



THE REPUBLIC OF UGANDA

NATIONAL BIODIVERSITY STRATEGY AND ACTION PLAN

**NATIONAL ENVIRONMENT MANAGEMENT
AUTHORITY (NEMA)**



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ACRONYMS

AGDP	Agriculture Gross Domestic Product
AI	Artificial Insemination
AWF	African Wildlife Foundation
AnGR	Animal Genetic Resources
ASL	Above Seal Level
CARE	CARE – Uganda
CBO	Community Based Organization
CITES	Convention on International Trade in Endangered Species
CFM	Collaborative Forest Management
CFR	Central Forest Reserves
DAD	Domestic Animal Diversity
DANIDA	Danish Development Agency
DDC	District Development Committee
DEAP	District Environment Action Plan
DRC	Democratic Republic of Congo
DTPC	District Technical Planning Committee
DWD	Directorate of Water Development
EAC	East African Community
EIA	Environmental Impact Assessment
ERC	Economic Recovery Credits
ERP	Economic Recovery Programme
ESAF	Enhanced Structural Adjustment Facility
FAF	Faculty of Agriculture and Forestry (Makerere University)
FAO	Food and Agricultural Organization of the United Nations
FD	Forest Department
FIRRI	Fisheries Resources Research Institute
FMP	Forest Management Plan
FORI	Forestry Resources Research Institute
FSUP	Forest Sector Umbrella Programme
FVM	Faculty of Veterinary Medicine (Makerere University)
GDP	Gross Domestic Product
GEF	Global Environment Facility
GMO	Genetically Modified Organism
IGAD	Intergovernmental Authority on Development
IMF	International Monetary Fund

ITFC	Institute of Tropical Forest Conservation
ILRI	International Livestock Research Institute
IUCN	The World Conservation Union
LA	Local Authority
LFR	Local Forest Reserves
MAAIF	Ministry of Agriculture, Animal Industry and Fisheries
MOET	Multiple Ovulation and Embryo Transfer
MOLG	Ministry of Local Government
MOWHC	Ministry of Works, Housing and Communications
MUBFS	Makerere University Biological Field Station
MUIENR	Makerere University Institute of Environment and Natural Resources
MUK	Makerere University Kampala
MWLE	Ministry of Water, Lands and Environment
NPGRP	National Plant Genetic Resources Programme
NAARI	Namulonge Agricultural Research Institute
NBDB	National Biodiversity Data Bank
NBU	National Biodiversity Unit
NEAP	National Environment Action Plan
NEMA	National Environment Management Authority
NGOs	Non-Governmental Organizations
NFAP	National Forest Action Plan
NORAD	Norwegian Agency for Development Co-operation
NWCMP	National Wetlands Conservation and Management Programme
NWSC	National Water and Sewerage Corporation
PEAP	Poverty Eradication Action Plan
PFE	Permanent Forest Estate
PGR	Plant Genetic Resources
QENP	Queen Elizabeth National Park
SAC	Structural Adjustments Credits
SAARI	Serere Agricultural and Animal Production Research Institute
SOER	State of Environment Report
THF	Tropical High Forest
TLUs	Tropical Livestock Units
TRIPS	Trade-Related Aspects of Intellectual Property Rights
UEB	Uganda Electricity Board
UFFCA	Uganda Fisheries and Fish Conservation Association
UIE	Uganda Institute of Ecology

UNESCO	United Nations Scientific Education and Cultural Organization
UNDP	United Nations Development Programme
UNCST	Uganda National Council for Science and Technology
URC	Uganda Railways Corporation
USAID	United States Agency for International Development
UWA	Uganda Wildlife Authority
WAD	Wild Animals Diversity
WID	Wetlands Inspection Division
WTO	World Trade Organisation
WWF	World Wildlife Fund for Nature

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I can only say thank you to all of you and keep the candle for biodiversity conservation in Uganda burning.

Aryamanya-Mugisha, Henry

Executive Director

NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY

FOREWORD

Uganda is widely recognized as one of those countries in Africa which has taken very significant steps to address the issues of biodiversity conservation and management. Because of its unique physical features and biogeographical location, Uganda is also known to be one of the richest countries in Africa in terms of biological diversity. This biodiversity represents one of the vital economic resources that the country has. The services and products provided by biodiversity in form of ecosystems, species and genetic resources contribute billions of shillings per year to Uganda's economy. For example, the gross economic output attributable to biological resource use in the fisheries, forestry, tourism, agriculture and energy sectors is estimated to be in excess of USh 820 billion (US\$ 546.6 Million) a year. Biodiversity also supports economic output indirectly because it provides secondary inputs, ecosystem services and functions that support and maintain human production and consumption. These indirect benefits are said to be worth at least USh 300 billion (US\$ 200 million) a year.

In addition to these direct gains in government revenue, biodiversity resources also support some of the poorest and most vulnerable sectors of Uganda's population. The rural people, the landless and women are highly dependent both on biological resource utilization, and on the diversity of resources that provides them with choice and fall back in times of drought, unemployment or other times of stress.

Besides having a high socio-economic value currently, Uganda's rich biodiversity also forms a key part of future sustainable economic development and growth. Many of the sectors targeted for future economic growth - such as fisheries, hydropower, tourism and agriculture - depend directly on biological resources and ecosystems. Biodiversity conservation also maintains a diverse pool of genetic resources available for future developments and applications, some of which may not be known now. These may contribute to the further development of tourism and leisure activities, and the use of resources for a wide variety of agricultural, industrial, pharmaceutical and medicinal applications.

Despite this vital importance, we continue to lose our biological resources due mainly to human induced causes such as encroachment, habitat destruction, poaching, over fishing, deforestation, pollution and introduction of invasive alien species. Urgent steps are therefore needed

at all levels to conserve our biological diversity and to ensure sustainable use of its components with a view to achieving sustainable development.

It is for this reason that the Movement Government has over the years taken concrete steps to ensure that conservation and sustainable management of our biological resources are promoted. These steps include, *inter alia* the adoption of the National Environment Management Policy 1994, the promulgation of the 1995 Constitution, the enactment of the National Environment Statute 1995, the Wildlife Statute 1995, the development of several sectoral policies such as the Wetlands Policy 1994, Wildlife Policy 1996, Fisheries Policy 2000, Forest Policy 2001 and the National Energy Policy 2000, among others.

The Convention on Biological Diversity (CBD), one of the major outcomes of the United Nations Conference on Environment and Development which was held in Rio de Janeiro in 1992, provides an international legal framework to promote the conservation of biological diversity, its sustainable use and a fair and equitable sharing of its benefits. Uganda signed the CBD on 12 June 1992 and ratified it on 8 September 1993. This was also a firm act of commitment by Government to promote international cooperation in the sustainable management and use of our biological resources. Uganda also recently signed and ratified the Biosafety Protocol to maximize the benefits of biotechnology while at the same time safe guarding our people from its dangers.

This National Biodiversity Strategy and Action Plan is therefore an important milestone in our untiring efforts to achieve sustainable development through sound management and sustainable utilization of our natural resources and the environment. The Strategy is also designed to consolidate the initiatives taken this far as well as to firmly focus our future actions and effort on the realization of the objectives of the Convention on Biological Diversity.

Our interest in the preparation of this National Biodiversity Strategy and Action Plan does not therefore aim only at fulfilling our international obligation but also in promoting the socio-economic development of this country. This is consistent with Uganda's overall strategy of poverty reduction, which is articulated in the Poverty Eradication Action Plan (PEAP) and in the Plan for Modernization of Agriculture (PMA).

I believe that the document which has been prepared not only highlights considerable progress made in biodiversity conservation in Uganda, but

is also a clear testimony to the continuing commitment of the Government of Uganda to carry the process forward.

The onus is now on us to translate this strategy and action plan into a tool for conserving biodiversity in the best way possible.

I am confident that the successful implementation of this National Biodiversity Strategy and Action Plan will not only be a remarkable stride towards our goal of building a society which is in harmony with nature, but that it will also constitute a solid basis for sustainable growth and development and a major step towards the realization of the cherished goal of our Vision 2025.

I wish you all good reading.

Hon. Dr. Ruhakana Rugunda
Minister of Water, Lands and Environment
November 2002

EXECUTIVE SUMMARY

Because of its unique bio-geographical location, Uganda boasts of very rich biodiversity compared to many African countries. This biodiversity makes a significant contribution to Uganda's national sustainable development and poverty eradication goals.

Besides having a high socio-economic value, Uganda's rich biodiversity also forms a key part of future sustainable economic development and growth. Many of the sectors targeted for future economic growth – such as fisheries, hydropower, tourism and agriculture – depend directly on biological resources and ecosystems. Biodiversity conservation also maintains a diverse pool of genetic resources available for future developments and applications, some of which may not be known now. These may contribute further to the development of tourism and leisure activities, and to the use of resources for a wide variety of agricultural, industrial, pharmaceutical, medicinal and other applications.

The importance of biodiversity has long been recognised by the Government of Uganda. This is clearly reflected in key government development policies and legal frameworks such as the Uganda Constitution (1995), the National Environmental Statute (1995), the Land Act (1998), the Poverty Eradication Action Plan (PEAP), and Plan for the Modernisation of Agriculture (PMA). These efforts have also been supplemented by implementing global biodiversity-related agreements such as the Convention on Wetlands of International Importance Especially as Waterfowl Habitat (1971), the Convention on the International Trade in Endangered Species of Wild Fauna and Flora (1973), commonly known by its acronym CITES, and the Convention on Biological Diversity (1993).

Despite the existence of these domestic policies and laws as well as the international agreements, some human activities still challenge the continued survival of this rich biodiversity. These include over-grazing, land fragmentation, poaching, deforestation, destructive fishing methods, excessive use of chemicals on farms, and introduction of foreign plants which ultimately become invasive.

To address these practices which lead to biodiversity loss, the Convention on Biological Diversity (CBD) calls upon countries to develop national strategies, plans or programmes for the conservation and sustainable use of biological diversity. Countries are also urged to integrate, as far as possible, the conservation and sustainable use of biological diversity into relevant sectoral or cross-sectoral plans, programmes and policies. In order to meet these obligations, the

Government of Uganda has prepared this National Biodiversity Strategy and Action Plan (NBSAP) to provide a framework to guide the setting of conservation priorities, channelling of investments and building of the necessary capacity for the conservation and sustainable use of biodiversity in the country.

Uganda's National Biodiversity Strategy and Action Plan was prepared with an overall Vision of *"A rich biodiversity benefiting present and future generations for national development"* while its goal is *"To enhance biodiversity conservation, sustainable utilisation and equitable sharing of its benefits at all levels"*. In order to achieve this goal, five strategic objectives were identified; namely:

1. To develop and strengthen co-ordination, measures and frameworks for biodiversity management;
2. To facilitate research, information management and information exchange on biodiversity;
3. To reduce and manage negative impacts on biodiversity;
4. To promote the sustainable use and a fair sharing of costs and benefits of biodiversity; and
5. To enhance awareness on biodiversity issues among the various stakeholders

Uganda is a unique country with a range of national ideologies, goals and interests already in place. The NBSAP was prepared to reflect these wider goals and broader realities of our national aspirations.

On the social front, the NBSAP reflects the ideals of social equity, gender balance and civil participation in actions to conserve biodiversity, ideals that are consistent with the country's wider goals and ideology as provided for in the Constitution of the Republic of Uganda (1995), the National Environmental Action Plan (1994) and Vision 2025 (1998).

During implementation, the NBSAP will integrate a range of economic instruments that aim at making biodiversity conservation financially profitable and economically worthwhile to all the groups whose activities have the most potential to impact on biodiversity, including the private sector and local communities. These will render actions contained in the NBSAP economically viable and socially desirable to all sectors of the population.

In the recent past, Uganda has developed a number of policies to support biodiversity conservation and its sustainable use. However, findings of

the assessment of these policies reveal that there is inadequate co-ordination among the various sectors involved in biodiversity management and conservation. This is due to lack of an explicit, articulate and comprehensive national biodiversity policy to guide harmonisation of policies as well as integration of biodiversity conservation and management into other sectoral policies and plans. Consequently, management of biodiversity as an important component of environment has continued to be sectoral in nature. These disjointedly implemented policies can be a source of conflicting actions and confusion especially in managing an ecosystem that falls under the mandate of more than one institution such as aquatic systems. As a general recommendation for policy reform, the NBSAP stresses the need to initiate a multi-sectoral and participatory policy reform programme to facilitate policy harmonization and consolidation as well as integration of biodiversity issues in all sectors.

Regarding legislation, Uganda has more than 50 statutes, apart from the Constitution, that address environmental management. An assessment of biodiversity-related legislation reveals that most of the recently enacted statutes are comprehensive, cross-linked and contain institutional frameworks for enforcement. However, the assessment recognises that the current laws would need to be revised to accommodate current trends and approaches in biodiversity conservation and management. It is also recognised that most laws have not been adequately enforced by the authorised institutions due to a wide range of constraints that include weak law enforcement capacity, inadequate deterrents and incentives and conflicting mandates. General recommendations for improving the legal framework for biodiversity conservation and management therefore include initiating a multi-sectoral and participatory legal reform programme to facilitate integration of biodiversity issues in all laws and their subsequent regulations as well as improving capacity for law enforcement.

Biodiversity conservation and management in Uganda is currently a responsibility of various sectoral institutions representing strong sectoral interests. For effective co-ordination of activities in these institutions, it is important that NEMA has the authority to monitor them. Limited capacity within NEMA has however hampered effective co-ordination. Capacity within sectors for biodiversity conservation is also not adequate. Assessment of institutional capacity revealed that Uganda needs additional expertise to support implementation of the NBSAP as well as the CBD. There is thus a need for a thorough assessment of the capacity building needs of the relevant institutions and the co-ordination capacity and role of NEMA.

In terms of implementation, the NBSAP envisages a life span of 10 years with a major review at the end of 5 years. It identifies institutional roles and responsibilities for biodiversity management in Uganda. It emphasises the need to forge strong and effective collaboration between and among the various sectors and stakeholders. It also emphasizes the need for a strong co-ordination unit to monitor the various actions by the different institutions. The strategies identify lack of reliable data and the necessary human resources and institutional capacity and enforcement of laws and policies as the major limitations hindering effective management of biodiversity in Uganda. Therefore research, training and institutional capacity building are highlighted as important areas. The NBSAP also recognizes that much of the biodiversity loss in Uganda is due to lack of awareness which encourages over-exploitation and unsustainable use of biological resources. The NBSAP emphasizes awareness among all the relevant sectors and stakeholders as an important strategic objective to promote biodiversity conservation in Uganda.

It is hoped that implementation of the NBSAP will contribute to Uganda's wider goal of poverty eradication as well as provide a framework for cross-sectoral co-operation in biodiversity matters.

1. INTRODUCTION

This NBSAP report is one of the products of the Biodiversity Strategies and Action Plan development process that Uganda undertook as part of the activities geared towards implementing the National Environment Policy and in response to its obligation under the Convention on Biological Diversity (CBD). Other products include sectoral and thematic biodiversity assessment reports¹, workshop and consultation reports and a National Biodiversity Assessment Report. This NBSAP report should therefore be read together with those reports.²

The development of Uganda's NBSAP underwent the following major steps:

The National Environment Management Authority (NEMA) set up Task Forces in June 1998 to address eleven key topical issues: Wildlife, Forests, Wetlands, Aquatic resources, Soil biodiversity, Social-cultural issues, Biodiversity economics, Plant genetic resources, Domestic animal diversity, Biotechnology and Biosafety and, Institutional and Legal issues. Initial work was done in 5 months and draft reports were submitted in November-December 1998. A training workshop for Taskforce members on the development of NBSAPs was undertaken by IUCN in March 1999.

In June 1999, a National workshop to review the work of the Task Forces' reports was organized and took place in Jinja. The workshop was also meant to develop the NBSAP Vision, Goal, Objectives and biodiversity conservation priorities. Further consultations with stakeholders and finalisation of the Task Force reports went on till September 1999. This activity ran concurrently with the preparation of the draft National Biodiversity Assessment Report and the NBSAP until March 2000. The draft NBSAP was subjected to further consultations with national and district stakeholders throughout 2000/2001. The draft NBSAP report was finalized in March 2002.

The NBSAP is divided into three main sections: Chapter 2 gives the background to Uganda's biodiversity. It presents the status of Uganda's biodiversity, general considerations for biodiversity management, biodiversity values, factors influencing biodiversity management and the relationship between NBSAP and the Convention on Biological Diversity (CBD). Chapter 2 also highlights Uganda's richness both in species and ecosystems diversity. It further identifies factors that influence biodiversity management including socio-cultural, population, economic, political and global factors.

¹ These cover the following themes: Wetlands, Wildlife, Forestry, Aquatic Resources, Agriculture, Domestic Animals, Plant Genetic Resources, Soils, Biotechnology and Biosafety, Institutional and Legal issues and, Biodiversity Economics.

² For more information and reference of facts and data.

Chapter 3 describes measures and strategies for conservation and sustainable use of Uganda's biodiversity. Specifically, the section provides guiding principles for biodiversity conservation and sustainable use, the National Vision and the goal and objectives for biodiversity management.

Chapter 3 also broadly divides the strategies for diversity management into general measures (i.e. cross-sectoral strategies) and thematic strategies. The cross-sectoral strategies cover cross-cutting objectives including: strengthening co-ordination, measures and frameworks for biodiversity management; facilitating research, information management and information exchange; reducing and managing negative impacts on biodiversity and enhancing awareness of biodiversity.

The sector-specific strategies cover the main thematic areas namely, wetlands and aquatic resources; forests; wildlife; domestic animal diversity; soil biodiversity; plant genetic resources and biotechnology and biosafety. Some of the Action Plans needed to address the strategies listed are proposed and put under Appendix 1 for cross-sectoral strategies and Appendix 2 for sectoral strategies. Some of the key actors are also appropriately indicated for each Action Plan.

Chapter 4 presents the implementation arrangements for the strategies and measures identified in Chapter 3.

Chapter 5 contains references cited during the preparation of the NBSAP.

Chapter 6 provides Annexes of relevant information regarding the process of preparing the NBSAP.

In the process of preparing Uganda's NBSAP the following major lessons were learnt:

- Development of the NBSAP requires substantial resources in terms of time and funds in order to achieve a good result. Because of limited financial resources, Uganda's NBSAP did not benefit from extensive consultations with the key stakeholders both at the central, and local government and community levels. Hence the need to promote public awareness especially in the districts and lower levels right at the onset of its implementation. It will be important to ensure that biodiversity issues are adequately integrated in the District Environment Action Plans and subsequently incorporated in the District Development Plans.
- Country-based technical expertise for developing the NBSAP is essential in providing guidance and promoting "ownership" of the process and product. The Task Forces' technical reports were

invaluable sources of data and information regarding possible strategies and actions to be undertaken to address the needs for sound biodiversity management in Uganda. However, the heavy reliance on outside consultants contributed significantly to the delay in preparation of the NBSAP.

- Institutional commitment is a prerequisite for the process to succeed. Given the level of financial resources available, this process would not have progressed had it not been for the high degree of commitment on the part of a few NEMA staff and those of a few key institutions that were involved.

In preparing this NBSAP, Uganda used a programme approach rather than a project approach that has been used by some countries. This is in recognition of the fact that a programme approach is more encompassing and always ensures interactions among various groups, sectors and institutions. Also, this approach enhances adoption of the ecosystem approach that is in turn useful in realising the inter-dependence of the various elements of biological resources in any ecosystem setting. It is also consistent with the Sector-Wide Planning approach that has recently been adopted by Government.

It is hoped that the NBSAP will be a useful guide for addressing Uganda's concerns in biodiversity conservation and the utilisation of its components as well as for implementation of the requirements of the Convention on Biological Diversity. The NBSAP specifically intends to:

- Provide a framework for setting priorities for the conservation and sustainable use of biodiversity in Uganda;
- Catalyse and provide guidance for legal, policy and institutional reforms necessary to achieve effective conservation and sustainable use of biodiversity;
- Enhance the planning and coordination of national efforts aimed at the conservation and sustainable use of biodiversity;
- Guide the investment and capacity building programmes for the conservation and sustainable use of biodiversity; and
- Facilitate information sharing and a co-ordinated action among the various stakeholders and foster scientific and technical co-operation with other countries and international organizations.

CHAPTER 2: BACKGROUND TO BIODIVERSITY IN UGANDA

2.1. Location and Size

Uganda is a landlocked country that lies astride the equator between 4°N and 1°S and stretches from 29.5° – 35°W (Figure 1). It is one of the smallest states in Eastern Africa covering an area of 236,000 km² composed of 194,000 Km² dry land, 33,926 Km² open water and 7.674 km² of permanent swamp (Langdale-Brown *et al* 1964, Langlands, 1973).

2.2 Physical Features

Much of the country lies on a plateau at altitudes ranging between 900 – 1500 m above sea level (a.s.l). Towards the south, the characteristic scenery consists of flat-topped mesa-like hills and broad intervening valleys frequently containing swamps; towards the north, the landscape is more subdued consisting of gently rolling open plains interrupted by occasional hills, mountains and inselbergs. South westwards, broken hill country forms the transition to the deeply incised plateau that reaches its greatest height levels above 2,000m a.s.l in south western Uganda.

The rift valley along the western border is represented by two troughs occupied by lakes Albert, Edward and George. Between these depressions lies the glaciated Horst Mountain of the Rwenzori range, rising to the highest peak in the country at 5,100m. There are a number of volcanic craters associated with the rift valley including the three quiescent Bufumbira volcanoes of Muhavura (4,130m), Mgahinga (3,470m) and Sabinio (3,630m). The central part of the country consists of the Lake Victoria basin.

The main topographical features in northern Uganda lie towards the eastern and north eastern borders and include four large inactive Miocene volcanoes, Elgon (4,320m), Moroto (3,890m), Kadam (3,070m) and Napak (2,540m), and number of hills and mountains composed of basement rocks, such as the Agoro – Agu (2,850m), Morongole (2,750m) and Rom (2,320m). Many of these volcanoes and mountains have been extensively scoured by erosion. The lowest point in Uganda is near Nimule town on the border with Sudan at about 600m a.s.l.

Figure 1: Location of Uganda in Africa



2.3 Climate

Although Uganda lies astride the equator, the country's would-be tropical climate is considerably modified by topography and local relief which give it a lot of climatic variation (Uganda Atlas, 1964).

Over most of the country, mean annual maximum temperature range between 18 - 35°C while the corresponding minimum range is 8 - 23°C. Relative humidity is often high usually ranging between 70 - 100% and mean monthly evaporation rates range between 125 - 200mm.

Much of the country receives between 1,000 - 1,500 mm of rain per annum, the amount increasing with altitude. Generally, the south of the country experiences two rainy seasons (March - May and September - November) while the north experiences only one long wet season (June to October). Rainfall reliability generally declines northwards. Due to its altitudinal and climatic variations, Uganda boasts of very rich biodiversity compared to other countries in the East African region.

2.4. Diversity of Biological Resources

Because of its unique bio-geographical location, Uganda harbours seven of Africa's 18 plant kingdoms - more than any other African country - and its biological diversity is one of the highest on the continent (Davenport and Matthews, 1995). It boasts more than half of all African bird species, and is second only to the Democratic Republic of Congo in terms of number of mammal species. For the latter, it is actually the 9th richest in the world, which is remarkable considering its size.

2.4.1 Species Diversity

Uganda is very rich in species diversity. There are more than 18,783 species that are known or have been recorded in Uganda. Table 1 below gives the number of biological species in Uganda based on information from the National Data Bank at MUIENR (1999), Makerere University.

Table 1: Number of known genera and species in major Taxonomic groups of Uganda's biota (MUIENR, 1999)

Group	Genera	Number of Species	Percentage of World species represented in Uganda
Viruses	58	88	4.4
Bacteria	137	?	?
Algae	49	115	0.5
Fungi	184	420	1.4
Lichens	51	296	1.6
Mosses	39	500	2.9
Ferns	102	386	3.9
Gymnosperms*	10	40	7.6
Monocotyledons*	323	1238	2.5
Dicotyledons	1258	4056	2.4
Protozoa	27	141	0.4
Nematodes	69	126	1.0
Annelids	6	9	0.1
Crustacea	18	37	?
Acarines	23	133	?
Insects	3170	8999	1.2
Molluscs	23	81	0.2
Fish	64	350	2.0
Amphibians	19	67	1.6
Reptiles	75	256	4.1
Birds	347	1007	11.1
Mammals	153	345	7.8

Note: * Includes exotics, also exact number of species of bacteria are not known

(Source: MUIENR 1999)

Box 1: Biodiversity hot spots in Uganda

- Mgahinga Gorilla National Park and Bwindi Impenetrable National Park – the mountain gorilla (*Gorilla gorilla berengei*) and other regionally and globally important species
- Rwenzori Mountain National Park – bay duiker (*Cephalophus leucogaster*)
- Sango bay wetlands and forest ecosystem – important tree species of global significance
- Dry mountains of Karamoja (Napak, Morungole, Kadam, Timu and Moroto) – regionally and globally important plant species
- Lake Victoria – cichlid and Nile perch species (alien species invasion)
- Papyrus swamps of Lake Edward, George and Bunyonyi have the endemic papyrus species (*Chloropeta gracilirostris*)

2.4.2 Ecosystem Diversity

According to Langdale-Brown *et al* (1964), there are at least 90 types of natural and semi-natural vegetation communities in Uganda. These have been subjected to various levels of human activities and have been significantly modified.

The major natural biodiversity ecosystems remaining are:

1. Forests

Reconstructed vegetation maps of Uganda indicate that before the arrival of agriculture, a considerable portion of the land surface was covered by forest while the remaining area was clothed by other forms of tree dominated vegetation. Today, forests and woodland cover only 20% or less of the land surface. The major types of forest are high altitude moorland and heath, high altitude forests, medium altitude forests and wooded savannah.

2. Woodlands/Savannah

There are two types of woodlands in Uganda: the *Combretaceous* and *Butyrospermum*. These types of vegetation range between woodlands where woody species form a single layer with relatively short closed canopy that is underlain by a more or less continuous grass layer, through wooded savannah where the canopy is more open and the grass layer continuous, to grass savannah, where trees are generally absent.

3. Wetlands

This ecosystem covers approximately 12.5% of the surface area. They constitute those areas with impended drainage, swamp forests, papyrus and grass swamps. Uganda's wetland ecosystem falls into three categories: lake associated wetlands, river or flood plain associated wetlands and, "dambos" which are composed of small unconnected units dependant on water from surrounding uplands without outlets.

4. Open Water Resources

Up to 17% of the country's surface area is covered by aquatic systems comprising five major lakes; Victoria, Albert, Kyoga, Edward and George, about 160 minor lakes, an extensive river system, dams and ponds. These aquatic systems are usually fringed with extensive wetlands or swamps (SOE, 1998).

5. Soil Biodiversity

Little is known of soil biodiversity in Uganda. The relevancy of soil biodiversity to soil productivity is the most crucial factor. Hence, there is need to understand the complex interactions between biotic and abiotic components of soil. Uganda is an agricultural country hence its dependence on soil for agriculture and the likely effects of agriculture on soil biodiversity are strong arguments for soil biodiversity conservation. Some relevant aspects of soil biodiversity in Uganda include:

(a) Availing plant nutrients in the soil.

Agriculture is the main economic activity in the country and contributes 80 % of Uganda's Gross Domestic Product (GDP). Unfortunately, Uganda's agriculture is mainly subsistence and thus receives low technological inputs. This, coupled with inefficient tools and agricultural methods, has led to over-exploitation of the farmland. For instance, some analyses of Uganda soils show that they are poor in major plant nutrients - nitrogen, phosphorus and potassium. Yet soil management surveys indicate that fertiliser use by farmers in Uganda is still minimal. Consequently, nationally, agricultural production continues to depend on the inherent fertility particularly from biological activities in the soil.

(b) Bio-nutrient availability

The atmosphere contains over 80 percent nitrogen by volume but is unavailable to higher plants and animals. Yet nitrogen is required by all living things for protein synthesis. Nitrogen can be supplied by applying fertilisers or through natural processes (nitrogen fixation by bacteria). This underscores the importance of soil bacteria as a nitrogen fixer.

(c) Decomposition of organic matter

Soil fauna and flora decompose organic debris introduced into soil. Humus is an important product of decomposition and significantly influences soil chemical, physical and biological properties.

(d) Modification of soil physical characteristics

Activities of soil organisms control soil colour. Macro fauna such as earthworms and termites are responsible for mechanically incorporating organic residues into the soil and filtrating air and water/moisture flow. These activities assist in making the soil more productive.

(e) *Soil organisms as pests*

Certain soil fauna are injurious to higher plants, and sometimes to animals. Macrofauna pests include soil insects, snails, slugs, ants, aphids, and nematodes. Microfauna pests include bacteria and viruses that cause blights, wilts, damping off, etc. Soil biodiversity also act as pests to animals (livestock). Examples of animal diseases caused by soil micro fauna include Anthrax, Black leg, Swine fever, and Coccidiosis.

(f) *Bacteria and yeast as industrial and biotechnology raw material*

Bacteria and yeast are used as industrial raw materials for various products, for example, in brewing, processing milk products and in the pharmaceutical industry.

(g) *Fungi as food and industrial raw material:*

Fungi are increasingly becoming an important diet item to many Ugandans. The growing of mushrooms as a source of sauce is an activity many people are getting involved in of recent.

6. *Modified Ecosystems*

These include: agro-systems, forest plantations, urban systems and irrigation schemes.

Box 2: Major Biodiversity Ecosystems in Uganda

Natural Ecosystems

- Forests – high, medium altitude forests, savannah mosaics and woodland savannah
- Woodlands
- Savannah – dominate drier areas of the country
- Wetlands – areas with impeded drainage, swamp, papyrus and grass swamps
- Open water (aquatic) – five major lakes, 160 minor lakes and an extensive river system

Modified Ecosystems

- Agro-ecosystems – e.g. sugar cane, tea, coffee plantations, agro-pastoral systems
- Forest plantations – of indigenous and exotic species
- Irrigation schemes – such as Kibimba and Olweny rice schemes

2.5 General Considerations for Biodiversity Management

2.5.1 Socio-economic considerations

Uganda is primarily an agrarian country, with agriculture contributing over 50% of the GDP. Agricultural output is largely by peasant farmers who grow both cash and subsistence food crops on their land holdings, averaging about 1.7 ha per household (Vision 2025, 1998).

In 1992, Uganda adopted Agenda 21 that proposes to address issues of sustainable development. Agenda 21 came about as a result of the realization that there were disparities among nations, with worsening poverty and socio-development indicators, and deterioration of the ecosystems on which we depend for our livelihood. At the same time, Uganda set its own vision for the next century:

Attaining sustainable socio-economic development which maintains or enhances environmental quality and resource productivity on a long-term basis and meets the needs of the present generation without compromising the ability for future generations to meet their own needs - (Vision 2025, 1998).

This *Vision 2025* requires Uganda to prioritise its economic policies, international co-operation, financing, trade relations and investment in human capital. It also calls for effective environmental management and good governance.

The role of biodiversity in contributing to Uganda's national sustainable development and poverty alleviation goals cannot be over-emphasized. Much of Uganda's economy depends on biodiversity. For example, the gross economic output attributable to biological resource use in the fisheries, forestry, tourism, agriculture and energy sectors is estimated to be in excess of US\$ 820 billion (US\$ 546.6 Million) a year (Emerton and Muramira, 1999). Biodiversity also supports economic output indirectly because it provides secondary inputs, ecosystem services and functions that support and maintain human production and consumption. These indirect benefits are worth at least US\$ 300 billion (US\$ 200 million) a year.

As well as having a high socio-economic value currently, the conservation of Uganda's rich biodiversity base forms a key part of future sustainable economic development and growth. Many of the sectors targeted for future economic growth – such as fisheries, hydropower generation, tourism and agriculture – depend directly on biological resources and ecosystems. Biodiversity conservation also maintains a diverse pool of genetic resources available for future

developments and applications, some of which may not be known now. These may contribute to the further development of tourism and leisure activities, and the use of resources for a wide variety of agricultural, industrial, pharmaceutical and medicinal applications.

Biodiversity is thus tied intimately to sustainable and equitable socio-economic development and poverty alleviation in Uganda. Accordingly, biodiversity degradation and loss would be reflected in a fall in all of these economic indicators, leading to an erosion of the economic production base and slowed economic growth. The economic impacts of biodiversity degradation would hit especially hard the poorest sectors of society who depend most on ecosystems and natural resources. Already vulnerable and with limited sources of income, employment and foreign exchange, this is an economic cost that the Ugandan economy and people can ill afford to bear. Biodiversity conservation therefore forms a central component and requirement of on-going attempts to meet national economic development plans and strategies for poverty alleviation.

2.5.2 Human Population Factors

The size of Uganda's population has been doubling almost every twenty years. It increased from 5 million in 1948 to 6.5 million in 1959; 9.5 million in 1969; 12.6 million in 1980 and to 16.7 million in 1991 (1991 Population and Housing Census). At 2.5% rate of population increase, Uganda's population is projected to become 24.5 million in 2002 and to double in 28 years, thereby reaching about 40 million by the year 2025 (Vision 2025, 1998).

The age structure of the population indicates that Uganda has a sizeable young population (47.3% of the country's population is less than 15 years of age), while 3.3% is over 64 years of age (Population and Housing Census, 1991) reflecting a high dependence ratio. The existence of a large young population in an environment of high levels of fertility creates a population momentum. This situation has a high implication on the socio-economic development of an individual, the family and the country at large. It also has implications on the natural resource base, hence biodiversity, upon which they will depend.

2.5.3 Economic Factors

Gross economic mismanagement and political instability rapidly eroded Uganda's economic gains of the 1960s in the 1970s and early 1980s. Blessed with a good climate, fertile soils and abundant human resources, Uganda was fortunate to remain self-sufficient in food with surpluses for export during this period.

Between 1960-70, there was a high rate of economic growth. The real GDP grew at an average rate of 4.8%, and per capita grew at about 3% per annum. The national savings rate averaged about 13.4% of GDP and was sufficient to finance the moderate rate of capital accumulation that amounted to less than 13% of GDP. The growth of manufacturing industries played a major role in sustaining economic growth in the 1960s. By 1971, industrial output accounted for 14% of GDP (Vision 2025, 1998).

The situation changed drastically after 1971 when the economy experienced domestic and external shocks, coupled with lack of sound macro-economic policies. There was drastic decline in investment and a high growth in illegal economic transactions. In 1972, the State launched the “Economic war” which saw the expulsion of foreign investors (dominated by Asians) and the expropriation of their assets. The large and complex enterprises were transformed into parastatal institutions, others re-distributed without consideration for capacity to manage them properly.

These measures implied abrupt loss of the country’s entrepreneurial class and skilled professionals, gross mismanagement of parastatal and dominance of speculative and rent-seeking activities. The effects of these shocks resulted into declining GDP at rate of 3.8% per annum during 1973-79 while inflation skyrocketed to over 40% per annum (Vision 2025)

In 1987, Uganda embarked on an Economic Recovery Programme, which was supported by Economic Recovery Credits (ERC), Structural Adjustments Credits (SAC) and Enhanced Structural Adjustment Facility (ESAF). The results of this Programme have been very positive with annual average GDP growth rate of 6.5% since 1987.

The favourable investment climate in Uganda created in the early 1990s has resulted in remarkable economic growth due to increased foreign investment. Uganda will therefore be required to provide resources (raw materials) to feed these industries. There have been isolated cases of attempts or successes, for example, to degazette protected areas for industrial development. In other cases, especially within the national parks, forest reserves and wetlands, pressures for concessions and leases have mounted too high to be easily sustained thus posing a potential danger to biodiversity conservation in those areas.

On the other hand, investment has created more jobs which is taking pressure off the direct use of natural resources. Secondly, the envisaged positive balance of payments will eventually result in increased reserves and possibly, increased funding for conservation. These scenarios point to the need to balance conservation and development.

A key concern is also the fact that currently, economic activities are directly causing biodiversity to be degraded in Uganda because they deplete, convert or pollute biological resources and ecosystems. Direct economic causes of biodiversity loss result from the unsustainable exploitation of biological resources, clearance and modifications of natural ecosystems and other interference's to land, water and air quality arising from activities in most sectors of the Ugandan economy such as forestry, fisheries, agriculture, water, industry and urban settlement.

It is, however, also clear that these activities are permitted or encouraged to occur as a result of wider policy, institutional and market failures (e.g., subsidies to agriculture, low prices for biological resources and few economic inducements for investment in conservation) which lead to a situation where benefits of biodiversity conservation and costs of its loss are poorly reflected in markets, and there is little incorporation of biodiversity economic values into the prices and profits that producers and consumers face in their day to day economic activities.

2.6 Biodiversity Values

2.6.1 Direct Values

The presence of indigenous biological resources and their diversity provide a wide range of direct economic benefits because they generate products which are used for subsistence, income and employment purposes. The quantified value of the direct economic benefits of Uganda's biodiversity is more than US\$ 823 billion (US\$ 548.6 Million) per annum (Emerton and Muramira, 1999). As available data only permits a small proportion of biological resource utilisation to be valued, this figure represents a minimum estimate of the total direct value of Uganda's biodiversity.

1. Forest and Woodland Resources

Uganda's natural forests and woodlands together cover an area of nearly 50,000 km² (Forest Department 1996, NORAD/FD 1996), of which approximately a quarter are protected as Central or Local Forest Reserves and the remainder lie in wildlife protected areas or on private and communally used lands. These forest and woodland resources yield a wide range of direct benefits to both domestic and commercial consumers including wood fuel, timber, poles and non-wood forest products such as fibres, honey, fodder, medicines and wild foods. Utilisation of Central Forest Reserves also generates income for the Government Forest Department.

The consumption of non-wood forest products, including medicines, wild foods e.g. bamboo shoots, shea butter oil, honey, gum Arabic, curios and weaving materials, has been estimated to be worth some USShs 2,100 (US\$ 1.4) per capita at the household level and USShs 1,050 (US\$ 0.7) per capita for commercial products for the whole of Uganda (NEMA 1996, - updated to 1998 prices). At current population levels, this equates to a total value of some USShs 66 billion (US\$ 44 Million) per year

The market value of wood products was in 1997 estimated to be USShs 173 billion (US\$ 115.3 million) of which some 80% or USShs 138 billion (US\$ 92 million) may be accounted for by indigenous forest resources. Over the same period, timber royalties and fees for the use of forest products and lands earned income of over USShs 797.5 million (US\$ 797.5 million) for the Forest Department. (Emerton and Muramira, 1999).

Table II: Value of wood products 1997

	Total consumption ('000 tonnes)*	Total value (US\$ mill)*	Assumed % Indigenous	Indigenous value (US\$ mill)
Monetary				
Sawn timber	541	18,925	67%	17,979
Poles	182	2,947	50%	1,474
Household fuel wood	598	3,727	100%	3,727
Commercial fuel wood	475	2,959	50%	1,480
Industrial fuel wood	830	5,171	50%	2,586
Charcoal	3,536	79,465+	75%	59,599+
Non monetary				
Poles	399	6,454	50%	3,227
Household fuel wood	13,596	42,356	100%	42,356
Commercial fuel wood	1,559	9,714	50%	4,857
Industrial fuel wood	184	1,145	50%	573
TOTAL	21,900	172,863		137,856

*(Source: * MFPED 1998; +Manufactured charcoal)*

Note: Exchange rate = 1 US\$ = USShs 1,500

Uganda's forests support a low level of tourist activities, and recreational facilities have been developed in at least two Forest Reserves. In 1997 Budongo and Mabira Forest Reserves generated over USSh 23 million (US\$ 0.015 Million) income for the Forest Department from entry fees.

Assuming that additional expenditures made by visitors to these forests – including travel, accommodation and other miscellaneous purchases within Uganda – is worth at least 10 times this amount, forest tourism may have a total annual direct value of over US\$ 255 million (US\$ 0.17 Million) (Emerton and Muramira, 1999).

Table III: Tourist revenues from Forest Reserves 1997

	Revenues (UShs) US\$)	
Budongo	11,538,500	7,692
Mabira	11,666,189	7,777
TOTAL	23,204,689	5,469

(Source: Forest Department, 1997)

2. Non-forest Plant Resources

Plants outside forest and woodland areas in bush land and grassland zones yield a variety of raw materials and physical products including building materials, fibres, honey, pasture, fodder, forage, medicines, wild foods and other utility items.

Livestock forms an important component of rural livelihood systems in Uganda, and natural vegetation accounts for a high proportion of their annual food needs. Taking into account differences in herd management systems, livestock productivity and intake of natural vegetation, indigenous plant-based resources may have an annual value of some US\$ 163 billion (US\$ 108.6 Million) calculated in terms of their contribution to pasture, fodder and forage.

Table IV: Value of natural vegetation for livestock 1998

Region	Livestock population (TLUs)	Total value of production (US\$ mill)	Value of natural vegetation (US\$ mill)
Central	1,090,510	49,362	10,484
Eastern	940,837	37,006	13,235
Northern	1,185,889	43,948	33,713
Western	2,087,854	113,283	51,252
TOTAL	5,305,090	243,599	108,685

3. Wildlife Resources

Uganda's wildlife resources yield direct benefits because they provide national or local income, and are also a source of bush meat and trophies, food, medicine, and support tourism activities, among others. There are no quantitative data on the level or value of wildlife hunting, cropping or ranching in Uganda. Tourism currently represents the major legitimate value accruing from wildlife resources.

Tourism is focused in the approximately 21,000 km² of gazetted wildlife protected areas in Uganda. In 1998 more than US\$ 2.3 billion (US\$ 1.53 million) was generated by UWA from entry fees and charges for other recreational activities in National Parks. Assuming that additional expenditure made by visitors to National Parks – including travel, accommodation and other miscellaneous purchases within Uganda – is worth at least 10 times this amount, wildlife tourism may have a total annual value in excess of US\$ 26 billion (US\$ 17.3 Million). (Emerton and Muramira, 1999)

4. Inland Water System Resources

Resources in inland water systems – lakes, rivers, wetlands and floodplains – support a broad range of direct uses including fishing, hunting, wild plant harvesting, livestock production, recreation and tourism. In 1998 it was estimated that over 217,000 tones of fish were caught in Uganda's major lakes with a landed value of nearly US\$ 326 billion (US\$ 217.3 million). The annual market value of fisheries activities (including other lakes, wetlands and rivers) may be in excess of US\$ 407 billion (US\$ 271.3 million).

Over 30,000 km² of Uganda is under seasonal or permanent wetlands. A wide variety of wetland plant species are harvested by adjacent human populations for food, medicine, construction material and handicraft production. Available data permit some of this use to be valued (Emerton and Muramira 1999). Accessible areas of at least a quarter of the 4,395 km² of papyrus swamps in Uganda (MFPED 1998) may be utilized by adjacent human populations. Each hectare of papyrus swamp yields 20 tones of dry papyrus culm a year (Craddock-Williams 1996) with a market price for construction materials of US\$ 54/kg (US\$ 0.036/Kg) giving a minimum value of papyrus utilization for Uganda of just under US\$ 6 billion (US\$ 4 Million) a year.

Natural vegetation in wetlands and floodplains also provides an important source of dry season grazing for livestock. Assuming that 10% of off-farm pasture, fodder and forage intake is accounted for by wetlands vegetation, dry-season grazing may have a total value in excess of US\$ 18 billion (US\$ 12 million) a year in terms of contribution to livestock production.

2.6.2 Indirect Benefits

1. Ecosystem Benefits

Ecosystems, their component species and diversity, generate a wide range of indirect benefits (see Box 1). Available data permits only a small proportion of the value of these indirect benefits to be quantified - including partial estimates of the erosion control, catchment protection and carbon sequestration functions of natural forests, woodlands, bush lands and grasslands and of the water retention and purification functions of wetlands. While the quantified value of these services is almost US\$ 300 billion a year (US\$ 193m), the total indirect value of Uganda's biodiversity is likely to be far higher than this.

Box 3: Summary of the indirect benefits of Uganda's biodiversity (Emerton & Muramira, 1999)

	US\$/year '000	% of total
erosion control	46,628	24%
water retention	99,013	51%
water purification	43,973	23%
carbon sequestration	3,540	2%
TOTAL	193,154	100%

2. Catchment Protection and Erosion Control by Natural Vegetation

Areas of natural vegetation, including forests, woodlands, bush lands and grasslands, play an important role in helping to avoid or mitigate soil erosion. By providing ground cover they control excessive runoff, minimise topsoil loss and decrease downstream sedimentation and siltation and thereby maintain on-site soil fertility and land productivity, regulating water quality and flow and prevent the siltation of downstream watercourses and dams. The catchment protection and erosion control services of upland forests and lowland vegetation are considered below.

The downstream benefits of upland closed forest areas in providing catchment protection can be quantified by looking at the costs of replacing these services by artificial means. This represents a minimum estimate of the value of these functions in terms of alternative expenditures avoided. In the absence of forest cover and under the next most likely land use – mixed subsistence agriculture – it would be necessary to control erosion by constructing on-farm soil and water conservation measures. Taking into account differences in topography and farming systems in Uganda, and including the costs of labour, other inputs and land taken out of production, on-farm soil and water conservation incurs expenditures ranging between UShs 70,000 (US\$47) to UShs 250,000 (US\$ 167) per hectare per year. In total, for the 12,727 km² of land under Central Forest Reserves, the benefit of forest catchment protection and erosion control services in terms of replacement costs avoided is nearly USH 148 billion (US\$ 98.6 Million) a year. This figure accords well with estimates of the total avoided costs of soil erosion measured in terms of effects on crop production, valued at between US\$ 132-396 million in 1991 or between USH 70-208 billion at 1998 prices (Slade and Weitz, 1991).

Erosion control functions of natural vegetation outside closed forests maintain on-site soil fertility and land productivity, as reflected in the output of lowland land uses. Studies carried out in similar areas of Eastern Africa have estimated that soil erosion arising from the loss of vegetative cover in rangelands may lead to annual declines in livestock productivity of up to 0.5% (Emerton 1997). For herds grazed in grassland and bush land areas of Uganda, erosion control services provided by natural vegetation may therefore have a quantifiable benefit of up to USH 815 million (US\$ 543,333) in terms of losses to livestock production avoided.

3. **Water Retention and Purification by Wetlands**

Wetlands generate a wide range of indirect benefits through water recharge and storage, sediment trapping, nutrient cycling and water purification functions. Many of these benefits contribute towards on-site productivity and direct use, and are reflected in estimates of fishing, wild plant utilization and dry-season grazing values presented above. Wetland ecosystem services also maintain and support off-site water-dependent consumption and production activities, including downstream resource utilization, industry and urban settlement.

Wetlands water recharge, storage and productivity services permit on-site economic activities in addition to those which depend directly on the harvesting of wild resources, most

importantly crop production. This crop output reflects wetland water retention and productivity maintenance services. Assuming that 15% of converted wetlands are used for rice production, accounting for just over half of the total area under rice in Uganda, the value of wetlands ecosystem functions as reflected in agricultural production is worth some UShs 66 million (US\$ 44,000).

Table V: Value of Wetlands Agricultural Production 1998

	Converted wetlands (km²)	Value of rice production (US \$)
Central	251	4,644
Eastern	1,752	32,426
Northern	172	3,183
Western	201	3,721
TOTAL	2,376	43,975

(Source: Emerton & Muramira, 1999)

Wetlands also provide important water purification services. Most urban populations in Uganda lack water-borne sewage systems, and domestic wastes often flow directly into swamps and wetlands. It is estimated that at least 725,000 people rely on wetlands for waste retention and purification, including populations in Kampala, Bushenyi and Masaka towns wetlands (NEMA, 1996). The value of wetland water purification and waste treatment services can be at least partially valued by looking at their replacement by other means. The costs of establishing and maintaining a 4,000 m³ sewage treatment pond, serving some 25,000 people is some UShs 195 million (US\$ 130,000) a year. This translates into a total annual value for wetlands water purification services in terms of replacement cost avoided of some US\$ 5.3 billion (US\$ 3.5 million) a year.

4 Carbon Sequestration

Natural vegetation – including forest, woodland, bush land and grassland – acts as a carbon sink, thereby helping to mitigate the effects of global warming. Estimates of carbon sequestration range between 10 tonnes of carbon per hectare of bush land or grassland to 210 tonnes of carbon per hectare of closed canopy primary forest (Myers 1997, Sala and Paruelo, 1997). Uganda’s natural vegetation is estimated to cover a surface area of almost 11.5 million ha. with the economic costs avoided of carbon sequestration valued at between \$1-100/tonne (Alexander *et al*, 1997); and at an average \$20/tonne (Myers, 1997), forests, woodlands, bush lands and

grasslands in Uganda may together provide economic benefits through mitigating the effects of global warming to a value of nearly US\$ 70 billion (US\$ 46 million) a year.

5. Option and Existence Benefits

Although none of the options and existence benefits associated with Uganda's biodiversity can be quantified on the basis of available data, their value is likely to be extremely large. Maintaining a diverse range of biological resources and ecosystems allows for possible future uses and developments for recreational, pharmaceutical, industrial and agricultural purposes and is thus likely to have a high commercial option value.

2.7 Biodiversity Management Factors

2.7.1 Biodiversity Status and its Management in Uganda

Uganda is yet to record all available species in the country but it is estimated that there are at least 18,783 species of animals, plants and micro-organisms (Section 2.4). These species are distributed in diverse ecosystem types, both natural and modified, such as forests, woodlands, soils, wetlands and aquatic systems, agro-ecological zones and urban environment. The Biodiversity Country Report (1996), First National Report to the CBD (1998) and the National Biodiversity Assessment Report (1999), among others, provide details on the status and trends on biodiversity in Uganda.

2.7.2 Protected Area System

Uganda's Protected Areas (PAs) are in form of Forest Reserves (9% of land surface) National Parks, Wildlife Reserves and Animal Sanctuaries. In total, they represent approximately 23% of Uganda land surface area.

However, these PAs are not representative of all the key ecosystems in Uganda. It would be worthwhile to establish a PA system that represents all key ecosystems including Aquatic resources, Wetlands and, Montane ecosystems.

There are other forms of biodiversity protection systems which represent specific international issues of importance. These are:

- a. World Heritage Sites (Bwindi Impenetrable National Park, Mt. Rwenzori National Park);

- b. Man and Biosphere Reserve (Queen Elizabeth National Park),
- c. Ramsar Site (Lake George).

2.7.3 Capacity and Management Challenges

Uganda's capacity to manage biodiversity is influenced by the following factors:

1. Management Strengths

Management of Uganda's biodiversity is largely a responsibility of Government. It is therefore prudent to have effective governance if this responsibility is to be fully met. Uganda's management strength is demonstrated by:

(a) Government Accountability

This is expressed in form of relevant policies, legislation and enforcement capacity. Policy and legislative measures have been developed to support conservation and the sustainable use of biodiversity. They include national policies on environment, wildlife, fisheries and wetlands as well as national statutes on environment, wildlife, land, water and decentralisation.

(b) Government Priorities

During budget allocation and national planning, some budgetary items reflect biodiversity conservation requirements.

(c) Strong Institutions

Institutions like UWA, NEMA, NARO, the Departments of Forestry, Wetlands, etc. concerned with bio-diversity have been established and these institutions are increasingly getting better co-ordinated.

(d) Management Structures

Management structures which are conducive to biodiversity conservation have been put in place. Decentralization of power to Local Governments has, for example, led to the decentralisation of management of natural resources. Other structures include the introduction of Privatisation and the Investment Code.

(e) Biodiversity Protection

A network of protected areas in key biodiversity habitats has been put in place and this provides a basis for sound conservation and management.

(f) Presence of Viable Species

The presence of viable species populations outside protected areas.

2. Biodiversity Management Weaknesses

Uganda's efforts in biodiversity management are undermined by the following weaknesses:

(a) Inadequate Manpower

This has been a consequence of Structural Adjustments Programmes whereby Uganda's Public service was and continues to be down-sized. The critical mass of human power is lacking in most of the environment-related institutions both at policy and field level. Linked to human capacity is the lack of skilled manpower that can meet the challenges of modern biodiversity management requirements and technology, rigid institutional set-ups and procedures. All these challenges hamper institutional performance.

(b) Inadequate Infrastructure for Supporting Management

The problem of inadequate infrastructure affects both the central and lower levels whereby even offices are not adequately equipped for smooth and efficient functioning.

(c) Low Core Funding from Government

Low core funding to biodiversity management institutions has often resulted into heavy dependence on donor funding and project support. This is unsustainable and jeopardises the long-term institutional planning and prioritisation of work. Budget allocation is unjustifiably lower for biodiversity conservation when compared to other sectors.

(d) Fragmented Management

The fragmented management of biodiversity ecosystems and natural resources into several institutions and agencies creates a problem of institutional co-ordination and conflicts between and among sector institutions over mandate, duplication in efforts and competition for work and resources.

(e) Policy Failures:

Uganda has numerous policies and laws that govern natural resources. However, some of the policies are presently outdated and need to be reviewed to reflect current management challenges (for example the Wildlife Policy, Forest Policy, Agriculture Policy etc). There is need to strengthen the co-ordination of various sectoral policies to achieve harmony and complementarity. This is especially so in the case of Biodiversity- related policies (National Environment Policy, Uganda Wildlife Policy, Wetlands Policy, Forestry Policy, etc.). Shortcomings in co-ordination and integrated approach in policies and legislation often result in conflicting activities and mandates. Policies pursued in most key biodiversity sectors are focused along conventional sectoral lines with no cross-sectoral linkages and synergies, while other policies such as the Wetlands policy lack legal backing for their enforcement.

(f) Lack of Political Support

Some of the policies in place lack political support, to the extent that in the past there have been inconsistencies in their interpretation and enforcement. These include the Decentralisation Policy, Privatisation Policy and the Investment Policy.

(g) Policy Gaps

These exist in certain aspects of biodiversity management. For example, there are no policies on Access rights, Patents rights, Biodiversity, etc.

3. Other Weaknesses in Biodiversity Management

These include the following:

- (a) Over-exploitation and unsustainable use of biological resources.
- (b) Encroachment on biodiversity habitats through expansion of agricultural land, drainage of wetlands and conversion for urban/industrial development.
- (c) Inadequate integration of social concerns like gender, equity, population, resource tenure, indigenous knowledge and stakeholder participation in biodiversity management.
- (d) Inadequate consideration of biodiversity within the national planning process and in development considerations.
- (e) Politics and associated civil unrest in some areas.

4. Opportunities for Improving Biodiversity Management

The following are opportunities for improving biodiversity management in Uganda:

(a) International and Regional Conventions and Protocols to which Uganda is a Signatory

Uganda is party to several international and regional protocols and agreements. Enforcement thereof will create opportunities for improving biodiversity management. These conventions and/or agreements include the following:

□ Convention Relating to the Preservation of Flora and Fauna in their Natural State 1933, London

This Convention aims at preserving the natural fauna and flora of certain parts of the world, particularly in Africa, by means of national parks and reserves, and by regulating hunting and collection of species. Its National level implementation is through the Uganda Wildlife Statute and the Forest Act.

□ African Convention on the Conservation of Nature and Natural Resources, 1968, Algiers

The Convention encourages individual and joint action for the conservation, utilisation and development of soil, water, flora and fauna for the present and future welfare of mankind, nutritional, scientific, educational, cultural and aesthetic point of view. This Convention was ratified in Uganda on 30.12.77. However owing to lack of finances, African states (including Uganda) have not implemented it.

□ Convention on Wetlands of International Importance Especially as Water Fowl Habitat (THE RAMSAR CONVENTION)

The Ramsar Convention's objective is to stem the progressive encroachment on and loss of wetlands now and in the future, recognizing the fundamental ecological functions of wetlands and their economic, cultural, scientific and recreational values. Uganda ratified the Ramsar Convention in 1988 and the National level implementation is through the setting up of the National Policy on Wetlands, 1994.

❑ **Convention on the Protection of the World Cultural and Natural Heritage, Paris, 1972**

This one aims at establishing an effective system of collective protection of the cultural and natural heritage of outstanding universal value, organised on a permanent basis and in accordance with modern scientific methods. Uganda signed the Convention in 1987. Uganda has included on the World Heritage List two sites: The Rwenzori National Park and Bwindi National Park. Future proposal include the National Parks of Mt. Elgon and Mghahinga.

❑ **Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), Washington, 1973**

The Convention protects certain endangered species from over-exploitation by means of a system of import/export permits. It was acceded by Uganda in 1987. The CITES standard forms for permits and certificates are used as a basis for the control of the traffic in specimens and endangered species. The Wildlife Statute incorporates CITES as a basis for control of traffic in endangered species.

❑ **Agreement on the Preparation of a Tripartite Environmental Management Program for Lake Victoria**

The objective of this Agreement is to develop a 5-year programme , *inter alia*, on fisheries resources of lake Victoria. Uganda signed the Agreement on 5.8.94. National Secretariats were established within the three East African countries to prepare and implement the Lake Victoria Environment Management Programme. One of the programmes is related to fish quality.

The Lake Victoria Environmental Management Program (LVEMP) is a direct consequence of this Agreement. It aims at collecting comprehensive information on water quality and fisheries resources of the lake, and developing tools and measures for the protection of the Lake Environment.

❑ **Lake Victoria Fisheries Organization (LVFO)**

The organisation's main objective is to promote better management of fisheries on the lake, co-ordinate fisheries management with conservation and use of the lake resources, collaborate with agencies and programmes on the lake, co-ordinate fisheries extension and advise on the introduction of non-indigenous organisms.

□ **Agreement on Cooperative Enforcement Operations directed at Illegal Trade in Wild Fauna and Flora, Lusaka, 1994**

The Agreement aims at reducing and ultimately eliminating illegal trade in wild fauna and flora and to establish a permanent Task Force for that purpose. Uganda signed this Agreement in 1994. The Wildlife Statute incorporates most of its provisions.

□ **The United Nations Convention to Combat Desertification, 1994**

The Convention targets combating desertification and to mitigate the effects of drought in seriously affected countries, especially in Africa. Uganda ratified the Convention on 25 June 1997. A National Plan of Action was developed for the country and is being co-ordinated by the Ministry of Agriculture, Animal Industry and Fisheries.

□ **The United Nations Framework Convention on Climate Change (FCCC)**

It aims at regulating the levels of greenhouse gas concentrations in the atmosphere so as to avoid the occurrence of adverse climatic changes. It also contains a requirement that sinks and reservoirs of carbon be conserved and sustainably managed. The FCCC also allows the joint implementation of activities which provide for reforestation or the prevention of deforestation. Uganda ratified the Convention in 1993.

(b) International and Regional Funding

Funding which is tied to the above frameworks has benefited biodiversity in Uganda. Major sources for these funds include the GEF, CBD, IGAD, RAMSAR Convention, and EAC, among others.

(c) Donor Support

Uganda still enjoys substantial donor support for socio-economic development, including funding for biodiversity conservation.

(d) Trade and Investment

A conducive trade and investment environment aimed at harmonising trade across the borders to check on trade in biodiversity especially the endangered species, and to harmonise tariffs as a measure against over-exploitation has been created. Mechanisms have also been put in place to check the unregulated movement of biological resources and to harmonise fiscal policies.

(e) The East African Community Charter

The Charter calls for collaboration on environment matters. On-going programmes cover Forestry, Rangelands and Water Ecosystems (Lake Victoria and River Nile). There are plans to initiate a similar programme on the Albertine Rift Ecosystem.

5. External Threats to Biodiversity Management

The following external threats affect the capacity for managing biodiversity:

- (a) Regional politically inspired conflicts** and other external threats force the Government to prioritise defence and national sovereignty and hence skewing budget allocation towards security issues at the expense of other sectors including biodiversity.
- (b) Global economies and trade trends** pose challenges to poor countries like Uganda as they are required to measure up to global standards. The global trade policies such as those of the WTO could have far reaching consequences where quotas and tariffs are instituted.

6. The Convention on Biological Diversity

Growing concern about the depletion of the world's biodiversity, and the social, economic and political consequences of this loss, have led to a number of global and national actions being taken to conserve biodiversity over the last decade. One of these actions has been the establishment of an international legal agreement known as the **Convention on Biological Diversity (CBD)**. The three main objectives of the CBD are:

- (a) The conservation of biological diversity;
- (b) The sustainable use of its components; and
- (c) The fair and equitable sharing of the benefits arising out of the utilisation of genetic resources.

To achieve these objectives, the CBD contains 42 articles, each dealing with specific aspects of biodiversity. Some of the articles are summarised in Box 3 on the following page. This NBSAP has been prepared partly in response to Article 6 of the CBD.

Box 4: Key topics covered by the CBD

General measures for conservation and sustainable use (**Article 6**)
Identification and monitoring (**Article 7**)
In-situ conservation (**Article 8**)
Ex-situ conservation (**Article 9**)
Sustainable use (**Article 10**)
Incentive measures (**Article 11**)
Research and training (**Article 12**)
Public education and awareness (**Article 13**)
Impact assessment (**Article 14**)
Access to genetic resources (**Article 15**)
Access to and transfer of technology (**Article 16**)
Exchange of information (**Article 17**)
Technical and scientific co-operation (**Article 18**)
Biotechnology and distribution of its benefits (**Article 19**)
Financial resources (**Article 20**)

CHAPTER 3: MEASURES AND STRATEGIES FOR BIODIVERSITY CONSERVATION AND ITS SUSTAINABLE USE

3.1 Guiding Principles

The following guiding principles were set as a basis for preparing this National Biodiversity Strategy and Action Plan (NBSAP):

- 3.1.1. Every person in Uganda has the responsibility to fully participate and contribute to conservation and wise use of biological resources;
- 3.1.2. A community based approach to natural resources management is vital to successful biodiversity conservation as it ensures ownership of the resources;
- 3.1.3. Community ownership and sharing of costs and benefits are vital for successful biodiversity conservation and sustainable use of the resources;
- 3.1.4. The goal and objectives of the NBSAP must be compatible with the various national planning frameworks such as the PEAP and PMA;
- 3.1.5. Uganda has the sovereign right to exploit her biological resources according to her national policies;
- 3.1.6. Co-ordination among the various stakeholders at all levels is critical to successful biodiversity conservation and to the wise use of the country's biological resources;
- 3.1.7. Decision making processes and planning for biological resource use and management should be participatory;
- 3.1.8. Traditional / Indigenous knowledge, technologies and practices must be part and parcel of any conservation efforts;
- 3.1.9. International, regional and national co-operation including sharing of information and appropriate technology is crucial for the conservation of biological resources.

3.2 Vision, Goal and Objectives of the NBSAP

3.2.1. The Overall Vision

The overall vision of Uganda's NBSAP is to maintain a rich biodiversity benefiting the present and future generations for national development.

3.2.2. The Goal

The goal of the NBSAP is to enhance biodiversity conservation, management and sustainable utilisation and fair sharing of the benefits arising from such utilisation at all levels.

3.2.3. The Objectives

The strategic objectives of the NBSAP are:

1. To develop and strengthen co-ordination, measures and frameworks for biodiversity management.
2. To facilitate research, information management and information exchange on biodiversity
3. To reduce and manage negative impacts on biodiversity
4. To promote the sustainable use and equitable sharing of costs and benefits of biodiversity
5. To enhance awareness on biodiversity issues among the various stakeholders

3.3. Measures for Biodiversity Conservation

Uganda is a unique country with a range of national ideologies, goals and interests already in place. The NBSAP is supportive of these wider goals and broader realities, some of which are outlined below:

3.3.1 Social Considerations

Uganda has put in place measures to cater for social issues in the management of biodiversity. The following legal and policy instruments, among others, either provide ownership or call for greater participation in the management of biodiversity:

- The Constitution of the Republic of Uganda, 1995.
- The National Environment Policy, 1995.
- The National Environment Statute, 1995.
- The Uganda Wildlife Statute, 1996.
- The Forest Policy, 2001.
- The Wetlands Policy, 1994.
- The Land Act, 1998.
- The Water Policy, 1999; and
- The Local Governments Act, 1997.

In order to achieve a realistic delivery of social benefits, other issues must be considered, some of which are mentioned below.

There is need to recognise and take into account traditional knowledge and innovations as a source of information that can be applied to enhance biodiversity conservation. Likewise, several of the traditional management regimes are applicable to date and should be encouraged as much as possible.

The population of this country has been doubling almost every twenty years. At an average rate of 2.5% per annum, Uganda's population is projected to become 24.5 million by the year 2002 and to double in 28 years thereby reaching about 40 million by the year 2025 (Vision 2025). This situation has important implications for the socio-economic development of an individual, the family and the country at large. It also has implications for the natural resource base, hence biodiversity, upon which the population depends.

Housing has a great impact on biodiversity and its habitat. Housing in the rural areas is almost entirely dependent on natural resources (poles, wood, grass, mud, etc.). Of particular importance is the actual and potential for deforestation, removal of rural vegetation cover and deterioration of wetland ecosystems where wetlands become a source of clay for bricks, roofing material and so on.

Uganda's land tenure systems provide an excellent opportunity for biodiversity conservation through the Protected Areas system. The Land Act creates the opportunities for both the Central Government and Local Authorities to establish a protected area in public interest. Secondly, the Land Act and other related legislation empower the common person to own and manage biodiversity outside Protected Areas. This provision enhances a sense of ownership and responsibility towards biodiversity and national heritage.

Under the Poverty Eradication Plan (PEAP), Government intends to increase household incomes by focusing on roads, land, agriculture, rural markets, employment and labour productivity, rural credit and financial services. Government intends to address the quality of life by focusing on provision of basic services such as primary health care, primary education, water and environment as well as disaster management. These strategies emphasize the use of natural resources and the protection of the environment including biodiversity.

Box 5: Summary of the key social issues to be considered in the management and conservation of biodiversity for Sustainable Development in Uganda

- Every person should have the constitutional right to live in a healthy environment and the obligation to keep the environment clean;
- The development of Uganda's economy should be based on sustainable natural resource use and sound management;
- Security of land and resource tenure is a fundamental requirement of sustainable natural resource management;
- Long-term food security depends on sustainable natural resource and environment management;
- The utilization of non-renewable resources should be optimized and where possible their life extended by recycling;
- Environmentally-friendly, socially-acceptable and affordable technologies should be developed and disseminated for efficient use of natural resources;
- Full environmental and social costs or benefits foregone as a result of environmental damage or degradation should be incorporated in public and private sector planning and minimized wherever possible;
- Social and economic incentives and disincentives should complement regulatory measures to influence peoples' willingness to invest in sustainable environment management;
- Priority should be given to establishing a social and economic environment which provides appropriate incentives for sustainable natural resource use and environment management;
- An integrated and multi-sectoral systems approach to resource planning and environmental management should be put in place;
- Regular monitoring and accurate assessment of the environment should be carried out and the information widely publicized;
- Conditions and opportunities for communities and individual resource managers to sustainably manage their own natural resources and the environment should be created and facilitated;
- Effective involvement of women and youth in natural resources policy formulation, planning, decision making, management and programme implementation and management is essential and should be encouraged;
- Increased awareness and understanding of environmental and natural resources issues by government and the public should be promoted;
- Social equity, particularly when allocating or alienating resources use and property rights should be promoted; and,
- Sub-regional, regional and global environmental interdependence should be recognised.

3.3.2 Supportive Economic Measures

Unless actions contained in the NBSAP are economically viable and desirable for all sectors of the population, they are unlikely to be implemented in practice. They may also undermine broader national, sectoral and local development goals. The use of supportive economic measures for Uganda's NBSAP also responds to the call in Article 11 of the CBD for Contracting Parties to "*..as far as possible adopt economically and socially sound measures that act as incentives for the conservation and sustainable use of components of biological diversity*".

During implementation, the NBSAP will integrate a range of instruments that aim to make conservation financially profitable and economically worthwhile to the groups whose activities have the most potential to impact on biodiversity – the private sector and local communities.

At the industrial, or large-scale business level, a range of economic instruments will be used to encourage biodiversity conservation measures such as market and charge systems: taxes and subsidies, loans and grants, bonds and deposits will all increase the economic desirability of biodiversity conservation and decrease the relative profitability of biodiversity-degrading industrial activities. Effort will also be made to identify and dismantle the perverse incentives and subsidies that encourage biodiversity degrading land-uses, resource-uses and technologies. They will especially target the sectors that currently contribute to resource over-exploitation, ecosystem conversion and pollution, as well as encouraging potential investors in biodiversity.

Local communities in biodiversity areas bear the major responsibility and cost of biodiversity conservation. They also have the potential to impact most on biodiversity through their day-to-day economic activities. Because they typically benefit little from biodiversity and face multiple livelihood constraints, local communities are often unwilling and economically unable to support conservation through limiting their existing economic activities, finding alternative sources of income and subsistence or bearing biodiversity-related opportunity costs and economic losses. Enabling biodiversity conservation through the provision of local economic incentives such as biotrade forms the central strategy of the NBSAP.

3.3.3 Policy, Legislative and Institutional Measures

1. Policy and Legal Framework

In the recent past, Uganda has developed a number of policies that can support and influence biodiversity conservation and sustainable use of resources. The Environmental Policy of 1995, which aims at sound sustainable development by reconciling economic development and conservation of resources, is a notable example that provides a good basis for proper management of all kinds natural resources. Other relevant sectoral policies developed include those for forestry, fisheries, wetlands, water, wildlife, agriculture, population, education, and gender, among others.

On the other hand, the findings of the assessment on policy, institutional and legal framework has revealed that there is inadequate co-ordination among various sectors involved in biodiversity management and conservation. This is due to lack of a specific and comprehensive national biodiversity policy to guide harmonization of policies and integration of biodiversity conservation and management issue into other sectoral policies and actions. Consequently management of biodiversity, as an important component of environment, has continued to be sectoral in nature where various sectors are implementing their policies that address particular concerns of the sector in an isolated manner. These disjointedly implemented policies can be a source of conflicting actions and confusion especially in managing an ecosystem that falls under the mandate of more than one institution such as aquatic systems.

As a general recommendation for policy reform, **Uganda needs to initiate a multi - sectoral and participatory policy reform programme to facilitate policy harmonisation and consolidation as well as integration of biodiversity issues in all sectors.** The policy review needs also to facilitate policy guidance for implementation of provisions of the CBD that are currently not supported by any of the existing policies. These include aspects such as:

- *ex-situ* conservation;
- Biodiversity impact assessment;
- Access to genetic resources;
- Land use and land use planning;
- Intellectual property rights; and,
- Biodiversity information management and sharing for decision-making.

Regarding legislation, Uganda has about 60 statutes apart from the Constitution that address environmental management. The assessment of biodiversity related legislation has revealed that most of the statutes enacted recently are comprehensive, cross-linked and establish institutional frameworks for enforcement. However, the assessment recognises that the current laws would need to be reviewed and up-dated to accommodate current trends and approaches in biodiversity conservation and management.

It is also recognised that most laws have not been adequately enforced by the authorised institutions due to a wide range of constraints including weak law enforcement capacity, inadequate deterrents and incentives and conflicting mandates. General recommendations for improving the legal framework for biodiversity conservation and management include initiating a multi-sectoral and participatory legal reform programme to facilitate the integration of biodiversity issues in all laws and their attendant regulations and to improve capacity for law enforcement.

2. Institutional Responsibility and Capacity

Biodiversity conservation and management in Uganda is currently a responsibility of various sectoral institutions representing their strong sectoral interests. For effective co-ordination of activities in these institutions, it is important that NEMA has the authority to monitor them. Limited capacity within NEMA has however hampered effective co-ordination.

Capacity within sectors for biodiversity conservation is also not adequate. Preliminary assessment of institutional capacity revealed that Uganda needs additional expertise to support implementation of the NBSAP as well as the CBD. There is thus a need for a thorough assessment of the capacity building needs.

The co-ordination capacity and role of NEMA must be strengthened to:

- Co-ordinate implementation of the NBSAP (e.g. by establishing a co-ordination unit);
- Support integration of biodiversity conservation into sectoral policies, programmes and activities;
- Support and co-ordinate capacity building for biodiversity conservation and management in all relevant sectors and communities;
- Monitor and report on progress in biodiversity conservation and implementation of CBD and other related conventions;
- Co-ordinate preparations and participation of Uganda in the CBD regional and global forums; and,
- Participate effectively in regional environmental policy issues and debates.

3.4 Strategies for Biodiversity Conservation

Uganda has a well-developed legal and institutional framework on biodiversity issues, including a framework environmental policy and legislation, wildlife and forestry policy and laws and a host of other sectoral policies and legislation. Institutional responsibilities are largely modelled along similar lines. Much of the environment and natural resource policies and institutions in Uganda have been reformed and re-ordered over the last 5 years. Notable gaps and omissions however include policies and institutions dealing with land use and biodiversity.

The key issues, threats and constraints affecting biodiversity in Uganda include the following:

1. Lack of a national land use policy.
2. Lack of a national food policy.
3. Lack of a national biodiversity conservation/management policy.
4. Inadequate co-ordination between and within institutions dealing with biodiversity.
5. Conflicting interests over biodiversity among various institutions.
6. Inadequate awareness of biodiversity issues.
7. Inadequate monitoring of environmental trends.
8. Lack of data to guide policy-makers and managers of biodiversity.
9. Inadequate community participation in biodiversity-related decision making processes.
10. Inadequate funding related to international conventions.
11. Lack of effective regional co-operation.

The following strategies are proposed to address the above inadequacies which affect biodiversity conservation and management in Uganda. Each set of strategies is meant to effect a specific objective. Five major objectives are set out below in this regard, followed by the attendant set of strategies:

3.4.1. General Strategies

The first objective is to develop and strengthen co-ordination, measures and frameworks for biodiversity management. To effect this, the following strategies shall be employed:

1. Strengthen the human and infrastructural capacity of sectors involved in biodiversity conservation
2. Establish and strengthen institutional linkages
3. Strengthen the co-ordination unit in NEMA to implement the NBSAP
4. Develop, strengthen and enforce biodiversity-related laws and regulations
5. Integrate biodiversity issues into national and sectoral plans
6. Strengthen biodiversity management outside protected areas
7. Strengthen the role of communities in biodiversity management
8. Establish and maintain Protected Areas representing key ecosystems in Uganda
9. Review, update and harmonize existing biodiversity policies and legislation to accommodate current trends and approaches
10. Initiate policy development to address "policy gaps" in biodiversity
11. Review and update existing biodiversity-related regulations and standards
12. Initiate the preparation of required regulations and standards
13. Develop and implement bye-laws that promote biodiversity conservation
14. Identify and develop sustainable funding mechanisms for biodiversity conservation
15. Promote the provision of economic incentives for biodiversity conservation
16. Incorporate provisions from international Conventions into local policies and legislation.
17. Co-ordinate and implement the provisions of biodiversity-related conventions
18. Participate effectively in global and regional fora, debates and programmes

The second objective is to facilitate research, information management and information exchange on biodiversity issues. The following strategies shall be employed in this regard:

1. Strengthen systems and procedures for research
2. Develop a national research policy
3. Develop sectoral research priorities
4. Promote research in strategic areas of biodiversity conservation and sustainable use
5. Establish a national biodiversity meta-data bank
6. Improve biodiversity information acquisition and management
7. Maintain and regularly update biodiversity reports
8. Build capacity for research and information management

The third objective is to reduce and manage the negative impacts of various activities on biodiversity. The following strategies shall be employed:

1. Prioritise important degraded ecosystems in the country
2. Identify and assess fragile ecosystems
3. Develop and implement species and habitat recovery and protection programmes
4. Develop indicators for monitoring biodiversity
5. Manage threats and causes to ecosystem degradation and species survival.
6. Undertake Environmental Impact Assessments (EIA) of policies, programmes or projects which are likely to have significantly negative impacts on biodiversity inside and outside protected areas
7. Build capacity to manage and restore degraded ecosystems.
8. Promote awareness on regulations that protect fragile ecosystems

The fourth objective is to promote the sustainable use and fair sharing of costs and benefits of biodiversity. The following strategies shall be employed in this regard:

1. Develop mechanisms for sustainable economic returns from the use of biodiversity resources
2. Strengthen the role of communities and other stakeholders in biodiversity management

3. Integrate a range of economic instruments to make biodiversity conservation financially profitable to the local communities
4. Provide economic incentives to local communities which promote the conservation of biodiversity
5. Establish mechanisms for enhanced participation in sharing of costs and benefits
6. Develop and strengthen legal frameworks to ensure the sharing of benefits and costs
7. Establish mechanisms for enhanced community participation in biodiversity management
8. Establish mechanisms for enhanced private sector participation in biodiversity management
9. Provide the private sector with economic incentives to invest in biodiversity conservation
10. Dismantle perverse incentives which encourage unsustainable use of biodiversity such as overexploitation, ecosystem conversion and pollution
11. Promote biotrade especially involving local communities

The fifth objective is to enhance awareness of biodiversity issues among the various stakeholders, using the following strategies:

1. Publicise policies, legislation and other aspects of biodiversity
2. Develop and implement informal public education and awareness programs on biodiversity
3. Promote formal education on biodiversity in educational institutions
4. Promote awareness and sensitisation on issues of fragile ecosystem degradation.
5. Develop and disseminate biodiversity awareness materials

3.4.2. Sectoral Strategies

The components of Uganda's NBSAP are organised according to major sectors, including wetlands, open water resources, forests, wildlife, domestic animal diversity, soils, plant genetic resources and biotechnology and bio-safety. The major rationale for this ordering is that it reflects existing institutional responsibilities and interests. It should however be emphasized that many of the strategies specified for these different sectors are mutually supporting, and that biodiversity conservation in each sector depends upon activities undertaken in others. The strategies listed for each sector are not exhaustive since they are periodically subjected to a review process.

Wetlands and Open Water Resources

1. Status of Wetlands

Wetlands cover approximately 13% of Uganda's surface area and provide many biophysical functions, in addition to generating numerous socio-cultural and economic values. Wetlands in Uganda are known to support some 43 species of dragon flies (of which 8 species are known to occur in Uganda only), 9 species of molluscs; 52 species of fish (which represents 18 % of fish species in Uganda), 48 species of amphibians, 243 species of birds, 14 species of mammals, 19 species of reptiles, and 271 species of macrophytes. All these species are of conservation importance, including those endemic to Uganda and those that appear in the IUCN Red Data list.

Ten sites have been identified as hot spots for biodiversity, requiring immediate and special attention. They include wetlands of Lake George (which has been designated as a Ramsar Site), Muchoya Swamp, L. Nabugabo, L. Bisina, Lutembe Bay, Doho Rice Scheme, Kyoga Swamp and L. Mutanda. Lake George has also been designated as a Ramsar Site.

1.1. Key Issues, Threats and Constraints Facing Wetlands:

- Lack of protection status for wetlands
- Unsustainable resource-harvesting
- Habitat loss through agricultural conversion and industrial development
- Inadequate biodiversity impact assessment of developments in wetlands
- Lack of clear ownership regimes
- Low awareness on wetland values and functions
- Inadequate legislation, enforcement and compliance
- Insufficient information on, or recognition of, economic value of wetlands

1.2. Strategies to Overcome Constraints:

The following strategies were prepared in consultation with the Wetland Sector Strategic Plan, 2001 – 2010 (WID – MWLE, 2001) and the National Policy for the Conservation of Wetland Resources 1995:

- Develop and enforce comprehensive legislation for wetlands management
- Enforce Wetlands Policy
- Strengthen institutional framework and linkages in the wetlands sector
- Co-ordinate development planning which relates to wetlands
- Map and categorise all important wetlands in the country
- Assess impacts of development on wetlands
- Improve information acquisition and management of wetlands.
- Undertake EIA on policies, programmes or projects that are likely to have significantly negative impacts on wetlands
- Develop capacity for Wetland EIA
- Explore alternatives to wetland resources
- Establish standards to pollution and waste discharge in wetlands.
- Establish mechanisms for enhanced community participation
- Develop mechanisms for sharing costs and benefits
- Develop mechanisms for ensuring economic contribution to wetlands management
- Publicize policies and legislation on wetlands
- Develop and implement informal public education and awareness
- Promote public education on wetlands in educational institutions
- Develop and disseminate wetland awareness materials.

2. Status of Open Water Resources

Open water resources cover approximately 17% of Uganda's surface area, including five major lakes (Victoria, Kyoga, Albert, George and Edward), some 160 minor lakes, an extensive river system (including River Nile), dams and ponds. They are an important source of fish, which is a major source of local income and subsistence, and of export earnings. There are over 250 species of fish and unknown diversity of other biodiversity forms. Other components of aquatic biodiversity such as algae, macrophytes and invertebrates are also

important in sustaining a stable production ecosystem. The bulk of the aquatic biodiversity is either endangered or under threat due to habitat degradation and impact of introduction of alien species.

2.1. Key Issues, Threats and Constraints Facing Open Water Resources

- There are no protected areas for both habitats and species in aquatic ecosystems
- Over-exploitation of fisheries resources due to inadequate control of activities and harvesting methods
- Introduction of invasive fauna and flora
- Degradation of habitat through pollution and conversion
- Inadequate information, poor packaging and dissemination of the information on open water biodiversity
- Communal ownership and open access to aquatic resources and ecosystems
- Inadequate involvement of local communities in resource and ecosystem management
- Cross-border issues on shared resources not adequately addressed
- Inadequate funding for management, research and education.

2.2 Strategies to Overcome Constraints

The following strategies, prepared taking into account the draft National Fisheries Policy (MAAIF, 1999), shall be employed in this regard:

- Gazette open water protected areas
- Periodically review the Fisheries policy
- Improve management of open water resources
- Regulate the use of aquatic resources
- Strengthen research on aquatic biodiversity
- Improve information acquisition and management
- Control exotic fish species
- Control invasive species and weeds
- Promote aquaculture (farmed fish) production

- Undertake EIA on policies, programmes or projects that are likely to have significantly negative impacts on aquatic biodiversity
- Develop appropriate mitigation measures against habitat degradation
- Strengthen community and resource use groups participation in fisheries management
- Develop mechanism for sharing costs and benefits
- Promote private sector investment and participation in aquatic biodiversity conservation
- Promote the conservation of indigenous species.
- Dismantle perverse incentives which encourage unsustainable use of aquatic biodiversity such as overexploitation and pollution
- Publicise policies and legislation related to open water biodiversity
- Promote awareness on relevant regulations
- Promote formal education on aquatic biodiversity in educational institutions
- Develop and disseminate open water biodiversity awareness materials

Forests

3. Status of Forest Resources

Forests are widespread in Uganda, and include high altitude forests, and medium altitude moist evergreen and semi-deciduous forests. Most of the larger tracts of forest are already gazetted, but there also exist extensive patches of forests outside these gazetted areas that are under the management of local communities and/or private owners. In total, forests and woodlands are estimated to cover 5 million ha, 43% of which is under government control and management. Forests have been widely converted over this century, especially in areas of high population. The remaining forests are also being rapidly degraded and lost.

3.1. Key Issues, Threats and Constraints:

- Overlap in responsibility with the wildlife sector
- Invasive alien species e.g. *Lantana camara*
- Multiple institutions manage Uganda's forests and trees

- Limited expertise to manage communally-owned forests and trees that fall outside protected areas
- Inadequate management of forests resources
- Inadequate recognition of economic and non-tangible value of forests
- Inadequate information on the economic and non-tangible value of forests
- Inadequate political support for forest conservation.

3.2. Strategies to Overcome Constraints

The following strategies were prepared taking into account the content of the draft Forest Policy 2001 and the draft National Forest Plan (MWLE, 2002) .

- Periodic review of the forestry policy
- Strengthen human, institutional and infrastructural capacity
- Improve institutional collaboration in the management of forest biodiversity
- Develop strategies for managing biodiversity in privately owned forests
- Develop strategies for managing biodiversity in local forest reserves
- Undertake research on agro-forestry and forest biodiversity
- Update information on forest resources
- Strengthen management and co-ordination of sectoral information
- Promote improved forest management techniques
- Undertake EIA on policies, programmes or projects that are likely to have significantly negative impacts on forest biodiversity
- Promote reforestation of environmentally sensitive watersheds
- Manage exotic and alien invasive species
- Integrate economic values in forestry management
- Promote use of energy efficient strategies and technologies

- Promote integration of forestry resources values into macroeconomic frameworks
- Develop mechanisms for sharing costs and benefits of forestry resources
- Develop mechanisms for ensuring economic contribution to forestry management
- Promote biotrade especially involving local community groups
- Establish economic incentives for private sector investments
- Publicize policies and legislation on forestry issues
- Develop and implement informal public education and awareness
- Promote formal education on forestry biodiversity in educational institutions
- Develop and disseminate forestry biodiversity awareness materials

Wildlife

4. Status of Wildlife

Wildlife in Uganda is mostly managed through a system of Protected areas under Uganda Wildlife Authority and Forest Department. Presently, there are 10 National Parks, 10 Wildlife Reserves, 6 Wildlife Sanctuaries and 13 Controlled Hunting Areas. Much wildlife however lies outside these protected areas, on private and communally used land.

4.1. Key Issues, Threats and Constraints:

- Overlap of responsibilities with forest and wetlands sectors
- Poor knowledge of the status of wildlife in Uganda's protected and unprotected areas
- Encroachment on protected areas
- Inadequate monitoring of protected areas
- Inadequate funding of the wildlife sector
- Inadequate consideration of wildlife outside protected areas
- Under-representation of some ecosystems in the protected area system

- Increasing human population pressure on wildlife resources and estate
- Negative impact of macroeconomic and sectoral economic policies
- Inadequate appreciation of wildlife values
- Inadequate consideration of community involvement

4.2. Strategies to Overcome the Constraints

The following strategies that take into account the content of the Uganda Wildlife Statute (1996) and the UWA Strategic Plan (2001 – 2005) shall be employed:

- Periodically review National Wildlife Protected Areas System Plan
- Develop site-specific management plans
- Develop innovative management approaches
- Improve relations with local communities
- Safeguard wildlife outside PAs
- Periodically review and assess adequacy of policy guidelines and regulations
- Foster collaboration between wildlife related international conventions and treaties
- Implement relevant provisions of wildlife-related international conventions and treaties
- Strengthen institutional linkages
- Promote relevant research on wildlife
- Improve information management systems
- Reduce the negative impacts of human activities
- Promote improved management techniques
- Undertake EIA on policies, programmes or projects that are likely to have significantly negative impacts on wildlife
- Identify alternatives to wildlife resources
- Integrate economic values in wildlife management
- Promote integration of wildlife resource values into macroeconomic frameworks
- Develop mechanisms for sharing costs and benefits of wildlife resources

- Optimise protected areas contribution to the welfare of neighbouring communities
- Identify and establish alternative funding mechanisms
- Promote cost-effective financial management practices
- Publicize policies and legislation related to wildlife
- Develop and implement informal public education and awareness programmes
- Promote formal education on wildlife biodiversity in educational institutions
- Develop and disseminate wildlife biodiversity awareness materials

Domestic Animal Diversity

5. Status of the Resource

Presently there is an estimated livestock population of 5.5 million cattle, 5.9 million goats, 1 million sheep, 1.4 million pigs and 22.7 million poultry in Uganda. Estimates of the number of rabbits, dogs and cats are not readily available. Livestock numbers are increasing, in line with the increase in human population and the relative civil calm in Uganda. Exotic and cross-breeds are however becoming increasingly popular. There is some concern that indigenous breeds may be undermined as land becomes more scarce, cross-breeding takes place and the demand for high-yielding exotics increases. It is estimated that Uganda has lost 12 breeds of cattle, 3 breeds of goats and one breed of sheep over the last century. There is however, no domestic animal species that are presently considered endangered.

5.1. Key issues, Threats and Constraints

- Land shortage (due to habitat loss and modification) hence reduced grazing land
- Overgrazing in areas of high live stock populations
- Cross-breeding and erosion of the indigenous genetic base
- Prevalence of diseases and epidemics
- Introduction of new breeds and varieties in relation to indigenous breeds
- Frequency of climate change phenomena such as drought and floods

- Socio-cultural practices and beliefs which translate into animal rustling and other vices
- Over-stocking of some areas
- Discrimination against indigenous breeds and systems
- Poor resource management strategies

5.2. Strategies to Overcome the Constraints

The following strategies are recommended:

- Implement the National Breeding Objectives and Guidelines
- Discourage discrimination against indigenous breeds and systems
- Initiate the development of a national policy and guidelines for sustainable management of rangelands
- Strengthen research capacity in domestic animal diversity.
- Promote research in rangeland management and resource utilisation
- Document indigenous breed characteristics
- Improve collection, processing and dissemination of information on livestock and feed resources
- Strengthen capacity to gather the information
- Strengthen capacity for planning, monitoring and evaluation of Domestic Animal Diversity
- Promote traditional management practices
- Undertake an inventory and characterisation of rangelands in Uganda
- Develop appropriate monitoring indicators for rangelands
- Improve water availability and management for improved livestock production
- Undertake EIA on policies, programmes or projects that are likely to have significantly negative impacts on livestock and rangelands
- Restock the country with special emphasis on the currently under-stocked areas
- Encourage stakeholder participation in planning for Domestic Animal Diversity
- Publicise relevant policies on Domestic Animal Diversity
- Develop and implement informal public education and awareness on Domestic Animal Diversity

- Raise awareness on the need for conservation and sustainable use of rangelands
- Promote formal education on rangelands and Domestic Animal Diversity in educational institutions
- Develop and disseminate rangeland and Domestic Animal Diversity awareness materials

Soil Biodiversity

6. Status of Soil Biodiversity

Soils are varied in forms and therefore support a variety of habitats and life forms, and hence the need to maintain it as a habitat. It is imperative therefore to understand the complex interactions between biotic and abiotic components. The role of soil microorganisms in productive systems and the environment cannot be overstated hence the need to preserve their habitat. Ugandan soils are dominated by ferralsols and ferrasols, both of which developed from old rock, and are highly weathered and leached. Though they are well drained, with deep subsoil, they have low nutrient reserves. They are therefore likely to be low in the population of soil biodiversity.

6.1. Key Issues, Threats and Constraints

- Scanty information is available on Uganda's soil biodiversity
- Inappropriate land use and agricultural methods
- Lack of a National Soils policy
- Land and soil degradation due to over-exploitation and poverty
- Lack of applied and action-oriented research into soil biodiversity

6.2. Strategies to Overcome the Constraints

- Initiate and review policies relating to soil biodiversity
- Strengthen human and institutional capacity for soil biodiversity
- Develop guidelines for soil biodiversity conservation
- Promote research on soil biodiversity
- Improve information management
- Develop and promote appropriate farming methods

- Develop measures to increase understanding of the values of soil biodiversity
- Publicize policies and programmes related to soil biodiversity
- Develop and implement informal public education and awareness on soil biodiversity
- Promote formal education on soil biodiversity in educational institutions
- Develop and disseminate soil biodiversity awareness materials

Plant Genetic Resources

7. Status of the Resources

Plant Genetic Resources (PGR) in Uganda range from little known indigenous wild fruits and vegetables, pastures and forages, medicinal plants, indigenous staples like millets and sorghums, to introduced crops such as maize, tobacco, cotton and beans. These PGR are distributed across the diverse ecological zones of Uganda. Recent studies indicate availability of over 215 species of wild food plants and mushrooms. The diversity of forages is known to be over 277 species while the medicinal species' list and their uses appear unlimited. These PGR, by nature of their value and attributes to man as food/feed, seed, medicine, etc, tend to be largely manipulated and in the hands of the communities and individuals. This implies that many of the species are on agricultural lands outside protected areas and highlights the importance of identifying mechanisms for protecting and promoting them. This will mitigate the effects of dwindling natural ecosystems and take care of changes in land use. Poverty eradication in Uganda will hinge largely on optimal utilisation of available PGR, product development and identifying new market niches for special and high value products. The more the economic value of PGR is unearthed the better the chances of safeguarding the resources from genetic erosion and total loss. Already over 30 indigenous species are endangered, 30 are rare and 10 are vulnerable.

7.1. Key Issues, Threats and Constraints:

- Lack of formal support for PGR
- Increased colonisation by alien invasive species
- Insufficient institutional linkages and co-ordination

- Global trends in Plant Genetic Resources e.g. the International Treaty on Plant Genetic Resources
- Lack of policy and legal frameworks specific to Plant Genetic Resources, including medicinal plants
- Introduction of new varieties in relation to indigenous species
- Insufficient capacity to manage *ex situ* or on-farm PGR
- Lack of a Plant Genetic Resource management and monitoring strategy
- Genetic erosion of indigenous Plant Genetic Resources due to changes in land use
- Climate change leading to drought, diseases, pests, famine, etc.

7.2. Strategies to Overcome the Constraints

- Strengthen institutional and infrastructural capacity for PGR management
- Improve human resource capacity for PGR management
- Promote research and bioprospecting on PGR, including medicinal plants
- Update information on PGR
- Document indigenous knowledge, technologies and practices in PGR conservation
- Conserve and maintain traditional species and varieties
- Collect information on availability of PGR germplasm
- Repatriate germplasm held in foreign countries
- Undertake EIA on policies, programmes or projects that are likely to have significantly negative impacts on PGR
- Develop mechanisms for sharing costs and benefits of PGRs.
- Develop mechanisms for ensuring economic contribution to PGR management
- Promote biotrade in PGR including medicinal plants
- Publicize policies and legislation related to PGR
- Develop and implement informal, public education and awareness
- Promote formal education on PGR in institutions

Biotechnology and Biosafety

8. Status

The consensus in Uganda is to embrace biotechnology and use it in a sustainable way to help improve our livelihoods, ensure food security and human health and safeguard the environment. At present, a number of institutions in Uganda are undertaking biotechnology related research and development activities. These activities are being guided by the Uganda Biosafety Framework that prescribes mechanisms for the judicious application of biotechnology in Uganda.

8.1. Key Issues, Threats and Constraints

- Limited awareness on the potential use, benefits, applications and risks of biotechnology
- Inadequate skilled human resource capacity for biotechnology and biosafety
- Limited institutional and infrastructural capacity to handle biotechnology research and development
- Inadequate public-private partnerships in biotechnology use and applications
- Lack of a coherent policy and regulatory frameworks that specifically address national biosafety regulations, intellectual property rights including the WTO's TRIPS Agreement and access to genetic resources and benefit sharing regimes.

8.2. Strategies to Overcome the Constraints

- Put in place policy and legal frameworks on biotechnology and biosafety
- Strengthen human, institutional and infrastructural capacity in all aspects of biotechnology
- Strengthen regional collaboration in biotechnology and biosafety
- Identify sustainable funding sources for biotechnology and biosafety activities
- Promote research in medical, agricultural, environmental and other areas of biotechnology and biosafety
- Update information on biotechnology and biosafety
- Establish a strong and effective monitoring system for biotechnology use and applications

- Undertake EIA or risk assessments on biotechnology policies, programmes or projects that are likely to have significantly negative impacts on human health and the environment including biodiversity
- Promote trade in biotechnology products
- Develop mechanisms for sharing costs and benefits of biotechnology
- Promote integration of biotechnology values into macroeconomic frameworks
- Undertake awareness and publicity campaign on the benefits and risks of biotechnology and biosafety
- Develop and disseminate biotechnology awareness materials.

CHAPTER 4: IMPLEMENTATION ARRANGEMENTS

4.1. Endorsement and Approval

The NBSAP shall be approved by the highest possible authority in Uganda so that it can secure government ownership and commitment to its implementation. The NBSAP will go to the NEMA Board of Directors; to the Policy Committee on Environment and to Cabinet before official launching. The approved NBSAP shall be publicised widely to secure stakeholder and public ownership and understanding.

4.2. How the NBSAP shall be used

The NBSAP shall be used:

- 4.2.1. As a planning tool by Government, NGOs, Private sector and other stakeholders to integrate biodiversity in national development and sectoral planning respectively.
- 4.2.2. By the Ministry of Finance, Planning and Economic Development as a reference for budget allocation for biodiversity conservation and management.
- 4.2.3. As a tool for fundraising and or co-ordination of donor support to biodiversity conservation.
- 4.2.4. As a guiding tool for NEMA to oversee the implementation of Uganda's obligation to the CBD. In line ministries, the desk officers responsible for related Conventions will also find this NBSAP a useful tool for co-ordinating the implementation of the CBD and the other Conventions.
- 4.2.5. As a guiding tool for assisting Districts to integrate biodiversity in their District Environment Action Plans, District Development Plans and District bye-laws.
- 4.2.6. As a source of information for the National Information data bank(s), research institutions and sectoral agencies. The NBSAP also points out information gaps and research priorities that sectoral agencies should work on.
- 4.2.7. As a guide to Uganda's involvement in international Conventions and agreements as well as the East African Community and other regional frameworks.

4.3. The Role of the NBSAP in Existing Plans, Strategies and Activities

The various agencies responsible for implementation of the NBSAP have sectoral plans and strategies that are on going or planned. It is expected that these agencies will integrate the provisions of the NBSAP into these sectoral plans and strategies.

Most importantly, the national planning frameworks such as the Poverty Eradication Action Plan (PEAP), Sector Wide Investment Plans (SWIPs) and the Plan for Modernizing Agriculture (PMA), should periodically incorporate elements of the NBSAP.

4.4. NBSAP Implementation

The following section details key steps in implementing the NBSAP.

4.4.1 Institutional Arrangements

NEMA will be responsible for the over-all co-ordination of the implementation of this NBSAP. The specific role of NEMA will involve supervising the implementation of the general measures (Section 3.4.1) as well as overseeing and co-ordinating the implementation of various strategies and actions by the sectoral agencies (Section 3.4.2). To enable NEMA fulfill this role, there is going to be a very strong need for inter-sectoral collaboration to avoid duplication. NEMA will also put in place a clear mechanism for fulfilling its role of coordination, supervision and monitoring.

1. Sectoral Agencies

Sectoral agencies will be responsible for ensuring the implementation of the Sectoral strategies and action plans (Section 3.4.2). Specifically they will be responsible for:

- Providing guidance and support to their respective links at district and local levels to ensure biodiversity issues are addressed;
- Integrating biodiversity issues into their sectoral policies and plans;
- Addressing specific issues that are mentioned in the NBSAP;
- Monitoring and disseminating information on their activities affecting biodiversity;
- Collaborating with NEMA on relevant issues in the NBSAP.

2. District Local Governments

At the district level, the District Local Government shall be the lead agency. Environment management including biodiversity is a decentralised function, in accordance with the National Environment Statute 1995 and the Local Governments Act 1997. Mechanisms are already in place for performing this function including the office of the District Environment Officer, the District and Local Environment Committees and the District Technical Planning Committee. Working through these bodies, the roles of the District Local Governments will include:

- Co-ordinating the implementation of the NBSAP in the District;
- Formulating and enforcing local policies and bye-laws related to biodiversity conservation and use;
- Assisting in documenting indigenous knowledge, technologies and practices in biodiversity conservation
- Monitoring biodiversity conservation including maintaining and disseminating accurate information
- Integrating biodiversity issues in District Environment Action Plans and subsequently incorporating them in District Development Plans
- Mobilizing resources, including community contributions, and allocation of resources for the implementation of NBSAP;
- Mobilizing local communities, resource use groups, NGOs and CBOs in biodiversity conservation;
- Identifying vital critical ecosystems, biodiversity hotspots and critical species that need protection and where required ensuring fulfilment of Uganda's obligations to the Convention on Biological Diversity and other related international agreements.

3. Local Communities

At the local level, the partners in implementing the NBSAP will be the local communities based on the assumption that they will be ready, willing and able to shoulder the responsibility for conserving and sustainably utilizing biodiversity resources in the areas. It is imperative that extensive awareness as well as identification of incentives to enhance their participation are undertaken beforehand. The specific roles of the local communities will include:

- Participation in planning processes such as DEAPs to identify and prioritise issues and actions related to the NBSAP;
- Implementing measures and activities geared towards ensuring land improvement and biodiversity conservation and sustainable utilization;

- Participating in training and capacity - building activities;
- Sharing information on traditional technology and knowledge with other communities and other stakeholders.

Local communities will need a lot of capacity building in the form of technical and logistic support if they are to meet the challenges involved in implementing the NBSAP. Some of this support will be provided by NEMA, local NGOs and CBOs. But much of the support will have to come from the district local governments.

4. Non-Governmental Organisations (NGOs)

NGOs will be crucial in the NBSAP. Their functions, among others, will include:

- Carrying out awareness-raising activities on the NBSAP;
- Assisting to strengthen the capacity of community-based organisations and communities to implement NBSAP;
- Facilitating technology transfer at community level;
- Promoting networking opportunities, especially among NGOs and other civil society organizations;
- Documenting indigenous knowledge, technologies and practices in biodiversity conservation
- Assisting CBOs and communities to formulate and implement projects related to the conventions.

5. The Private Sector

Key roles of the private sector, among others, will be to:

- Invest in sustainable and environmentally-sound technologies;
- Invest in alternative income-generating activities;
- Contribute resources to support programmes on land management and biodiversity conservation.

4.4.2 Financing the Implementation of the NBSAP

Article 6(b) of the Convention on Biological Diversity requests countries to integrate, as far as possible and as appropriate, the conservation and sustainable use of biological diversity into relevant sectoral or cross-sectoral plans, programmes and policies. This requires tapping internal funding from the sectors. Furthermore, because this NBSAP is a framework strategy presented through a programme approach rather than a project approach, it has no specific budget ceiling or resource envelope. It is clear however, that

implementation of the NBSAP will require new and additional sources of funds. These sources will include:

1. Government

Uganda ratified the Convention on Biological Diversity (CBD) and Article 20 of the CBD requires Contracting Parties to “... *provide, in accordance with its capabilities, financial support and incentives in respect of those national activities which are intended to achieve the objectives of this Convention, in accordance with its national plans, priorities and programmes*”. Government must therefore endeavour to fulfil this obligation by increasing budgetary allocations to support biodiversity conservation programmes related to this NBSAP.

Fortunately, most of the activities identified in the NBSAP are already contained in the day to day activities of NEMA and the relevant lead agencies. Therefore, there will be minimal additional costs involved. It is estimated that each lead agency would require at least 10 million shillings over and above their recurrent expenditure per year to implement additional activities in the NBSAP. In order to realize this contribution, every attempt should be made to periodically incorporate elements of the NBSAP into national planning frameworks such as the Poverty Eradication Action Plan (PEAP), Sector Wide Investment Plans (SWIPs) and the Plan for Modernizing Agriculture (PMA).

2. Development Partners and Donor Agencies

As a Party to the Convention on Biological Diversity, Uganda currently benefits in excess of 20 million U.S. dollars, from the Global Environment Facility (GEF) for implementing biodiversity programmes in the country. Continued funding for various NBSAP activities will be sought from GEF.

However, this will require Uganda to fulfill its obligations to the CBD, such as meeting her annual contribution of 350 U.S. dollars to the CBD Secretariat, supporting delegations to CBD meetings and other related activities.

- This NBSAP will also provide a useful guide to other development partners and donor agencies to identify programmes for support to biodiversity conservation and sustainable development of Uganda.

3. The Private Sector

There are many different ways that the private sector could participate in biodiversity conservation. The establishment and improvement of markets, along with appropriate property rights,

provides one means of devolving some of the responsibility for managing biodiversity and sharing in the costs of its conservation.

Efforts should also be made to attract charitable contributions and donations through such mechanisms as trusts, endowments and foundations.

Support should also be provided for the entry of the private sector into biodiversity conservation in other ways, including biotrade; research and development into new biodiversity products and markets; the allocation of concessions and franchises; and the provision of tax relief on investment and contributions.

The NBSAP should make use of this wide range of potential financing mechanisms in its attempt to broaden, and make more sustainable, the funding base for biodiversity conservation. Particular priority should be given to those funding mechanisms that encourage private sector investment, and community participation in biodiversity management.

4.4.3 Monitoring, Evaluation and Reporting

The NBSAP will be implemented over an initial period of 10 years with a major review after 5 years.

The implementation of NBSAP will require regular monitoring and evaluation of progress. NEMA shall be the Lead Agency responsible for monitoring implementation of the over-all NBSAP. Participating institutions will be responsible for monitoring implementation of their respective tasks.

To be able to effectively monitor the NBSAP, NEMA will:

1. Take the lead in developing a Monitoring and Evaluation Programme that will include a reporting structure and format, performance and impact indicators, compliance indicators and monitoring tools.
2. Assist Sectoral institutions to develop their own monitoring plans and seek to integrate these into the over-all NBSAP Monitoring Plan.
3. Assist Sectoral institutions to develop baseline performance indicators with milestones for tracking implementation progress over the initial 5-year period. Examples of baseline performance indicators are presented in Table 5 below:

Table 5: Measuring the Impact of Implementation of the NBSAP

Strategic Objective	Performance Indicators
1.To develop and strengthen co-ordination measures and frameworks for biodiversity management	<ul style="list-style-type: none"> • Co-ordination mechanisms in place and adhered to by all stakeholders • Biodiversity laws and bye-laws enforced
2. To facilitate research, information management and exchange on biodiversity	<ul style="list-style-type: none"> • Research strategies in place • Biodiversity information network in place
3.To reduce and manage negative impacts on biodiversity	<ul style="list-style-type: none"> • Some degraded ecosystems rehabilitated • Species restoration implemented
4. To promote the sustainable use and fair sharing of costs and benefits of biodiversity	<ul style="list-style-type: none"> • Regulations on Access to genetic resources implemented • Collaborative management agreements in place
5.To enhance awareness on biodiversity issues among the various stakeholders	<ul style="list-style-type: none"> • Awareness materials prepared and disseminated

A comprehensive list of performance indicators will be developed by the sectors during the first year of the NBSAP implementation in terms of quantity, quality, time and place. The resulting set of indicators will then be used as the basis of the NBSAP performance monitoring system.

The Key Monitoring Tools shall Include:

- Annual reports from relevant stakeholders
- Annual reports from NEMA
- Annual meetings convened by NEMA to specifically discuss the progress on implementing the NBSAP
- Periodic National Reports to the CBD

CHAPTER 5: REFERENCES

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CHAPTER 6: ANNEXES

6.1 Participants in NBSAP Workshops and Consultations

6.1.1 Training workshop : March 1999

Co-ordinator

Dr. B.H. Ogwang

Aquatic Biodiversity Task Force

Dr. R. Ogutu Ohwayo
Mr. S.B Wandera

Wildlife Task Force

Ms. Apophia Muhimbura – Atukunda
Mr. Herbet Tushabe
Mr. Francis Kahembwe
Mr. Edgar Buhanga

Forestry Task Force

Mr. Fred Kigenyi
Mr. David Duli
Mr. J. Walugembe

Plant Genetic Resources Task Force

Mr. John Mulumba Wasswa
Dr. R. Bukenya-Ziraba
Ms. Sophia Apio-Kerwegi
Mrs. Beatrice Male-Kayiwa

Genetic Resources Task Force

Dr. F.M Mbuza
Dr. C. Tizikara

Biotechnology and Biosafety Task Force

Dr. C. Mugoya

Wetlands Task Force

Mr. P. Mafabi
Dr. J. Arinaitwe
Mr. Willy Kakuru

Soil Biodiversity Task Force

Dr. Mary Rwakaikara
Dr. Charles Nkwiine

Institutional and Legal Issues Task Force

Ms. Doris Akol

6.1.2. List of Participants at the June 1999 Consultative Workshop

Convenor

Dr. B.H Ogwang, NEMA

Facilitators

Dr. Geoffrey Howard, IUCN
Mr. Issa Abdulrahaman, IUCN
Mr. Alex Muhweezi, IUCN

Participants

Hon. L. Kezimbira – Miyingo, Minister of State for Environment
Prof. John Okedi, NEMA
Mr. Kabanankye Ishmael Kabann, MISR
Dr. Moses Isooba, UWS
Ms. Pauline Nantongo, WCU
Ms. Apio Sophia, NCRL
Mr. Patrick Nantanga, UNFA
Mr. K.K.P Bakkabulindi, Uganda Herbalists association
Mr. Stephen Galiwango, Rwakedde Env. Protection and Awareness Association
Mr. David Walugembe, Uganda Forestry Association
Eng. Paul Mubiru, Energy Department
Dr. Festus Bagoora, NEMA
Mr. Manson Tweheyo, Faculty of Forestry , MUK
Mr. John Mulumba Wasswa, NARO
Mr. O.G Kasango, RDC's Office, Jinja
Mr. Silver Rwakaikara, Soil Science, MUK
Mrs. F. Sewankambo, NEMA
Ms. Dorothy Kagwa, IUCN
Mr. Charles Nkwiine, Soil Science, MUK
Mr. S. B Wandera, FIRI
Mr. John Wabende, LVEMP
Mr. Paul Mafabi, MWLE, Wetlands Inspection Division
Dr. Ogutu-Ohwayo, FIRI
Ms. Jane Kavuma, WWF
Me. E.T Muramira, NEMA
Dr. Emmy Beraho, NEMA
Ms. P. Kizza, NEMA
Mr. D. Hafashimana, Forest Department
Mr. E. Mukasa, Mukono District
Mr. John Ngobi, Jinja
Ms. Betty Munabi, Private Sector
Ms. Doris Akol, URA
Mr. Willy Kakuru, Wetlands Inspection Division
Mr. Leo Mwebembezi, DWD – WRND
Mr. F. Kahembwe, FORI-NARO
Ms. Gloria Nkara, Private Sector
Dr. C. Mugoya, UNCST

6.2 Sources of other comments on the NBSAP

1. Dr. Kyokwijuka B. for Director of Animal Resources, MAAIF
2. Nanjala Rebecca, District Environment Officer, Busia
3. James Okiria-Ateker, District Environment Officer, Kumi
4. Martin Rutangye, Director Education, Awareness & Training, NEMA
5. Edith Kateme-Kasajja (Mrs) for PS, MWLE
6. Dr. Mary Rwakaikara, Department of Soil Science, Makerere University
7. G.R. Turyahikayo for PS Ministry of Energy & Mineral Development
8. Dr John Aluma, Deputy Director General, NARO
9. Dr. PMB Kasoma, Director, MUIENR
10. Dr. Robbie Robinson, Executive Director, Uganda Wildlife Authority
11. Mr. Gerald Eilu, Faculty of Forestry, MUK

6.3. EXAMPLES OF ACTIVITIES TO BE UNDERTAKEN UNDER GENERAL MEASURES OR CROSS-CUTTING ISSUES IN BIODIVERSITY MANAGEMENT

OBJECTIVE ONE: TO DEVELOP AND STRENGTHEN COORDINATION, MEASURES AND FRAMEWORKS FOR BIODIVERSITY MANAGEMENT				
Outputs	Strategy	CBD link	ACTIVITIES	Key Actors
1. Coordination and inter-sectoral linkages strengthened	1. Establish and strengthen institutional linkages	Article 6	<ul style="list-style-type: none"> • Restructure and strengthen existing arrangements and enhance inter-coordination and cooperation among relevant institutions • Harmonize institutional approaches to biodiversity concerns 	NEMA, Sectoral Agencies
	2. Strengthen coordination unit in NEMA to implement the NBSAP	Article 6a	<ul style="list-style-type: none"> ◆ Strengthen an NBSAP monitoring mechanism in NEMA ◆ Develop and implement a monitoring and reporting programme ◆ Undertake regular cross-sectoral consultations on NBSAP implementation ◆ Develop guidelines for Districts to implement NBSAP 	NEMA Sectoral Agencies Districts
2. Measures for biodiversity management enhanced	1. Develop, strengthen and enforce biodiversity related laws and regulations	Article 8	<ul style="list-style-type: none"> ◆ Strengthen the implementation of bio-safety regulations and laws ◆ Strengthen implementation capacity (institutional, human, infrastructural and legal frameworks) for biodiversity management 	UNCST NEMA Sectoral Agencies
	2. Integrate biodiversity issues into national and sectoral plans	Article 6b	<ul style="list-style-type: none"> ◆ Develop and implement guidelines for integration of biodiversity into national, sectoral and district plans 	NEMA, Sectoral Agencies, Districts, NGOs
3. All key biodiversity ecosystems represented in National Protected Areas System	3. Strengthen biodiversity management outside protected areas	Article 9 & 8c	<ul style="list-style-type: none"> ◆ Encourage collaborative management ◆ Develop regulations and guidelines on biodiversity outside protected areas ◆ Integrate biodiversity conservation in district plans ◆ Regulate conservation and use of biological resources outside protected areas ◆ Provide incentives and support to local communities for biodiversity conservation ◆ Develop and implement programmes for cross-border shared biodiversity resources 	NEMA Districts NGOs CBOs Sectoral agencies e.g. UWA, NARO
	4. Strengthen the role of communities in biodiversity management	Article 6b, 8j	<ul style="list-style-type: none"> ◆ Undertake training programmes to promote community based programmes ◆ Assess and document level of dependence on biodiversity for community livelihood ◆ Document and integrate indigenous knowledge and customary/cultural rights in biodiversity management ◆ Develop and implement community based management approaches ◆ Empower communities to manage the ecosystem better ◆ Put in place conflict resolution mechanisms in biodiversity management 	NEMA Sectoral agencies Districts NGOs CBOs
	1. Establish/maintain Protected Areas representing key ecosystems in Uganda	Article 8a – b, 8d, 8g	<ul style="list-style-type: none"> ◆ Review National Protected Area Systems ◆ Assess viability of all Protected Areas ◆ Gazette un-represented ecosystems into Protected areas 	Parliament Districts Sectoral Agencies e.g. FD, UWA MTTI, MWLE

4. Biodiversity related Policies and Legislation strengthened	1. Review, update and harmonise existing biodiversity policies and legislation	Article 8i, 8g, 8k, 6b	<ul style="list-style-type: none"> ◆ Review and update policies and legislation on biodiversity ◆ Review and update policies and legislation on Intellectual Property rights ◆ Review and update policies and legislation on irrigation and water use and management 	NEMA Sectoral Agencies
	2. Initiate policy development to address "policy gaps" in biodiversity	Article 6b	<ul style="list-style-type: none"> ◆ Initiate biodiversity policy reforms in relevant areas ◆ Develop a national food policy ◆ Develop policies and/or legislation on: <ul style="list-style-type: none"> -Economic instruments -Biodiversity information and management -Access to Genetic Resources -Land-use planning -Biotechnology and Biosafety 	NEMA Sectoral Agencies
	3. Review and update existing biodiversity-related regulations and standards	Article 8k	<ul style="list-style-type: none"> ◆ Review regulations and standards on: <ul style="list-style-type: none"> -Soil conservation -Fisheries management -Water use and management 	NEMA, Sectoral Agencies
	4. Initiate the preparation of required regulations and standards where there are gaps		<ul style="list-style-type: none"> ◆ Translate and disseminate regulations and standards ◆ Develop regulations and standards on biodiversity where there are gaps e.g. for Plant and animal pests and disease control 	NEMA Sectoral Agencies
	5. Develop and implement bye-laws that promote biodiversity conservation	Article 8k	<ul style="list-style-type: none"> ◆ Prepare Environment policies at district and lower levels ◆ Formulate bye-laws related to biodiversity conservation ◆ Implement the bye-laws 	NEMA Sectoral Agencies Districts

5. Funding for biodiversity conservation & sustainable management secured	1. Identify and develop sustainable funding mechanisms	Article 20.1 20.2 - 7 21.4	<ul style="list-style-type: none"> ◆ Identify, publicize and tap into existing and new funding sources ◆ Promote natural resource accounting at all levels ◆ Integrate biodiversity funding requirements into government budgets ◆ Access global funding tied to the CBD and others ◆ Encourage private sector investment in biodiversity ◆ Lobby for increased government and donor support 	NEMA, Sectoral Agencies e.g. Min. of Finance Private Sector
	2. Promote the provision of economic incentives for biodiversity conservation	Article 11	<ul style="list-style-type: none"> ◆ Develop and publicize incentives ◆ Document and disseminate “good practices” in biodiversity incentives ◆ Integrate biodiversity incentives into policy frameworks at all levels 	Sectoral Agencies NEMA Private Sector
6. International and Regional cooperation enhanced	1. Domestic International Conventions	Article 6a	<ul style="list-style-type: none"> ◆ Review national policies and legislation to conform with relevant provisions of International Conventions and Regional Treaties ◆ Simplify and disseminate International Conventions 	NEMA, Sectoral Agencies e.g. Min. of Foreign Affairs, Justice
	2. Coordinate and implement the provisions of biodiversity related conventions	Article 6a	<ul style="list-style-type: none"> ◆ Streamline coordination and institutional roles for implementing conventions ◆ Implement national obligations 	NEMA Sectoral Agencies
	3. Participate effectively in Global and Regional forums, debates and programs	Article 5, 8m, 9e, 18.1, 18.3 -5	<ul style="list-style-type: none"> ◆ Organize regular national level processes to feed into global and regional processes ◆ Secure government funding to meet associated costs, including funding for participation in global & regional forums , debates and programs 	NEMA NGOs Sectoral Agencies e.g. Min. of Finance, Planning and Economic Development

OBJECTIVE 2: TO FACILITATE RESEARCH, INFORMATION MANAGEMENT AND INFORMATION EXCHANGE ON BIODIVERSITY ISSUES				
Outputs	Strategy	CBD link	Activities	Key Actors
1. Research activities strengthened	1. Strengthen systems and procedures for research	Article 12a, 12b, 12c 7a - b, 16, 18	<ul style="list-style-type: none"> ◆ Strengthen research capacity ◆ Strengthen role of UNCST ◆ Identify and document research priorities ◆ Undertake research in priority areas ◆ Develop research guidelines ◆ Identify funding sources ◆ Invest in research 	Sectoral Agencies UNCST Universities Research Institutions
2. National Policy on research established	1. Develop a national research policy	Article 7, 12	<ul style="list-style-type: none"> ◆ Develop a national policy on research 	UNCST NEMA Universities Research institutions
	2. Develop sectoral research priorities	Article 7, 12	<ul style="list-style-type: none"> ◆ Develop sectoral research priorities 	UNCST Universities Research institutions
3. An effective biodiversity information management system established	1. Establish a national meta-data bank	Article 7d, 17.1, 17.2, 26, 7c	<ul style="list-style-type: none"> ◆ Undertake assessment of all biodiversity components to fill the gaps in information ◆ Strengthen coordination mechanisms for biodiversity information ◆ Strengthen national biodiversity data banks ◆ Strengthen the Clearing House mechanism in NEMA ◆ Make functional and strengthen the CHM for products and processes of biotechnology ◆ Use CHM as facility for networking 	NEMA UNCST Sectoral Agencies Academic institutions Research Institutions
	2. Improve information acquisition and management	Article 7d	<ul style="list-style-type: none"> ◆ Collect, analyze and disseminate information to relevant stakeholders ◆ Build capacity to manage biodiversity information 	NEMA Sectoral Agencies
	3. Maintain and regularly update biodiversity reports	Article 17.1, 17.2, 7d	<ul style="list-style-type: none"> ◆ Review and update National biodiversity reports ◆ Develop and implement national biodiversity monitoring and reporting programmes 	NEMA Sectoral Agencies
	4. Build capacity for research and information management		<ul style="list-style-type: none"> ◆ Undertake capacity building for research and information management 	Sectoral Agencies UNCST NEMA Universities Research Institutions

OBJECTIVE 3: TO REDUCE AND MANAGE NEGATIVE IMPACTS OF VARIOUS ACTIVITIES ON BIODIVERSITY				
Outputs	Strategy	CBD link	Activities	Key Actors
1. Degraded critical ecosystems assessed and prioritised	1. Prioritise important degraded ecosystems in the country	Article 8h, 14e	<ul style="list-style-type: none"> ◆ Carry out inventory of degraded ecosystems ◆ Develop criteria for ranking degree of degradation of important ecosystems 	NEMA Academic and Research institutions Sectoral Agencies
	2. Identify and assess fragile ecosystems	Article 8f	<ul style="list-style-type: none"> ◆ Analyse existing data and information on fragile ecosystems ◆ Carry out case studies ◆ Develop monitoring indicators ◆ Identify & document degraded fragile ecosystems 	NEMA Academic and Research institutions Sectoral Agencies
2. Degraded/Fragile ecosystems rehabilitated /Protected	1. Develop and implement species and habitat recovery and protection programmes	Article 9	<ul style="list-style-type: none"> ◆ Develop and implement species recovery programmes ◆ Develop and implement habitat restoration programmes ◆ Promote programmes to maintain species and habitat balance 	NEMA Sectoral Agencies NGOs, CBOs
	2. Manage threats and causes to ecosystems' degradation and species' survival		<ul style="list-style-type: none"> ◆ Institute measures for managing alien and invasive species ◆ Raise public awareness ◆ Identify alternatives to biodiversity resources ◆ Strengthen facilities for ex-situ conservation ◆ Incorporate biodiversity issues in national EIA guidelines for biodiversity conservation ◆ Strengthen capacity for planning, monitoring and evaluation of negative impacts ◆ Develop appropriate mitigation measures ◆ Promote active participation of stakeholders in monitoring and predicting biodiversity impact due to utilization ◆ Integrate environmentally friendly approaches in "conflict" resolution 	NEMA Sectoral Agencies NGOs CBOs Private Sector
	3. Build capacity to manage and restore degraded ecosystems		<ul style="list-style-type: none"> ◆ Strengthen human, institutional and infrastructural capacity to manage and restore degraded ecosystems 	Sectoral Agencies Research institutions Tertiary educational institutions

OBJECTIVE 4: TO PROMOTE THE SUSTAINABLE USE AND FAIR SHARING OF COSTS AND BENEFITS OF BIODIVERSITY				
Outputs	Strategy	CBD link	Activities	Key Actors
1. Economic returns from biodiversity resources optimised	1. Develop mechanisms for sustainable economic returns from use of biodiversity resources	Article 15.2, 15.4 15.5, 15.7	<ul style="list-style-type: none"> ◆ Develop economic instruments for biodiversity valuation ◆ Lobby for the inclusion of natural resource accounting in national budgets ◆ Develop mechanisms for managing and monitoring local and international trade in biodiversity resources ◆ Identify and promote alternative uses and substitutes for biodiversity resources ◆ Build capacity for economic valuation of biodiversity ◆ Undertake economic valuation of biodiversity 	NEMA Sectoral Agencies
2. Collaborative management of biodiversity strengthened	1. Strengthen the role of communities and other stakeholders in biodiversity management	Articles 8j, 10c, 10d, 10e	<ul style="list-style-type: none"> ◆ Promote stakeholder participation in biodiversity management ◆ Strengthen community based biodiversity management institutions ◆ Strengthen institutional collaboration between sectors, Districts, NGOs etc ◆ Put in place conflict resolution mechanisms in shared biodiversity resources 	NEMA Sectoral agencies NGOs CBOs Districts
3. Mechanisms for sharing costs and benefits established	1. Establish mechanisms for enhanced participation in sharing of costs and benefits		<ul style="list-style-type: none"> ◆ Develop mechanisms for sharing costs and benefits from biodiversity use ◆ Integrate biodiversity costs and benefits into micro - and macro-economics frameworks ◆ Promote access to and responsibility for biodiversity resource use 	NEMA Sectoral Agencies e.g. Min. of Finance, Planning and Economic Development
	2. Develop and strengthen legal frameworks to ensure sharing of benefits and costs	Article 10e, 8j, 15.7	<ul style="list-style-type: none"> ◆ Regulate biodiversity access regimes ◆ Establish a law on property Rights 	NEMA UNCST Sectoral Agencies e.g. Min. of Justice
4. Role of communities in biodiversity management strengthened	1. Establish mechanisms for enhanced participation in biodiversity management	Article 15.2, 15.4 15.5, 15.7 8j	<ul style="list-style-type: none"> ◆ Assess and document level of community dependence on biodiversity for livelihood ◆ Document and integrate indigenous knowledge and customary/cultural rights in biodiversity management ◆ Undertake training programmes to promote community biodiversity conservation ◆ Develop and implement community based management approaches ◆ Strengthen community based biodiversity management institutions ◆ Provide incentives and support to local communities for biodiversity conservation ◆ Provide incentives and support to the private sector for biodiversity conservation 	NEMA Sectoral Agencies NGOs CBOs Districts

OBJECTIVE 5: TO ENHANCE AWARENESS OF BIODIVERSITY ISSUES AMONG THE VARIOUS STAKEHOLDERS				
1. Public awareness on biodiversity issues enhanced	1. Publicize policies, legislation and other aspects of biodiversity	Article 13	<ul style="list-style-type: none"> ◆ Translate policies and legislation into simpler forms ◆ Involve stakeholders in policy reforms ◆ Undertake awareness campaigns on biodiversity issues 	NEMA NGOs, CBOs, districts Sectoral Agencies e.g. Min. of Education
	2. Develop and implement informal public education and awareness programs on biodiversity		<ul style="list-style-type: none"> ◆ Encourage and support NGOs ◆ Encourage public participation on World Biodiversity Days ◆ Integrate biodiversity issues in informal education ◆ Organize biodiversity courses including bio-safety and biotechnology for community leaders, extension workers ◆ Encourage and support biodiversity awareness through music, drama etc ◆ Disseminate relevant information to members of the public through radio, TV, newspapers, seminars etc. 	NEMA Educational institutions Sectoral agencies NGOs CBOs Districts
	3. Promote formal education on biodiversity in educational institutions		<ul style="list-style-type: none"> ◆ Integrate biodiversity into the school and college curricula ◆ Encourage the development of biodiversity courses in schools and colleges 	NEMA, Sectoral Agencies e.g. Min. of Education
	4. Develop and disseminate biodiversity awareness materials		<ul style="list-style-type: none"> ◆ Translate the provisions of the CBD into simpler and local languages ◆ Develop and disseminate awareness materials, posters, T-shirts etc to the general public 	NEMA, Sectoral Agencies, NGOs, CBOs, Districts

6.4: PROPOSED SECTORAL STRATEGIES:

6.4.1 WETLANDS RESOURCES

OBJECTIVE ONE: TO DEVELOP AND STRENGTHEN COORDINATION, MEASURES AND FRAMEWORKS FOR WETLANDS MANAGEMENT				
OUTPUTS	STRATEGY	CBD LINK	ACTIVITIES	Key Actors
1. Legal framework for wetlands management	1. Develop and enforce comprehensive legislation for wetlands management	Article 8k	Prepare sectoral legislation on wetlands	MWLE, Parliament, WID
2. Wetlands policy implementation strengthened	1. Enforce wetlands policy	Article 8k	<ul style="list-style-type: none"> Periodically review and strengthen Wetlands policy Initiate actions at proposed RAMSAR sites 	NEMA, WID, MWLE
	2. Strengthen institutional frameworks and linkages in the wetlands sector	Article 8c, 8k	<ul style="list-style-type: none"> Build Institutional capacity (facilities and human capacity) Develop guidelines on improved harvesting methods, Sand and clay excavations, development zoning etc 	MWLE, WID
3. Wetlands resource utilization optimised	1. Coordinate development planning which relate to wetlands	Article 6b, 14a, 14b	<ul style="list-style-type: none"> Review and update development plans for wetlands Apply "zoning" approach towards wetlands planning and management 	MWLE, WID

OBJECTIVE 2: TO FACILITATE RESEARCH, INFORMATION MANAGEMENT AND INFORMATION EXCHANGE ON WETLAND BIODIVERSITY				
OUTPUTS	STRATEGY	CBD LINK	ACTIVITIES	KEY ACTORS
1. Wetlands inventory undertaken	1. Map all important wetlands	Article 7a - b	<ul style="list-style-type: none"> Undertake GIS based inventory and aerial surveys Undertake wetland resources assessment Generate wetlands inventory maps and resource assessment maps 	WID
2. Impact of agriculture and industry on wetlands assessed	1. Assess impacts of development on wetlands	Article 14a, 14b, 14e	<ul style="list-style-type: none"> Undertake impact studies on agriculture, industry, excavations (sand, clay) Disseminate results of impact studies 	WID, NEMA
3. Information on wetland biodiversity increased	1. Improve information acquisition and management	Article 7d, 17.1, 17.2	<ul style="list-style-type: none"> Collect, analyse and disseminate information to relevant stakeholders Build capacity to manage data on wetlands 	MWLE, WID

OBJECTIVE 3: TO REDUCE AND MANAGE NEGATIVE IMPACTS OF VARIOUS ACTIVITIES ON WETLAND BIODIVERSITY				
1. EIA guidelines on wetlands strengthened	1. Develop capacity for Wetland EIA	Article 14a, 14b, 14e	<ul style="list-style-type: none"> ◆ Build capacity for Wetland EIA ◆ Streamline procedures for EIA on Wetland activities ◆ Enforce compliance on EIA regulations 	NEMA, WID
2. Alternatives to wetlands resources developed	1. Develop alternatives to wetland resources	Article 8c, 8f, 10b, 10d	<ul style="list-style-type: none"> ◆ Identify and promote alternative uses and substitutes to wetland resources ◆ Demonstrate the “wise-use” options of wetlands 	WID
3. Pollution and discharge of wastes into wetlands regulated	1. Establish standards to pollution and waste discharge in wetlands	Article 8	<ul style="list-style-type: none"> ◆ Establish maximum tolerable levels of pollution and discharge ◆ Develop and implement pollution and monitoring programs 	WID NEMA
OBJECTIVE 4: TO PROMOTE SUSTAINABLE USE AND EQUITABLE SHARING OF COSTS AND BENEFITS FROM WETLANDS				
1. Mechanism for sharing costs and benefits established	1. Establish mechanisms for enhanced community participation	Article 10b, 10c	<ul style="list-style-type: none"> ◆ Promote stakeholder participation in wetland management 	WID
	2. Develop mechanism for sharing costs and benefits	Article 15.4, 11. 10e	<ul style="list-style-type: none"> ◆ Promote access to and responsibility for wetland resources ◆ Implement activities that promote access ◆ Document and apply indigenous peoples knowledge and practices 	WID NEMA
	3. Develop mechanisms for ensuring economic contribution to wetlands management	Article 8m, 8j, 17.1,17.2	<ul style="list-style-type: none"> ◆ Develop and implement suitable economic tools for sharing the costs involved in wetlands management 	WID MWLE
OBJECTIVE 5: TO ENHANCE AWARENESS OF WETLAND ISSUES AMONG THE VARIOUS STAKEHOLDERS				
5. Public awareness on wetland issues enhanced	1. Publicize policies and legislation on wetlands	Article 13b	<ul style="list-style-type: none"> • Translate policies and legislation into simpler forms • Undertake awareness campaigns • Involve stakeholders in policy reforms 	WID
	2. Develop and implement informal public education and awareness	Article 13	<ul style="list-style-type: none"> • Encourage and support NGOs • Organize wetland courses for community leaders and extension workers • Encourage and support wetland awareness through music, drama etc • Disseminate relevant information to members of the public through radio, TV, newspapers, seminars etc. 	WID NEMA NGOs Districts
	3. Promote formal education on wetlands in educational institutions	Article 13	<ul style="list-style-type: none"> • Integrate wetland issues into formal educational curricula 	WID NEMA
	4. Develop and disseminate wetland awareness materials	Article 13	<ul style="list-style-type: none"> • Translate the provisions of the Ramsar into simpler and local languages • Develop and disseminate wetlands awareness materials, posters, T-shirts etc 	WID NEMA

6.4.2 OPEN WATER RESOURCES

OBJECTIVE 1: TO DEVELOP AND STRENGTHEN COORDINATION, MEASURES AND FRAMEWORKS FOR MANAGEMENT OF OPEN WATER RESOURCES				
OUTPUTS	STRATEGY	CBD LINK	ACTIONS	KEY ACTORS
1. Open water ecosystems adequately represented in the National Protected Areas system	1. Gazette open water protected areas	Article 8a - b	<ul style="list-style-type: none"> • Assess open water resources including threats to biodiversity, justification for gazettement the areas etc • Create gazetted areas for open water ecosystems 	FIRRI MAAIF DWD Parliament Districts
2. Capacity for open water resources management strengthened	1. Strengthen capacity for management	Article 8c 14c,d	<ul style="list-style-type: none"> ◆ Integrate community based management into policy ◆ Develop and implement programmes for cross-border and shared open water resources ◆ Periodically review Fisheries Policy 	MAAIF DWD
	2. Improve management of open water resources	Article 8c	<ul style="list-style-type: none"> ◆ Strengthen human, institutional and infrastructural capacity ◆ Strengthen linkages between relevant sectors 	MAAIF FIRRI
	3. Regulate open water resources use	Article 8L	<ul style="list-style-type: none"> ◆ Assess fisheries stocks and determine suitable fishing effort ◆ Set fishing quotas ◆ Develop standards on appropriate fishing methods and gear 	FIRRI MAAIF
OBJECTIVE 2: TO FACILITATE REASEARCH, INFORMATION MANAGEMENT AND INFORMATION EXCHANGE				
1. Research activities strengthened	1. Strengthen research on open water biodiversity	Article 12b 7a - b Article 14a, 14b	<ul style="list-style-type: none"> ◆ Identify research priorities ◆ Undertake inventory of aquatic biodiversity ◆ Undertake species ecological studies ◆ Undertake impact assessment on aquatic resources by introduced species ◆ Undertake impact assessment by pollution, eutrophication, etc. 	MAAIF FIRRI
2. Information on aquatic biodiversity increased	1. Improve information acquisition and management	Article 7d	<ul style="list-style-type: none"> ◆ Collect , analyze and disseminate information to relevant stakeholders ◆ Strengthen human, institutional and infrastructural capacity to manage data on aquatic biodiversity 	FIRRI MAAIF
OBJECTIVE 3: TO REDUCE AND MANAGE NEGATIVE IMPACTS ON OPEN WATER RESOURCES				
1. Exotics and Invasive species controlled	1. Control exotic species	Article 8h	<ul style="list-style-type: none"> ◆ Develop and implement guidelines on introduction and monitoring of exotics ◆ Manage exotics 	MAAIF NEMA, WID FIRRI DWD
	2. Control invasive species and weeds	Article 8h	<ul style="list-style-type: none"> ◆ Raise public awareness ◆ Manage invasive species and weeds, including water hyancith 	MAAIF WID
2. Eutrophication and pollution controlled	1. Develop appropriate mitigation measures against habitat destruction		<ul style="list-style-type: none"> ◆ Establish pollution standards ◆ Establish wetlands buffering capacity ◆ Formulate recommendations for mitigation measures ◆ Manage eutrophication and pollution 	NEMA FIRRI WID DWD

OBJECTIVE 4: TO PROMOTE THE SUSTAINABLE USE AND FAIR SHARING OF COSTS AND BENEFITS OF OPEN WATER RESOURCES				
1. Stakeholder participation in development and management of aquatic resources enhanced	1. Strengthen Community and resource use groups participation	Article 8j, 10c, 10e	♦ Establish community based management structures	MAAIF FIRRI
2. Costs and benefits of aquatic resources management shared	1. Develop mechanism for sharing costs and benefits	Article 15.4, 11. 10e	♦ Develop and implement appropriate economic instruments (e.g., licenses, taxation, etc.)	MAAIF NEMA
OBJECTIVE 5: TO ENHANCE AWARENESS OF OPEN WATER RESOURCES AMONG THE VARIOUS STAKEHOLDERS				
Public awareness on aquatic biodiversity issues enhanced	1. Publicize policies and legislation related to open water biodiversity	Article 13b	♦ Translate policies and legislation in simpler forms ♦ Undertake awareness campaigns ♦ Involve stakeholders in policy reforms	MAAIF FIRRI
	2. Develop and implement informal public education and awareness	Article 13	♦ Encourage and support NGOs ♦ Organize open water biodiversity courses for community leaders, extension workers ♦ Encourage and support aquatic biodiversity awareness through music, drama etc ♦ Disseminate relevant information to members of the public through radio, TV, newspapers, seminars etc.	MAAIF FIRRI NGOs Districts DWD
	3. Promote formal education on open water biodiversity in educational institutions	Article 13	♦ Integrate aquatic biodiversity issues into the educational institutions curricula	MAAIF Min. of Education
	4. Develop and disseminate open water biodiversity awareness materials	Article 13	♦ Develop and disseminate awareness materials, posters, T-shirts etc	MAAIF FIRRI

6.4.3: FORESTRY

OBJECTIVE 1: TO DEVELOP AND STRENGTHEN COORDINATION, MEASURES AND FRAMEWORKS FOR MANAGEMENT OF FORESTRY RESOURCES

OUTPUTS	STRATEGY	CBD LINK	ACTIONS	KEY ACTORS
1. Mechanisms for institutional coordination strengthened	1. Periodic review of the Forestry policy 2. Strengthen institutional linkages	Article 6a, 6b, 8k, 8i	<ul style="list-style-type: none"> ◆ Undertake periodic review of Forestry Policy ◆ Harmonise institutional approaches to Forest biodiversity conservation 	NEMA MWLE FD
	3. Strengthen institutional capacity		<ul style="list-style-type: none"> ◆ Build institutional capacity for policy implementation 	MWLE FD
2. Management of privately owned forests improved	1. Develop strategies for managing biodiversity in privately owned forests	Article 8c	<ul style="list-style-type: none"> ◆ Integrate strategies for conservation of biodiversity into management of privately owned forests ◆ Assess and address capacity to manage biodiversity in privately owned forest ◆ Document and disseminate best practices 	MWLE NEMA FD

OBJECTIVE 2: TO FACILITATE RESEARCH, INFORMATION MANAGEMENT AND INFORMATION EXCHANGE

1. Research on forest biodiversity enhanced	1. Undertake research on agro-forestry and forest biodiversity	Article 12b-c	<ul style="list-style-type: none"> ◆ Identify relevant areas for research ◆ Strengthen research capacity ◆ Undertake research (inventory, ecological surveys, etc.) 	FD NARO Universities
2. Information on Forestry resource management improved	1. Update information on forest resources	Article 7a - b	<ul style="list-style-type: none"> ◆ Review and update existing records and information 	NARO FD Universities
	2. Promote information sharing and networking	Article 7d	<ul style="list-style-type: none"> ◆ Establish mechanisms for sharing data with other centers ◆ Publish and disseminate information in usable form ◆ Build human, institutional and infrastructural capacity to manage forest biodiversity 	MWLE FD

OBJECTIVE 3: TO REDUCE AND MANAGE NEGATIVE IMPACTS ON FOREST BIODIVERSITY

1. Negative impacts on forestry biodiversity resources reduced	1. Promote improved management techniques	Article 8c, 8d, 8f, 8L	<ul style="list-style-type: none"> ◆ Develop and implement improved forest management practices ◆ Optimise harvesting of forest products 	MWLE FD
	2. Manage exotic and alien invasive species 3. Identify alternatives to forest resources	Article 8h	<ul style="list-style-type: none"> ◆ Develop institutional capacity to mitigate negative impacts of exotic and invasive alien species ◆ Develop and implement a monitoring plan for exotics ◆ Promote and facilitate alternative sources of fuel 	FD MWLE

OBJECTIVE 4: TO PROMOTE SUSTAINABLE USE AND FAIR SHARING OF COSTS AND BENEFITS				
1. Use of economic instruments for forestry management promoted	1. Integrate economic values in forestry management	Article 11	<ul style="list-style-type: none"> ◆ Build capacity for economic valuation of forestry resources ◆ Undertake economic valuation of forestry resources ◆ Develop and implement economic instruments 	FD
	2. Promote integration of forestry resources values into macroeconomic frameworks		<ul style="list-style-type: none"> ◆ Integrate forestry values into macro-economic frameworks 	NEMA FD Ministry of Finance MWLE
2. Costs and benefits of forestry shared	1. Develop mechanisms for sharing costs and benefits of forestry resources	Article 10b, 10c, 15.4	<ul style="list-style-type: none"> ◆ Integrate access rights into policies and legislation ◆ Promote access to and responsibility for forestry resources ◆ Implement activities that promote access ◆ Document and apply indigenous peoples knowledge and practices 	NEMA FD MWLE
	2. Develop mechanisms for ensuring contribution to forestry management	Article 8m, 8j, 17.1, 17.2	<ul style="list-style-type: none"> ◆ Develop and implement suitable economic tools for sharing the costs involved in forestry management 	FD MWLE
OBJECTIVE 5: TO ENHANCE AWARENESS ON FORESTRY BIODIVERSITY AMONG THE VARIOUS STAKEHOLDERS				
1. Public awareness on forestry biodiversity issues enhanced	1. Publicize policies and legislation on forestry issues	Article 463a, 13b	<ul style="list-style-type: none"> ◆ Translate policies and legislation into simpler forms ◆ Undertake awareness campaigns ◆ Involve stakeholders in policy reforms 	FD MWLE
	2. Develop and implement informal public education and awareness	Article 13	<ul style="list-style-type: none"> ◆ Encourage and support NGOs ◆ Organize forestry biodiversity courses for community leaders, extension workers ◆ Encourage and support forestry biodiversity awareness through music, drama etc ◆ Disseminate relevant information to members of the public through radio, TV, newspapers, seminars etc. 	FD MWLE NEMA NGOs Districts
	3. Promote formal education on forestry biodiversity in educational institutions	Article 13	<ul style="list-style-type: none"> ◆ Integrate forestry biodiversity issues into educational institutions 	FD, MWLE Min. of Education
	4. Develop and disseminate forestry biodiversity awareness materials	Article 13	<ul style="list-style-type: none"> ◆ Develop and disseminate awareness materials, posters, T-shirts etc 	FD MWLE NEMA

6.4.4: WILDLIFE

OBJECTIVE 1: TO DEVELOP AND STRENGTHEN COORDINATION, MEASURES AND FRAMEWORKS FOR MANAGEMENT OF WILDLIFE BIODIVERSITY				
OUTPUTS	STRATEGY	CBD LINK	ACTIONS	KEY ACTORS
1. Long-term strategic plans for wildlife estates developed	Periodically review National Wildlife Protected Areas System Plan	Article 8a-b	<ul style="list-style-type: none"> ◆ Assess viability of all Protected Areas ◆ Identify and mark boundaries ◆ Develop a National PA Systems Plan 	UWA MTTI FD Districts
	2. Develop site specific management plans	Article 8a-b 6a	<ul style="list-style-type: none"> ◆ Develop and implement management plans for each Protected Area 	UWA MTTI FD Districts
2. New wildlife management approaches promoted	1. Develop innovative management approaches	Article 8I, 8j	<ul style="list-style-type: none"> ◆ Consolidate and replicate collaborative management programmes ◆ Review collaborative management guidelines ◆ Institutionalise collaborative management 	UWA MTTI
3. Wildlife Policies and regulations regularly reviewed	1. Periodically review and assess adequacy of policy guidelines and regulations	Article 8k, 8l, 6a	<ul style="list-style-type: none"> ◆ Periodically review and update wildlife policies and regulations 	UWA, MTTI NEMA
4. Provisions of the wildlife international conventions implemented	1. Foster collaboration between wildlife-related conventions and treaties	Article 6a, 6b	<ul style="list-style-type: none"> ◆ Develop strategies for effective coordination between different conventions relevant to wildlife 	UWA MTTI,
	2. Implement the relevant provisions of wildlife related Conventions	Article 6a, 6b	<ul style="list-style-type: none"> ◆ Develop guidelines for “domesticating” conventions ◆ Develop capacity for implementing Conventions 	NEMA MTTI, UWA
5. Institutional linkages between agencies improved	1. Strengthen institutional linkages	Article 8m, 10e	<ul style="list-style-type: none"> ◆ Strengthen coordination between wildlife agencies ◆ Strengthen linkages between wildlife sector, other sectors and district departments 	MTTI MoLG, Districts other Sectoral Agencies
OBJECTIVE 2: TO FACILITATE RESEARCH, INFORMATION MANAGEMENT AND INFORMATION EXCHANGE				
1. Database on wildlife resources established	1. Promote relevant research on wildlife	Article 7d	<ul style="list-style-type: none"> ◆ Undertake ecological and species studies ◆ Build Institutional capacity to undertake surveys and inventories 	UWA, Research Institutions Universities
	2. Improve information management systems		<ul style="list-style-type: none"> ◆ Establish UWA database ◆ Build capacity to manage wildlife data 	UWA, MTTI
OBJECTIVE: 3 TO REDUCE AND MANAGE NEGATIVE IMPACTS OF VARIOUS ACTIVITIES ON WILDLIFE				
1. Pressure on Wildlife Resources reduced	1. Reduce the negative impacts of human activities	Article 7c, 8e, 8l	<ul style="list-style-type: none"> ◆ Integrate human population factors in wildlife management strategies ◆ Address causes of human-wildlife conflict 	UWA MTTI
	2. Identify alternatives to wildlife resources	Article 8j, 8c, 10c	<ul style="list-style-type: none"> ◆ Develop alternatives to wildlife resources ◆ Promote and facilitate access to alternative uses of wildlife resources 	UWA MTTI

OBJECTIVE 4: TO PROMOTE SUSTAINABLE USE AND FAIR SHARING OF COSTS AND BENEFITS OF WILDLIFE RESOURCES				
1. Use of economic instruments for wildlife management promoted	1. Integrate economic values in wildlife management	Article 11	<ul style="list-style-type: none"> ◆ Build capacity for wildlife economics valuation ◆ Undertake economic valuation of wildlife ◆ Develop and implement economic instruments 	UWA MTTI
	2. Promote integration of wildlife resource values into macroeconomic frameworks	Article 11	<ul style="list-style-type: none"> ◆ Integrate wildlife values into macro-economic frameworks 	UWA MTTI Ministry of Finance
2. Costs and benefits of wildlife shared	1. Develop mechanisms for sharing costs and benefits of wildlife resources	Article 10b, 10c, 15.4	<ul style="list-style-type: none"> ◆ Integrate access rights into policies and legislation ◆ Promote access to and responsibility for wildlife resources ◆ Implement activities that promote access ◆ Document and apply indigenous peoples knowledge and practices ◆ Develop and implement suitable economic tools for sharing the costs involved in wildlife management 	UWA MTTI
2. Financial base for wildlife Sector improved	1. Identify and establish alternative funding mechanisms	Article 8m, 11, 20.1, 20.2 - 7, 21.4	<ul style="list-style-type: none"> ◆ Review and improve management of concessions and tourism and other resources 	UWA MTTI
	2. Promote cost-effective financial management practices	Article 21.4, 11, 8L	<ul style="list-style-type: none"> ◆ Improve financial management practices and budget controls 	UWA MTTI

OBJECTIVE 5: TO ENHANCE AWARENESS OF WILDLIFE RESOURCES AMONG THE VARIOUS STAKEHOLDERS				
1. Public awareness on wildlife resources enhanced	1. Publicize policies and legislation related to wildlife	Article 13b	<ul style="list-style-type: none"> ◆ Translate policies and legislation into simpler forms ◆ Undertake awareness campaigns ◆ Involve stakeholders in policy reforms 	UWA MTTI
	2. Develop and implement informal public education and awareness programs	Article 13	<ul style="list-style-type: none"> ◆ Encourage and support NGOs ◆ Organize wildlife biodiversity courses for community leaders, extension workers ◆ Encourage and support wildlife biodiversity awareness through music, drama etc ◆ Disseminate relevant information to members of the public through radio, TV, newspapers, seminars etc. 	UWA MTTI NGOs Districts
	3. Promote formal education on wildlife biodiversity in educational institutions	Article 13	<ul style="list-style-type: none"> ◆ Integrate wildlife biodiversity issues into curricula of educational institutions 	UWA, MTTI, NEMA Min. of Education
	4. Develop and disseminate wildlife biodiversity awareness materials	Article 13	<ul style="list-style-type: none"> ◆ Develop and disseminate awareness materials, posters, T-shirts etc 	UWA MTTI

6.4.5: DOMESTIC ANIMAL DIVERSITY (DAD)

OBJECTIVE 1: TO DEVELOP AND STRENGTHEN COORDINATION, MEASURES AND FRAMEWORKS FOR MANAGEMENT OF DOMESTIC ANIMAL DIVERSITY				
OUTPUTS	STRATEGY	CBD LINK	ACTIVITIES	KEY ACTORS
1. National Animal breeding Policy implemented	1. Implement National breeding objectives and guidelines.	Article 8k	<ul style="list-style-type: none"> ◆ Publicize the national breeding objectives and guidelines ◆ Establish and improve animal breeding infrastructures ◆ Publicize the National Breeding Policy ◆ Initiate and consolidate animal breeding schemes 	MAAIF
	2. Promote the use of indigenous breeds and systems		<ul style="list-style-type: none"> ◆ Discourage discrimination against indigenous breeds and systems 	MAAIF
OBJECTIVE 2: TO FACILITATE RESEARCH, INFORMATION MANAGEMENT AND INFORMATION EXCHANGE				
1. Research on DAD enhanced	1. Strengthen research capacity for DAD	Article 12b-c	<ul style="list-style-type: none"> ◆ Identify relevant areas for research ◆ Undertake research on domestic animal and rangelands resources 	MAAIF NARO Universities
	1. Implement National Breeding objectives and guidelines	Article 12b-c	<ul style="list-style-type: none"> ◆ Strengthen research capacity 	NARO, MAAIF Universities
2. Information on DAD improved	1. Document indigenous breed characteristics.	Article 7a-b, 7d	<ul style="list-style-type: none"> ◆ Compile breed inventories, characteristics and registers ◆ Develop inventory of endangered animals ◆ Develop gene banks ◆ Compile traditional management practices and disseminate information ◆ Develop strong capacity for characterization and conservation 	MAAIF NARO Universities
	2. Improve collection, processing and dissemination of information.	Article 12, 17.1, 17.2, 7a - b, 7d	<ul style="list-style-type: none"> ◆ Strengthen database on DAD and rangelands 	MAAIF NARO
	3. Strengthen capacity to gather information		<ul style="list-style-type: none"> ◆ Equip information centres ◆ Build capacity to manage data on DAD and rangelands 	MAAIF NARO
OBJECTIVE 3: TO REDUCE AND MANAGE NEGATIVE IMPACTS OF VARIOUS ACTIVITIES ON DOMESTIC ANIMAL DIVERSITY				
1. Capacity for planning, monitoring and evaluation strengthened	1. Strengthen capacity for planning, monitoring and evaluation of DAD	Article 12	<ul style="list-style-type: none"> ◆ Register all data and disseminate information to relevant stakeholders ◆ Strengthen coordination mechanisms for DAD ◆ Build human Capacity to implements DAD programs 	MAAIF NARO
	2. Promote traditional management practices	Article 8I, 13a, 13b	<ul style="list-style-type: none"> ◆ Identify key features and describe current production systems and associated indigenous knowledge and indicate anticipated changes ◆ Initiate incentives to promote traditional domestic animals diversity 	MAAIF NARO
OBJECTIVE 4: TO PROMOTE THE SUSTAINABLE USE AND FAIR SHARING OF COSTS AND BENEFITS ASSOCIATED WITH DAD				
1. Stake holder involvement in conservation of DAD improved	1. Encourage stakeholder participation in planning for DAD and rangelands	Article 8j	<ul style="list-style-type: none"> ◆ Consult Stakeholders on schemes to conserve DAD and rangelands ◆ Promote game ranching/farming ◆ Extend breeding improvement and conservation schemes 	MAAIF UWA

OBJECTIVE 5: TO ENHANCE AWARENESS OF DOMESTIC ANIMAL DIVERSITY AMONG THE VARIOUS STAKEHOLDERS				
1. Public awareness on DAD enhanced	1. Publicize relevant policies on DAD and rangelands	Article 13b	<ul style="list-style-type: none"> ◆ Undertake awareness campaigns ◆ Involve stakeholders in policy reforms 	MAAIF
	2. Develop and implement informal public education and awareness on DAD and rangelands	Article 13	<ul style="list-style-type: none"> ◆ Encourage and support NGOs ◆ Organize DAD courses for community leaders, extension workers ◆ Encourage and support DAD awareness through music, drama etc ◆ Disseminate relevant information to members of the public through radio, TV, newspapers, seminars etc. 	MAAIF Districts NGOs NARO
	3. Promote formal education on DAD in educational institutions	Article 13	<ul style="list-style-type: none"> ◆ Integrate DAD issues into educational institutions curricula 	MAAIF NEMA Min. of Education
	4. Develop and disseminate DAD awareness materials	Article 13	<ul style="list-style-type: none"> ◆ Develop and disseminate awareness materials, posters, T-shirts etc 	MAAIF

6.4.6: SOIL BIODIVERSITY

OBJECTIVE 1: TO DEVELOP AND STRENGTHEN COORDINATION, MEASURES AND FRAMEWORKS FOR MANAGEMENT OF SOIL BIODIVERSITY				
1. Mechanisms for institutional coordination strengthened	Initiate and review policies related to soil biodiversity	Article 6a, 6b, 8k, 8i	<ul style="list-style-type: none"> ◆ Develop and update policies related to soil biodiversity 	NEMA, Universities Research Institutions
	Strengthen human and institutional capacity		<ul style="list-style-type: none"> ◆ Build human, institutional and infrastructural capacity for implementing soil biodiversity issues 	Universities Research institutions
2. Guidelines on Soil biodiversity conservation developed	1. Develop guidelines for soil biodiversity conservation	Article 8k	<ul style="list-style-type: none"> ◆ Initiate development of guidelines ◆ Integrate guidelines in the Plan for Modernization of Agriculture 	NEMA, MAAIF, NARO Universities
OBJECTIVE 2: TO FACILITATE RESEARCH, INFORMATION MANAGEMENT AND INFORMATION EXCHANGE				
1. Research on soil biodiversity enhanced	Promote research on soil biodiversity	Article 12b-c	<ul style="list-style-type: none"> ◆ Identify relevant areas for research ◆ Strengthen research capacity ◆ Undertake research on soil biodiversity 	NARO, MAAIF Universities
2. Information on Soil Biodiversity improved	1. Improve information management		<ul style="list-style-type: none"> ◆ Improve on information sharing and management 	Universities NARO, MAAIF
OBJECTIVE 3: TO REDUCE AND MANAGE NEGATIVE IMPACTS OF VARIOUS ACTIVITIES ON SOIL BIODIVERSITY				
1. Farming systems improved	Develop and promote appropriate farming methods	Article 8e, 8c Article 16.4	<ul style="list-style-type: none"> ◆ Promote Agricultural extension extensively ◆ Promote appropriate farming technologies ◆ Develop methods to mitigate the effects of soil erosion, fire, overgrazing and other inappropriate practices 	MAAIF NARO NEMA & other Sectoral agencies
OBJECTIVE 4: TO PROMOTE THE SUSTAINABLE USE AND FAIR SHARING OF COSTS AND BENEFITS OF SOIL BIODIVERSITY				
1. Value of Soil biodiversity understood	1. Develop measures to increase understanding of the values of soil biodiversity	Article 11, 13a, 13b	<ul style="list-style-type: none"> ◆ Undertake soil biodiversity valuation ◆ Integrate soil biodiversity values into the over-all agriculture modernization strategy 	NARO MAAIF NEMA Universities
OBJECTIVE 5: TO ENHANCE AWARENESS ON SOIL BIODIVERSITY AMONG THE VARIOUS STAKEHOLDERS				
1. Public awareness on soil biodiversity enhanced	1. Publicize policies and programmes related to soil biodiversity	Article 13b	<ul style="list-style-type: none"> ◆ Undertake awareness campaigns on soil biodiversity issues ◆ Involve stakeholders in policy reforms 	Universities MAAIF NEMA
	2. Develop and implement informal public education and awareness on soil biodiversity	Article 13	<ul style="list-style-type: none"> ◆ Encourage and support NGOs ◆ Organize soil biodiversity courses for community leaders, extension workers ◆ Encourage and support soil biodiversity awareness through music, drama etc ◆ Disseminate relevant information to members of the public through radio, TV, newspapers, seminars etc. 	MAAIF NEMA Districts NGOs
	3. Promote formal education on soil biodiversity in educational institutions	Article 13	<ul style="list-style-type: none"> ◆ Integrate soil biodiversity issues into the educational institutions curricula 	Universities MAAIF, NEMA Min. of Education
	4. Develop and disseminate soil biodiversity awareness materials	Article 13	<ul style="list-style-type: none"> ◆ Develop and disseminate awareness materials, posters, T-shirts etc 	MAAIF NEMA

6.4.7: PLANT GENETIC RESOURCES (PGR)

OBJECTIVE 1: TO DEVELOP AND STRENGTHEN COORDINATION, MEASURES AND FRAMEWORKS FOR MANAGEMENT OF PGR				
OUTPUTS	STRATEGY	CBD LINK	ACTIONS	KEY ACTORS
1. Capacity in PGR centres strengthened	1. Improve human resource capacity for PGR management	Article 8	<ul style="list-style-type: none"> ◆ Develop and avail training programmes in characterization and conservation of PGR 	NARO Universities
	2. Strengthen institutional and infrastructural capacity for PGR management	Article 8	<ul style="list-style-type: none"> ◆ Equip training and research centres to be able to deal with PGR ◆ Integrate PGR into PMA 	NARO Universities MAAIF
OBJECTIVE 2: TO FACILITATE RESEARCH, INFORMATION MANAGEMENT AND INFORMATION EXCHANGE				
1. Research on PGR enhanced	1. Develop research programme on PGR	Article 8	<ul style="list-style-type: none"> ◆ Develop and avail research tools in PGR ◆ Identify, document and coordinate research priorities ◆ Undertake research on indigenous PGR and others 	NARO, Universities
2. Information on PGR improved	1. Update information on PGR	Article 8	<ul style="list-style-type: none"> ◆ Document and disseminate cases of genetic erosion ◆ Document and disseminate economic potential of PGR ◆ Strengthen human, institutional and infrastructural capacity to manage PGR data 	MAAIF NARO Universities
OBJECTIVE 3: TO REDUCE AND MANAGE NEGATIVE IMPACTS OF VARIOUS ACTIVITIES ON PLANT GENETIC RESOURCES				
1. Traditional management practices promoted	1. Conserve and maintain traditional varieties and species	Article 8j, 8h	<ul style="list-style-type: none"> ◆ Promote genetic enhancement of indigenous PGR ◆ Establish seed banks to preserve indigenous varieties ◆ Characterize and conserve important plant species 	NARO MAAIF NGOs Universities
OBJECTIVE 4: TO PROMOTE THE SUSTAINABLE USE AND FAIR SHARING OF COSTS AND BENEFITS OF PGR				
PGR Germplasm restored	1. Collect information on availability of PGR germplasm	Article 7d, 17.1, 17.2,	<ul style="list-style-type: none"> ◆ Survey and search for information on germplasm at local, national and international levels and repatriate where necessary 	NARO, MAAIF Universities
	2. Repatriate germplasm	Article 17.2	<ul style="list-style-type: none"> ◆ Repatriate germplasm from sources outside the country ◆ Collect, multiply, characterize and distribute germplasm 	NARO, MAAIF Universities
2. Costs and benefits of Plant Genetic Resources shared	1. Develop mechanisms for sharing costs and benefits of PGR.	Article 10b, 10c, 15.4	<ul style="list-style-type: none"> ◆ Promote access to and responsibility for PGR ◆ Implement activities that promote access ◆ Document and apply indigenous peoples knowledge and practices 	NARO MAAIF Universities
	2. Develop mechanisms for ensuring economic contribution to PGR management	Article 8m, 8j, 17.1,17.2	<ul style="list-style-type: none"> ◆ Develop and implement suitable economic tools for sharing the costs involved in PGR management 	NARO MAAIF Universities

OBJECTIVE 5: TO ENHANCE AWARENESS ON PLANT GENETIC RESOURCES AMONG THE VARIOUS STAKEHOLDERS				
1. Public awareness on use and conservation of PGR enhanced	1. Publicize policies and legislation related to PGR	Article 13a, 13b	<ul style="list-style-type: none"> ◆ Translate policies and legislation into simpler forms ◆ Undertake awareness campaigns ◆ Involve stakeholders in policy reforms 	NARO MAAIF NEMA
	2. Develop and implement informal public education and awareness	Article 8	<ul style="list-style-type: none"> ◆ Encourage and support NGOs ◆ Organize PGR courses for community leaders, extension workers ◆ Encourage and support PGR awareness through music, drama etc ◆ Disseminate relevant information to members of the public through radio, TV, newspapers, seminars etc. 	MAAIF,NARO NGOs Districts
	3. Promote formal education on PGR in educational institutions		<ul style="list-style-type: none"> • Integrate PGR issues into the educational institutions curricula 	NEMA,NARO Universities Min. of Education

6.4.8 BIOTECHNOLOGY AND BIOSAFETY

OBJECTIVE 1: TO DEVELOP AND STRENGTHEN COORDINATION, MEASURES AND FRAMEWORKS FOR MANAGEMENT OF BIOTECHNOLOGY AND BIOSAFETY

OUTPUTS	STRATEGY	CBD LINK	ACTIVITIES	KEY ACTORS
1. Capacity to manage Biosafety and biotechnology issues built	1. Build national capacity in all aspects of biotechnology	Article 8g	<ul style="list-style-type: none"> ◆ Equip and facilitate National Biosafety Committee ◆ Undertake training to build capacity in risk-benefit analysis of new technologies ◆ Strengthen human, institutional and infrastructural capacity for biotechnology and biosafety 	UNCST Universities Research institutions Sectoral Agencies Private Sector
	2. Put in place policy and legal framework on biotechnology and biosafety	Article 19.1 6a, 8k	<ul style="list-style-type: none"> ◆ Initiate policy and legal frameworks to address biosafety and biotechnology issues 	UNCST NEMA other Sectoral Agencies
	3. Strengthen regional collaboration in biotechnology and biosafety	Article 8	<ul style="list-style-type: none"> ◆ Promote regional and international collaboration in biosafety and biotechnology issues 	UNCST Universities Private sector NARO
2. Funding for biotechnology and biosafety activities secured	1. Identify sustainable funding sources for biosafety and biotechnology activities	Article 20.1, 20.2-7, 21.4	<ul style="list-style-type: none"> ◆ Develop fundraising strategy ◆ Fundraise targeting various sources including private sector 	UNCST Ministry of Finance Universities Research institutions

OBJECTIVE 2: TO FACILITATE RESEARCH, INFORMATION MANAGEMENT AND INFORMATION EXCHANGE				
1. Research on biosafety and biotechnology enhanced	Promote research in medical, agricultural, environmental and other areas of biotechnology		<ul style="list-style-type: none"> ◆ Develop and avail research tools ◆ Develop research guidelines ◆ Undertake research in agricultural, environmental and other areas of biotechnology ◆ Strengthen research capacity ◆ Identify and prioritize Biotechnology research and project areas 	NARO UNCST Universities Private sector
2. Information on biosafety and biotechnology improved	1. Update information on biosafety and biotechnology		<ul style="list-style-type: none"> ◆ Document past and present biotechnology research and projects ◆ Establish a data bank on issues of biosafety and biotechnology ◆ Build capacity to manage data on biotechnology and biosafety 	UNCST NEMA MWLE
OBJECTIVE 3: TO REDUCE AND MANAGE NEGATIVE IMPACTS ON BIODIVERSITY				
1. Biotechnology products, movements and development monitored	1. Establish a strong and effective monitoring system	Article 16.1-3., 16.4, 16.5, 19.1, 19.2, 19.3, 19.4	<ul style="list-style-type: none"> • Develop and implement a monitoring system for biotechnology • Develop capacity for planning, monitoring and evaluating risks of genetically modified foods, crops and other GMOs • Develop and disseminate standard safety measures 	UNCST Research institutions Universities
OBJECTIVE 4: TO PROMOTE THE SUSTAINABLE USE AND FAIR SHARING OF COSTS AND BENEFITS OF BIOTECHNOLOGY				
1. Costs and benefits of biotechnology shared	1. Develop mechanisms for sharing costs and benefits of biotechnology	Article 10b, 10c, 15.4	<ul style="list-style-type: none"> ◆ Review relevant regulations and streamline issues of costs and benefit sharing e.g. Agricultural seeds and Plants Statute, draft regulations on Plant Germplasm Collection, draft National Biosafety Regulations, the Patent Statute and other Intellectual Property Rights measures and draft regulations on access to genetic resources 	UNCST Universities, NEMA MAAIF, NARO Min. of Justice Private sector NGOs other Sectoral agencies
	2. Promote integration of biotechnology values into macroeconomic frameworks		<ul style="list-style-type: none"> ◆ Integrate biotechnology values into macro-economic frameworks 	UNCST Ministry of Finance
OBJECTIVE 5: TO ENHANCE AWARENESS OF BIOTECHNOLOGY AND BIOSAFETY AMONG THE VARIOUS STAKEHOLDERS				
1. Awareness on biosafety and biotechnology issues enhanced	1. Undertake awareness and publicity campaign on the benefits of biotechnology and biosafety	Article 13a, 13b	<ul style="list-style-type: none"> ◆ Develop and implement Awareness and Publicity strategy on biosafety and biotechnology 	UNCST NEMA
	2. Develop and disseminate biotechnology awareness materials		<ul style="list-style-type: none"> • Develop and disseminate awareness materials, posters, T-shirts etc 	UNCST