NIGERIA

FIRST NATIONAL BIODIVERSITY REPORT

JULY 2001

1.0 INTRODUCTION

Nigeria is located in the western part of Africa between latitudes 4° 16´N and 13°52´N; and between longitudes 2°49´E and 14°37´E. It occupies a total land area of 923,768km^2 with a population of 120million people. 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 ranges from about 450 mm in the northeast to about 3500 mm in the coastal south-east, with rains falling within 90 to 290 days respectively. The mean annual temperature ranges from 21°C in the south to 30°C in the north with extremes of 14°C and 45°C and an altitude range of 0 - 1000m above sea level.

At the current annual growth rate of 2.8%, the country's population may reach 150 million by the year 2010. Consequently, the demand for food, fuel-wood and other biological resources will experience a corresponding increase and this will lead to increased pressure on land, water and other resources. Thus the high rate of population growth is crucial among the set of factors that degrade the environment and threaten biodiversity in Nigeria.

Although Nigeria derives about 80% of its external earnings from the oil sector, agriculture contributes about 38% of the GDP. About 70% of the population derives their means of livelihood from agriculture, and the economy is characterized by a large rural based traditional sector. Furthermore, most of the rural poor derive their livelihood from wild species of biodiversity. The urban population also benefit from the exploitation of the country's biological resources, particularly in the construction industry.

Nigeria operates a federal system with 36 States and the Federal Capital Territory. There are **774** local governments at the third tier level, which support the Federal system. The country has over 250 ethnic groups with rich cultural endowment. The diversity of culture has considerable impact on biodiversity utilization and the level of protection. Natural and man-made threats including resource over-exploitation as well as direct and indirect consequences of socio-economic development have contributed to the erosion of biodiversity in the country.

Nigeria signed the Convention on Biological Diversity in 1992 and ratified it in 1994. It has since participated actively in the activities of the Convention and is committed to its objectives. The country, therefore, accords very high priority to a successful implementation of all articles of the Convention as a responsible member of the global community and in pursuit of sustainable development.

This report documents efforts of the Federal Republic of Nigeria geared towards achieving the objectives of the Convention, prepared through a participatory process in compliance with the obligations pursuant to Article 26 of the Convention and in keeping with decisions of the second and third Conferences of Parties to the Convention.

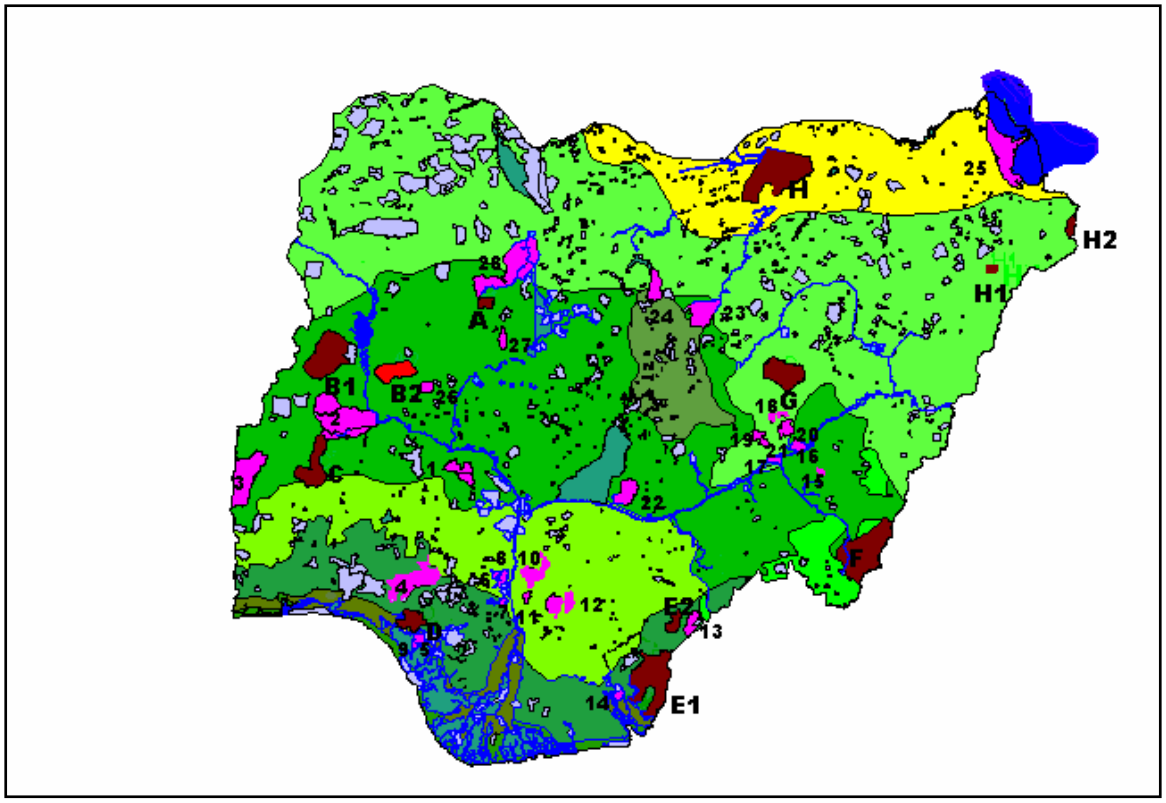
2.0 CURRENT STATUS OF BIODIVERSITY IN NIGERIA

2.1 Biodiversity Endowment

Nigeria is rich in Biodiversity. The country is 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. Of these animals about 0.14% is threatened while 0.22% is endangered. About 1, 489 species of microorganisms have also been identified (Table 1). All of these animal and plant 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. Most of the biodiversity sustain the rural economy.

Table 1: INVENTORY OF PLANT SPECIES

GROUPS OF PLA NTS	FAMILIES	GENERA	SPECIES
Algae	67	281	1335
Lichens	-	14	17
Fungi (Mushrooms)	26	60`	134
Mosses	-	13	16
Liverworts	-	16	6
Pteridophytes	27	64	165
Gymnosperms	2	3	5
Chlamydosperms	2	2	6
Monocotyledons	42	376	1575
Dicotyledons	172	1396	4636
Total	**338**	**2215**	**7895**



2.2 PROTECTED AREAS NETWORK

2.2.1 FIGURE 1: GAME RESERVES:

S/No.	Name of Reserve	Area	Location	Vegetation Type
1.	Ebbazikampe		Kwara State	Guinea Savannah
2.	Okpara		Oyo State	Rain Forest
3.	Upper Ogun		Oyo State	Dry Forest/G. Savannah
4.	Ohosu		Edo State	Lowland Rainforest
5.	Ologbo		Edo State	Lowland Rainforest
6.	Iri-Ada-Obi		Edo State	Lowland Rainforest
7.	Ologbolo-Emu-Urho		Edo State	Lowland Rainforest
8.	Orle River		Edo State	Lowland Rainforest
9.	Gilli-Gilli		Edo State	Lowland Rainforest
10.	Anambra		Anambra State	Rainforest/Derived S.
11.	Uddi/Nsukka		Anambra State	Lowland Rainforest
12.	Akpaka		Anambra State	Lowland Rainforest
13.	Obudu		Cross River State	Lowland Rainforest
14.	Stubbs creek		Akwa-Ibom	Mangrove/Swamp Forest

			State	
15.	Ibi		Taraba State	Guinea Savannah
16.	Wase Sanctuary		Plateau State	Sudan Savannah
17.	Wase Rock Bird Sanctuary		Plateau State	Sudan Savannah
18.	Pandam Wildlife Park		Plateau State	Sudan Savannah
19.	Pai River		Plateau State	Sudan Savannah
20.	Ankwe River		Nasarawa State	Sudan Savannah
21.	Damper Sanctuary		Nasarawa State	Sudan Savannah
22.	Nasarawa		Nasarawa State	Sudan Savannah
23.	Lama/Bura		Bauchi State	Sudan Savannah
24.	Kogin Kano		Kano State	Sudan Savannah
25.	Lake Chad		Borno State	Sahel Savannah
26.	Dagida		Niger State	Sudan Savannah
27.	Alawa		Niger State	Sudan Savannah
28.	Kwiambana		Zamfara State	Sudan Savannah

Nigeria's present-day National Parks and Game Reserves were originally forest reserves, first established in the early 1900s. The British colonial administration spearheaded the creation of game reserves to conserve wildlife to provide protein supplement and also for posterity (Table 2).

After a survey of the wildlife resources of West Africa in 1932, Col. A. H. Haywood recommend the establishment of game reserves in the savannah region of Nigeria, particularly in Borgu/Oyo; Wase/Muri and the Chafe/Kwiambana areas. He also recommended the establishment of Game Departments to coordinate wildlife management, enforce wildlife laws and project endangered species such as Chimpanzee (*Pan troglodyte*), Gorilla (*Gorilla gorilla*), Ostrich (*struthio camelus*), Rhinoceros (*Diceros bovornis*), Giraffe (*Giraffa camelopardalis*), Pigmy hippopotamus (*Choeropsis liberiensis*) and Water chevrotain (*Hyemoschus aquaticus*).

One important obstacle to wildlife conservation in Nigeria was that the conservation areas included traditional hunting grounds of several communities. This suggested that Nigerians should participate in wildlife enforcement since they are in the best position to convey conservation ideas to their people. It was then advocated that conservation should be limited to specific areas where there would be no conflicts with local interest

and all revenues earned from sale of hunting licenses and wildlife trophies should be ploughed back into conservation.

The Yankari Forest Reserve, with an area of 1, 280km^2, in Bauchi province, was demarcated and constituted a game reserve in 1956. The reserve was opened to the public in September 1962. The Borgu Forest Reserve with an area of 245km ^{2} was also demarcated and constituted a game reserve in 1963 by the Northern Nigeria government.

A comprehensive survey of the wildlife situation in Nigeria in 1962 showed drastic reduction in wildlife numbers when compared with neighbouring countries, a trend attributed to excessive hunting. This led to a recommendation preventing hunting or capture of all species threatened with extinction, a strict limit to the hunting of species with low or reduced numbers, a ban on night, hunting and establishment of closed hunting seasons. Furthermore, it was recommended that the establishment of more game reserves, and of a wildlife advisor board with professionally trained ecologist to protect wildlife resources should implement management programmes, Research and public should be intensified in the vicinity of Lake Chad, Jos Plateau, Lafia (north of River Benue), Mambilla and Obudu, (for gorillas and chimpanzees), Cross River, Upper Ogun and Gilligilli and should be designated as game reserves.

On 23 September 1975, the area formerly known as Borgu Game Reserve together with the adjacent Zugurma Game Reserve were declared as the Kainji Lake National Park, and the decree for the establishment of this park was eventually promulgated in 1979, with a Board of Trustees in 1991, the Federal government created five more National Parks, namely: Gashaka Gumti National park, Old Oyo National Park, Chad Basin national Park, Cross-River National Park and Yankari National Park and together with Kainji Lake National Park, came under the management of the National Parks Service. Decree 46 of 1999 created two new national Parks, Okomu National Park and Kamuku National Park. There are now a total of eight national parks and 28 game reserves in the country (figure 1).

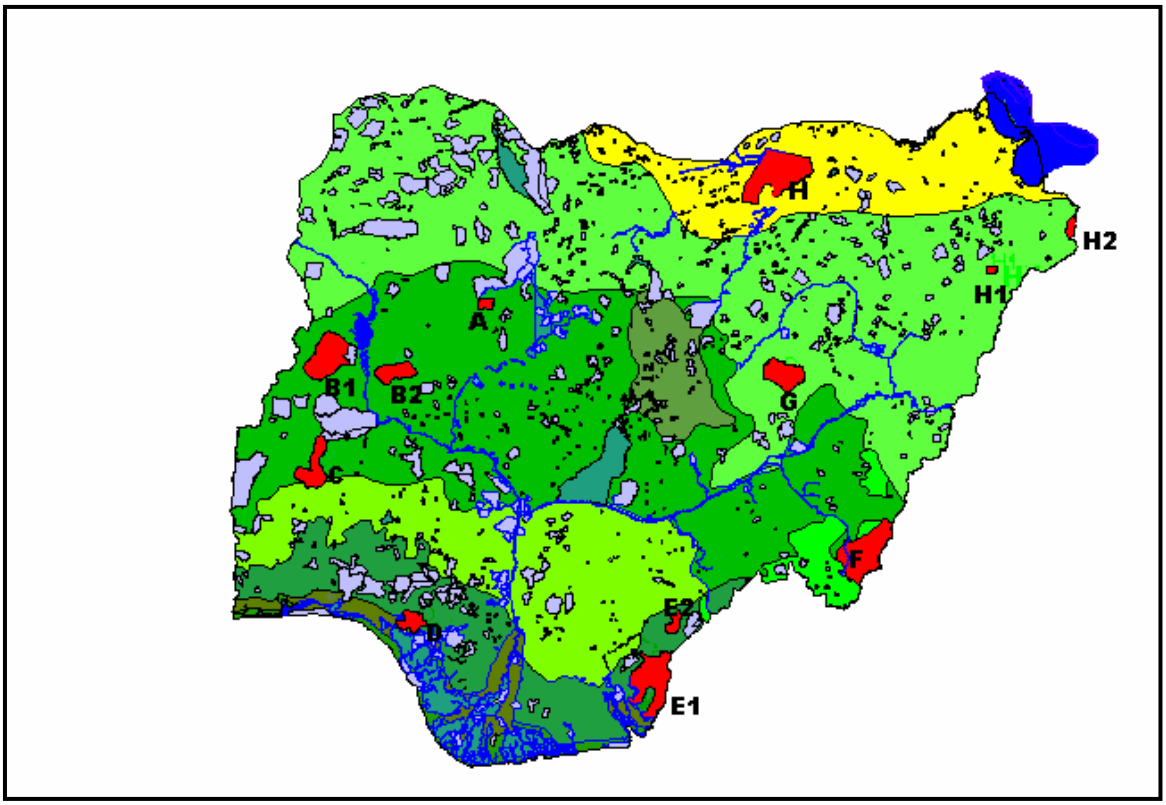


FIGURE 2: NIGERIAN NATIONAL PARKS

KEY TO NATIONAL PARKS MAP:

S/No.	Name of Park	Area	Location	Vegetation Type

A.	Kamuku National Park	121, 130 ha	Kaduna State	Guinea Savannah
B1 B2.	Kainji National Park (Borgu Sector) Kainji National Park (Zugurma Sector	532, 000 ha	Niger State	Guinea Savannah
C.	Old Oyo National Park	253, 000 ha	Oyo State	Dry Forest/G. Savannah
D.	Okomu National Park	200 ha	Edo State	Lowland Rainforest
E1. E2.	Cross-River National Park (Oban Division) Cross-River National Park (Okwango Division)	400,000 ha	Cross-River State	Lowland Rainforest
F.	Gashaka Gumti National Park	6, 402, 480 ha	Taraba State	Guinea S/Montane
G.	Yankari National Park	225, 000 ha	Bauchi State	Guinea Savannah
H. H1. H2.	Chad Basin National Park (Hadejia-Nguru Wetlands/oasis Sector) Chad Basin National Park (Sambisa Sector) Chad Basin National Park (Chingurme-Duguma Sector)	230, 000ha	Borno State	Sahel Savannah

Nigeria's present network of protected areas includes a biosphere reserve, 8 national parks, 445 forest reserves, 12 strict nature reserves and 28 game reserves. Other sanctuaries and game reserves have been proposed. The total area of land under national parks is about 2.4million hectares. These game reserves were meant to conserve wild life and to supplement protein from domestic sources. Species that had priority for conservation then were identified to include chimpanzee (*Pan troglodytes*) lowland gorilla (*Gorilla gorilla*), ostrich (*Strutio camelopedalus*), Black Rhinoceros (*Diceros biocornis*) Giraffe (*Giraffa camelopardalis*), pigmy hippopotamus (*Choeropsis liberiensis*) and water chevrotain (*Hyemoschus aquaticus*). There is evidence that some of these have since become extinct and there is need for more species to receive special attention.

2.3 Threats to Biodiversity

2.3.1 Population Pressure

As already indicated, the population of Nigeria is expected to increase to about 150 million by 2010. This will result in increased demand for natural resources thereby posing threats to biodiversity. With increase in population and consequent increase in demand for biological resources, natural habitats are being destroyed for plantation establishment, irrigation, food and livestock production, and non-timber forest resources utilization.

Large areas of natural forests are being exploited for tree species such as the mahoganies, *Nauclea diderrichii (opepe), Terminalia ivorensis (Odigbo), Terminalia superba (Afara), Triplochiton sceleroxylon (Obeche)* and others known in international market. High intensity of logging and illegal exploitation of these and other species has continued to pose serious threats to the country's forest resources.

Non-timber forest products (NTFPs) are used for food, medicines, oil, resin, tannin, household equipment, fuelwood, and furniture and building materials. The subsistence rural dwellers have continued to exploit these products for income generation. NTFPs varieties of other economic uses include the rattan cane *(Laccosperma sedndiflora*) chewing sticks (*Garcinia manii*) wrapping leaves such as *Thaumatococcus danielli* which also produces fruits that are sweeter than sugar. *Triplochiton sceleroxylon* is known to be hosts of the larvae of *Enaphae venata a moth* species which apart from producing cocoons that are good material for local silk ("*Sanyan"*) they are also good sources of animal protein to both the urban poor and rural dwellers.

There has been an increasing trend in the use of medicinal plants amongst both urban and rural dwellers. This trend has grave consequences on the survival of some plant species. This is because of the unsustainable manner in which many species are harvested. Furthermore, the downturn in the economy and inflationary trend has led to the excessive harvesting of non-timber forest products for various uses. Some of these species are now threatened. Examples are H*ymenocardia acida, Kigelia africana, and Cassia nigricans*

2.3.2 Threatened Biodiversity Species in Nigeria:

SPECIES	MAIN USES	STATUS
A. **PLANTS**		
Milicea excelsia	Timber	Endangered
Diospyros elliotii	Carving	Endangered
Triplochiduiton scleroxylon	Timber	Endangered
Mansoiea altissinia	Timber	Endangered
Masilania accuminata	Chewing stick	Endangered
Garcina manni	Chewing stick	Endangered
Oucunbaca aubrevillei	Trado-medical	Almost Extinct
Erythrina senegalensis	Medicine	Endangered
Cassia nigricans	Medicine	Endangered
Nigella sativa	Medicine	Endangered
Hymenocardia acida	General	Endangered
Kigelia africana	General	Endangered
B. **ANIMALS**		
Crocodylus niloticus	Food/medicine/bags	Endangered
Osteolaemus tetraspis	Food/medicine	Endangered
Struthio camelus	Food/medicine	Endangered
Psittacus erithacus	Medicine/pet	Endangered
Cercopithecus erythrogaster	Food	Endangered
Loxodonta africana	Food/Ivory	Endangered
Trichecus senegalensis	Food	Endangered
Giraffa camelopedalus	Food/medicine	Endangered
Python sabae	Bags	Endangered
Gazella dorcas	Food	Endangered

2.3.3 Agriculture and Habitat Destruction

Agriculture in Nigeria is largely based on traditional technology. Shifting cultivation remains a major farming system among the peasant farmers who produce over 90 per cent of total food supplies. The farming method is a primary cause of habitat destruction. This is because it is characterized by vegetation destruction short fallow periods and unequal access to farmlands.

Large scale plantation establishment of cash crops as well as indiscriminate bush burning and overgrazing also lead to habitat destruction for indigenous species of plant and animals occurring in narrow ecological ranges. The area devoted to grazing in the country rose from 166, 326km^2 in 1978 to 187, 236km^2 in 1995. Because most of the cattle are concentrated in the semi-arid zones that support 90% of cattle, the area is subjected to overgrazing, indiscriminate bush burning and shortage of fodder.

Other causes of habitat destruction include increasing economic development, desertification, drought, and other man-made disasters like mineral prospecting and oil spillage. Continuous threats from these sources lead to increased pressure on biodiversity and possible extinction of some species.

2.3.4 Genetic Erosion

A substantial loss of species diversity (intra and infra-specific) is due to habitat destruction resulting from land clearance for various uses. Forest exploitation and vegetation clearance are the major causes of natural gene-pool loss as is occurring in many species including i*rvingia gobanensis* and *I. Wombulu* in the rainforest and Niger Delta. Most species that were originally diverse in Nigeria are becoming rare.

The use of only improved varieties of crops and the complete neglect of local varieties and the land races also lead to loss of biodiversity. A major example of this is the use of improved okra (*Abelmoscus esculentus*) in place of the native materials of the tall okra (*A. caillei*) that is popularly known to be sensitive to day-length. Local varieties including sword bean *(Canavalia ensiformis)*, African yam bean *(Sphenostylis stenocarpa*) and Lima beans *(Phasceolus lunatus*) are now becoming extremely rare, as only improved cowpea *(Vigna unguiculata)* is being cultivated in many farms.

Similarly, *Dioscorea dumetorum*, *Dioscorea bulbifera*, *Trichosanthis* species, (Snake tomato), and *Digitaria exilis* (Hungry rice – 'acha') are no longer in popular cultivation. Restricted planting of many other popular crops have also been reduced and they have been replaced with commercially improved varieties, thereby causing the loss of important gene resources of these plants.

Grazing pressure, fire, and excessive use of systemic herbicides, including pollution are other factors that affect biodiversity loss. Fire destroys large areas of forest ecosystems annually with the elimination of sensitive species such as *Afromosia laxiflora, Ceiba pentandra, Entada abyssinica, Hildegardia barteri*

and Holarrhera wulfbergia. Although fire is a natural phenomenon in the savanna, it is steady entering the rainforest.

Indiscriminate hunting of wildlife for food to compliment subsistence farming and bush burning leads to loss of biodiversity and also depletes the ecosystem by causing death of wildlife; destruction of eggs and plant species, while illegal grazing of livestock in game reserves constitutes a threat to wildlife itself.

2.3.5 **Causes of Biodiversity Loss**

Available evidence shows that biodiversity is being lost at a disturbing rate in Nigeria. The causes of biodiversity loss are largely related human factors. These are due to interaction with the environment for development, improved quality of life resulting from industrialization, technological advancement and rapid growth in urbanization.

The indirect causes of biodiversity loss in Nigeria include the following: economic policies, rising demand for forest products, cultural practices, poor law enforcement and weak laws. Factors such as rapid urbanization, increasing human population and trade in forest products have collectively increased the demands for forest products. For example, increased export demands for primates and birds for research and trade in timber and non-timber species are indirect causes of biodiversity loss in various parts of the country. Low budgetary allocation to the forestry sub-sector has curtailed national efforts to reforest large areas that have been deforested. Consequently, the allowable timber cuts are not replaced hence sustained yield of the forests cannot be attained. Continued timber cut without replacement indirectly leads to biodiversity loss.

Cultural practices that encourage the use of specific species for festivals often limit the population of species particularly occurring under narrow ecological range. 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.

Direct causes of biodiversity loss are related to agricultural activities, bush burning, fuel-wood collection, logging, grazing and gathering. The introduction of cash crops like cocoa, coffee, rubber, cotton, groundnut and oil palm into the farming systems since the 1900s was a big impetus for massive deforestation of the natural ecosystems. For example, the land devoted to agriculture increased from 8.9 million hectares in 1951 to about 55.8 million hectares in 1995. The massive rate of deforestation is a direct cause of biodiversity loss.

Wood accounts for about 85% of domestic energy use in the country. Preference is often given to wood species with high calorific values that occur largely in the savanna and rainforest ecosystems of the country. Thus high depletion of fuel-wood species is easily notable in the savanna and rainforest ecosystems.

3.0 NATIONAL POLICY ON BIO-DIVERSITY CONSERVATION

3.1 Policy Framework

The national policy on conservation and sustainable use of biological diversity is an integral part of the national policy on environment. The policy was first developed in 1989 following the promulgation of the Federal Environmental Protection Agency (FEPA) decree no 58 of 1988 and revised in 1999. The decree provides the legal framework for the implementation of the policies on environmental protection, natural resources conservation and sustainable development. The national policy on conservation of biological diversity is aimed at:

(i) Integrating Biological Diversity considerations into national planning, policy and decision making; and
(ii) Conserving and enhancing the sustainable use of the nation's biological diversity.

With the creation of the Federal Ministry of Environment (FME) in 1999, FEPA was absorbed and the ministry became the highest policy making body responsible for addressing environmental issues in Nigeria, including conservation of biodiversity.

In pursuit of the policy objectives as enunciated, an overriding concern is to alleviate poverty and increase the *per* capita income of Nigerians. Consequently, the country has developed strategies and programmes for sound and sustainable management of biodiversity involving the most vulnerable groups particularly women and children. The strategies have been designed to promote sustainable and adequate levels of funding and focus on integrated human development programmes, including income generation, increased local control of resources, strengthening of local institutions and capacity building including greater involvement of community–based and non-governmental organisations, as well as the lower tiers of government as delivery mechanisms.

3.2 Legal and Institutional Framework

3.2.1 Legal framework

One of the significant outcomes of Nigeria's participation in the United Nations Conference on Environment and Development (UNCED) was the signing of the Convention on Biological Diversity. Nigeria, thus assumes obligations under the provision of the treaty in accordance with customary international law.

The Nigerian constitution makes fundamental provision for environmental protection and clearly identifies important components of environment. Section 20 of the constitution of the Federal Republic of Nigeria contains the country's environmental objectives that are meant, "*to protect and improve the environment and safeguard the water, air, land, forest and wildlife*".

In recognition of the need to protect her biological resources, Nigeria has put in place a number of legislations including the Forestry Ordinance the National Parks Decree, the Federal Environmental Impact Assessment Decree, and the Environmental Impact Assessment among others. An indicative list of laws and international signatories are shown (box 2):

Box 2: Environment Related International Conventions and Protocol signed and Ratified by Nigeria

- African Convention on the Conservation of Nature and Natural Resources, (Algiers)**,** 1968
- International Convention for the Prevention of Pollution of the Sea by Oil, 1954-62
- Convention on Fishing and Conservation of the living resources of the High Seas, 1985
- Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matters, 1972
- United Nations Convention on the Law of the Sea, 1982
- The RAMSAR Convention on the Conservation of Wetlands of International Importance, especially as Waterfowl Habitat, 1971
- The Convention Concerning the Protection of the World Culture and Natural Heritage, 1972
- Convention on International Trade in Endangered Species of Fauna and Flora, (CITES) 1973
- Convention on the Conservation of Migratory Species of Wild Animals, 1973
- Framework Convention on Climate Change, 1992
- Convention to Combat Desertification, 19.

Box 3: Environment Related National Legislations enacted by Nigeria

- Exclusive Economic Zone Decree no……of 1978;
- The Forestry Ordinance, 1937
- Wild Animal Preservation laws of 19
- Oil in Navigable Waters, Decree no. …… of 1968;
- FEPA decree no. 58 of 1988, 59 of 1992
- FEPA decree no. 59 of 1992
- EIA decree no. ……..
- National Parks decree no 1979, 1991, and 1999
- Sea Fisheries Decree 1971 and listing regulation of 1972;

- National Parks Decree, no. ….of 1991 and revised in 1999; and
- The Endangered Species (Control of International Traffic) Decree. No. 11 of 1983

3.2.2 **Institutional Framework**

A number of institutions and organizations have been designated to carry out activities that could facilitate the implementation of the Convention on Biological Diversity in Nigeria. The Federal Ministry of Environment coordinates the activities of these institutions. The creation of the Ministry is a deliberate design by the Federal Government to achieve a well-articulated, effective and efficient outfit that will adequately address and manage environmental issues in Nigeria in a holistic manner, devoid of duplication of efforts and competition among various government agencies.

The Federal Ministry of Environment has the responsibility to control land degradation including soil erosion, combat desertification, abate pollution, and embark on reforestation and conservation of biological diversity. The National Parks Service has the overall responsibility for the protection and conservation of biodiversity in the national parks. At the state level, equivalent bodies have been established for the protection of biological diversity and general environmental management. Private initiatives include the establishment of botanical/zoological gardens and support for biodiversity programmes through provision of financial grants. There has also been a marked increase in the number of Non-Governmental Organizations (NGOs) that are concerned with the environment and conservation of biological diversity. The prominent NGOs include the Nigerian Conservation Foundation (NCF), Forestry Association of Nigeria (FAN), Nigerian Environment Study/Acton Team (NEST), the Savannah Conservation, CENRAD and the Nigeria Field Society and Biodiversity Conservation and Development Programme. Table 3 describes the functions of various ministries and agencies.

Table: 3. Institutional Responsibilities for Biodiversity Conservation and Research in Nigeria

S/N	Institutions	Responsibilities
1.	Federal Ministry of Environment	➢ Advise Federal Government on all matters pertaining

		to the conservation utilization and regeneration of forests resources. ➢ Has an overall responsibility for environmental Management in the country. ➢ Protect and manage biodiversity/resources through stakeholder participation, and assist in the development of trained manpower to meet the demands of environmental management.
2.	Forestry Research Institute of Nigeria	➢ Improve genetic value of species of economic potentials, improvement of methods of cultivating, harvesting and processing of forest products. ➢ Improve knowledge of the ecology of plants and animals, the methods of pest control and management of biodiversity in natural forest. ➢ Integrate the cultivation of wild plants and wild animals of economic importance into the farming systems in different ecological zones to yield positive socio-economic benefits on the rural populations.
3.	State Ministries of Environment /Forestry Department	➢ Constitution and protection of forest lands through enforcement of relevant legislation ➢ Develop regeneration programmes and harvesting systems for biological resources.
4.	Local Government Department of Agriculture and Natural Resources	➢ Establish local Government Forest Reserves ➢ Mobilize rural communities to support environmental and conservation programmes.
5.	Ministry of Agriculture	➢ Support biodiversity conservation in grazing reserves through control of hunting and harvesting of plants. ➢ Encourage and promote the consolidation of scattered and fragmented farm holdings. ➢ Encourage production of agricultural crops and commodities to ensure food and nutrition security in the country and for export.
6.	Ministry of Water Resources	➢ Development of surface and underground water for multipurpose uses and management of water sheds.
7.	Universities/Technical schools	➢ Conduct research on the control and management of species under *in situ* and *ex situ* conservation methods. ➢ Train manpower for the execution of conservation

		programmes of government.
8.	Non-Governmental Organizations	➢ Support biodiversity Conservation through awareness campaigns, interpretive education and research.. ➢ Lobby governments to support environmental and Biodiversity conservation programmes. ➢ Direct participation in preparation and implementation of management plans, report writing and in seeking for international funds to support biodiversity conservation. ➢ Notable NGOs involved in biodiversity conservation in the country include Nigerian Conservation Foundation, (NCF), Forestry Association of Nigeria (FAN), Nigerian Field Society (NFS), Savanna Conservation (SC), Centre for Environment Renewable Natural Resources Management Research and Development (CENRAD) and Nigerian Environment Action Study Team (NEST), BDCP.
9.	Linkage Centre for Forest Conservation and Biodiversity (Federal Ministry of Environment/ University of Agriculture Abeokuta (UNAAB)	➢ Environmental monitoring of Conservation plots and agricultural lands. ➢ Wildlife domestication, aquaculture, and conservation of medicinal plants and lost crops. ➢ Research on species in Botanical and Zoological Gardens.
10.	National Institute for Pharmaceutical Research and Development (NIPRD)	➢ Ethno-botanical/Ethno-medical survey of medicinal and aromatic plants. ➢ Research and development of the active components of medicinal plants for industrial utilization and their conservation. ➢ Documentation, training and evaluation of herbal products and traditional medical practice.
11. (i)	Agricultural Based Research Institutions Rubber Research Institute of Nigeria (RRIN)	➢ Conservation of *ex situ* seed gene bank and life field gene bank ➢ In-situ Conservation of species of and rubber, *ex situ* seed gene bank, live field gene bank and in vitro for rubber

(ii)	Cocoa Research Institute of Nigeria (CRIN) Ibadan	➢ Conservation of *in situ* species of cocoa, *ex situ* seed gene bank, live field gene bank and in vitro for cocoa
(iii)	Nigerian Institute for Oil Palm Research (NIFOR) Benin	➢ Conservation of *ex situ* seed gene bank for all palms.
(iv)	National Cereals Research Institute (NCRI) Badegi	➢ Conservation of *ex situ* seed gene bank and live field gene bank for all cereals
(v)	National Root Crops Research Institute, Umudike	➢ Conservation of live field gene bank on farm for cassava, potato, sweet potato, ginger and coca yam
(vi)	Institute of Agricultural Research, Samaru Zaria	➢ Conservation of gene bank for various food crops.
(vii)	Institute of Agricultural Research and Training Moor Plantation, Ibadan	➢ Conservation of life gene bank for various crops for training and development.
(viii)	National Horticultural Research Institute Ibadan	➢ Conservation of seed gene bank life field in vitro for horticultural food crops.
(ix)	National Centre for Genetic Resources and Biotechnology, Ibadan	➢ Conservation of seed gene bank field gene bank in vitro for forest trees, fruit trees, vegetables and ornamentals.
(x)	International Institute of Tropical Agriculture (IITA) Ibadan	➢ Conservation of *ex situ* seed gene bank and field gene bank for agricultural crops, and multipurpose trees.
(xi)	Lake Chad Research Institute, Maiduguri	➢ Conservation and genetic improvement of cereals, *ex situ* seed gene bank and field gene bank.
(xii)	National Agricultural Extension and Research Liaison Services (NAERLS), Zaria	➢ Public awareness on the Conservation of crop gene banks on the field and the use of environmentally friendly agricultural practices.
(xiii)	National Animal production Research Institute (NAPRI) Zaria	➢ Conservation of gene banks in livestock species.
(viv)	National Institute for Freshwater Fisheries Research (NIFFR) New Bussa.	➢ Genetic improvements of freshwater fisheries and Conservation

4.0 NATIONAL BIODIVERSITY STRATEGY AND ACTION PLAN.

4.1 Summary of the Plan.

Nigeria started the process of preparing its own Biodiversity Strategy and Action Plan (BSAP) in 1995. The World Bank funded it as part of an Environmental Management Programme. The current draft is a result of a series of consultation with stakeholders through workshops at national and zonal levels.

The goal of the plan is to conserve and enhance the sustainable use of the nation's biodiversity and to integrate biodiversity-planning considerations into national policy and decision-making. It identified the biggest threat to conservation of biological diversity as poverty.

In the plan, emphasis is placed on *in situ* conservation through protected areas such as Forest Reserves, Game Reserves, National Parks and Wildlife Sanctuaries. Priority attention is placed on conservation of samples of ecological characteristics (montane, mangrove, wetland and rain forest, and endemic species across the country.

BSAP also contains specific priority actions for *ex situ* conservation of various species of plants and animals of distinct economic importance, including the re-introduction or rehabilitation of endangered species of plants and animals and the conservation of threatened and endangered species. The administrative and policy reforms contained in the plan provide a vehicle for achieving its conservation goal and objectives. It emphasizes the values inherent in individual, community and NGOs activities in Nigeria.

Finally, the Action Plan makes concrete provision for a programme of research, extension and education that will enhance the sustainable development of Nigeria's new legal instruments, institutional collaboration and responsive financial mechanism.

(i) Sustainable use of components of biological diversity especially the aspects concerning the protection and encouragement of customary use of biological resources in accordance with traditional cultural practices that are compatible with conservation and sustainable use requirements (Article 10);

(ii) Incentive measures for the conservation and sustainable use of components of biological diversity (Article 11);

(iii) Access to genetic resources (Article 15);

(iv) Access to and transfer of technology (Article 16); and

(v) Handling of biotechnology and distribution of its benefits (Article 19).

In addition, adequate strategies are yet to be identified and plans developed to address the gaps in the draft National Biodiversity Strategy and Action Plan (NBSAP). The gaps arose as a result of some constraints encountered in the course of preparing the document.

4.2 Constraints and Opportunities

The major constraint to the production of a comprehensive NBSAP in Nigeria is financial. However, the country recently sought and obtained assistance from GEF to update and complete the preparation of the plan. The purpose of the GEF support is to enable Nigeria address all the provisions (Articles) of the Convention in the NBSAP. The actual implementation of the NBSAP may also be limited by finance. Other perceived constraints include inadequate capacity, lack of database and poor understanding of the importance of biological diversity in the national economy. Support from international partners will go a long way in addressing these constraints.

Nigeria has a lot of opportunities for international investors, multilateral and bilateral donor agencies, the private sector and NGOs to participate in biodiversity activities. Among some of the activities identified in the NBSAP are:

(i) Wetland Conservation and Management;
(ii) Bio-prospecting;
(iii) Rehabilitation of degraded ecosystems;
(iv) Development of Biodiversity Centre in each Ecological zone;
(v) Support Zone Development of Protected Areas;
(vi) Management of National Parks;
(vii) Sustainable Fisheries management;

(viii) Agro-biodiversity;

(ix) Medicinal Plants Conservation;

(x) Captive breeding of a variety of animal species; and

(xi) Plantations of indigenous tree crops.

5.0 INTEGRATING BIODIVERSITY CONSERVATION INTO NATIONAL DEVELOPMENT

The Nigerian policy on environment places emphasis on mainstreaming biodiversity consideration into sectoral policies, plans and programmes. Specific actions concerning biodiversity are to be found in sectoral activities such as Forestry, Agriculture, Transport, Mining, Energy, Land use Planning, Protected Areas Management, Water Resources Management, Grazing Reserves Management, Tourism, wildlife conservation, Nigeria conservations strategy and Natural Resources

The main principal instruments for integrating biodiversity conservation into sectoral programmes in Nigeria is the Environmental Impact Assessment (EIA) Decree No. 86 of 1992. In implementing this law, the country has evolved a system of procedures and technical guidelines for sectoral programmes. These procedures and guidelines embrace biodiversity concerns especially in ecologically sensitive areas. Nigeria has one of the most developed procedures for EIA in Africa.

In the ***forest sector***, Nigeria's network of forest reserves contains very rich biological diversity requiring protection. The Forest Policy recognizes this necessity and has an overall goal to upgrade the forest management plans and expand the protected forest estates from 10% to 25% of Nigeria land area. Control of logging and the development of low-impact logging system are new priority actions of government.

With regard to ***agriculture***, agro-biodiversity is also receiving some priority attention from Government. Concerns presently are geared towards conserving and multiplying the lost crops indigenous to Nigeria and the West African sub-region. Such crops include yams, oil palm, sorghum, millet, cowpea, West African wild rice etc.

What is to be realised is the need to strengthen the capacities of Nigerian research institutes to enable them implement their mandates regarding the conservation of agro-biodiversity.

Effective ***land use planning*** has been recognized as a viable means to integrate biodiversity conservation and development. This is because it is based on integrated use whereby the lands are maximised to produce the highest number of benefits. Forests are simultaneously managed to conserve biodiversity, provide bio-products and protect the natural ecosystems.

Currently, land use planning in protected areas in the country is in accordance with the needs to sustain biodiversity and the environment. The protected forests are specific lands (enclaves) for conserving wild species of habitats and natural ecosystems. Conservation of wild flora and fauna also occurs in grazing reserves, fetish groves (anthropological reserves) and centres of *ex situ* conservation in the country. Nevertheless, the absence of a comprehensive national land use plan has posed serious threat to the Nigerian environment vis-à-vis the conservation of biodiversity. Even within the pockets of land units with sectoral land use plans, poor implementation and lack of review of plans have led to the degradation of the environment. This is because land use practices are hardly controlled as in the case of agricultural production.

Towards integrating biodiversity conservation and development, government is encouraging ***eco-tourism*** in many protected areas. The major objective of the National Park service in Nigeria is, therefore, to conserve biodiversity and ensure its sustainable use through interpretation of the mechanisms at work in the National Parks, enjoyment and understanding of the issues.

Protection of ***marine biodiversity*** is another entry point towards the integration of biodiversity conservation and development. Thus the National Maritime Authority is making concerted national efforts and the Department of Fisheries to discourage over-fishing especially shrimps so as to ensure effective conservation of marine life.

In addition, it is now a mandatory requirement of the National Planning Commission that there should be an environmental compliance statement, in which protection of biodiversity is explicitly expressed, for capital projects to be approved.

National effort to integrate biodiversity conservation and development is being strengthened through research and development in higher institutions. There are 16 agricultural research institutes in Nigeria with responsibilities for biodiversity monitoring and research. Similarly, all the 36 Universities have programmes on various aspects of biodiversity. Training needs for specialist areas of conservation professionals however need to be assessed.

Furthermore, the Ministry of Education has developed a national master plan on Environmental Education and Public Awareness in collaboration with the Federal Ministry Environment. The public awareness programme is being implemented through appropriate mass media instrumentalities and local modalities using relevant active NGOs. Nevertheless, skilled manpower is still inadequate and there is the need for short-term specialized training.

6.0 ACTIONS TO IDENTIFY AND MONITOR BIOLOGICAL DIVERSITY AND THEIR POTENTIAL IMPACTS.

Most of the actions taken to identify and monitor biological diversity and their potential impacts since Nigeria signed the Convention in 1992 are in the area of biodiversity information systems, biodiversity assessment and development of a set of biodiversity indicators.

6.1 Biodiversity Information and Data Bank

Nigeria has a fairly well developed body of database on biodiversity scattered in different sectoral agencies and non-governmental institutions. The sectoral database needs to be connected to a central node in the Ministry of Environment. The Ministry is presently in the process of establishing a viable network of information system. Towards this end, an

Environmental Data Bank Unit has been established but this would need to be upgraded and made viable.

6.2 Biodiversity Assessment

Nigeria is aware of the various standardized methodologies recommended for biodiversity assessment by UNEP. These standards have been applied for all current assessment going on in the country. These include periodic vegetation and land-use studies, forest and biodiversity surveys, land-use assessment, plant exploration and analysis. Some specific examples of these assessment activities include biodiversity country study, biodiversity surveys and vegetation and land use studies.

6.3 Biodiversity Country Study

The Biodiversity Country Study of 1992 described the status of biodiversity conservation in Nigeria. It was the first national attempt to put together in one volume all available information on biodiversity in the country. The main objective of the study was to assess the total costs and benefits and the unmet needs of biological diversity conservation and rational use in Nigeria. In addition to providing an overview of the status of biodiversity in terms of conservation efforts and future needs, the study established priority areas of biodiversity conservation in the country.

6.4 Biodiversity Surveys

Biodiversity surveys in Nigeria have come in various forms such as botanical surveys, zoological surveys, forest resources surveys, wildlife inventory and aquatic resources surveys. Results of such surveys have been utilized in the preparation of Conservation Strategies and Action Plans. The following Conservation Strategies and Plan have benefited from the result of such surveys:

(a) National Conservation Strategy – 1985
(b) Natural Resources Conservation Action Plan – 1992

(c) National Biodiversity Strategy and Action Plan – 1998

(d) State Environmental Strategy and Action Plan – 1997.

Nigeria however needs to make the surveys continuous and systematic as different from the existing practice of discontinuous assessment. Under the State of the Environment Assessment and Reporting Programme, the country is placing special attention on biological diversity, forests and coastal and marine resources. The programme commenced in year 2001 and is expected to provide input into the UNEPS's Global Environment Outlook.

6.5 Vegetation and Land Use Studies

The First National vegetation and land-use studies were carried out in 1976. The study revealed that the natural vegetation was altered by human activities such as grazing, cultivation, bush burning and logging over long period of time. The disturbances on the vegetation have resulted in the complex patchwork of vegetation with different ages and forms particularly in the densely populated areas. The 1976 studies were updated through another study in 1995. The study shows drastic changes in the vegetation over those of 1976. The highlights of these are shown in Table 4:

Table 4: CHANGES NIGERIAN IN VEGETATION FROM (1976 – 1995)

S/N	MAJOR VEGETATION TYPE	DECREASE IN AREA (km^2)
1.	**Savanna** Guinea Savannah Sudan Savannah Sahel Savannah	 69, 907 32, 186 Significant increase.
2.	**Forest** Undisturbed forest Disturbed forest Riparian forest	 13, 837 4, 417 2, 147
3.	**Mountainous Vegetation** Mountain forest Mountain grassland	 No change 1, 373

4.	**Grasslands** Continuous grassland Discontinuous grassland	 Increased by 6, 955 Increased by 5, 111
5.	**Flood Plain Marsh/Swamp** Shrub Swamp Grass March	 7, 651 4, 011
6.	**Coastal Vegetation** Freshwater Swamp Mangrove forest Tidal flats/Saltwater Marsh	 1, 817 9, 994 541
7.	**Exposed Areas** Gully Erosion Sand Dunes Rocks outcrops	 18, 395 4, 017 1, 208
8.	**Reservoirs** Reservoirs	 Increased by 1, 561

Source: Geomatics, 1998

7.0 INTERNATIONAL COOPERATION

Nigeria believes that collective efforts at the sub-regional, regional and global levels are crucial to achieving the conservation and sustainable use of biodiversity and the equitable sharing of the benefits from these resources.

Nigeria has participated actively in the initiation and negotiation of bilateral and multilateral agreements, treaties and conventions at the sub-regional, regional, and international levels. The country has also made efforts at implementing such instruments at the national level.

7.1 Sub-Regional Level

Through the Economic Community of West African States (ECOWAS), Nigeria has participated actively in the development and implementation of initiatives on the conservation of biological diversity in the sub-region. Such initiatives include Water Conservation, Agriculture and Aquatic waterweeds Control Projects and the UNIDO supported Gulf of Guinea Large Marine Ecosystem Project (GOGLME). The country has also participated in the elaboration of Sub-Regional Action Plans (SRAP) on

desertification control under the UN Convention to Combat Desertification (CCD). In addition, it has also participated in the development of the African elephant conservation plan for the species in the sub-region and is helping in the development of some bilateral sub-regional projects relevant to biodiversity conservation. As a member of the Lake Chad Basin Commission, Nigeria is participating with other countries in the Chad Basin, in the Conservation of the resources of the Lake Chad.

7.2 Regional

At the regional level, Nigeria is working to forge partnership for the benefit of biodiversity conservation in the African region. Some of these activities include the FAO initiative on Plant and Genetic Resources Development for Food and Agriculture. The country recently collaborated with UNEP to host the 8th session of the African Ministerial Conference on Environment. At the 4th Conference of the Parties to the Conservation on Migratory Species of Wild Animals in November 1999, Nigeria signed the Memorandum of Understanding on the Conservation of Sea Turtles of the Atlantic Coast of Africa including Macronesia and was appointed focal point for the species.

7.3 Global

Nigeria has signed and ratified a number of biodiversity-related Conventions and Protocols and government has as a matter of policy ensured the implementation of the provisions of these Conventions, Protocols and Agreements at the national level.

8.0 MEANS OF IMPLEMENTATION

8.1 POLICY FRAMEWORK

To meet the overall goal of Biodiversity conservation in Nigeria and in consonance with Articles 1, 3, 5, 6, 18, 20 and 21 of the Convention, technologies and capabilities are being developed to protect endangered ecosystems, especially watersheds, fresh water and high forests. Deliberate attempts are on going to enhance the yield of indigenous and exotic species facing high economic demand, to sustain their supplies and improve the survival of their substitutes (through biotechnology, tissue culture and LMOs). The sustainable utilization and management of the fragile soils for the perpetuation of species

of economic, medicinal and genetic conservation values has to be embarked upon. Conscious efforts are being made to regulate the use of water resources and protect forest watersheds, habitats and wetlands.

8.2 **Manpower Development**

There is a dearth of trained professionals in biodiversity conservation and in keeping with Articles 12 of the Convention; the curricula in the relevant department of the various Universities and other institutions of higher learning need to be redesigned to address the needs of training professionals in biodiversity conservation in the country.

There is also the need for in-service and short-term specialized training in biodiversity conservation for the support staff in the various aspects of their functions.

8.3 **Financial Resources and Mechanism**

The funding strategies for biodiversity conservation need to be reviewed to ensure adequate financial allocation to the Federal Ministry of Environment and other relevant establishments. This will be in consonance with Articles 20 and 21 of the Convention. Additional resources need to be mobilized from the Ecological Funds and Forestry Trust Funds (as being operated in Ondo, Oyo and Cross-River states). Others are resources from multilateral agencies, NGO's, CBO's and the private sector.

8.4 **Legal Reforms**

In consonance with Articles 4, 15, 16, 17, 22 and 42 of the convention, Nigeria has embarked on the review of biodiversity related laws. This is done through a consultative process involving the Federal Ministry of Justice (FMJ), the Law Review Commission and the Nigerian Institute for Advanced Legal Studies, the Federal Ministry of Environment, the National Assembly and other relevant stakeholders.

8.5 Technology

Conservation of biodiversity requires the development and application of appropriate technology, particularly in research, education, ex-situ conservation, and information management and risk analysis. Such technology is not available in Nigeria and therefore need to be acquired.

8.6 Public Education and Awareness

In line with Article 13 of the Convention, the Federal Ministry of Environment as Focal Point, is collaborating with the Federal Ministry of Information (FMI), the Broadcasting Organization of Nigeria (BON) and the Newspapers Proprietors Association of Nigeria (NPAN), the Nigerian Guild of Editors (NGE), among others, through appropriate mass media instruments to achieve public education and awareness on the value of biodiversity and the need for their conservation and sustainable use.

9. FUTURE PROSPECTS

Acquisition of appropriate technology (biodiversity etc) to fully implement the enabling activities, PRA preparation of projects e.g. GEF for support by International and National mechanisms.

10. CONCLUSION

Without doubt Nigeria is richly endowed with diverse flora and fauna. These vital resources are presently threatened by increased population pressure and intensified human development activities. These activities have been of major concern to political leaders, policy analysts, ecologists and economic managers who realize that natural resources are the backbone of industry. Consequently government has adopted the policy of integrated conservation and sustainable use of the nation's biological diversity, with a view to promoting greater awareness of the value of biodiversity.

In line with Article 6 of the Convention, Nigeria has integrated biodiversity concerns into her environmental policy and in developing the National Biodiversity Strategy and Action Plan. The country has also taken steps to integrate biodiversity considerations into the various sectors of the economy. The major constraints identified in conserving biodiversity include the dearth of trained/skilled manpower, appropriate technology, and inadequate funds to implement the various biodiversity programmes. What Nigeria requires is enhanced cooperation at the local, regional, and global levels to ensure the conservation and sustainable use of her rich biodiversity and ensuring equitable sharing of the benefits derivable from these resources. A successful effort will no doubt influence development in the West African sub-region, and so enhanced international cooperation will be vital.

APPENDIX 1: SELECTED PLANTS COMMONLY USED IN NIGERIA **

NAME	PART USED	HOW USED
Afromomun danielii	Ripe fresh fruit pulp and seed	Fruit pulp and seed eaten seed raw
Aframomum baumannii	Ripe fresh fruit pulp only	Used as spice in food or chewed as stimulant
Aframomun sceptium	Fruit and seed	Ripe fruit pulp and seed eaten raw
Aframomun melegueta	Fruit pulp and seed	Spice for eating cola nut (peppery taste)
Anchomanes difformis	Rhizome	The rhizome is everywhere (BI) eaten in time of scarcity but only after special preparation
Ancistrophyllum secondiflorum	Fresh terminal bud	Fresh terminal bud is eaten raw
Annonidium mannii	Fruit	The fruit is well fleshed is edible and has a sweet sour taste.
Annona senegalensis	Leaves	Leaves are good strengthening food for human and horse flowers are used for flavoring food. Ripe fruits is edible, has a pleasant flavor.
Ancrocaryon waneanum	Fruit flesh	Fruit flesh edible with an acid taste, seed-oily and edible
Balanites egyptica	Leaves	The leaves are eaten as a vegetable
Boerhavia diffusa	Leaves	The leaf is used occasionally as course kind of pot-herb in soup
Canarium schweinfurthii	Fruit pulp	Ripe fruits are soaked in hot water to soften the pulp which is eaten
Carpobia lutea	Fruit pulp	Ripe fruit pulp eaten raw
Ceiba pentandra	New leaves	Used as vegetable for soup by Igbo people
Cerototheca seasamoides	Leaves	Used as soup vegetable and used along with other food stuffs for the sake of its mucilaginous activity
Chrysophyllum albidum	Fruit and seed mucilage	Ripe fruit pulp eaten raw
Chrysophylum perpulchrom	Fruit pulp	Sweet fruit pulp eaten raw
Coula edulis	Seed	Seed kernel ground and used as condiment
Crytosperma	Leaves	The leave are eaten as a Senegalese vegetation in Gabon and young leaves are eaten in orlu area as vegetable
Deiinbollia pinnata	Seed mucilage	Seed mucilage is sucked
Detarium senegalensis	Seed kernel	Seed kernel powder used as condiment in soup

Detarium microcarpa	Seed kernel	Seed kernel powder used as condiment in soup
Detarium microcarpa	Seed kernel	Seed kernel powder used as condiment
Diaium guineensis	Seed kernel	Seed kernel powder used as condiment
Dissotis grandifotia	Root stock	Mature (dry) fruit pulp is eaten raw. The tuber root contains sugar, which is extracted as follows: the roots are washed and half dried in the sun beaten in a mortal and steamed. When cool they are squeezed by hand and the juice obtained is used as substitute for sugar, it also used to produce a fermented beverage.
Emilia sonchifolca	Leaves	Leaves used as vegetable
Eribroma oblanga	Seed	Seed roasted and eaten
Garnicinia kola	Bitter seed	Seed chewed like cola nut
Gongronema latifolim	Leaves	Leaves used as vegetable has slight bitter taste
Gymnema syvestris	Leaves	Leaves chewed as sugar-free diabetic diet
Heinsia crinita	Leaves	Leaves used as soup herb
Irvingia gabonensis	Fruit pulp, seed kernel	Ripe fruit pulp is eaten var dulcislike mango fruit seed kernel is ground and used as soup thicker. Ground seed kernel used as a soup thicker.
Irvingia wombulu	Seed kernel only	Seed kernel powder used as var excelsa soup thickener – condiment
Lasinanthera africana	Leaves	Leaves are used as soup herb
Landolphia duicis	Fruit	Edible in vegetables taste
Landolphia hirsita	Fruit	Fruit occasionally eaten
Londophia owariensis	Fruit pulp	The fruit pulp is edible and is esteemed in all areas and is recorded as a source of vitamin in various areas. It is fermented to give an alcoholic drink.
Lannea acida	Young leaf, fruit pulp	Young leaves are eaten in W. Africa fruit pulp is edible
Lannea welwitshii	Fruit	Fruit pulp is eaten in Zaira
Leptadenia arborea	Fruit	Fruit eaten when ripe
Leptadenia hastate	Leaf, young shoots and flowers	The leaves, young short and flowers are eaten usually cooked and in soups
Monathotaxis laurentii	Fruit	Fruit is edible
Monathotaxs vogelli	Fruit	Fruit is edible
Monadora myristica	Seed	Seed roasted, ground and used as condiment in pepper soup
Mondora tenuifolia	Seed	Seed, roasted ground and used as condiment in pepper soup preparation
Napoleona vogelli	Fruit pulp	Ripe fruit pulp and seed mucilage are

		sucked
Parkia biglobosa	Seed	Seed is roasted, ground, mixed with oil and pepper and used to eat boiled yam, coco yam etc (by Ifunkpa people – Cross River State
Pergulaia daemia	Lead and Fruit	Leaves used as vegetable
Pentaclethra macrophylla	Seed kernel	Kernel of cooked seed is sliced, washed and allowed to ferment or a few days after which it is eaten as salad or used as condiment in other food preparation. The leaves and fruit are edible and used as spice in soup and other food all over Nigeria
Piper guineensis	Leaves and Fruit	The dried black berries and the fresh red fruits are used in flavoring soup, rice etc. The leaves taken with food are supposed to improve the chances of conception.
Portulaca olerace	Leaves	Used as vegetable
Saba florida	Fruit	Fruit pulp is eaten raw
Sclerocarpbirrea	Fruit	Fruit juice is boiled down to thick consistency used for sweetening guinea corn gruel only seed kernel is edible
Sroindela junglafidolia	Fruit	Ripe fruit is edible
Sorindela warneckii	Fruit	Ripe pulp sweet and edible
Spondia mombin	Fruit	Ripe fruit fresh edible and in the fruit is fermented into a kind of beer
Stereopermum kanthiamum	Fruit pod	
Trichoscypha	Fruit pulp	Ripe fruit pulp is sweet and is widely eaten
Tranthema portulacastrum	Leaves	Used as vegetables
Uraria chamae	Fruit pulp	Pipe fruit is sweet and is widely eaten

APPENDIX 2: STATUS OF WILDLIFE IN NIGERIA

(a) Surveys on the status of wildlife in Nigeria have been few. Hunting and habitat loss have lead to serious impacts on wildlife population. However, the effect of hunting on wildlife populations cannot be easily predicted and assessed. This is because different species react differently to hunting pressure and disturbances as a result of hunting and other human activities. Some species, which has withstood hunting pressure, are they cutting grass and R*icetomys* spp and the giant rat in some species with Nigeria as the western limit of their hunting alone.

(b) The following is a list of wildlife species classified as rare, threatened or endangered:

S/N	ORDER	FAMILY	COMMON NAME	SCIENTIFIC NAME	STATUS
1.	Chelonia	Pteomedusidae	African keeled mud turtle	Pelosiso carinus	Endangered
2.			West African Mud turtle	Pelusions castaneus	Endangered
3.			African dwarf Mud turtle	Pelusions nanus	Endangered
4.			William's African Mud turtle	Pelusions williamsi	Endangered
5.		Trionychidae	Abry's flapshell turtle	Cycloderma aubryii	Endangered
6.			Namibian flapshell turtle	Cyclonorbis elegans	Endangered
7.			Senegal flapshell turtle	Cyclonorbis senegansis	Endangered
8.		Dermochelidae	Leatherback turtle	Dermochelys coriacea	Endangered
9.		Chelonidae	Green turtle	Chelonia mydas	Endangered
10.			Olive ridley	Lepidochelys olivacea	Endangered
11.			Hoaksbill turtle	Eretmochelys imbircata	Endangered
12.	Crocodylia	Crocilidae	crocodylusni	Nile crocodile	Endangered
13			Slender snouted crocodile	Crocodylus catapractus	Endangered
14.			African dwarf crocodile	Osteolamus tetrapis	Endangered
15.	Squamata	Veranidae	Nile monitor lizard	Varamus niloticus	Endangered
16.			Monitor lizard	Varanus exanthematicus	Endangered
17.		Pythonidae	Royal python	Python regius	Endangered
18.			Rock python	Python sebae	Endangered
19.	Struthioniformes	Struthionidae	Ostrich	Struthio camelus	Endangered
20.	Pelecaniformes	Pelethronodae	Pink-backed pelican	Pelecanus rufescens	Endangered
21.	Coconiformes	Adeidae	Grey heron	Ardea cinerea	Endangered
22.			Goliath heron	Ardea goliath	Endangered
23.			Breen heron	Bruorides virescens	Endangered
24.			Purple heron	Ardea purpurea	Endangered
25.			Great egret	Egretta alba	Endangered
26.			Little egret	Egretta garzetta	Endangered

27.			Cattle egret	Ardeola ibis	Endangered
28.			Squocco heron	Ardeola rolloides	Endangered
29.			Black-crowned night heron	Nycticorax nycticorax	Endangered
30.		Scopidae	Hammercop	Scopus unbretta	Terminated
31.		Ciconidae	White stork	Ciconia ciconia	Endangered
32.			Abdim's stork	Ciconia abdimii	Endangered
33.			Saddle-billed stork	Ephippiorhynchus senegalensis	Endangered
34.			Marabou stork	Leptoptilus crumeniferus	Endangered
35.			Wood ibis	Ibis ibis	Endangered
36.		Threskiornithidae	African spoonbill	Platelea alba	Endangered
37.			Sacred ibis	Threskiornis aethiopica	Endangered
38.			Glossy ibis	Plegadis falcinelus	Endangered
39.			Hadada ibis	Bostrychia hagedash	Endangered
40.	Falconiformes	Accipitaridae	Nubian vulture	Aegypius tracheliotus	Endangered
41.			Rappel's griffon vulture	Gyps ruppellii	Endangered
42.			White-backed vulture	Gyps bengalensis	Endangered
43.			Palm-nut vulture	Gypohierax angolensis	Endangered
44.			Hooded vulture	Neophron monachus	Endangered
45.			West African River Eagle	Haliaetus vocifer	Endangered
46.			Short toed eagle	Circaetus gallicus	Endangered
47.			Martial eagle	Polemaetus bellicosus	Endangered
48.			Bateleur eagle	Terathopius ecaudatus	Endangered
49.			Common buzzard	Buteo buteo	Threatened
50.			Montagua's harrier	Cyrcus pygargus	Threatened
51.			Goshawk	Accipitar genitilis	Threatened
52.			Sparrow hawk	Accipitar nisus	Threatened
53.		Falconidae	Hobby	Falco subbuteo	Threatened
54.			Kestrel	Falco innunculus	Threatened
55.		Sagisttariidae	Secretary bird	Sagittarius serpentarious	
56.		Phasianidae	Helmet guinea-fowl	Numida meleagris	Threatened
57.			Crested guinea-fowl	Guttera edourdi	Endangered
58.			Stone-Partridge	Ptilophacus petrosus	Endangered
59.		Gruidae	Crowned crane	Balearica pavonina	Endangered
60.		Otididae	Black-bellied bustard	Lissotis melanogaster	Threatened
61.			Senegal Bustard	Eupodotis senegalensis	Endangered
62.			Denham's bustard	Neotis dehami	Endangered
63.			Sudan bustard	Otis arabs	Endangered
64.	Columbiformes	Pteroclidae	Chesnut-bellied sandgrouse	Pterocles exustus	Threatened
65.			Pterocles quadricintus	Four-banded sadrouse	Threatened
66.	Pisttaciformes	Psittacidae	African grey parrot	Psittacus erithacus	Endangered
67.			Red headed love bird	Agapornispullaria	Endangered
68.			Senegal Parrot	Poicephalus senegalensis	Endangered
69.			Senegal long-tailed parakeet	Psittacula krameri	Endangered
70.	Coraciiformes	Alcedinidae	Giant kingfisher	Ceryle maxima	Threatened

71.			Blue-breasted kingisher	Halcyon malimbica	Threatened
72.			Malachite kingfisher	Alcedo cristata	Threatened
73.			Pied kingfisher	Ceryle rudis	Threatened
74.			Pigmy kingfisher	Ceryx picta	Threatened
75.			Senegal kingfisher	Halcyon senegalensis	Threatened
76.		Upupidae	Hoopoe	Upupa epos	Endangered
77.		Bucerotidae	Abyssianian Ground Hornbill	Bucorvus abyssinicus	Endangered
78.		Ploeceidae	Ibadan malimbus	Malimbus ibadansis	Endangered
79.			Black mountain weaver	Ploceus melanogaster	Endangered
80.	Primates	Cercopithecidae	Colobus monkey (guereza)	Colobus polykomos	Endangered
81.			Olive colobus	Procolobus verus	Endangered
82.			Red-eared Guenon	Cercopithecus erythrotis	Endangered
83.			Moustached Monkey	Cercopithecus cephus c.	Endangered
84.			Mona monkey	Cercopithecus mona	Threatened
85.			White throated monkey	Cercopithecus eruthrogaster	Endangered
86.			Patas monkey	Erythrocebus patas	Threatened
87.			Olive baboon	Papio anubis	Threatened
89.		Ceropithecus	White hosed monkey	C. Nictitans	Extinct
90.			Green (tantelus) monkey	C. aethiops	Extinct
91.			Rensis's monkey	C. preussi	Extinct
92.			Ground monkey	C. Poganis	Extinct
93.			Grey-checked mangabey	C. albigenia	Extinct
94.			Red-capped mangabey	C. torguatus	Extinct
95.			Drill baboon	Mandrillus leucocphaeus	Endangered
96.		Pongidae	Chimpanzee	Pan troglodytes	Endangered
97.			Western lowland gorilla	Gorilla gorilla	Endangered
98.	Pholidota	Manidae	Manis gigantean	Giant pangolin	Threatened
99.			Treep oangolin	Manis tricuspis	Threatened
100	Hystricomorpha	Hystricidae	Crested porcupine	Hystrix cristata	Threatened
101			Brush-tailed porcupine	Atherurus africana	Threatened
102	Carnivora	Canidae	Hunting dog	Lycaon pictus	Endangered
103			Side-striped jacka	Canis adustus	Rare
104			Pale fox	Vulpes pallida	Rare
105		Mustelidae	Honey badger	Mellivora capensis	Rare
106			Cape clawless otter	Aonys capensis	Rare
107		Viverridae	African civet cate	Civettictis civetta	Endangered
10			Cusimanse	Crossarchus crossarchs	Rare

8					
109		Hyaenidae	Spotted hyaena	Crocuta crocuta	Rare
110			Striped hyaena	Hyaena hyaena	Endangered
111		Felidae	Serval cat	Leptailurus serval	Rare
112			Caracal or desert lynx	Caracal caracal	Rare
113			Leopard	Panthera pardus	Endangered
114			Lion	Panthera leo	Endangered
115			Cheetah	Acinonyx jubatus	
116	Tubulidentata	Orycteropidae	Aardvark	Orycteropus afer	Endangered
117	Proboscidea	Elephanitidae	African bush elephant	Loxodanta africana africana	Endangered
118			African forest elephant	Loxodonta africana cyclotis	Endangered
119	Hyracoidea	Procaviidae	Rock hyrax	Procavia capensis	Rare
120			Three hyrax	Dendrohyrax	Rare
121	Sirenia	Trichechidae	Manatee	Trichechsu senegalensis	Endangered
122	Artiodactyla	Suidae	Red river hog	Potamochoerus aethipticus	Rare
123			Wart hog	Phocochoerus aethipicus	Threatened
124			Giant forest hog	Hylochoerus meinertzhagani	Endangered
125		Hippopotamidae	African hippopotamus	Hippopotamus amphibius	Endangered
126			Pigmy hippopotamus	Choeropsis liberiensis	Endangered
127		Tragulidae	Water chevrotain	Hymoschus acquaticus	Endangered
128		Giraffidae	Giraffe	Giraffa camelopardalis	Endangered
129		Bovidae	African buffalo	Cyncerus cafer cafer	Threatened
130			Dwarf buffalo	Cyncerus cafer nanus	Threatened
13			Water buck	Kobus ellipsiprymnus	Threatened

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132			Mountain reedbuck	Redunca fulvirufula	Endangered
133			Bohor reedbuck	Redunce redunca	Endangered
134			Giant eland	Taurotragus derbianus	Endangered
135			Western hartebeest	Alcelahpus *b. major*	Endangered
136			Roan antelope	Hippotragus equinus	Endangered
137			Korrigum (topi)	Damaliscus l. korrigum	Endangered
138			Western kob	Kobus kob kob	Endangered
139			Bush buck	Tragelahpus scriptus	Endangered
140			Sitatunga	Tragelahpus spekii	Endangered
141			Red-fronted gazelle	Gazella rufifrons	Threatened
142			Dorcas gazelle	Gazella dorcas	Endangered
143			Dama gazelle	Gazella dama	Endangered
145			Yellow-backed duiker	Cephalophys sylvicultor	Endangered
146			Red-flanked duiker	Cephalophus rufilatus	Endangered
147			Maxwell’s duiker	Cephalophus maxwellii	Endangered
148			Black duiker	Cephalophus niger	Endangered
149			Blue duiker	Cephalophus monticlla	Endangered
150			Bay duiker	Cephalophus dorsali	Endangered
151			Klipspringer	Oreotragus oreotragus	Endangered
151			Royal antelope	Neotragus pygmaeus	Endangered

APPENDIX 3: LIST OF CONTRIBUTORS

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