STEMING ENVIRONMENTAL DEGRADATION: THE AFFORESTATION APPROACH

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ABSTRACT

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The forest vegetation has within the past few decades undergone changes due to population growth and poverty. The demand for forest products has continued to increase, while the land available for growing them has been shrinking due to agricultural demands, city expansion and infrastructural development. The consequences of deforestation process in Nigeria include desertification in the North and gulley erosion in the South. Sustainable afforestation programme and tree planting in Nigeria therefore becomes highly imperative to meet the increasing demand for forest products. A sustained afforestation has potential benefits to human life, although the establishment phase may however be riddled with a lot of challenges such as conflicts with local people, environmental risk, animal damage and inadequate protection. A national policy on tree planting that will provide an enabling environment for the planters is recommended. There is the need for proper breeding and selection of trees for good quality characters such as fast growth, early fruiting etc. There is also the need for the establishment of a financial institution for the purpose of providing financial help to tree planters. Finally, all afforestation projects should carry the indigenous people along to reduce the cost of policing the plantation to protect it from human destruction.

Key Words: Deforestation, environmental degradation, human destruction, afforestation.

INTRODUCTION

The environment within which man live continues to experience changes the world over. Man has caused profound environmental changes in his search for survival and development. The changes have been crucial to the growth of human population, security and quality of life. On the other hand, it has also caused negative environmental changes manifested in soil erosion, loss of cropland, pollution, deforestations and destruction of biological diversity among others. Recurrent incidence of drought, famine, floods and rapid vegetation modification point to a possible breakdown in the natural environment (Oloyede, 2008). These events lead to loss of lives, crops and properties, rising levels of food scarcity and hunger. For example, Lake Chad in Northern Nigeria and Lake Saguibine in Northern Mali, which were once vast lakes have now evaporated to become arid desert (Ogukunle, 2004). The savanna dry regions are exposed to changing rainfall patterns, desertification and droughts. The coastal communities in Niger Delta Region and Lagos face rising sea levels and increased flooding.

Among the human activities that have striking effect on the earth’s environment is deforestation, which is a progressive removal of forest cover. Nearly 50% of the earth’s land surface has been transformed by direct human action, with significant consequences on biodiversity, soil and climate (Oloyede, 2008). Across Africa, there is urgent need to plant and grow more trees. We must replace the forests we have cut down before it is too late. Our survival depends on it. There is an urgent need to stem down the current rate of deforestation in the country as Bandy (1994) has observed that a continuous trend will result in diminishing the remaining tropical forest by the end of the 21st century.

Sustainable afforestation programme and tree planting in Nigeria is highly imperative. Planting of trees bring a lot of benefits to humans, although the operation has a whole lot of challenges. This paper is therefore aimed at highlighting these benefits and challenges in an attempt to help formulate a National protocol on sustainable tree planting to address the declining forest estate in the country.

STATUS AND CONSEQUENCES OF DEFORESTATION IN NIGERIA

By the late 19th Century, Nigeria had about 65 million hectares of rich tropical primary forests, with abundant flora and fauna (Federal Ministry of Environment, 2001). Now in the 21st Century, this hectarage has been reduced to about 4 million hectares with only a third is under effective protection in National Parks (Ogbonnaya, 2003, Adedire, 2007). A study conducted by Nigerian Environmental Study/Action Team (NEST) showed that Nigeria lost 5% of its forest annually throughout the 1980s (Oloyede, 2008). Another report by
Forestry Research Management, Evaluation and Coordination Unit (FORMECU) of the Federal Department of Forestry indicated that Nigeria still loses an annual average of 350,000 hectares of forest cover. (Ogbonaya, 2003). Although every country within the humid tropics is undergoing deforestation of primary forests (Bandy, 1994), 12 countries with Nigeria ranked highest (Table 1) account for about 81% of the total deforested area (Adedire, 2007).

Table 1: Deforestation rates and carbon emissions for leading countries

<table>
<thead>
<tr>
<th>Country</th>
<th>Annual deforestation rate ('000ha/year)</th>
<th>Deforestation rate (%/year)</th>
<th>Annual CO₂ emitted (million t C/year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brazil</td>
<td>5000</td>
<td>2.1</td>
<td>46</td>
</tr>
<tr>
<td>Indonesia</td>
<td>1200</td>
<td>1.4</td>
<td>12</td>
</tr>
<tr>
<td>Myanmar</td>
<td>800</td>
<td>3.3</td>
<td>8</td>
</tr>
<tr>
<td>Mexico</td>
<td>700</td>
<td>4.2</td>
<td>6</td>
</tr>
<tr>
<td>Colombia</td>
<td>650</td>
<td>2.3</td>
<td>6</td>
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<tr>
<td>Thailand</td>
<td>600</td>
<td>8.4</td>
<td>6</td>
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<tr>
<td>Malaysia</td>
<td>480</td>
<td>3.1</td>
<td>5</td>
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<tr>
<td>Zaire</td>
<td>400</td>
<td>0.4</td>
<td>5</td>
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<tr>
<td>India</td>
<td>400</td>
<td>2.4</td>
<td>4</td>
</tr>
<tr>
<td>Nigeria</td>
<td>350</td>
<td>14.3</td>
<td>6</td>
</tr>
<tr>
<td>Peru</td>
<td>350</td>
<td>0.7</td>
<td>3</td>
</tr>
<tr>
<td>Vietnam</td>
<td>350</td>
<td>5.8</td>
<td>3</td>
</tr>
<tr>
<td>World Total</td>
<td>13860</td>
<td>1.8</td>
<td>140</td>
</tr>
</tbody>
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Source: Adedire, 2007

The consequences of this deforestation process in Nigeria include desertification or desert encroachment in the North and gulley erosion in the South. Some villages in the North have become buried by the advancing sand dunes. In the South, many houses and roads have been destroyed by gulley erosion and those in the coastal areas experience flooding due to the rising level of the sea. Other consequences of deforestation include reduced crop production or yield due to erosion of fertile topsoil. Also, rainfall and other weather patterns have become distorted and unpredictable. There have been delays in onset of rains and premature cessation of rains. Populations of wildlife or animal species have also become depleted due to the destruction of their habitats. In Nigeria, about 69 species of mammals, 5 species of reptiles and 19 species of birds are on the endangered species list (Okojie, 1994). Destruction of forests, wetlands, and other biologically rich ecosystems threatens to eliminate these species in a human-caused mass extinction that would rival those of geological history (Cunningham and Saigo, 1997). By destroying habitat, we eliminate not only prominent species, but also many obscured ones, of which we may not even be aware.

THE BENEFITS OF SUSTAINABLE AFFORESTATION PROGRAMME

Sustainable afforestation implies viewing the forest as an integrated whole rather than as a source of any one economic product or service (GEF, 2010). Afforestation rationales have generally been confined to environmental or social benefits, stimulation of social economy and multiplier effects (Oyen and Nygaard, 2000). The environmental and social benefits to be gained from sustained tree planting include carbon sink, soil and water protection, wind break, creating wildlife habitat, less pressure on natural forests and promotion of outdoor activities and public health.

Carbon sequestration: Afforestation or tree planting is recognised under the term of Kyoto Protocol, as an eligible activity to help mitigate emission of green house gases (GHG). As a carbon sequestration activity, afforestation primarily offsets atmospheric CO₂ (IPCC, 2000). Carbon is fixed through photosynthesis and sequestered in tree’s biomass above and below ground. The mitigation options by the forestry sector include extending carbon retention in harvested wood products, product substitution, and producing biomass for bio-energy. This carbon is removed from the atmosphere and is available to meet society’s needs for timber, fibre, and energy. Biomass from forestry can contribute 12-74 EJ/yr to energy consumption, with a mitigation potential roughly equal to 0.4-4.4 GtCO₂/yr depending on the assumption whether biomass replaces coal or gas in power plants (Nabuurs et al., 2007). In addition, it is transferred to the soil by the roots and by decomposition of forest debris or litter (Freedman and Keith, 1998).

Amelioration of micro-climate and diversification of farm products: Trees introduced in farming systems can provide many services; they can affect the farm microclimate through cooling of the soil, control of erosion, improvement of soil fertility and can serve as soil water catchment (Oloyede, 2008). Trees are vital to increasing
the stability and resilience of the farming system. Products from trees are important source of food and form essential part of the diet (Baumer, 1995; Salim et al., 1999). In many countries, more than half of the indigenous food crops consist of tree species (Ruffo et al., 2002). Further, the wider range of farm niches created provides options to diversify and helps to reduce risks, thus contributing to food security.

Fodder production: One tree product that needs specific mention is fodder. The protein levels in pods and leaves of fodder trees complement those of most grass species, and can boost livestock weight as well as milk production (Roothaert, 1999). During dry periods, tree fodder is often the only source of food. In addition, trees also provides good source of bee fodder (Oloyede, 2008).

Employment generation: Afforestation activities generate direct employment, thus contributing to the rural economy as indicated in Omo and Oluwa forest reserves of Osun and Ogun State in Figure 1 (Onyekwelu and Afolabi, 2003). In regions with small or only a few existing wood processing industry, this may expand following large-scale afforestation in the area. However, employment in traditional forestry encompasses employment in recreation, wildlife management and tourism to which afforestation is a major contributor. Afforestation also provides recreational opportunities for people where new forests are close to urban areas with little old forest present (Oyedele, 2008).

Figure 1: Percentage of people employed in afforestation projects in Omo and Oluwa communities.

Source: Onyekwelu and Afolabi, 2003

Source of energy: Afforestation is also useful in energy supply by providing cheaper and more accessible fuelwood. At the global level, wood is the third most valuable commodity for energy supply after petroleum and natural gas (WRI, 1990). More than two-thirds of the people in the developing countries depend solely on wood for household energy (Oyedele, 2008). In 1999, it was estimated that 1.46 million tones of fuelwood were produced worldwide making 5% of the world total energy requirements (FAO, 2001). Most of the wood harvested is burned to cook meals, heat homes and sustain rural industries in the form of wood or charcoal, briquette or pellets (Thomas, 2010).

CHALLENGES AND PROSPECTS

Despite the wealth of products and services trees offer, tree planting in the country is not sustainably practiced. It is apparently clear that the level of awareness and sensitization of the public on sustainable tree planting is very poor, thus accounting for the challenges facing the projects such as:

i. Conflict with local people: A lot of afforestation projects have been conducted in the country between the 1970s and 1990s (Oloyede, 2008). Afforestation projects have been carried out as a means to cope with ecosystem deterioration such as deforestation, desertification and soil erosion. In reality, the projects often bring conflicts with local people. The reason for most of these conflicts is their incompatibility with the developmental needs of the local people thereby resulting in the disruption of the objectives of the projects and in some cases abandonment. Consequently, the objective of reforestation has to incorporate the needs of the local people to avoid conflicts with them. Oya (1998) calls this kind of change a ‘Paradigm Shift’ in forest policy. Tamale et al., (1995) listed the Lack of land tenure security, Lack of control over forest resources, Lack of secure or reliable markets and suitable pricing policies, Lack of appropriate technologies, Long rotation periods, Competition with
other uses for land, labour and capital, Bureaucratic bottle necks and Weak local institutional capacity as some of the reasons for the failure of social forestry projects in the country.

ii. Environmental risk and improper planning: Newly planted trees are damaged by many factors such as weather conditions, insect pests, diseases, fire, wild and domestic animals and people. The amount of risk varies with environment and location. One of such occurs when exotic species are not tested before planting in new environments. There is the possibility that native insects or diseases may readily adapt to and destroy the exotic host. In such instances, there is need for the planter to prepare a small trial of the species before committing it to a large scale operation. Other potential causes of damage can be identified early through site inspection and assessment. With this knowledge the operation manager can prepare remedy measures to reduce or prevent these occurrences. Aside from identifying the hazards, the manager must also assess the cost-benefit ratio in identifying solutions. Total protection against all risks will however, prove too costly. Any potential profits from tree would be eliminated by excessively high investment on protection.

iii. Animal damages: Animal damage can be caused by smaller animals such as rodents, and larger animals like cow. Left unprotected, seedlings may be subjected to browsing and trampling by both wild and domestic herds. Domestic animals such as goats, pose a severe problem. However, control may be done by physical barrier or by removal of the offending animals. Physical barriers include fences, walls, thorn hedges and ditches or a combination of any two or three of these. Fencing is easier to install, but is an expensive option. Wire-mesh enclosure can be used as protection against smaller animals. Experience however, has shown that wire fencing is often stolen and ineffective when used for long-term protection, restrict community access to areas otherwise available for free-range grazing and also interrupt migratory patterns of some wildlife. In extreme cases, poison baits may be effective in controlling some incursions of specific animals.

iv. Unwanted vegetation: Tending trees after planting creates favourable conditions for both the plants’ survival and healthy growth. Tending operations keep the plants from being suppressed by natural vegetation and protect them from other potential sources of harm such as animals, insects and diseases. Generally these operations include a wide range of treatments including access control, soil and nutrient management, pest management etc. Unwanted vegetation or weeds interfere with the development and survival of young trees. In addition, a thick ground cover such as grass not only hinders nutrient uptake, but may harbour harmful animal pests, which can girdle and destroy the small trees. The objective of weeding is to reduce or remove this vegetation to promote better growth and development of the planted trees. In general, the intensity of the weeding operation should be done at a level that effectively encourages establishment at a reasonable cost. Also, the types of treatments should not be so severe that it degrades the site through soil or nutrient loss.

v. Fire threat: Indiscriminate bush burning destroys large areas of forest land, leaving behind it colossal socioeconomic losses to the nation (Skoup and Company, 1986). For example, (Umeh, 1989) reported that the in the 1982/83 dry season, over 1,700ha of forest plantations, including two Agricultural Development Projects, were burnt. Also, between 1980 and 1982, over 900ha of Gmelina pulpwood plantation in Oluwa Forest Reserve, Ondo State, and 490ha of pine pulpwood plantation in Anambra State, both established with loans from the World Bank, were lost to fire (Nwobosi, 1986). Losses of agricultural crops in Bendel State alone was estimated at about N19 million, based on the existing compensation rates in the State. In the 1982/83 dry season also, 3,575ha of forest plantation were burnt in Niger and Plateau States and the loss incurred was estimated at over N3.6 million (Nwoboshi, 1986). Fire is of a particular threat during the dry season. Pastoral farmers often burn the bush to promote new growth for their cattle. However, simple measures can be taken by plantation managers to assess, prevent and control fires when they occur. Assessing the degree of fire hazard involves a simple check of four factors: air temperature, relative humidity, wind speed, and fuel build up (Ogogo, 2008). Dry conditions and strong winds expose the site to its greatest fire risk. Methods to reduce the chance of fire include reduction of the ground level vegetation fuel source, controlled burning, and fire breaks. Reduction of fuel source can be done through either cultivation of the soil or cutting and chopping the grass and weeds.

vi. Human-caused hazards: Hazards created by humans on newly planted sites take many forms. However, these risks are often due to carelessness rather than purposeful action. Increased fire hazard from traditional field burning, mentioned above, is an example. Another factor is trespass. Plantation managers might avoid these potential problems through good communications and involvement of local communities. If villagers are made partners in the potential benefits of a tree, they are more likely to be interested in the tree’s protection. To encourage long-term care of the plantation, some incentives should be established to encourage villagers to care for the trees. Possibly the most effective method, however, is to ensure that those involved have direct benefits from the plantation they are protecting.
CONCLUSION AND RECOMMENDATION

A sustained afforestation has potential benefits to human life, although the establishment phase may however be riddled by a lot of challenges which may discourage resource-poor planters. It is therefore necessary to fashion out a national policy on tree planting that with an enabling environment for the planters. A national protocol in nursery establishment for the production of good quality seedlings of various useful trees is desirable and urgently required. There is also the need for proper breeding and selection of trees to achieve something similar to the genetically modified (GM) food crops and animals. This will help in incorporating good quality characters such as fast growth, early fruiting etc. into our various tree species. There is the need for the establishment of a financial institution for the purpose of providing financial help to tree planters in form of loan/and or aid. Finally, all afforestation projects should carry along the indigenous people to reduce tension/friction, thereby reducing the cost of policing the plantation to protect it from human dangers.

REFERENCES


