Nigeria, with the aim of finding solution to the problem.

Deforestation simply put is the clearing away of forests. It is the process by which an area is deprived of existing natural forest vegetation and resources. This can be brought about by systematic felling, indiscriminate logging or total clearing of existing vegetation for arable farm or industrial purposes. It usually results in destabilization of forest ecosystems and the surrounding environment. To this effect, its causes could be classified into two groups as stated below.

- (a) Man
- (b) Natural causes of deforestation

#### (a) Man

It is through the activities of structural development, logging and agriculture, that deforestation is caused by man. These activities include building of roads and citing of large projects, oil exploration and solid mineral exploration.

#### Building of Roads and Citing of Large Projects

In developing communities social amenities such as roads, hospital, water plants etc. are regularly provided by the government and or the communities themselves. Most times without proper planning, primary forests are cleared to site such projects. In Nigeria sites presently occupied by Petrochemicals, Refineries, Fertilizer Companies and Liquefied Natural Gas Plants where sometime, naturally occurring forest ecosystems.

#### Mineral/Oil Exploration Activities

Mineral/Oil exploration activities in Nigeria are major causes of deforestation, especially in the Niger Delta region. Since the early 1950s when the Nigerian oil industry was developed, its activities have been

responsible for crossing the deltas with oil and gas pipe lines thereby removing vegetation cover along their paths. Facilities such as oil well heads, major pipelines manifolds and flow stations have also been sited in previously forested area.

### **Bush Burning**

Both farmers and hunters in this part of the world use fire as a tool notwithstanding the fact that it is one of the most serious agents of forest destruction especially during the dry season. Most fires are caused either deliberately or by accident and these destroy trees of all sizes including seedlings. Fire hazards are more where the herbs and fallen leaves on the forest floor become dry. Most often animal rearers burn the old grasses to encourage growth of succulent grass for pasture. It has also been suggested that grass lands were sometime forested areas on which man had deliberately set fire to catch game thereby destroying previously existing forest vegetation. Timber loggers also set fire on forest accidentally while smoking or while carrying out any fire prone activity. This most times result in ground forest fires, surface fires and eventually wild crown forest fires.

### **Logging**

The high forests is the main sources of logs in Nigeria. as cited by Kio in 1983; by the years 2000 the consumption of wood based products will be 19 million cu meters from 3 million cu meters of 1975. In order to meet this demand, timber dealers encourage unlawful and indiscriminate logging in naturally occurring forests. Depletion of unreserved forests has also resulted in the concentration of logging activities within protected forest reserves in Nigeria. for example in 1960 western Nigeria, the areas outside the forest reserves, amounted to 52 percent of the total timber volume output, but five years later, this had fallen to just 16 percent. For the period of 1971-1975 for the whole country the long output of the unreserved forests was only 38 percent of the total. It is therefore clear that logging is one of mans activities which cause deforestation in both protected and unreserved forests in Nigeria.

In the cause of solid mineral exploration large factories such as the Ajaokuta steel mill in Kogi State have occupied previously forested areas. All these contribute to further depletion of the nations forest estate which is below the international standard of 20-25 percent of the total reserved high forested areas of the country (Areola 1987).

### **Agricultural Activities**

Large scale agriculture which requires a large land capital has also consumed a large portion of forested areas in Nigeria. Mechanized farming in the middle belt was practiced by indigenous farmers, but the system of shifting cultivation is still employed to improve crop yield. This required shifting of the farm sites to virgin and uncultivated lands thereby clearing existing natural forests.

Even if the best natural forest management systems available could be implemented in Nigeria, the forest reserves would not be able to meet the country's timber needs of 19 million m<sup>3</sup> cu in the year 2000. Yields of the natural high forests are about 10-25 percent of the short-time yields from plantations (Lawtan 1973). The trend is therefore, for the clearance of primary forest for plantation development with both indigenous and exotic timber species, often to be detriment of the country's natural forests. According to Boelke and Croze (1986), the total land area planted increase with an annual average area of 26,000 ha. This implies that agricultural development is a major factor causing deforestation in Nigeria.

## **Natural Causes of Deforestation**

Natural hazards which result in deforestation include:

### **Diseases**

It is quite common to find diseased tree stands in forests. Some tropical tree disease, such as mistletoes, blister rust, blight etc all caused by fungi, and capable of destroying mature trees and subsequently large stands to cause deforestation. Insects within a forest ecosystem also play roles in causing plant disease as their day to day feeding habits make forest trees susceptible to disease infection.

### **Damage to Trees by Other Plants**

Forest trees are damaged in various ways by other plants of the community. Whilst the superficial epiphytic flora causes little direct damage, it may reduce tree photosynthesis by cutting off the supply of light to the leaves of trees. Climbing plants such as honeysuckle *Lonicera Periclymenum*, Partly strangle young trees so that tree stems are distorted and sometimes the sheer weight of climbers may lay flat a young sapling thereby destroying it completely.

### **Climatic Factors**

Climatic factors, such as wind and temperature are also agents of deforestation. Strong winds are capable of breaking down trees on their paths in large numbers or in some cases uprooting them completely. High or very low temperatures are known to have disease causing effects on young trees. In cases of very low temperature, tree roots are frozen to deprive the shoot system of water thereby causing death. Scotching is the result of high temperature which creates a ring of burnt plant tissue round the stems of sapling at their points of contact with the soil. This could also lead to death of young trees.

### **Damages to Trees by Mammals**

Heavy browsing modifies the form of seedlings, and may prevent a shrub layer from development and in an old forest creates a browse line beneath which no young living tree shoot survives. Selective browsing can radically alter the proportions of different plant species present and even eradicate some. Tree bark is eaten by many groups of mammals notably rabbits, squirrels, porcupines, mouse, elk and elephants, and relatively small beavers is just as capable as the elephant of tree felling (Ovinton 1965).

### **Death and Decay of Trees**

Trees are living things and often die naturally. Death may be premature due to root competition or lack of sufficient light or nutrients. These deficiencies predispose the plants to attack by insects or fungi which results into death and subsequent elimination of trees.

### **Effects of Deforestation**

The effects of deforestation are most times not felt instantly by the forest ecosystem or the surrounding woodland environment. But over time, the absence of vegetation cover in a previously forested area affects both the living and non living components of that environment in the following ways.

## Soil Erosion

Deforestation exposes forest soils to direct contact with the rains and this enhances the free flow of run off which causes soil erosion. For communities whose sources of drinking water are influenced by water sheds soil erosion results in the increase of the mineral content of the surrounding water bodies and also increases turbidity.

In areas where slopes are steep or agricultural practice is bad the land may show excessive erosion in the absence of surrounding forests. Erosion galleys eat back further into agricultural land with each rain storm and remove valuable top soil. Soils that are exposed to erosion will no doubt have lower fertility potentials as compared to more stable soils protected by good vegetation cover.

## Soil Destabilization

Deforestation in desert prone areas destabilizes soil and enhances the encroachment of sand upon agricultural lands. This is most times the case in Northern Nigeria where desertification is a major threat to agriculture as trees that would have been used to stabilize sand dunes are felled to be used as fuel wood.

## Migration of Animal Species

Forest areas which had been the natural habitats of some wild life for years are no longer conducive for such wild animal species to survive when deforestation takes place. Such animals end up migrating to more conducive environments.

Some times it results in the death of such animals and subsequent extinction, as such animals are not able to adapt to their new environment. Typical examples are the migration of elephants and hippopotamus from the Niger Delta as a result of deforestation.

## Increase in Reflected Solar Radiation

Wood lands reduce the amount of solar energy reaching the ground, since the upper canopy reflects some incident radiation. The ratio of reflected to incident radiation is called the albedo and is usually greater in land areas without vegetation cover. This is because radiant energy is absorbed by the different plant layers in every vegetation, leaving a very small percentage to be reflected back into the atmosphere. Thus deforested areas will reflect more radiant energy into the atmosphere, which will in turn enhance global warming.

## Economic Implications of Deforestation

Most of the forested lands in Nigeria are located in the rural areas and in these areas the level of environmental awareness is reduced as compared to the highly enlightened populace in the city centers. Therefore, the physical affects of deforestation which are mostly environmental are not foreseen by the rural dwellers.

However the economic effects of deforestation which affects their substance directly can not be over emphasized. It is thus very common to observe the high cost of forage crops and other forest products as deforestation results in their scarcity in communities and settlements where they used to be cheap and available. Examples of such products include tree crops like *Dalium quineensis* (icheku), *Cola nitida* (goro), *Treculia African* (African broad fruit) *Irvingia gabonensis* (Ogbono) and animals like snails and grasscutter to mention but a few.

Subsequently, this effect stretches to the urban areas as the rural still serve as the primary source of forage crops and forest products.

## Conclusion

Deforestation has continued to reduce the total forested land area of Nigeria. Its effects are quite obvious now, that environmental awareness is gradually reaching every strata of the society. Also, from the economic point of view deforestation has created a negative impact on the average Nigerian.

The Government has over the years promulgated laws as regards forest conservation and protection. But these laws are not enforced to achieve the goals for which they are made. However public enlightenment about the causes and effects of deforestation would go a long way to solve the problem by bringing the realities to the grassroot – rural dwellers.

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