

HARNESSING NIGERIA'S BIOLOGICAL DIVERSITY IN AN INTEGRATED APPROACH TO NATIONAL DEVELOPMENT

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Abstract

Biological diversity is the number and variety of organism found within a specified geographical region. This paper focuses on the geographical region called Nigeria, a country located in the tropical region which is typically rich in biological diversity. Indeed the variable climatic conditions and physical features have endowed Nigeria with a very rich biological diversity. However, over the last three decades, there have been a progressive decrease in the country's biological diversity. Nigeria biological diversity has to be restored and conserved due to its relevance to human development in the areas of agriculture, human health, business and industry, leisure, cultural and aesthetic values and ecological services. Nigeria's biological diversity should thus be harnessed in an integrated approach to national development.

Keywords-Biological diversity, integrated approach, national development, Nigeria

Introduction

Biological diversity commonly referred to as biodiversity is the variety of life forms on earth which is composed of the number of species of plants, animals and micro organism, the enormous diversity of genes in these species, the different ecosystems on the planet, such as deserts, rainforests, savannas and coral reefs (The Beehive, 2011).

Biodiversity is the number and variety of organism found within a specified geographical region, it is the quantity of plant and animal species in a given environment. Babsal and Co. (1998), further states that biodiversity means the number, variety and variability of living organism usually defined in terms of genes, species and ecosystems corresponding to fundamental and hierarchically-related levels of biological organization.

Nigeria is located in the western part of Africa between latitudes 4°16'N and 14°37'E. It occupies a total land area of 923,768km² with a population 160 million people (Wikipedia, 2011). By virtue of its geographical extent, it spans different climatic and ecological zones. The variable climatic conditions and physical features have endowed Nigeria with a very rich biodiversity. The mean annual rainfall range from about 450 mm in the north east to about 3500 mm in the coastal south east, with rain falls within 90 to 290 days

respectively. The mean annual temperature range from 27°C in the south to 30°C in the north with extreme of 14°C and 45°C and an altitude range of 0 – 1000m above sea level (FGN, 2010).

The rich biodiversity of tropical countries like Nigeria can be harnessed in an integrated approach to national development which is an approach that encompasses sectors of the livelihood of the people to bring about development. The aim of the paper is therefore to examine how Nigeria's biodiversity can be harnessed in an integrated approach to national development.

Biodiversity endowment of Nigeria

Nigeria is rich in biodiversity as the country is well endowed with a variety of plant and animal species. There are about 7,895 plant species identified in 338 families and 2,215 genera (Table 1). There are 22,000 vertebrates and invertebrates species. These species include about 20,000 insects, about 1,000 birds, about 1,000 fishes, 247 mammals and 123 reptiles (FGN, 2010). Among these animals about 0.4% are threatened while 0.22% is endangered. About 1,489 species of micro-organisms have also been identified (Table 1). All of these plant and animals species occur in different numbers within the country's vegetation that range from the mangrove along the coast in the south to the Sahel in the North.

Table 1; Inventory of Plant Species

	Groups of Plants	Families	Genera	Species
1.	<i>Algae</i>	67	281	1335
2.	<i>Lichens</i>	-	14	17
3.	<i>Fungi</i>	26	60	134
4.	<i>Mosses</i>	-	13	16
5.	<i>Liverworts</i>	-	16	06
6.	<i>Pteridophytes</i>	27	64	165
7.	<i>Gymnosperms</i>	2	3	05
8.	<i>Chlamydosperms</i>	2	2	06
9.	<i>Monocotyledons</i>	42	376	1575
10.	<i>Dicotyledons</i>	172	1396	4636
Total		338	2215	7895

Source: FGN (2010)

Nigeria has several National Parks that were established with the sole aim of preserving enhancing, protecting and managing vegetation and wild animals inside them. These National Parks are shown on table 2.

Table 2 : Nigeria's National Park

S/No.	Name of Park	Are (ha)	Location	Vegetation
1.	Kamuku National Park	121,130	Kaduna State	Guinea Savannah
2. (a)	Kainji National Park (Borgu Sector)	532,000	Niger State	Guinea Savannah
(b)	Kainji National Park (Zugurma Sector)			
3.	Old Oyo National Park	253,000	Oyo State	Dry Forest/ Guinea Savannah
4.	Okomu National Park	200	Edo State	Lowland Rainforest
5. (a)	Cross River National Park (Oban Division)	400,000	Cross River State	Lowland Rainforest
(b)	Cross River National Park (Okwango Division)			
6.	Gashaka – Gumti National Park	6,402,480	Taraba State	Guinea Savannah/ Montane Vegetation
7.	Yankari National Park	225,000	Bauchi State	Guinea Savannah
8. (a)	Chad Basin national Park (Hadejia-Nguru Wetlands/Oasis Sector)	230,000	Borno State	Sahel Savannah
(b)	Chad basin National Park (Sambisa Sector)			
(c)	Chad Basin National Park (Chingurme-Duguma Sector)			

Source: FGN (2010)

Nigeria's network of protected areas include a biosphere reserve, 08 National parks, 445 forest reserves and 28 game reserves. The total land area under national parks is about 2.4 million hectares. These game reserves were meant to conserve wild life and to supplement protein from domestic sources (FGN, 2010).

It is estimated that in Nigeria, there are more than 4600 plants of which about 205 are endemic that is they cannot be found elsewhere (Zabbey, 2004). This fact is also acknowledged by Wikipedia (2011) that recognizes the rainforest coastal eco-region of Cross River among others, as an important centre for biodiversity including the Drill Monkey which is only found in the wild in this area. It is widely believed that the surrounding Calabar, Cross River State contain the world's largest diversity of butterflies (Wikipedia, 2011). The Niger Delta region especially the Mangrove Swamps is one of the most productive ecosystems with rich community of flora and fauna. In the north, the different types of savannah vegetation belts consist of rich areas of biodiversity. Examples of these areas include the Hadejia-Jama'are-Nguru wetlands, the Jos and Mambilla Plateau to mention a few.

Current status of biodiversity in Nigeria

In 2010, the Federal Government of Nigeria assigned group of experts to undertake a nationwide survey on the status of biodiversity in the country. These experts came out with the fourth National Biodiversity Report in July, 2010. The report explained that Nigeria, without doubt is richly endowed with diverse flora and fauna. These vital resources are threatened by increased population pressure and intensified by human development activities. Available evidence shows that biodiversity is being lost at a disturbing rate in Nigeria. The causes of biodiversity are largely human related or human factors. These are due to interact with the environment for development, improved quality of life resulting from industrialization, technological advancement and rapid growth in urbanization.

The direct causes of biodiversity loss in Nigeria include economic policies, rising demand for forest products, poor law enforcement and weak laws (FGN, 2010). Factors such as rapid urbanization have collectively increased deforestation and

biodiversity loss. For example increased export demands for primates and birds for research and trade in timber and non timber species are direct causes of biodiversity loss in various parts of the country.

Low budgetary allocation to the forestry sub-sector has curtailed national efforts to forests large areas that have been deforested. Consequently the timber cut are not replaced hence sustained yield of the forests cannot be attained. Continued timber cut without replacement directly leads to biodiversity loss. Moreover, most of the laws that control the management of several species are outdated and their enforcement is inadequate. The consequence is overexploitation of resources and subsequent loss of biodiversity (FGN, 2010).

Agricultural practices such as bush burning, fuel wood collection, logging, grazing and gathering are direct cause of biodiversity loss. The continued cultivation of cash crops and increased clearing of land for cultivation of food crops have led to massive deforestation of the natural ecosystems. Furthermore use of fuel wood accounts for about 85% of domestic energy use in the country. There is thus high depletion of fuel wood species in both the savannah and reinforces ecosystems. The fuel wood extractors have now moved into forest reserves and communal forest areas (FGN, 2010).

In addition, some State governments are removing the protected status from forest reserves without regard for the biodiversity. The unfortunate impression that has thus been created is that the forest reserves exist as a land bank for other sectors as demands continue nationwide (Ladipo, 2010). A perfect example of this case is in Katsina State where two successive governments in 2006 and 2009 have cleared two forest reserves without concern for biodiversity leading to the loss of neem trees planted in 1948 by the colonial administration (Ladan, 2011).

Extractive industries that exploit crude oil and natural gas in the Niger Delta region have deleterious effect on the ecosystem and local biodiversity in many ways. Oil and gas pipelines buried underground fragment biodiversity ecosystems like rainforest and mangroves. Oil spillages which routinely occur in the Niger Delta region, releases barrels of oil into the land, swamp, estuaries and coastal waters of Nigeria. Example the Goi Trans Niger pipeline oil spill in 2004. The

overall effect of oil on ecosystem health and local biota are many and indeed harmful. One of which is that crude oil contain toxic components which cause outright mortality of plants and animals (Zabbey, 2004).

Gas flaring associated with oil production is very harmful to ecosystem and biodiversity. Oil leakages and fire also associated with oil production and transportation have effects on biodiversity. Forest fires killed local plants and animals inhabiting an area (Zabbey, 2004). Indiscriminate hunting of wild life for food (Bush meat), subsistence farming by shifting cultivation leads to loss of biodiversity and also depletes the ecosystem by causing death of wild life, destruction of eggs and plant species, while illegal

grazing of livestock in game reserves constitute a threat to wild life itself (FGN,2010).

In general, habitat destruction results in the depletion of Nigeria’s biodiversity. For example the Nile crocodile (*Crosodylus nilotinus*) found in the coastal waters is fast disappearing due to habitat loss and hunting. In the south, the forest elephant, chimpanzee, leopard, the royal python, the Nigerian guenon are among the endangered list (Table 3). Forestry experts reported that about 65 of Nigeria’s 560 species of trees are now faced with extinction while many are at various stages of risk (Nathaniel and Nathaniel, 2011). The threatened biodiversity species are shown in table 3.

Table 3: Threatened biodiversity species in Nigeria

S/No	Species	Main Uses	Status
A. Plants			
1.	<i>Milicae E</i>	Timber	Endangered
2.	<i>Diospyros ellicotti</i>	Timber	Endangered
3.	<i>Triplochluiton S.</i>	Timber	Endangered
4.	<i>Mansoiea ultissinia</i>	Timber	Endangered
5.	<i>Masilania acumminata</i>	Chewing stick	Endangered
6.	<i>Garcina Manni</i>	Chewing stick	Endangered
7.	<i>Erythrina Senegalensis</i>	Medicine	Endangered
8.	<i>Cassia nigricans</i>	Medicine	Endangered
9.	<i>Nigella sativa</i>	Medicine	Endangered
10.	<i>Hymenocardia acid</i>	General	Endangered
11.	<i>Kigelia Africana</i>	General	Endangered
12.	<i>Oncunbaca aubrevillei</i>	Trade-medical	Almost extinct
B. Animals			
1.	<i>Crocodylus nicoticus</i>	Food/medicine/bags	Endangered
2.	<i>Osteolaemus tetapis</i>	Food/medicine	Endangered
3.	<i>Struthio camelus</i>	Food/medicine	Endangered
4.	<i>Psittacus erithacus</i>	Medicine/pet	Endangered
5.	<i>Ceriopithecus C.</i>	Food	Endangered
6.	<i>Laxodonta Africana</i>	Food/Ivory	Endangered
7.	<i>Trichecus Senegalensis</i>	Food	Endangered
8.	<i>Giraffa camelopedalus</i>	Food/medicine	Endangered
9.	<i>Python Sabae</i>	Bags	Endangered
10.	<i>Gazelle dorcas</i>	Food	Endangered

Source: FGN (2010)

From the table it could be observed that many plants and animals species in Nigeria are endangered and some even extinct. The result is

that areas of forests vegetation are now classified as derived savanna due to excessive exploitation. There are also few remaining pocket of forest in the south while in the north forest reserves are under

pressure. In the case of wild animals, few are now found in the wild mostly due to habitat destruction. Most of the wild animals are found mainly in the national parks, game reserves and wild life sanctuaries.

The Nigerian Conservation Foundation (NCF, 2011) during the 20th anniversary of its only conservation center in Lagos, Lekki conservation centre decried the loss of biodiversity in Nigeria, which has a negative effect on the ecosystem and human population.

Strategies for harnessing Nigeria's biodiversity

Nigeria is very rich in biodiversity, however the last three decades; the biodiversity has been lost at an alarming and disturbing rate. The rate of loss has to be controlled and the country's strength on biodiversity be used in an integrated approach to national development as biodiversity has relevance to the country's development.

The following strategies are proposed to enable the country harness her rich biodiversity for integrated national development.

- i) The Federal Government should implement without further delay the National Biodiversity Strategy and Action Plan adopted in 1988 to restore Nigeria to 25% forest cover by the year 2020 and to make definite efforts to end gas flaring.
- ii) The budgetary allocation to the forestry sub-sector should be increased in order to boost national efforts at reforestation of deforested areas especially in the Middle Belt and Northern part of the country.
- iii) Since the nation's biodiversity of plants and animals can be harnessed as items of trade and investment, the biodiversity development should be properly identified, made available and backed with information and technological infrastructure to enable their cultivation and conservation.
- iv) All medicinal plants should be given special attention for conservation through the establishing Herbal Heritage Centres where local indigenous medicinal plants will be grown, conserved and cultivated for medicinal purposes.
- v) The activities of timber logging companies should be closely monitored and controlled

to ensure that tree species cut for timber are replaced by replanting. This will ensure sustained yield of the forest and revenue from the companies.

- vi) Forest and savannah vegetation that were cleared to make way for urban development projects such as roads, schools, housing estates etc. should be replaced to maintain a good environment in the urban centres.
- vii) The use of fire wood should be reduced through the provision of an alternative cheap source of domestic energy such as biogas which is widely accepted and used in developing countries. This will reduce the rate of deforestation, conserve our environment and improve the livelihood of the rural populace especially women.
- viii) Forest reserves especially in the northern part that is prone to desertification should be strictly kept as reserves. Laws should be enacted, so that no State governor in power has the right to remove the protection status on such reserves due to their ecological importance.
- ix) There is the need to provide adequate information about the medicinal plants and their uses to increase the rate of patronage by the people. There is also the need to provide easy access to finance for drug development in Nigeria. This is important as herbal products have become a source of wealth creation in other developing countries such as India, China etc.
- x) The governments especially at Federal and State levels should boost the ability of the traditional medicine practitioners to utilize science, technology and innovation to protect and harness biodiversity to standardize commercialized products and services that attract international acceptance as China, India and the two Koreas (Oladesu, 2011).
- xi) Government and regulatory bodies have a potent role to play in maintaining the biodiversity of the fragile Niger Delta. The government should ensure that the extracting companies comply with the oil and gas laws while the companies should try as much as possible to avoid oil

- spillage, oil leakages, forest fires and gas flaring.
- xii) Environmental laws that control the management of several plant and animal species should be updated and its enforcement adequate enough to punish offenders and serve as deterrent to others.
- xiii) The activities of local farmers that are harmful to biodiversity such as bush burning; shifting cultivation and even hunting should be monitored and controlled. This can be through public enlightenment campaigns highlighting the negative impacts of their actions and importance of maintaining biodiversity.

Conclusion

The biodiversity of plants and animals are very important to human development. It is in recognition of this that the United Nations declared the year 2010 as the International Year for Biodiversity. Over the years many countries of the world have been experiencing loss in biodiversity. This biodiversity loss is among the most serious environmental problem facing the world today (Adiaye). Nigeria's rich biodiversity is a great asset which if preserved and maintained would bring socio-economic opportunities for generations. What is required is therefore a balance between development aimed at upgrading the socio-economic status of the people and the conservation of the quality of our environment (NCF, 2011).

Nigeria's biodiversity is an important source of food, medicine, raw materials and items of trade. It holds great potential to transform the nations agricultural system terms and contribute to health care improvement, but also provide investment opportunities to assist poverty reduction, wealth creation and contribute to national socio-economic growth in an integrated approach to national development.

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