

ENSURING ENVIRONMENTAL SUSTAINABILITY THROUGH FORESTRY IN NIGERIA

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Abstract:The issue of green house effect would not have been a problem if there were enough forest to curb the excess carbon dioxide released into the air .The environmental benefit from the forest include land stabilization, forest hydrology, atmospheric purification ,carbon sink and check to climate change,the conservation, protection and sustainable use of the forest and application of forest technology are the most feasible and plausible approach for solving and mitigating the problem of climate change, gas flaring and other environmental degradations in Nigeria and all over the world.

Attempts at meeting human needs without undermining the environmental quality status have been made in recent past but Nigeria environmental crisis seems to have defied all possible prescriptions. Sustainability is a desirable concept, the accompanying short and long-term implications of indiscriminate and uncontrollable use of forest resources have stood as obstacles. Considerations as well as strategies for achieving effective sustainable forest management system are discussed. Sustainability is never an option but a must, for national development.

This paper has highlighted the contributions of forestry to environmental sustainability, trend of forest resources utilization and its present status in Nigeria with a view to recommending strategies that will yield a common goal of sustainable forest management system for national development.

Keywords : Environmental sustainability, Forest management, Climate change,Conservation,

Introduction

The most eloquent statement on the sustainable forest management worldwide is the Millennium Development Goals Declaration of United Nations, 2000 of which Goal No.7 emphasized on "Environmental sustainability". This is because the document clearly states the targets of the goal towards bringing positive changes in the society through conservation of environmental resources for the total well-being of people. The aim of the Millennium Development Goals (MDGs) is to encourage development by improving social and economic conditions in the world's poorest countries of which Nigeria is one. According to United Nations Declaration (UN, 2000), the four main targets Nigerians ought to have been addressed themselves to are:

- (i) Integrate the principles of sustainable development into the country's policies and programs; reverse loss of environmental resources.
- (ii) Reduce biodiversity loss, achieving a significant reduction in the rate of loss.
- (iii) Reduce by half the proportion of people without sustainable access to safe drinking water

- (iv) Achieve significant improvement in lives of at least 100 million slum dwellers, by 2020.

Furthermore, the set targets are linked with indicators for which the successes are to be monitored and evaluated. The indicators are:

- a. *Proportion of land area covered by forest, CO₂ emissions, total per capita and per \$1 GDP(PPP).*
- b. *Consumption of ozone-depleting substances.*
- c. *Proportion of fish stocks within safe biological limits.*
- d. *Proportion of total water resources used.*
- e. *Proportion of terrestrial and marine areas protected.*
- f. *Proportion of species threatened with extinction.*
- g. *Proportion of population with sustainable access to an improved water sources, urban and rural.*
- h. *Proportion of urban population with access to improved sanitation.*

The actual and potential contribution of forest resources to sustainable livelihoods tends to be overlooked by decision and policy-makers. This situation is due to a predominance of information on crops and livestock in the agriculture sector and / or a narrow vision on the role of forestry sector . The roles of forestry in ensuring environmental sustainability are in, no doubt laudable if well managed. However, adjudged by these indicators, Nigeria realizing this goal at future targeted year remains bleak. Poverty presents a critical road block to sustainable utilization of natural resources in Nigeria. Of the country's population of over 140 million, about 70% live in rural areas and are directly and indirectly dependent on forest resources to meet their domestic needs . Over 92% of Nigerians - approximately 130 million people live under poverty. According to the 2006 Human Development Report, produced by the United Nations Development Programme, 70.8% of Nigerians live on less than a dollar a day - and 92.4% on less than two dollars per day . The trends of this poverty have been allowed to persist to date, the present socio-economic crisis affecting the poor has undermined efforts to achieve the Goal N07 and other MDGs. Development based on utilization of natural resources, pressure of population and their growing demands and poverty of the people took a heavy toll of our environmental assets . We need to tackle the environmental degradation in a holistic manner in order to ensure both economic and environmental sustainability. This is a most challenging task for the country and in particular for our planners and policymakers today. If sustainable development of Nigeria is so highly desirable, the country should without delay embrace sustainable forest management systems.

Forest is defined as a tract of land covered by plant association predominantly composed of trees and other woody vegetation. Our forests are intimately tied to our whole socio-economic lifestyle. Forest provides us with food and shelter materials for everyday use. The forest base is potentially capable of producing multitude of goods and services that are of intimate importance to the welfare of mankind, these include, fuel wood, fruits, nut, leaves, roots, medicinal, recreational and environmental protection. Also forest protective influence on the environment includes protection from flood, control of erosion, storage of water and shelter of agricultural lands against the desiccative effect of winds and the sun. Forest also plays a role in the function of biosphere and mitigation of climate change.

Trees moderate climate especially at a very local or micro level under the canopy of the forest, air speed is reduced, direct isolation is greatly excluded, humidity likely to increase and fluctuation in temperature is diminished. [1,5,9,20,28,]

Overview of Forest Environment

The total area of forest plantation in Nigeria is estimated as 34900 hectares, most of which are within the forest reserves (10 million hectares). Nigerian forest environment has been on continuous deterioration rate, various human needs now pose serious problem in the ecosystem and the resources. Uncontrolled logging and tree felling, urbanization, industrialization, population pressure, environmental pollution, agricultural practices, poverty and ignorance are principal causes of forest degradation. Tropical forest are being lost at a faster rate than reforestation annually at an estimated annual of 26Ck per year. It is on record of a loss of about 14.6 million natural forest annually. The socio implication of these deforestation process are quite disturbing, acute shortage of both industrial timber and fuel wood are already with us, while deforestation is also robbing us of numerous shrubs and herbs of food and medicinal value, as well as valuable plant genetic resources. [2,4,8,10,16]

Concept of Sustainability

Sustainable development is a development which meets the needs of the present generation without compromising the ability of future generations to meet their own needs.

Food and Agricultural Organisation (FAO) defines sustainable forest management as the stewardship and use of forest and forest land in a way and at a rate that maintains their biodiversity, productivity, regeneration capacity, vitality and their potentials to fulfill now and the future relevant ecological, economic and social functions at local, national and global levels which does not cause damage to other ecosystems. For forest managers, sustainably managing a particular forest tract means determining in tangible way, how to use it today to ensure similar benefit. .. health and productivity in the future.

Environmental sustainability strategies are measures taken to ensure effective protection, conservation and proper utilization of environmental resources without going to extinction for present and future benefit. [11,12,16,24,29]

Role of Forestry in Conservation of Environment:

Land Stabilization

Soil erosion causes loss of soil and vegetation cover and general degradation of the soil more often to a state of infertility; however trees and shrubs are known to play excellent role in soil stabilization irrespective of structure or geological origin. The roots system penetrates deeply, spreads extensively and forms an interlocking network which binds soil together, this makes soil resistant to wind and water erosion. It was stated that for the good of the present and future generations of this country the preservation of forest trails as inviolate plots is essential. Forest can act as barriers against landslides and avalanches. [11,13,15]

Forest Hydrology

Forest cover slows water movement through parts of the hydrological cycle. When rain falls on a forest, parts of it cling to the leaves and stem from where it gradually evaporates and some trickle down the stem and is absorbed into the ground. Forest trees and shrubs absorb the soaked water for growth and loose some through transpiration, this is possible because tree roots penetrate deeply into the soil to draw on reserve moisture and continue transpiring at a high rate. With this, dry forest trees can act as pump and dry a site so the water table is significantly lowered. This effect can greatly moderate rainfall intensity at the ground surface, reduce soil moisture and, reserve and increase infiltration capacity and virtually eliminate raindrop erosion. [14,17,18]

Atmospheric Purification

Forest creates healthy environment which makes life worth living. Trees when planted around a dwelling place provide a micro climate which makes the environment conducive to healthy living. It was reported that oxygen given off by trees and vegetation covers can help to purify the atmosphere. The shade from the trees can lessen heat conduction and radiation transmitted from the sun. The shade provided by trees, cools the air underneath, checks dust and buffers noise pollution. [28,29]

Carbon Sink

Numerous activities (burning biomass, industrial processes, vehicular fumes, gas flaring, burning fossil fuels etc) release large quantity of carbon dioxide (CO_2) to the atmosphere.

There is fixed amount of carbon in the world. It exists primarily either in the atmosphere as CO_2 in 'storage' in living or formerly living things. Carbon is taken out of the

atmosphere and put in storage" in organic compound by photosynthesis of green plant. The storage can be in living or recently living plant and animals in forest, shrub land, grasslands and aquatic ecosystems. Consequently, a forest is referred to as 'carbon sink'.

The warming up of the atmosphere due to depletion of the ozone by emission of greenhouse gases (carbon dioxide, chlorofluorocarbons, methane and nitrous oxide) is a global environmental problem. Forest worldwide absorbs billions of dollars if an equivalent storage would have to be created in other way. From this point of view, the main purpose of forest management is of immediate ecological and economic importance, [4,9,12,15]

Forest and Climate Change

The tropical rainforest in ensuring decent climate cannot be 'overstressed'. The forest purifies the atmosphere of pollutant gases especially excessive carbon dioxide. It has been established that tropical rainforest is the major global sink of the largest volume of excess carbon dioxide in the atmosphere. The implication of forest technology in combating climate change is the most feasible and plausible approach for solving the problem of climate change not only in Nigeria but all-over the world. Forest helps to ameliorate global warming, conserves the ecological system and conserve the nation's biodiversity [21,25,28,30].

Consideration for effective sustainable forest resources management

Forestry as a tool for sustainable development provides the opportunity for promoting synergy in the planning and implementation of multiple development programmes (poverty reduction, food security, improving health quality status, climate change response with mitigation and adaptation). Forests play a major role in sustaining life. They provide many vital services: moderating stream flows by absorbing excess rainfall, renewing the air we breathe, recycling moisture from the soil to the atmosphere, and providing shelter for people and livestock. Forests stabilize the soil and protect it from wind and water erosion and thereby avoid downstream sedimentation and the risk of flooding. Sustainable forest management can help to ameliorate global climate change through carbon sequestration, carbon storage, and the moderation of local weather. Young, vigorous forests sequester atmospheric carbon while mature forest act as carbon stores, thereby moderating the negative effects of global climate change.

The conservation and sustainable use of forests are also important aspects in conserving biodiversity. About 90 percent of all terrestrial plant and animal species live in the world's forests, and establishing and maintaining a worldwide network of well-administered protected areas will conserve this global genetic pool. Addressing the loss of forests to deforestation or their degradation from misuse will have a direct,

positive impact on the quality of biodiversity. Despite significant resource flows and global concern, the potential of forests to ensure environmental sustainability, realize economic growth, and their contribution to the local and national environment has not been fully realized in Nigeria due to numerous challenges. Many tropical developing countries are facing major challenges in successfully implementing national development goals, and achieving global targets and yet they now have to deal with climate change which is another layer of constraints besides other global environmental change issues. Nigeria is a landscape dominated by people, and the population continues to grow at about 2.4 percent per year. The natural resources of the country do not grow similarly and continue to be degraded and depleted due to the increasing demands of people (and their associated industries) for water, food, fuel, and income. The many state forest reserves in the country were originally set up in recognition of the importance of many tree species and the associated flora and fauna around the country. Within these forests are many endemic plant species and some that are commercially valuable, like mahogany and other hardwoods. Most of these forest reserves are now mostly only protected on paper, as they continue to be subjected to official and unofficial unsustainable logging, and virtually unrestrained firewood and plant collecting. Most animals that are considered edible which is nearly everything in many areas have long since disappeared. [3,6,7]

Strategies for ensuring environmental sustainability

A wide variety of new legislation, supporting policies and agencies are needed to begin experimentation with alternative means of achieving environmental sustainability. In Nigeria now if significant biodiversity and forests are to be conserved, Nigerians need to take a triangle approach. Those few areas that still contain considerable resources need to focus on first saving them from the widespread destruction that has already degraded most other areas. Sad to say, much of Nigeria's biodiversity and forests are already doomed, but present efforts can still save important tips of the iceberg for future citizens of Nigeria and the world. [19,20]

Environmental education and awareness

Environmental education and awareness should be major part of our national philosophy of education. This will provide a base to serve the society with a view to bringing about an attitudinal change and realization in the mindset of the society in general and individuals in particular that "to build a sustainable society, we must learn not to rival nature but to cooperate with and live in harmony". [22,23]

Right of poor community must be recognized and strengthened

Many efforts at environmental resource management in Nigeria failed because they paid inadequate attention to the various stakeholders involved and their particular interest. In Nigeria today, local people are dependent on forest therefore, a form of Joint Forest Management is to be developed. The local communities, the private sector and government are stakeholders who should cooperate in sharing the burden as well as the benefit. Each Stakeholder is expected to have rational but different interest concerning the use and management of forest resources and these differences may be fundamental. Failure to recognize different and potentially conflicting interest of the various groups and what each stands to lose or gain from exploitation or conservation has frequently led to local resistance to policies and development Projects, which therefore fail to meet their intended objectives.

Restoration of culture

Nigeria like many other African countries is endowed with very rich culture and tradition. The traditional culture of Nigeria stressed a strong relationship with the environment, and in the past, a culturally acceptable environmental management resulted from strictures and taboos related to water bodies, land, and deep forest. Though there are some cultural practices that are peculiar to some towns and villages, in general they have so many things in common and served the same important purpose of conserving nature. This, to a large extent helped saved the environment and our ancestors rarely died of pollution related ailments. The Osun Sacred Grove is the largest and perhaps the only remaining example of a once widespread phenomenon that used to characterise every Yoruba settlement. The grove is a highly sacred sanctuary where shrines, sculptures and artworks honour Osun and other Yoruba deities. With the advent of Christianity, Islam, civilization and its accompanying technology in Nigeria, however, many of these beliefs, taboos, customs and traditions have been relegated to the background and are regarded by many as fetish and useless, though they played a key role in environmental protection.

Generation of carbon credit

Destruction of forests is an environmental problem that needs an economic solution. In order to out-compete the drivers of deforestation, carbon credits must be generated for forested states if they reduce vegetation loss to an agreed level each year. This can be monitored by satellite technology. The monies paid could then be channeled into engaging and training forestry personnel and park rangers, drafting of new forestry laws, agricultural intensification, renewable energy, education and small businesses, and building better roads and infrastructure in order to stimulate development and create alternative livelihood. [21, 25, 28,30]

Full conservation effort

Full conservation of Nigeria's forests is necessary to mitigate global climate change and ensure environmental stability. Protected areas in Nigeria harbor most of the remaining interesting biodiversity, but these areas vary in the amount of actual protection occurring on the ground.

Some national parks, including Cross River and Gashaka-Gumti, have enclave villages in their midst, and all protected areas are closely surrounded by communities that continue to expand their agricultural practices in ever-increasing patches of disturbance. Roaming Fulani cattle herders still graze their animals within Yankari State Game Reserve, and no doubt others as well.

Conserving the wild relatives of cultivated crops is also needed. All stakeholders need to understand that biodiversity is critical to the maintenance of a healthy environment. Its role is enormous in meeting human needs while maintaining the ecological processes upon which our survival depends. Biodiversity not only provides direct benefits such as food, medicine, and energy; it also affords us a "life support system." There is need for creation of more national parks with at least one in each state.

[8,14,28]

Funding of research and implementation of findings

Research on sustainable forestry will aim to get new technologies to all forest users and help governments to make better policies. The goal is to reduce poverty, and help to achieve the Millennium Development Goals 7 beyond the targeted year (2015). Forests can tackle poverty directly. They also provide a platform for wider economic growth,' with knock-on effects far beyond the rural sector. It is clear that research on environmental sustainability requires constructive participation by communities, governments and the private sector, and ensure that its findings are shared between communities, governments and the private sector. [22,29,30]

Frequent and detailed forest inventory or assessment

In order to effectively manage natural resources, there must be accurate data on the distribution and abundance of the resources involved, the amount harvested from year to year, the ecological parameters of sustainability for each, and other relevant factors. In Nigeria, such information is often lacking, or if it does exist, it is impossible to locate. The lack of information may be the most severe threat, to sustainability in Nigeria. With no knowledge of what laws exist, no real understanding of what these resources are, and no clear idea of where these resources are headed, there is no way to manage them effectively. Hence inventory is a way to ensure environmental sustainability. The lack of a comprehensive valuation of forest economic goods and environmental services results in a low appreciation of their worth, hence, they are not respected and managed for their full value and full potential.

In addition to the points earlier mentioned above, ,to achieve a sustainable environment through forestry, Nigeria needs a scientific, implementable and cutting edge national forest policy.[1,8,12,29]

NIGERIA FOREST POLICY

The forest resources of Nigeria which consist predominantly of plants and animals have dwindled considerably over the last 20 years and now considered deficit, particularly in wood. The causes are numerous, including rapid population growth, infrastructural development, expansion of agricultural frontiers into the forest reserves and other forested lands, unsustainable forest management and other conservation practices, and illegal exploitation as well as desertification phenomenon. These factors have all combined to reduce the forest land area and exacerbate environmental degradation in the country. This precarious situation calls for specific government 'guidance and control of forestry activities at all levels.

The provisions in the extant National Forest Policy, as contained, in the 1988 Agricultural Policy for Nigeria, have become inadequate to address the deplorable state of our nation's forests, the worsening environmental conditions and other emerging national imperatives as well as the international obligations, as a result of our bilateral and multilateral agreements. Some of the emerging issues from these national and international imperatives include greater community and civil society participation in forestry development, communal forest owners' involvement in management decisions, participatory and benefit sharing arrangements in the management of natural forests, tree tenurial rights on private holdings and private forest development in general.

Thus a new National Forest Policy was evolved and developed through broad-based multi-stakeholders discussions in four geographical zones of Nigeria with inputs from several committee sittings and study tours outside the country. The entire process leading to the emergence of new policy was supervised by the National Forestry Development Committee and endorsed by the National Council on Environment. Consequently, a new National Forest Policy was approved by the Federal Executive Council on 14th June 2006.

The guiding principles for the new policy are based on the government's reform agenda, including good governance and the need for the forest sector to contribute to poverty reduction, food security and the provision of a sustainable environment for the present and future generations. A major paradigm shift in the new forest policy is the promotion of partnership in governance and the recognition of the stakeholders as agents in the promotion of sustainable forest management. The roles and functions of all the stakeholders were decentralized with the Federal Government maintaining core functions of policy development and regulation. Most importantly, the new policy, actually reflects the thinking of all relevant stakeholders in the forestry arena as they were actively involved in all the stages leading to the formulation of the policy.

The new policy came into being through the assistance of the Food and Agriculture Organization of the United Nations (FAO), the National Forest Programme Facility and the contributions (the Nigerian Conservation Foundation) to the success of the policy. The policy is committed to all Nigerians and urged all to join hand together in the attainment of its objectives for the sustainable management of our forest resources for the present and future generations.

When a reliable policy is achieved, it will go a long way in boosting Nigeria economy.[1,2,11]

Forestry and the Nigerian Economy

Historically, the forestry sector has contributed immensely to the Nigerian economy. There are records of exports of forest produce from this country since 1822. Similarly, before the forest service was formerly constituted, interested forestry groups had introduced a number of trees and woody species into the country.

Forest resources increasingly constitute a significant element in our national economy. Unlike in the past when forests were taken for granted because they were found almost everywhere, people are becoming increasingly aware of the direct and far-reaching influences of the forest as the available forests are continually diminishing while the demand for forest goods and services continues to rise.

Forestry and forest industries had played the role of a pace-maker with major forest products being the mainstay of the country's favourable balance of payments in the past. The sector had accounted for about 2% of the Gross Domestic Products (GDP) and 8% of the agricultural value added over the last two decades. It provides employment for some 1.8 to 2 million people mostly part-time, who supply fuelwood and poles, together with 5,000 people employed in the log processing in the forest zones of south. Timber exports used to be important but were banned in 1976 in the hope of slowing down the rapid destruction of the forests. Import of wood products reached US\$1-77 million in 1986 and included pulp and paper products worth US\$165 million and wood panels worth US\$7.6 million. The Central Bank of Nigeria (CBN) (2002) put the contribution of forestry to Nigeria's GDP using 1984 factor cost at 1.27% in 1996; 1.24% in 1997; 1.22% in 1998; 1.2% in 1999 and 1.189% in 2000. The total value of the non-wood products and environmental functions are enormous though not completely quantifiable and so are under-estimated in national accounting. In essence, our use of plant materials from forests as industrial raw materials now stands next in importance to their uses as food directly or indirectly with wood still in command as the major structural material for building and other constructional purposes in the country's economy

The forest estate from which wood and other forest products are obtained has been subjected to severe encroachment, vegetation degradation and dereservation for agriculture, roads, transmission. lines, expansion of urban area, etc. [16,19,23]

Recommendation

In Nigeria, economic development has not been sustainable partly because biological resources are improperly managed. The trends which manifest by the misuse of forest and biodiversity, the underestimation of the benefits of biological conservation, the noninclusion of the full costs of biodiversity losses in economic accounting, must all be reversed. The following strategies shall be pursued:

- a. work out ways of using the ecosystems sustainably thereby improving their social, economic and cultural values;
- b. promote *in-situ* and *ex-situ* biodiversity conservation;
- c. maintain as large an area as possible of modified ecosystems to support a diversity of sustainable uses and species;
- d. promote sustainable agro-ecosystems without compromising natural ecosystems;
- e. increase awareness and understanding of forestry and biodiversity to society;
- f. conserve and facilitate access to genetic resources that are important to agriculture, medicine and industry;
- g. support the sharing of the benefits and knowledge, expertise and technologies in the use of biodiversity in a fair and equitable manner;
- h. support the integration of forestry and biodiversity conservation objectives in sectoral policies, programmes, strategies, regulations and educational programmes at all levels
- L take the full economic and social costs and benefits of forestry and biodiversity into account when converting land to agriculture and urban systems;
- J. restore and rehabilitate degraded ecosystems;
- k. ensure implementation of forestry and biodiversity Strategy and Action Plan;
- L assess periodically the national forestry and biodiversity conservation status through monitoring and identification;
- m. strengthen centres for the exchange of data and information of relevance to the conservation of forestry and biological diversity [15,21,22]

Conclusion

The contribution of the forest to environmental sustainability cannot be overemphasized. Vegetation covers are known to play regulatory and protective roles on the total environment through their abilities to improve water regimes ameliorate ambient temperature and reduce the erosivities and destructive effects of rainfall and wind. Similarly, they can reduce solar radiation intensities at the ground level and regulate CO₂ and O₂ levels of the air. Sustainability of man and the environment depends highly on the forest. Any negative impact on the forest will also affect the environment negatively which in turn affect man's existence, therefore the conservation, protection and sustainable use of the forest is undebatable.[1,28,29,30]

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