REPUBLIC OF CAMEROON

MINISTRY OF THE ENVIRONMENT AND FORESTRY

CONVENTION ON BIOLOGICAL DIVERSITY

NATIONAL REPORT 1997

UNEP

UNITED NATIONS ENVIRONMENT PROGRAMME

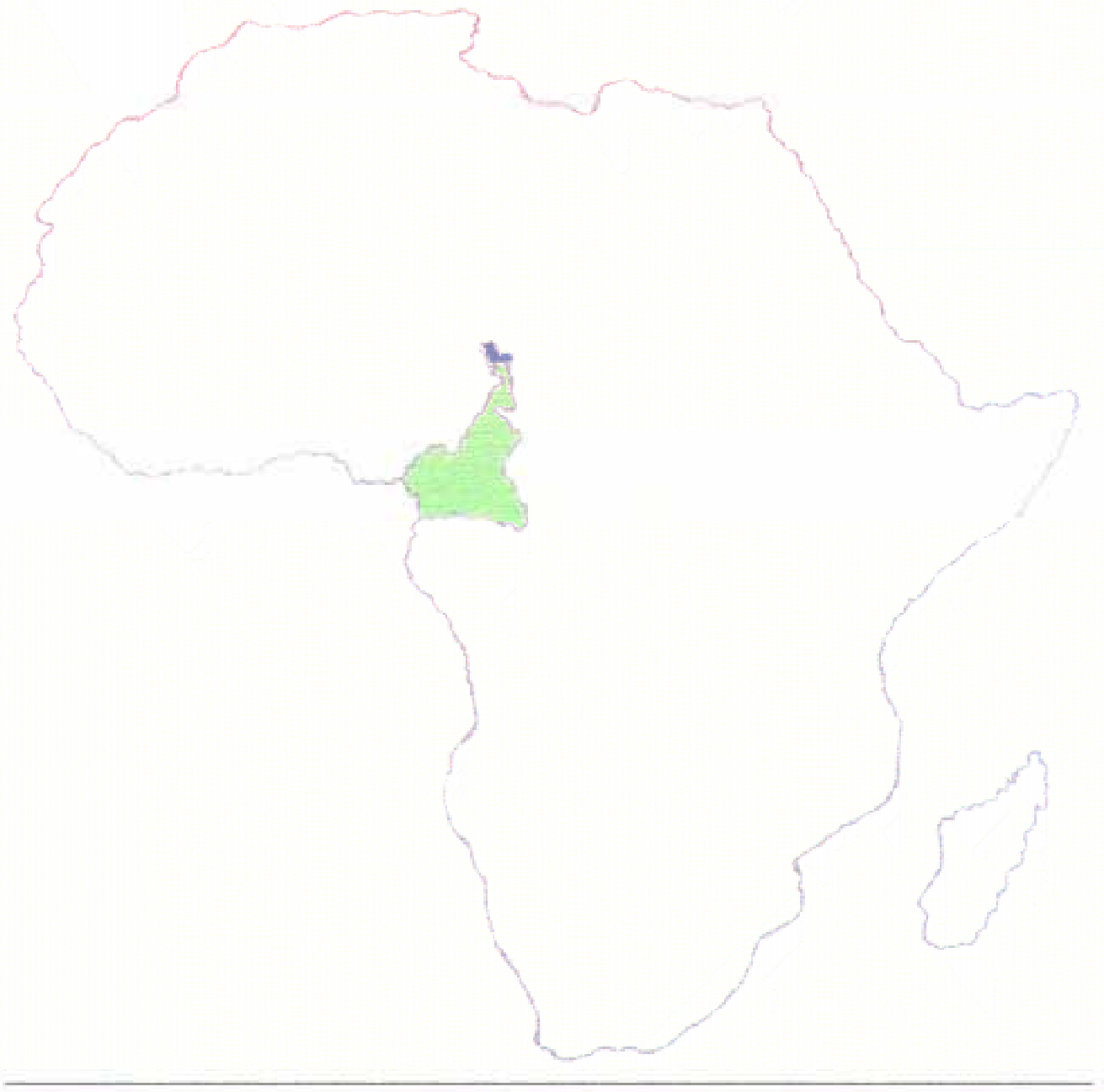


TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF BOXES

LIST OF MAPS

EXECUTIVE SUMMARY

In accordance with Decision II/17 of the Conference of Parties (COP) a national report on the implementation of the Convention on Biological Biodiversity (CBD) is expected to be written and made available to the Secretariat of the Convention and other parties desirous to benefit from the information from the reporting party. The report is expected to serve as a follow-up mechanism on how a party is implementing the CBD noting especially that the time has come « For Action » which implies that parties to the Convention, should begin implementing the CBD. This first National Report is expected to focus in so far as possible on the measures taken to implement article 6 of the Convention (Decision II/17) and it is also in fulfilment of Cameroon's obligation as a party to the Convention..

This report is completed following the model provided by the COP as contained in the Annex to decision II/17 as well as the « National Biodiversity Planning Guidelines Based on Early Experiences from Around the World », produced by the WRI/IUCN/UNEP. Additional guidance is from information contained on « Further Guidelines on preparation of National Reports» contained in documents UNEP/CBD/SBSTTA/3 Inf 15116.

In terms of content, a number of issues have been discussed in the main fourteen sections of the report. The issues highlight those aspects and activities with regards to the implementation of the CBD particularly focusing on those principal objectives of the Convention with regard to: the **conservation of biological diversity, the sustainable use of its component and the equitable sharing of the benefits arising out the utilisation of genetic resources.** The report relates how these main areas of focus apply at national level considering the country's institutional set-up, the existing policy and legal framework; their further application in biodiversity evaluation, biosafety and biotechnology the Clearing House Mechanism as well as indigenous knowledge. Discussions on the **« major causes of biodiversity loss and capacity to achieve the objectives of the CBD** using illustrations contained in document UNEP/CBD/SBSTTA/3 inf 15.

It is to be mentioned that Cameroon is in the process of preparing the Draft National Biodiversity Strategy and Action Plan and its outcome will be reflected on the final National Report.

In order to better explain the text and emphasis on important issues, illustrations, in the form of tables and maps, have been included. A number of annexes are found at the end of the report. A chart on the level of implication and the state of implementation of the Convention in Cameroon is included as Appendix I

The report has been compiled by a selected panel from the task-force of the National Biodiversity Strategy and Action Plan who represent key ministries and the main NGOs that interfere with biodiversity processes and activities in the country. The draft report has been subjected for commentary and corrections by the main key-players within the institutions and various sectors involved in biodiversity before being considered for approval by government. The draft copy was sent to the UNEP headquarters in Nairobi for examination and criticism and will later be sent to the Secretariat of the CBD to be tabled to the Fourth Conference of Parties (COP 4).

Mention is made on the short-coming and difficulties encountered in the whole process of documenting and other activities related to the implementation of the CBD - whether in the course of elaborating the NBSAP or while assembling information for the national report. In this regard it should be noted that time schedules and the envisaged level of performance might have fallen short of expectation of possible indicators for the future.

ACKNOWLEDGEMENT

A number of persons and institutions have been extremely helpful in the production of this report and The Co-ordinator of the National Biodiversity Strategy and Action Plan (NBSAP) would like to express his gratitude to the following :

The United Nations Environment Programme (UNEP) which has directed the entire process of reporting in general and in particular the Task Managers of the National Biodiversity Strategy and Action Plan Unit in Nairobi, Mr. Manab Chakraborty and Mrs. Carmen Tavera.of the Biodiversity Unit in Nairobi; the UNDP Cameroon who have handled the funds for the programme. The Global Environment Facility (GEF) for financing the whole process of National Biodiversity and Action Plan including the First National Report. Mrs. Tavera made valuable comments which have helped to improve the quality of the report. The NBSAP information was used in building up much of this report. Special gratitude goes to members of the Task Force of the National Biodiversity Strategy and Action Plan who supplied valuable information both for the NBSAP document and for national reporting. Dr. MBAH A. David, the consultant on Agricultural Biodiversity, was very helpful in assembling and organising much of the needed information particularly on agricultural biodiversity and Institutional framework. His suggestions and corrections in all chapters have been very useful. The Secretariat of the focal point to the CBD Cameroon has been extremely helpful in the typing. The services and structures provided by the Ministry of Environment and Forestry have contributed immensely to the success of this work

List of Contributors

Augustine BOKWE
Technical Adviser, Ministry of Environment and Forestry
Co-ordinator, NBSAP, Focal Point CBD

David Akuro MBAH
Director of Valorisation and Development Support,
Ministry of Scientific and Technical Research
Expert on Agricultural Biodiversity

Estherine LYSINGE
Legal Adviser WWF Cameroon
Expert on International Agreements and Legislation
member of task-force and Consultant on Institutional Affairs

Mary FOSI MBANTENKHU
Research Officer, Legal Affairs Division, MINEF
Expert on policy, institutional and legal framework

SATABIE Benoit
Director of National Herbarium, Yaounde
Expert on Floral Biodiversity

J.C. NJOCK
Director of fisheries, MINEPIA
Expert on Coastal and marine Biodiversity

FOTEU ROGER
Head of Planification Unit,
Department of forestry -MINEF
Expert on Forest Biodiversity.

ACRONYMS

ASF..	African Swine Fever
AT0	African Timber Organisation
BDCPC.	Bioresources Development and Conservation Programme-Cameroon
BIONET	Biodiversity Network
CBD..	Convention on Biological Diversity
CHM..	Clearing House Mechanism
CIDA	Canadian International Development
COP	Conference of Parties
CIFOR	Centre de Recherche Forestiere lnternationale
DFID	Department for International Development
EEC	European Economic Community
ECOCAS..	Economic Community of Central African States
ECOFAC..	Ecosystemes Forestier de l'Afrique Central
EIA	Environmental Impact Assessment
FAO..	Food and Agriculture Organisation of the United Nations
FED	Fond European de Developpement
GITAF	Groupement lnterprofessionel pour la transformation et de l'amengement de la Forets du Cameroun
GTZ	German Technical Assistance
GEF..	Global Environment Facility
HPI..	Heifer Project International
ICRAF	International Centre for Research in Agroforestry
IRAD	Institute of Agricultural Research for Development
IRZV	Institute of Animal and Veterinary Research
IMPM	Institute of Medical and Medicinal Plants Research
IITA	International Institute of Tropical Agriculture
ITTO	International Tropical Timber Organisation
IUCN	International Union for Conservation of Nature
MAISCAM	Cameroon Maize Co-operation
MIDENO	Mission for the Development of the North West
MINAGRI	Ministry of Agriculture
MINEF	Ministry of Environmental and Forestry
MINEPIA	Ministry of Livestock, Fisheries and Animal Industries
NBSAP	National Biodiversity Strategy and Action Plan
NEMP..	National Environmental Management Plan
NFAP..	National Forestry Action Plan
NWCA	North West Co-operative Association
NYZS/WCS	New York Zoological Society/Wildlife Conservation Society
OCFSA..	Organisation de la Conservation de l'Afrique Centrale
ONU..	Organisation des Nations Unies
PNVA	Natural Agricultural Vulgarisation Programme
SBSTTA	Subsidiary Body for Scientific, Technical and Technological Advice
SODECOTON..	Cotton Development Co-operation

SOWEDA.....	South West Development Authority
UNIDO.....	United Nations industrial Development Organisation
UNDP..	United Nations Development Programme
UDEAC..	Central African Customs and Economic Union
UNEP	United Nations Environment Programme
UCCAO	Union of Co-operatives of Coffee Producers of the Western Province
WARDA.....	West African Rice Development Association
WBSCD	World Business Council or Sustainable Development

2. BACKGROUND

2.1 Generalities

2.7.7 State of *Biodiversity*

Cameroon is endowed with a very rich biodiversity and this is explained by its geographical location near the equator and in the heart of Africa, rich volcanic soils in the south and good watershed which accounts for good drainage systems. After Democratic Republic of Congo, South Africa and Madagascar, Cameroon comes 4th in biodiversity richness with a high degree of endemism. This rich biodiversity is seriously under threat with heavy reduction of species numbers through agriculture, fishery, forestry activities and wildlife poaching.

2.2 Characteristics of Cameroon Ecosystems

A sectoral outline of biodiversity enables us see the ecosystems which are seriously being degraded and those species breeds/varieties which are vulnerable, or are likely to be extinct. For the purpose of this study, six major ecosystems have been identified, namely:-

- the Marine and Coastal Ecosystem;
- the Tropical Humid Dense Forest Ecosystems;
- the Tropical Wooded Savannah Ecosystems;
- the Semi-Arid Ecosystems; and
- the Fresh Water Ecosystems

(see map and Table 2.1 below)

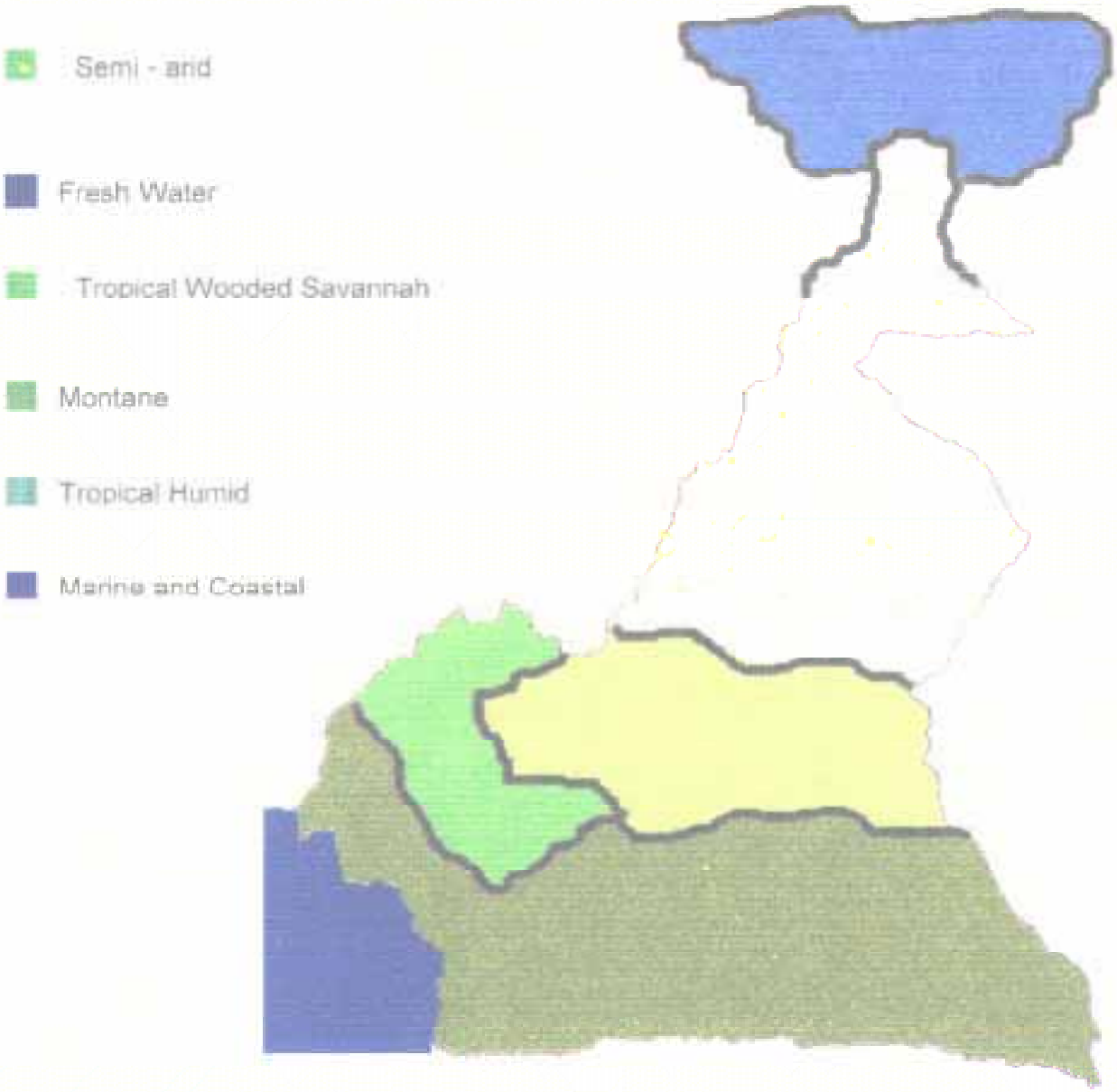

Semi - arid
Fresh Water
Tropical Wooded Savannah
Montane
Tropical Humid
Marine and Coastal

Table 2.1 Characteristics of Cameroon's Ecosystems

PRIORITY ECOSYSTEM	MAJOR COMPOSITION	LOCATION	CLIMATE AND SOILS	OBSERVATION
Marine and Coastal Ecosystem	1. Continental shelf 2. Mangrove zone 3. Continental Coast	Geoaraphical The coast is 402 km. long beginning from the Akwayafe river on the south eastern end of Nigeria, latitude 4" 40 N. and descends to the border with Equatorial Guinea at the river Campo Latitude 2" 20 N. The ecosystem is between Longitude 8" 30 and 10° 20 E. Administrative Ndian, Fako, Mêmé, Manyu Moungo, Sanaga Maritime, Wouri, and Ocean divisions.	The climate is warm and humid with annual water surface and air temperatures averaging 24" C and 26.5" C respectively. The area obeys a mono-modal rainfall pattern with an average of 5,000 mm per year. Soils The soils are volcanic, the clays have a colour ranging from grey to fallow. The beaches are sandy. The northern and central parts of the ecosystem lie on sedimentary soils.	The northern section of the continental shelf is wide: 25 nautical miles and 99% trawlable while the southern part is narrow: 15 n.m. and 70 % trawlable. Continental Coast The northern and central parts are dissected by rivers carrying large quantities of alluvial deposits hence the prevalence of mangrove species, The coastal mount Cameroon slopes and the extreme south of the ecosystem lie on hard rocks hence little deposits and few mangroves.
Tropical Humid Dense Forest	1. Littoral or Atlantic humid forests 2. Biafran forest 3. Guinea-Congolian forest 4. Swamp/flood forests.	Geographical It is situated between latitudes 2" and 6" 30 N., and longitudes IO" 20 and 16" 20 E. Administrative South West (tendency), Littoral, Centre, south and East provinces.	The rainfall obeys 2 pattern: Cameroonian; mono-modal with more rain, and guinean; bi-modal with less rain. ex Douala = 4,028mm, Yaounde =1 ,597 mm. Mean annual temperatures are between 32" C and 235°C Soils Volcanic in the west, granitic and variously metamorphic in the rest of the ecosystem.	The Atlantic variant is made of 3 levels: tree, shrub and herbs, with a lot of Lophira alata. The Atlantic type gives way to the Biafran and then to the mixed forests of Gilbertiodendron d. which further give way to the Sterculia subviolacea marsh and raffia swamp forests,
Tropical Wooded Savannah	1. Tree and woodland Savannah 2. Shrub Savannah 3. Grassland Savannah	Geoaraphical Latitudes 5" and 8" 20 N., and Longitudes 9°30 and 15°40 E Administrative N. West, and Adamawa provinces.	The mean altitude is between 1,000 m and 1,600 m a.s.1. The average annual temperature is 19.4°C, and the mean annual rainfall is 2,000 mm. Soils Volcanic in the western half granitic in the S/E Adamawa.	Tree and woodland Savannah is found in the south and west of the eco-system, progressing to shrub Savannah of Daniella o. and Lophira l., and then to grass Savannah of Imperata cylindricum and Pennisetum purpureum.
	1. Steppe, or large open lands	Geograpical	The climate is severe with clear	There major features include the

Semi-Arid	2. Savannah shrubland and scrubland 3. Prairie: pastures 4. Yaérés and Bovés: flooded lands.	Latitudes 8°20 and 13" 10 N., and longitudes 12" 30 and 15" 40 E. Administrative North, and Extreme North provinces.	differences between the daytime and night-time temperatures Maximum temperatures vary between 40 and 42°C: end April and the minimum temperature is 17°C: Dec/Jan. Rainfall drops from South: 1,000 mm per year. Soils The eastern flood plains lie on sedimentary soils? The western soils are volcanic around the Mandara mountain and granitic north and south of the mandara.	Benoue plain in the S/East littered by islbergs and small hills, the dry Mandara region, and the flood vegetation on the West, known as the Bovés and Yaérés. A special and unique vegetation of thorny shrubland occur in the Mozogo Gogoko reserve of the Mayo-Tsanaga division. Characteristic activities include fishing in the eastern flood plains; February - April, as the waters receed.
Montane	1. Subalpine or Ericaceous bilt (3, 000 - 4,000 m.a.s.1) 2. Afromontana belt (1,600 m 3,000 m. a.s.1.) 3 Submontane (1,200 - 1,600 m)	Topographic The mountains are mainly located on the western half of the country's continental plate.	Mountains are cooler than their parent ecosystem because of their altitude ex. Mt. Cameroon 4,095m=4°C at peak and Limber 100m=32°C. The soils are mainly volcanic	The country's mountains are noted for volcanic activity. The most recent was in 1982 on Mt. Cameroon. Some flora: lichens and orchids strive on recent mountain larva.
Fresh Water Ecosystem	1. Limnological (continental lakes) 2. Lothological (Continental rivers)	Geographical Rivers traverse one or more ecosystems but the lakes reside in a parent ecosystem. These features are different from their parent ecosystems due to the modification effect of water on micro-climate and vegetation.	The micro-climate is more humid, with lower temperatures than the parent ecosystem(s). The annual thermal amplitude is lower than that of the parent ecosystem.	The lakes are classified in four categories namely : Craters or volcanic reservoirs ii Subsistence or lowland Lakes iii Basin lakes ie, Lake Chad iv Artificial Lakes ie, Lagdo.

Source : Assembled from Amou'ou, et al. (1985); Sayer, et al. (1992); MINEF - N.E.M.P., (1996; Okotiko, (1997); Satabie, (1997), CENADEFOR, (1985)
NB. The geographical locations of the various ecosystems are only indicative (see corresponding maps).

BOX1

AREA COVERAGE OF FOREST RESOURCES

Total surface area of Cameroon	475,440 km2
Total land area	465,412 km2
Semi-arid	102,068 km2
Wooded Savannah	171,992 km2
Coastal and Maritime Zone	9,670 km2
Tropical Forest Zone	181,682 km2
Forests	210,717 km2
Land under Cultivation	19,668 km2
Protected Areas	43,681 km2
Rate of deforestation (1996)	200,000 ha/yr
Timber production in (1993 - 1996)	3.000.000 m3

HUMAN POPULATION

Total Population (1995)	13,200,000
Population growth rate (1993 - 2000)	2,9%
Population / km2	27.76
Urban Population (1995)	5,974,647
Urban population growth - rate (1976 - 1987)	5.6%
Number of poor people (1987)	3.500.000

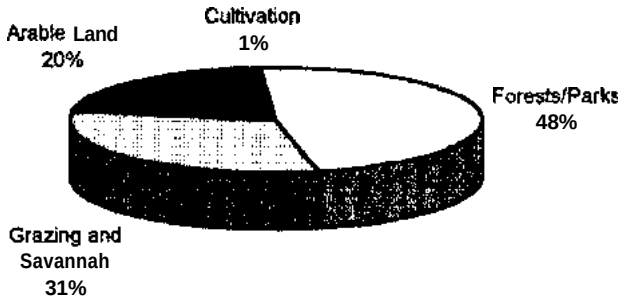
MACRO-ECONOMIC INDICATORS

GDP growth rate (1994/1995)	1.47
Debt in 10^6 CFA Francs (1994/1995)	5,763,757

Table 2..2. ECOLOGICAL AND ECONOMIC STATUS OF BIODIVERSITY

ECOSYSTEM	EXTENT (HA)	VALUE (MILLION CFA)
The closed Rainforests	18.000.000	23,400.000
Open Exploitation	8.000.000	5.580.000
Biodiversity Conservation Areas	3.000.000	146.400.000
Arable land	6.812.500	722.000
Pastures	14.300.000	126.800.000
Fisheries	?	100.000.000

An ecological assessment (Table 2.1) shows that Cameroon has a great potential which ranges from the closed tropical rainforest which also contains biodiversity conservation areas to arable land and pastures. The ecological value of the green environment is estimated at about 6,473.9 thousand million CFA.



Source:BOKWE 1996

Fig. 2.1 Distribution of Maior Land Uses

The major land-use patterns illustrated in Fig 2.1 show that forests and national parks occupy about 48% of the total land areas while the grazing and the Savannah lands occupy 31%. Only a small portion of our total land(1%) is under cultivation and 20% for arable land.

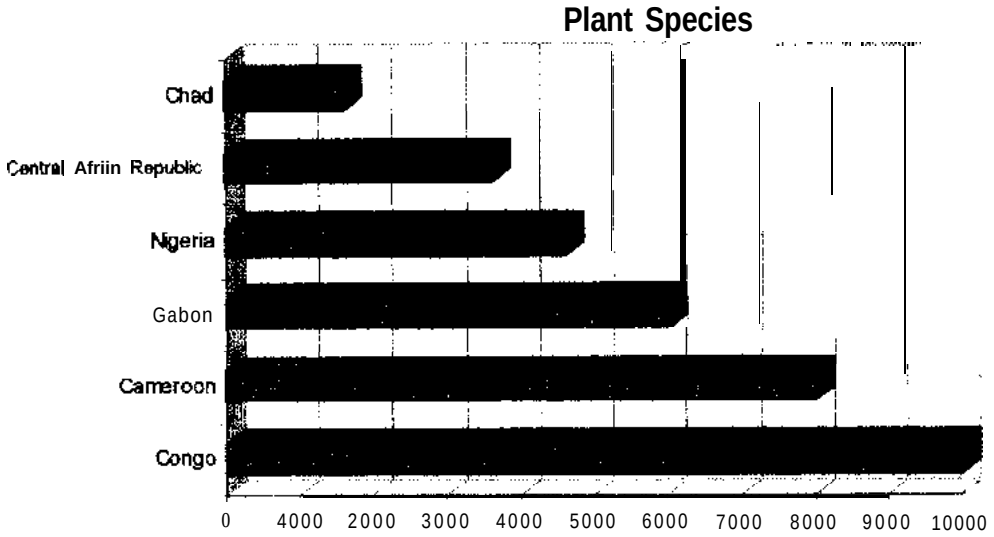
The state of Cameroon's biodiversity can be examined from two perspectives:

- The ecological status and the species level;
- Ecological status and values

2.2. ***1. Floral Biodivemity***

Cameroon's flora occupies the 4th place in the richness of Africa and second in the Central African Region (Table 2.2.1 a)

Wiih regards to the ecosystem classification of forests, Letouzy has established 5 classes. The forest ecosystems, coastal, montane, open savannahs and aquatic. Because of the variations in Cameroon's ecological zones (ranging from marine to arid Savannah), the floral biodiversity of Cameroon is varied and the national herbarium has been the reference centre for the plant collections within the national territory. The herbarium has registered over 90% of existing species.



source: National Herbarium Satabie 1997.

Fig. 2.1(a): Floral Diversity in Central Africa and Nigeria

So far the general situation by group and published taxons is represented in tables 2.2.1(a) below.

Table 2.2.1 (a): FLORAL BIODIVERSITY BY GROUP AND PUBLISHED TAXONS

Group	Taxons Published		
	Families	**Genera**	**Species**
Spermatophytes	83	552	1928
Pteridophytes	26	68	257
TOTAL	**109**	**620**	**2,185**

There are more flowering plants than non-flowering plants within the Cameroon flora which have been published of a total of 2.185 species, there are 1928 species of flowering plants **alread** published.

The floral biodiversity of Cameroon has been under-going drastic degradation resulting mostly from human interference. The floral evolution is seen from the situation in which several species are in danger, vulnerable, or are rare (Table 3.2.1 (c).

TABLE 2.2.1 (b): THREATENED FAMILIES AND TAXA IN CAMEROON FLORA

Family/ Taxon	Rare	Endangered
Rutacae	1	
Cyperaeae	1	
Ericaceae	1	
Gnetaceae	1	
Rubiaceae	1	1
Rasaceae		1
Caesalpinaceae		1
Shyracaeae		1
Araoaeae		1
Euphabiaceae		1
Bursaraeae		1
Minosaoeae		1
Luxembugiaceae		1
Pontenderiaceae		1
Apocycreae		

MANGROVES

The mangrove belt of the Coastal and **Maritime** Ecosystem Stretches in an area of 243Km² and contains about 14 mangrove and associated species

350 species of lianas and climbers

8 species of ferns, 15 spices of mosses

BOX 2 : CENTRES OF BIODIVERSITY IN CAMEROON

Kurop National Park, ... 6,500 ha..... 3,500 plant species.

Dja Biosphere Reserve,..... 8,100 ha ..... 2,000 plant species.

Waza National Park ..... 170,000 ha ..... ? Animal species (fish, birds, mammals, ... reptiles, insects)

Benoue National Park ..... 180,000 ha ..... ?

Campo/Ma'an ..... 270,000 ha ..... ?

Mount Cameroon ..... ?

Mount Kupe ..... ? Highest species diversity per ha in African (4000-5000 species)

Source - *Satabie, B.* (1997)

Cameroon's flora is full of a variety of plants which are useful for timber, food, fuel medicine, cultural practices, building as well as other social functions. The following families are predominant; ACHNTHACEAE, AMARANTHACEAE, ANACARDIACEAE, ANNONACEAE, APOCYNACEAE, BROMEUACEAE, BURSERACEAE, CAESALPINIACEAE, MELIACEAE, MIMOSACEAE, MORACEAE, PAPILIONACEAE, STERCULIACEAE. Most of the families which are endangered fall within the heavily exploited species.

2.2.2. Forestry

Timber Products

Within the Tropical forest zone, the slash and burn method of agriculture and forestry activities are the principal causes of loss of biodiversity. Inventories have been made on about 14 million hectares of high forest and a potential of 4.165 billion cubic metres of timber is considered available. This volume can be multiplied by **4** if all uses (fuelwood, pulp requirements, etc.) are considered. There are proposals for conducting multi-resource inventories to enable an assessment of non-timber forests products as well.

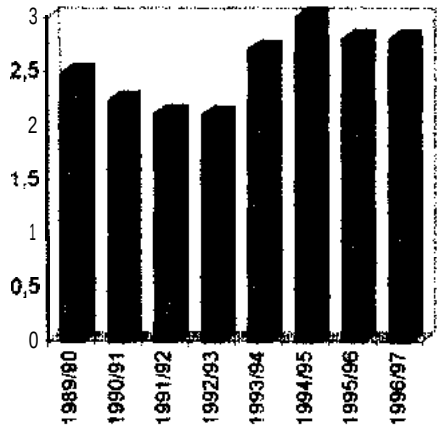
BOX 3

FOREST INVENTORIES

So far the following inventories have been carried out in Cameroon:

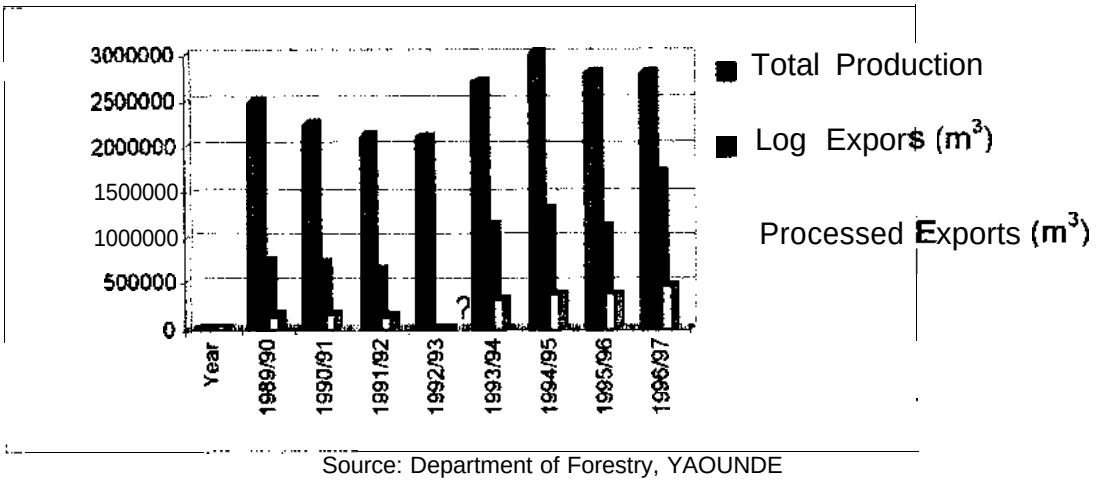
Reconnaissance inventory, 1-3%	1983-1991
Pre-inventory, 0.5-1%	1985-1989
Management inventory, 1-5%	1966-1994
Management and Pre-investment, 1%	1992
Paper and pulp inventory, 1%	1998

There are 400 marketable species and only about 60 are considered for the export market. Table 2.2.1. ℃ shows the market classification of Cameroon's timber species which are grouped into 3 categories.



Source: Department of Forestry - Yaounde

Timber production in milfions of m^3 from 1989190 to 1996197.



Source: Department of Forestry, YAOUNDE

TIMBER PRODUCTION /EXPORTS TRENDS THROUGH THE COASTAL SEA PORTS OF CAMEROON IN m^3.

2.2.1: (C) Volume According to market classification

GROUP	MARKETING	VOLUME (M3)
A	Special actually marketed	120.000.000
B	Species having a market potential	280.000.000
C	Species to be promoted	350.000.000

According to the inventories, marketable species have been classified into 5 main groups namely:

Group 1	High Value species:	**21** Species
Group 2	Recent Market species:	**14** Species
Group 3	Irregularly Marketed species:	48 Species
Group 4	Occasional species :	521 Species
Group 5	Species introduced in Cameroon :	28 Species

Non timber Forest Products

A number of non-timber forest products are of use in the forest environment. They fall in three main categories :

- Medicinal plants.
- Plants meant for food.
- Plants for social and cultural uses (building, carving, weaving).

Economic importance of Non Timber Forest Products :-

The added value on NTFP annually has been estimated at about 7 million US dollars

In recent years, NTFP have been of great economic importance to their domestic uses. A number of NTFPs are being commercialised within and out of Cameroon and many others are the raw materials for local crafts and industries. Among the exports of NTFPs, the principal species over the past 15 years have been :-

Pygeum africanum - barks industrially processed in Cameroon and exported as pharmaceutical raw materials
Strophanthus
Yohimbe
Gnetum africanum
Piper guinensis
Rattan - artisanel furniture construction

The quantities of these products going in for the internal and external trade are not available

2.2.3 *Coastal and Marine Biodiversity*

Information on the state of marine and coastal biodiversity is not available except on the fisheries sector. Generally rich, the components include 451 species of fish (marine and brackish water), 2 species of crustacean, some sea mammals and several species of plankton. There is a rich and extensive mangrove coastline which stretches for about 3434 km^2 comprising the following main species of mangroves and other dominant species : *Rhizophora harrisonii, R.mangle, Avecenia africana, Laguncularia racemosa*. The state of marine biodiversity is shown in Table 2.2.2.

2.2.4 Fresh Water Biodiversity

Box 4.

FRESH WATER BIODIVERSITY

Fresh water biodiversity is unevenly distributed geographically. It is higher for fish species in the tropics. Central Africa is among the three richest areas for fish species in the world. Recent studies show them to be very rich in unique bacteria of potential use in biotechnology.

**about half of the world's wetlands have been lost.*
**Rivers, lakes and wetlands are parts of the land and so sound economic practices will help restore aquatic ecosystems.*
**Fresh, surface and ground waters provide benefits to humanity*

** Total production from aquaculture in 1992 was 13.9 million tons of fish and invertebrates and 5.4 million tons of plants.*

The total extent of fresh water in Cameroon is about 3960 km2 distributed in rivers, swamps, lakes and dams, (Table 2.2.2(a). The various life forms are of special interest in biodiversity. As is the case with marine and coastal biodiversity, no information on the other species is available except for the species in Table 2.2.3.

TABLE 2.2.2 : NATURE AND EXTENT OF FRESH-WATER IN CAMEROON

TYPE	AREA (KM²)	CAPACITY (m3)
Rivers	1000	2.400
Yares swamps	34.000	40.000
Natural lakes	1800	4.500
Water retained in reservoirs (dams)	2800	19.040
Total in-land water surface area	39.600	65.940

Source -NEMP Cameroon, 1996

TABLE 2.2.3 SITUATION OF FRESH-WATER BIODIVERSITY

SPECIES TYPE	TOTAL SPECIES	ENDEMIC	THREATENED	PROTECTED
Fishes	354	115	354	1
Other forms				

Source Dept. of Fisheries MINEPIA 1997

2.2.5 *Wildlife Biodiversity*

The table of wildlife biodiversity (Table 22.4) shows that there is a high degree of endemism within species of different forms of wildlife in Cameroon while several others are under threat. One species of birds is extinct. In the highlands of Bamenda alone, 30 species of birds are either near threatened, vulnerable or endangered. In the Korup and Obang Hills of the South West Province there are 1050 species of butterflies (the highest recorded in Africa so far). There is no current information on the numbers of wildlife species. Inventories are yet to be conducted to determine the rate of endemism, threat etc.

TABLE 2.2.4 : WILDLIFE BIODIVERSITY

SPECIES TYPES	TOTAL SPECIES	ENDEMICS	THREATENED	EXTINCT
Mammals	409	10	27	
Birds	1000	11	47	1
Reptiles:	183	19	2	?
snakes	85	?	?	?
Amphibians	190	?	1	?
insects :	1110	?	?	?
Butterflies	1550	?	?	?
Micro-Organism	1050	?	?	?

Source :DFA/MINEF

2.2.6.1.*Protected areas in Cameroon*

Protected areas in Cameroon cover a total of about 4 million hectares which is about 9% of the total land area. The distribution is as follows (Table 2.2.4.1).

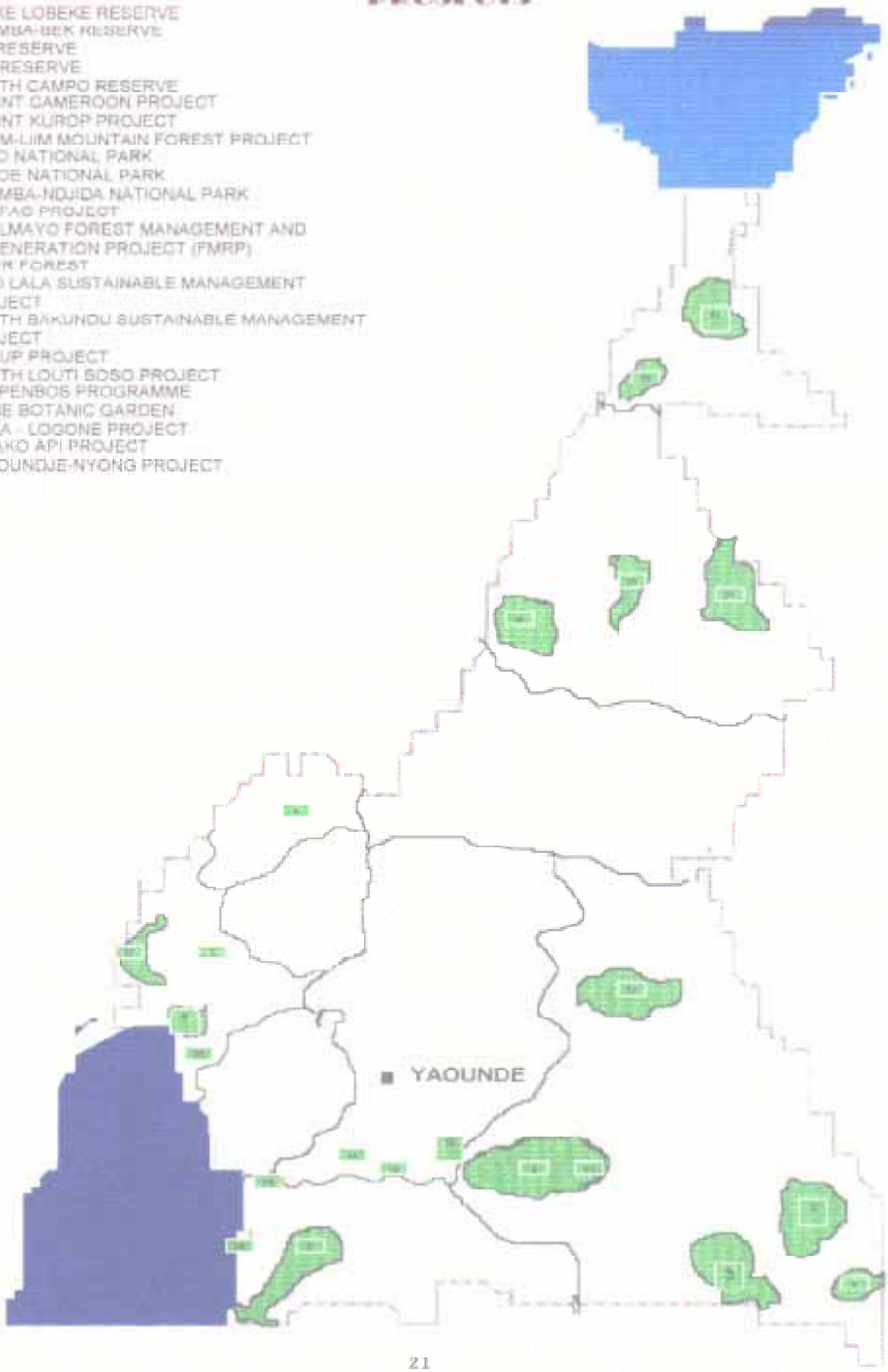
Table 2.2.5. PROTECTED AREAS IN CAMEROON

NATURE OF RESERVE	AREA (ha)	%
Production reserves	1.700.000	3.2
Protection reserves	28.400	0.3
Faunal reserves	2.400.00	5.5
Total	4.128.000	9

As shown on the map below, on the management operational areas, protected areas are located in almost all the terrestrial ecological zones. Thus we find protected areas in the humid dense forest as well as in the sahelian northern part of the territory.

OPERATIONAL FOREST MANAGEMENT PROJECTS

1. LABKE LOBEKE RESERVE
2. BAUMBA-BEK RESERVE
3. NKI RESERVE
4. DJA RESERVE
5. SOUTH CAMPO RESERVE
6. MOUNT CAMEROON PROJECT
7. MOUNT KUROP PROJECT
8. KILUM-IJIM MOUNTAIN FOREST PROJECT
9. FARO NATIONAL PARK
10. BENOE NATIONAL PARK
11. BOUMBA-NDJIDA NATIONAL PARK
12. ECOFAC PROJECT
13. MBALMAYO FOREST MANAGEMENT AND REGENERATION PROJECT (FMRP)
14. TIGER FOREST
15. SO'O LALA SUSTAINABLE MANAGEMENT PROJECT
16. SOUTH BAKUNDU SUSTAINABLE MANAGEMENT PROJECT
17. KORUP PROJECT
18. NORTH LOUTI BOSO PROJECT
19. TROPENBOS PROGRAMME
20. LIMBE BOTANIC GARDEN
21. WAZA - LOGONE PROJECT
22. DIMAKO API PROJECT
23. LOKOUNDJE-NYONG PROJECT



There are intentions of creating “Marine Protected Areas” and suitable sites are being sought especially in the Campo-Kribi region. Presently no marine protected areas exist in the country in spite of the threat faced in the conservation of marine biodiversity. Some sites have been identified already and the procedure for creating the protected areas will begin shortly.

2.2.6 *Agricultural Biodiversity*

The agricultural sector of Cameroon is very interesting and has an important effect on the lifestyle and the traditions of the people. Crop diversity consists of cereals, roots and tubers, legumes, vegetables, stimulants, oils, rubber (textiles) and a host of other genetic resources. Table 2.2.5(a) shows the crop diversity of Cameroon.

TABLE 2.2.5(a): CROP DIVERSITY

TYPE	SPECIES	NUMBER OF VARIETIES
CEREALS	Maize	18
	Sorghum	2 »
	Millet	2 »
	Rice	12 »
ROOTS and TUBERS	Cassava	5 clones
	Sweet Potatoes	5 clones
	Yams	7
	White irish Potatoes	3 »
LEGUMES	Groundnuts	285 accessions
	Cowpeas	4
	Beans	512 accessions
PLANTAINS and BANANAS	Bananas	2
	Plantains	6
FRUITS	Tangerines	a
	Mangoes	4-5
	Guavas	6
STIMULANTS	Coffee	9
	Cocoa	a new clones
Oil palm		1
Cotton		2
Rubber		184 clones
Forage - Legumes		1
FOODS FROM THE WILD	Rice	3 species
	Legumes	3-4 sp.
	Yams	a-9 species
	Vegetables	4 species
	Wild coffee	5-6 species

	Drinks (from Raphia)	5-6 species
	Fruits	205 species

* **No data on other vegetables (e.g. carrots, cabbages, tomatoes, etc.).**

It is observed that we may run into the danger of loss of crop biodiversity in our eagerness to select suitable varieties for agricultural production. Some genetic resources, e.g. sorghum, maize, cocoyam, groundnuts and pepper are threatened or endangered.

2.2.7 Animal Diversity

The situation of animal genetic resources will be examined in terms of numbers (Table 2.2.5(b) and species. Domesticated species are cattle, sheep, goats, pigs, poultry. There are pet species like dogs and cats which have no economist impact.

Table 2.2.5 (b) : ANIMAL GENETIC RESOURCES POTENTIAL

SPECIES	NUMBERS
Cattle	4,361,500
Sheep	2,358,100
Goats	2,917,500
Pigs	800,000
Poultry	14,000,000

Table 2.2.5(c) LIVESTOCK SPECIES AND BREEDS.

TYPE	SPECIES	BREEDS/VARIETIES	THREATENE DENDANGER ED	EXTINCT
Cattle	Bos taunues Bos indicus	7 breeds 4 breeds	Muturu	Bamileke (Bos taurus)
Sheep & Goats	Sheep Goats	10 breeds (7 indeg,. 3 exotic) 7 breeds (4 indeg. 3 exotic)	Black Belly	
Pigs & Poultry	no information on breeds yet.			

2.2.8 Microbial Biodiversity

Micro-organisms have been classified under bacteria, fungi and viruses. Diversity of micro-organisms in Cameroon is of great importance as it influences the economy in the areas of agriculture, forestry and health and industries. Microbial diversity also has effects on social, industrial and biotechnological activities. Table 2..2.6 shows some classification of large mushrooms used in Cameroon following the activity sector.

Studies on identification and use are still going on and information will soon be available through work which is currently underway

Table 2.2 6(a) : LARGE MUSHROOMS AND BACTERIAS OF CAMEROON

GROUP	NO OF SPECIES
MUSHROOMS	
Agaricaceae	6
Amanitaceae	59
Coprinaceae	?
Pleuvotaceae	
Polyporaceae	8
Schizophyllaceae	?
Ganodermataceae	2
BACTERIA	
Rhizobiam	>60
Pseudomanas	>20
Endomycohiua	>100
Ectomycorhizza	>20

2.3 Value of Biodiversity Conservation and Sustainable use

The value of all biological resources becomes useful and economically important only when the resources can be available in usable quantities and in sustainable manner. For those resources which contribute to the economic and social welfare of the communities and the nation, it is essential that they are managed under sustained yield methods.

The value of biodiversity conservation and sustainable use can be seen from the following principal benefits : economic, cultural, scientific, social, aesthetic, climatic, nutritional, medicinal, and architectural. These values are extremely important to people who live daily with the resources. Traditional and cultural values have been handed down through generations and immense knowledge

has been built in many traditional societies. Scientific information exists as a basis for development on biological organisms within the maritime and forest communities.

Most of the traditional knowledge has been exploited and what is "stored" is not recorded. Many new species have been identified alongside the screening important chemical substances. Cameroon biodiversity is full of endemism and this explains why we have several species within our ecosystems which play important roles in the national economy.

The centres of rich wild biodiversity are Dja, Korup, Waza, Boubadjidah, Bouba Bek, Nki and several other reserves which have enormous contributes to offer to the scientific community.

Most of Cameroon's biological resources are under-exploited. Contributions from fisheries, agricultural, forestry and wildlife resources provide valuable foreign exchange earnings. Table 3.3 illustrates foreign earning contributions to the national economy (after petroleum).

Table 2.3: BIODIVERSITY CONTRIBUTIONS TO THE NATIONAL ECONOMY

SECTOR	NATIONAL GDP CONTRIBUTION (%)
Petroleum	59.4
Agriculture	25
Fisheries	0.6
Wildlife	0.3
Forestry	14.7

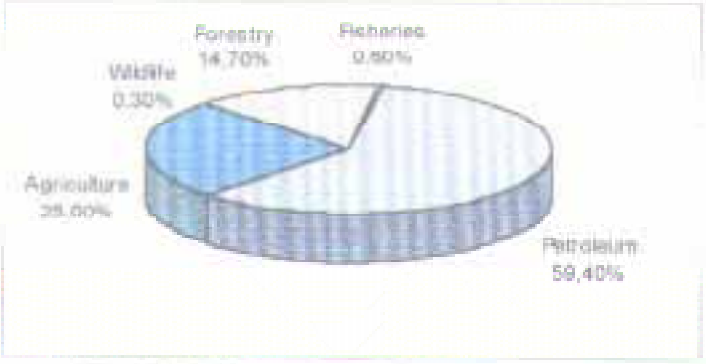


Fig. 2.3: BIODIVERSITY CONTRIBUTION TO GDP

The economic advantages should be made to persist through improved management systems and good markets. It is thought that farming methods and management systems be improved so that the products and services from our natural resources should continue to be available to the community at large for now and the future.

The depletion of the Ozone layer and mastery of the effects of climate change, conservation and sustainable use of resources are all issues to be addressed when considering the conservation of biological resources.

2.4 Policy and Legal Framework on Biological Diversity

Through the elaboration and application of the policy and legal frame-work, the Government guarantees :

- The right of every individual to a healthy environment and a harmonious balance of ecosystems as well as sustainability at product level between urban and rural areas;

- Information and sensitisation of all citizens on environmental problems by the public and private sector institutions,

- The possibility for grass-root communities and approved associations to exercise recognised rights relating to the infringement of environmental laws and regulations.

With regard to the fundamental principles of environmental resource management and protection of natural resources , the following have been adopted :

- The « polluter pays » principle according to which the expenses incurred for the prevention and curbing of pollution are borne by the polluter;

- The principle of participation according to activity sector is imperative in order to guarantee access to information, the duty to safeguard the environment and the necessity to coalesce with the sectors and groups of activity concerned.

Special attention has been given to the protection of mangrove ecosystems which play an important role in conserving marine biodiversity, maintaining coastal equilibrium and protecting the genetic resources which today are of special environmental significance:

Policy guidelines for the protection and management of forests, wildlife and fishery resources;

- Policy guidelines for the protection of the environment and rational management of natural resources;

- Legal frame-work for the management, exploitation and control of forestry, wildlife, and fishery resources. (Law voted in 1994)

- Legal framework on environmental management (law voted in 1996).

- In drawing up the National Policy on Biodiversity, Government will :

- Set up standards and institutions for managing biological resources and providing the products and services sustainably,

- Prepare reports on pollution, biodiversity conservation and on the state of the environment in general,

- Initiate research into the quality of genetic resources and the environment,
- Publish and disseminate information on environmental protection.

2.5 Institutions and Organisations Involved in Biodiversity in Cameroon

A number of institutions or organisations are directly or indirectly involved in the management of biodiversity in Cameroon. The institutions mentioned in Table 2.5 have been grouped under: agricultural, wildlife and forestry biodiversity. Apart from occasional research, no information has been found on marine ecosystems.

TABLE 2.5:(1) NATIONAL INSTITUTIONS AND ORGANISATIONS INVOLVED IN AGRICULTURAL BIODIVERSITY IN CAMEROON

INSTITUTION	MAIN ENGAGEMENT ACTIVITY	SINCE WHEN	ACHIEVEMENTS
* MINAGRI	Crop Production (Export & **Food)** Extension	1960	
.CDC .SODECAO SOCAPALM .UCCAO	**Oil** palm, rubber, tea, banana production. Cocoa production Oil **palm production** **Coffee production**	1947	50000ha **cultivated**
HEVECAM .NWCA .SOWEDA	**Rubber production** **Coffee production. and marketing** **Integrated rural development**	? ?	? ? ?
.MIDENO .SODECOTON PANNAR	**Integrated Rural Development** **Production of cotton** **Seed (maize) production. And marketing**	? ? 1994	? ? ?
MAISCAM .MINEPIA	**Maize production** **Animal Husbandry:** **i) production** **ii) animal health** **iii) extension**	1960	
'SODEPA	**Cattle production, exploitation**	?	?
SOGELAIT	. **Dairy production,** commercialisation	1994(1960)	Good

			dissemination
TADU DAIRY COOP B'DA DAIRY COOPERATIVE	Dairy and beef production, marketing Dairy production and marketing	1988	Good dissemination of Agric. Technologies
PNVA	Agricultural extension	1988	Covers all 10 provinces
Fed. Elev. Adamawa	Cattle production	?	Groups farmers for joint action.
H P I	Small livestock production with small farmers	1974	
IRAD	Research: genetics, physiology, nutrition, health, pathology, forestry, environment etc.. . on plant and animal production, etc. and transformation.	1980 (1996)	Since 1930's/40's. Achievements : "Improved" varieties/breeds made available to farmers (small) and large plantation organisations.

Source: MBAH D. 1997

Table 2.5.2 INTERNATIONAL ORGANISATIONS AND NGOs INVOLVED IN WILDLIFE BIODIVERSITY IN CAMEROON

INSTITUTION	MAIN ENGAGEMENT: ACTIVITY	MAIN ENGAGEMENT: SINCE WHEN	ACHIEVEMENT SO FAR
UICN	- Re-habilitation of the Yares - Management plan of the North of Waza National Park - Management plan of the Dja Reserve	? 1995	plan already done ?
WWF	- Management plan for elephants - Management plan for protected areas	1995 1990	plan about to finish
WCS	Elephant sanctuary	1996	on - going
ECOFAC	Biodiversity conservation - Management plan of Dja reserve	1992	on - going

GEF	Biodiversity conservation	1994	on - going
DFI	Biodiversity conservation	1984	on - going
SC1	Assisting MINEF in organising hunting	1995	on - going

Source : Dept. of Wildlife, MINEF

Table 2.5.3 INSTITUTIONS AND ORGANISATIONS INVOLVED IN FRESH-WATER & MARINE BIODIVERSITY IN CAMEROON

INSTITUTION	MAIN ENGAGEMENT		ACHIEVEMENT SO FAR
	ACTIVITY	SINCE WHEN	
FAO	Fish-farming	1970	Breeding of tilapia and the cat fish
MINEPIA	Continental fisheries and fish culture	1960	Development and management
IRAD	Research	1980	- Reproduction; - Nutrition and breeding of Tilapia and cat-fish

Source : Dept. of Fisheries MINEPIA

Table 2.5.4 INSTITUTIONS AND ORGANISATIONS INVOLVED IN FOREST BIODIVERSITY

The Mount Cameroon Project and the Limbe Botanic Garden	- Development of the Botanic Garden - Conservation of genetic resources by creating forest reserves in Etinde, Onge, Mabeta, Moliwe	1988	- Renovation of the herbarium; - Review of activities of the Botanic Garden; - Inventory of reserves; - Demarcation of project zones with the involvement of the population.
Garoua Wildlife School	- Creation of a herbarium to train students and drafting of Graminae flora	+10 year	- Drafting of Cameroon's Graminae flora
Mbalmayo Forestry School	Forestry and Botany lessons	+15 years	- Creation of an arboratum and a herbarium
Yaounde I, Dschang and Ngaoundere Universities	Forestry and Botany lessons	+ 30 years for Yaounde	- Existence of teaching herbaria
Centre for Medicinal Plants studies of the IMPM	Inventory and study of chemical properties of medicinal plants	+ 15 years	- Development of some traditional medecinal products
IRAD	Forage production and range management in Adamawa, North west	+ 37years	-Creation of a forage herbarium and development of forage species/varieties.

NATIONAL FORESTRY DEVELOPMENT AGENCY	- Forest inventory	+ 20 years	- Inventory of the southern part of the country
The Korup Project in Mundemba	- Characterisation of biodiversity of the area - Conservation and sustainable management of biological resources	+ 10 years	- The Reserve is up-graded to a National Park. - Detailed studies and inventory of the whole Park
SI/BDCPC project	- Forest dynamics studies.	+1	50 ha plots made and trees tagged..
GEF / BIODIVERSITY Project	- Biological inventory and the elaboration of management plans.	+ 3-5 years	- Study (inventory) of some advanced sites
The ECOFAC PROJECT in DJA	- Biological inventory for exploitation plans	+ 5-8 years	- Studies and inventories already advanced
The Netherlands Foundation - TROPENBOS of Kribi	- Conservation and rational use of the tropical forest	+ 5% years	- Research already well advanced
The Kilum-ljim Mountain Forest Project of Oku	- Biological inventory and management plan of the zone	+ 8 years	- Inventory carried out - Agropastoral activities
WWF / WCS Programmes	- Biological inventories in the Southeast, North and Bakossi mountains	+ 10 years	- Very interesting work already carried out
IUCN Activities in the Lomie	- Research on biological resources	+ 5 years	- Expected result to be identified
The LOM-PANGAR Project	- Environmental impact assessment following the dam-reservoir at the confluence of two rivers	+ 2 years	- Work still underway

Source : Wildlife Dept. MINEF, 1997

BOX 5

BIOREGIONAL MANAGEMENT

Bioregional Management has the potential to reap huge gains for biodiversity - in part by attracting a larger, more complex pool of skills and tools. This approach also helps local communities to grasp the connections between biodiversity and their own livelihoods and encourages them to begin voluntarily restoring the habitats, sites, and ecological functions that determine the health of larger ecosystems.

NRI 1997

Table 2.6 THREATS TO DIFFERENT FORMS OF BIODIVERSITY

FOREST AND WILDLIFE	FRESH-WATER	MARINE AND COASTAL	AGRICULTURAL	MICROBIAL
FOREST BIODIVERSITY - Land - tenure and land-use system do not recognise conservation and sustainability of biological resources; - Agricultural and forestry practices of negative impact on habitat and biodiversity; - Environmental insensitive commercial land-use practices - Uncontrolled grazing and indiscriminate bush-fires; - Over-harvesting of natural population of species beyond sustainability - Introduction of incompatible alien species; - Perpetual lack of scientific knowledge of the complexity of the three levels of biodiversity (genes, species and ecosystems). - Desertification in the northern part of the country. **WIDELIFE BIODIVERSITY**	WATER BASED THREATS - Construction of dams changes running water to still water ecosystems; - Introduction of exotic species; - Over-harvesting; - Aquaculture LAND BASED THREATS Agricultural practices - pesticides, fertilisers, sediments - Forestry practices - clearing felling cause runoff, turgidity; - Industrial discharge, sedimentation, toxic chemicals. HYDROLOGICAL THREATS Reduction of natural continuous vegetation cover reduces transpiration into the air. - Highly vegetated landscapes will better sustain aquatic ecosystems and species diversity.	Poor knowledge of marine resources, introduction of exotic species, over-harvesting-,uncontrolled fishing nets; .-Water- climate change ; -. Poor maintenance of habitat; .Pollution - industrial discharge, methods which have no regard for conservation.	- Poor farming methods - Introduction of unadaptable and non resistant breeds; - Non-recognition of land use rights; - Uncontrolled; Cross-breeding; - Poor plant and animal management techniques; - Changes of soil atmospheric conditions; - Incorrect use of pesticides herbicides and pollutants; - use of fire even as a clearing weapon;; Neglect of correct veterinary techniques. - Tropical diseases on livestock	- Soil erosion; . Water contamination with ntroduction of pollutants; . Deforestation exposes nicro-organisms to adverse weather conditions; Burning of vegetation and op soil destroys many nicro-organisms; Climatic change and adverse conditions destroy many species of microbial organisms - Infrastructural development and mining deform the land from its original structure.

- Lack of knowledge of species numbers and their population trends; - Poor knowledge of the species habitats and their changes in relation to species habitat requirement; - Uncontrolled hunting sometimes with fire and poisonous chemicals on arrows poaching; - Logging and removal of forest cover - Absence of evaluation and monitoring ; - Poor management techniques.	**BIODIVERSITY** LOSES - No estimates have been made in Cameroon. World estimates are 55% in the group (birds, amphibians and fishes) - Extinctions can be really high with Cameroon Fresh-water species. FUTURE THREATS - Climate change - Pollution Growth - Increased per capita consumption			

3. GOALS & OBJECTIVES

The conservation of biological resources, their sustainable use and the equitable sharing of the benefits arising from those resources are the cardinal objectives of CBD. These are the concerns of all contracting parties to the Convention. It implies that activities during the implementation of the Convention should lead to the attainment of specific goals. Since by their very nature, all the goals cannot be achieved at once, there is need to measure the level of attainment of each goal in relation to its main objectives. In Cameroon, we examine the goals set from the various national policies including the different international agreements on the different forms of biodiversity.

3.1 National Conservation Goals

This section attempts a critical examination of Cameroon's various policies on biological resources. Cameroon has laid down specific policies on its forestry, wildlife marine and agricultural resources. Some of these policies are backed by institutional and legal instruments. Table 2.1. shows the main biodiversity sectors with their related policy items, their priority goals and the level of attainment. There are five main biological resource sectors which have been covered by government policies - Agriculture, Forestry, Wildlife, Fishery Lands, and these sectors receive attention particularly as they influence the country's economy. Information on mines and energy has not been included.

3.1.1 On Conservation

Goals on the conservation of biological resources have been set and the fact remains that while some of the goals are being attained, others still remain unattained due to the following reasons;

- Lack of information about the resource;
- Inadequate means to enforce the regulations governing the sector;
- Wrong application of management principles;
- Poor exploitation methods;
- Non-respect of the timetable.

3.1.2 On Sustainable Developmenf

Attainment of this goal is dependent on the way that biological resources are used. The goal requires complete mastery of the resource potential through appropriate inventories and surveys which must include:

- The determination of exploitation fraction of the resources
- The selling of quotas
- Controlled and judicious exploitation
- Trade from the exploited resource (exploitation should benefit and improve national economy);
- Sound regeneration methods to replace lost biodiversity.

There should be adequate sensitisation of the population towards sustainability.

Following the various policies, up to 1997, a number of goals have been attained in spite of constraints mentioned. The estimated average achievement of these goals is shown in fig 2.1.2. From the study of the policies and goals of the various sectors, information shows that a considerable portion of the objectives of our sectors have not been achieved.

For each sector, a maximum number of objectives related to the management, conservation and sustainable use of biological resources was outlined as seen in Fig. 2.2 The attained goals for each examined and the fraction determined.

3.2 Policies and Objectives on Biodiversity :

The main policies and objectives on biodiversity are outlined and examined in the fields of agriculture, wildlife, forestry, and fisheries.

TABLE 3.2. AGRICULT RAL BIODIVERSITY POLICY ND GOALS IN CAMEROON

LAW /TEXT	MAIN POLICY ITEMS	GOALS PRIORITISED	% ATTAINMENT
Decree N°. 86/155 of 24/6/86	Cattle movement	Cattle health	"guestimates"
Arrete N°.0/3/MINEP/A of 31 May 94	Creation of "reserves" for cattle breeds	Creation of cradle for Gudali cattle ⇒ protection from crossbreeding with other breeds	"80%"
Decree N". 76/420 of 14 Sept. 76	Regulating breeding, circulation and exploitation of cattle	- Preservation of some breeds - Exploitation of cattle - Circulation of cattle	"70%"
Laws N". 74/13 of 16 July 74	Contagious diseases.	- Sanitary Protection from contagious diseases (livestock)	"70%"
Circular letter no. 0/2 /MINEP/A DSU of 14/3/ 84	Control of ASF (African Swine Fever)	- Protection of pigs against ASF	"80%"
Law N° 90-013 of August 10 1990	Phytosanitary protection	Import/export of : - plants - plant products - soils - culture media	"50%"
Decree N° 92-2231PM of May 25, 1992	Modalities for application of law no 90-013 of August 10, 1990.	As above including : - pesticides -plant growth regulators -environmental protection -animal/human protection.	"80%"
- Document in preparation by MINAGRI	Access to germ-plasm (seed stock, etc.)	Import/export of : - breeding material (e.g. seeds of various crops) - plant pathology, etc.	no guestimate

Sources : MINAGRI, Dept. of Plant Protection, MINEPIA (Dept. of Vet. Services, 1997)

"Guestimates" are personal

TABLE 3.2.(b) WILDLIFE BIODIVERSITY POLICY AND GOALS IN CAMEROON

LEGAL INSTRUMENT	MAIN POLICY ITEMS	GOALS PRIORITISED	% ATTAINMENT
aw n°94/01 of anuary 1994 n Forestry and Vildlife and 'isheries	Species knowledge	Vildlife and forest nventories of : Threatened species Endangered species Endemic species	60
	Aanagement plan	Conservation- Exploitation- Protection Education Sensitisation	50
	Conservation plan	Creation of protected areas Management plan Community management Control plans Protection	60
	sustainable use	Sustainable management - use quota system	
	Forest industrialisation Ban export of logs by year 2000	-control of resource exploitation - reduction of forest exploitation; -involvement of local populations	40
	Provide alternatives to uncontrolled game-hunting and illegal trade illegal of bush meat.	- Game farming - Game ranching -communal hunting rows	20

Source : Dept. of Wildlife and Protected Areas, MINEF, 1997;
: Dept. of Forestry, MINEF 1997

TABLE 3.2(c) SITUATION OF FISHERIES BIODIVERSITY POLICY AND GOALS

LEGAL INSTITUMENT	MAIN POLICY ITEMS	GOALS PRIORITISED	% ATTAINMENT
- Law N°94/01 of January 1994 ; on forestry, wildlife and fisheries regimes. - Decree N°95/413 of June 20, 1995 :Modalities of application of above law.	Fish Biology	- Biology and dynamics of principal exploitable species	50%
	Environmental follow-up	-Pollution by hydrocarbons - Pollution by heavy metals - Other pollutions	30%
	Exploitation Techniques	Subsistence fishing Industrial fishing	73%
	Knowledge of marine potentials in Cameroon	Inventory - Evaluation of potentials	75%

Source : Dept. of Fisheries, MINEPIA.

The total **average attainment of goals in the various sectors is shown** in Fig 3.2 below.

The Agricultural sector is prioritised with about 60% achievement, followed by the Fresh water ecosystems 40% then the Forestry sector with 25% and the Wildlife domain has 12%. The coastal and marine is the least because it is still being explored and several programmes are underway among which are:-

- The exploration of the maritime - particularly the mangrove zone
- The creation of marine protected areas
- Inventory of marine biodiversity

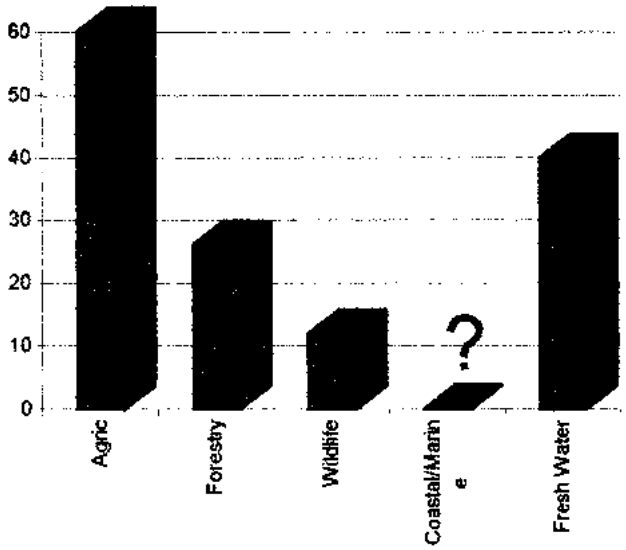


Fig. 3.2 Estimated average achievement of Biodiversity related policies and goals

3.3 International agreements and programmes on biodiversity

Cameroon has signed several agreements in the form of treaties, protocols and conventions with other countries and international organisations. These agreements have resulted in the execution of activities aimed at improving the conversation and management of the country's biological resouces and proper management of the environment.

The following are some international legal instruments relating to agro-silvo-pastoral, forestry and environment management to which Cameroon has subscribed:

- convention on the Protection of the World Cultural and Natural Heritage.
- Convention on International Trade in Endangered Species of Wild Fuana and Flora (CITES).
- Convention on conservation of Migratory species of Wild Animals (CMS)
- Convention on Desertification.
- Convention on Biological Diversity.
- Convention of the African Migratory Locusts.
- Convention on the Statutes on the Development pf Lake Chad Basin.
- Agreement on the Joint Legislation for Flora And Fuana.
- Phytosanitry Convention for Africa.
- African Convention on Conservation of Natural Resources.
- Co-operation and Conservation Agreement Between Countries of Central Africa on the Protection of wildlife.

- EEC/ACP (Lome IV) Convention.

Table 3.3 shows the various organisations in various fields with which Cameroon has signed agreements. We notice that FAO intervenes in almost all the sectors UNDP and UNEP also intervenes in a number of sectors

Table 3.3 : ORGANISATIONS WITH WHICH CAMEROON HAS SIGNE AGREEMENTS 0 BIODIVERSITY

AGRICULTURAL BIODIVERSITY	FORESTRY	WILDLIFE	FISHERIES	ENVIRONMENT
	EEC		FAO	UNEP
UDEAC	FED		UDEAC	UNDP
OIE	TROPENBOS	WWF	COI	UNIDO
FAO	UNDP	IUCN	ONU	
ITTA	CIFOR	CITES	JICA	
ILCA (ILRI)	GEF			
	FAO			
IPGRI	UNDP			
"WWF"	CIDA			
NYZS/WCS	SNV			
ICRAF	ITTO	NYZS/WCS		
	FAC			
	IUCN	CMS		
	WCS			
	AT0	GTZ		
	World Bank			
	GTZ	OFCSA		
	TROPENBOS			
	DFID	WCS		
	ITA			
	CITAF	Birdlife Intern.		
	FAO AFRICAN COMMISSION OF FORESTRY AND WILDLIFE			
CONVENTION ON BIOLOGICAL DIVERSITY				

4. STRATEGY

4.1 Status of implementation of the National Biodiversity Strategy

Cameroon concluded its National Environmental National Plan (NEMP) and National Forestry Action Programme in 1996 and 1995, respectively. There are environmental and forestry policies and laws. Strategies on environmental management have been identified with corresponding plans of action. Since the strategies have been treated sectorally in the NEMP and NFAP, it is evident that for the same country, the same policies and objectives exist for the same sectors in the NBSAP.

Although the policies and strategies for environmental and forestry protection and the rational development of natural resources have been classified on ecological bases, the key Government policy objectives coincide with the main strategies expressed in the conservation and sustainable use of our biodiversity. The NEMP/NFAP examined specific policies and strategies of forest biodiversity under semi-arid, wooded Savannah, coastal and marine, tropical forests zones, while sectoral policies have been treated under human capacities, management of agro-silvo-pastoral space, marine coastal and fishery resources, natural resources and hazards and research, information and sensitisation.

The evaluation of implementation of the NBSAP at this point in time is guided by the rate of implementation of the NEMP/NFAP within the same sectors. Globally, among the strategies identified in the NBSAP and using the sectoral NEMP/NFAP classification, realisation has been grouped into « Regional » and « Sectoral » Projects. Thus, the classification in Table 4.1 indicates the rate of implementation of (from the investment point of view) the NEMP/NBSAP.

During the elaboration of the NEMP, a series of projects which have been planned to cover a 10 - 15 year period was identified within the frame-work of regional and sectoral studies.

The total investment, which was valued at 2323 thousand million CFA, francs is divided into 5 categories :-

- Projects underway 92.4 thousand million CFA Frs;
- Priority projects 6.9 thousand million CFA Frs;
- New projects 75.3 « «
- Scheduled projects 57.7 « «
- Projects to be created amount to be set

It is worth noting that this investment is very general, without reference to specific biodiversity components. NFAP started off first but appears to **have achieved less.**

4.1.1 Other Strategies

A number of national strategies which **relate to biological resources have been considered to have a direct or indirect effect on the National Biodiversity Strategy. The two major classifications would** be :

- **National strategies directly related to biological resources;**
- **National strategies indirectly related to biological resources.**

(a) ***Those directly related to biological resources :***

These are principally strategies which are considered for the protection of the environment, considerations the management and development of natural resources and have been based on ecological and the economic activity of the country. as already indicated earlier in this section.

(b) ***Those not directly related to biological resources:***

This category refers to those strategies based more on factors affecting the management of biological resources than the resources themselves. Among these are:

- Strategies for building human capacities;
- Strategies for enhancement of primary products;
- Strategies for urban development;
- Strategies for exploitation and the rational management of energy, water, and mining or quarry activities

(C) Strategies related to coastal degradation.

In order to fight against coastal erosion, several strategies may be considered among which are:

- The protection of fragile and erosion proven areas;
- The monitoring of degraded areas;
- The planning and impact assessment of the construction of all coastal structures;

The rationalisation of the exploitation of sand and gravel quarries and mangrove trees;

- The fostering of compliance with legislation, especially that relating to the occupation of maritime areas.

Box 6

Why a National Biodiversity Strategy ?

Natural resources, though renewable, can be exhausted if not properly managed. Special attention on their management will enhance their availability sustainable. We should endeavour to provide the required treatment for a targeted resource while it is still in its Abbott. Biological resource strategies in Cameroon are now planned in relation to their ecosystems to prioritise remedial actions where damage has been caused and to protect to avoid further threats and further losses to biodiversity.

What are the main areas of focus when examining the strategy with regards to biodiversity in Cameroon? We have classified **the main strategies in relation to the following ecological zones**

- Strategies related to the wooded Savannah ecosystem;
- Strategies related to the coastal and marine ecosystem;
- Strategies related to the tropical humid forest ecosystem;
- Strategies related to the semi-arid ecosystem;
- Strategies related to the montane ecosystem;
- Strategies related to the fresh water ecosystem.

The strategies have been identified around the following major concerns ;

- The sustainable exploitation of biological resources,
- The protection of maritime resources ;
- The control of coastal erosion and pollution risks;
- Judicious application of regulations and principles of international conventions for the protection of biodiversity.

Generally, the strategies aim at the development, protection and use of the flora and fauna as well as the aquatic resources with a view to preserving biodiversity.

The principal strategies related to the management of biological resources are the NBSAP and the NEMP. We see that in both the sectoral and regional project treatments, are closely related and therefore for the sake of evaluation they cannot be treated separately. The cost of implementation of projects of the NEMP/NBSAP is shown in Table 4.1.

TABLE 4.1: TOTAL NEMP/NBSAP INVESTMENTS

SECTOR	SPECIFIC COMPONENT OF BIODIVERSITY PRIORITIZED	ON-GOING	PROJECT ENVISAGED	TOTAL US $
Natural Resources	-Pollution, -Mining and Quarrying activities - Lagging	4,499,5	14 811,9	19.310,9
Coastal and Fisheries	-Exploitation methods and pollution	3,140,6	9,426,3	12,566,9
Ago-Forestry and pastoral	Sylvo-pastoral - Environmental protection	6, 7698,7	6,9271,5	
Promotion of raw materials	Use of local materials.	3,533,5	1160	4.693,5

Research, information and sensitising	Applied research and extension.	11,520,6	23.100	34.620
Human capacity building	Short/long term	248,0	1660,5	1905,5

The following areas constitute principal sectors with biodiversity strategies:

(a) The Tropical Forest Zone

The strategies in this sector are **aimed** at curbing and reversing the degradation process through the implementation of the new forest law.

(b) The agro-silvo-pastoral space

- **The** valorisation of products and agro-silvo pastoral activities with a view to increasing food security and improving on the national economy;

- The participation of the local population in the conservation and management of forests and protected areas;

- Educating and sensitising people to adopt and apply sustainable exploitation systems and methods;

- The reinforcement of scientific research and development of coherent systems for agro-pastoral exploitation,

(c) The management of the maritime, coastal and fisheries resources

- Control of coastal erosion with special attention to the conservation and protection of mangroves;

- Control and reduction of various land-based types of pollution particularly from industries, urban centres and agro-industrial plantations, and

- Rational management of fishery resources in the sea, rivers and lakes.

(d) The enhancement of primary products

- Development of ecologically sustainable industrial policy that reconciles economic and social development with nature conservation and
- The development of domestic technologies,

(e) Research, Information and sensitisation

- Research towards the needs of biodiversity protection;
- Providing information on biodiversity to enable planning and better management;
- Introducing and re-enforcing environmental education in school programmes;

- Sensitising decision-makers, the general public and, especially, opinion leaders
- Capacity building in rural areas towards the mastery of rural environment and a better knowledge of the resources and their potentialities.

4.2 Relationship of the Strategies

In terms of protection and management of biodiversity, the various strategies bear relationship to one another (Fig.4.2). For the objectives of the CBD to be achieved, the strategies in most of the sectors need to be strictly followed. The sustainability of our biodiversity requires that in all the ecological zones, education and sensitisation, judicious management and exploitation of water and forest resources, the building of human capacity, the need to improve on the agricultural methods are all inter-related and must be all co-ordinated for optimal results.

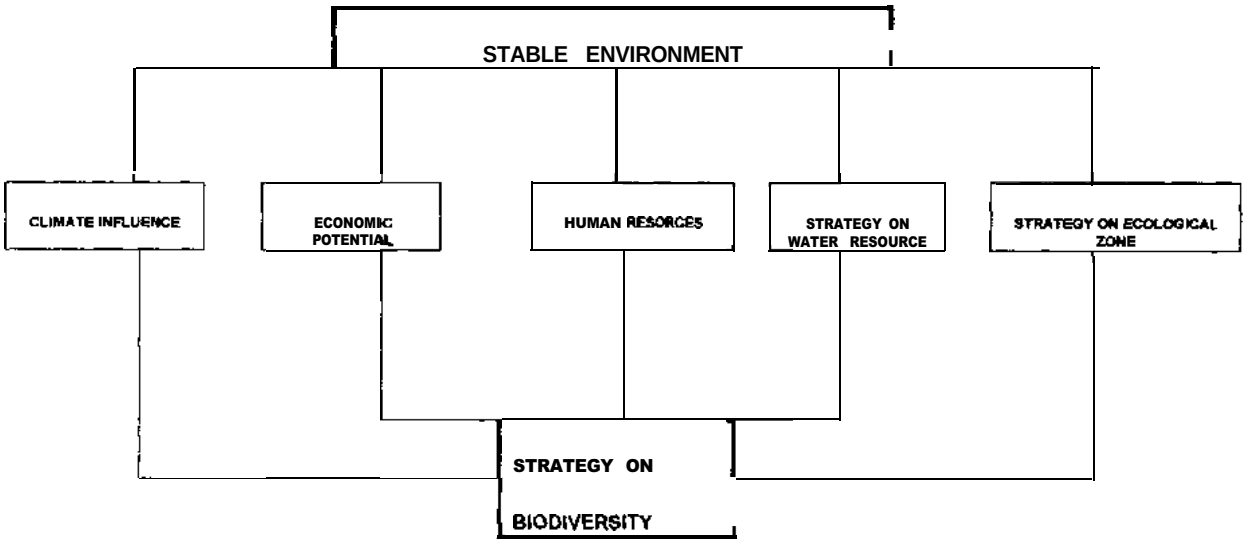


Fig. 4.2. RELATIONSHIP OF VARIOUS STRATEGIES

4.3. Constraints in Implementing Strategies

Among the problems encountered in the application of the various strategies discussed in this section are the following ;

- ***Lack of Resources***

The lack of human and financial resources has often limited the rate and intensity to which action should be taken on to various biodiversity strategies. Quite often policies and strategies are put in place but to have them property executed requires the services of sufficient and qualified personnel, sufficient finance as well as appropriate infrastructure.

- ***Inadapted policies***

Some of the existing policies have been adopted from elsewhere and are not suitable to the country's local conditions. Strategies developed from such policies do not suit accompanying programmes. This is why today, many of such policies are being revised.

- ***Non application of laws and regulations***

Even where the laws and regulations exist, their strict application is difficult due to lack of collaboration and co-ordination, lack of incentives, poor knowledge of the regulations in force, poverty and poor enforcement mechanisms.

- ***Servicing the debt burden***

The debt commitment with Cameroon's foreign partners makes it difficult to follow all the relevant steps of the various programmes of its strategies. Due to the economic crisis and the devaluation, the debt burden, both domestic and external, has been increasing for nearly ten years. It went from 957.7 thousand millions in 1985/86 to 5 763.8 thousand millions in 1994195, representing an increase of 83.4% of the GDP, thus exerting excessive pressure on the states finances. Revenue from exports which should finance development projects is deviated to paying debts incurred and thus hampers appropriate implementation of the development policy. Despite these problems in implementing the strategies and objectives discussed, a realistic action plan with targeted responsible stakeholders is conceived. This is the subject of the next section.

- ***Non mastery of the Environmental Components***

There is lack of information on the environmental resource components in particular the complex nature of the tropical forest ecosystems, the unexplored marine resources as well as the ever-changing nature of the freshwater species and their habitats.

- Other Constraints
- Other difficulties can be grouped into :-
- Institutional and
- Scientific

Institutional Obstacles are among the following :-

- Difficulty in co-ordinating and integrating numerous stake-holders and their respective issues
- Poor co-ordination among government agencies and the NGOs
- Poor co-ordination between donor project team and in-country team
- Lack of awareness on the part of government agencies and the local people
- Lack of communication between the scientific community and policy-makers

Continual institutional change with economic restructuring.

Scientific obstacles include :-

- Lack of research on biodiversity's role in ecosystems
- Lack of sufficient scientific and economic data
- Duplication of scientific efforts

Legal and Policy area obstacles :-

- Lack of data to support policy work
- Lack of capacity for policy analysis
- Difficulty in determining costs of biodiversity conservation
- Inappropriate land tenure policies
- Difficulty in integrating indigenous land claims and interests into planning.

5 THE NATIONAL BIODIVERSITY STRATEGY AND ACTION PLAN (NBSAP)

The National Biodiversity Strategy and Action Plan (NBSAP) is a concept of the CBD and has to be implemented by every party following decisions of the COP. The Cameroon National Biodiversity Strategy and Action Plan (NBSAP) is still in the preparatory process. It will be the final product of the National Environmental Management Plan in the area of biodiversity. The sectoral state of biodiversity has been examined in the NBSAP and is being derived from the major problems affecting biodiversity with objectives identified. When complete, it will provide specific guidance on the sustainable use of Cameroon's biological resources.

5.1 Status of Development of NBSAP

The steps being followed towards the development of the NBAP are:

- The various sectors and components of the country's biological resources were identified and classified into Forestry, Agricultural, Aquatic (Coastal/ Marine/ Fresh Water) Wildlife and categorised within an ecosystem approach.

- A multi-disciplinary task force was assigned to examine the composition and state of the biodiversity for each sector with a view to coming up with a general monograph for whole country. This was achieved through training and consultation workshops;

- The first consultative and inaugural workshop presided by the Hon. Minister of Environment and Forestry was held in Limbe in the South West Province.

- For each ecosystem and sector, strategies were proposed and the corresponding actions for each strategy were provided;

- For each action that should be taken the suitable actor to implement the strategy was identified;

- The draft document is expected to be ready by January 1998 while the final document should be available by March 1998;

- A large consultative workshop involving all the key players and stake-holders in the field of bioresources was help for people to express their opinion on the actions to be taken before the final approval of the document.

5.2 Implementation

Although the NBSAP is still under preparation some action has already been existing towards the goals and objectives envisaged in the NBSAP-Cameroon. Action through other action plans related to the various fields on biodiversity is noteworthy. The existence of other action plans will be seen in the next section (5.3) of this report . Some action plans have existed for over ten years. In the forestry sector, Cameroon was among the first African countries to implement the National Forestry Action Plan.

It will be necessary therefore to see how the other existing plans are being implemented.

Table 5.1: RATE OF IMPLEMENTATION OF ACTION PLANS.

TYPES OF ACTION PLAN BY SECTOR	YEAR OF LAUNCHING	PRINCIPAL OBJECTIVE	DEGREE OF IMPLEMENTATION
National Forestry Action Plan (Forestry)	1958	• Sustainable forestry • Agro-forestry	Statistics not available
National Land-Use Plan	1994	• Distribution of land by use • Sustainability	Statistics not available
National Environment Management Plan	1995	• Environmental protection • Biodiversity protection	Statistics not available
National Biodiversity Strategy {Forests Biodiversity Action Plan {Marine {Agriculture	1998	. Conservation • Sustainable use • Benefit sharing	Statistics not available
Special Plan on Agriculture ?		Food security	Statistics not available
Special Plan on Fisheries ?		Food security	Statistics not available

5.3 **Constraints Anticipated in their Implementation**

Implementation of the action plans encounters a number of constraints, among which are :

- Lack of means to follow up and faithfully apply the prescriptions of the plan

- Slow administrative procedures which sometimes do not reckon time as a determining factor when dealing with nature, seasons and various life-forms;

- Unsensitised local population find it difficult to understand the conservation messages being delivered by the executors of various plans;

- The participatory approach has not begun to yield fruits since it is only beginning to be applied;

- The absence of incentives to the principal actors and the custodians of the resource provokes action against conservation measures.

5.4 **Measures being Adopted**

The action programme intends to use a good number of strategies which include among others: the sensitisation of women, especially those of the hinterlands whose day to day activities have very serious consequences on the environment; the involvement of local populations in all activities related to the environment; the creation of alternative income generating activities and inculcation of environmental awareness in the local populations thus alleviating poverty.

The implementation of this action programme requires the participation of all those whose activities are related to the biological resources (NGOs, Ministries and institutions involved in the sector, local communities, the private exploiters, youths and women's groups, etc.).

Government has taken appropriate measures to encourage formation of local NGOs associated with environment stabilisation.

Encouragement of research in the areas of biological resources and ensuring the availability of the results to the users.

SUMMARY OF ACTIVITIES TO BE TAKEN IN EACH ECOSYSTEM

The actions to be taken towards the conservation of biodiversity in Cameroon have been identified and group according to the problems occurring within each of the six ecosystems identified: The number of actions by ecosystems are summarised below;

5.5. Future Programmes on Cameroon's Biodiversity

The following future programmes are envisaged to ensure that biodiversity and genetic resources in Cameroon continue to remain sustainable.

FOREST /WILDLIFE	FRESH-WATER	MARINE AND COASTAL	AGRICULTURAL	MICROBIAL
Under the National Forestry Action Plan, and the National Environment Management Plan, the Forestry and Wildlife Resources require specific programmes within the following areas: (A) ASSESSMENT - Assessment of all the resources through resource inventories. - Knowledge of insect species (B) MANAGEMENT - Appropriate management principles will be adopted to the specific requirements. - Management should involve local communities and other stakeholders related to the resource.	Following the discussions and recommendations made by SBSTTA III on the valuation of goods and services for the inland water ecosystems, the following programme of action is envisaged :- (A) MANAGEMENT - Integrated watershed management will be encouraged - Special measures will be taken to guard against Introduction of alien species which may adversely affect aquatic biological diversity; - Use of low cost (appropriate) technologies to meet water-shed management goals; -. Identification of low-cost and environmentally appropriate technologies to assist in the conservation	The coastal and Marine sectors require special attention and the following future programmes are envisaged : ASSESSMENT (A) Assessment of all the resources through appropriate inventories. (B) MANAGEMENT - Better resource management; - Involve local communities; - Identify low cost and environmentally appropriate technologies to assist in the conservation and sustainable use of marine resources; - Education and awareness will be strengthened for both the population and policy-makers.	Cameron's economy which is predominantly agricultural special measures need to be adopted to ensure agricultural viability and sustainability. (A) ASSESSMENT Knowledge of - Agricultural potential - Agricultural methods now in use and their impact on production/environment. (B) MANAGMENT - Improved agricultural methods; - Use of irrigation where necessary; - Better yields in crop and livestock - Evaluation before introduction and alien	Microbial diversity should follow definite programmes in relation to the economy. (A) ASSESSMENT Many are yet unknown and assessment of what exists is very necessary. (B) MANAGEMENT - Inventories of various species and types; - Collection and conservation; - Selection and exploitation - Creation of resource centres; - Special strategies and programmes on biosafety; - Develop uses of micro-organisms for the industrial activities. (C) FOOD INDUSTRIES

(C) EXPLOITATION - All resource exploitation will be well planned, judiciously undertaken and strictly controlled. - Exploitation will be done according to regulations in force. - Exploitation Waste will be reduced considerably. (D) ENVIRONMENTAL IMPACT ASSESSMENT E.I.A. will be carried out wherever necessary (E) REGENERATION Regeneration of degraded and fragile ecosystems will be intensified. (F) PROMOTION Encouragement in the marketing of lesser known species of timber and better markets for timber products Market surveys for the Non-Timber Forest Products.	and sustainable use of inland waters; - Involve local communities to develop and manage plans of inland waters; - Education and awareness will need to be strengthened for the population and policy-makers. **(B)** MONITORING AND ASSESSMENT - Identify cost effective approaches and threats of inland waters; - Promote the development of criteria and indicators for measuring impacts on fresh water ecosystems; - Assessment will be undertaken in important inland water ways to ascertain threatened species (C) ENVIRONMENTAL IMPACT ASSESSMENT Measures will be taken to encourage environmental impact assessment (EIAs) of water development projects, aquaculture, watershed activities, forestry, agricultural and	(C) EXPLOITATION - All exploitation well planned, judiciously undertaken and strictly controlled; - Exploitation done following the regulations in forest (D) ENVIRONMENTAL IMPACT ASSESSMENT E.I.A. will be conducted when and where appropriate (E) MONITORING Identify cost effective approaches and threats within the coastal and marine ecosystem; - Develop criteria and indicators for measuring impacts on coastal and marine areas. (F) CREATION OF PROTECTED AREAS Areas should be identified for the creation of protected areas.	species (C) LAND-USE, LAND TENURE Land-use systems and safe land-tenure practices will be encouraged to avoid unnecessary removal of vegetation cover. (D) FOOD PROGRAMME Solid food programmes to ensure « National Food Security » (E) OTHER AGRICULTURAL PROGRAMMES Envisaged programmes well linked to the objectives and goals. (F) EXTENTION SERVICE Efficient extension services will assist in spreading information and better farming methods to local farmers. [G] SOIL IMPROVEMENT Better methods to improve agricultural soils should be adopted so as to have	Encourage use of microbes for food industries - breweries, food preservatives (D) ENVIRONMENTAL CONTROL Use in metallurgy through action of certain bacteria, algae (E) **SOCIO** - ECONOMIC Microbial biotechnology will help reduce importation of pesticides, insecticides, etc. and create employment. (F) SOIL IMPROVEMENT PROGRAMMES Encourage use of nitrogen-fixing bacteria to improve agricultural soils (G) BIOTECHNOLOGY With studies of the DNA the country should explore means of avoiding any risks arising from the introduction of the LMOs. (H) TRAINING Training for skills especially in bacteriology, nematology, virology, applied microbiology.

(G) MONITORING Monitoring of growth and behaviour of the species to know their evolutionary trends. (H) INFORMATION The use of media to know the value of our resources: - local population should be adequately sensitised; - Local communities should be encouraged in knowing the importance of the biological resources which they are usually called to protect. (I) RESEARCH Appropriate researches should be undertaken to provide information on our wildlife and forest resources.	mining. (D) OTHER MEASURES - Develop cooperation for sustainable management of transboundary watershed; - A review of effectiveness of the national regulations, incentives which may affect inland water ecosystems (E) RESEARCH Research will be ecosystem-based for decision-making in a multi-disciplinary and integrated manner.	(G) TRAINING - Development of man-power in specialised fields on species and ecosystem management (H) RESEARCH Appropriate researches should be undertaken and research results available to those needing them. (I) POLLUTION Efforts should be made to counter pollutive measures caused by industrial spills and other forms.	better yields. (H) MARKETS Better markets should be sought for the variety of agricultural products (I) TRAINING Improvement of agricultural man-power in all fields of agriculture. (J) RESEARCH - Appropriate research to be undertaken in priority areas; - Research results made available to those requiring them.	(I) RESEARCH Further research will be conducted in micro-organisms - fungicides - nematicides - fertilisers - antibiotics - antifungicides - mycorhizas etc.

Table 5.2 Summary of Actions by Ecosystem.

ECOSYSTEM	NUMBER OF ACTIONS
COASTAL MARINE	36
TROPICAL HUMID DENSE	48
TROPICAL WOODED SAVANA	39
SEMI - ARID	52
MONTANE	46
FRESH WATER	31
TOTAL	252

It should be noted that only prioritised action have considered and listed in order of priority. Other related actions envisaged have been mentioned in the National Environmental Management Plan or the National Forestry and Action Plan which priorities have also been set considering the key strategic actions to be taken specifically on the conservation of biodiversity, in Cameroon, 252 actions have been identified and it is hoped that when these actions have been undertaken, there will be a clear and much wider scope to identify other areas for further action.

Future programs on biodiversity management are based broadly on the following activities outlined sectorially on the Table that follows:

6. COLLABORATION AND PARTNERSHIP

For effective ecological management and biodiversity conservation, it is important to know whether the key players collaborate. If they collaborate, what is the degree of collaboration and involvement.

Government is the central body to which most institutions are attached. All organisations (foreign or national) usually enter into agreement with Government before initiating activities on biological resources . Government's concern is to ensure co-ordination.. The form of collaborative links that exist in the fields of biodiversity are illustrated in figure 6.1 Collaboration and partnership are examined under sectorial collaboration, institutions and organisation involved and their level of involvement.

6.1 Sectoral Collaboration

Collaboration among the different institutions has greatly improved over the years and this collaboration is achieved through the following processes:

- Exchange of technical reports;
- Meetings, seminars and workshops;
- Extension, exchange of research results.

With the inception of the CBD, links with various stake-holders has brought the key-players much closer. It should be recalled that the various ministries which treat issues of biodiversity have been stressing on collaboration and co-ordination of the efforts.

There are a number of interministerial bodies which intervene in the domain of biodiversity. Within the Ministries of Agriculture, Environment and Forestry, Livestock, Fisheries and Animal Industries, there are committees which are meant to inform and execute, in a more rational manner, government policy on the management of biological resources. A genetic resources committee has been formed in the Ministry of Scientific and Technical Research, there is a CBD follow-up committee, the Interministerial Task-force of the NBSAP, the multi-disciplinary committee on Biosafety.

In order to come up with a meaningful forestry and wildlife policy, the revision of the old policy involved contributions from several ministries. Similarly to lay down a sound environmental policy and environmental law for Cameroon , all the sectors of the economy including the rural population were all involved in the setting up of the country's environment management plan.

Before major decisions are taken on issues of biodiversity, the bodies concerned are sufficiently involved either in the planning stage or in the execution phases.

Government is seen as the central body from where policy originates. The policy is initiated and executed by various institutions like the ministries, inter-governmental and non-governmental organisations who feed Government with information through their technical reports. On the other hand, there is the legislative arm of the nation (Parliament) which produces laws on matters biological resources. Some of the ideas on the laws come from the people and are presented to Parliament in the form of bills which mature into laws. This web of information flow provides for collaboration among the major key-players. It is expected that the participation of the rural population in particular and the overall users in policy development and implementation will continue to improve and increase.

6.2 Different Organisations and Level of Involvement

The question which is often asked is: "What is the level of involvement of the various groups ?" We need to first identify the organisations involved and their roles in the collaboration.

ORGANISATIONS

The main groups which need to be involved in biodiversity issues include :

- The various ministries handling matters on biodiversity;
- Parliament- the legal institution and the people representative;
- Non-Governmental Organisations (National and International);
- The main users of genetic resources (farmers, hunters, fishermen etc.);
- The media (radio, television and the written press).

It becomes more important to see at what level these various groups are called to collaborate or contribute. Is it at the initial preparatory stage or at the decision making phase?

Ideas which constitute policy statements are brought in by the main key-players from the population who are in daily contact with the law-makers (members of Parliament).

Generally when policies are being conceived, all main key-players are involved in the planning phase. The rest of the public is also involved sometimes informally . The final decision is taken by the appropriate administrative authorities after ensuring that the contributions of the main stake-holders have been included in the decision. During the execution phase, the level of involvement is widened because the policy executors are generally:

-The external services of the administration;

-The local NGOs; collaborating with the International NGOs

-The rural population.

DEGREE OF INVOLVEMENT

In assessing the degree of involvement, we need to know the role expected of each collaborator. Again, at what stage and how much collaboration do we expect from them? They can figure in the conception phase, the phase of decision making or the execution stage. Collaboration is usually high when people understand the importance of their involvement and have an interest in their involvement. In biodiversity management, we are concerned with collaboration from three areas :

- Collaboration from other administrative services;
- Collaboration from traditional and political authorities; and
- Collaboration from local, urban and village communities.

There is marked collaboration during the conception and planning phases by various ministerial bodies when the concept is put in the form of bills. Then collaboration is expected from parliament to promulgate laws . During the execution phase interventions from the NGOs and the

ministries concerned for the exploitation phase which is usually backed by laws and regulations, the local population is expected to collaborate fully. This collaboration is high only when the interests of the local population are taken into consideration. Otherwise, the local population is involved from the beginning to guarantee their view is considered finally.

6.2.1 How do fhe Plans Relate?

Fig. 6.2 shows the relationship among NBSAP and 3 well-developed plans (NFAP, NEMP, LUP) and 3 under-developed "plans" (Water and natural resources fisheries, agriculture). The 3 well articulated plans address some "sectors" of biodiversity (e.g. NFAP handles forest and wildlife biodiversity; NEMP handles general ecosystems management without directly handling other components of biodiversity just as LUP handles the zoning of space for various uses without direct treatment of other components of biodiversity) with the clean link between any 2 of them being silvo-agro-pastoral activities. Hence, NBSAP absorbs relevant strategies and actions within these plans rather than duplicate them.

- Besides these biological links, there are institutional/administrative links such as:
Institutional backing - ministerial structures to administer relevant areas in biodiversity.

- Same legal instruments - the regulations governing forestry wildlife and fisheries are usually promulgated at the same time and contained in one document;

- Many of the policies and the laws are executed and supervised by the same ministries as is the case with the Environment ,Forestry and Wildlife laws which are administered principally by the Ministry of Environment and Forestry in collaboration with other institutions. Fishery and animal husbandry regulations are administered by the Ministry Fisheries and animal industries.

- For many of the action plans, there interministerial committees which w-ordinate the activities of those plans and help in the follow-up.

As seen from Fig. 6.2, they involve all agreements and protocols implying that their activities are represented in all sectors of the biodiversity. Their plans of action therefore will be implemented as the duty and concern of all sectors and stakeholders.

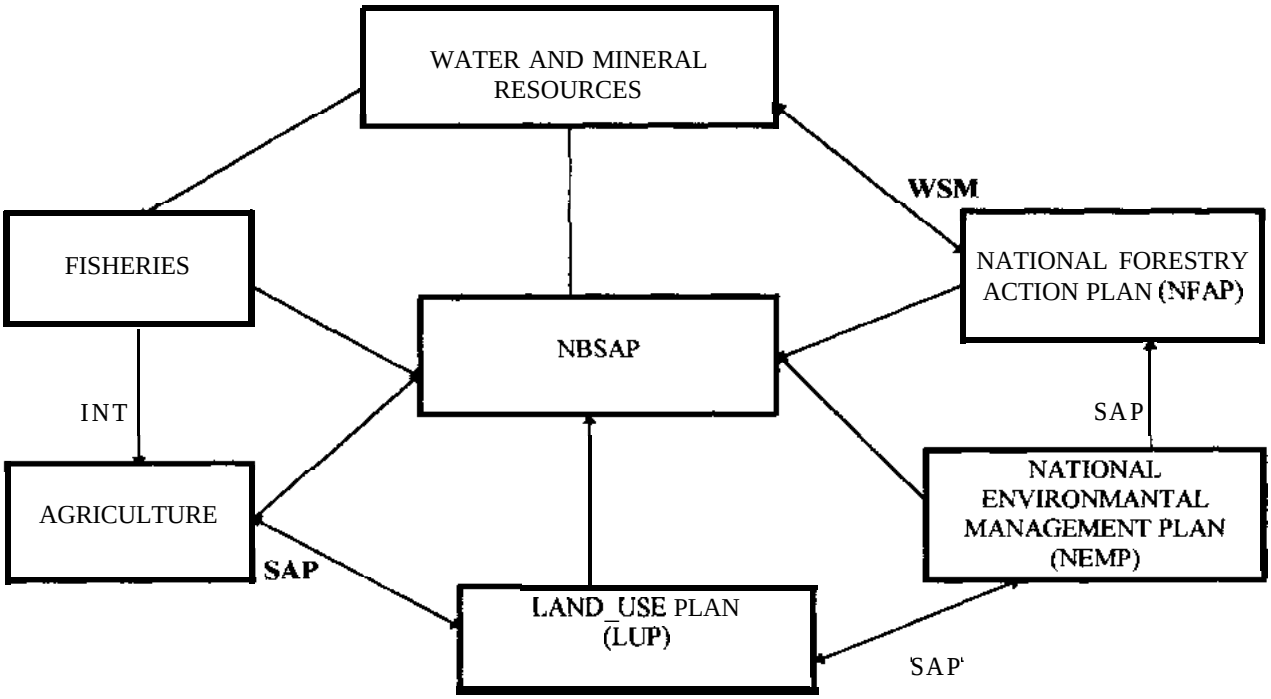


Fig. 6.2 Relationship of Action Plans

6.3 PROGRESS ON PUBLIC AWARENESS ON IMPORTANCE OF BIODIVERSITY

Throughout the national territory, progress has been made in sensitising the public on the importance of biodiversity ***. Success*** is sought through the following mechanisms:

The administrative structuring;
The media;
International organisations;
Financial and technical assistance;
Clubs and associations;
Village development programmes;
Public education, project location;
Traditional rulers.

6.3.1 *Administrative structuring*

Ministries which manage biological resources have their structures represented from ecoregional through provincial to district levels. In this way, policies and information on biodiversity reach the rural masses.

6.3.2 *The Media*

As a matter of policy, the national media (Cameroon-Radio and Television, the national daily, Cameroon Tribune), are usually invited to cover all important events on the creation, launching and other forms of information on the activities concerning management of our biological resources. resources. Through the media, the public is informed through the two official languages. as well as many local languages.

6.3.3 international Organisations

There are several international organisations which intervene in the various fields of biodiversity in Cameroon. These organisations work with the government ministries as well as with the local population where most of the activities are located.

6.3.4 *Financial and Technical Assistance*

Among the conditions for technical assistance from donor agencies is the provision for increased awareness on the importance of biodiversity. Sensitisation remains as an integral activity in some of the projects on biodiversity conservation and management. Reference is made to the ECOFAC, Korup, IUCN Dja Kilum/Ijim Mountain Projects, where sensitisation of the population is an integral activity within the projects.

6.3.5 *Traditional and Political Authorities*

Traditional rulers and political authorities are expected to collaborate with Government and all its institutions. This is required in the rural areas where activities on biodiversity are going on. Meetings and important events on biological resource management activities conducted by administrative authorities are usually attended by traditional chiefs and the political representatives of the area making Government policy known to the people. This practice disseminates Government policy to the people.

6.3.6 *Youth Clubs and Village Groups*

In many educational institutions, clubs, youth movements involved with environmental protection and biodiversity conservation exist. Common initiative groups also exist in many towns and villages. Important messages regarding biodiversity information and resource management are passed down through these groups who in turn diffuse the message to other members of the society..

6.3.7 *Public Education in Project Areas*

Most of the biodiversity conservation Projects carry out public education and sensitisation in their different project areas through the organisation of workshops' seminars' information bulletins' projection of films to local populations' organisation of quiz and other forms of competition on biodiversity issues. The actions carried out by the various projects has had a lot of positive impact on biodiversity conservation in the country as a whole.

7. RESOURCE AVAILABILITY

The strategies proposed and the various actions recommended can be meaningful only if financial and human resources are available to enable them to be realised. Financial, human and appropriate technologies are required. This section will be examined under :" budget" and "source of funding".

7.1 Budget Requirement for Execution of Strategy

The budget for the strategies is recommended for a 5-Year period to cover the main items involved in biodiversity management. Items which are considered are: studies, equipment, manpower, infrastructure, education, research, technology development, and information management. Table 7.1, shows the indicative budget proposals according to the various sectors.

The total approximate budget is estimated to be about 6 billions francs CFA ($ US 11 million).
* Only recently the Ministry of Transport has decided to include an environmental unit to take care of the environmental aspect in the course of their road infrastructure.

TABLE 7.1: PROPOSED J-YEAR BUDGET FOR BIODIVERSITY MANAGEMENT

BUDGET DESCRIPTION		BIODIVERSITY SECTORS						
BUDGET LINE	EXPENDITURE ITEM	A AGRICULTURE (Plant/Animal)	B FLORAL	C FAUNAL	D COASTAL / MARINE	E FRESHWATER	F Microbes and Insects	TOTAL
100	STUDIES	50.000	50.000	75.000	100.000	50.000	100.000	425.000
200	SPECIES IDENTIFICATION	25.000	30.000	25.000	10.000	20.000	60.000	1'70.000
300	EQUIPMENT	300.000	55.000	100000	30.000	30.000	110.000	625.000
400	MANPOWER	1.250.000	10.000	75.000	125.000	50.000	20.000	1.530.000
500	INFRASTRUCTURE	500.000	30.000	50000	20000	20000	70000	690.00
600	EDUCATION	75.000	15.000	25000	30000	10.000	60.000	215.000
700	RESEARCH	500.000	50.000	75.000	50.000	25.000	200.000	900.000
800	TECHNOLOGY DEVELOPMENT	200.000	30.000	50.000	40.000	50.000	80.000	450.000
900	INFORMATION MANAGEMENT CHM	50.000	50.000	80.000	20.000	20.000	50.000	270.000
1000	EVALUATION & MONITORING	90.000	100.000	150.000	100.000	900.000	100.000	1.440.000
TOTAL		3.040.000	420.000	705.000	525.000	1.175.000	850.000	6.715.000

***Estimates in 1.000 CFA**

7.2 Other Forms of Resources

Coupled with financial resources, other forms of resources will be required to enable biodiversity resources to be managed towards sustainability.

Among the other principal resources required are :-

- Manpower
- Infrastructure

7.2.1 Manpower

There is need for sufficient and qualified manpower resources to enable us cope with the requirements of bioresource information. Full knowledge of our ecosystems and genes is retarded by the lack of qualified scientists. There is need for specialists in the fields of :-

- Zoology
- Entomology
- Botany
- Oceanography
- Microbiology (virology, Bacteriology, Mycology)
- Genetics
- Soil science

and many other fields in order to cope with knowledge of the various areas of the varied nature of our biological resources.

7.2.2. ***Infrastructure***

The basic forms of infrastructure required in the various areas will be in the form of :-

- Road infrastructure - most areas of high biodiversity are still inaccessible.

- Housing infrastructure - Buildings are required to accommodate centres of education mostly within rural communities.

- Educational and Scientific Institutions - There is an urgent need to provide suitable educational institutions to disseminate knowledge related to our biological resources in accordance to Government's policy of education and involvement of the rural masses in resource planning and management. There is also the urgency to provide suitable laboratories to cope up with the studies and research on our species.

7.3 Sources of Finance

The main sources of finance for implementing the strategies will be classified under :

State contributions

Bilateral and multi-lateral funding which come in the form of Support funds ;

- Loans

7.3.7 *State Contribution to Funding*

This is the sum of all budgetary allocations in the different budget of the key biodiversity related Ministries and Organisms under their tutelage relating to biodiversity activities and investment.

7.3.2. *Bilateral and Multilateral Funding*

The bulk of the funding in this area will be derived from countries with which Cameroon has cooperation ties, from international Organisations , regional groupings and International NGOS.

7.3.3 Loans

Some major realisations and investment in biodiversity conservation in areas where bilateral or multilateral funding is lacking will be carried out through the contracting of loans.

7.4 The Actual Situation

Nowadays in Cameroon, programmes exist on biodiversity conservation in several sites within the various ecosystems (Map on Operational Forest Management Projects)

Resources from these programmes are :-

- Technical Assistance from member countries who have expressed interest in themanagement of Cameroon's biodiversity.

- State Contributions in personnel, infrastructure and budgetary allocations
- Donor organisations under bilateral and multi-lateral funding

CALENDAR

The schedule of activities is illustrated in Fig. 8. Only the main items have been considered for the COP timetable. The calendar stretches for a period of 13 months during which a number of major activities are expected to be accomplished. The activity period is from January 1997 to February 1998. Whereas the meeting of the COP has been held annually since 1994, there was no COP meeting during 1997. After COP3 in 1996, the next meeting COP4, will be held in 1998 in Latvia.

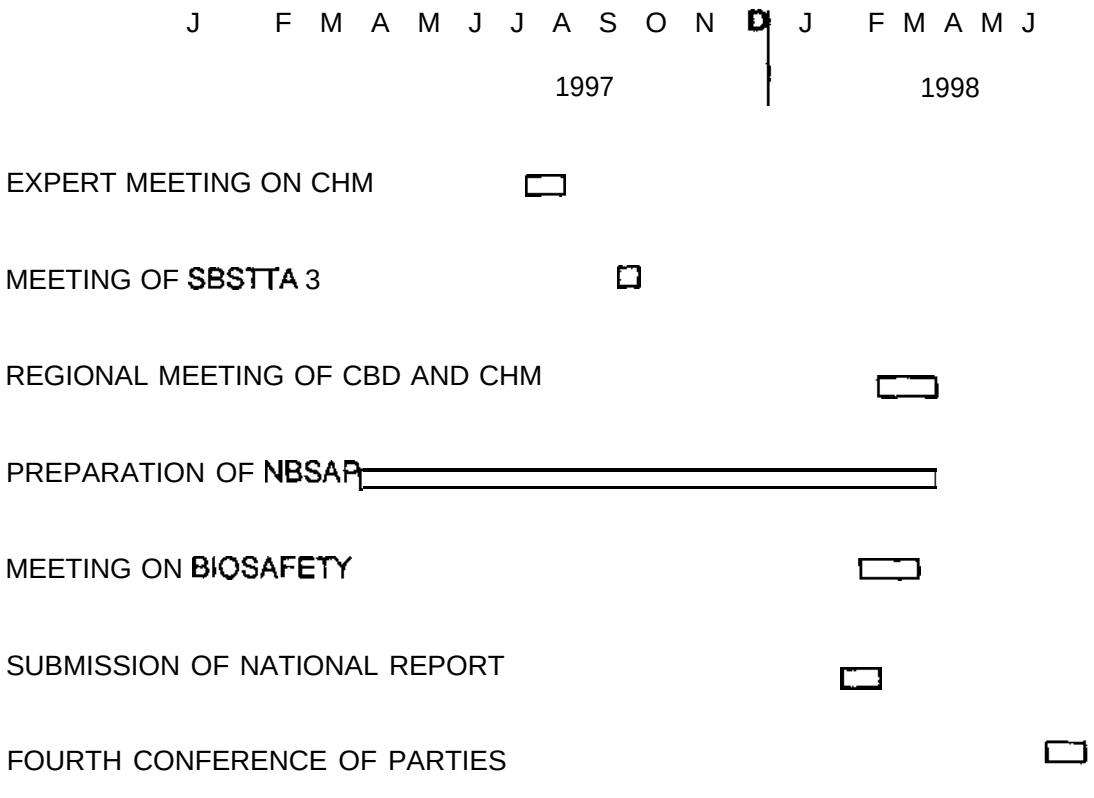


FIG 8:CALENDAR OF THE CBD ACTIVITIES (1997/98)

9 MONITORING & EVALUATION

There is need to monitor and evaluate the evolutionary trends of the state of our ecosystems and our biological resources, in order to know:

- The state of exploitation and utilisation
- The measure of productivity and other primary demographic parameters.
- The behaviours of the particular species through collection of quantitative data;
- The evolution of the species population their breeding sites, species composition, population sizes);
- The time to take a decision for or against a given trend, lessons learned and recommendations for improvement.

9.1 **National Efforts in Evaluation**

Considerable efforts are underway in resource evaluation through

- Resource inventories;
-Characterisation/identification of various species ;
-Socio-economic studies, etc.

In most sectors (private and public) handling the management of biological resources, there are programmes and projects aimed at the evaluation and monitoring trends in resource development. In the agricultural, livestock, fishery and forestry sectors , some evaluation is undertaken but not as full and regular activities. In all the sectors monitoring is undertaken much more as experimental activities and not as a regular national concern.

The degree of evaluation and monitoring in various sectors is shown in Table 9.1.

TABLE 9.1: DEGREE OF EVALUATION & MONITORING

SECTOR	EVALUATION		MONITORING		REMARKS
	REGULAR PROGRAMMES	EXPERIMENTAL	REGULAR	EXPERIMENTAL	
AGRICULTURAL	X	X	X	X	Plantain news Insect Pest monitoring, rapid alert system,
FISHERIES		X		X	
ANIMAL HUSBANDARY		X			System of alert and signalling of

	-		-	X	epidemics Forest dynamics in Korup
FORESTRY	-		-		
MICRO BIOLOGY	-		-		-
HUMAN POPULATION					National demographic surveys

Evaluation and monitoring is complicated by the absence of regular and upto-date information in the major areas of biological resources. Table 9.1 shows that in all the main sectors of the economy evaluation is not undertaken as a matter of principle except in the agricultural sector where both evaluation and monitoring are done regularly. The Plantain/Banana monitoring and insect pest monitoring are specific areas in agriculture where monitoring and evaluation are going on; There is monitoring and evaluation in the diversification for agricultural exports project. There are also efforts on monitoring conducted by the Bioresource and Diversity Conservation Programmes in Cameroon (BDCPC) in collaboration with the Smithsonian institute in an effort to evaluate tropical high forest dynamics using the Korup National Park.

9.2 Internal Evaluation

This occurs mostly within projects and it is meant for the follow-up of a specific activity objective. It is usually carried out by the project authorities. The results are rarely shared with other parties since the situations are not specifically identical. It is hoped that with the arrival of the CHM processes information on monitoring will be included among other date to be collected and stored on a national basis.

10. SHARING NATIONAL EXPERIENCE

10.1 Experience Sharing in Biodiversity

As it has been reported in section **2** of this report, Cameroon has been sharing its experience with international organisations and other countries on the knowledge of various forms of genetic resources. Many of these organisations intervene directly and carry out operations within the country, information from these activities is eventually published and made available to researchers, other international bodies, universities and friendly governments who require the information.

Information on biological resources is built from the following activities :

- Project execution;
- Various forms of research results or findings;
- Public sensitisation including the media-radio, television ,press;
- Seminars/meetings (national and international);
- Publications of scientific nature.

In November 1996, Cameroon organised an important seminar on the "Availability of National Research Findings" in the Ministry of Scientific and Technical Research in which researchers on Agriculture, Fisheries, Mines and Geology, Zoology, Medicinal Plants attended present. Several countries of the Central and West African Sub-regions participated in the seminar.

10.1.1 National Implement of the Clearing House Mechanism

Cameroon has progressed considerably in the implementation of the Clearing House, so far the following results has been achieved :

- The signing of a memorandum of understanding (MoU) with the Government of the Fedleral Republic of Germany for technical assistance towards the implementation of the CHM.

- Cameroon's linkage to the World Web Internet system will enhance the gathering, and processing of information

- Application for the GEF funding for the enabling activities to provide the basic equipment and install them for the access we very much require;

- A system of information collection is being developed pending connection to the Internet.

The implementation of the regional environmental information management programme for the central African region is another venue for quick access to information on natural resource management.

10.2. *Thematic contributions*

So far, no regular schedule (e.g. networking allows for national experts/specialists in respective fields/sectors, etc., to share their experience with others. However, the Cameroon Biosciences Society organises annual conferences. There is usually a main theme but other bioscience sectors/disciplines are given sub-themes for treatment. National experience in $ and, therefore, biodiversity, is shared in the framework of conference presentations and proceedings. Furthermore, officials working in the "Protected Areas" (of National/Environmental Management Plan) have 6 monthly meetings to present and discuss reports.

11. BENEFIT SHARING

Benefit-sharing can be assessed with respect to incomes and derivations from exploitation of genetic resources. Benefit-sharing assists in achieving the participatory concept and the sensitisation of the local communities. Benefits can result from land revenue, products from exploitation, infrastructure or indirectly as employment, and social gains. Thus products from genetic resources can yield either direct or indirect benefits. Land is a primary resource from which benefits from genetic resources originate. In Cameroon land ownership and the resulting benefits (income, products, etc.) are usually shared. So far benefits sharing from exploitation of biological resources (biodiversity prospecting) has taken the form of cash or equipment for individuals, laboratories and community services.

11.1 Resource Components Under Exploitation

The degree of exploitation and amount of products yielded depends on the ecological zone. (Table 11 .1) Timber products in the dense forest in the south are in great supply and largely serve for external trade while wildlife products in the sahelian north are largely exploited and serve the internal markets. The country is largely « self-sufficient » in food production given its various ecological zones, fertile soils. Export crops are now very diversified, except for factors like droughts, floods, locust attacks and other pests diseases. The areas (Table 11 .1) under exploitation provide the products for both internal and external trade.

Table 11 .1: SOME RESOURCE EXPLOITATION COMPONENTS

SECTOR	ZONE	BENEFITS		COMMERCIAL DESTINATION	
		DIRECT	INDIRECT	Int.	Ext.
LAND	All zones	Revenue from land rents	- Food products - Revenue from food sales	X	
FORESTRY	Timber-Taxes - Wood for furniture, energy -Non-Timber Forest Products - Building -Wildlife resources		- Employment - Sand/gravel - Road infrastructure - Social benefits - Medicinal, cultural products - local building materials - Hunting possibilities.	X X X X	x x x
MARINE and BRACKISH WATER		- Fish for food and commerce - Water for industrial use and irrigation - Water for domestic uses pasture - Wood for domestic energy use.	Irrigation Pasture Animal husbandry	X X X	X

WILDLIFE		- Wildlife-taxes from tourism -Wood for energy -Non Timber products	infrastructure Social benefits Medicinal products	X	X
AGRICULTURE		Cocoa, coffee, bananas, rubber, oil/palm; maize, etc. .;	Employment - Food	X	X

11.2 Existing Policies **on Benefit - Sharing**

Policies on benefit-sharing are based on the regulations governing the land tenure systems, exploitation of forestry, fisheries and wildlife resources. The policies stipulate that the local communities within which resources are being exploited should:

- Be informed on the intention to exploit a given resource;
- Participate in deciding the process of exploitation;
- Be encouraged through employment within the exploitation activities;
- Be remunerated communally through taxes which should be paid to their councils or municipalities or communities.

11.3 Level of Benefit-Sharing so Far Achieved

The level of benefit-sharing so far achieved is in the form of communal taxes and it could be said that the payment of these taxes ensures that the communities concerned actually derive the intended benefit. So far the level of achievement on benefit sharing is :

- In the form of direct taxes paid to the local councils;
- In the form of infrastructure (road or social services);
- In the form of employment;
- In the form of cash/kind (biodiversity prospecting and product harvesting).

11.4 **Principal Beneficiaries**

The principal beneficiaries of the benefits arising from resource exploitation are:

- The traditional rulers and owners and custodians of land ;
- The local communities through taxes and social infrastructures;
- Individual villages through employment
- Individuals (traditional healers, prospectors) and/or services closely associated with the use of the resource.
- Organised groups such as Common Initiative Groups, University Clubs, etc.

11.5 Benefit Sharing and Biodiversity Protection

The involvement of local communities in biodiversity and habitat protection has taken many forms in Cameroon. The well known forms occur in projects on sustainable forest management like :

- The Mount Cameroon Project in which several village communities around the Mount Cameroon are involved in the exploitation of the barks of Pygeum *africana*, a medicinal plant which is being threatened and heavily used as the raw material for a processingpharmaceutical factory.

- The Kilum, Ijim Project sponsored by Birdlife International in which village communities are being encouraged to plant *Pygeum africana* along the Oku Forest and participatory management in order to protect the fragile Oku Forest Montane vegetation.

- The Dja Biosphere Reserve Project sponsored by ECOFAC, and IUCN encourages participatory management and controlled hunting around the heavily poached sections of the reserve, through the creation of alternative economic activities, sanitation facility the local communities.

- In the case of the Korup Project financed by the European Community, DFID, WWF and GTZ participatory management entails the rational use of non-timber forest products and engagement of the population into income-generating activities with the bid to reducing pressure on the forest.

- The SHAMAN/BDCPC policy of benefit-sharing whereby cash payments and social services are provided to the indigenous people is an indication of the kind of benefit-sharing which is intended to benefit the local communities for exploitation of medicinal products in Cameroon.

So far recorded achievements in benefit-sharing have resulted in :

- Increased sensitisation of the local communities
- Considerable reduction in illegal exploitation
- Improved relationship between villagers and government/project staff
- Increased benefits to villages either individually through employment or collectively in village treasury or some form of infrastructure.

11.6 Intellectual Property Rights

In Cameroon, the recognition of Intellectual Property Rights (IPR) on genetic resources has not yet taken its rightful place in spite of the agreements signed with member countries of the African Intellectual Property Organisation. There are a number of reasons that prevent the full exercise of the rights and in particular on the aspect of technology transfer which the CBD emphasises. Some of these are :

- The absence of a national legislation governing Intellectual Property Rights on Biodiversity;
- Poor organisation within the local communities to enable the follow-up of the information and knowledge leading to these rights ;
- Ignorance of the village communities and individuals who should normally benefit from knowledge leading to IPR.

Cameroon has, however, signed four main agreements on the protection of IPRs, the principal ones being:

(a) The Bangui agreement of 1977 creating the African Intellectual Property Organisation (OAPI) which governs inventions, patents, trade names, unfair competitions, documentation and, copyrights.

The Bangui Agreement is not clear on the protection of IPRs in relation to genetic resources, new varieties of plants and modified biological organisms.

(b) The Paris Convention of 1883 which protects patents, industrial, design, trade marks, etc.

c) The Bern Convention of 1977 which protects literally and artistic works of authors;

(d) International Union for the Protection of new Varieties of Plants 1991 (UPOV). This was the first consideration of the new varieties of plants

(a) The World Trade Organisation Agreement which replaced the General Agreement on Trade and Tariffs

Under the provisions of Article 16 of the CBD, greater emphasis has been made on the need for parties to the Convention to apply the terms of this article if the goals for " conservation and equitable sharing of Benefits from Genetic Resources'* have to be achieved.

12. BIOSAFETY AND BIOTECHNOLOGY

Biosafety and Biotechnology is another priority among the programmes of the CBD and since contracting parties have been requested to contribute in the safe handling and transfer of living modified organisms (LMOs), Cameroon has also prioritised these programmes. Considerable effort is underway to contain (at national level), contribute at regional and global levels to the requirements regarding biosafety and biotechnology.

12.1 National Efforts on Biosafety and Biotecnology

- Institution of a multi-sectorial committee on biosafety;
- Participation in all international conferences on biosafety/biotechnology;
- First conference in Madrid 1995 for developing UNEP International Technical Guidelines;
- Expert meeting in Cairo - Egypt;
- Regional conference in Cote d'Ivoire - 1996;
- Participation in the 1st biosafety working group meeting in Aahrus -Denmark, 1997;
- Participation in both the 2nd and 3rd biosafety
- working group meetings in Montreal, Canada (May and October, 1997).

NATIONAL PROGRAMME ON BIOSAFETY

A national programme on Biosafety in Cameroon has just started aimed at the elaboration of a national policy and enactment of a legal framework which will pay particular emphasis on :

- Enhancing of the institutional capacity of the Biotechnology Centre in Nkolbissong and others
- Research Programmes;
- Human Resources capacity building;
- Sensitisation of the public;
- Importation / production of modern biotechnology products.

Cameroon has several advantages in putting up a workable programme on biosafety/ biotechnology. Among the advantages are :

The country is at a very low stage of production of modern biotechnological products. There is great need for modern biotechnology in order to improve on food and animal production; to reduce health cost, industrial cost while ensuring the conservation of the country's rich biological diversity and protecting human health;

- There is neither policy nor other legal framework on biotechnology/biosafety
- There are considerable knowledge gaps in the country in the field of interaction between Living Modified Organisms (LMOs),, the environment and risk management;

- The implementation of biosafety/biotechnology programmes is a translation of Government's international commitment into national realities as shown in the ratification of the Convention on Biodiversity;
- The country's concerns regarding ethical, social and economic aspects of the adverse impact of genetically modified organisms (as they will affect the livelihood of our populations) can only be made known through Cameroon's involvement in the biotechnology/biosafety international debate and the establishment of country position on the issue.

A BIOTECHNOLOGY RESEARCH CENTRES

Research on LMOs is (Important in crop improvement) carried out by the Regional Agricultural Research Centre, Ekona. There is well-developed centre for Biotechnology at the University of Yaounde consisting of an International Scientific Committee on biotechnology and a well-developed Plant Biotechnology section which caters for research in agriculture, agro-industries and the environment. There are three laboratories namely, tissue culture, microbiology and genetic laboratories. Similarly the Animal Biotechnology section caters for human and animal research. The laboratories in this section are: the immunology laboratories, moleuclar biology laboratory and biochemistry laboratory. See organisational chart

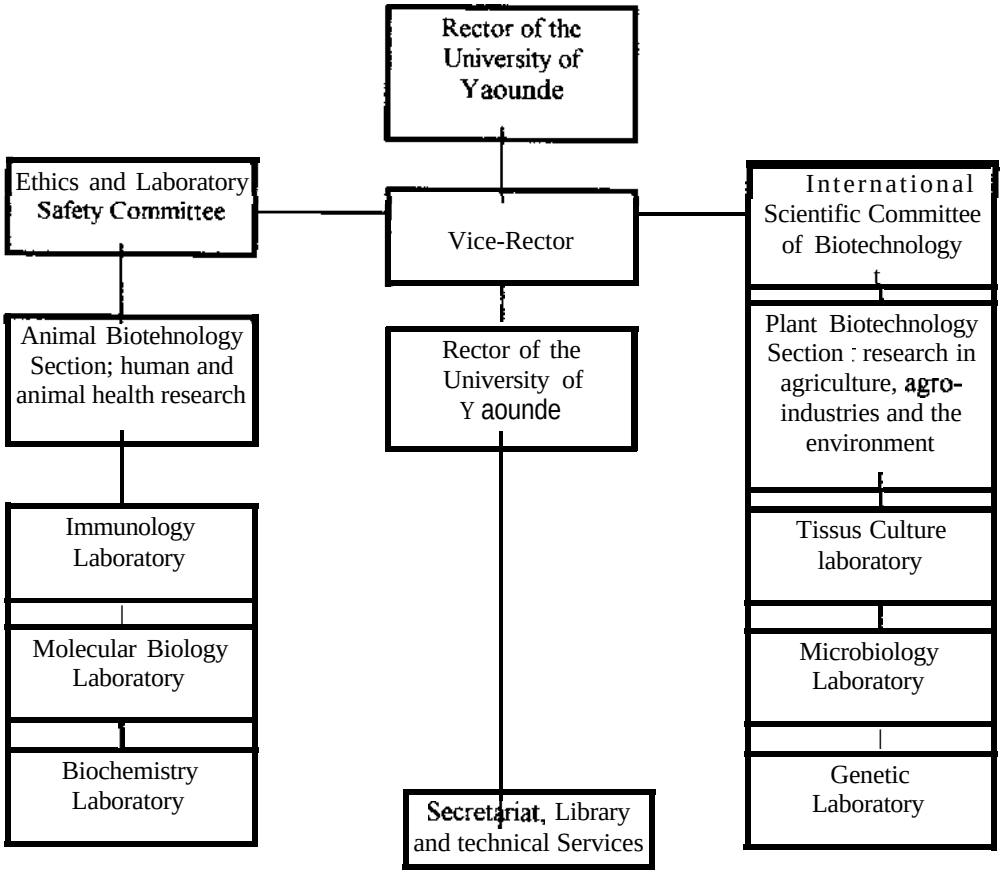


Figure 12 Organisation chart of the Centre of Biotechnology at the University of Yaoundel

B RESEARCH PROGRAMMES

Research in animal biotechnology:

Because of the occurrence of infectious and parasitic diseases, a number of research programmes have been undertaken with the following main objectives :

- To develop simple diagnostic methods which are sensitive, specific, and inexpensive and capable of being used for the detection of pathogens or carriers to human;

- To develop and/or produce vaccines against those diseases;

- To develop effective drugs based on the active principles of medicinal plants which can be used in treating the diseases. Malaria, schistosomisasis, onchocerosis, and trypanosomiasis are studied since they are dominant in Cameroon.

Research in plant biotechnology:

In this area, the main researches are :

- Preservation of genetic resources of the flora of Cameroon, thanks to the constitution of a germplasm bank;

- Improvement of agriculture and agro-industry and diversification of the nutritive and edible plants;

- Environment protection e.g. through sewage systems purification.

C PROGRESS AND ACHIEVEMENTS

The following achievements have been made at national level by the biotechnological Research Programme:

- Since the establishment of the Biotechnology Centre, it is now possible to use genetic engineering techniques for:

- The development of a test for river blindness (Onchocercosis) through the use of monoclonal antibodies.

- In plant biotechnology, the exploitation of the properties of nodules in legumes has been achieved for natural fertilisation with the help of atmospheric nitrogen-fixing bacteria;

- Studies aimed at eradicating cocoyam root rot (*Pythium myrotilum*) are well advanced.

- The production of Living Modified Organisms (LMOs) has not yet reached the commercial stage. Interesting results have however been achieved but not yet made public.

D CONSTRAINTS AND LIMITATIONS

The following are the limitations in the fields of biotechnology/biosafety

- Lack of a national oversight;

- Insufficient means to enable the proper functioning of existing research institutions;

- Lack of funds to increase the number of programmes and disseminate results;

- Non-continuity of research work on biotechnology since the economic recession;

- Insufficient flow of information from research and development of the LMOs to the agro-industrial sector.

E COOPERATION

Cameroon has made considerable efforts towards bilateral and international co-operation in the domain of biotechnology. This co-operation has brought possibilities for contacts with bodies: IITA, NCI, UNIDO, WARDA, FAO.

MEMBERSHIP OF ORGANSATIONS

Cameroon is a member of many regional and international institutions and commissions which could facilities benefits from biotechnology/biosafety both at regional and international levels. These include:

- Central African Customs and Economic Union UDEAC
- Economic Community of Central Africa States (ECOCAS);
- Economic Commission for Africa, ECA;
- Lake Chad Basin Commission;
- World Trade Organisation;
- Party to the Convention on Biological Diversity;

The Economic Commission for Livestock, Meat and Marine Resources. Cameroon is the seat of the African Organisation for Intellectual Property Rights (AOIP, for francophone African countries) whereby researchers can obtain patents on Intellectual Property Rights (IPR).

13. INDIGENOUS KNOWLEDGE

Throughout the national territory, indigenous knowledge exists in the various fields of biodiversity and very often on tribal basis. Indigenous knowledge is not documented and therefore, neither exchanged nor handed down to future generations. Much of the knowledge is held or within village communities and only used during critical occasions. Knowledge of treatment of some diseases is only told and handed to special family members. Much of the knowledge is not known to the public and therefore, can only be exploited and investigated using special approaches and techniques.

13.1 The Kinds of Indigenous knowledge Identified

In Cameroon, indigenous knowledge exists in the form of

- Traditional science;
- Technologies
- Traditional patterns;
- Habits and customs

Table 13.1 shows forms of indigenous knowledge occurring within most areas of the Cameroon's eco-regions.

Table 13.1 shows forms of indigenous knowledge occurring within most areas of the Cameroon's eco-regions.

Table 13.1 AREAS OF INDIGENOUS KNOWLEDGE IN CAMEROON

FIELD OF KNOWLEDGE	TRADITIONAL SCIENCE	TECHNOLOGIES	HABBIT AND CUSTOMS	ECO - REGION
AGRICULTURE	Domestication of crops/livestock, breeding etc.	Farming techniques	Governed by taste and cultures, etc.	All - Regions
FOOD PROCESSING AND STORAGE		Abundant Local methods of food processing	Governed by taste culture, life style, etc.	All regions
BREWERY SILVICULTURE/HORTICULTURE	Selective tree and flower growing			All regions
FISHING	Mastery of fish behaviour and various fishing methods	Traditional fish technologies	Activity of communities in the marine, river/lake areas.	Marine and Fresh- water areas
NATURAL SCENCES	Botany, Zoology, Soil Science Geology, History	Germination and raising, etc.	Traditional names and behaviour of plants and animals, soil types, exist within local communities	All regions
MEDICINE - (HUMAN/VETERINARY	Traditional Healing of many diseases in human and domestic animals	Many forms have been developed to be used in the healing processes	Several customs and practices are used	All eco-regions
RELIGION	Traditional belief of a Deity, a Divine authority		local forms of worship ceremonial libation	All regions
CRAFTS MANSHIP		Carving, Weaving, Pottery	bowls, bags, clay pots are customary y in some communities, etc.,	Forest, sahelian /Savannah coastal marine
ART and MUSIC	Music and art are developed and appreciated..	Music instruments developed: - local guitar, drums, flutes, etc.	Art is practised as a custom tattooing, beauty make-up	All regions

COMMUNICATION	Developed as local means of contact- traditionai messages. Information is also transmitted.	Special message devises, local letters, dresses of emissary	Regular with most village communities	In regions where modern communication methods are absen
ADMINISTRATION/JUSTICE	Traditional rulers and family heads use local administration and justice		Regularly used to maintain discipline and justice	All the regions
LANGUAGE POWER	Variety of languages expressed differently		Expressions and proverbs related with nature of biological resource	All regions
SPORTS AND GAMES	Traditional sports and games		Every society has its customary sports and games	
HUNTING	Hunting Practices	Special hunting techniques trapping technologies	Trapping, arrow hunting, method of attracting prey	Forest zone and sahelian/savannah
BREWERIES	Knowledge of extraction fermentation and distillation of saps and honey		Local beers and liquors	
PHARMACOLOGY	Mixing of extracts in definite proportions		Traditional use of herbal mixtures for ailments.	
CULTURE	Rich culture exists in every traditional society	Several technologies associated with cultural manifestations	Cultural festivals , cultural rites - birth , deaths, initiation ceremonies, etc..	
WAR/FARE	Defence Practices	Weapons developed locally	local herbs ointment against different forms of attack. etc.	Exists in all communities
WITCHCRAFT	“Secret science”, hardly discussed	No known technologies	Practised for self protection and get prominence in society through affluence	

Source - Bokwe- Exploitation of NTFP in S. Bakundu Forest Reserve.

14 OTHER RELATED INTERNATIONAL REPORTING REQUIREMENTS

14.1 **RELATED CONVENTIONS** AND TREATIES RATIFIED BY GOVERNMENT OF CAMEROON

Cameroon has signed a number of agreements related to bioresources These agreements took the form of treaties and conventions and are classified under « Universal », « Continental », and "Subregional" conventions.

UNIVERSAL CONVENTIONS

- Convention on the Protection of Cultural and Natural Heritage (Pans, November 23, 1972);

- Convention on International Trade in Wildlife and Endangered Species

(CITES) Washington, March 3, 1973

- Vienna Convention on the Protection of the Ozone Layer (Vienna, March 22, 1985);

- Montreal Protocol on the Control of Susbstances that deplete the Ozone layer (Montreal, 16 September, 1987);

- Convention on Migratory species Species (CMS) Bonn, 1979;

- Convention of Climate Change (June 14, 1992);

- Convention on Desertification (Paris, October 1994);

- Co-operation agreements with international NGOs (IUCN, WWF, ITTO,).

CONTINENTAL CONVENTIONS

- Convention on the Conservation of Nature and Natural Resources (Alger, 1968);

- Bamako Convention on Waste Importation in Africa its transboundaty movement and management of toxic wastes.

SUB-REGIONAL CONVENTIONS

- 1964 Accord Creating the Lake Chad Basin Commission;

- Accord on joint regulation of fauna and flora within the Lake Chad Basin (Enugu, December 3rd, 1977);

- Convention on Co-operation relating to the Protection and Development of Marine Environments and the Coastal areas of West and Central Africa (Abidjan, March 16, 1981);

- Accord for co-operation and concertation among Central African states relation to wildlife conservation (Libreville, April 16, 1983);

- African Timber Organisation (ATO).

Cameroon’s commitment to the implementation of the provisions of the above treaties and conventions is an indication of the enabling environment provided by the government, which is a prerequisite for the achievement of biodiversity conservation, its sustainable use and the sharing of benefits derived from the exploitation of genetic resources.

CONCLUSION

This first national report on the implementation of the Convention on Biological Diversity is derived from reports submitte by the Task Force for preparation of the National Biodiversity Strategy and Action Plan (NBSAP) and from earlier documents/plans. It attempts to relate activities in those documents/plans with the objectives of the CBD. The report, from the state of biodiversity nationwide, goes through the strategy and action plan (under preparation) necessary to meet the expectations of the Convention or Biological Diversity. The major prior plans include the National Environmental Management Plan (NEMP) the National Forestry Action Plan (NFAP) and the Land Use Plan (LUP). These plans by their nature, did not and were not expected to treat biodiversity in its entirety. They treated biodiversity at "overlapping point only". Strategies/actions at these points are to be absorbed into the NBSAP. The report reveals that Cameroon is progressing satisfactorily towards the expectations of the Convention especially as all the stakeholders in biodiversity are consulting each other, collaborating, sharing information and benefits both in biodiversity sustainable management and genetic resources.

It is hoped that the Ministry of Environment and Forestry as the Focal Point to the Convention in Cameroon will provide the much needed co-ordination to enhance the implementation of the goals set for biodiversity activities in the various areas.

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Appendix I

APPLICATION OF THE CONVENTION ON BIOLOGICAL DIVERSITY IN CAMEROON

To what degree has the CBD been applied in Cameroon ? The analysis below shows the extent to which the Convention is being applied in accordance with article 26 of the CBD which stipulates the obligation of each contracting party to report on measures taken to ensure the implementation of the convention.

ARTICLES	WHAT THE CONVENTION REQUIRES	APPLICATION IN CAMEROON	ACTUAL SITUATION
3	SOVEIGNTY IN RESOURCE EXPLOITATION ACCORDING TO THE UN CHARTER	Cameroon organises exploitation of its biological resources according to its national policies and legislation.	All exploitation of natural resources are under state control with indigenous populations participating and sharing in benefits
4	RESOURCE ACTIVITIES TO BE CONFINED WITHIN NATIONAL TERRITORY	- Cameroon operates within confines of its territory. - Agreement with foreign governments for co-ooeration.	- Activities within Cameroon exist. Cases of sub-regional/bilateral co-operation are many.
5	COOPERATION WITH OTHER COUNTRIES	- Exists in the form of treaties and agreements. - In the form of regional co-operation - Implementation of the CHM	ECOFAC, LAKE CHAD BASIN COMMISSION COMMISSION, PROTOCOL with GTZ for setting the CHM UDEAC "ECOCAS" established
6	GENERAL MEASURES FOR CONSERVATION AND DEVELOPMENT OF MONITORING	Legal frame work, established Institutional setting, Complementarily of various articles of CBD	MINEF,MINEPIA, MINAGRI,MINREST, all created and fulfil specific roles. Elaboration of NFAP, NEMP and NBSAP-Cameroon.
7	IDENTIFICATION AND MONITORING	Knowledge of resource base going on through different forms of resource inventories species description and identification research in Agric, Fisheries,	In agric. Several varieties of crops have been identified/developed and on-going. In forestry-inventories in 14 million ha have been done

		Forestry.	In fisheries, FAO code of responsible fishing started in 1996
8a,b,c	CREATION OF PROTECTED AREAS	High priority in Government Policy - Aims at putting 30% of total land area under protection - Aims at creating marine protected areas. - Recovering protected areas lost through population's encroachment	- Several projects underway to identify -protected and suitable areas - Game reserves, parks created
8d,f,j,k	CONSERVATION AND SUSTAINABLE USE OF BIOLOGICAL RESOURCES	New policies in application, fisheries, forestry and revision of fisheries, wildlife and forestry laws emphasise on : - Better management techniques - Education and sensitisation - Participatory management - Incentive measures - Improved farming and fishing methods	Success is being achieved in agriculture-better yields, resistant breeds/varieties conservation ex *situ* on research stations (better for plants than for animals).

8,f,I	REHABILITATION OF DEGRADED ECOSYSTEMS	Special attention is being given to fragile ecosystems like : . Montane areas . Water-sheds Wetlands Heavily farmed lands . Sahel (drought)	Mt. Cameroon Kilum Kupe Manengouba Korup projects. These are reserves in water-shed areas. and fragile ecosystems.
8h	CONTROL OF ALIEN SPECIES THAT THREATEN ECOSYSTEMS	Agricultural policy. . . . Control of import/export of species/varieties/breeds, Creation of 'homes" (cradles) for animals	. Plant protection law of August, 1990. Breeds protection decree of 1994. . Early warning system/mechanism for disease/danger.. control International transhumance certificate
9	CONTROL RISKS FROM BIOTECHNOLOGY	* Efforts underway for the control of : - Living modified organisms (LMOs) - Pollutants and contaminants - Influx of alien species • Cameroon is developing a national code on biosafety and participation in development of international protocol on Biosafety.	Phytosanitary control in existence in boarder posts: Law on import/export of plants, etc.. Committee on biotechnology created by MINEF.