REPUBLIC OF UGANDA

FIRST NATIONAL REPORT ON THE CONSERVATION BIODIVERSITY IN UGANDA

Preparation of the Report coordinated by

January, 1998

TABLE OF CONTENTS

LIST OF ACRONYMS iii

EXECUTIVE SUMMARY v

1. INTRODUCTION 1

2. GOALS AND OBJECTIVES 5

3 BACKGROUND INFORMATION 7
- 3.1 The status and trends of biodiversity in Uganda 7
  - 3.1.1 Biodiversity at the ecosystem level 7
    - 3.1.1.1 Forests 7
    - 3.1.1.2 Wetlands 9
  - 3.1.2 Biodiversity at the species level 10
    - 3.1.2.1 The status of some species 10
    - 3.1.2.2 Loss of species and its causes 18
  - 3.1.3 Biodiversity at the genetic level 19
- 3.2 The Value of Biodiversity to Uganda 20
  - 3.2.1 Forests 20
  - 3.2.2 Wetlands and aquatic habitats 20
  - 3.2.3 Other ecosystems 21
- 3.3 Current efforts to reduce biodiversity loss in Uganda 21
  - 3.3.1 Overview 21
  - 3.3.2 Institutional Responsibilities and Capacities 22
  - 3.3.3 Legislation and policies in place 24
  - 3.3.4 Existing programmes to enhance biodiversity conservation 25
  - 3.3.5 Regional and International Conventions 27

4. NATIONAL BIODIVERSITY STRATEGY 30

5 COLLABORATION AND PARTNERSHIP 31
- 5.1 Sectoral Involvement in implementation of biodiversity objectives into national planning and development 31
- 5.2 Involvement of different organisations in implementation of the CBD at national level 32
- 5.3 Collaboration with international organisations 33
- 5.4 Public Awareness of the importance of biodiversity 35

6. IDENTIFICATION, MONITORING AND EVALUATION 37

7. SHARING NATIONAL EXPERIENCES 40

7.1 Clearing House Mechanism 40
7.2 Case studies from Uganda 41

8. MEASURES TO FULFIL OTHER REQUIREMENTS OF THE CBD ... 48
8.1 Enhanced Management of Protected Areas 48
8.2 Adoption and Promotion of Ex-situ Conservation Measures (Article 9) 50
8.4 Impact Assessment and Minimising of Impacts (Article 14) 51
8.5 Access to Genetic Resources (Article 15) 51
8.6 Biotechnology and Biosafety (Article 16) 52

9. REFERENCES 54

LIST OF FIGURES:

Fig. 1: Uganda and its Protected Area 2
Fig. 2: Ecofloristic Zones of Uganda (from Green et al, 1997) 4
Fig. 3: No. Of Species in Major Taxonomic Groups of Uganda's Biota 11
Fig. 4: Categories of Protected Areas in Uganda 12

LIST OF ACRONYMS

APE	Action Programme for the Environment
AWF	African Wildlife Foundation
BINP	Bwindi Impenetrable National Park
CARE	Carry American Relief Everywhere
CBD	Convention on Biological Diversity
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
COP	Conference of Parties
DANIDA	Danish International Development Agency
DTC	Development Through Conservation
EANHS-U	East Africa Natural History Society-Uganda Branch
EIA	Environment Impact Assessment
ELU	Environmental Liaison Unit
EU	European Union
FCCC	Framework Convention on climate Change
GEF	Global Environment Facility
GTZ	Gesellschaft für Technische Zusammenareit (German Development Agency
IBA	Important Bird Area
IDA	International Development Agency of the World Bank
IGCP	International Gorilla Conservation Programme
ITFC	Institute of Tropical Forest Conservation
IUCN	World Conservation Union
LDC	Least Developed Country
LVEMP	Lake Victoria Environment Management Project
LVFO	Lake Victoria Fisheries Organisation
MBIFCT	Mgahinga and Bwindi Impenetrable forest Conservation Trust
MISR	Makerere Institute of Social Research
MoU	Memorandum of Understanding
MUIENR	Makerere University Institute of Environment and Natural Resources
MUP	Multiple Use Programme
NARO	National Agricultural Research Organisation
NABDB	National Biodiversity Data Bank
NEAP	National Environment Action Plan

NEMA	National Environment Management Authority
NGO	Non Governmental Organisation
PMAC	Park Management Advisory Committee
PPC	Park Parish Committee
RSP	Revenue Sharing Programme
RSPB	Royal Society for the Protection of Birds
SAP	Structural Adjustment Programme
TAU	Trust Administration Unit
TMB	Trust Management Board
UNDP	United Nations Development Programme
UNESCO	United Nations Educational Scientific and Cultural Organisation
USAID	United States Agency for International Development
UWA	Uganda Wildlife Authority
UWEC	Uganda Wildlife Education Centre
WCMC	World Conservation Monitoring Centre
WWF	World Wide Fund for Nature

EXECUTIVE SUMMARY

The preparation of the report is in accordance with Article 26 of the CBD and the Resolution and recommendations of the 2nd Conference of the Parties (Jakarta, Indonesia, November 1995). Because the preparation of the Biodiversity strategy and Action Plan has only just begun, this report could be regarded as an "Interim Report". The report covers initiatives by Uganda in implementing the Convention in accordance with Article 6 of the Convention regarding measures aimed at conservation and sustainable use of biological resources. It also touches on implementation of other articles of the Convention.

Uganda though small, has a very rich and varied biodiversity resulting from its biogeographical setting, varied altitudinal range (600-5100m) creating diverse physical features. With an estimated 90 vegetational communities, Uganda has more than 18,000 species of fauna and flora (NBU, 1992) although the actual figure is unknown because some species are poorly known especially those in lower life forms. There are very few endemic species despite its unique biogeographic position.

Uganda ratified the Convention on Biological Diversity in September 1993 ushering in a new direction and momentum for further development of environmental and conservation activities, involving people participation, creating linkages, promoting government - NGO - Private Sector cooperation at all levels.

Uganda, in its National Environment Management Policy of 1994, has a clear objective to conserve and manage sustainably, the country's terrestrial and aquatic biological diversity in support of national socio-economic development. The National Environment Statute 1995 also has elaborate provisions for conservation of biological diversity. Therefore current policy and legislation in Uganda conforms to the key objectives of the CBD.

Ecosystem diversity

According to Langdale-Brown *et al* (1964), there are at least 90 types of natural and semi-natural vegetation communities. These have, however, been modified in various ways by human activities. Forest were more extensive at the beginning of century than they are today. Among the major causes of deforestation are an inadequate legislative and policy framework, lack of accurate information on the forest resources, as well as human encroachment on forests for agriculture, fuelwood and pitsawing. Wetlands occupy more than 10% of the country but they have always been perceived

as wastelands. This has led to their misuse including clearance for urban and industrial development, drainage for agriculture and excessive harvesting of resources.

Species diversity

The high ecosystem diversity in Uganda implies high species diversity. However, our knowledge of species in Uganda is confined to the larger and more conspicuous vertebrate and higher plant species. The lower but nonetheless important forms are little known. Of the 345 mammalian species known, a number are under various degrees of threat. These include primates such as the chimpanzee and gorilla, the eland, roan antelope, steenbok, the wild dog, cheetah and various rodent species. There are species that have gone extinct in recent years including two species of rhinoceros and the bongo antelope, bay duiker and white-bellied duiker.

There are more than 1000 species of birds of which 28 are threatened at global level. These include the Shoebill, Nahan's francolin and the endemic Fox's Weaver.

There is less information on the other taxa but among reptiles, the Nile Crocodile had declined although it appears to be recovering in protected areas such as the Murchison Falls National Park. There are two butterfly species that are threatened and a number of woody plants as well, mainly because of restricted distribution or overharvesting for timber.

Outside PAs, large animals have declined drastically with the exception of a few areas. Plants are also exposed to various levels of threat e.g. the palm *Phoenix reclinata* which is currently heavily exploited for fencing posts especially near urban areas.

As far as agrobiodiversity is concerned, there is some information on forage species, cereal crops, vegetables and other indigenous food crops as well as indigenous livestock species in various agricultural research institutions. The general trend is a decline in indigenous agrobiodiversity.

Among the causes of loss of species is overuse, encroachment on PAs, introduction of alien species such as *Lantana camara* and water hyacinth as well as changing agricultural practices involving monoculture, use of introduced improved breeds and agrochemicals.

Genetic diversity

At the genetic level, knowledge of our diversity is still scanty. It is mainly confined to crops and a few animals. However, there are efforts to establish

a National Gene Bank and a DNA laboratory which will enable genetic characterisation of various indigenous species.

The value of biodiversity to Uganda

The biological diversity of Uganda is the basis for development and is a natural heritage of the country. Therefore, biodiversity conservation and sustainable use is a priority issue in the country's development and conservation policies. It forms an important foundation for a sustainable, balanced socio-economic development of Uganda. Natural communities such as forests protect the soil, ensure regular rainfall, stabilise climate, provide habitats for other species, supply products such as food, medicines, fuelwood etc.

Current efforts to reduce biodiversity loss

Uganda, recognising the importance of biodiversity to its survival, has instituted measures to reduce the rate of biodiversity loss. This has been through the building of capacity in institutions concerned with biodiversity such as Uganda Wildlife authority (UWA), National Environment Management Authority (NEMA), Forest Department, Ministry of Agriculture, Animal Industry and Fisheries, National Agricultural Research Organisation (NARO) and institutions of higher learning. The latter ensure that there is adequate human resources supply. Furthermore, appropriate policies and enabling legislation have been put in place in recent years to ensure conservation and sustainable use of biological diversity. These range from the National Constitution to policies such as the National Environment Management Policy, the Wildlife Policy and Wetlands Policy and statutes such as the National Environment Statute, Wildlife Statute, the Water Statute and the Decentralisation Statute.

Among the existing programmes to enhance biodiversity conservation are the recently concluded UNDP/GEF funded Institutional support for the Protection of East African Biodiversity; the Lake Victoria Environment Management Programme funded by the World Bank; Reducing biodiversity loss at cross-border sites in East Africa funded by UNDP/GEF; the Conservation and Sustainable Tourism Programme funded by the World Bank, USAID, EU and GTZ, the Wetlands Management and Conservation Programme, the Natural Forest Conservation Programme, and others.

In order to strengthen its conservation objective; Uganda has signed and ratified a number of other regional and international treaties and conventions. These include the Ramsar Convention, World Heritage Convention, CITES etc.

National Biodiversity Strategy

Although Uganda has not yet prepared a National Biodiversity Strategy and Action Plan, the country has already gone through a comprehensive National Environment Action Planning process during which most of the key issues that would be relevant in a National Biodiversity Strategy and Action Plan were identified. These issues are scattered in a number of separate documents and still need to be amalgamated into a single strategy. Initial steps have already been taken in the form of a national stakeholder workshop and the formation of a NEMA Technical Committee on Biodiversity Conservation

Collaboration and Partnership

In order to achieve the objectives of the CBD, various sectors such as the agricultural, fisheries, water, forestry and wildlife sectors now take biodiversity conservation objectives into consideration during their planning. Various organisations , including development agencies, international and local NGOs are actively involved in either implementing CBD objectives directly or helping other organisations to do so. There is active collaboration between governmental and non-governmental agencies in these activities.

The level of public awareness of the CBD and its objectives is still relatively low but efforts through formal and informal mechanisms to spread education and awareness are improving. Universities, nature protection agencies and NGOs are all involved.

Identification, Monitoring and Evaluation

The identification of components of biodiversity is being done through university departments and NGO activities. Although there is no national monitoring programme, a number of monitoring activities are already taking place at specific site level. A biodiversity database has been established by the Forest Department and a National Biodiversity Data Bank (NBDB) is operational at MUIENR.

Sharing National Experiences

NEMA has been identified as the focal point for the Clearing House Mechanism and is in the process of setting up other mechanisms for information exchange.

Interesting case studies from Uganda include the Mgahinga and Bwindi Impenetrable forest Conservation Trust which is a 4 million US dollars endowment, the interest from which will enable the funding of community

projects, research projects and park management projects. The other case study is the Revenue-Sharing and Multiple-Use programmes. The Revenue Sharing Programme (RSP) in which the wildlife protected area (WPA) shares part of its revenue with the adjacent communities was adopted as a policy in December, 1994 and its implementation in BINP started in 1995. The Multiple Use Programme (MUP) in which local people around the national parks are allowed limited access to in-park resources in designated multiple use zones for regulated harvesting of specified resources on a sustainable basis, was initiated in 1992 and approved by UNP in 1993. These involve the return to communities of 20% of gate receipts for developmental activities and regulated use of resources from designated areas of the park. All these initiatives are gradually improving the relationship between protected area managers and surrounding communities.

Measures to fulfil other requirements of the CBD

Other measures taken by Uganda to fulfil CBD objectives include enhanced management of protected areas (*in situ* conservation), promoting ex-situ conservation, encouraging the use of indigenous knowledge in the health and agricultural sectors, adopting EIA measures for all development activities and developing measures connected with access to genetic resources, biotechnology and biosafety.

1. INTRODUCTION

Uganda has a total area of about 236,000 km^2 and is bounded by Sudan in the north, Democratic Republic of Congo in the west, Rwanda in south-west, Tanzania in the south and Kenya in the east (Fig. 1). Of the total area, 194,000 km^2 is dry land, 33,926 km^2 open water and 7,674 km^2 permanent swamp (Langdale-Brown *et al.*, 1964). The country lies on the African plateau at altitudes ranging on average, between 900 - 1,500 m above sea level. In 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. Southwestwards, broken hill country characteristically encircling lowland embayments forms the transition to the deeply incised plateau that reaches its greatest heights of over 2,000 m above sea level in Kabale district. The rift valley, which runs along the western border, has two troughs containing Lakes Edward, George and Albert. Between these depressions lie the glaciated horst mountains of the Rwenzori range, rising to the highest peak in the country at 5,100 m. There are a number of volcanic centres associated with the rift valley including the three quiescent Bufumbira volcanoes of Muhavura (4,130 m), Mgahinga (3,470 m) and Sabinio (3,630 m). The lowest point in Uganda is about 600 m above sea level near Nimule town at the border with Sudan.

Uganda's tropical climate is considerably modified by its elevation and local relief (Atlas of Uganda 1967). It is therefore quite variable. Mean annual maximum temperatures over most of the country range between 18^o and 35^{o}C whereas the corresponding minimum range is 8^o to 23^{o}C. Relative humidity is often high, usually ranging between 70 and 100% and mean monthly evaporation rates range between 125 and 200 mm.

Much of the country receives between 1,000 and 1,500 mm of rain per annum. This tends to increase with altitude. The south and centre of the country has a bimodal rainfall pattern, the two rainy seasons being March to May and September to November whereas the northeast has only a single rainy season with July being the wettest month and January the driest. Rainfall reliability generally declines northwards.

Uganda is endowed with abundant water resources both in the form of surface and ground water. The surface water consists of numerous rivers, swamps and lakes. There are eight rivers exceeding 100 km in length and six major lakes covering 34,814 km^2. The whole of the country lies within the Upper Nile catchment but nationally, this is subdivided into ten smaller catchments (Atlas of Uganda 1967). Three of these cover only small peripheral areas in the north and northeast of the country.

Uganda's evolutionary history of its flora is such that the country has six of the twelve major centres of plant endemism in tropical Africa (White 1983). Each of these centres has its own distinctive set of species of higher plants - and presumably this applies also to the animals which utilise the habitat. When Ugandan habitats are classified on the basis of ecofloristic zones (EFZs) (Sharma, 1988) the country has nine such zones. The zones are characterised by certain species assemblages. Fig. 2 shows Uganda's EFZs. The total sum of all these factors is that the country is fairly rich in biodiversity, at the ecosystem, species and even genetic levels.

According to Langdale-Brown *et al.* (1964) the country has at least 90 types of natural and semi-natural vegetation communities. These basically consist of various types of forest, forest/savanna mosaic, savanna and swamp forest types. Many of these communities have been influenced by human activities to different degrees resulting in the establishment of a variety of agro-ecosystems. The diversity of vegetation types results in a corresponding diversity in fauna.

Today, many of the habitat types are represented to some extent in their natural state in a system of protected areas which include wildlife reserves, forest reserves and national parks.

Protected areas (PAs) cover more than 15% of the country, but aquatic and wetland ecosystems are not quite well represented. Furthermore, some categories, such as Community Wildlife Areas have been greatly influenced by human activities.

The total number of species in Uganda is not known. There is a provisional list of about 18,000 (NBU 1992) but even this is questionable (Pomeroy 1993). What is certain however is that the total number is greater than that figure and that the majority of the species have not yet been recorded (Pomeroy 1993). Some species are better known than others and consequently have more reliable data. The country, for example, has 1008 species of birds, 345 of mammals, 356 of reptiles and 72 of amphibians (NBDB, 1997). This is quite a high diversity, given the size of the country.

Uganda's mainly rural population was, according to the last Census in 1991, 16.5 million. With an average annual growth rate of 2.5% it is now over 18.5 million. Population density tends to correlate strongly with rainfall distribution, a phenomenon that highlights the predominance of agriculture as a major land use activity.

The ratification of the Convention on Biological Diversity (CBD) by Uganda in September 1993 was a formal recognition by the Uganda Government of the new opportunities offered by the Convention for closer international cooperation and for pursuing the integration of biodiversity objectives within national policies.

This report describes the measures taken by Uganda for the implementation of Article 6 of the CBD as well as the efforts taken to implement other requirements of the Convention and decisions of the Conference of the Parties (COP). Section 1 is an executive summary. Section 2 gives background information on Uganda. Section 3 describes the extent to which the goals and objectives of Uganda on biodiversity conservation agree with those of the CBD. Section 4 discusses the status and trends of biodiversity in Uganda, its values as well as current efforts to reduce its loss. Section 5 assesses progress made by Uganda in the preparation of a National Biodiversity Strategy. Section 6 discusses the extent to which different sectors in government, national and international organisations, NGOs and the public is aware of and collaborates in the implementation of CBD objectives. Section 7 reviews progress made by Uganda in identifying components of its biodiversity, establishing monitoring mechanisms and organising biodiversity data so that they can be used in natural resource management. Section 8 highlights some of the areas where Uganda has tried to address relatively new concepts under the CBD such as the Clearing House Mechanism, empowerment of communities and benefits sharing. Section 9 highlights measures taken by the country to fulfil other requirements of the CBD.

2. GOALS AND OBJECTIVES

The objectives of the Convention on Biological Diversity (CBD) are the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilisation of genetic resources. It is meant to enable a balance between conservation, sustainable use and the sharing of benefits so that no section of society feels deprived of opportunities to benefit from the biological resources.

Although Uganda has not yet prepared a biodiversity strategy, the National Environment Management Policy for Uganda has a clear objective in connection with the conservation of biological diversity i.e. "to conserve and manage sustainably the country's terrestrial and aquatic biological diversity in support of national socio-economic development". The Policy has a number of guiding principles towards achieving the above objective e.g. "Conservation of biodiversity is a form of natural resource

management which has as its primary goal, the maintenance of national biological resources to meet the needs and aspirations of present and future generations". The Policy also outlines a number of strategies that need to be adopted in order to conserve biodiversity. For example,

Enact and/or reactivate legislation on the management of natural resources to provide for conservation of biodiversity in its widest sense, including areas outside the PA system.

Develop a policy framework and guidelines for the identification and management of buffer zones and buffer areas in and around PAs to help reduce conflicts between multiple uses and users (e.g. livestock and wildlife).

Establish a mechanism for collaboration between Protected Area management and the neighbouring communities in order to resolve potential conflicts through the involvement of local people in the planning, management and decision making process, and ensure that a portion of the benefits from the Protected Area System is offered to the local communities.

The National Environment Statute 1995 under which the National Environment Management Authority (NEMA) was established, has a number of provisions for the conservation of biological diversity. It provides in Section 42 as follows:

1. The Authority shall, in consultation with the lead agency, issue guidelines and prescribe measures for the conservation of biological diversity.

2. The Authority may, in issuing guidelines under subsection (1) -

    (a) Specify national strategies, plans and programmes for conservation and sustainable use of biological diversity.
    (b) integrate the conservation and sustainable utilisation ethic in relation to biological diversity in existing government activities and activities of private persons;
    (c) identify, prepare and maintain an inventory of biological diversity in Uganda;
    (d) determine which components of biological diversity are threatened with extinction;
    (e) identify potential threats to biological diversity and devise measures to remove or mitigate their effects.

Section 43 provides for the conservation of biological diversity *in situ*.

Section 44 provides for the conservation of biological resources *ex-situ*. Section 45 provides for access to Uganda's genetic resources. Section 46 deals with the management of forests, while Section 48 deals with the management of rangelands. The Management of rivers, lakes and wetlands is covered by Section 35-38.

It is clear that Ugandan policy and legislation is in conformity with the key elements of the objectives of the CBD (Article 1); conservation, sustainable use and benefits sharing.

3 BACKGROUND INFORMATION

3.1 The status and trends of biodiversity in Uganda

3.1.1 Biodiversity at the ecosystem level

As mentioned in the introduction there are at least 90 types of natural and semi-natural vegetation communities based on aerial photography of the 1950s. These communities are grouped into about 21 larger categories, which in this report, are representing ecosystems. These range from high montane moorland and through various types of forests, forest-savanna mosaics, savannas, thickets, grasslands, wetlands and cultivations.

Due to increasing populations and the fact that the country is mainly agricultural, many of these ecosystems are no longer in their original natural form. Most have been modified to variable degrees. However, it is not currently known to what extent the Langdale-Brown (1964) ecosystems have been changed. The Protected Area system has managed to keep representative sections of some of the vegetation types. Communities such as *Butyrospermum* Savanna, forest/savanna mosaic, palm savanna etc, are not represented in the PA system (Reynolds and Pomeroy 1995). Where they occur, they are exposed to intensive human influence through various activities.

This report will use two major ecosystems, forests and wetlands, to illustrate current status and trends in ecosystem diversity in Uganda.

3.1.1.1 Forests

The country's forests cover a wide range of habitats and are rich in terrestrial biodiversity. At the turn of this century, 45% of the country (108,450 sq. km.) was covered with forest and woodland. Some of this was gazetted as forest reserves. Gazetted forest cover presently stands at only 14,900 sq. km (7.7% of total land area) including 7,500 sq.km in savanna woodland and plantations, 5,900 sq. km in tropical high forest (3% of total

land area) and 1,500 sq. km in montane catchment.

Thus, the present level of forest land estate is only 21% of what it was in 1890. While rates of deforestation have recently decreased due to improved political and economic stability, the forests and the biodiversity they contain are still under significant pressure.

Deforestation and its underlying causes

Deforestation and other forms of degradation are manifestations of extreme pressure on the forest estate accompanied by poor management of the estate. The underlying processes causing deforestation in Uganda are as follows:

There is an inadequate legislative and policy framework. The current Forest Act and policy need some revision to conform to new concepts of forest management such as collaborative forest management. The process of revising both is underway. It is hoped that revised versions will create a more positive attitude towards forests by local communities.

The lack of accurate data on forest resources and their uses has led to the forest sector being given low priority in allocation of resources for its effective and efficient management. It is therefore urgent that the Department produces and publishes the vital data to argue the case for forestry.

Encroachment on the forest estate for agricultural purposes by the local communities in an attempt to expand areas under cultivation is by far the main cause of deforestation. Since the late 1980s, however, Government has been clearing all natural high forests of encroachers and illegal farming, opening boundaries and carrying out enrichment planting. As a result, the forests are now regenerating.

The majority of Uganda's rural population depends directly on firewood for its energy needs. In addition, the largest fraction of urban dwellers depend on charcoal for their energy needs. Moreover, fuelwood will continue to be the main source of household energy in Uganda for the foreseeable future, in spite of Government efforts to increase hydro-electric power generation and promote the use of renewable energy sources other than wood. As a result, considerable pressure is and will be exerted on woodlands, forest areas and agricultural lands as sources of woodfuel.

The current production of woodfuel is estimated at 15.6 million cubic meters

per annum while consumption is about 18.3 million cu. meters per annum (World Bank 1986). Thus, demand exceeds supply by 17%. The shortfall in these areas is made up partly by the accelerated harvesting/depletion of forest capital. This practice is not sustainable and leads to devegetation, soil erosion and other forms of land degradation, siltation of water courses and reservoirs, and even changes in local climate.

Pitsawing has played a significant role in forest degradation especially in the Busoga region and in the islands in Lake Victoria. In particular, it is selectively depleting Uganda's prize hardwood species such as mvule (*Milicia excelsa*) and mahogany (*Entandrophragma spp.*).

Miners in areas near limestone deposits such as those in Tororo and Kasese Districts are depleting forests for fuelwood to fire local lime kilns. This has created a serious deforestation problem in the concerned areas.

The traditional brick making industry has also expanded following the growth of the building industry. Although brick production data is scanty, it is thought that the demand for fuelwood for firing bricks has contributed significantly to the disappearance of forests especially close to rapidly growing towns and urban centres.

3.1.1.2 Wetlands

For its size, Uganda's wetlands are complex and extensive, being found in almost all areas of the country. They occupy about 13% of the total area of the country, including areas of permanent flooding but not open water.

The country's wetlands ecosystems can be classified into two broad categories: wetlands associated with lakes, and wetland associated with rivers and flood plains. The wetlands associated with natural lakes and lacustrine swamps include: Lake Victoria, Lake Kyoga/Kwania lake/swamp complex, Lake Albert area, Lake Edward, Bunyonyi lake/swamp complex, Kijanebalola lake/swamp complex, Bisina/Opeta lakes area, Lake Wamala area and other wetlands associated with minor lakes. Lake George within Queen Elizabeth National Park and comprising a total area of 15,000 ha., was designated a wetland of international importance under the Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention), in March 1988.

The main wetlands associated with riverine swamps and floodplains include: the Okere, Kafu and the Nile area river systems. All the lakes and river systems including some other smaller units are interconnected and have complex boundaries. In addition, there exist other smaller units of wetlands called "dambos" that are not connected at all to the two categories and have

no outlets at all.

Major threats to wetlands

There is a variety of threats to wetlands arising from human activities. These include drainage for urban and industrial development, agriculture and livestock ranching; excessive harvesting of vegetation such as papyrus and palms (*Phoenix reclinata*); clay mining for brick and tile-making; repeated burning by hunters to flush wildlife such as sitatunga and overuse for effluent treatment.

Conservation and sustainable utilisation of wetlands in Uganda is also constrained by a number of management-related factors, namely: inappropriate land tenure systems, unregulated and unplanned developments, especially fish farming; some sectoral policies that encourage wetlands drainage and conversion to unsustainable uses; and the unscrupulous activities of some developers. This situation is exacerbated by the fact that available data on wetlands is scanty and inadequate. Wetlands remain an area that has not been adequately studied.

3.1.2 Biodiversity at the species level

A high ecosystem diversity would imply a high species diversity as each different ecosystem tends to have a set of species unique to it. In Uganda, our knowledge of the species present is confined to the more known taxa such as birds, mammals, butterflies, higher plants, reptiles, amphibians and fish, either because of their relative conspicuousness or economic importance. Little is known about the less conspicuous and lower but nonetheless important forms of life. The tendency therefore is to use flagship species to indicate the status of biodiversity at the species level.

In Africa, for its size, Uganda is among those countries endowed with the greatest diversity of animal and plant species. This is a result of its geographical location and other reasons as stated in Section 2.

3.1.2.1 The status of some species

Fig. 3 summarises the current knowledge of species richness in Uganda. Wild species conservation focuses both on protected areas management and the management of wildlife resources outside the protected area system.

(a) Status in protected areas

Protected wildlife areas consist of ten National Parks, eleven Wildlife

Reserves, twelve Community Wildlife Areas, and six Wildlife Sanctuaries. The more than 600 Forest Reserves of Uganda also contain some species that do not occur in the other PAs. Fig. 4 shows the proportional sizes of various categories of PAs in relation to total gazetted area.

The indigenous mammalian fauna include more than 40 different species of primates, ungulates, carnivores and other relatively large mammals. The total number of mammals in Uganda is currently estimated at 345 (Davies and vanden Berghe 1993) the critical ones for conservation include some primates, antelopes, rodents and a number of other taxa.

Nineteen species of primates occur and those of conservation concern include *l'hoest's Guenon* in Rwenzori, Bwindi and Kibale National Parks and Budongo Forest Reserve; the Uganda red colobus *Procolobus badius* in Kibale National Park and around the Mpanga River near Lake George; the chimpanzee *Pan troglodytes* in many of the forests in the West; and the mountain gorilla *Gorilla gorilla berengei* in the Bwindi Impenetrable National Park (BINP) and Mgahinga Gorilla National Park. A recent census of gorillas in BINP revealed the presence of only about 290 individuals.

The country formerly had 30 species of antelopes. However, the bongo, bay duiker and white-bellied duiker are extinct; the eland has been reduced to small populations in Lake Mburo and Kidepo Valley National Parks, and Steenbok have not been sighted for many years and are probably extinct. Another 14 species are considered threatened as a result of increased agricultural encroachment, overgrazing and poaching. Similarly the populations of most antelope species are now small. The Uganda kob has also been reduced to very low levels in places like Toro Wildlife Reserve, but healthy populations still live in Queen Elizabeth National Park and Murchison Falls National Park. The northern white rhino (*Ceratotherium simum*) has been poached to extinction, despite efforts made in the 1960s to protect it in Murchison Falls National Park. A few years before 1988, a few black rhinos (*Diceros bicornis*) were said to still range in Murchison Falls National Park, but it is feared that even these have now been exterminated. The situation is similar for the Kidepo Valley National Park (UNEP 1988).

As regards other mammals, the wild dog *Lycaon pictus* is now considered extinct, except for occasional wanderers from Tanzania and Sudan, although recent unconfirmed reports indicate their presence in the Ankole Ranching Scheme in Mbarara district. Jackson's mongoose is widespread but rare. The conservation requirements of both these species need to be assessed. There are ten rodent species of conservation concern. These include: the mountain squirrel (*Funisciurus carruthersi*) on Mount Rwenzori; the groove-toothed rat (*Otomys tropicalis*) in many different habitats in the mountains; Delany's mouse (*Delanymys brooski*) in the mountains of the south-west; the creek rat (*Pelomys hopkinsi*); the climbing wood mouse (*Hylomyscus denniae*) in the montane forest; the large *Thamnomys venustus* in montane forests in the south-west; the mill rat (*Mulomys dybowskii*); and the African pygmy mouse (*Mus acholi*) endemic in the north-west. The Lake Victoria Rat (*Pelomys isseli*)endemic to Sese Islands faces loss of habitat with increasing

human population on the few islands where it occurs. There is hardly any current information on the occurrence of the Congo Clawless otter (*Aonyx congica*). The conservation status of this species in the country needs re-evaluation. Karamoja was the only area in Uganda with any population of Cheetah (*Acinonyx jubatus*). Recent sightings of these report not more than 10 individuals. Small isolated populations are believed to still range in the Pian Upe and Matheniko wildlife areas. They are nonetheless under continuous hunting pressure, putting their continued existence in jeopardy. Just like the Clawless Otter, the Water Chevrotain (*Hyemoschus aquaticus*) and the Pigmy Antelope (*Neotragus batesi*) are other species far which no recent information on occurrence is available. The status of these species in Uganda remains a matter of conjecture.

The biology and ecology of the majority of shrews in Uganda is just beginning to be understood, this implies that the status of up to 30 species of mammals in this group for Uganda have not until now received the desired conservation attention. But because they are small sized animals habitat change may perhaps not have reached such an extent as to affect their continued survival. There is a similar lack of knowledge about bats.

The avifauna is largely doing well. However, of the more than 1000 recorded species, the country has twenty eight threatened species at global level. Ten are designated as vulnerable e.g. Lesser Kestrel, Corncrake, Blue Swallow and Grauer's Rush Warbler; two are data-deficient i.e. Nahan's Francolin and the Entebbe Weaver, and sixteen are near-threatened e.g. the Shoebill, Lesser Flamingo, Pallid Harrier, Red-faced Barbet, Papyrus Gonolek and Fox's Weaver. Fox's Weaver, *Ploceus spekeoides* is the only species endemic to Uganda and recent surveys by the East Africa Natural History Society-Uganda Branch indicate that healthy populations may exist in the Lakes Kyoga, Opeta and Bisina swamps. There are currently efforts to gather data on the Nahan's Francolin in Budongo Forest Reserve and the Shoebill in Murchison Falls National Park.

As far as reptiles are concerned, the most well known are the crocodiles. The Nile Crocodile occurs in significant numbers below Murchison Falls. The decline in population has, however, been precipitous having dropped from 700 individuals in 1967 to 80 in 1980. However, in April 1984, between 240-260 crocodiles were counted below the falls (UNEP 1988). More recent research in MFNP shows that crocodile populations are recovering (Baguma *in prep*). Crocodiles have also recently been sighted on Lake Edward and along Kazinga Channel. The slender-snouted crocodile might occur but has not been confirmed in recent years. The dwarf crocodile is very rare but has been reported recently (Stuart and Adams, 1991). Crocodiles outside PAs are highly persecuted and are unlikely to survive. There is little information about the status of other reptiles although isolated

inventories such as one of BINP revealed a low snake diversity (Robert Drewes pers. comm.).

The National Biodiversity Unit (NBU 1992) reported that 50 species of amphibians have been described in Uganda. Stuart and Adams (1990) mention 10 species of conservation concern (without naming them) and report that there are no endemics.

Five of these species are supposedly shared only with Congo (D.R.), two with Congo (D.R.) and Rwanda, two with Zaire, Rwanda and Burundi, and one with Zaire, Rwanda, Burundi and Tanzania. All of these occur in southern and western Uganda.

Current National Biodiversity Data Bank (NBDB) records show that the country has 72 species. There is a proposal to Flora and Fauna International by the Herpetile Working Group of the EANHS-U for funding to undertake surveys of amphibian status in Uganda.

Relatively few fish species occur in protected areas as there are very few lakes and wetlands with protected status. However, even those few waterbodies with protected status are often exploited for fish although the status of species there is not known.

Compared to vertebrates, little is known about invertebrates. There is no information on the total number of invertebrates that occur in the country. Very few taxa have been studied, mainly insects such as butterflies, moths and dragonflies. However, two species are rated by the IUCN as of conservation concern; the rare African giant swallowtail butterfly (*Papilio antimachus*) known from the Semliki, Budongo and Kalinzu forests, and the cream-banded swallowtail (*Papilio leucotaenia*) which occurs in the montane forests of the south-west.

As regards plants, there is some information, particularly on the higher plants but their status is much less known. A recent joint project between MUIENR and WCMC has attempted to evaluate the status of woody plant species in Uganda. There are 54 woody plant species considered to be under threat. The majority of them occur in one or more protected areas. Within the PA system there are restricted range species that are critically endangered such as *Chassalia ugandensis* from Kayonza Forest. Species that are endangered include *Sedum churchillianum, Lobelia stuhlmanii* and *Alchemilla roccati* from Rwenzori National Park. Vulnerable ones include *Milletia lacus-alberti* and *Dialium excelsum* from Budongo Forest Reserve, and two subspecies of *Rubus runssorensis; runssorensis* and *umbrosus*. Among the near-threatened restricted range species is *Diospyros katendii*, a tree restricted to Kasyoha-Kitomi Forest Reserve. Among the commercially

exploited species, *Entandrophragma utile, Milicia excelsa* and *Prunus africana* and *Turraeanthus africanus* are endangered, whereas 16 species including *Entandrophragma angolense, E. cylindricum, Lovoa swynnertonii, Phoenix reclinata, Nauclea diderrichii, Olea capensis* and *Raphia farinifera* are vulnerable.

(b) Status Outside protected areas

The present policies and legislation for the management of terrestrial biodiversity outside the protected area system is inadequate. The existing land tenure systems of mailo holdings, leasehold and customary holdings offer little incentive for protection and management of biodiversity in these areas. Maintenance of habitats and species are at the mercy of individual land owners.

While animal wildlife is under considerable pressure and requires more attention for conservation, a few areas outside the protected areas system with considerable populations of mammals have been identified in several rangelands in Uganda e.g. the Ankole Ranching Scheme covering an area of 65,000 sq km. Population estimates for the principal game animal species in these ranches show the presence of viable numbers of impala, zebra, waterbuck, bushpig, bushbuck, buffalo, warthog, oribi, topi and hippo. Other areas in districts such as Kiboga and Luwero also still have reasonable animal populations.

As with animals, the status of plants outside protected areas is not known for most species. for woody plants however, there are some restricted range species that are critical e.g. *Rytgyinia* sp. is confined to Iganga District in eastern Uganda whereas *Aloe tororoana* is only known from Tororo rock, an area of only a few hectares. *Phoenix reclinata* is highly vulnerable outside PAs, as it is heavily harvested for fencing ports, especially near urban areas.

Aquatic biodiversity is to a large extent outside the PA system. It therefore suffers direct human impacts as communities exploit it for their sustenance. For example, fish biodiversity has been adversely affected due to unregulated exploitation without adequate provisions for sustained renewal of the biodiversity. There has also been a considerable change in fish species composition in lakes such as Victoria and Kyoga following the introduction of the Nile perch in the 1950s. There have, as yet, been no detailed studies in the Ugandan part of Lake Victoria to establish the status of the surviving cichlid species. However, preliminary studies show that some haplochromine and tilapiine cichlids have survived in refugia at the edges of the lake and in nearby small lakes (Chapman *et al* in press).
Agrobiodiversity

Agrobiodiversity is a fundamental feature of farming systems around the world. It encompasses many types of biological resources tied to agriculture including:

Crop species/varieties
- Livestock and fish species
- Soil organisms in cultivated areas
- Biological control agents for crop/livestock pests
- Cultural and local knowledge of biodiversity

Agrobiodiversity therefore includes not only a wide variety of species, but also the many ways in which farmers can exploit biological diversity to produce and manage crops, animals, land, water, insects and other biota. Figure 2 indicates the minimum species richness in various taxa in Uganda. However, research to determine the potential contribution of these indigenous species to human and livestock needs is still limited to a few plants. The indigenous plants are well adapted to the environment and require low inputs. Because modern agriculture requires high inputs, some exotic crops have become too costly to produce by the majority of farmers and this has significantly reduced food security in the country.

Important steps were taken in the 1960s onwards to collect and conserve forage germplasm (mainly grasses), at Namulonge Agricultural Research Station, Makerere University, Kabanyolo and Serere Agricultural Research Station. Exotic accessions of grasses and legumes have also been collected as a means of increasing the genetic resource base. These materials have been conserved mainly in field *ex situ* facilities or gene banks.

As far as cereal crops are concerned, collection missions for sorghum and millet were organised around the country in 1993. Conservation is mainly done in the field. The National Sorghum and Millet Improvement Programme also depends on the world collection at SAARI.

Uganda is endowed with diverse types of local vegetables. A collection made by Goode in 1969-72 showed that there were over 100 species of local vegetables in Uganda. Unfortunately, the collection was lost due to lack of long term storage arrangements and others were mixed up due to the sudden death of the scientist.

There are also some under-exploited food crops. Some outstanding root, tuber and oil crops, well known to Ugandans are neglected by researchers. Among these are the yams (*Dioscorea* spp), Taro (*Colocasia*), Cocoyam (*Xanthoma* spp), livingstone potato (*Plectrathus esculantus*) and various mushrooms. In view of this, a project was conceived by the National Agricultural Research Organisation (NARO) and there is now some ongoing

research to collect and document distribution and status of *Dioscorea* spp. countrywide.

Although many species of livestock were introduced to the continent, they have become so well naturalised that they can be considered as components of agrobiodiversity. The Uganda Country Study of 1992 revealed that for some species such as cattle, there had been a gradual decline in the national herd since the 1970s. The "indigenous" *Bos indicus* has several genotypes; two types of Zebu, the long-horn Sanga from Ankole and intermediate forms. There is need to establish the current status of all these types before they get genetically eroded by the imported *Bos taurus*. Other livestock such as goats have increased in population but there is still need for further data to be gathered on them.

3.1.2.2 Loss of species and its causes

The following are the main pressures on species.

Consumptive uses

Unsustainable use of resources through unregulated hunting, fishing, the capture of live wild animals and plants for export and tree-cutting pose real threats to the conservation status of wildlife. Poaching includes the use of both the traditional bow and arrow and traps, and more recently, the automatic rifle. Poaching in and outside protected areas has resulted in major reductions in species populations, some to outright extinction, including both the black and white rhinoceros. As a result of the past political upheaval, the country's rich wildlife heritage has been severely decimated. Unfortunately, all the protected areas have experienced this phenomenon in the past and some are currently under this pressure e.g. capture of Grey Parrot nestlings in Kalangala District still persists. However, these activities can be controlled as long as there is sound administration and management and protection and conservation practices are in place.

Encroachment

As a result of a high human population growth rate accompanied by increased demand for arable and grazing land, encroachment on protected areas is still a major problem e.g. encroachment is still a major problem around Lake Mburo Park area where herdsmen are competing with wildlife for grazing land. A number of Forest Reserves had been until recently encroached for agriculture. The eviction of encroachers is resulting in satisfactory regeneration.

In PAs such as Queen Elizabeth National Park which contain fishing

villages, there has been a tendency for these settlements to expand outside of delineated borders and the communities to engage in collection of firewood within the protected areas resulting in increased deforestation and loss of habitat.

Outside PAs there is no clear policy on how natural areas may be used in such a way as to minimise species loss. It is common for land to be cleared of all vegetation before farming activities begin, something that is often unnecessary.

Changing agricultural practices

The adoption of modern farming methods including the use of high-yields hybrid varieties, monocultural systems and a lack of awareness of the value of agrobiodiversity and undervaluation of traditional knowledge have led to the neglect of many traditional food crops including vegetables. Closely associated with this is the adoption of exotic varieties by communities. This is causing the gradual disappearance of indigenous food species and it is important that remedial measures to conserve them are taken.

Modern agricultural practices encourage the use of various types of pesticides and other agricultural chemicals. The impact of excessive use of such chemicals on soil and other biodiversity is not known but could be quite significant. For example, unconfirmed reports indicate that the population of the ox-pecker, a bird once abundant in the rangelands of western Uganda, has declined tremendously due to widespread use of acaricides.

Introduction of alien species

Some alien species could be a threat to indigenous species through habitat alteration and/or competition for resources. For example, *Lantana camara* originally introduced as an ornamental plant has spread widely and dominated many habitats in Uganda, to the detriment of indigenous plant species. The water hyacinth *Eichornia crassipes* is believed to be having an adverse effect on aquatic communities in the littoral zones of major waterbodies. The Nile perch *Lates nilotica* has led to the disappearance of hundreds of endemic haplochromine cichlids in Lake Victoria.

3.1.3 Biodiversity at the genetic level

Genetic characterisation of populations in Uganda for both wild and domestic species is at a relatively rudimentary stage. There is therefore little information regarding genetic diversity in Uganda. However, before capacity to analyse genetic diversity is acquired, it is important that conservation at species level be maintained at populations at or above the minimum viable

level. It is only then that we can expect to conserve an adequate genetic diversity. The situation regarding agrobiodiversity at genetic level is much better that for wild species. Various breeding experiments are conducted at a variety of agricultural research institutes including Namulonge for cotton, potatoes and cassava; Kawanda for horticultural crops and banana; and Serere for cereal crops. There are efforts to establish a National Gene Bank.

The capacity to undertake genetic characterisation is currently being built at MUIENR, where, through a link with the Zoological Institute of the University of Copenhagen, two students are being trained at Ph D level and another two at M.Sc. level. It is hoped that in the next year or so, a small DNA laboratory will be set up at MUIENR. Through this laboratory, it will be possible for researchers to undertake a variety of wildlife and crop and domestic animal genetic studies.

However, even before the capacity for high level genetic studies is acquired, it is clear that the large-scale introduction of improved varieties of both plants and animals is bound to affect indigenous varieties adversely. It is therefore important that the genetic attributes of indigenous breeds and varieties is preserved before they are eroded by hybridisation and other forms of genetic manipulation.

3.2 The Value of Biodiversity to Uganda

Uganda is one of the Least Developed Counties (LDCs) and still largely depends on natural resources for its survival. It is not well endowed with mineral resources and hence has to depend mainly on biological resources. Biodiversity is therefore of tremendous value to the country.

3.2.1 Forests

Forests generate and protect the soil, ensure sufficient and regular rainfall, stabilise climate, protect water bodies from siltation, provide *in situ* conservation of genetic resources, provide a safe refuge for plant and animal species threatened with extinction, and generally create an environment suitable for human activities. Forest products range from those that can be consumed directly after harvest (fruits, roots, medicinal plants, game, firewood, etc.) to those that become raw materials (logs, poles, etc.) for other purposes.

3.2.2 Wetlands and aquatic habitats

While the general feeling among many Ugandans in the past has been that wetlands are wastelands, many people presently derive numerous benefits from this resource. Most of these traditional uses of wetlands are sustainable but a few of them have had serious effects on the wetland

ecosystem as a whole. The main products currently derived from wetlands include materials such as ambatch which is commonly used by fishermen as net floats; food in the form of wild meat from sitatunga, fish and various birds; dry season forage for livestock; craft, thatching and mulching materials from species such as *Cyperus* papyrus, *Typha* and *Phragmites*; building poles and fencing posts from *Phoenix reclinata,* medicinal plants and water. Wetlands may also be cultivated on a sustainable basis to produce various food crops.

Other aquatic habitats such as lakes and large rivers are the major source of fish which supplies a significant proportion of the nation's protein needs and has become second to coffee as a foreign exchange earner in recent years.

3.2.3 Other ecosystems

Apart from forests and wetlands, other ecosystems in Uganda provide services essential to support life. Many of our protected areas are in savanna ecosystems and are the basis for tourist activities and revenue. It is these natural ecosystems that have been converted to agroecosystems that maintain the agrobiodiversity on which Uganda largely depends. As mentioned earlier, indigenous breeds and varieties are much better adapted to local conditions and require fewer inputs. It would therefore be more cost-effective to find ways of improving them rather than substituting them with exotics. Quantitative estimates of biodiversity values are still in the initial stages of development as environmental economics is a new area in Uganda.

3.3 Current efforts to reduce biodiversity loss in Uganda

3.3.1 Overview

If the extent of forest cover (including tropical high forests and woodlands) is taken as a proxy for Uganda's biodiversity, clearly the country has registered significant loss. Forest and woodland cover has declined from 45% in 1890 to about 20% in 1996 of the area of the country (National Biomass Study, 1996). It is unlikely that Uganda's total biodiversity has declined by a similar amount, since forests and woodlands are not the only reservoirs of biological diversity. While it may be impractical to advocate for a complete stop to biodiversity loss, it is necessary to attempt to control it.

Uganda has approached the control of biodiversity loss in a number of ways including the following, among others: institutional capacity building; putting in place appropriate policies, legislation and regulations; implementation of projects and active participation in regional and

international fora.

3.3.2 Institutional Responsibilities and Capacities

1. Institutional structures

Several institutions are engaged in various activities related to biodiversity conservation and utilisation. These include among others NEMA, Forest Department, Ministry of Agriculture, Animal Industries and Fisheries, Ministry of Natural Resources, Ministry of Tourism, Wildlife and Antiquities and Ministry of Local Government, Makerere University and various Research Institutes.

The National Environment Authority (NEMA) has a cross-sectoral mandate and is the principal national authority on environmental matters, including biodiversity. the mandate of NEMA for the environment includes responsibility for the implementation of the provisions of the Convention on Biological Diversity. NEMA works in a co-ordinating, supervisory and monitoring role with the following lead agencies:

Uganda Wildlife Authority (UWA), created in 1996 by an Act of parliament, is a merger of the former Uganda National Parks and the Game Department. For increased management effectiveness and to allow for greater community participation, UWA has zoned Uganda into six wildlife areas. Furthermore, the Wildlife Statute, 1996, places ownership of all wildlife in the country in the hands of the state. This means UWA can manage wildlife in both protected and unprotected areas.

National Agricultural Research Organisation (NARO) was established in 1994 as an autonomous research organisation. The various institutes of NARO address different aspects of biodiversity conservation and sustainable utilisation. For example. the Fisheries Research Institute (FIRI) is responsible for aquatic biodiversity; while the Forestry Research Institute (FORI) deals with biodiversity in forest areas. The various agricultural research institutes also have set up crop and livestock genetic resources conservation programmes. NARO and its institutes work closely with the Consultative Group on International Agricultural Research (CGIAR) and its various international agricultural research centres (IARCs).

The Forest Department in the Ministry of Natural Resources is one of the oldest government institutions that have been involved in the conservation and utilisation of biological resources in Uganda. Although previously

activities revolved around consumptive use of the forest resources, there is now a major change in focus to address issues of biodiversity conservation and sustainable utilisation.
Makerere University through its Institute of Environment and Natural Resources, Forestry Department and other biological departments is active in biodiversity conservation through training and research activities and biodiversity database development. MUIENR collaborates closely with NEMA and other agencies involved with management of biodiversity and has provided services such as vegetation maps for various protected areas.

There is a Wildlife Department in the Ministry of Tourism, Wildlife and Antiquities which is essentially a policy unit. It also facilitates cross-sectoral linkages and links with local authorities.

2. Human Resources

Uganda has a potential pool of highly qualified scientists and socio-scientists capable of making decisions on biodiversity conservation and the implementation of the Convention. Numerous experts have been involved at various levels in issues concerning biodiversity; for example the preparation of background documents preceding Rio; "The Country Study on costs, benefits and unmet needs of biological diversity Conservation". They have also been involved in inventories and the formulation of legislations, policies and guidelines for the implementation of the Convention. The preparation of the National Environment Action Plan is also evidence of their competence.

This pool of human resource is drawn from various institutions, and sectoral agencies, and at all levels of administration including the grassroots, who have been involved in the management of natural resources.

However, there are still gaps of expertise in certain areas including biotechnology, monitoring, environmental accounting among others, which need to be addressed.

3. Funding

Much of the funding for biodiversity activities is mainly through overseas development assistance, Government and to a limited extent local budgets through institutional initiatives. There is virtually no funding from the private sector.

Uganda has also received endowment funds through the Bwindi Trust Fund for the conservation of the habitat and Mountain Gorillas in Bwindi and Mgahinga Forests amounting to 4m dollars. Funding has also come from

the GEF - a financing mechanism of CBD.

Much of the financial support is directed mostly to management of - protected areas, although areas such as capacity and infrastructure building, awareness, are also considered.

Government financial support of these activities through the State budget is provided depending on the financial situation. Currently there is dire lack of funding from this source and due to the World Bank SAP - agencies have had their activities curtailed and have depended mainly on Donor funding.

All the various institutions mentioned above therefore have funding as their major constraint. It is hoped that this situation will change gradually as some of the agencies begin to generate their own funds and the economic situation has improved to the extent that government can commit more money to biodiversity conservation.

3.3.3 Legislation and policies in place

A number of regulations have been put in place to protect the Ugandan environment, including the conservation and sustainable use of biodiversity.

The constitution (1995) charges the state, including local governments, "to promote the rational management of natural resources as a measure to safeguard and protect biodiversity". There are specific sections that provide for the protection of water bodies, wetlands, forests, national parks and any land to be reserved for ecological or tourist purposes for the common good of all citizens.

The National Environment Statute (1995) provides for sustainable management of the environment. One of the principles of environment management is to maintain stable functioning relations between the living and non-living parts of the environment through preserving biodiversity and respecting the principle of optimum sustainable yield in the use of natural resources.

The Wildlife Statute (1996) aims to enhance economic and social benefits from wildlife management by permitting wildlife user rights in community wildlife areas. it also emphasises public participation in wildlife management.

The Water Statute (1996) emphasises the rational management of water resources including aquatic biodiversity.

The National Wetlands Policy (1995) was the first of its kind in Africa and

aims to curtail the rampant loss of wetlands resources and to ensure that benefits from wetlands are sustainably and equitably distributed to all people of Uganda.

The Decentralisation Statute (1993) is the legal framework for decentralisation or devolution of power to the district and lower level. It provides for the establishment of the District Environment Committee (DEC) as a functional committee of the district local council (DLC). There is also a provision for a Secretary for Environmental Issues at all levels of the local council hierarchy.

Statutory Instruments: there is a provision in Uganda's legislative system under which certain categories of leaders such as cabinet ministers, commissioners or directors are allowed to issue regulations called statutory instruments, as follow-ups to Acts of parliament. Statutory instruments offer the flexibility to plug regulatory loop-holes in any of the statutes dealing with the conservation and sustainable use of biodiversity.

Local legislations: These consist mostly of bye-laws at the district, sub-county and village levels where in fact biodiversity is most abused or negatively impacted upon. The ability to pass by-laws at the lower levels offers additional flexibility for strengthening the regulatory framework for the conservation and sustainable use of biodiversity.

There are older laws which although, at the time of enactment did not have specific provision for biodiversity conservation, at least provided for sustainable exploitation of resources e.g. the Fish and Crocodiles Act 1964. The revised Forestry Policy of 1987 addresses issues of biodiversity conservation. Since 1989, it has been official policy to increase the areas of Strict Nature Reserves to 20% of the whole forest estate.

3.3.4 Existing programmes to enhance biodiversity conservation

Uganda has projects which specifically target conservation and sustainable use of biodiversity. A few are listed below;

Institutional support for the protection of East African biodiversity: This was a UNDP/GEF regional project which started in 1991 and ended in 1996. It supported biodiversity inventories in the Forest Department and the National Wetlands programme. It also provided institutional support to Makerere University, in the Faculty of Agriculture and Forestry and the Institute of Environment and Natural Resources (MUIENR). The National Biodiversity Data Bank at MUIENR was also strengthened.

Lake Victoria Environment Management Programme which started in 1997. It is being funded by the World Bank. The project is meant to

support the protection of catchment areas in ten districts around Lake Victoria and aquatic biodiversity in the lake. It will be implemented by the Fisheries Department, Water Resources Management Department, Fisheries Research Institute, Kawanda Agricultural Research Institute, Lake Victoria Fisheries Organisation, Wetlands Programme, Water Hyacinth Control Unit and Makerere University.

Reducing biodiversity loss at cross-border sites in East Africa. This is also a regional project funded by GEF/UNDP. It started at the end of 1997.

Makerere University Biological Field Station is a unit of MUIENR involved in ecological monitoring in parts of Kibale National Park. It also provides undergraduate and post-graduate training in tropical forest biology and post-doctoral research.

The Conservation and Sustainable Tourism Programme: This is an ambitious multi-donor multi-institutional investment package which includes the Protected Areas Management and Sustainable Utilisation (PAMSU) Programme funded by the World Bank, the European Union, USAID and GTZ.

Natural Forest Management and Conservation project of the Forest Department: Funded by the EU, the project has completed biological inventories of 66 major forest reserves out of over 700 to assess the biodiversity and richness within Uganda's protected forest areas. It also expanded the area managed as nature reserves to cover 20% of the estate.

National Wetlands Management and Conservation programme: It is funded by the Dutch Government. It has undertaken inventories of wetlands resources in many districts of Uganda and was also responsible for producing Africa's first national Wetlands Policy in July, 1996.

NGOs have projects supporting biodiversity conservation, such as CARE-DTC in Bwindi; WWF at Bwindi and Rwenzori Mountains National park, AWF at Lake Mburo National Park, and IUCN at Mt. Elgon and Kibale National Parks. Several of the NGO activities are integrated conservation and development projects designed to help communities living adjacent to protected areas better appreciate the values of these resources.

The Institute of Tropical Forest Conservation under Mbarara University of Science and Technology is a WWF-funded initiative to promote research in tropical forests especially in the densely-populated south-western Uganda. The East Africa Natural History Society-Uganda Branch is currently involved in producing a directory of Uganda's Important Bird Areas (IBAs), a project desired at identifying key bird habitats.

GEF-Small Grants Programme: Since 1997, a GEF-Small Grants programme that provides funding to NGOs, CBOs and other organisations whose activities fulfil CBD and other Rio conference objectives commenced in Uganda. It is hoped that the activities of this programme will help in getting communities at grassroots level involved in biodiversity conservation.

3.3.5 Regional and International Conventions

Uganda also actively participates in various other International Conventions, Protocols and Agreements which relate to biodiversity conservation. Some of the notable ones are:

The Convention on Wetlands of International importance especially Waterfowl Habitat, 1971 (The Ramsar Convention).

The provisions of this Convention provides adequate measures for the conservation of wetlands, which if implemented, would fall within the conservation standard envisaged by the Convention on Biological Diversity. Uganda ratified the Ramsar Convention in 1988 and the following are the implementation actions so far taken:

The setting up of a *National Policy for the Conservation and Management of Wetlands Resources, 1994*.

Uganda has identified Lake George and the surrounding swamp lands as a Ramsar site for inclusion in the List of Wetlands of International Importance.

The Convention concerning the Protection of World Cultural and Natural Heritage, Paris, 1972.

The principle objective of the World heritage Convention is to protect objects of cultural and natural heritage which are of value to present and future generations of mankind.

From the point of view of the conservation of biological diversity, it is the provisions relating to the conservation of the natural heritage that are relevant. The convention establishes a World heritage list on which the World Heritage committee may list those properties which form part of the world cultural and natural heritage. Uganda signed the Convention in 1987. Since then, two sites, The Rwenzori National Park and Bwindi National Park have been inscribed as World Heritage Sites.

The Convention on International Trade in Endangered Species of Wild fauna and Flora, Washington, 1973 (CITES).

CITES is one of the most important treaties in the field of conservation of biological diversity. It aims at protecting certain endangered species from over-exploitation through a system of import/export permits.

The CITES Convention was acceded to by Uganda in 1987. The CITES standard forms for permits and certificates are used by Uganda Wildlife Authority as a basis for control of the traffic in specimens and endangered species. The Wildlife Statute incorporates CITES as a basis for control of traffic in endangered species. The Fish and Crocodiles Act, 1964 also implements some aspects of CITES especially on optimum sustainable yield.

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

This Convention is the primary pan-African legal instrument for the conservation of the environment in general and biological diversity in particular. The Convention provides for measures to ensure conservation, utilization of soil, water, flora and faunal resources in accordance with scientific principles and taking into account the interest of the inhabitants. These provisions illustrate a forward looking treaty which is well in tune with the wide conservation objectives of the Convention on Biological Diversity. Under this Convention, it is unlikely that a conflict with the Convention on biological diversity will arise.

Accession to the Convention by Uganda was in December 1977, but due to lack of finance, many African States, including Uganda, have not been able to directly implement it.

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

The main objective of the Agreement was to develop a 5 year programme , *inter alia,* on fisheries resources of Lake Victoria. Uganda signed the Agreement, among the East African countries of Kenya and Tanzania in August 1994. National Secretariats were established within the three countries to prepare and implement the Lake Victoria Environment Management Program. The Agreement is aimed at collecting comprehensive information on the water quality and fisheries resources of the lake, and developing tools and measures for protection of the Lake Environment.

The Rio Declaration on Environment and Development

This declaration was adopted by the UN Conference on Environment and Development at Rio de Janeiro in June 1992. While the individual principles of the Rio Declaration may not show any specific reference to the issue of biological diversity, it may be argued that if the declaration is seen and construed as a whole, then the universal coverage of environmental issues may be seen. For instance, the Rio Conference adopted Agenda 21 because 'it reflects a global consensus and political commitment at the highest level on development and environment co-operation'. A number of chapters of Agenda 21, deal with strategies and activities for achieving the conservation of biological diversity. The chapters which are relevant to Uganda, include that dealing with combating desertification and drought, sustainable mountain development, promoting sustainable agriculture and rural development and management of freshwater resources. Most of the strategies recommended by Agenda 21 are similar to but more detailed than those contained in the Convention on Biological Diversity. Agenda 21 is therefore, a valuable starting point in attempting to implement the Convention.

International Convention to Combat Desertification in those countries experiencing serious drought and/or Desertification, 1994

The main objective of this Convention is to combat Desertification and to mitigate the effects of drought in seriously affected countries, especially in Africa. Uganda signed the Convention in 1994 and ratified it on 25 June, 1997. A National Plan of Action was developed for the country. At the moment, the Plan of Action is being co-ordinated by the Ministry of Agriculture, Animal Industry and Fisheries.

The UN Framework Convention on Climate Change (FCCC), 1992

The main objective of this Convention is to regulate levels of greenhouse gas concentrations in the atmosphere so as to avoid occurrence of climate change to a degree, *inter alia*, that would impede food production. It is also particularly significant in that it 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 reaforestation or the prevention of deforestation. Uganda ratified the Convention in 1993. The National Environment Statute, 1995 contains provisions for reduction of greenhouse gases.

Lake Victoria Fisheries Organisation (LVFO)

Objectives: to promote better management of fisheries on lake Victoria, to co-ordinate fisheries management with conservation and use of the lake resources, to collaborate with agencies and programs on the lake, to co-ordinate fisheries extension and to advise on introduction of non-indigenous organisms. Uganda is a signatory and ratified the Convention in December 1995.

Lusaka Agreement, 1994

This is an agreement amongst members of the Eastern, Central and southern African countries in co-operative enforcement operations directed at illegal trade in wild fauna and flora. The major objective is to reduce and ultimately eliminate the illegal trade in wild flora and fauna and to establish a permanent task force for that purpose. Uganda signed in 1994 and the new Wildlife Statute of 1996 includes most of the provisions of the agreement.

4. NATIONAL BIODIVERSITY STRATEGY

One of the key requirements under the CBD is for contracting parties to develop national strategies and action plans to enable the integration of biodiversity management into all sectoral policies and programmes. Uganda, in recent years, has gone through a relatively thorough environment Action Planning process which led to the production of a number of policy documents including The National Environment Management Policy for Uganda 1994, The National Environment Action Plan for Uganda 1995. During the NEAP process, Issue and Topic papers were produced on both terrestrial and aquatic biodiversity.

The documents give background information on terrestrial and aquatic biodiversity, review its importance and the threats to it. They then discuss the status of biodiversity in Uganda, its conservation and management including institutional and policy issues. They then give detailed recommendations on institutions, protected area system, research and training as well as on biodiversity outside protected areas. The NEAP process as well as other related activities have therefore identified most of the key issues that would be required in a NBSAP. The only problem is that they are scattered in a number of documents and they need to be brought together into one strategy.

Consequently, it is still necessary for Uganda to go through the process of developing a NBS from which a National Biodiversity Action Plan may then be drawn up. So far, the initial steps have been taken in the form of a national stakeholder workshop to brainstorm on what actions need to be taken to develop a strategy and the formation of a Technical Committee on Biodiversity Conservation to advise NEMA on biodiversity issues.

5 COLLABORATION AND PARTNERSHIP

5.1 Sectoral Involvement in implementation of biodiversity objectives into national planning and development

Previously, there was little, if any collaboration or co-ordination of activities that in one way or another, impacted on biodiversity by the different sectoral institutions. During the National Action Planning process, it was recognised that many environmental issues and problems in the country were cross-sectoral in nature and hence there was a need to have policies that are in consonance with this reality.

A number of sectoral institutions in Uganda impact on biological diversity. These include the Ministries of Agriculture, Animal Industry and Fisheries; Lands, Housing and Urban Development; Natural Resources; Tourism, Wildlife and Antiquities; Works, Transport and Communications; Trade and Industry etc. The National Environment Management Policy for Uganda, 1994, recognised that in order to achieve cross-sectoral policy objectives, there was a need for certain guiding principles and strategies. In the legal context, it is now accepted that the legal framework for environmental, including biodiversity matters, should strengthen rather than take away the sectoral competencies, capabilities and responsibilities. However, there is need to ensure cross-sectoral co-ordination and management. This has been achieved through the formation of the National Environment Management Authority (NEMA), a semi-autonomous institution under the Ministry of Natural Resources with the responsibility for co-ordinating, monitoring and supervising all activities in the field of environment including biodiversity conservation. Environment Liaison Units (ELUs) have been set up in all lead agencies. In this case, most sectors involved in biodiversity Conservation and/or utilisation have ELUs which are the link between the lead agencies and NEMA.

The Ministry of Agriculture, Animal Industry and Fisheries already recognises the importance of the CBD. This is why it has set up a National Animal Genetic Resources Steering Committee and a National Animal Genetic Resources Programme. The two main objectives of the programme are -

- to ensure the conservation of diversity of animal genetic resources in Uganda;

- to ensure sustainable and best use of the national animal genetic resources.

A National Plant Genetic Resources Coordination Committee was established in 1992. It was mandated to set up priorities for plant genetic resources collection, conservation, documentation, characterisation and

evaluation. Accordingly, a National Plant Genetic Resources Programme was developed and is currently co-ordinated from Kawanda Agricultural Research Institute.

The Forestry sector in the Ministry of Natural Resources has already undertaken species inventories for key taxa in over sixty of its Forest Reserves. The purpose is to use these data to plan on how to utilise our Tropical High Forests on a sustainable basis. The current Forest Act places emphasis on the importance of forests in biodiversity conservation and the department has gone a long way in integrating the CBD requirements in its draft Forestry Master Plan.

The Water sector, also in the Ministry of Natural Resources has an overall goal of managing and developing the water resources of Uganda in an integrated and sustainable manner, so as to secure and provide water of adequate quantity and quality for all social and economic needs. The sector has therefore developed a Uganda Water Action Plan which recognises the need for a holistic approach to water resources management - one which links economic and social development to the protection of natural ecosystems. This focus rhymes with the objectives of the CBD.

The Wetlands policy enacted in 1995 has, as some of its goals, the maintenance of biological diversity, maintenance of wetland values and functions and the integration of wetland concerns in the planning and decision making of other sectors.

The Wildlife sector, has, in the Wildlife Statute 1996 addressed many of the CBD requirements. Among the functions of the Uganda Wildlife Authority (UWA) is the requirements to establish policies and procedures for the sustainable utilisation of wildlife by and for the benefit of the communities living in proximity to wildlife; to establish management plans for wildlife conservation areas and for wildlife populations outside wildlife conservation areas.

All these and other sectors are today using a cross-sectoral approach to planning of their activities in order to ensure that all sectoral interests connected to biodiversity and its conservation are catered for.

5.2 Involvement of different organisations in implementation of the CBD at national level

At national level, there are, as indicated elsewhere in this report, other organisations apart from government departments, engaged in activities that deliberately or otherwise implement CBD objectives.
NGOs have been particularly active in this area. For example WWF, with

support from DANIDA has a programme to help Uganda to effectively implement the Convention. It is working with government agencies, especially NEMA and other NGOs to implement three priority articles of the CBD i.e. (i) Article 6 on formulation of National Biodiversity Strategies and Action Plans (ii) Article 11 on incentive measures for biodiversity conservation and sustainable use and (iii) Article 15 on access to genetic resources.

Local NGOs, with support from WWF and IUCN, have formulated an Action Plan to implement the CBD. Under this plan, several activities will be undertaken to implement the CBD including raising of public awareness about provisions of the CBD through workshops, dissemination of education materials and media campaigns; field conservation activities; research/field studies; policy analysis and lobbying government for positive policy change; and advocacy for protection of local people's intellectual property rights and equitable sharing of benefits. It is expected that all these activities will take place under the umbrella of the National NGO Working Group on Biodiversity.

Universities are playing a key role in implementing the CBD. The "People and Plants Initiative" of UNESCO, Kew and WWF is supporting research on various ethnobotanical aspects through the Mbarara University of Science and Technology. The data being gathered are providing baseline information on plant resource use by local communities and will enable the adoption of the concept of sustainability in the use of the resources. Makerere University through its various departments and institutes such as MUIENR, Zoology, Botany, Makerere Institute of Social Research (MISR) is involved in research and training in biodiversity conservation, socio-economic aspects of resource use as well as in database development and exchange of information on research results with other institutions such as WCMC. For example, MUIENR in collaboration with WCMC has just completed a Draft Red Data List of Woody Plants of Uganda. This kind of information is essential in the management of species that are exposed to various forms of threat.

5.3 Collaboration with international organisations

The Government of Uganda, for pragmatic reasons related to inadequate financial resources base, actively encourages collaboration with international organisations in order to achieve the goals of the CBD.

Numerous international NGOs are involved in programmes to conserve biodiversity in Uganda. For example, the World Conservation Union's (IUCN) mission in Uganda is to ensure conservation of biodiversity, natural features and natural systems of Uganda and to reconcile this with the

development needs of the country and priorities of the national constituency. A country office was established in 1993 and the organisation is supporting the National Wetlands Management and Conservation programme under which biodiversity inventories of wetlands have been undertaken.

IUCN is also involved in some conservation and development projects around major conservation areas; Kibale and Semliki National Parks in western Uganda and Mt. Elgon National Park in eastern Uganda. Two other international NGOs, the Worldwide Fund for Nature (WWF) and CARE are also involved in conservation and development projects; the former around Rwenzori National Park and the latter around Bwindi Impenetrable and Mgahinga Gorilla National Parks. There is also WWF support to the Institute of Tropical Forest Conservation (ITFC), International Gorilla Conservation Programme, support to implementation of the CBD and other projects. The African Wildlife Fund (AWF) is active among communities around Lake Mburo National Park.

Uganda collaborates with other international NGOs indirectly through links which local NGOs have with the international NGOs. For example, the East Africa Natural History Society-Uganda Branch is a member of the BirdLife International partnership and with support of the British partner, the Royal Society for the Protection of Birds (RSPB), has identified the Important Bird Areas (IBAs) for Uganda.

Other international organisations that Uganda collaborates with include ones such as the World Bank. The unique Bwindi Trust was set up with a GEF endowment through the World Bank. The bank is also providing financial support to the National Environment Management Authority (NEMA), the institution entrusted with co-ordinating and overseeing environmental management, including biodiversity conservation, in Uganda. The World Bank also supports other initiatives such as the Lake Victoria Environment Management Programme which will deal with issues of biodiversity in the lake and its catchment and the Protected Areas Management and Sustainable Utilisation programme (PAMSU) which seeks to improve management capacity in Uganda's Protected Areas as well as assisting local communities around those areas in deriving benefits from the PAs including exercising the user rights conferred on them by the new Wildlife Act.

The European Union has provided support to both the Forest Department and the Natural Forest Management and Conservation project which involved carrying out extensive biodiversity inventories in its major forest reserves, the results of which are now being used to zone the forests into conservation and production sections. The results also form an important

baseline for future monitoring.

Between 1991 and 1996, there was a UNDP/GEF regional project which focused on institutional support for the protection of biodiversity. There was support to institutions such as the Forest Department, Department of Environment Protection, Makerere University (MUIENR) and Forestry Department, Uganda Institute of Ecology and Wildlife Clubs of Uganda. Some of the achievements included enhanced capabilities of the National Environment Management Authority (NEMA), Makerere University Institute of Environment and Natural Resources (MUIENR) and the Forest Department to capture, store, analyze and disseminate information relating to the conservation and management of biodiversity, thus helping to fulfil Article 7 (d) of the CBD. The project also enabled inventory work to be carried out by MUIENR, the National Wetlands Conservation and Management Programme as well as the Forest Department (Article 7a & 8). Education and awareness activities by the Department of Environment Protection and the Wildlife Clubs of Uganda (an NGO) were also supported (Article 13). Biodiversity research and training activities were boosted in MUIENR, Uganda Institute of Ecology and the Forestry Department at Makerere (Article 12). Another regional UNDP/GEF project; this time focusing on cross-border biodiversity sites, started at the end of 1997. There are two immediate objectives for the new project -

To establish an environment around the cross-border sites where local agencies and communities can promote sustainable use of biodiversity.

To bring into balance the demand and supply of natural resource products, including biodiversity, at cross-border sites.

If successfully accomplished, the project will have addressed several CBD articles such as Article 7, 8 10, 11, 13, 17, 18 etc..

The financing by GEF and IDA of the LVEMP activities is catalysing Kenya, Tanzania and Uganda to develop a better understanding of how Lake Victoria functions, learn how the actions of their populations in the lake basin affect the lake management and work out ways jointly to implement a comprehensive approach to manage the lake ecosystem to achieve benefits particularly the conservation and sustainable use of biodiversity in freshwater ecosystems.

These examples serve to illustrate the degree to which Uganda is collaborating with international organisations, in order to achieve the objectives of the CBD.

5.4 Public Awareness of the importance of biodiversity

As is typical of many policies and laws on natural resources in Uganda, there is still a general lack of knowledge about the CBD, what it means and obligations at national, district, household and individual levels. This is mainly due to a previously inadequate government policy on environmental education and public awareness development, the lack of an appropriate lower and higher education curriculum, inadequate trained personnel and teaching materials, limited coverage by public communication media and illiteracy. This state of affairs needs to be changed urgently, particularly among the grassroots communities, in daily touch with biological diversity.

Article 13 of the Convention deals with the need for increased public education and awareness with regard to the Convention and conservation. Education and awareness have been spread through formal and informal education programmes.

The formal option involves educational institutions at various levels. For example, Makerere University Institute of Environment and Natural Resources has produced a book entitled "Environmental Education: A Source Book for Teacher Educators in Uganda". This book is meant to equip teacher trainers with the skills needed to impart environmental knowledge, including biodiversity conservation, to teachers who then pass this on to their pupils. NEMA, through its Education, Awareness and Training Division, is working with the Curriculum Development Centre to integrate environmental education, including issues of biodiversity and its conservation into the school curriculum.

At the informal level, outside the classroom, there has been considerable progress in spreading awareness about biodiversity and its importance as well as the measures required for its conservation. The NEAP process involved widespread consultations at district level during which issues of biodiversity and its conservation were discussed. The concerned public at that level certainly learnt more about biodiversity and the CBD.

As a result in a gradual change in management approach among protected area management agencies, such as Uganda Wildlife Authority (UWA), communities around Protected Areas such as National Parks are becoming involved in management through Park Management Advisory Committees. Members of these committees are sensitised about the importance of biological diversity and the need to conserve it. They, in turn, spread this knowledge among the local communities surrounding the park.

NGOs, both local and international, are playing a leading role in biodiversity education and awareness activities. For example, Wildlife Clubs of Uganda

is active in the school system. The East African Wild Life Society and East Africa Natural History Society, through talks and other public awareness activities such as World Birdwatch Day, World Environment Day, publications such as NATURE WATCH etc.. are spreading information about biodiversity. The Integrated Conservation and Development Projects mentioned in Section 6.3 have education and awareness, as one of their key activities. Earth Council, international NGO is currently facilitating local NGOs in Uganda to set up a Civil Society Secretariat for Sustainable Development in Uganda. There is an interim arrangement for Wildlife Clubs of Uganda to be the Secretariat to facilitate information exchange and networking amongst NGOs and CBDs involved in environment and biodiversity conservation.

NGOs in Uganda held a workshop in July 1996 on the CBD at which they came up with a plan of action to implement the Convention. One of the key activities identified in the Action Plan is training and awareness. It was also resolved to form an NGO Working Group on Biodiversity for purposes of implementing the Action Plan.

Institutions such as the Uganda Wildlife Education Centre (UWEC), formerly Entebbe Zoo, are also playing a key role in awareness raising through their displays and talks to visitors.

The private sector has not yet played a major role in spreading education and awareness but the trend is changing as some local businesses such as the New Vision Publications begin to offer concessionary terms for an environmental pull-out magazine, the NATURE WATCH. A number of local radio stations have set aside special times for environmental programmes, which have potential to be used more effectively in spreading awareness of the CBD.

6. IDENTIFICATION, MONITORING AND EVALUATION

Article 7 of the CBD is basically about the ordering and use of information on biological diversity and biological resources.

Uganda completed a National Biodiversity Country Study in 1991. This was the first stage of a systematic and comprehensive assessment of her biodiversity resources. A number of gaps were identified, and priority activities identified. Based on this, a number of projects and programmes were designed. However, very few have been funded and implemented.

Arising from the country study, further assessment of the country's biodiversity resources has been carried out through inventories and other forms of data collection by different government institutions.

As regards identification of components of biodiversity, progress has mainly been at the level of ecosystems and habitats significant for biodiversity as well as species and communities. At the ecosystem and habitat level, there have been some initial attempts by MUIENR to identify vegetation types by Langdale-Brown *et al* (1964) that are outside the present protected area system (e.g. Pomeroy, 1993). The purpose was to highlight these habitats so that something can be done before they disappear.

At a more detailed level, MUIENR has also produced preliminary biodiversity ratings for two areas of Uganda; a 2000 km^2 part of southern Uganda - the so-called Sango Bay area and a 27,000 km^2 area of North-eastern Uganda (Kotido and Moroto districts) (Kasoma and Pomeroy 1996, Pomeroy and Tushabe 1996). These two studies give some indication of the biodiversity importance of different habitats in these areas and could form the basis for larger countrywide analyses. The National Biomass Study in the Forest Department has since the late 1980s been involved in gathering data countrywide on biomass growth and utilisation using remote-sensing techniques. The outcome from these studies form an important baseline for future monitoring of changes in key ecosystems or habitats. It is now possible for biomass and vegetation data sets to be combined with other data sets for purposes of modelling, spatial analyses, predictions and scenarios all of which are important in making decisions on the management of biological diversity at the ecosystem level.

As far as species and communities are concerned, there have been a number of institutions involved in gathering inventory data. MUIENR as well as the Departments of Zoology and Botany at Makerere University have continued to obtain data on species and communities in various Ugandan habitats. These data are gathered in the course of postgraduate student and staff research. The important Bird Area (IBA) programme of BirdLife International (formerly ICBP) as well as its global partnership is an attempt to identify areas vital for biodiversity conservation using birds as the indicator taxon. In Uganda, the East Africa Natural History Uganda Branch, an NGO, has over the past two years been involved in identifying IBAs for Uganda. A directory of these IBAs is almost complete. This will go some way in fulfilling some of the requirements of Article 7 of CBD. It is also an illustration of how parties can work with NGOs to implement the CBD. Large scale inventories for selected forests and wetlands have been carried out by the Forest Department and the National Wetlands Conservation and Management Programme respectively.

Currently, Uganda has no national programme on ecological monitoring although there is an umbrella policy for all environmental monitoring developed during the NEAP process. Some suitable data to form the

baseline for biodiversity monitoring already exist, but they need to be brought together so that the extent of environmental changes which are taking place can be perceived more clearly. Many of the existing data are in non-standard form but they can still be of use. There are a number of schemes that have resulted in generation of data that could form the basis of a monitoring programme but there is need for a better co-ordinated programme, nationwide.
Despite the lack of a nationwide mechanism for monitoring biodiversity, there is some ongoing monitoring activity. Most notable of these are large mammal counts (especially elephants) in Queen Elizabeth, Murchison Falls and Kidepo Valley National Parks (e.g. Olivier and Abe 1992), which have been the responsibility of Uganda Institute of Ecology; primate counts and some associated vegetation in Kibale National Park by Makerere University Biological Field Station; waterfowl counts at about 15 sites as part of a Wetlands International programme by the East Africa Natural History Society-Uganda Branch.

Ecological monitoring programmes have been designed for Bwindi Impenetrable National Park by the Institute of Tropical Forest Conservation (ITFC), the Rwenzori Mountains National Park by the WWF-funded Rwenzori Mountains Conservation and Development Project. A similar programme is currently being designed for Mt Elgon National Park by the IUCN-funded Mt. Elgon Conservation and Development Project. The programmes will, in addition to monitoring the components of biodiversity also monitor other activities that are likely to have impacts on biodiversity e.g. resource use, tourism and illegal activities. MUIENR is currently developing a central spatial information system as a pilot project for protected area in-park monitoring in Murchison Falls National park. It is hoped that this GIS-based information system will form the basis for the development of a country-wide information system for Uganda Wildlife Authority.

Data collection *per se* is not very useful for conservation of biological diversity. There must be a way in which the data available is transformed into information that is useful for managers and users of biodiversity. There is already considerable progress in establishing mechanisms by which inventory and other data may be made useful to users. The Forest Department has established a computerised Biodiversity Database by means of which it has been possible to organise the data obtained from the inventory exercise and perform analyses that have enabled the identification of key biodiversity areas in the Forest Reserves surveyed. Monitoring and enforcement strategies for the department are also evolving through the implementation of a certification system in the forestry sector. The National Biodiversity Databank (NBDB) at MUIENR has, over the last five years, developed the capacity to handle various forms of biodiversity data. There is now a well-organised computer-based system with a number of data

handling, analysis and presentation capabilities that make it the most comprehensive biodiversity information base in the country. The capacity to use GIS in the NBDB has led to the development of the ability to analyse the country's conservation needs based on the representation of ecosystems and species, or sets of species in protected areas by various forms of gap analysis.

State of the environment reporting

The first State of the Environment (SOE) Report for Uganda was published in 1994. There is a draft form for 1996. Its purpose is to report on progress made towards Uganda's environmental goals. It provides a comprehensive and descriptive assessment of air, water, land, plant and animal resources across the country. If continued, it would form a convenient monitoring yardstick.

7. SHARING NATIONAL EXPERIENCES

7.1 Clearing House Mechanism

Article 18 of the Convention requires the establishment of a 'clearing house' mechanism to promote and facilitate technical and scientific co-operation. Through this mechanism, developing countries gain access to data and technology from other nations that have comparable ecological, social and economic conditions and more importantly, gain a forum for articulating priority needs for scientific and technical exchange.

The Convention Clearing House Mechanism is currently in a pilot phase of implementation. In Uganda, NEMA has been identified as the national Focal Point for the Clearing House. It is presently seeking GEF funding to develop a national network.

Through this funding, NEMA will attempt to:

develop guidelines for participation;

encourage relevant institutions e.g. the Forest Department, Makerere University Institute of Environment and Natural Resources, NARO etc to describe, or 'register' themselves and their data holdings;

organise, make available, maintain the base of information relevant to the level of the Clearing House (e.g. on national legislation, action plans at the national level, biodiversity inventories etc);

manage and respond to non-electronic requests for information;

actively seek links with relevant sectoral networks;

provide and manage the needed World Wide Web server technology and maintain core information.

NEMA is also the INFOTERRA focal point in Uganda.

Outside NEMA, there have been efforts by some organisations to promote regional co-operation in the field of conservation and sustainable use of biological diversity. In the early 1990s, MUIENR initiated a process whereby institutions and professionals involved in biodiversity database activities in Uganda, Kenya and Tanzania could meet once annually to agree on matters such as common species lists, data entry modalities, data exchange mechanisms etc. Three meetings have so far been held in Uganda, two in Kenya and one in Tanzania. There is now an agreed list of birds, mammals, and plants and draft lists for reptiles, amphibians, and fish. These meetings received financial support from a variety of sources but especially the UNDP/GEF Project on Institutional support for the protection of East African Biodiversity. Participants in these meetings came from institutions such as National Museums of Kenya, University departments, National Environment Management Council (Tz), Protected Area Management Organisations. In several cases participants came from international organisations such as the World Conservation Monitoring Centre (WCMC).

7.2 Case studies from Uganda

Uganda has some cases which reflect experiences encountered in implementation of Article 6.

The empowerment of communities, sharing of benefits and incentive measures to promote biodiversity conservation and development.

Benefiting from the funding mechanisms put in place by the Convention on Biological Diversity, conservation and development and benefit sharing .

The Mgahinga and Bwindi Impenetrable Forest Conservation Trust (MBIFCT).

The overall aim of the MBIFCT is, in co-operation with other like-minded organisations, to promote the conservation and protection of the biodiversity in two National Parks, Mgahinga Gorilla and Bwindi Impenetrable. The two areas are home to the largest population of mountain gorillas in the world - estimated at about 300 in Bwindi alone. The habitat was being threatened by human activities and therefore endangering the gorilla population. Furthermore, these areas have unique biodiversity unequalled elsewhere in Uganda.

The Mgahinga and Bwindi Impenetrable Forest Conservation Trust (MBIFCT) became a trust under “The Republic of Uganda Trustee Incorporation Act” on the 2nd March 1994. The Trustees appointed a Trust Management Board (TMB) which in turn established a Trust Administration Unit (TAU)

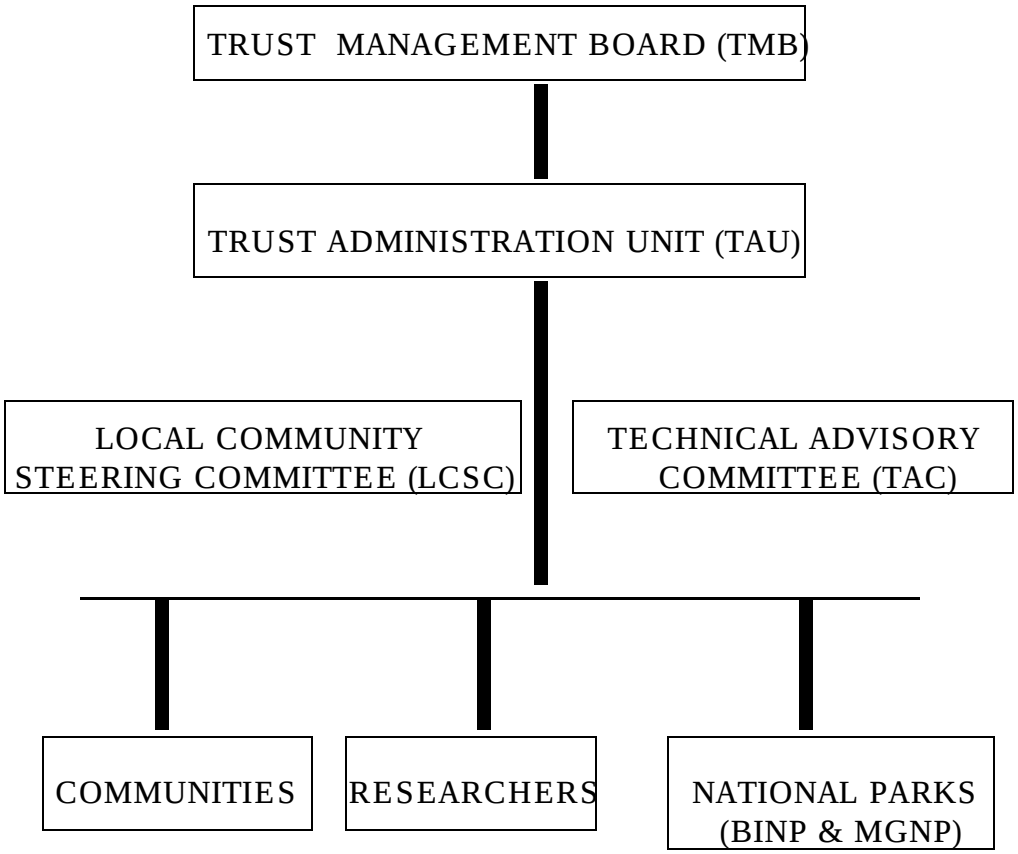
to run the day to day affairs of MBIFCT. The TAU came into being on 1st July 1995.

MBIFCT has been funded by the Global Environment Facility through the World Bank in order to conserve the biodiversity of two important resource bases in Uganda, Mgahinga Gorilla National Park (MGNP) and Bwindi Impenetrable National Park (BINP). The Government of Uganda and GEF, with the encouragement of USAID and conservation NGOs, have set up the Trust to provide a flow of funds and technical assistance to local communities in order to demonstrate tangible benefits from the conservation of these resource bases. In addition the Trust provides financing for research in and around the two parks, as well as support for improved park management.

The GEF grant of 4 million US dollars to MBIFCT is in the form of an endowment fund which has been placed with a finance company in London. The income derived from this endowment will provide grants for community, research and park management projects in perpetuity. In order that the endowment fund may be given time to consolidate, the first two years of MBIFCT's operation were funded by USAID under its Action Programme for the Environment (APE). These USAID funds amounted to $880,700 over the two years, of which, nearly $36,000 was available for training and education in the communities and $310,000 available for grants and technical assistance. The $310,000 was allocated as follows: 60% to projects arising from the community initiative, 20% for research grants and 20% to supporting management in the two National Parks. The balance of the funds, $534,700 covered the start up and administration costs.

By the end of the first two years, MBIFCT attracted further funding from the Dutch Government for another five years to continue to pay for operational costs thus enabling the capital invested to accrue more interest, and/or to add directly to the capital so that the annual income available for expenditure from the endowment fund can become greater. Administrator of the MBIFCT would like to see the endowment fund grow to at least $8 million. Such a sum would ensure an annual income of about $500,000 being available to MBIFCT for use in its operations whilst at the same time maintaining the capital value of the endowment. Once MBIFCT is entirely dependent on the income from the endowment fund the actual amount available each year will be dependent on the success of the investment company which in turn depends on the fluctuations of the world finance markets.

The MBIFCT is structured as shown in the organogram below:



The principle operational area for the MBIFCT and from which community projects are received is defined as two parishes deep around each of the two National Parks of MGNP and BINP. However some projects beyond the two parishes may be funded if it can be demonstrated that such projects have conservation benefits for either of the two parks. Research projects may be carried out inside the parks or among the communities in MBIFCT's operational area described above. National Parks Projects may be associated with any aspects of work related to the two parks.

In summary therefore the Trust funds three types of projects:

Community Projects, which, may arise from a whole community or a group from within the community or an individual. Community Projects may include social development/activities, income generating or business activities.

Research Projects including base line data collection and monitoring which

may arise from within the parks or the communities surrounding the parks.

Park Management Projects

The TAU is designed to work with communities, groups and individuals; with the two National Parks management teams and with institutions and individuals in the field of research. TAU will assist any of the above to present proposals to the appropriate committee, the Local Community Steering Committee, the Technical Advisory Committee or the Trust and Management Board.

This is one of the very few Trust Funds around the World combining biodiversity conservation and community development. It is already showing signs of success as there is a working relationship with communities who have realised that there can be direct benefit from conservation of biodiversity.

Access to Genetic Resources and Benefit Sharing in Bwindi Impenetrable National Park

A study has recently be conducted around BINP (WWF, 1997) this case study analysed two of the benefit sharing arrangements, namely; the revenue sharing programme and the multiple use programme.

The Revenue Sharing Programme (RSP) in which the wildlife protected area (WPA) shares part of its revenue with the adjacent communities was adopted as a policy in December, 1994 and its implementation in BINP started in 1995. The process was for the establishment of the RSP included a workshop in March, 1994 whose recommendations were consolidated by an eight-member select committee and presented to government. There was limited public consultation and community involvement during the establishment and elaboration of the RSP. For example, the communities did not have much input in determining the percentages of the revenue collected that should go the RSP. Originally, 12% of the revenue from gorilla permits was set aside for revenue sharing of which 2% went to the National RSP Consolidated Fund for other parks which do not make enough money from tourism, 2% went to the three districts of Kabale, Kisoro and Rukungiri and the remaining 8% went directly to the local communities. However in 1996, new policy guidelines were passed by parliament stipulating that it is 20% of the gate collections that should be remitted to the RSP through the district authorities and not directly to the PMAC and PPCs. Though 20% looks more than the original 12%, the actual amount of money is far less because the gate fee per tourist/visitor is only about US$ 25 compared to a gorilla tracking permit which is about US$ 130.

The RSP is administered by the Park Management Advisory Committee (PMAC) and the Park parish Committees (PPCs) which were formed to act as direct links to the local communities for the implementation of the programme. RS funds are disbursed to support community development projects in the adjacent parishes but not as cash payments to individuals. A Parish was identified as a convenient local institution to handle the revenue to be shared and provide an easier mechanism for distribution of the benefits to the people affecting and being affected by the Park. To date, over 21 community projects have been approved and received funding from RSP. funding level for each project was up to Uganda shillings four million (UShs 4,000,000 i.e. about $4,000). This figure was decided on because the park has then managed to raise about Ushs 50 million and this was to be equally shared by the 21 parishes adjacent to the park. A total of over US$ 100,000 has so far been shared with the neighbouring communities. This amount is far much more than any contribution that government has ever made for development projects in the area.

Although the idea of revenue sharing is good in principle, its implementation modalities need to be refined with the participation of all the stakeholders. While through PMAC, the beneficiary communities are represented and appear to have significant voting power, in reality, they do not have much say over what their share should be.

The Multiple Use Programme (MUP) in which local people around the national parks are allowed limited access to in-park resources in designated multiple use zones for regulated harvesting of specified resources on a sustainable basis, was initiated in 1992 and approved by UNP in 1993. The process of discussing multiple-use for local communities was initiated by Park staff and supported by NGOs in the area including CARE, IGCP and ITFC. This then created a "parent to child" relationship between park staff and community members. The key steps included; carrying out of preliminary studies and surveys into extractive resource use including vulnerability assessment, allowing of limited harvesting of non-timber products (medicines, honey, mushrooms, fruits and craft materials) from the park, participatory management planning to set resource use objectives and establishment of a Park Management Advisory Committee (PMAC) and Park Parish Committees (PPCs).

Park Parish Committees (PPCs) were formed as direct links to local communities for programme implementation. The chairpersons of each of the PPCs, a total of 21, are automatically members of the PMAC for BINP. Memoranda of Understanding were signed between each parish and the park authorities detailing among others, agreements on who among the community should access the forest, when and how often, what resources should be harvested, how and in what quantities, and what sections of the

forest (multiple use zones) should access be allowed. Guidelines were established in regard to utilisation of the resources and general management of the multiple use activities.

Local community participation was firmly established as a key principle in the establishment of the multiple-use programme. Participatory rural appraisals and negotiations were conducted at a cautiously slow pace with the local community leaders and resource users in the different parishes for a period of over nine months to allow both parties to learn from each other and ensure that interests of the whole parish community were taken into account. Multiple use field workshops lasting 3-4 days each were conducted in each pilot scheme using PRA tools. The programme has been widely supported by the local people and has significantly helped to improve the relationship between the local people and the park authorities.

The following lessons were learned from the general views of the various groups interviewed and the available literature reviewed on the RSP and the MU Programme:

(a) The Revenue sharing Programme

The concept of revenue sharing was decided on by park authorities and the supporting projects and agencies. The park also decided on the amount of money to release to the communities. No community participation was sought on the purpose and rationale of revenue sharing and the amount of money to be remitted to the community.

The disbursement of money to communities has brought hope to the community that after all some tangible benefits are beginning to trickle in. It is seen as a gesture of goodwill on part of the national park authorities to which communities are eager to respond. However, the programme created high expectations among some of the local people and their confidence has gradually waned because of some apparent delays in realising the support from the RSP funds for their projects.

Local communities decided to use the initial money from revenue sharing on community projects for two main reasons. First, originally everybody has equal access to forest products, so the revenue sharing money should fund projects where all have equal access such as schools, clinics and roads. Secondly the park authorities and supporting agencies indicated a preference to community projects compared with individual projects.

The decision as to what project a community implemented was taken in view

of the volume of money received from the park. Uganda shillings fifty million was available to the 21 parishes adjacent to BINP for the first disbursement of the revenue sharing money. Each parish was to receive up to UShs 4 million so all the 21 projects funded in the first phase of the programme are very similar; schools of 2 to 4 classrooms, sub-dispensaries and roads. No funds went to an income generating project.

Communities, especially the leaders, appreciate the role played by park authorities and supporting agencies and projects in guiding them on how to design, implement and monitor the various projects. Many of the people talked to said that without this guidance much of the money could have been misused by a few elites and left no visible projects on the ground.

Revenue sharing programme is beginning to pay off. Peoples' attitudes are beginning to change positively.

Communities feel that the next money disbursement should go to support individual families to enable them start income generating activities. Many say this could be achieved by putting the money in the local credit and savings schemes known locally as "Biika oguze".

The changes in percentage of park revenue to be set aside for revenue sharing are a source of worry to both the communities and park management that disburse the money. The original arrangement in which 12% of all gorilla permits was set aside for revenue sharing was quite specific and favourable to communities. The new policy which stipulates that 20% of only the gate collections should be remitted to the RSP through the district authorities and not directly to the PMAC is less favourable because gate fee per tourist/visitor is much less than a gorilla tracking permit. Unless policy makers review the new guidelines, the future of revenue sharing is seriously threatened.

(b) The Multiple Use Programme

The MU programme has been fairly successful in improving the community-park relations and enhancing community participation in conservation. It has enhanced the local people's sense of ownership of and collective responsibility for conserving the park resources (Smith *et al.*, 1995).

There has been marked reduction in illegal activities in the parishes where the MU programme is implemented due to the high level of community surveillance and vigilance in reporting wrong doing. This has led to a

reduction in the park management costs for patrolling.

The PPCs have set out their own compliance systems and clear guidelines for dealing with offenders. For example, to avoid cancellation of access rights for entire group due to the actions of a few individuals in a certain location, the Beekeeping Association divided itself into five branches such that in the event of non-compliance, only the offending branch is penalised but not the entire association.

The MoUs for multiple use have varied from parish to parish because of the uneven distribution of the resources, especially where some specific resources, once widespread are now over-exploited in some areas.

Although the peoples' attitude towards the park has significantly improved, it is difficult to ascertain the sustainability of that positive attitude if, for example, for some reason it becomes necessary for the park authorities to restrict access to some of the resources.

The level of economic benefits of the MU programme is still very low because of the restrictions to small quotas of "minor" forest products. The economic benefits are smaller compared to what would be realised by engaging in illegal activities such as pitsawing or poaching. This presents a big challenge to the BINP management. However, looking at the wider Community Conservation and Development Programme (CCDP) which encompasses other initiatives such as the RSP, MBIFCT, substitution activities under the CARE/DTC project etc, the incentives involved in these programmes collectively provide fairly good motivation for the local people to conserve the park.

Overall, the two benefit sharing arrangements in BINP are very encouraging and need to be refined and supported further. However, benefit sharing should be expanded to include sharing of benefits from bioprospecting activities in the park such that local people share part of the benefits from the research work, either in form of royalties or research fees or training/capacity building. This would contribute to the requirements envisaged in the third objective of the CBD.

8. MEASURES TO FULFIL OTHER REQUIREMENTS OF THE CBD

8.1 Enhanced Management of Protected Areas

In line with article 8 of the Convention, Uganda has gone a long way in enhancing biodiversity conservation in protected areas (*in situ* Conservation).

In situ conservation in Uganda is long tradition. The first regulations

concerning the protection of biodiversity date back to 1920. They concerned the protection of forests (*in situ*), followed by Game in 1930s and National Parks in 1950s.

Specific efforts undertaken by Uganda in implementing this Article include among others:

The recent creation of National Parks including: Semliki, Rwenzori, Kibale, Mgahinga, Bwindi Impenetrable and Mt. Elgon. The Act provides for the protection of both wild animals and wild plants within the national park. This is an attempt at ecosystem management, a holistic approach protecting all species. The New Wildlife Act provides for the sustainable use of the resources through its provisions related to the promotion of access and user rights. This Act therefore captures the key twin objective of the Convention, conservation and sustainable use of biological resources.

Maintaining viable populations of species in natural surroundings and recovery of populations of threatened species, and rehabilitation and restoration of degraded ecosystem is being done in a number of ways. For example, in Forest Reserves which were recently encroached, enrichment planting of key tree species was undertaken to assist natural regeneration after eviction of enchroachers.

Protection of biological diversity outside areas for individual species of animals has also been provided for under the Wildlife Statute 1996.

The Statute has a comprehensive Schedule which prohibits the hunting of certain species of animals and also prohibits possession of trophies of such animals. However, it principally focuses on large mammals and therefore leaves a wide spectrum of animal life unprotected.

Protection of species is also provided for under various other Acts; regulating forestry, fisheries etc.

Promotion of sustainable development in zones adjacent to protected areas - this is a conservation approach that has been widely applied in the country, dating far back before the CBD. The main objective is to protect the vital ecosystems, but making them benefit local development to enlist community support for conservation. The programmes provide enabling channels for communities to meet their basic needs by benefiting from conservation areas through resource use rights and contributing to management decisions.

The Ugandan Constitution (1996) and NEMA Statute (1995) both clearly

provide for *in situ* conservation. They provide for specific protection of plant and animal ssp and their habitats.

The statute allows NEMA in consultation with the lead agency to issue guidelines for:

land use methods that are compatible with the conservation of biological diversity.

the selection and management of protected areas so as to promote conservation of various terrestrial and aquatic ecosystems of Uganda.

the selection and management of buffer zones near protected areas.

special measures for protection of species, ecosystems and habits faced with extinction.

prohibiting or controlling the introduction of alien species.

integrating traditional knowledge for the conservation of biological diversity with mainstream scientific knowledge.

8.2 Adoption and Promotion of Ex-situ Conservation Measures (Article 9)

Uganda has a few centres for ex-situ conservation of live and sterile materials, some of which maintain genetic diversity. These include among others:

Wildlife Education Centre formerly (Entebbe Zoo) run by an independent Trust

The Botanical Gardens (Entebbe) run by NARO.

Seed Bank at Kawanda Agricultural Research Station.

There are various depositories scattered in tertiary institutions and research stations, but there is no organised central data bank to record the various numbers of live or sterile specimens.

The NEMA Statute provides for NEMA, in consultation with the lead agency.

to prescribe measures for the conservation of biological diversity ex-situ especially for species threatened with extinction;

to issue guidelines for the establishment and operation of germplasm banks, botanical gardens, Zoos, animal orphanages etc;

requires NEMA, in consultation with the lead agency, to ensure that species threatened with extinction which are conserved ex-situ are re-introduced into their native habits and ecosystems where the threat to the species has been terminated or where viable populations of the threatened species have been achieved.

Ex-situ conservation is also being encouraged on private land including farms, for example, medicinal plants and endangered tree species, as well as wildlife ranching in areas where wildlife still exist on private land. This form of conservation is, however, still relatively undeveloped and a lot is still to be done to evolve sustainable policies and practices.

Preservation and maintenance of knowledge and practices of indigenous and local communities whose lifestyle are relevant for conservation and sustainable use of biological diversity.

This provision is contained in article 10 of the Convention. Uganda is encouraging use of indigenous knowledge in utilisation and conservation of biodiversity resources, for example integration of traditional medicines in the health sector. There is also increased concern about increased monocultural cropping in modern agriculture, which is weakening the traditional farmer's role in keeping a variety of crop and animal genetic resources on the farm. However most farmers are still keeping traditional crop and animal varieties on their farms in order not to lose the rich genetic resources that have been developed on their farms for generations. This presents a potential for on-farm conservation.

8.4 Impact Assessment and Minimising of Impacts (Article 14)

It provides that the impact assessment of human activities be part of the written EIA. It is now mandatory in Uganda that EIA is undertaken before any development project takes place. The full implementation of the EIA scheme in the Statute will result in minimising impacts of development activities on biological diversity. The national guidelines for EIA are now in place and EIA regulations are being drafted for presentation to parliament. While this provision is now being applied, it has not permeated down to community level.

8.5 Access to Genetic Resources (Article 15)

The issue of genetic resources and technological transfer are still complex, Uganda's genetic resources continue to be accessed by outsiders without

any due regulations and control. At present, researchers are using crop varieties to develop hybreeds with no clear arrangements for rewarding the farmer.

The NEMA Statute has attempted to strengthen Uganda's control over her genetic resources. The Statute allows NEMA, in consultation lead agencies, to issue guidelines and to prescribe measures for the sustainable management and utilisation of the genetic resources of Uganda for the benefit of its people.

The guidelines shall specify:

appropriate arrangements for access to the genetic resources of Uganda, by non-citizens and of Uganda including the fees to be paid for that access;

measures for regulating the export of germplasm;

the sharing of benefits derived from genetic resources originating from Uganda.

In general Uganda still has a long way to achieve significant success in the implementation of this area of concern.

8.6 Biotechnology and Biosafety (Article 16)

At national level in Uganda, a National Biosafety Committee has been put in place to handle biosafety issues and also advise Government on the same subject. This committee has formulated a Biosafety Bill which is almost ready for tabling before parliament.

The co-ordination of Biotechnology and Biosafety in Uganda is carried out by the National Council of Science and Technology. Biosafety guidelines have been drafted.

Clearly, the subject of biosafety is new to most Ugandans and there is urgent need to sensitise the policy makers and the general public on the subject and its importance if the country is to benefit from the current national and international efforts on the subject.

Access to and Transfer of Technology

Uganda being a developing country is more of a recipient requiring access to technology and biotechnology.

Uganda has experienced the same problems of higher costs and unfair terms of accessing technology. However, through technical and bilateral arrangement access to biotechnological packages especially in the agricultural sector have been possible. Access to technology has also been made in order to efficiently harness and utilise biological resources sustainably especially in the processing of agricultural/forestry products and medicinal extraction.

9. REFERENCES

Atlas of Uganda, 1967. Department of Lands and Surveys, Uganda.

Baguma R.K. (In prep.). some Aspects of the Ecology of the Nile Crocodile, *Crocodylus niloticus* in the Murchison Falls National Park, Uganda. M.Sc. Draft Dissertation.

Chapman, L.J., C.A. Chapman, R. Ogutu-Ohwayo, M. Chandler, L. Kaufman and A. Keither (In press). Refugia for endangered fishes from introduced predators: The recent history of Lake Nabugabo, Uganda. *Conservation Biology*.

Davies G. and E. vanden Berghe 1994. checklist of the Mammals of East Africa. East Africa Natural History Society, Nairobi.

Glowka, L., F. Burhenne-Guilmin and H. Synge, 1994. *A Guide to the Convention on Biological Diversity*. IUCN, Gland and Cambridge.

Langdale-Brown, I., H.A. Osmaston and J.G. Wilson, 1964. *The Vegetation of Uganda*. Government Printer, Entebbe.

Kasoma P. and D. Pomeroy (eds), 1996. *Biodiversity of the Sango Bay Area*, MUIENR, Kampala.

NBDB, 1997. Species lists for East Africa (electronic database) MUIENR, Kampala.

NBU, 1992. *Uganda Country Study on Costs, benefits and Unmet Needs of Biological Diversity Conservation*. Department of Environment Protection, Kampala.

NEAP, 1995. *The National Environment Action Plan for Uganda*. NEAP Secretariat, Ministry of Natural Resources, Kampala.

Pomeroy, D.E. (ed.) 1993. *Biodiversity in Uganda: An Overview*. MUIENR and UNEP/ACI.

Pomeroy, D. and H. Tushabe, 1996. *Biodiversity of Karamoja, Part One: Ground surveys: Results and Analyses*. A Report to the Ministry of Tourism, Wildlife and Antiquities by MUIENR.

Sharma, M.K. 1988. *Eco-floristic Zone Map of Africa*. FAO, Rome.

Smith, R.B., M. Infield, J. Otekat and N.T. Handler, 1995. *Review of the*

Multiple Use (Resource Sharing) Programme in Bwindi Impenetrable National Park. A Report for the CARE-DTC Project.

Stuart, S.N. and R.J. Adams, 1991. *Biodiversity in Sub-Saharan Africa and its Islands*. IUCN, Gland.

UNEP, 1988. *Strategic Resource Planning in Uganda: Natural Resources and Environment in Uganda*. Vol. V.

WWF, 1997. *Access to Genetic Resources and Benefit Sharing in Bwindi Impenetrable National Park (BINP).* A draft Report prepared for the World Wide Fund for Nature-Eastern Africa Regional Programme Office, Nairobi.