THE REPUBLIC OF UGANDA

FOURTH NATIONAL REPORT TO THE CONVENTION ON BIOLOGICAL DIVERSITY

NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY
MINISTRY OF WATER AND ENVIRONMENT

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TABLE OF CONTENTS

List of Figures

List of Tables

EXECUTIVE SUMMARY

Uganda is a land locked country which lies between latitudes and longitudes 4.2^0 N and 1.5^0S and 28^0E and 35^0W respectively. Its neighbours are Kenya to the East, Tanzania and Rwanda to the South and Southwest respectively, the Sudan to the North and the Democratic Republic of Congo (DRC) to the West. Uganda covers an estimated total area of 241,551km^2. Uganda is located in an area where seven of Africa's distinct biogeographic regions or phytochoria converge. Given Uganda's location in a zone between the ecological communities that are characteristic of the drier East African savannas and the more moist West African rain forests, combined with high altitude ranges, the country has a high level of biological diversity.

The total number of species in Uganda is not known although a provisional list of 18,783 exists. What is certain however is that the total number could be much higher than this figure since a large number of species have probably not yet been recorded. Uganda has been reported to harbour 7.5% of mammals, 10.2% of bird species, 6.8% of butterflies and 4.6% of dragonflies which are globally recognized. Uganda is also reported to have more species of primates than anywhere else on earth of similar area. Some components of biodiversity in Uganda (for example below ground biodiversity) are poorly known. Work on these groups is only in the initial stages, being carried out mainly by Universities and Research Institutes which are constrained by shortage of research funds. Improved knowledge of such elements of biodiversity could raise the country's biodiversity importance far higher than reported above.

Uganda's rich biodiversity is distributed across both terrestrial and aquatic habitats. Most of the biodiversity can be found in natural forests, but a considerable amount is also found in other natural ecosystems such as mountains, savannahs, wetlands, lakes and rivers. However, the biodiversity has over the years been subjected to various threats and current estimates show that the country is losing its biodiversity at the rate of 1% per year due these threats. Since the early 1990s, Uganda has made tremendous effort to address these threats through national initiatives and also through international cooperation including ratification of the Convention on Biological Diversity (CBD) on 8th September 1993.

This fourth National Report to the CBD describes the measures taken by Uganda to implement the various Articles of the Convention and especially through implementation of the National Biodiversity Strategy and Action Plan (NBSAP) and the progress it has made towards the CBD's 2010 target and implementation of its Strategic Plan. Chapter I gives an overview of biodiversity status, trends and threats, Chapter II assesses the status of implementation of the NBSAP, Chapter III addresses the level of integration of biodiversity considerations in national and sectoral plans and policies while Chapter IV concludes by giving the progress Uganda has made towards the 2010 target and implementation of the CBD's Strategic Plan.

The major natural biodiversity ecosystems in Uganda include mountains, forests, savannahs, wetlands and freshwater (aquatic) ecosystems (lakes and rivers) while modified ecosystems include agro ecosystems, forest plantations and various urban systems such as urban agriculture. These ecosystems and the species they contain are frequently subjected to various threats such as over-harvesting and exploitation of

biological resources, population pressure and habitat conversion/degradation, encroachment and changes in land use (including degazzettement), soil erosion, invasive alien species (IAS), oil and gas exploration, illegal exploitation and cross border trade in natural products, climate change, environmental pollution and armed conflicts, civil unrest and refugees. Agro-ecosystems are also negatively impacted on through replacement of local breeds or varieties by introduced ones, loss or neglect of traditional varieties, genetic erosion of indigenous plant genetic resources due to changes in land use as well as through the introduction of genetically modified organisms (GMOs).

The implications of biodiversity loss attributed to these threats are phenomenal considering that the services and products provided by biodiversity in form of ecosystems and species constitute billions of Uganda shillings per year to the national economy. In addition to direct gains in government revenue, biodiversity resources also support some of the poorest and most vulnerable sectors of Uganda's population. The rural people, the landless and women are highly dependent both on biological resource utilization, and on the diversity of resources that provides them with choice and fall back in times of drought, unemployment or other times of stress. The exact economic value of these biodiversity and ecosystem services is complex and controversial to calculate but past estimates put the gross economic output attributable to biological resource use in the fisheries, forestry, tourism, agriculture and energy sectors to be around US$ 546.6 million a year and indirect value associated with ecosystem services and functions to be over US$ 200 million annually, which for a least developed country like Uganda, cannot be underestimated. It is for this reason that the Government of Uganda has over the years taken concrete steps to ensure that conservation and sustainable management of biological resources are promoted. These steps include, *inter alia*, the adoption of the National Environment Action Plan (1995), the promulgation of the 1995 Constitution which has very strong provisions for sustainable biodiversity and natural resource management, the enactment of the National Environment Act, the Uganda Wildlife Act, National Forestry and Tree Planting Act, as well as the development the National Environment Management Policy (1994) and several sectoral policies such as the Wetlands Policy 1994, Wildlife Policy 1996, Fisheries Policy 2000, Forest Policy 2001,the National Energy Policy 2000 and National Biotechnology and Biosafety Policy (2008), among others. Details of these policies, laws and plans are discussed in Chapter 3.

While the NBSAP, which was formulated in 2002, is also intended to address threats to Uganda's biodiversity, it has also contributed significantly to the implementation of the three objectives of the Convention, the Thematic Programmes of Work and Cross-cutting Issues of the CBD and achievement of the CBD's 2010 target and its Strategic Plan. Some of the concrete results achieved from implementation of the NBSAP since its formulation include improved collaboration between the CBD National Focal Point and the Focal Points of other international conventions; formation of a Biodiversity Conservation Coordination Initiative to promote inter-sectoral collaboration; enhanced implementation of PA activities, establishment of a National Biotrade Programme, formulation and enactment of Regulations on Access to Genetic Resources and Benefit Sharing, establishment of biodiversity information sharing mechanisms, initiating the development of indicators for biodiversity and the preparation of a National Invasive Species Strategy and Action Plan.

The NBSAP has also facilitated the involvement of local communities in biodiversity management, integration of indigenous knowledge and practices in biodiversity conservation and the promotion of public awareness on biodiversity. Progress in the area of Biotechnology and Biosafety in Uganda has also largely been achieved through the NBSAP. The major obstacles to effective implementation of the NBSAP are:

a) Inadequate financial resources for implementation of planned activities and programmes.

b) Inadequate human and infrastructure capacity in relevant fields of biodiversity conservation for example taxonomy, capacity to carry out conservation and characterization of germplasm,

c) Lack of a central node/clearing house mechanism to facilitate information sharing among institutions involved in biodiversity conservation.

d) Limited documented information on indigenous farm animal genetic resources including physical characteristics.

e) Inadequate enforcement and compliance to environmental legislations;

f) Insufficient information on economic value of protected areas and fragile ecosystems like wetlands, hilly and mountainous areas, and rangelands, among others.

g) Inadequate managerial and technical capacity at the District and lower local Government levels for implementation of NBSAP.

The NBSAP has not been the only avenue for implementation of the various articles of the CBD. The objectives of the Convention have also been integrated in Uganda's policies, laws, plans and programmes. Some of the policies which have specific biodiversity issues mainstreamed include the National Environment Management Policy, National Fisheries Policy, Energy Policy, Tourism Policy, National Policy on Biotechnology and Biosafety, Wetlands Policy, Wildlife Policy and the National Forest Policy, among others. Major laws include the Constitution of Uganda, the Land Act, the National Forestry and Tree Planting Act and the Wildlife Act. These policies and laws are generally implemented through sector plans and programmes such as the Wetland Sector Strategic Plan, the National Forest Plan, the National Forestry Authority Business Plan, Uganda Wildlife Authority Strategic Plan and the Land Sector Strategic Plan.

Uganda also addresses biodiversity issues through regional and other international conventions such as the Lusaka Agreement, the Convention on International Trade in Endangered Species of wild flora and fauna (CITES), the United Nations Framework Convention on Climate Change (UNFCCC), the United Nations Convention to Combat Desertification (UNCCD), the Ramsar Convention on Wetlands, the Convention concerning the Protection of World Cultural and Natural Heritage and the African Convention on the Conservation of Nature and Natural Resources, among others.

Although Uganda continues to make a significant contribution to reducing biodiversity loss for the benefit of the country and the international community, the country still faces a number of policy and legal challenges. In terms of legislation, the most significant challenge is one of inadequate enforcement due to staff constraints. Some of policies still need be harmonized with the provisions of the National Environment Management Policy to enhance and strengthen issues on conservation of biodiversity particularly policies on urban planning and development. This will provide a stronger foundation for long term biodiversity conservation and benefits. In addition, there have been instances where high population growth and densities around highly biodiverse forest reserves have led to a spillage of settlements into the PAs.

The policy and legal mechanisms for wildlife conservation outside PAs is still weak and needs to be strengthened leading to loss of biodiversity. Thus management of wildlife outside protected areas remains a big challenge to Government. Extensive deforestation on private, communal and (the former) public lands also poses another serious policy concern. About 70% of Uganda's forests are outside PAs, and is thus more prone to degradation due to lack of legal protection. It is because of this reason that there is noticeable extensive deforestation in non-gazetted tropical high forests, woodlands and bush lands caused by heavy and uncontrolled utilization, encroachment and over-harvesting. Indeed, deforestation and loss of biological diversity have been more extensive and severe outside the protected areas system. There are inadequate legal provisions to address the rampant overgrazing and poor farming techniques such as shifting cultivation common in some parts of Uganda such as the 'cattle corridor'. This contributes to extensive and unnecessary clearing of woody vegetation accompanied by a considerable amount of biodiversity loss.

During the sixth meeting of the Conference of the Parties to the Convention on Biological Diversity in its decision VI/26, Parties committed themselves to a more effective and coherent implementation of the three objectives of the Convention, to achieve by 2010 a significant reduction of the current rate of biodiversity loss at the global, regional and national level as a contribution to poverty alleviation and to the benefit of all life on earth.

Further to the above, the seventh meeting of the Conference of the Parties, in its decision VII/30 adopted a framework to facilitate the assessment of progress towards the 2010 targets and communication of this assessment, to promote coherence among the programmes of work of the Convention and to provide a flexible framework within which national and regional targets may be set, and indicators identified. The focal areas to base the assessment were identified as:

- Reducing the rate of loss of the components of biodiversity, including: (i) biomes, habitats and ecosystems; (ii) species and populations; and (iii) genetic diversity;
- Promoting sustainable use of biodiversity;
- Addressing the major threats to biodiversity, including those arising from invasive alien species, climate change, pollution, and habitat change;
- Maintaining ecosystem integrity, and the provision of goods and services provided by biodiversity in ecosystems, in support of human well-being;
- Protecting traditional knowledge, innovations and practices;
- Ensuring the fair and equitable sharing of benefits arising out of the use of genetic resources;

- Mobilizing financial and technical resources, especially for developing countries, in particular least developed countries and small island developing States among them, and countries with economies in transition, for implementing the Convention and the Strategic Plan;

Uganda has made significant progress regarding these focal areas. The protection of habitats and ecosystems are being implemented through various approaches. Within PAs for example, there are specific areas designated as Strict Nature Reserves. Preparations are also in final stages to increase the PA coverage by adding fresh water ecosystems which were originally under-represented in the existing PA system. A total of 11 Ramsar Sites receiving special protection have now been gazetted with a total surface area of 307,756 hectares. Area under coniferous plantations is also increasing at an average rate of 0.1% per year with respect to its 1990 level. There is a Fisheries Development and Strategic Investment Plan (2005) which considers identification, gazetting and protection of critical fish breeding areas on all major lakes in Uganda. Implementation of the Plan will mean more areas under biodiversity protection. In terms of species, mammalian populations are increasing from the 1970s level when many species were decimated due to lawlessness. For example nationally:

- elephant population has increased by over 100% from 550 in 1995 to 3,000 in 2004.
- buffaloes have increased by 61% from 7,000 in 1995 to 18,000 in 2004
- mountain Gorillas have increased by 8% from 292 in 1995 to 315 in 2002
- giraffe population has increased by 52% from 153 in 1995 to 320 in 2004
- chimpanzee population increased by 33% from 3, 300 in 1997 to 4,950 in 2003, Uganda has the highest Chimpanzee population in Africa.

Restoration of extinct mammals is also being undertaken. For example, the white rhino which became extinct in Uganda in the 1980s are being re-introduced into the country and presently 2 are at Uganda Wildlife Education Centre and 6 at Ziwa ranches in Nakasongola District.

Uganda strongly supports the principle of promoting sustainable use of biodiversity. For example, the management of PAs is governed under the principle of sustainable use. This is reflected in the relevant laws on Forestry, Wildlife and Fisheries. All the forest and wildlife PAs are supposed to be managed under management plans, prescribing how sustainable use will be ensured and enforced. The sustainable use of aquatic ecosystems and their resources especially fisheries is being emphasized these days, with the creation of no fishing zones and the use of Beach Management Units (with representatives from both government and the fisher communities) at every fish landing site to ensure adherence to the law and the principle of sustainable harvesting.

Uganda's biodiversity has for many years been negatively impacted on by alien invasive species including the Nile perch since the 1950s and the water hyacinth in the 1990s. The Nile perch (an introduced species) continues to be a threat to various fish species in Lake Victoria. An assessment has been carried out in the forestry, wildlife and agricultural sectors to identify key invasive alien species in Uganda and the areas that are affected. However, not much has been done yet regarding measures to eradicate them although some progress has been made through a GEF-UNEP regional project 'Removing Barriers to Invasive Plant Management in Africa' which is implemented by NARO. Through this project, an IAS Training Manual has been developed, efforts to

manage/control several species such as *Cymbopogon nardus, Senna spectabilis, Lantana camara and Parthenium hysterophorus* are on-going, extensive awareness on the impact of invasive alien species on biodiversity has been created and a National Invasive Species Strategy, Action Plan and Policy Guidelines for Uganda has been prepared.

In terms of protecting traditional knowledge, innovations and practices, a draft National Policy on Traditional Medicine and Medicinal Plants has been prepared by the Ministry of Health which integrates traditional medicine/medicinal plant products and practitioners into the commercial sector to enhance income at the individual, community and national level and improve health in the country. Uganda has a total of 56 local languages all of which are being encouraged and developed through deliberate government policy such as through encouragement of radio and TV programmes in the various languages in all government owned media as well as in some privately owned media. However, urbanization and globalization have tended to encourage only a few dominant languages over the multitude of other local languages.

During COP VI, the Parties, in Decision VI/26, adopted a Strategic Plan in which parties committed themselves "to a more effective and coherent implementation" of the CBD's three objectives to achieve the 2010 target. In terms of the Strategic Plan, Uganda strongly believes that the Convention is fulfilling its leadership role as a world leader in guiding the conservation of the planet's biodiversity. This was clearly demonstrated at the World Summit on Sustainable Development in 2002 in South Africa where the CBD took the lead on biodiversity issues after setting the 2010 target a few months earlier. Uganda is also of the opinion that the CBD is playing an active role in promoting cooperation between other international instruments such as the UNCCD, UNFCCC and Ramsar. At the national level, Uganda sees more cooperation now than ever before between the National Focal Points of other Conventions including UNFCCC, UNCCD CITES, CMS and Ramsar. There is also a lot of cooperation at the regional level especially among the three East African States of Uganda, Kenya and Tanzania.

In terms of the Cartagena Protocol on Biosafety, Uganda has put in place the National Focal Points, a Competent Authority and a National Bio-safety Committee. No commercial releases of living modified organisms (LMOs) have been carried out as yet though some confined field trials have been approved. The National Biotechnology and Biosafety Policy has been passed by Cabinet while the National Biotechnology and Biosafety Bill is in its final stages of approval. Capacity building activities have been on-going since the 1990s to date, supported by different international and bilateral donors and the Uganda government. Uganda compiled and submitted its first National Report on the Cartagena Protocol, which was submitted to the CBD in 2007 as required.

While it can be acknowledged that Uganda has made considerable progress in implementing the three objectives of the convention and towards achieving the CBD's 2010 target and the strategic plan of the Convention, especially through the NBSAP, there are still many gaps that need to be addressed, including:

- Inadequate use of biodiversity indicators for measuring status and trends of biodiversity
- National biodiversity targets to addressing the Goals of the 2010 target needs to be developed

- Inadequate financial, human, technical resources
- Inadequate attention to biodiversity outside PAs
- Existing scientific and traditional knowledge not fully utilized
- Poverty among the Ugandan population and their dependence on natural resource use
- Population pressure on biodiversity rich ecosystems
- Inadequate law enforcement

Support to these deficient areas are constrained by inadequate knowledge of economic and non-tangible biodiversity values; limited capacity for ecosystem management by local communities, local authorities or private owners; inadequate funding for research, capacity building, outreach activities and education; inadequate manpower, poor infrastructure such as laboratory facilities and the underlying factors such as poverty and the fast growing human population. Adequate support in these areas would go a long way in providing Uganda with a conducive environment for meeting its obligations under the Convention.

ACRONYMS

ABS	Access to Genetic Resources and Benefit Sharing
ACODE	Advocates Coalition for Development and Environment
BCCI	Biodiversity Conservation Coordination Initiative
BMU	Beach Management Unit
CBD	Convention on Biological Diversity
CBO	Community-based Organization
CEPA	Communication, Education and Public Awareness
CFR	Central Forest Reserves
CITES	Convention on International Trade in Endangered Species of Fauna and Flora
COP	Conference of the Parties
CSO	Civil Society Organization
DDP	District Development Plan
DFS	District Forestry Service
DRC	Democratic Republic of Congo
EAC	East African Community
EIA	Environmental Impact Assessment
EU	European Union
FAO	Food Agriculture Organization
FD	Forest Department
FIRRI	Fisheries Resources Research Institute
GDP	Gross Domestic Product
GEF	Global Environment Facility
GHG	Greenhouse Gas
GIAN	Geneva International Academic Network
GMO	Genetically Modified Organism
GSPC	Global Strategy for Plant Conservation
GTI	Global Taxonomy Initiative
IAS	Invasive Alien Species
IBA	Important Bird Areas
IBRD	International Bank for Reconstruction and Development
IGAD	Inter-Governmental Authority on Development
IUCN	World Conservation Union
LMO	Living Modified Organism
LVEMP	Lake Victoria Environment Project
MFNP	Murchison Falls National Park
MIST	Management Information System
MTA	Material Transfer Agreements
MTTI	Ministry of Tourism, Trade and Industry
MUIENR	Makerere University Institute of Environment and Natural Resources
MWLE	Ministry of Water, Lands & Environment
NAADS	National Agricultural Advisory Services
NAPA	National Adaptation Programme of Action
NARLI	National Agriculture Research Laboratories Institute
NARO	National Agricultural Research Organisation

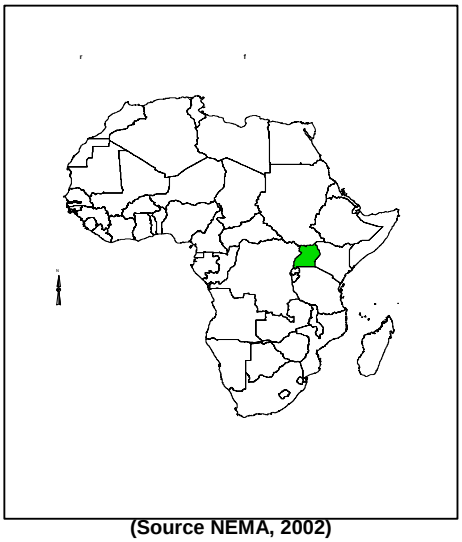
NBSAP	National Biodiversity Strategy and Action Plan
NCSA	National Capacity Needs Self-Assessment
NDP	National Development Plan
NEAP	National Environment Action Plan
NEMA	National Environment Management Authority
NFA	National Forestry Authority
NFP	National Focal Point
NGO	Non-Governmental Organizations
NISSAP	National Invasive Species Strategy, Action Plan
PA	Protected Area
PEAP	Poverty Eradication Action Plan
PGR	Plant Genetic Resources
PGRFA	Plant Genetic Resources for Food and Agriculture
PIF	Project Identification Form
PMA	Plan for Modernization of Agriculture
QENP	Queen Elizabeth National Park
RAF	GEF Resource Allocation Framework
SOE	State of Environment Report
UBOS	Uganda Bureau of Statistics
UNCCD	United Nations Convention to Combat Desertification
UNCST	Uganda National Council for Science and Technology
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
USAID	United States Agency for International Development
UWA	Uganda Wildlife Authority
UWS	Uganda Wildlife Society
WMD	Wetlands Management Department
WWF	World Wide Fund for Nature

CHAPTER 1: OVERVIEW OF BIODIVERSITY STATUS, TRENDS AND THREATS

1.1 Uganda and its unique biodiversity

Uganda is a land locked country which lies between latitudes and longitudes 4.2^0 N and 1.5^0S and 28^0E and 35^0W respectively. Its neighbours are Kenya to the East, Tanzania and Rwanda to the South and Southwest respectively, the Sudan to the North and the Democratic Republic of Congo (DRC) to the West (shaded in green in Fig.1 below). Uganda covers an estimated total area of 241,551$km^{2.}$

Fig. 1: Location of Uganda in Africa



(Source NEMA, 2002)

Uganda is located in an area where seven of Africa's distinct biogeographic regions or phytochoria converge (White, 1983). Given Uganda's location in a zone between the ecological communities that are characteristic of the drier East African savannas and the more moist West African rain forests, combined with high altitude ranges, the country has a high level of biological diversity. The total number of species in Uganda is not known although a provisional list of 18,783 (NEMA, 2006) exists. What is certain however is that the total number is greater than this figure and that a large number of the species have probably not yet been recorded.

Although the country covers just 241, 551 km^2 and accounts for only 0.18% of the world's terrestrial and freshwater surface, Uganda has been reported to harbour 7.5% of mammals, 10.2% of bird species, 6.8% of butterflies and 4.6% of dragonflies which are globally recognized (NEMA, 2007). In two Ugandan forests only (Bwindi Impenetrable and Kibale National Parks), Ipulet (in prep.) recorded 173 species of polypore fungi, which is 16% of the total species known from North America, Tropical Africa and Europe. Uganda is also reported to have more species of primates than anywhere else on earth of similar area. For example, Kibale National Park covering 760 Km^2 has 12 species of primates. Some components of biodiversity in Uganda (e.g. belowground biodiversity) are poorly known. Work on these groups is only at the initial stages, being carried out

mainly by Universities and Research Institutes which are constrained by shortage of research funds. Improved knowledge of such elements of biodiversity could raise the country's biodiversity importance far higher than reported above.

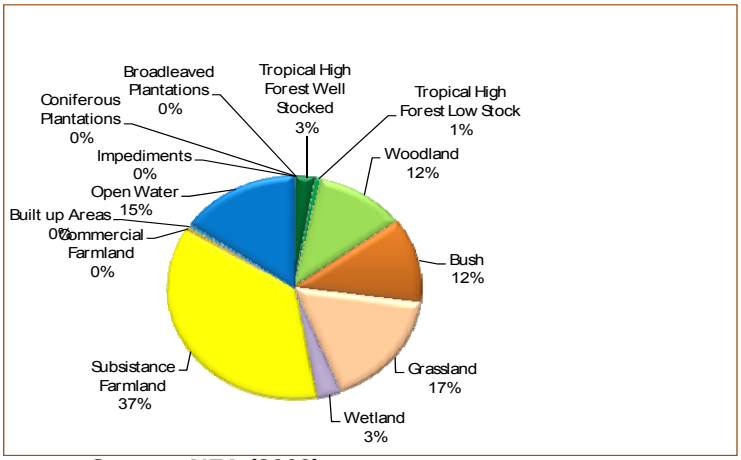
The ratification of the Convention on Biological Diversity (CBD) by Uganda in September 1993 was a formal recognition by the Government of Uganda of the new opportunities offered by the Convention for closer international cooperation and for pursuing the integration of the Convention's objectives within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

This fourth National Report to the CBD describes the measures taken by Uganda to implement the various Articles of the Convention and especially through implementation of the National Biodiversity Strategy and Action Plan (NBSAP) and the progress it has made towards the CBD's 2010 target and implementation of its Strategic Plan. Chapter I gives an overview of biodiversity status, trends and threats, Chapter II assesses the status of implementation of the NBSAP, Chapter III addresses the level of integration of biodiversity considerations in national and sectoral plans and policies while Chapter IV concludes by giving the progress Uganda has made towards the 2010 target and implementation of the CBD's Strategic Plan.

1.2 Biodiversity at the ecosystem level

Analyses of biodiversity in Uganda have relied on either the National Biomass Study map with 13 landscape categories (FD, MWLE, 2003) or the earlier **analysis by Langdale-Brown et al. (1964) which determined 22 main vegetation** types (with 96 subtypes) in Uganda. The country (both land and water) covers an estimated total area of 241,551km^2 out of which farmland is the most extensive, followed by grasslands, woodlands, water bodies, bush lands, tropical high forests, in that order (Figure 2). The area of wetland, given below as 3%, only represents the proportion which is papyrus swamp but actual total area of wetlands in the country including those on farmland, forests and woodland is13% (see section1.2.4).

Fig. 2: The National Land cover composition showing percentage of key ecosystems

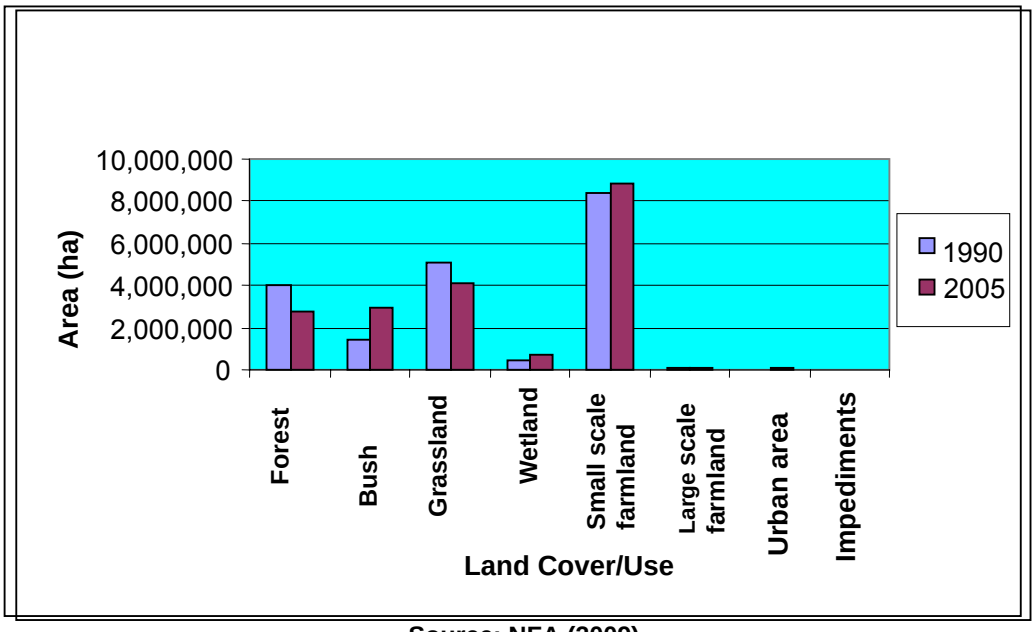


Source: NFA (2009)

Despite its small size, Uganda has an extraordinary amount of diversity in both terrestrial and aquatic habitats. It has the mighty Nile River, punctuated by various falls e.g. the Bujagali Falls (where white-water rafting is now conducted), Karuma Falls and Murchison Falls. The ecosystems range from the snow-capped peaks of the Rwenzori Mountains (Mountains of the moon), the Virunga Volcanoes and Mount Elgon to high altitude montane forests, to the open waters of Lakes Victoria, Albert and others, to the islands of Lake Victoria and Bunyonyi. There are several forest-fringed crater lakes that stud the rift valley floor and escarpment around the landscapes of Rwenzori Mountains and Queen Elizabeth National Park in the western part of the country.

Over time, a high proportion of the vegetation of Uganda has been modified by cutting, cultivation, burning, grazing and other anthropogenic actions, and many of these vegetation types have been significantly reduced in quality and range over time. The National Biomass Study (1996) shows how much this has changed and what remains. The situation has no doubt deteriorated further from the natural state since 1990 except for bushland (partly due to overgrazing of rangelands) and small scale farmland (due to the ever increasing human population) (Figure 3).

Fig. 3: Changes in land cover from 1990 to 2005



Source: NFA (2009)

Most of Uganda's biodiversity can be found in natural forests, but a considerable amount is found in open waters, wetlands and dry/moist savannah. The easiest place for measuring biodiversity richness is at the ecosystem level. Box 1 shows the range of Uganda's ecosystem biodiversity; while Box 2 some of the country's hotspots.

Box 1 Major biodiversity ecosystems in Uganda

Natural Ecosystems

- Mountains - high altitude moorland and heath,
- Forests – high altitude forests, medium altitude forests, woodlands
- Savannah – composed of thickets, dominating the drier areas of the country
- Wetlands – areas with impeded drainage, papyrus and grass swamps
- Freshwater (aquatic) – five major lakes, 160 minor lakes and extensive river systems

Modified ecosystems

- Agro-ecosystems – agriculture and agro-pastoral systems
- Forest plantations – of indigenous and exotic species
- Urban systems – at various urban centres

Box 2 Biodiversity hot spots in Uganda in terms of species richness

- **Mgahinga Gorilla National Park and Bwindi Impenetrable National Park –** the mountain gorilla (*Gorilla gorilla berengei*) and other regionally and globally endemic species

- **The Albertine Rift region including Rwenzori Mountains National Park –** It harbours more species of vertebrates than any other region on the African continent. This region also shelters more than half of continental Africa's bird species. There are more endemic mammals, birds and amphibians found in the Rift than any other site in continental Africa. Conservation International recently listed the Albertine Rift as one of the world's most endangered areas, based on levels of species endemism and rates of habitat destruction. Three fish species (*Varicorhinus ruwenzori* (a cyprinid), *Microcteriopoma damasi* (an anabantid) and *Hypsopanchax modestus (*a cyprinodontid) are Albertine Rift endemics.

- **Sango bay Ecosystem -** The Sango Bay ecosystem is comprised of a system of wetlands and forests in southern Uganda (Rakai District). It borders Lake Victoria and contains 14% of Uganda's fish species and 41% of its bird species. At the mouth of Kagera River (partly in Tanzania and partly in Uganda) the forests contain *Podocarpus* spp. and other species usually restricted to montane forests.

- **Kibale National Park – globally and regionally endemic species, primate species richness e.g. chimpanzees**

- **Dry mountains of Karamoja (Napak, Morungole, Kadam, Timu and Moroto) –** The area has thirty known regional endemic species of birds, among them the globally-threatened Karamoja Apalis (*Apalis karamojae*), and several endemic species of butterflies (*Papilio nobilis*, *Charaxes smaragdilis elgonae*). Most of these parts of the country have been insecure, but peace is now returning.

- **Lake Victoria and others –** Lake Victoria is the world's largest tropical freshwater lake and, until recently, supported 600+ endemic haplochromine cichlids (a group of fishes in the perch family) including Nile **perch species (alien species invasion)**. Lakes George and Edward, both international lakes, as is Lake Victoria, support 79 species of fish.

- **Mount Elgon National Park –** contains regional endemics

- **Lake Kyoga Satellite lakes –** until the 1950s, the fish fauna of the Kyoga basin lakes (Omuno, Gawa, Bisina, Opeta, Nakuwa, Nawampasa, Gigati, Aibapet, among others) were generally similar to the Lake Victoria fish species (Beadle, 1959). Due to increased fishing pressure, the fish species composition has changed in both Lake Victoria and Lake Kyoga. The Kyoga Satellite Lakes continue to support about 40 haplochromine fish species 14 of which were originally present in Lake Victoria and main Lake Kyoga during the pre-perch era.

- **Papyrus swamps of Lake Edward, George and Bunyonyi –** have endemic papyrus (Chloropeta gracilirrostris)

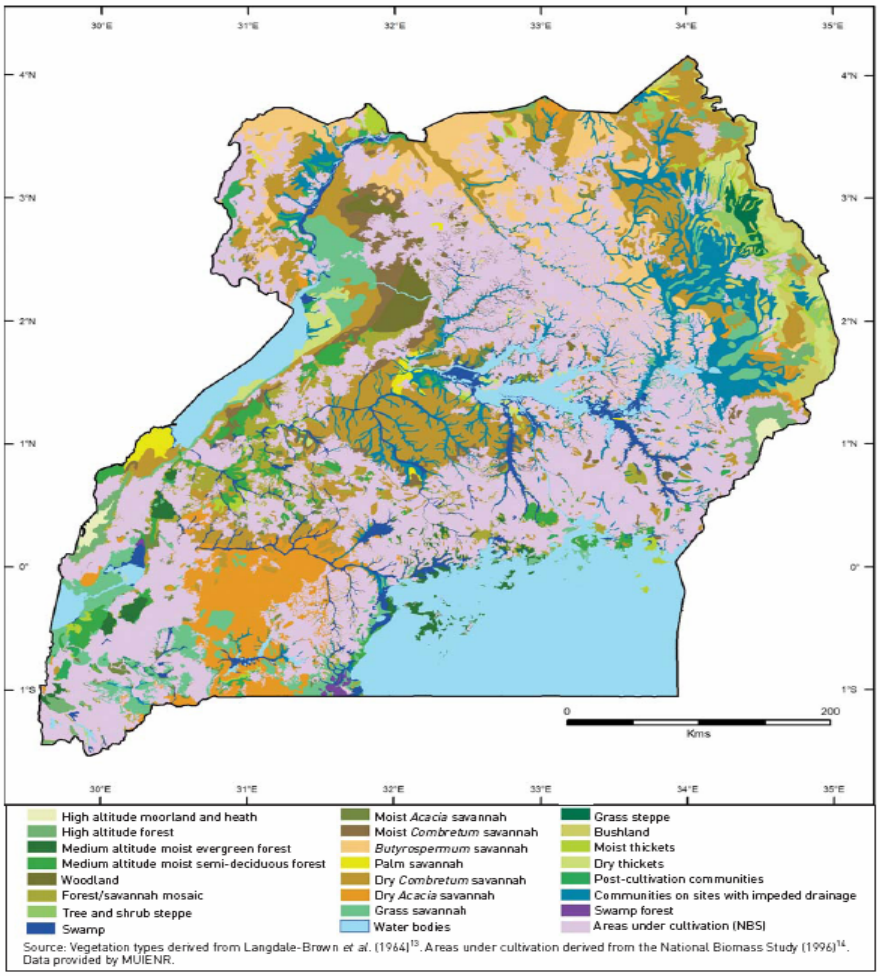
- **Ramsar sites –** Uganda has 11 wetlands scattered throughout the country which have been designated as Ramsar sites with special protection, containing many bird and other species

- **Important Biodiversity Areas (IBA) –** The IBA concept focuses on the conservation of birds and their habitats. Uganda has 32 IBAs comprising of National Parks, Forest Reserves, Wetlands/Ramsar sites, and land under private ownership. Conservation of IBAs in Uganda is based on the four pillars of conserving species, sites and habitats while involving site support groups.

1.2.1 Mountains

Uganda has a number of high mountains including the Rwenzori massif, which rises to an altitude of 5120 metres, being the highest in Uganda and the 3rd highest in Africa. There are also Mounts Elgon, Moroto and Napak, among others. All mountains in Uganda rising above 2800 metres are accorded a Protected Area status either as National Parks or as Forest Reserves. This has been the case since colonial times, due to their importance as water catchment areas for underlying areas and the need to protect the fragile soil on the steep slopes from erosion. Consequently, most of them still have reasonable areas of intact natural vegetation cover which is inhabited by different species of animals.

Fig. 4 Map showing some of Uganda's ecosystems and land use types



Source: Cottray *et al.* (2006)

Threats to Mountain Biodiversity

- Human encroachment on the lower slopes for extension of cultivation and livestock grazing
- Uncontrolled exploitation of natural resources
- Pollution mainly resulting from tourists' improper disposal of waste

- Global warming leading to climate and habitat change
- Seasonal fires in the montane grasslands and woodlands
- Hunting of the wild animals for food and cultural purposes
- Deforestation for fuel wood

1.2.2 Forests

Forests are widespread in Uganda and include high altitude forests, medium altitude moist green and semi-deciduous forests. Uganda has forests in protected areas managed by NFA (Central Forest Reserves), UWA (National Parks and Game Reserves), Local Governments (Local Forest Reserves) and forests outside protected areas under management of private owners. The main functions of the forests are ecological, for biodiversity protection as well as for the production of goods and services to meet economic and social needs of Ugandans.

The Forestry Policy 2001 defines the Permanent Forest Estate (PFE) as 'land that is set aside for forestry activities in perpetuity'. This is forest land which is held in trust by Government for the people of Uganda. It is composed of 1.9 million hectares, representing about 5% of the total land area of Uganda. It includes Central Forest Reserves (CFRs), Local Forest Reserves (LFRs) and forested areas in National Parks. The main functions of the PFE are ecological and biodiversity protection as well as the production of goods and services to meet economic and social needs of Ugandans. The remaining forests covering approximately 10% of total land area (or 70% of all forests in the country) are regarded as forests outside protected areas.

Natural forest types include those found at higher and lower altitudes and those with various plant compositions ranging from primarily evergreen to deciduous to bamboo forests. Various forest specialist species of conservation concern are associated with the various forest types. For instance, mountain gorillas are found only in the higher altitude evergreen forests of the Albertine Rift. The Albertine rift endemic fish *Varicorhinus ruwenzori* has been recorded almost exclusively in aquatic habitat within forested sites of Bwindi Impenetrable National Park (Kasangaki, in prep.). A variety of endangered and rare bird species are forest specialists that are closely associated with only one particular forest type. Bennun et al. (1996) estimated that 187 of Uganda's 1012 bird species (NEMA, 2007) are forests specialists. As more and more forested land is converted to plantations such as the palm plantations on the Bugala Islands in Lake Victoria, more and more forest specialist species disappear.

If the extent of forest cover (including tropical high forest and woodland) is taken as a proxy for Uganda's biodiversity, then the country has registered a significant loss. Drastic changes in the forest cover have taken place in Uganda during the last century. In 1890, forests covered approximately 10,800,000 hectares or 52% of Uganda's surface area. By 1996, forest cover had declined to about 20% and further to around 15% by 2005.

Table 1 shows the changes in forest cover between 1990 and 2005. Over this period of 15 years, the average rate of deforestation was 1.8%, with the Tropical High Forest (THF well stocked) registering the lowest rate of 0.5%. The reduction in the forestry cover has negatively affected the supply of forest products and services, resulting in social stress. The livelihoods of Ugandans have also been negatively affected partly as a result of this decline in vegetation cover. Growth in monetary agricultural food production declined from 1.7% in 2004/05 to 0.9% in 2005/06 largely due to nutrient depletion and unpredictable climate variations. In terms of plantations, the increased acreage of Pine and other coniferous species is gradually improving tree cover in the country although the loss of broad leaved trees such as Eucalyptus spp. is still high due to high demand for construction and other uses.

Table 1: Forest Cover Change (1990 – 2005)

Year/ Land cover/use	Broadleaved Plantations	Conifer Plantations	THF well stocked	THF low stocked	Woodland	Total Forest Cover
1990	18,682	16,384	651,110	273,061	3,974,508	4,933,745
2005	14,786	18,741	600,957	191,694	2,777,998	3,604,176
Change in Area	-3896	2357	-50153	-81367	-1196510	-1329569
Change in Area per year	-260	157	-3343	-5424	-79767.3	-88637.9
% Change in Area	-20.8%	14.4%	-7.7%	-29.8%	-12%	-26.9%
% Change per year	-1.4%	0.1%	-0.5%	-2%	-2%	-1.8%

Source: NFA (2009)

More serious degeneration of forest cover has taken place in the central districts of Uganda where there are intense economic activities like agricultural expansion, firewood and charcoal trade, furniture industry, and small-scale manufacturing industries (bakeries, brick making, etc). Virtually the only forests in these districts are those remaining in CFRs.

However, there was recovery in the forest cover within the CFRs in which there was sustained activity by the former Forestry Department (FD) and later, NFA. For example, NFA inventory records show that in Mabira, the formerly encroached areas were substantially restored with a young forest consisting of 46 tropical moist forest species, within 16 years after the encroachers left.

As the forests on private lands disappear, pressure is turned on PAs. For example, the trend in number of encroachers (for rural settlements, agriculture and urban expansion) in CFRs increased from 180,000 people in 2004/05 to 220,000 a year later (NFA, 2007). Forest management has been made difficult by encroachment in some CFRs like those in South Busoga, Mubende and Kiboga Districts. This has led to serious degradation of such forests as a result, the forests are badly degraded.

The drive to improve the management of forests on private lands is reflected through the development of technical guidelines for management of private and community forests, which have been prepared. However, more could be done to promote management of private and community forests because this is where the looming domestic energy crisis can be effectively reversed, nutrition & health improved, pressure on highly biodiverse forests relieved, and implementation of the government's water for production strategies supported. Unfortunately, the capacity of the District Forestry Services (DFS) is still inadequate.

Limited capacity in districts has contributed to poor control of access and exploitation of the private and community forests, and lack of systems for marketing of timber trees through open tendering, which is currently operational in plantation CFRs. Therefore, over-exploitation and creaming off of high timber value species is very common in these forests.

Threats to forest biodiversity

- Over harvesting – poor planning, weak enforcement of laws and inappropriate processing technology have resulted in unsustainable harvesting of forest products and the degradation of the resource base;

- Invasive alien species such as *Lantana camara* in Eastern Uganda and Senna in Budongo forest reserve in the North West;

- Encroachment – over the years there has been consistent clearance of forest cover for settlements, agriculture and grazing, urbanization and industrial growth among other uses;

- Human population pressure e.g. institutions such as schools, prisons rely almost exclusively on firewood for cooking as does 90% of the population;

1.2.3 Grasslands/Savannas

Grasslands/savannas cover more than 50% of the land area of Uganda and are dominated in different locations by species as diverse as grasses, palms or acacias. Much of this habitat has been converted to human use for agriculture and grazing. The remaining pockets of natural savannas and grasslands covering approximately three million hectares (Figure 3) are primarily found in various protected areas in Uganda. Savannas throughout Uganda were once the home to large populations of rhinoceroses, elephants, giraffes, antelopes, lions, wild dogs and the like. However, a few of these large mammals, such as black and white rhinos and wild dogs, are now considered to be extinct in the country due to over-exploitation in the past.

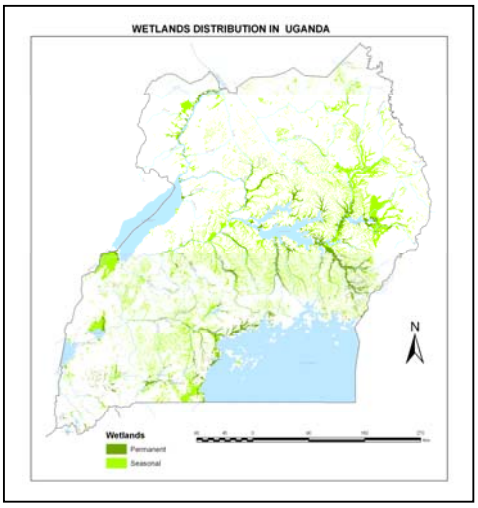
1.2.4 Wetlands

Uganda's wetlands cover about, 29,000 sq. km, or 13% of the total area of the country. They comprise swamp (8,832 sq. km), swamp forest (365 sq. km) and sites with impeded drainage 20,392 sq. km (Figure 5). They include areas of seasonally flooded grassland, swamp forest, permanently flooded papyrus, grass

swamp and upland bog. As a result of the vast surface area and the narrow river-like shape of many of the wetlands, there is a very extensive wetland edge.

There are basically two broad distributions of wetland ecosystems in Uganda: (a) the natural lakes and lacustrine swamps and the riverine and flood plain wetlands which are associated with the major river systems in Uganda. Wetlands also have intrinsic attributes, perform functions and services and produce goods of local, regional, national or international importance. Together, they represent considerable ecological, social and economic values.

Fig. 5: Wetland coverage and distribution in Uganda



Wetlands in Uganda are known to support some 43 species of dragon flies (of which 8 are known to occur in Uganda only); 9 species of molluscs; 52 species of fish, 48 species of amphibians, 243 species of birds, 14 species of mammals, 19 species of reptiles, and 271 species of macrophytes. 11 sites have been gazetted as Ramsar sites and as such are being given special protection. Apart from providing seasonal breeding and reproductive ground for various fish species including *Labeo sp.*, *Barbus sp., Clarias sp*., and *Mormyrus sp*., Uganda's wetlands also provide habitats for feeding endangered fish species.

The key threats to wetland biodiversity include:

Most wetlands in Uganda occur outside of protected areas, and their range and quality is rapidly being eroded for agricultural land. Other threats include:

- Unsustainable resource harvesting;
- Habitat loss through agricultural conversion, industrial development and burning; and
- Inadequate enforcement of legislation, regulations and compliance in wetlands use.

1.2.5 Freshwater (aquatic) ecosystem

Of the total area in Uganda, approximately 15.3% is open water. Open water is a category that includes major lakes such as Lake Victoria, Lake Kyoga, Lake Albert, Lake Edward and Lake George and over 160 smaller lakes, various stretches of the Nile River and rivers, streams and water bodies throughout the country. The most significant water body in Uganda is Lake Victoria, which is the second largest fresh water lake in the world and the cradle of the River Nile. Collectively, these water bodies contain one of the largest assemblages of diverse freshwater fish species in the world. In Lake Victoria alone more than 600 species of cichlid fish have been found, with as many as 102 species found in a single study of southern lake waters in the early 1990s (Arinaitwe, et al. 2000).

Other organisms which inhabit Uganda's freshwater ecosystems include invertebrates, molluscs and others. Some of these are either endangered or under threat due to habitat degradation and impact of introduction of alien species.

Threats to freshwater biodiversity

The natural state of some of the freshwater bodies in Uganda was negatively impacted upon by the introduction of exotic species, including the Nile perch and other fish species as well as the water hyacinth. The water hyacinth seemed to have been under control around 2000; however there are currently lots of resurgences of the weed in most aquatic systems. Agricultural runoff and clearing of the forest on Lake Victoria Islands continue to threaten the survival of several fish species in the lake. Other threats to the freshwater biodiversity include:

- Overexploitation of fisheries resources due to inadequate control of activities and harvesting methods;
- Improper fish resource exploitation methods;
- Introduction of invasive fauna and flora, such as the Nile Perch and water hyacinth;
- Degradation of habitat through pollution and conversion;
- Inadequate information of aquatic biodiversity such as on stock levels and taxonomy to guide sustainable exploitation, monitoring and conservation activities;
- Unlimited access to aquatic resources. The aquatic resources or fisheries are taken as a public resource;
- Lack of representation for both habitats and species conservation in aquatic ecosystems in the protected area system;
- Water level fluctuations in lakes;
- Resurgence of water hyacinth;
- Reduction of inshore wetlands (breeding and nursery grounds for fish)**.**

1.2.6 Biodiversity in Protected Areas

Protected Areas (covering approximately 16.3% of Uganda's total land area) include Central Forest Reserves (under National Forestry Authority), Local Forest Reserves (under Local Governments), National Parks and Wildlife Reserves (under Uganda Wild Life Authority). Approximately 47% of Protected Areas (PAs) are forestland and 37% grasslands. Wildlife is important to Uganda as a source of food and material, recreation, tourism, nature study and scientific research. Uganda's wildlife occurs in both protected areas and outside protected areas. There are currently three categories of PAs in Uganda. These are National Parks, Wildlife Reserves and Forest Reserves (Table 2).

Table 2: Extent of Uganda's protected areas by category

Category	No. of reserves*	Area (km^2)	%age of Uganda's land area
Forest Reserves	710	11,410**	5.8
National Parks	10	8,023**	4.1
Forest Reserve/National Parks	-	3,190	1.6
Wildlife Reserves	12	9,024**	4.6
Forest/Wildlife Reserves	-	420	0.2
Total	**732**	**32,067**	**16.3**

Note: * No. of reserves shown for each category includes those carrying dual status.
** Areas shown exclude reserves or parts of reserves carrying dual status.
Land area of Uganda is 197,096 km^2 (UBOS, 2004)

Loss of habitat is perhaps the most serious negative factor affecting protected areas and is certainly the most difficult to halt. For example, Mt. Elgon National Park, 8% (89 sq. km) of the national park habitat in Uganda is seriously encroached on. Given the high population growth in the country, many communities have ended up establishing farms and settlements very close to the boundaries of the PAs resulting in destruction of crops by wild animals especially elephants, hippos and buffalos.

Another important threat to wildlife areas involves illegal grazing in National Parks by local communities neighbouring the parks. This inevitably reduces the grazing capacity of the National Parks for wildlife.

It is also evident that over the years, the establishment of settlements in areas formerly exclusively inhabited by wild animals. Apart from blocking of migratory roués, the presence of statements at the fringes of National Parks has resulted in problems arising from competition for resources within the PAs. This is particularly evident in Semliki, Kidepo Valley and Lake Mburo National Parks. The latter two parks are affected by predominantly pastoral communities, where conflict is arising from competition for water and pasture, besides systematically killing off particularly carnivorous animals in order to protect livestock.

1.2.7 Biodiversity outside Protected Areas

The present policies and legislation for management of terrestrial biodiversity outside PAs is inadequate. The existing land tenure systems of land holdings, leasehold and customary holdings offer little incentive for protection and management of biodiversity outside PAs. Maintenance of habitats and species are at the mercy of individual land owners. While wildlife is under considerable pressure and requires more attention for conservation, a few areas outside the PA system with considerable populations of mammals have been identified in several rangelands in Uganda e.g. the former Ankole Ranching Scheme which has viable numbers of impala, zebra, waterbuck, bush pigs, buffaloes, warthogs, oribi, topi and hippos. Other areas in districts such as Kiboga and Luwero also have reasonable animal populations outside PAs.

As with animals, the status of plants outside PAs is not known for most species of woody plants. However, there are some restricted range species that are critical for example *Rytgyinia sp.* is confined to Iganga District in eastern Uganda whereas *Aloe tororoana* is only known on Tororo rock, an area of only a few hectares. *Phoenix reclinata* is highly vulnerable outside PAs, as it is heavily harvested as poles for fencing especially in 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. Shoreline vegetation, such as papyrus, *Vossia* and *Typha* which are under increasing threat from human activities, has been demonstrated to be quite important for fish biodiversity. Results of a few studies have been reported for other components of aquatic biodiversity such as phytoplankton, macrophytes and macro-invertebrates (Balirwa 1998).

1.2.8 Agro-ecosystems

Considering normal conditions and when compared to the rest of sub-Saharan Africa, Uganda is fairly well endowed with one of the most favourable climates for agricultural production. Temperatures over most of the country range between 15 – 35^0C all year round. Most of the country receives between 1,000 – 2,000mm of rainfall annually and this is usually well distributed and largely bimodal. It is, therefore, possible to grow two crops a year under rain fed conditions in most parts of the country. The soils, though weathered tropical soils liable to leaching, are able to support vigorous crop growth.

Despite the favourable climatic conditions, the area under cultivation in the country has fluctuated considerably over the past years for various reasons. There was a sharp rise in the area under cultivation between 1960 and 1979 from around 3.3 to 3.5 million ha. This was followed by a sharp fall between 1979 and 1980 from 5.7 to 3.5 million ha, primarily due to the prevailing civil war. The period 1980-1984 registered a slight increase in cultivated area followed by yet another decline between 1984 and 1985 also a result of civil war. Since then, there has been a steady increase in the area under cultivation due to improved security, macro economic stability and law and order (BOU, 2000). Current estimates indicate that Uganda has 7.2 million hectares of arable land under permanent crops or approximately 30% of the country's territory (ECA, 2005).

Crop production dominates Uganda's agricultural activities. Almost 70% of farm holdings are engaged in crop production as a principal activity and about 25% are engaged in mixed farming. Ugandan farmers grow both food and what are considered traditional cash crops. The main food crops include: cereals (maize, millet and sorghum); legumes (beans, field peas, cow peas and pigeon peas); oil seeds (sesame, groundnuts and soya); and root crops (sweet and Irish potatoes, cassava and yams). Traditional cash crops are coffee (Robusta and Arabica), cotton, tea and tobacco. Except for tea, which is mostly grown on large

plantations, subsistence producers grow the rest of the cash crops. As Uganda's exports are becoming increasingly diversified, due to trade liberalization policies of the Government, the distinction between food and cash crop is becoming less defined. Some traditional food crops such as sesame, beans and maize have become major cash crops. Ugandan farmers also keep a diversity of livestock on their smallholdings. Pastoralists in the 'cattle corridor' of central Uganda are the ones who are exclusively involved in cattle keeping.

Demographic projections by district suggest that as a country, Uganda will be depleted of land available for farmers around 2022 (Jorgensen, 2006). By region, eastern Uganda will run out of available land for agriculture earlier than the other regions by around 2010, while western and central Uganda will take longer. The northern region will be depleted of available land area for farmers as late as around 2020 despite its high population growth largely due to the relatively large unexploited agricultural land area (Jorgensen, 2006).

The main land-related environmental issues facing Uganda today is land degradation. Although some parts of Uganda remain relatively under-cultivated and not experiencing significant degradation problems, e.g. Gulu, Lira, Apac, Katakwi and Kitgum districts, the rest face serious land degradation problems. The main causes of land degradation are: high population growth rates; poor methods of cultivation, deforestation, bush burning, and overgrazing. These factors have had a negative impact on food production and hence food security.

Soil erosion

The principal manifestation of land degradation in Uganda is soil erosion, caused by surface runoff or wind where vegetation cover has been removed through clearing of land for agriculture, poor cultivation practices, and overgrazing. Soil erosion accounts for over 80% of the total cost of environmental degradation in Uganda, conservatively estimated at 4 -12% of gross national product (Slade and Weitz, 1991).

While there is some general appreciation of the magnitude of the soil erosion problem, unfortunately, existing policies and legislation are highly inadequate to address the problem. More over there is insufficient institutional capacity and lack of coordination and networking among the few existing institutions whose work relates to soil management and productivity, thus contributing further to degradation. The lack of awareness (among major land users) of appropriate soil management techniques, combined with poverty and demographic conditions that have characterized Uganda for the last three decades have also contributed to soil degradation. It is for the above reasons that the Government has prepared a draft National Soils Policy for Uganda which seeks to:

a) promote awareness on the current state of the country's soils, and the need for their rehabilitation and sustainable utilization;
b) transform existing mechanisms to establish a national framework with the mandate to ensure wise use and conservation of the soils for present and future generations;

c) promote optimal land use without necessarily compromising the environment through the use of soils;

d) establish a structure for continuous monitoring and assessment of Uganda's potential in terms of its soil properties and weather, soil degradation and then undertaking technical measures required to control it;

e) promote a coordinated institutional approach to resource (soil) management and policy implementation; and

f) promote a participatory approach in resource conservation and policy implementation.

Overgrazing

Overgrazing by traditional herders (pastoralists) is also contributing to land degradation. The pastoralists practice communal grazing, depend entirely on natural pasture, and keep as many animals as they are capable of handling often out of step with the carrying capacity of the area. The pastoralists do not practice proper pasture management, which results in overgrazing of the rangelands and their subsequent invasion by unpalatable grass species such as *Cymbopogon afronardus* and thorny bushes of *Acacia hockii*.

Uganda's rangelands occupy about 84,000km^2, situated in what is described as the 'cattle corridor' extending from the Ugandan-Tanzania border in the southwest through Mbarara, Mubende, Kiboga, Nakasongola and on to Kotido and Moroto in north eastern Uganda. The combination of increased human population growth, traditional nomadic sentiments of over-stocking and invasion by agricultural settlers has resulted in the over-utilization and irreversible damage of parts of Kotido, Moroto, Nakasongola, Nyabushozi and Kazo counties in Mbarara and Kabula and Kakuto counties in Rakai districts.

Bush burning

As a result of custom, culture or social habits, Ugandans living in predominantly rangeland areas engage in annual bushfires. The fires are set to encourage new growth for pasture. Fire can be an effective management tool if applied correctly and early enough. Otherwise, the fires tend to destroy valuable biological resources and encourage emergence of fire-resistant or fire-tolerant species which themselves may be invasive and not suitable for pasture.

Agrochemicals

Another cause of land degradation is pollution through the use of agrochemicals. To date, Uganda's agriculture is generally low-input low-yield technology. Nonetheless, as Ugandans move towards modern agriculture and the growing of high value crops, the use of agrochemicals is expected to increase.

1.3 Biodiversity at the species level

High ecosystem diversity would imply a high species richness as each 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 (Table 3), either because of their relative conspicuousness or economic importance. Little is known about the less conspicuous and lower but nonetheless important forms of life such as belowground biodiversity.

Table 3: Recorded flora and fauna species in Uganda

Taxon	Total no. of species in Uganda	% of global species	Number of globally threatened species in Uganda
Amphibians	86	1.7	10
Birds	1,012	10.2	15
Butterflies	1,242	6.8	-
Dragonflies	249	4.6	-
Ferns	386	3.2	-
Fish	501	2.0	49
Flowering plants	4,500	1.1	40
Fungi (polypore)	173	16	-
Liverworts	275	46	-
Mammals	345	7.5	25
Molluscs	257	0.6	10
Mosses	445	3.5	-
Reptiles	142	1.9	1
Termites	93	3.4	-
Other invertebrates	-	-	17

Source: NEMA (2007)

Because of various threats, several Ugandan species have qualified to be included on the IUCN Red lists (Table 4).

Table 4: IUCN Red list species

Conservation status	Taxon	
	Plants	Animals
EX-Extinct	0	34
EW-Extinct in the Wild	0	4
CR-Critically Endangered	3	27
EN-Endangered	4	31
VU-Vulnerable	33	72
LR/cd-Lower Risk/conservation dependent	1	18
NT-Near Threatened (includes LR/nt-Lower Risk/near threatened)	8	64
DD-Data Deficient	1	41
LC-Least Concern (includes LR/lc-lower risk, least concern)	10	1,562

Source: NEMA (2007)

1.3.1 The Status of mammals

Uganda is reported to have 345 species of mammals (NEMA, 2007) of which 13 species are designated as vulnerable. These include five primates, the chimpanzee (*Pan troglodytes*), crested mangabey (*Lophocebus galeritus*), L'Hoest's hamlym (*Cercopithecus L'Hoestii*), and the red colobus monkey (*Procolobus badius*). The other vulnerable species are Carruther's mountain squirrel (*Funisciurus carruthersi*), the cheetah (*Acinonyx jubatus*), and elephant (*Loxodanta africana*), all of which are threatened by forest destruction.

De Brazza's monkey (*Cercopithecus neglectus*) occurs in forests in eastern and western Uganda. This monkey's habitat is declining rapidly due to the intense pressure exerted by human activities. The common eland (*Tragelaphus oryx*) is a species that occurs in low densities in Lake Mburo and Kidepo National Parks. The bohor reedbuck (*Redunca redunca*) was once widespread but has now become confined mainly to conservation areas. The leopard (*Panthera pardus*) is confined to a few large forests and savannas areas, and it is threatened by forest loss, poaching and reduced abundance of prey species. The topi (*Pamaliscus lunatus*) has always been sparsely distributed but was mainly found in the southern sector of Queen Elizabeth National Park where its population underwent a drastic reduction due to poaching and habitat loss.

It has been reported that the northern white rhinoceros (*Ceratotherium simum cottoni*), the black rhinoceros (*Diceros bicornis*) and the African wild dog (*Lycaon pictus*) are all extinct although eight white rhinos have recently been re-introduced in Uganda from Kenya. Wildlife dogs once considered extinct have been sighted in Kidepo Valley National Park. Other extinct mammals include the bongo (*Tragelaphus eurycerus*) which formerly occurred in Mt. Elgon forest but was exterminated between 1913 and 1914; the white-bellied duiker (*Cephalophus leucogaster*) which is believed to have been present in Semliki has since disappeared; the bay duiker (*Cephalophus dorsalis*) was recorded once in the riverine forest below the western foothills of the Rwenzori mountains, but this area is so densely populated that the species cannot survive there; the okapi (*Okapia johnstonni*) was previously found in the Semliki forest but is now non-existent due to hunting; the giant eland (*Tragelaphus derbianus*) which used to occur in West Nile is believed to have been wiped out in the 1970s; and the steenbok (*Raphicerus campestris*) is extinct because its former habitat (Mbale district) is now heavily populated.

Other mammals whose status is not yet determined include: rare species like the cape clawless otter (*Aonyx capensis*) and the Congo clawless otter (*Aonyx congica*); species of indeterminate status like Rwenzori otter shrew (*Micropotamogale ruwenzori*) and long-tailed forest shrew (*Sylvisorex suncoides*); and, species of unknown status like Rodent Shrew (*Paracrocidura maxima*), Thomas' bush-baby (*Galago thomasi*) and Jackson's mongoose (*Bdeogale jacksoni*).

Although large mammal populations are still relatively low following decades of over-hunting when Uganda was in turmoil, the numbers of many of these species are gradually making a come-back Table 5.

Table 5: Population trends of some key mammal species

Species	1960s	1982-1983	1995-1996	1999-2003	2004 – 2006	Status in Uganda
Uganda kob	70,000	40,000	30,000	44,000	34,461	Population deceasing
Buffalo	60,000	5,000	18,000	1,800	30,308	Population increasing
Elephant	30,000	2,000	1,900	2,400	4,322	Population low, but slowly increasing
Hippopotamus	26,000	13,000	4,500	5,300	7,542	Population increasing slowly
Hartebeest	25,000	18,000	2,600	3,400	4,439	Population increasing slowly
Topi	15,000	6,000	600	450	1,669	Population increasing
Impala	12,000	19,000	6,000	3,000	4,705	Population low, but beginning to increase
Waterbuck	10,000	8,000	3,500	6,000	6,493	Population increasing
Burchell's zebra	10,000	5,500	3,200	2,800	6,062	Population increasing
Eland	4,500	1,500	500	450	309	Population low, may still be decreasing
Rothschild's giraffe	2,500	350	250	240	259	Population stable
Bright's gazelle	1,800	1,400	100	50	0	Very rare, precarious
Roan	700	300	15	7	0	Very rare, precarious
Oryx	2,000	200	0	0	0	Extinct in Uganda
Black rhino	400	150	0	0	0	Extinct in Uganda.
rhino	300	20	0	0	8	Originally extinct but 2 at UWEC and 6 in the sanctuary (Ziwa Rhino ranch)
Derby's eland	300	0	0	0	0	Extinct in Uganda

Source: Uganda Wildlife Authority (2008)

1.3.1 Birds

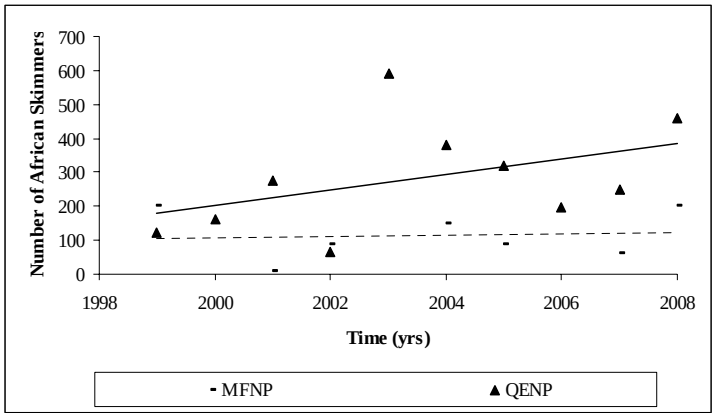
The avifauna are largely doing well in Uganda. However, of the more than 1,000 recorded species, Uganda has 15 threatened species at global level (NEMA, 2007); 10 are designated as vulnerable e.g. Blue Swallow and Grauer's Rush Warbler; 16 are near–threatened e.g. Shoebil, Lesser Flamingo and Fox's Weaver.

There are seven species that are designated as rare, the majority of which are forest species and are mainly threatened by forest loss. These include the African green broadbill (*Pseudocalyptomena graueri*) and chapin's flycatcher (*Muscicapa lendu*) which occur in Bwindi forest. The forest ground thrush (*Zoothera oberlaenderi*) which has been recorded only in Semliki forest is also threatened by disturbance. Rare non-forest species include the endemic papyrus yellow warbler (*Chloropeta gracilirostris*), which occurs in papyrus swamps around lakes Edward, George, Bunyonyi and Mutanda, and is threatened by habitat loss and disturbance. The migrant corncrake (*Crex crex*) is also threatened.

Other forest bird species that are rare or under threat due to forest loss and disturbance from hunting include: Nahan's francolin (*Francolinus nahani*) which is found in several forests in western Uganda and Mabira forest, and turner's eremomela (*Eremomela turneri*) which occurs in Nyondo forest in south-western Uganda. There are two species recognized by IUCN as vulnerable; that is Grauer's swamp warbler (*Bradypterus graueri)* and the peregrine falcon (*Falco peregrinus*). The former is a highland species which occurs in Mubwindi and Ruhiza swamps of Bwindi National Park and is threatened by wetland drainage.

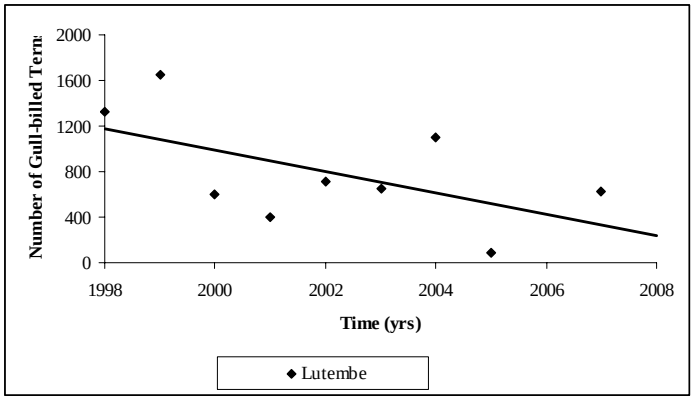
Data collected from Important Bird Areas (IBAs) in Uganda show wide variations in trends according to individual bird species and their habitats. Figure 6 shows the population of African Skimmers increasing in Queen Elizabeth National Park (QENP) but decreasing in Murchison Falls National Park (MFNP). On the other hand, Figure 7 shows the population of Gull-billed Terns on the decline in Lutembe bay near Lake Victoria.

Fig. 6: Trend of African Skimmers in QENP and MFNP



Source: Uganda IBAs, 2008

Fig. 7: Trend of Gull-billed Terns in Lutembe Bay



Source: Uganda IBAs, 2008

1.3.2 Fish

Uganda is estimated to have over 500 fish species (NEMA, 2007). During the early 1950s and 1960s, *Oreochromis niloticus, Oreochromis leucosticus, Tilapia zillii, Tilapia rendalli* and the predatory Nile perch (*Lates niloticus*) were introduced in Lake Kyoga and Victoria. The haplochromis and tilapia species are in the endangered category as result of increased predation by the introduced Nile perch. In addition, *Oreochromis esculentus*, Orvariabilis and Haplochromine cichlids, have been classified as endemic to the Lake Victoria system. In a 1990 survey, none of the species in the families Mustacembelidae, Amphilidae, Cyprinodontidae and Schilbeldae known to occur in Uganda's waters have been recorded (feared extinct).

1.3.3 Reptiles

Uganda has a total of 142 species of reptiles (NEMA, 2007) out of which are 103 species of snakes. Two species of crocodile are known to occur in Uganda; the Nile crocodile (*Crocodylus niloticus*) and the dwarf crocodile (*Osteolaemus tetraspis*). The Nile crocodile used to be quite widespread in Uganda but due to poaching, its numbers have seriously dropped to the extent that it is now in the vulnerable category. They are still found in significant numbers below Murchison Falls. Crocodiles have also been sighted on Lake Edward and along Kazinga Channel. Crocodiles outside PAs are highly persecuted and are unlikely to survive. There is very little information about the status of other reptiles such as snakes. Many reptile species occur under the forest and savannah/grassland ecosystems.

1.3.5 Amphibians

A total of 86 species of amphibians (NEMA, 2007) are known to occur in Uganda and out of these, 48 have been recorded in wetlands, with the rest existing under the forest or savannah/grassland ecosystems.

1.3.4 Higher Plants

As regards higher plants, there is some information but their status is much less known. Within the PA system, there are restricted range species that are critically endangered such as *Chassala ugandensis* from Kayoza Forest. Species that are endangered include *Sedum churchilliamum, Lobelia stuhlmanii* and *Alchemilla roccati* from Rwenzori National Park. In addition there are tropical timber species which occur in Uganda that have also been reported as threatened (exploited for commercial purposes) including Diospyros mespiloformis (african ebony), *Drypetes gerrardii, Entadrophragma cylindricum*, *Guarea cedrata, Khaya anthotheca*, *Khaya grandifoliala, Khaya senegalensis* (mahogany), *Funtamia africana* (bush rubber), *Ocotea usambarensis, Olea hochstetteri, Premna angolensis*, and *Vitex keniensis* but generally information on the status of higher plant species is inadequate.

1.3.5 Lower Plants

Lower plants are characterized by their lack of vascular tissue (the transport system for water and nutrients within higher plants). Under this category are bryophytes, lichens and algae. Lower plants have not been well studied in Uganda but it is known that some species found in the country can be used as food for both man and animals, while others have medicinal value. Examples of both higher and lower plants of medicinal value are given in Table 6 below.

Table 6: Examples of medicinal values of Uganda's biodiversity resources

Family	Species	Disease	Part used
Asteraceae	*Aspilia pluriseta*	Malaria	Roots
Cucurbitaceae	*Mukia maderaspatensis*	Infertility	Roots
Cyperaceae	*Mariscus squarrosus*	Male impotence	Whole plant
Leguminosae	*Sesbania sesban*	Gonorrhoea	Roots
Oxalidaceae	*Biophytum sensitinum*	Diabetes mellitus	Leaves
Polygonaceae	*Polygonum pulcheria*	Tropical ulcers	Roots
	Polygonum setulosum	Abdominal pain	Leaves
	Rumex bequaertii	Gastric ulceration	Roots
Umbeliferae	*Centella asiatica*	Peptic ulcers	Whole plant
Urticaceae	*Obetia pinnatifida*	Cough	Leaves
Zingiberaceae	*Aframomum sanguienum*	Intestinal worms	Shoots, seed

Source: WWF, 2005

1.3.6 Micro-organisms

These life forms are not visible to the naked eye and as such have attracted rather modest interest from both scholars and lay observers. Currently no exhaustive data can be given about their status. The ecology of these life forms is not well understood as they are so ubiquitous in distribution that delineating their habitats and hence, setting them aside for conservation is impossible. Their biological functions as primary, secondary and tertiary producers, however, are quite well understood, and are conceived as essential to the continued survival of both themselves and higher forms.

1.3.7 Agricultural biodiversity

Most agricultural biological diversity (agrobiodiversity) in Uganda is conserved on farm, owing to the diverse farming systems associated with different agro-ecological zones and associated farming systems. Subsistence and commercial farmland in Uganda cover a total area of about 8,469,445 ha (FD, MWLE, 2003) with an unspecified area of grasslands and woodlands also serving as rangelands for different species and varieties of domestic livestock, comprising of both improved breeds and traditional ones.

In terms of species, the major categories of agrobiodiversity in Uganda include soil biodiversity, plant genetic resources and domestic animal diversity.

Status of soil biodiversity

Little is known about the status of soil biodiversity in Uganda. However, the status of soil biodiversity is known to be largely determined by vegetation cover. Soils rich in biodiversity tend to support rich and diverse vegetation. Soil biodiversity is also determined by the nature and extent of agricultural systems. Intensive agriculture coupled with use of pesticides, fertilizers or pure crop monoculture tends to have great impact on soil biodiversity more than other agricultural practices. Some reports have estimated that there are some 730 species of soil microflora in Uganda with the various categories shown in Table 7 below.

Table 7: Major species of soil microflora in Uganda

Type	Genera	Species
Bacteria	92	137
Fungi	184	420
Algae	115	149
Nematodes	63	103

Source: Rwakaikara and Nkwiine (1998)

Threats to soil biodiversity

- Bush burning;
- Land and soil degradation due to poor farming methods.
- Soil erosion;
- Fertilizers, pesticides, fungicides and herbicides for production of vegetables, fruits, coffee, tea, tobacco, sugar cane, among others;
- Climate change

Status of Plant Genetic Resources

Of the estimated, 1,400 indigenous species in Uganda (many of whose potentials have not been exploited), 30 species are known to be endangered, 43 are rare and 10 are vulnerable (NBSAP, 2002). In addition, there are over 230 exotic species, some of which are very important to this country. Table 8 gives a broad summary of the conservation status of some of the PGR in Uganda

Table 8: The conservation status of PGR in Uganda

Conservation Status	Explanation
Exotic plants	58 families in 180 tree species; > 55 species of other plants, mainly ornamental and fruit trees/plants and vegetables.
Agricultural species	>200 species of non-cultivated edible plants, >……species of cultivated species (not known)
Indigenous Edible fruit trees	37 families represented by 75 species
Endangered species	30 species
Rare plants	43 Species
Vulnerable	10 Species

Source: NBSAP, 2002

Modern agriculture enforces use of improved cultivars but some farmers have retained their varieties and this form of in-situ on-farm conservation needs to be strengthened. The local communities are custodians of a lot of indigenous knowledge on PGR but documentation of this knowledge as well as inventories of the under exploited plants and location maps for further exploration are poorly developed in the country. A lot of genetic erosion of indigenous species are going on at an alarming rate as Uganda modernizes its agriculture with emphasis on exotic species and improved varieties. Populations of the once popular indigenous fruits and vegetables such as indigenous tomatoes are rarely seen nowadays.

Threats to PGR for food and agriculture

- Replacement of local crop varieties by introduced commercial varieties (e.g. nematode and disease resistant varieties of banana, cassava, maize, beans);

- Loss or neglect of traditional varieties, including crop wild relatives and landraces e.g. millet, cowpeas, pigeon peas, Lima and Bambara beans, and wild medicinal plants and local fruits and vegetables (e.g. *Solanum nigrum,* Ginger lily through wetland destruction, Cape gooseberry by fire and overgrazing and introduction of exotic species such as tomatoes and cabbages);

- *Loss of* other indigenous species found in cultivated areas (for example *Crotolaria jaburnifloria, Thumbergia alarta and Eluophia streptopetala* (internationally protected), as well as increasing problems of invasive crop weeds (for example parasitic *Striga,* Couch grass and *Lantana camara*.

- Introduction of new varieties in preference to indigenous species;

- Genetic erosion of indigenous plant genetic resources due to changes in land use;

- Climatic change, leading to drought, diseases, pests, famine.

Status of Domestic Animal Diversity

Livestock production in Uganda contributes 5% and 14.6% to total GDP and agricultural GDP respectively (UBOS, 2004). It is an integral part of the agricultural system in many parts of the country.

In recent years, livestock numbers have been increasing, in line with human population trends and the relative civil calm in Uganda. The increase in cattle population is attributed to general improved animal health as a result of nationwide disease control, improved breeding programmes and better management practices. The demand for milk directly and by milk processing plants has further stimulated animal production. Exotic and cross-breeds are however becoming increasingly popular. There is some concern that indigenous breeds are being undermined, as land becomes scarcer and demand for high-

yielding varieties increases. It is believed that Uganda has lost 12 breeds of cattle, 3 breeds of goats and one breed of sheep over the last century leaving the current indigenous breeds which for the moment do not appear to be endangered (Table 9), although systematic monitoring needs to be undertaken to discern future trends in species composition.

Table 9: Number of breeds within Uganda's domestic animal diversity

Type	No. of breeds/ varieties	Remarks
Cattle	>16	• 4 indigenous breeds, 12 Exotic breeds • Indigenous breeds distributed country-wide mainly under traditional systems; exotics mainly under commercial dairy or beef farming
Goats	7	• 3 indigenous, 4 exotic breeds • There is increasing commercial value to goats for dairy and beef favouring exotic breeds
Sheep	7	• 3 indigenous, 4 exotic species • Exotic breed are not well adopted, they are concentrated in highland areas
Pigs	4	• 1 mixed breed, several breed related to wild forms; 3 breed introduced • Economic value increasing as "pork" continues to become popular.
Poultry	9	• 3 indigenous; 6 introduced breeds • Exotics concentrated in and around urban areas

Source: Mbuza et al. (1999)

Threats to domestic animal diversity

Poverty - Large proportions of Ugandans live below the poverty line and are ignorant of the importance of conserving biodiversity. It is usually the best animals that are sold off for slaughter or sacrificed during difficult times thus leaving inferior ones to form the economic base. The ability of the owners to cope with the socio-economic demands keeps on dwindling as they dispose of more animals without replenishment capacity.

Introduction of new breeds/varieties - The long-term viability of animal agriculture in Uganda depends strongly on the genetic variability of the indigenous animals being reared. However, this genetic base is now being rapidly eroded as breeds developed for intensive management regimes are replacing local races of livestock. The small number of improved breeds does not offer sufficient genetic reservoir for future breed improvement. Even the national semen bank mainly holds stocks of imported exotic semen. There are only a few stocks of semen of indigenous animals. Uganda has no stocks of cryo-preserved embryos.

Systematic breed substitution and irrational genetic transformation - Due to the high demand for livestock products to feed the rising human population growth, cross breeding and breed replacement are increasingly being encouraged and intensified in Uganda. This has given rise to increasing numbers of crosses and exotic animals at the expense of the indigenous animals. This

systematic breed substitution, although the threat is still small, could wipe out the local population in future if no adequate precaution is taken.

1.4 Biodiversity at the genetic level

Plant genetic resources (PGR) in Uganda range from little known indigenous wild fruits and vegetables, pastures and forages, medicinal plants, indigenous staples like millet and sorghum to introduced crops such as maize, tobacco, coffee, cotton and beans. This PGR is distributed across the diverse ecological zones of Uganda (Table 10).

Table 10: Some of the indigenous plant species in Uganda and their values

Category	Example (sp)	Current/potential values
Crops	*Sorghum spp*	- Staple food in Northern, Eastern and South Western Uganda; also used to brew local gin
	Finger millet *(Eleusine spp)*	- Staple food in Eastern, Northern and Western Uganda; also used to brew local beer
	Yams *(Dioscorea spp)*	- Staple food; also used as a source of genes for improved varieties
	Cowpea (*Vigna spp*)	- Local vegetable; also used as a forage crop
	Castor *(Ricinus commumis*)	- Industrial oil
	Passion fruit (small purple varieties) *Passiflora spp*	- Fruits for local consumption; also commercially exploited and their genes are used for crop improvement
	Jackfruit	- Local consumption but has an export potential
	Wild Strawberries (*Rosaceae*)	- Local consumption ad genes used for crop improvement
	Wild berries *Solanum spp*	- Local Consumption and genes are used for crop improvement
	Highland pawpaw	- Local consumption and a source of genes for crop improvement
Flowers	Orchids	High export value
Grasses	Lemon grass *Cymbopogon spp*	- Used on tooth paste and cosmetics and soap
	Pennisetum purpureum	- Pasture crop and genes used for pasture improvement
	Chloris gayana	Forage crop
	Brachiaria spp	Forage crop
Forage legumes	- *Crotalaria spp*	Forage crop
	Lablab spp	Forage crop
	Dolichos spp	Forage crop
Local vegetables	*Amaranthus spp*	Food and forage for Animals (Pigs)
	- *Solanum spp*	Vegetable
	Bidens pilosa (Black jack)	Vegetable
	Commelina bengalensis	Vegetable
	Colocasia esculenta	Vegetable
Plants with pesticidal properties	- *Azadiracha indica (Neem tree)*	Pesticidal value
	Ricinus commumis (Castor)	Pesticidal value
	Phytolacca dodecandra	Pesticidal value

Source: Kagera Basin Trans-boundary Agroecosystem Project 2004.

In terms of domestic livestock, the indigenous breeds of cattle are the main source of beef in the country and form almost 95% of the total cattle population. There is fear that the rate of adopting exotics coupled with cross-breeding the exotics with indigenous breeds might accelerate the rate of displacement of the indigenous species by the introduced breeds.

Genetic characterization of populations in Uganda for both wild and domestic species is at a relatively rudimentary stage although there are reasonable advances in some taxa such as the tilapines. There is therefore little information regarding genetic diversity in Uganda. More information on various aspects of biodiversity at the genetic level can be found throughout this report especially under agrobiodiversity and in Appendix IV A (Progress towards targets of the Global Strategy for Plant Conservation). However, before capacity to analyze genetic diversity is acquired, it is important that conservation at species level is not allowed to erode to populations below the minimum viable level.

1.5 Threats to Biodiversity and causes of Biodiversity loss

The general threats to biodiversity in Uganda continue to exist, including habitat loss, modification and alteration along with unsustainable harvesting, pollution and introduction of alien species, among others. The rate of biodiversity loss in Uganda is high and was calculated in 2004 to be around 10-11% per decade or 1% per annum (Pomeroy and Tushabe, 2004). The historical loss of species has been great in Uganda, and the negative trends are continuing. Many major mammal species, such as rhinos, cheetahs, and oryx were extirpated during Uganda's decades of internal turmoil between 1970 and 1990. Birds and fish species continue to decline in numbers and distribution throughout the country. Most of the remaining large animals are confined to protected areas, where their numbers are small but stable or decreasing still. However, in a few cases (e.g. the mountain gorillas, elephants and kob), the trends show some increase partly because of increased attention (Pomeroy and Tushabe 2004). The major threats to biodiversity in Uganda include the following:

1.5.1 Over-harvesting and Exploitation of Biological Resources

Biodiversity is mainly lost through uncontrolled harvesting or removal without replacement and use of poor harvesting methods which affect regeneration of the species. Over-exploitation depletes Uganda’s stock of animal and plant resources, lowering populations, affecting the genetic diversity and increasing the risk of local extirpation and subsequent extinction. Over-exploitation can occur from commercial operations, such as logging, or from local practices, such as medicinal plant harvesting. The over-exploitation of non-timber products, such as native bamboo, can lead to the loss of biodiversity. In some cases the species are targeted because of their food value. In other cases, it is due to their commercial value or because they are used in popular medicines. In still other cases, over-exploitation is due to the pet and skin trade, whether to private or public collections. In other cases, fish have been extensively exploited for food in Uganda today. Illegal fishing through the use of wrong fishing gear is reported to be a threat to fish population. It has a devastating effect on the fish stocks by

interfering with the breeding cycle when immature fish and mature fish are caught before spawning. Poaching and over-hunting have, in the past, contributed to the loss of the country's species richness. During the 1970s, elephant and buffalo populations declined drastically due to massive poaching (Aleper and Moe 2006). In the late 1980s, with improved management and the reactivation of anti-poaching patrols in Queen Elizabeth National Park (QENP), a number of species – primarily kob, buffalo and waterbuck – increased rapidly as a result of a ban in wildlife hunting.

1.5.2 Population Pressure and Habitat Conversion/Degradation

A principal cause of habitat conversion is human population pressure. Despite the high incidence of disease, including HIV/AIDS, Uganda's population is growing fast and is over 80% rural. Human population growth rates for Uganda exceed 3% per annum, while the average world population growth rate being somewhere around 1.3%. Annually, more land must be brought under cultivation to feed the increased number of people. In places such as Kabale and Kisoro, which are located within the region of the Albertine Rift, the increased demand for agricultural land has led to land fragmentation, which is a generalized pattern observed across all of Uganda. Fragmentation eliminates connectivity between natural habitats negatively impacting on wildlife movements.

The deforestation rate in Uganda is estimated to be around 55,000 ha per year, based on habitat change from 1990-1995. This causes severe loss of habitat and biodiversity annually. Bushfires are also a major contributing factor to habitat destruction. Some species are eliminated while others proliferate. The domination of savannah woodland by fire-resistant *Acacia* spp is one example. In Lake Mburo National Park, the proliferation of *Acacia hockii* is considered a threat to the population of herbivorous animals.

1.5.2 Encroachment and changes in land use (including degazzettement)

There is a growing demand for change of land use of PAs to agriculture or industrial expansion. Economic valuation of PAs would help in justifying, in economic terms, the importance of maintaining the PAs.

1.5.3 Soil Erosion

One of the indicators of land degradation is soil erosion. It has been estimated (Yaron *et al.* 2003) that the annual cost of soil nutrient loss due to soil erosion in Uganda is about $625 million per year. Notwithstanding the accuracy of the data used in the two studies, the evidence is clear: the problem of soil erosion is increasing with every passing year and this calls for urgent action. The draft national soils policy when finalized will a framework for addressing this problem.

Poor agricultural practices, such as over-stocking of rangelands and cultivation on steep slopes, contribute to erosion and siltation of water bodies, thereby altering ecosystems and species composition. Inappropriate policies, such as the agriculture policy of modernization, implicitly encourage monocultural and agrochemical-intensive farming systems that contribute to loss of genetic

diversity through over-specialization and pollution of sub-soil ecosystems. The introduction of high-yielding maize varieties and promotion of clonal coffee are current examples.

1.5.4 Invasive Alien Species (IAS)

The introduction of exotic species into natural systems can affect biodiversity in many ways. Exotic species can out-compete native species and replace them in the system, thus reducing the species diversity, lowering genetic diversity, and increasing the homogeneity of the landscape. A preliminary list of IAS for Uganda (NARO 2002) includes species such as *Lantana camara, Broussonetia papyrifera, Mimosa pigra* and *Senna* spp. whose threat on native species has increased considerably. For example, *Senna spectabilis* has invaded over 1,000 ha of the Budongo Forest Reserve and vast areas of the Matiri Forest Reserve (Kyenjojo District) while *Broussonetia papyrifera* has covered vast areas of the Mabira Forest Reserve. Control strategies for these species are still being investigated (NARO, 2009).

Tree planting activities of NFA are focused on introduced species (*Eucalyptus* spp., *Pinus* spp. and *Grevillea robusta*). Although useful to meet short terms needs for timber, they could threaten the survival of native species if there are no guidelines for private tree planting. Moreover, the National Agricultural Advisory Services (NAADS) program has a focus on 'improved varieties' in a bid to modernize agriculture in line with the Plan for Modernization of Agriculture (PMA). Native species are ignored by these efforts. However, the integration of natural resource management is becoming important in NAADS programs and offers opportunity for addressing this anomaly.

Lakes and rivers might be the ecosystems most affected by the introduction of exotic species and the consequent ecological changes in species and community composition. For example, the introduction of the Nile perch and water hyacinth has been extremely damaging for biodiversity in Lake Victoria. Lake Victoria is the largest tropical lake in the world, with 68,000 km2 of surface area shared among three countries: Uganda, Kenya and Tanzania. This lake supports Africa's most important inland fishery and, until recently, harboured more than 600 species of endemic haplochromine cichlids.

Over the past century, the ecology of Lake Victoria has changed significantly and the fish stocks were subjected to three major events, which included fishing intensification, introduction of exotic species into the lake, and environmental changes. The introduction of the Nile Perch is resulting into approximately 40% of the haplochromine species disappearing. It is estimated that approximately 150 species of the haplochromine cichlids are extinct, 100 of them being from Ugandan waters.

The water hyacinth (*Ecihhornia crassipes*), also known as the waterweed and arguably the most noxious aquatic weed in the world, was first reported on Lake Victoria in December 1989, having entered the Lake from River Kagera, and then on Lake Kyoga in May 1998. The plant is native to South America where it occurs basically harmlessly in streams and seasonally flooded environments.

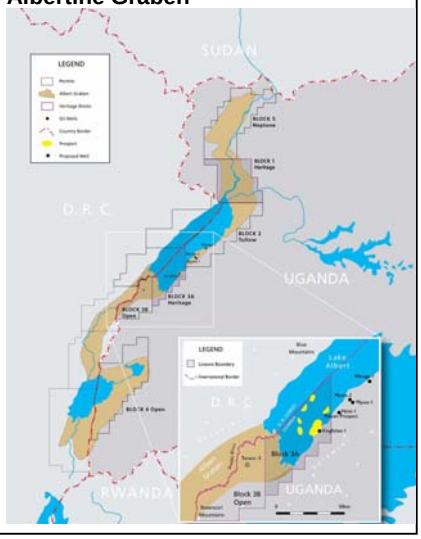
Given its high proliferation rate, the weed has spread rapidly over the years to the shores of Lake Kyoga, the banks of River Nile and most of the northern tip of Lake Albert impacting negatively on fish and other aquatic species.

1.5.5 Oil and gas exploration in the Albertine Rift

Prospecting for oil in the Albertine Rift is a major threat to biodiversity in the area. Hardman Resources Limited (from Australia) has confirmed that Uganda can produce commercial quantities of oil (up to an estimated 10000 barrels per day). This has raised excitement and other companies such as Heritage Oil (from Canada) and Tullow Oil (from United Kingdom) have been licensed to drill in other parts of the Albertine Graben (the country's oil exploration frontier – Box 3). There is also prospecting for geothermal energy by the Ministry of Water, Minerals and Energy. Exploration activities such as road construction, drilling and movement of heavy machinery are likely to interfere with the behaviour of wildlife. Habitat loss (to construction of roads and other infrastructure), pollution, population increase and increased pressure of extraction of resources (as more people are attracted to work in oil related activities) are occurring, inevitably.

Although a National Oil Policy is now in place, there is an urgent need to review and harmonise the regulatory frameworks for the petroleum and mining sectors in Uganda and other cross-sectoral laws affecting the sectors e.g. the Land Act, National Environment Act, Uganda Wildlife Act, and Forest Act so as to minimise the negative impacts of oil and mineral exploration on biodiversity in the Albertine region.

Box 3: Oil Prospecting Blocks in Albertine Graben



Source: **NEMA 2008**

1.5.6 Illegal exploitation and cross border trade in Natural Products

Illegal exploitation of resources has been most pronounced on the Uganda-DRC border affecting mostly the timber resources. There is a possibility of such trade also affecting the northern Uganda region targeting products such as Gum Arabic and wildlife through movements between Uganda and Southern Sudan.

1.5.7 Genetically Modified Organisms

Genetically Modified Organisms (GMOs) are organisms that are modified in a laboratory to have characteristics derived from genes of other species. Under Uganda's Bio-safety Framework, GMOs have to be thoroughly tested before they are released as agricultural crops into the open environment. There is concern that GMOs could have a detrimental effect on biodiversity by cross-pollinating with indigenous species or by being viable in areas that non-GMO crops are not thus resulting in additional widespread loss of natural habitat.

A number of institutions such as NARO are presently undertaking biotechnology related research and development activities. These activities are being guided by the Uganda Bio-safety Framework that prescribes mechanisms for the judicious application of biotechnology in Uganda. Although the Biotechnology Policy has now been approved there is still no law or regulations including Bio-safety Law and Regulations for implementing the Cartagena Protocol on Bio-safety to allow for importation and testing of GMOs on a large scale. This is a task that is being handled by the Uganda National Council for Science and Technology (UNCST). Since Uganda does not yet have adequate control mechanisms for GM materials, NARO has not authorized the importation of any clearly indicated GM crop seeds as of 2002.

The challenges in the use of GMOs in Uganda include:

- limited awareness on the potential use and applications of biotechnology;
- inadequate skilled human resource capacity for biotechnology and bio safety;
- limited institutional capacity for training in biotechnology;
- limited institutional and infrastructural capacity to handle biotechnology research and development;
- inadequate public-private partnerships in biotechnology use and applications;
- lack of a coherent policy and regulatory framework for biotechnology and bio-safety that specifically addresses national bio-safety regulations.

1.5.8 Climate Change

The change in climatic conditions being experienced across the globe as a result of the increased concentration of greenhouse gases in the atmosphere since the industrial revolution also affects biodiversity. Uganda's climate is predicted to change such that the distributions of many of its species and ecosystems will shift in tandem with drier or wetter parts of the country. Climate change also causes changes in the temperature and alkalinity of aquatic systems affecting the survival of biodiversity (DEAT 2006).

The impacts of climate change are not very obvious to the ordinary Ugandan. However, recently there has been severe drought in Uganda. There has also been evidence of a reduction in glacial extent (area) on the Rwenzori Mountains for the period 1906 to 2003 (Mileham *et al*. in prep.). It has been predicted that if current trends in global warming persist, ice cover remaining on the three main peaks of the Rwenzoris (Mounts Baker, Speke and Stanley) will disappear altogether by 2023 (Mileham *et al* in prep.). Projected increases in future temperatures will allow future changes in vegetation and other biodiversity to be predicted. For example, as the climate warms, the various Afroalpine vegetation zones will be expected to move to progressively higher altitudes and consequently to decline in area (Pomeroy & Tushabe, 2004). The disappearance of ice cover will mean reduced water flow in the streams downstream which feed into lakes George and Edward, and Semliki River discharging water into Lake Albert and ultimately into the Nile. The biodiversity and tourism potential of the Rwenzori Mountains National Park will also be affected. Issues of climate change, therefore, need to be given prominence as a matter of urgency particularly in the Albertine Rift and Mt. Elgon regions.

1.5.9 Pollution

The discharge of industrial effluents into our water systems as well as the runoff from agricultural lands and urban settlements, bringing with it the chemicals leached from these areas, pollute water systems and have a detrimental effect on biodiversity. High nutrient contents caused by fertilisers or other nutrients reaching aquatic ecosystems result in eutrophication where the system becomes anaerobic and there is not enough oxygen for many species to survive. Many toxic substances also have detrimental effects on biodiversity.

Pollution from the use of pesticides associated with cotton production and malaria prevention (residual indoor spraying), herbicides used on tea and tobacco and in association with urban areas (solid waste, air pollution, etc.) pose a potential threat to biodiversity if not regulated by guidelines. The use of polythene bags and plastics pose a big threat not only to soils but also to soil biodiversity particularly in the urban areas. While the level of industrialization in Uganda is still very low, the industries that are in operation are significant sources of pollution. Many operate with obsolete equipment; others use environmentally-inappropriate technologies. Nutrient-rich industrial effluents find their way into Uganda's open waters contributing to eutrophication and destruction of aquatic biodiversity in those water bodies as has been experienced in Lakes Victoria and George.

1.5.10 Armed conflicts, civil unrest and Refugees

In the early 1980s, many peri-urban plantation forests were cleared for security reasons. This has in turn led to greater pressures on the surrounding natural forests for fuel wood, poles and timber. At the same time, civil unrest in neighbouring countries has resulted in influxes of refugees into Uganda. These refugees need land on which to settle, cut poles with which to build settlements, and collect fuel wood for cooking and heating. In addition to the migrations of human refugees, the migration of wildlife fleeing conflict also shapes the habitat.

Due to current insurgencies along the Congolese border, for example, approximately 1200 elephants have crossed over into Ugandan national parks.

1.6 Implications of Biodiversity loss

Uganda has unique physical features and biogeographical location, making it one of the richest countries in Africa in terms of biological diversity. This biodiversity represents one of the vital economic resources that the country has. The services and products provided by biodiversity in form of ecosystems and species constitute billions of shillings per year to Uganda's economy. In addition to direct gains in government revenues, biodiversity resources also support some of the poorest and most vulnerable sectors of Uganda's population. The rural people, the landless and women are highly dependent both on biological resource utilization, and on the diversity of resources that provides them with choice and fall back in times of drought, unemployment or other times of stress.

Natural ecosystems provide many essential services such as the provision of clean water and air, medicinal plants, pollination of crops, food and shelter prevention of soil erosion, nutrient cycling, and the meeting of spiritual, cultural, aesthetic and recreational needs. Large portions of the country's economy are heavily dependent on biodiversity including the fishing industry, tourism, livestock industry agriculture based on indigenous species, commercial and subsistence use of medicinal plants and ecotourism, among others. The continued loss and degradation of Uganda's biodiversity therefore present a serious challenge to her society and the national economy.

The exact economic value of these biodiversity and ecosystem services is complex and controversial to calculate. It has been shown in South Africa that unconverted, intact and conserved ecosystems are between 14% and 70% economically more valuable than ecosystems that have been converted for agriculture, forestry plantations or urban development (DEAT 2006). Despite limited data on biodiversity valuation, past estimates put the gross economic output attributable to biological resource use in the fisheries, forestry, tourism, agriculture and energy sectors at US$ 546.6 million a year and indirect value associated with ecosystem services and functions at over US$ 200 million annually (Emerton and Muramira, 1999).

At the sectoral level, the contribution of forestry to Uganda's Gross Domestic Product (GDP) is estimated at 6%. In terms of livelihoods, Glenn Bush, 2004, established that 11 - 27% of household cash incomes of communities around forest reserves were derived from forestry. In terms of employment, forestry employs 1 million people in the formal and informal sectors (Forest Policy 2001). In addition, the contribution of forests to soil and water management, carbon sequestration, and future uses for Uganda's biodiversity has been valued at US$ 130.7 million annually (Glenn Bush, 2004).

Wildlife resources yield direct benefits such as local and national income from tourism activities, and are a source of bush meat, food, medicine, wildlife hunting, cropping and ranching.

Uganda has a booming tourism industry, which makes the second-largest contribution to GDP of all sectors of the economy. Tourism arrivals in the country now stand at 883,230 persons as compared with 769,662 persons in 2006 (UBOS, 2008) and 192,754 in 2000. In 2007, Uganda is reported to have fetched US$ 475 million (New Vision Newspaper, 3 May 2009). Most tourists come to Uganda to experience its unique natural beauty and wildlife and thus this industry is heavily dependent on biodiversity. Due to the linkage of hotels and lodges to protected areas, local communities also benefit through direct employment and the provision of goods and services (food stuff, labour, crafts). Also benefiting from the wildlife sector are transport companies and tour operators who provide vehicles for hiring and tour services, airlines, crafts malls, mobile phone companies, hotels and restaurants. Wildlife based tourism had an annual economic value of over US$ 200m and employed over 70,000 people directly in 2004. UWA alone employs 1300 permanent staff. The concessions given to private businessmen to operate hotels within the protected areas have also boosted employment opportunities for local people.

Proximity to PAs has also enabled local communities to start their own community eco-tourism initiatives which have created wealth for the local people neighbouring the protected areas. Local communities normally work in community groups to establish campsites for tourist's accommodation. They also organise community tourism activities where the tourists visit their community facilities as well as their cultural activities.

Plant genetic resources (PGR) for food and agriculture are the biological basis of world food security and, directly or indirectly support the livelihoods of every person on earth. The PGR for food and agriculture in Uganda range from little known indigenous wild fruits and vegetables, pastures and forages, medicines, indigenous staples like millets and sorghum to introduced crops such as maize, tobacco, cotton, and beans. These form the basis for the livelihoods of most Ugandans in terms of both food security and sources of income. In terms of domestic animal diversity, livestock production in Uganda contributes 5% and 14.6% to total GDP and agricultural GDP respectively (UBOS, 2004). It is an integral part of the agricultural system in many parts of the country. About 22% of all households are livestock keepers. Livestock also contributes to foreign exchange earnings, employment, nutrition and hides and skins.

Wetlands are areas that are transitional between terrestrial and aquatic ecosystems and are generally characterised by vegetation that can survive in saturated soil conditions. Notable values of wetlands in Uganda include their important water sources for human consumption, agriculture, livestock, and recreation, as well as their ecosystem functions and services such as water purification, water flow, storage and recharge, shoreline stabilisation, micro-climate regulation and biodiversity habitat provision. Papyrus and other wetland plants have commercial value (e.g. Table 11), at least 22 species of plants growing in wetlands are edible, and many other plants are used for medicinal purposes.

Table 11: Economic value of Nakivubo urban wetland in Kampala

Wetland benefit	Economic value (US$/year)
Crop cultivation	60,000
Papyrus harvesting	10,000
Brick making	17,000
Fish farming	3,000
Water treatment & purification	700,000 – 1,300,000

Source: NEMA 2007

The aquatic environment is a major source of food, employment, local income and of export earnings. There are over 500 species of fish in Uganda, with the water bodies having a capacity to produce over 300,000 metric tonnes of fish annually, and unknown diversity of other biodiversity forms. The fishing industry employs up to one million Ugandans. Fish and fish products have been the second highest export revenue earner in Uganda after coffee between 2002 and 2005 and between 2002 and 2006. In terms of export revenue, fish and fish products earned Uganda US$ 141 million in 2006, declining slightly to US$ 124 million in 2007 (UBOS, 2008). Current observations from commercial catches indicate that the species composition of Lake Victoria stocks has been reduced to three main species, namely Nile Perch, *Rastreneobola argentea* (locally known as mukene) and *Oreochromis niloticus.*

Despite this vital importance of biodiversity, Uganda continues to lose its biological resources due mainly to human induced causes such as encroachment, habitat destruction, poaching, over fishing, deforestation, pollution and introduction of invasive alien species. Urgent steps are therefore needed at all levels to conserve Uganda's biological diversity and to ensure sustainable use of its components with a view to achieving sustainable development. It is for this reason that the Government has over the years taken concrete steps to ensure that conservation and sustainable management of biological resources are promoted.

These steps include, inter alia, the adoption of the National Environment Action Plan (1994), the promulgation of the 1995 Constitution which has very strong provision on biodiversity and natural resource management, the enactment of the National Environment Act, the Uganda Wildlife Act, National Forestry and Tree Planting Act, as well as the development of several sectoral policies such as the Wetlands Policy 1994, Wildlife Policy 1996, Fisheries Policy 2000, Forest Policy 2001,the National Energy Policy 2000 and National Biotechnology and Biosafety Policy (2008), among others. Details of these policies, laws and plans are discussed in Chapter 3.

CHAPTER 2: CURRENT STATUS OF THE NATIONAL BIODIVERSITY STRATEGY AND ACTION PLAN

2.1 Brief description of NBSAP

Uganda signed the Convention on Biological Diversity on 12th June 1992 and ratified it on 8th September 1993. This marked a firm act of commitment by the Government to promote international cooperation in the sustainable management and use of our biological resources. Uganda also signed and ratified the Cartagena Protocol on Biosafety on 24th May 2000 and 30th November 2001 respectively to maximize the benefits of biotechnology while at the same time safe guarding the potential negative impact from use of genetically modified organisms.

Preparation of the National Biodiversity Strategy and Action Plan (NBSAP) for Uganda started in 1998 and was concluded in 2002. The draft NBSAP was subjected to extensive consultations including workshops with various stakeholders at the national level. The stakeholders consulted included relevant Government Ministries, Regulatory Agencies, Research and Academic Institutions, Non-Governmental Organizations, the Private Sector and Development Partners, among others. The draft NBSAP was also reviewed and endorsed by a Statutory Technical Committee on Biodiversity Conservation, then by the Board of Directors of NEMA and the Policy Committee on the Environment, chaired by the Rt. Hon. Prime Minister. The Policy Committee on Environment approved the draft NBSAP on 18th December 2003. The NBSAP was then submitted to Cabinet in 2004. Cabinet requested for re-submission of the document in June 2008 and this has been done.

The overall vision of the NBSAP is to maintain a rich biodiversity benefiting the present and future generations for national development while its goal is to enhance biodiversity conservation, management and sustainable utilisation and the fair sharing of the benefits arising from such utilization at all levels.

The NBSAP has five strategic objectives for promoting biodiversity conservation and its sustainable use. The five strategic objectives are to:

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

In the NBSAP, the five objectives are segregated into outputs, strategies, linkages to key articles of the CBD, activities and key actors responsible for

implementation of the activities. The CBD linkages and status of implementation of priority activities are summarized in Appendix III.

Achievement of targets requires clear timeframes supported by adequate financial resources. The Government of Uganda has limited financial resources and other more pressing priorities than biodiversity conservation and the country therefore opted to prepare its NBSAP without specific targets although implementation of the key activities identified in the NBSAP will no doubt contribute to the realisation of the 2010 global biodiversity target.

2.2 Overview of the Implementation of Priority Activities and Articles of CBD

Implementation of NBSAP priority activities by relevant stakeholders is on-going although in some areas, the activities are yet to be implemented. Progress made and results achieved are also indicated in Appendix III. Most of the NBSAP achievements also contribute to the implementation of the various articles of the Convention, the CBD thematic Programmes of Work as well the cross-cutting issues adopted under the Convention.

The CBD Thematic Programmes of Work include: Agricultural biodiversity, Dry and sub-humid land biodiversity, Forest biodiversity, Inland waters Biodiversity, Island Biodiversity, Mountain Biodiversity and Marine and Coastal Biodiversity.

The cross cutting issues adopted under the CBD are the 2010 Biodiversity Target, Access to Genetic Resources and Benefit Sharing (ABS), Biodiversity for Development, Climate Change and Biodiversity, Communication, Education and Public Awareness (CEPA), Economic Trade and Incentive Measures, Ecosystems Approach, Global Strategy for Plant Conservation (GSPC), Global Taxonomy Initiative (GTI), Impact Assessment, Invasive Alien Species, Liability and Redress, Identification, Monitoring, Indicators and Assessments, Protected Areas, Sustainable Use of Biodiversity, Technology Transfer and Cooperation, Tourism and Biodiversity and Traditional Knowledge, Innovation and Practices.

2.2.1 Achievements from implementation of the NBSAP since its formulation

The following are some of the concrete results achieved from implementation of the NBSAP since its formulation:

Formation of a Biodiversity Conservation Coordination Initiative

A Biodiversity Conservation Coordination Initiative (BCCI) was established in June 2006 with the overall goal of supporting and facilitating the development of relevant and workable approaches to effective biodiversity conservation for the benefit of the local, national and international community. BCCI was formed by four government institutions– National Environment Management Authority (NEMA), Uganda Wildlife Authority (UWA), National Forestry Authority (NFA) and Wetlands Management Department (WMD). The establishment of BCCI has strengthened networking and collaboration between NEMA, UWA, NFA and WMD on matters related to biodiversity conservation. Regular meetings are held

to discuss and come up with a way forward on key issues of biodiversity concern. These institutions have gone further and identified areas of collaboration under the BCCI which includes resource mobilization, law enforcement, planning, capacity building, public education and awareness, research, ecosystem restoration, valuation of biodiversity and ecosystem services, collaborative management and benefit sharing.

Improved collaboration between the CBD NFP and other international conventions

Collaboration between the CBD NFP and other biodiversity related conventions has improved. NEMA coordinated the implementation of a GEF supported project 'National Capacity needs Self-Assessment (NCSA)' which identified capacity needs for the Convention on Biological Diversity (CBD), United Nations Convention to Combat Desertification (UNCCD), United Nations Framework Convention on Climate Change (UNFCCC), and agreements on International Waters. The National Focal Points for the Conventions also regularly collaborate in various undertakings, for example, in the preparation of National Reports.

Enhanced progress in the implementation of PAs

Regarding establishment and maintenance of PAs areas, Annex IIIB highlights the key achievements such as:

- Eight additional Ramsar sites have been gazetted since NBSAP formulation bringing the total number of Ramsar sites to 12.
- A Wildlife Protected Areas System plan was developed in 2002.
- Ecotourism development including community based eco-tourism is being promoted.
- UWA has established an information management system called Management Information System (MIST);
- UWA has put in place a monitoring and research policy which has prioritized areas of research to enhance wildlife management.
- The National Forest Plan (2002) was developed to implement the National Forestry Policy and has provision for the protection of biodiversity.
- NFA has an inventory section that undertakes inventories for both biomass and biodiversity monitoring to enhance the conservation of forest biodiversity.
- NFA is leading the reforestation of degraded areas and have a plan to plant an average of 2500 ha annually for the next 10 years. Private sector involvement is a key component of this programme and NFA has established a unit to handle issues on the private sector. NFA has offered

land to private farmers for tree planting as an incentive to encourage economic investment in forestry and conservation of biodiversity.

- Benefit sharing is being promoted through Collaborative Forest Management.

- A draft wetland bill is being prepared by a Wetlands Advisory Group and is coordinated by the Wetlands Management Department in the Ministry of Water and Environment.

- Restoration of wetlands that is critical for biodiversity conservation is on-going.

- Recruitment of District Wetlands Officers by districts is gaining momentum. This is aimed at strengthening institutional framework and linkages for wetland management with WMD and NEMA at the national level.

- Development of District Wetland Action Plans (DWAPs) which are integral parts of the District Development Plans (DDPs) have provided a framework for integration of wetlands issues in district development plans. WMD is responsible for building capacity of district to carry out this function.

- Inventory of wetlands in the country was carried out and this process led to mapping wetlands in the country. In addition a National Wetland Information System (NWIS) has been put in place at WMD. This system has facilitated access to and management of information on wetlands in the country.

- WMD has adopted a Community Wetland Management Planning (CWMP) process to enhance community participation in wetland management. A manual on CWMP was developed by WMD and is being used in training districts and local communities on WMD.

- NFA has prepared a Forest Nature Conservation Master plan addresses the issue of integration of biodiversity concerns into NFA programmes.

- A review Uganda Wildlife Trade was conducted between August 2007 and August 2008 under the auspices of the National Environment Management Authority (NEMA) and the Department of Wildlife Conservation in the Ministry of Trade, Tourism and Industry (MTTI). The study among others recommended a policy and institutional framework that enhances collaboration and ensures coordination regarding wildlife trade.

- Uganda Wildlife Authority (UWA) has strengthened law enforcement in curbing trade in wildlife including endangered species like elephants, mountain gorillas, chimpanzees, among others. UWA has a Law Enforcement Unit based in Kampala responsible for among others coordinating operations aimed at reducing and ultimately eradicating illegal wildlife trade. The unit staff normally inspects wildlife consignments at ports of entry and exit. The unit also closely works with Uganda Customs,

Uganda Police and other law informant organs in curbing illegal trafficking of wildlife and their products.

- UWA has also entered into collaborative arrangement with Democratic Republic of Congo (DRC) and Rwanda to control cross-border illegal trade in wildlife. One such arrangement was the signing of an MoU between Rwanda, DRC and Uganda in Goma in January 2004 detailing the objectives of Trans-boundary Collaborative Management of the Central Albertine Rift (CAR). A Strategic Plan for the Trans-boundary protected areas and the entire CAR landscape was developed as a framework to guide this collaboration over the next 10 years.

- Uganda is also drafting legislation for enforcement of the Lusaka Agreement on Cooperative Enforcement Operations Directed at Illegal Trade in Wild Fauna and Flora. This law will establish the Lusaka agreement national bureau, spell out its functions and provide for other general procedures including reporting. Uganda is also currently developing national legislation aimed at enhancing enforcement of CITES at the national level. The law will specify mechanisms for monitoring wildlife trade and enforcement of CITES.

Enhanced the establishment of a National Biotrade Programme

A National Biotrade Programme has been established under the Uganda Export Promotion Board in the Ministry of Tourism, Trade and Industry to promote trade in biodiversity components. The programme was launched in 2003 with support from United Nations Conference on Trade and Development (UNCTAD). It aims at promoting trade (both national and international) and investment in biodiversity based products and services from Uganda in order to generate employment, foster economic development and promote sustainable use of natural resources.

Promoted the establishment of Regulations on Access to Genetic Resources and Benefit Sharing

Regulations on Access to Genetic Resources and Benefit Sharing were put in place in May 2005 with NEMA as the Focal Point and Uganda National Council for Science and Technology (UNCST) as the Competent Authority. UNCST is responsible for processing applications for access to genetic resources, coordinating all activities of lead agencies, establishing and maintaining depository for all material transfer agreements (MTAs), training, ensuring that MTAs have sufficient information for sharing of benefits, and ensuring that technology transfer and information exchange is effected by persons accessing the genetic resources in Uganda. NEMA on the other hand, is responsible for developing guidelines, formulation of a national policy on access to genetic resources, public awareness, capacity building, advising on access to genetic resources outside protected areas and ensuring compliance and enforcement of the regulations. A capacity building programme for district technical staff on the implementation of the ABS regulations and NBSAP has been developed and will run from June 2008 to December 2009.

Guidelines on Access to Genetic Resources and Benefit Sharing were also developed in 2007 to operationalize the implementation of the ABS regulations. The overall objective of the Guidelines is to provide for simple arrangements and procedures to implement the ABS regulations.

Facilitated the establishment of Biodiversity information sharing mechanisms

Presently, there are existing information management systems in some of the institutions like UNCST, UWA, NFA, WMD, National Agricultural Research Organization (NARO), Botany Department at Makerere University, Zoology Department (Makerere University), Institute of Environment and Natural Resources (Makerere University) and Nature Uganda among others. There is need for establishment of a national biodiversity meta-data bank (national node) through which all the information from these institutions can be shared. To this end, NEMA has, in collaboration with the United Nations Environment Programme (UNEP), prepared a proposal for establishing a Clearing House Mechanism in Uganda. UNEP submitted the proposal to the Global Environment Facility (GEF) in January 2009.

Catalyzed the preparation of a National Invasive Species Strategy and Action Plan

- Management of invasive species has been put under the responsibility of the different sectors in the NBSAP and especially under the strategies for open water resources, forest resources and plant genetic resources. Uganda is one among four countries participating in the United Nations Environment Programme (UNEP)-Global Environment Facility (GEF) project '*Removing Barriers to Invasive Plant Management in Africa'*. Through this project, an IAS Training Manual has been developed, efforts to manage/control several species such as *Cymbopogon nardus, Senna spectabilis, Lantana camara and Parthenium hysterophorus* are on-going, extensive awareness on the impact of invasive alien species on biodiversity has been created and a National Invasive Species Strategy, Action Plan and Policy Guidelines for Uganda have been prepared.

Facilitated the involvement of local communities in biodiversity management

Various programmes have been put in place to promote collaborative natural resource management with local communities. NFA and ***Nature***Uganda are implementing programmes on Collaborative Forest Management while UWA is implementing Revenue Sharing Programme and a Wildlife Use Rights Programme. WMD is carrying out Community Based Wetland Management Planning to promote wise use of wetland resources.

Facilitated the integration of indigenous knowledge and practices in biodiversity conservation

With respect to the integration of traditional knowledge and practices in the conservation of biodiversity, a draft National Policy on Traditional Medicine and Medicinal Plants has been developed by the Ministry of Health. Many species used for herbal medicine are collected from the wild, often being harvested using unsustainable methods, and at rates faster than they can grow to meet the demand. Conservation, both ex-situ and in-situ, is therefore critical both to protect the plants while at the same time to meet the health needs of the local population. The draft policy aims among others to put in place a policy framework that will:

a) Integrate traditional medicine/medicinal plants products and practitioners into the commercial sector to enhance income at the individual, community and national level and improve health in the country;

b) Mainstream traditional medicine into national health care delivery system;

c) Put in place mechanisms for conservation and sustainable utilization of traditional medicine and medicinal plants recognizing that economic, social development and poverty alleviation are the first and overriding priorities of the nation;

d) Provide for protection of Intellectual Property Rights, equitable access and benefit sharing arising from the use of traditional knowledge, innovation and practices relevant to the conservation of traditional medicine and medicinal plants;

e) Establish a framework that promotes the participation of local communities at all levels of policy making and implementation of the conservation and sustainable utilization of, production, domestication and commercialization of traditional medicine and medicinal plants;

f) Facilitate research, technology transfer in traditional medicine and medicinal plants;

g) Provide for linkages into national, regional and international programmes with a view to enhancing partnership and technological inputs into traditional medicine and medicinal plants;

h) Guarantee the supply of traditional medicine, which is safe, effective, of high quality, widely available and affordable.

On conservation of biodiversity, the policy will:

1. Put in place mechanisms for conservation and sustainable utilization of traditional medicine and medicinal plants recognizing that economic, social development and poverty alleviation are the first and overriding priorities of the nation;

2. Develop a framework to facilitate research, documentation and dissemination of information on traditional medicine and medicinal plants;

3. Provides for equitable access and benefit sharing arising from the use of traditional knowledge, innovation and practices relevant to the conservation of traditional medicine and medicinal plants;

4. Establish a framework that promotes the participation of local communities at all levels of policy making and implementation of the conservation and sustainable utilization of traditional medicine and medicinal plants;

5. Provides for linkages into regional and international programmes on traditional medicine and medicinal plants.

The development of indicators for biodiversity

Some preliminary indicators for monitoring environment quality and trends (including biodiversity) have been developed by the relevant sectors with NEMA as the coordinating agency. These indicators are intended to assist the country analyze environmental quality and trends by focusing on the following:

- **Performance evaluation**: evaluating Uganda's performance towards meeting environmental targets with respect to environmental quality.

- **Environment and sustainable development**: analyzing the relationship between the development actions in Uganda and environmental sustainability.

- **Causal loops**: analyzing the link between causes and effects of environmental conditions.

- **Prediction**: analyzing current environment situations, predicting trends and future scenarios.

- **Reporting and compliance**: providing quality and timely information and ensuring fulfilment of institutional obligations to reporting and compliance.

- **Prioritizing parameters:** measurements providing representative features of Uganda's environmental quality.

Although not yet widely known and used, these indicators and the resultant information will form the basis for environmental reporting by NEMA to inform the public, decision makers and environmental managers. It will also provide a framework for monitoring progress towards the achievement of the 2010 biodiversity target and beyond. There is an urgent need for the various sectors to study the indicators, generate consensus on priority indicators and test them for suitability under field conditions in the field before adoption for regular use.

Promoted public awareness on biodiversity

Most of the relevant government agencies as well as NGOs, CSOs and CBOs are involved in education and awareness programmes. There are awareness programmes these institutions designed for the different stakeholders including decision makers (at national level) down to the local communities at the district level. Most institutions have departments/sections specifically handling issues on public education and awareness. NEMA has produced and is widely distributing a series of handbooks under the following themes: Biodiversity and Poverty Eradication, Biodiversity and Tourism, Biodiversity and Climate Change, Biodiversity and Food Security, Biodiversity and Health and Biodiversity and Culture.

Progress made in the area of Biotechnology and Biosafety

Uganda has made considerable progress since signing the Cartegena Protocol. Some of the progress includes the following, among others:

- Approval of a National Policy on Biotechnology and Biosafety in April 2008.

- An active National Biosafety Committee (NBC) is in place with the following functions, among others

    a) establish and continuously review the status of the biotechnology and biosafety in Uganda;

    b) review proposals involving specifically high risk category of organisms and controlled field experiments and recommend appropriate type of confinement facility;

    c) review reports on all approved research projects involving genetically engineered organisms;

    d) develop and recommend training programmes for Institutional Biosafety committees and Institutional Biosafety officers;

    e) approve use of genetically engineered organisms and their products in agricultural and industrial production and application;

    f) establish work mechanisms for institutional Biosafety committees as well as biosafety norms and patterns for the functioning of such committees;

    g) demand when it is considered necessary, environmental impact study and environment impact report of projects and appliances involving release of GMOs in the environment in collaboration with relevant environment monitoring bodies, besides specific requirements in accordance with the applicable hazard level.

- Strengthening of institutional capacity for biotechnology and biosafety has also covered the following:

    a) UNCST through BIO-EARN Programme trained 5 PhDs in biotechnology between 2002 and 2006. Four students were trained at Masters level in food safety, environment safety and molecular biology through the Programme on Biosafety Systems (PBS) between 2005-2008.

    b) 40 biosafety inspectors and 30 scientists and regulators were trained on risk assessment and management of GMOs through support of UNEP/GEF between 2002 -2006.

In terms of infrastructure for biotechnology and biosafety the key results include the following:

a) Laboratories at Crop Science Department at Makerere University, MUIENR, Med Biotech Labs and National Agriculture Research Laboratories Institute – NARLI (formerly Kawanda Agricultural Research Institute) have been equipped.

b) GMO testing facility has been established at NARLI. This was through a GEF/UNEP Project. The facility was launched on 22nd June 2007. The facility is to serve as containment and experimental facility for GM plants to check their disease and pest resistance before they are introduced in the field.

c) Protocols for confined field trials, shipment and transportation of GMOs have been developed by UNCST.

d) Biosafety desk has been established at UNCST to facilitate coordination of activities on biosafety in the country.

e) Information officers have been trained in the use of Biosafety Clearing House. Journalists were trained on biotechnology and biosafety information delivery to increase awareness on biotechnology and biosafety.

f) A biotechnology and biosafety communication strategy has been developed.

g) A Bio-Vision newsletter on biotechnology and biosafety is being produced every six months.

2.3 Contribution of NBSAP to the Thematic Programmes of Work and Cross-cutting Issues.

Thematic programme of work on Inland Water Biodiversity

Biodiversity of Inland Waters is an integral part of Uganda's NBSAP and biodiversity of Inland Waters is fully recognized and taken care of wherever water resources/ wetlands overlap with other ecosystems that are subject to conservation. Furthermore, Uganda is implementing a Wetlands Policy and Wetlands Sector strategic plan, which, together with the National Environment Act and the National Environment (Riverbanks, wetlands and Lakeshores) Regulations address most of the provisions of the Program of work. The Technical committee on Biodiversity Conservation, one of the statutory technical committees provided for under the National Environment Act, oversees the coordination of actors responsible for Inland waters ecosystems.

The Wetlands Management Department, which is the institution coordinating the implementation of the Ramsar Convention on Wetlands, participates in planning and implementation of programme/activities related to biodiversity conservation in Uganda and as such, they bring on board any concerns of relevance to Ramsar for incorporation in national biodiversity planning and conservation. This approach has encouraged establishment of synergies between this programme of work and related activities under the Ramsar Convention as well as the implementation of the Joint Work Plan (CBD-Ramsar). The Wetlands Sector Strategic Plan has priority activities which are already being implemented.

Programme of work on Agro-biodiversity

NEMA coordinated with the EU-ACP EPA the implementation of a project on integrated assessment of the potential impacts of trade liberalization on Uganda's biodiversity. It was undertaken under the United Nations Environment Programme (UNEP) initiative on Integrated Assessment of Trade-related Polices and Biological Diversity in the Agricultural Sector. The initiative responded the CBD (COP) Decision VI/5, which called for the study of the impacts of trade liberalization on agricultural biological diversity and cooperation in this effort among international organizations. The specific focus of the assessment was on biodiversity concerns associated with the horticulture sector. The Plant Genetic Resources assessments focused on crops and their wild relatives while work on Animal genetic resources focused on goats and chicken. There is also an on-going project aimed at assessing below ground biodiversity.

Other assessments on community-based management of plant genetic resources focusing on various crop species like finger millet, pigeon peas, sorghum, and vegetables taking into account the rare varieties have also been undertaken contributing to assessment of the knowledge, innovations and practices of farmers and indigenous and local communities in sustaining agricultural biodiversity and agro-ecosystem services for food production and food security.

Under the Adaptive management (programme element 2) and Capacity building (programme element 3), some pilot work has been done with both crop farmers and livestock keepers, aimed at improving traditional farming systems for better productivity. Focus has been on different areas depending on the farming system; ranging from reduction of soil loss, reducing post harvest loss, improved livestock pastures, improving crop yields and increasing livestock productivity by using improved varieties.

Agricultural biodiversity has been incorporated into the NBSAP. In the policies on forestry and wildlife, there is deliberate effort to conserve agricultural biodiversity that falls within PAs to guide mainstreaming and integration into national plans and strategies for the conservation and sustainable use of agricultural biodiversity in sectoral and cross-sectoral plans and programmes. Other aspects of Agricultural biodiversity are presented in Appendix IV B.

Identification, monitoring and assessment, and indicators

There are various programmes which deal with identification, monitoring and assessment, and indicators. Examples of these programmes include the following:

- There is a biodiversity data bank at Makerere University Institute of Environment and Natural Resources (MUIENR). The biodiversity data bank contains information on biodiversity inventories which are undertaken every two years which are compiled into Uganda's biodiversity report. The reports contain assessments at ecosystem and species levels.

- NFA, UWA and WMD all have spatial inventories and thematic data/attributes useful for monitoring, as well as information capture and management mechanisms.

- For threatened species, there is a system of PAs under Forestry and Wildlife, Wetlands (Ramsar sites), World heritage sites, as well as herbaria at various Agricultural Research Institutes. The National Gene Bank for plant genetic resources has been launched at Entebbe Botanical Gardens.

- National Forest Inventories of major forest ecosystems were undertaken from 1988–1995. The National Biomass study under NFA continues to produce comprehensive land use cover and stratification maps covering the whole country.

Expanded programme of work on forest biological diversity

- There have been some efforts to explain the concept of the ecosystem approach to forest management;

- There also efforts to promote participation of all stakeholders especially local people living close to the forests in management and planning activities and selection of suitable forest management practices for the different forests. These efforts are linked to the CBD programme element 1 – Conservation,

sustainable use and benefit-sharing and Programme element 3 – Knowledge, assessment and monitoring.

- Replanting of selected tree species in some degraded areas is being done by NFA to protect, recover and restore forest biological diversity. The Forest Conservation Master Plan provides additional tool to enhance the conservation of forest biodiversity. Forest biodiversity inventory continues to be undertaken providing a basis for monitoring the status and trends of forest biodiversity.

Biological diversity of dry and sub-humid lands

Most wildlife protected areas and rangelands in Uganda are found in dry and sub-humid ecosystems. Such PAs and rangelands are clearly reflected in the NBSAP, contributing to the implementation of decisions V/23, VI/4 and VII/2 on integration of actions under the programme of work on dry and sub-humid lands. There are several on-going projects in the rangelands of Uganda including 'Mainstreaming and implementation of Sustainable Land Management activities in six cattle corridor Districts of Uganda' supported by UNDP and the Government of Norway through the East and Southern Africa Drylands Programme

Mountain Biodiversity

Government has put in place measures to conserve mountain biodiversity through the National Environment (Mountainous and Hilly Areas Management) Regulations which provides for measures to:

- facilitate the sustainable utilization and conservation of resources in hilly and mountainous areas for the benefit of the people and communities living in the area;

- promote the integration of and the wise use of resources in hilly and mountainous areas into the local and national management programmes; and

- regulate and promote efficient and sustainable use of resources in hilly and mountainous areas so that the functions and values derived thereof are maintained for the present and future generations.

Under the regulations, District Councils regularly make by-laws identifying hilly areas at risk of environmental degradation and taking appropriate measures; require every land owner or occupier while utilizing hilly areas to carry out soil conservation measures, protect water catchment areas and maintain adequate vegetation cover. Restoration of degraded hills has been identified as one of the key areas by Government and presently, there are extensive on-going tree planting activities on hilly and mountainous areas throughout the country.

Biodiversity and Tourism

The EIA process in Uganda provides a framework for assessing, monitoring and measuring the impact of tourism on biodiversity. Environment audits are also carried out during implementation of tourism projects. Measures are also in place to regulate the number of tourists allowed at a time to visit sensitive ecosystems and species such as gorilla viewing in Mgahinga Gorilla National Park and Bwindi Impenetrable National Park.

Educational/awareness programmes are in place to explain the tourism guidelines to tour operators and guides as part of their licensing process and license renewal is subject to adherence to the agreed guidelines. Communities are also being supported to establish and manage tourist accommodation facilities in addition to the revenue sharing programme. These measures contribute to implementation of the CBD decision VII/14 on the provision of indigenous and local communities with capacity-building and financial resources to support their participation in tourism policy-making, development planning, product development and management.

The practice of sustainable eco-tourism in and around Pas is contributing to the objectives of the Convention, while at the same time contributing to the 2010 target of reducing biodiversity loss, contributing towards the implementation of the NBSAP and achievement of the Millennium Development Goals.

Biodiversity and Climate Change

The National Adaptation Programme of Action (2005) has been prepared by Uganda including adaptation interventions required to minimize impacts of adverse effects of climate change on crop and livestock production, pasture and rangelands, forestry and water resources linking biodiversity directly to climate change.

In the water resources sector, there are national and regional initiatives addressing climate change concerns such as those under the Nile Basin Initiative and Lake Victoria Environment Management Project. An integrated river basin management model is in its advanced stages of development by FAO/Nile Basin Initiative. Conservation of wetlands and catchment areas is being emphasized through projects such as the Mt. Elgon Resources and Environmental Conservation Project which link biodiversity to climate change.

Other activities being undertaken by various organizations include research in the development of drought resistant species (crops, livestock and trees) by NARO, large scale tree planting programmes under NFA, Gazetting and surveying of Forest Reserves (NFA) and Methane reduction programmes such as waste composting for municipalities being promoted by NEMA.

Impact assessment

The National Environment Act makes it mandatory for Environmental Impact Assessments (EIAs) to be conducted prior to execution of specified projects. In addition there have been two regulations to this Act which are being implemented. These are the National Environment (Environmental Impact Assessment) Regulations and the National Environment (Environmental Impact Practitioners) Regulations. Government has also put in place Guidelines for EIA to guide the process. EIA sector guidelines have also been developed for the energy and fisheries sectors. Some sectoral policies and laws have provision for EIA to be carried out e.g. the National Forestry and Tree Planting Act, Uganda Wildlife Act and Wetlands Policy. Strategic Environment Impact Assessment of policies, programmes and projects often take into account biodiversity issues during the assessment process.

2.4 Funding of NBSAP priority activities

Budgetary allocations in Uganda (including donor support) take a sector-wide approach (Environment and Natural Resources sector comprising Forestry, Wildlife, Wetlands, NEMA, NFA etc together) and so is the allocation of work to serving officers. There are no separate budgets for the Convention on Biological Diversity.

There are a few trust funds related to biodiversity which are up and functioning, such as the Mgahinga and Bwindi Impenetrable Forests Conservation Trust (conserving the habitats for the rare and endangered mountain Gorilla- *Gorilla gorilla beringei*) and a number of others are planned, but not yet functional.

Other financial instruments include the Environment Impact Assessment Certification Fees, Wetland and Water Permits, Grazing permits in Forest Reserves, Fishing Permits and registration for boats, National Park entry fees. The functions of these financial instruments are defined in their respective laws and regulations (e.g. Environment Act, Environment Impact Assessment Regulations, Water Act, Forestry and Tree Planting Act, Fishing Act).

The Global Environmental Facility has over the years provided Uganda with considerable financial support for Biodiversity projects which were highlighted in the Third National Report to the CBD in 2006. There are also a number of biodiversity related projects funded by non-GEF donors although lack of capacity to prepare proposals still limits access to additional funds. Examples of these sources of funding are presented below (Table 12)
Funding of NBSAP

Table 12: Examples of biodiversity projects funded by GEF and non-GEF sources in Uganda

Country	Project Name	Agency	GEF Grant (US$ m.)
Uganda	Bwindi Impenetrable National Park and Mgahinga Gorilla National Park Conservation	IBRD	4.430
Uganda	Institutional Capacity Building for Protected Areas Management and Sustainable USE (ICB – PAMSU)	IBRD	2.289
Uganda	Support for the Implementation of the Uganda National Biosafety Framework (NBF) within the context of the Cartagena protocol	UNEP	0.560
Uganda	Conservation of Biodiversity in the Albertine Rift Forest Protected Areas	UNDP	3.755
Uganda	Building a Foundation for Sustainable Wildlife Trade in Uganda: A Review of the National Wildlife Trade Policies in Support of the Convention on International Trade in Endangered Species of Fauna and Flora (CITES)	EU under the Geneva International Academic Network (GIAN)	CHF 39,000
Uganda	Developing an Experimental Methodology for Testing the Effectiveness of Payments for Ecosystem Services to Enhance Conservation in Productive Landscapes in Uganda which was approved by GEF in August 2008.	GEF	1.0
Uganda	An Integrated Assessment of the Potential Impacts of the EU-ACP Economic Partnership Agreement on Uganda's Biodiversity: A Case Study of the Horticulture Sector.	EU through UNEP-Geneva	0.064
Uganda	Establishment of Clearing House Mechanism	GEF	0.33
Uganda	Extending Wetland Protected Areas through Community Conservation Initiatives (COBWEB)	GEF-UNDP	0.88
Uganda	Supporting country action on the CBD Programme of Work on Protected Areas	GEF-UNDP	0.149
Uganda	Removing Barriers for Private Sector Participation in Biodiversity Conservation in Productive Landscapes	GEF	1.2
Regional	Community-based Management of On-farm Plant Genetic Resources in Arid and Semi-arid Areas of Sub-Saharan Africa	UNEP	0.750
Regional	IBA/Protected Area Monitoring Project	EU through Birdlife International	Euro 1,886,172
Regional	Botanical and Zoological Taxonomic Networks in Eastern Africa (BOZONET): Linking Conservation to Taxonomy	UNDP	5.275
Regional	Removing Barriers to Invasive Plant Management in Africa	UNEP	5.725
Global	Pilot Biosafety Enabling Activity	UNEP	2.744
Global	Conservation and Sustainable Management of Below Ground Biodiversity, Phase 2	UNEP	4.007

2.5 Successes, Obstacles and Lessons Learned

2.5.1 Effectiveness of NBSAP in addressing various biodiversity concerns

The NBSAP has been relatively effective in directly and indirectly addressing the various biodiversity concerns in the country such as:

- Improving coordination among various agencies through the formation of a Biodiversity Conservation Coordination Initiative;

- Improving collaboration between the CBD and other international conventions at national level;

- Addressing a number of Articles of the Convention such as PAs, formulation of Regulations on Access to Genetic Resources and Benefit Sharing, establishment of Biodiversity information sharing mechanisms, preparation of a National Invasive Species Strategy and Action Plan, promotion of public awareness on biodiversity as well as support to relevant areas of biotechnology and bio safety;

- Implementation of the Convention's Thematic Programmes of Work and Cross-Cutting Issues such as inland waters biodiversity, agro-biodiversity, identification, monitoring and assessment, and indicators and the expanded programme of work on forest biological diversity.

2.5.2 Obstacles to NBSAP implementation

Some of the obstacles that have hindered the smooth implementation of NBSAP include:

- Inadequate financial resources for implementation of planned activities and programmes.

- Inadequate human and infrastructure capacity in relevant field of biodiversity conservation for example taxonomy, capacity to carry out conservation and characterization of germplasm in the National Gene bank among others.

- Lack of a central node/clearing house mechanism to facilitate information sharing among institutions involved in biodiversity conservation.

- Limited information on indigenous farm animal genetic resources including physical characteristics.

- Inadequate enforcement and compliance to environmental legislations.

- There is insufficient information on economic value of protected areas and fragile ecosystems like wetlands, hilly and mountainous areas, and rangelands, among others.

- Inadequate managerial and technical capacity at the District and lower local Government levels for implementation of NBSAP.

- Limited capacity for managing biodiversity outside protected areas where there is biodiversity loss in Uganda.

- Putting in place a National Policy for Biodiversity Conservation.

2.5.3 Suggestions to improve implementation of NBSAP

The following suggestions are made to enhance the implementation of NBSAP:

- Implementation of NBSAP should be given more support from GEF.
- Make every effort to support training of human resource in the critical areas like biodiversity valuation, taxonomy, biotechnology, inventory among others.
- Put in place the necessary infrastructure and strengthen institutions at national and district levels to carry out their mandates for the implementation of NBSAP.
- Build capacity for assessing and monitoring the impact of climate change on biodiversity.
- Document traditional knowledge and practices which are relevant for biodiversity conservation.
- provide support to community based activities that link biodiversity conservation to poverty alleviation; and
- Put in place a National Policy for the Conservation and Management of Biodiversity.

2.5.4 Lessons learned from NBSAP implementation

Some of the lessons learned during NBSAP implementation include the following:

- Valuation of biodiversity is a very critical component of benefit sharing;
- More data on biodiversity is urgently needed for informed decision;
- Availability of funds and trained human resources in various aspects of biodiversity conservation is very important;
- Implementation of activities with tangible results on the ground and especially those that contribute to poverty eradication attract the support of Government and local communities;
- Biodiversity Conservation must be relevant to Government priority programmes and therefore NBSAP should not be a stand alone document but rather should incorporate national development aspirations;
- Economic returns from the conservation of biodiversity appeals most to local communities;
- A critical human resource cadre trained in biotechnology and bio- safety is still needed for Uganda to successfully engage in biotechnology product development;
- Low awareness on benefits of biotechnology and bio safety contributes more negative perception.

CHAPTER 3: SECTORAL AND CROSS-SECTORAL INTEGRATION OF BIODIVERSITY CONSIDERATIONS

Over the years Government of Uganda has put in place a number of policy and legal frameworks as well as plans for sustainable natural resource management including biodiversity conservation while environmental mainstreaming is emphasised in all government policies and programmes. The following policy and legal instruments, among others, provide for ownership and call for greater participation in the management of biodiversity:

3.1 Integration of biodiversity considerations into national and sectoral policies

The National Environment Management Policy

The National Environment Management Policy (NEMP) of 1994 has a provision for biodiversity conservation. It calls for biodiversity to be conserved and managed sustainably for national socio-economic development. The policy aims at sustainable social and economic development, which maintains and enhances environmental quality and resource productivity on a long-term basis to meet the needs of the present generation without compromising the ability of future generations to meet their own needs.

The NEMP provides for the development of comprehensive policies, strategies and actions for biodiversity conservation [article 6(a) of the CBD], establishment of collaborative arrangement for protected area management with local communities [Article 8(j) of CBD], enactment and/or reactivation of legislation on the management of natural resources to provide for biodiversity conservation, among others.

Most of the key national policies like the Wildlife Policy, the Forestry Policy, and the Wetlands Policy which are discussed elsewhere in the text, have been revised to include provisions of the NEMP and biodiversity conservation. Other policies include:

Agriculture Policy

The objective of the National Agriculture Policy in relation to the environment is to promote farming systems and land-use practices that conserve and enhance land productivity in an environmentally sustainable manner. The Agriculture policy further recognizes that land is a natural resource for agriculture and that land use, land prices and customs have implications on biological resources as well as on the soil, water and living resources which farmers depend on for agricultural production.

National Fisheries Policy

The Government through the National Fisheries Policy aims at sustainable utilization of fisheries resources by maintaining stable fish production, improved domestic consumption and fish exports and modernizing the activities of fishing

communities to achieve human development indicators. Other government interventions through the Policy include: provision of resources to upgrade landing sites and quality control laboratories to meet international standards, provision of resources to strengthen the Uganda Bureau of Standards (UBOS) and the Inspectorate Section of the Fisheries Department.

Energy Policy

The goal of Uganda's energy policy is to meet the energy needs of Uganda's population for social and economic development in an environmentally sustainable manner. The energy policy recognizes that Uganda has abundant opportunities to develop its energy resources, especially hydroelectric power and biomass. Wood is by far the most important source of energy in Uganda. Even though the importance of petroleum and electric power is growing, it is expected that wood fuel will continue to be the dominant source of energy in Uganda for the foreseeable future. Most of this energy is consumed in the form of firewood and charcoal at domestic level and by small and medium scale processing enterprises. As the human population grows, the pressure on forests, which harbours a significant proportion of Uganda's biodiversity, will mount and there will ultimately be a direct relationship between biomass energy consumption and conservation of biological diversity.

The energy policy also recognizes that energy development and environmental damage are intricately related. The policy recognizes the need to mitigate both the physical and social environmental impacts created by energy development. The recent discovery of oil in Uganda has been located in the Albertine Graben where most of wildlife protected area lies. Out of the 22 wildlife-protected areas in Uganda, oil is believed to occur in 10 of them. There are concerns about the impact of oil development on biodiversity conservation in the areas. However with proper planning and monitoring, these two activities could coexist.

Tourism Policy 2003

The national Tourism Policy seeks to assist in efforts to promote the economy and livelihood of the people essentially through poverty alleviation by encouraging the development of sustainable quality tourism. It also seeks to market Uganda as a favoured tourist destination for ecotourism in a country renowned for its rich biodiversity. The future of tourism in Uganda based on biodiversity is very bright. The country has 10 National Parks, 10 Wildlife Reserves and 7 Wildlife Sanctuaries, some of which are acclaimed as being among Africa's best (NEMA, 2007). The country's main wildlife attraction for foreign visitors is the rare mountain gorilla, found in Bwindi Impenetrable National Park and Mgahinga National Park. Many other species of primates can also be seen, including chimpanzees and monkeys. Kibale National Park alone contains 12 different types of primate, while Ruwenzori National Park is regarded as one of the most spectacular in Africa.

Draft National Policy on Plant Genetic Resources

A draft National Policy on Plant Genetic Resources for Food and Agriculture (PGRFA) has been prepared by the National Agricultural Research Organization (NARO). PGRFA are the basis and foundation of our agricultural system and therefore the cornerstone of our economy and livelihoods. The policy is due for submission to Cabinet for approval.

National Policy on Biotechnology and Biosafety (2008)

The objective of this young policy is to promote biotechnology development and to use it, taking due measures to meet safety concerns to overcome important social and environmental problems with the view of improving the quality of life. The policy has provisions on risk assessment and risk management to ensure human and biodiversity health and environmental integrity. The policy also:

- Provides for risk assessment and management for all biotech applications
- Provides for national capacity building in biotechnology through research and training
- Ensures public and environmental safety in biotech applications

The Decentralization Policy (1994)

In an effort to take services nearer to the people, the Government of Uganda adopted the decentralization policy which focuses at the district and sub- county levels as the priority planning and implementation levels. In terms of the CBD, the policy:

- Supports empowerment of actors and institutions at lower levels to manage their natural resources including biological resources;
- Enhances community sharing of benefits and costs of environmental and natural resources management;
- Ensures increased community participation and decision making in environmental and natural resource management;
- Provides for decentralized planning for natural resource management to the district and lower levels sub county levels.

3.2 Integration of biodiversity considerations into national and sectoral laws and regulations

Major National Laws relevant to the CBD

Uganda has enacted several laws to regulate environment and natural resource management. Some of these laws and how they affect biodiversity conservation are discussed below.

The Constitution of Uganda, 1995

The Constitution of Uganda, which is the supreme law of Uganda, recognises and makes special provisions for environment and natural resources. The Constitution has a number of Articles which are relevant to the CBD, for example, *Article 237(2)(b)* mandates Parliament to make laws which authorise the central government or local governments, to hold in trust for the people, and protect natural lakes, rivers, wetlands, forest reserves, game reserves, and national parks, and to reserve land for ecological and tourist purposes for the common good of all citizens.

The Local Government Act Cap. 243

This act consolidates and streamlines the existing law on Local Governments in line with the Constitution to give effect to the decentralization and devolution of functions, powers and services. Through the enabling provisions and following the poor track record of 'top down' centralised, bureaucratic management and regulation of natural resources by the state, emphasis is now being put on community-based natural resources management (CBNRM). This is because it is now a common consensus that communities and community-based institutions are better positioned to both respond and adapt to locally specify social and ecological conditions and to represent local interests and preferences.

The Act provides for the functions and powers of Local Government Councils. Accordingly, District Environment Committees have been put in place in several districts in the country. District Environment Officers have been recruited by the Local Governments and are members of the District Technical Planning Committees to ensure that environmental concerns including biodiversity are integrated into development programmes.

The Land Act, Cap. 227

Section 44 provides for the Government or a local government to hold in trust for the people and protect natural lakes, rivers, wetlands, forest reserves among others, for ecological and touristic purposes for the common good of the citizens of Uganda. It also requires Government or local government not to lease or otherwise alienate these natural resources which could be subjected to unsustainable utilization.

The National Environment Act, Cap. 153

This Act addresses the inadequacies of previous natural resource legislations, introduces the participatory approach in biodiversity conservation, and recognizes the importance of international treaties such as the CBD, CITES, Ramsar and the International Undertaking on Plant Genetic Resources, among others. In addition, the Act has provision for equitable use and sharing of benefits from the conservation of biological resources and urges NEMA to issue guidelines on special measures for the protection of species, ecosystems and habitats faced with extinction.

The National Forestry and Tree Planting Act, 8/2003

This Act establishes the National Forestry Authority whose functions are to manage all the country' Central Forest Reserves; provide various forest services on contract to Governments other agencies, councils and clients and operate the National Tree Seed Centre and National Biomass Centres. In terms of the CBD, the Act:

- Establishes a framework for the forest sector's management and planning.
- Provides for the impact assessment relating to the forest sector.
- Provides for community and private sector participation in the management of forests.
- Provides for the declaration of protected forests by the Minister in consultation with the various stakeholders for purposes of conserving biological diversity
- Emphasizes the protection of endangered, threatened and rare biological species.
- Provides for public educations and awareness raising including some other technical services related to the forest sector.

The Wildlife Act, Cap. 200

Under the Wildlife Act, the Uganda Wildlife Authority is charged with the responsibility of managing, coordinating and controlling human activities within and without wildlife-protected areas to ensure maximum sustainable utilization of wildlife resources in Uganda.

To ensure that government policy is not frustrated, the Wildlife Act requires a management plan to be prepared for each wildlife protected area, compliance with statutory requirements by the community in the management of wildlife and carrying out of environmental impact assessments and environment audits and monitoring which augurs well for biodiversity conservation and its sustainable use. Protected area management is one of the priority programmes of the CBD.

Other regulations relevant to biodiversity conservation

Besides the above major policies and laws, there are regulations which govern environment management including biodiversity conservation. Examples of these regulations include the following:

The National Environment (Access to Genetic Resources and Benefit Sharing) Regulations, 2005

These regulations relate to Article 15 of the CBD which calls upon Parties to put in place measures including legislative measures for access to Genetic Resources and Benefit Sharing. The regulations prescribes procedure for access to genetic resources for scientific research, commercial purposes, bioprospecting, conservation or industrial application; the sharing of benefits derived from genetic resources and promoting the sustainable management and use of genetic resources, thereby contributing to the conservation of biological

resources of Uganda. The regulations apply to access to genetic resources or parts of genetic resources, whether naturally occurring or naturalized, including genetic resources bred for or intended for commercial purposes within Uganda or for export.

The National Environment (Environmental Impact Assessment) Regulations S.I. I53-1

Article 14 of CBD among others requires Parties to the Convention to put in place procedures for EIA for proposed projects that are likely to have adverse effects on biodiversity with a view to avoiding or minimizing such effects.

The National Environment (Wetlands, Riverbanks and Lakeshores Management) Regulations S.I. I53-5

The regulations regulate activities within the protection zones for river banks and lake shores to ensure that biodiversity is protected. The regulations provide for sustainable management of wetlands, riverbanks and lakeshores to protect their vital functions including protection of biodiversity therein.

The National Environment (Mountainous and Hilly Areas Management) Regulations S.I. I53-6

The regulations provides for sustainable utilization and conservation of resources including the biodiversity in mountainous and hilly areas by and for the benefit of the people and communities living in the area for the present and future generations.

National Biosafety Bill

This Bill is being prepared by the Uganda National Council for Science and Technology. When enacted, the law will give effect to the National Policy on Biotechnology and Biosafety (2008) referred to above.

3.3 Integration of biodiversity considerations into national and sectoral plans and strategies

The National Environment Action Plan 1995

Government of Uganda developed a National Environment Action Plan (NEAP) in 1995 which provides a framework for addressing environment and natural resource management concerns including deforestation, soil erosion, loss of biodiversity and drainage of wetlands, among others. Complementing the NEAP in addressing biodiversity into the different sectors are the following sector plans:

- The Wetland Sector Strategic Plan 2001-2010
- The National Forest Plan 2002
- The National Forestry Authority Business Plan
- Uganda Wildlife Authority Strategic Plan
- The National Biodiversity Strategy and Action Plan 2002

- Vision 2025
- Land Sector Strategic Plan (2001-2011)
- District Environment Action Plans

These plans are implemented at sector level within established time frames and with resources provided by the central Government and donors.

Poverty Eradication Action Plan (PEAP)

For more than 10 years, the key planning tool has been the Poverty Eradication Action Plan (PEAP). The PEAP has been Uganda's national development framework and medium-term planning tool. It has also been the Poverty Reduction Strategy Paper (PRSP), guiding the formulation of Government policy and the implementation of programmes through sector wide approaches and a decentralized system of governance.

The PEAP is reviewed regularly and the latest draft, which is in advanced stages, will be transformed into a five year National Development Plan (NDP). Key issues relevant to biodiversity conservation in the draft NDP include:

- Improvement of the quality and productivity of the environment, natural resource base towards sustainable economic growth and poverty reduction (including restoration and rehabilitation of degraded natural forests and woodlands, wetlands, watersheds, grasslands and other key ecosystems).

- Establishment of effective incentive mechanisms for benefit sharing, sustainable use and conservation of natural resources (e.g. introduction of appropriate taxation mechanisms as incentives and promotion of payment for ecosystem services).

- Improving the knowledge base, information sharing and exchange, and education towards increased capacity and empowerment (e.g. by supporting education, public awareness and communication on natural resources including biodiversity).

- Improving natural resource governance towards increased efficiency and equity (e.g. by empowering local communities to participate in natural resource management for accountability and equitable use).

3.4 Implementation of other biodiversity related Conventions in Uganda

Over the last four decades, Uganda has participated in major international meetings on sustainable development, endorsed important international declarations and ratified several international treaties in the field of environmental protection. Major international conventions that Uganda has signed and/or ratifies include the Convention on Biological Diversity, the Convention to Combat Desertification, the Ramsar Convention on Wetlands and the United Nations Framework Convention on Climate Change, among others. Although many of these agreements have not set any specific targets or indicators for monitoring

progress towards environmental sustainability, they represent the expressions of the international community to work together towards achieving sustainable development.

Convention on International Trade in Endangered Species of wild flora and fauna (CITES)

This is a convention that brings together biodiversity conservation and wildlife trade. The purpose of CITES is to ensure that no species of wild fauna or flora becomes or remains subject to unsustainable exploitation because of international trade. CITES regulates trade in threatened/endangered species of listed species through a system of permits.

Uganda has put in place a CITES Management Authority (Ministry of Tourism, Trade and Industry) and CITES Scientific Authority (represented by Uganda Wildlife Authority (UWA) for wild fauna, Forestry Inspection Division now Forestry Sector Support Department for wild flora and Fisheries Department for fisheries).

The functions of the CITES Management Authority include:

- Granting permits and certificates on behalf of the Government of Uganda
- General communications and representation of the Party with the Secretariat and with other Parties
- Preparing and submitting Annual Reports (on trade) and biennial reports (on legislative and administrative matters) for the Secretariat and for haring with other Parties to the Convention

Instruments for regulating wildlife trade put in place by UWA include Wildlife Use Rights Guidelines and Regulations, Standard operations procedures for applying and approval of proposals, Inspection checklist, Baseline surveys/ studies, Wildlife trade guidelines and a Management Information System (MIST) to help with data entry, analysis and dissemination.

Uganda is currently developing national legislation aimed enhancing the enforcement of CITES at the national level. The law will specify mechanisms for monitoring wildlife trade and enforcement of CITES, specify offences and penalties and provide for reporting mechanisms, court action and other general procedures.

The Lusaka Agreement

The Lusaka Agreement was adopted on 8th September 1994 basing on a number of factors including the recognition that the conservation of wild fauna and flora is essential to the overall maintenance of Africa's biological diversity and that wild fauna and flora are essential to the sustainable development of Africa. Parties to the Agreement include Congo (Brazzaville), Kenya, Tanzania, Uganda, Zambia and the Kingdom of Lesotho.

Uganda is currently drafting legislation for enforcement of the Lusaka Agreement on Cooperative Enforcement Operations directed at illegal trade in wild fauna

and flora. This law will establish the Lusaka agreement national bureau, spell out its functions and provide for other general procedures including reporting.

UWA has a Law Enforcement Unit based in Kampala responsible for, among others, coordinating operations aimed at reducing and ultimately eradicating illegal wildlife trade. The unit staff normally inspect wildlife consignments at ports of entry and exit. At the regional level, the unit collaborates with Lusaka Agreement Task Force (LATF) for information sharing and joint operations. The unit also closely works with Uganda Customs, Uganda Police and other law informant organs in curbing illegal trafficking of wildlife and wildlife products.

United Nations Framework Convention on Climate Change (UNFCCC)

Uganda signed the UNFCCC on 13th June 1992 and ratified it on 8th September 1993. The objective of the UNFCCC is to achieve, in accordance with the relevant provisions of the Convention, stabilization of Greenhouse Gas (GHG) concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. As a signatory to the UNFCCC, Uganda has carried out a number of activities in support of UNFCCC implementation, including:

- Designated the Department of Meteorology as the UNFCCC Focal Point;
- Compiled a national inventory of sources and sinks of GHGs;
- Carried out vulnerability, adaptation and mitigation assessments;
- Developed a National Adaptation Programmes of Action (NAPA);
- Carried out capacity building activities on the UNFCCC in general and Clean Development Mechanism in particular;
- Carried out public awareness activities on global warming and climate change.

United Nations Convention to Combat Desertification (UNCCD)

The Government of Uganda signed the UNCCD in June 1994 and ratified it in September 1997. The objective of the UNCCD is to combat desertification and mitigate the effects of drought in those countries experiencing serious drought and/ or desertification, particularly in Africa, so as to achieve sustainable development. The Government of Uganda, like other country parties, is required to fulfil a number of obligations, which include, among others to:

- Adopt an integrated approach addressing the biophysical and socio-economic aspects of desertification and drought;
- Integrate strategies for poverty eradication into efforts to address land degradation and drought;
- Give priority and demonstrate relevant commitment to combating desertification through allocating adequate financial resources to implement the National Action Plan to combat desertification in Uganda;
- Integrate the NAP into strategies for sustainable development and cooperation frameworks, such as poverty reduction strategies.

Government of Uganda has undertaken a series of activities to implement the UNCCD in Uganda including:

- Preparation of a National Action Plan (NAP) to combat desertification was undertaken in 1998;
- Preparation of a road-map for resource mobilization for NAP implementation has been completed;
- Formulation of an Integrated Drylands Development Programme (IDDP) to operationalise NAP implementation at community level was undertaken; and
- Efforts to mainstream dry land issues into national development frameworks, Sectoral and District Plans are on-going.

The Ramsar Convention on Wetlands

The aim behind this convention is to halt the worldwide loss of wetlands and to conserve those that remain through wise use and management. It calls for international cooperation for sustainable development and targets activities with negative effect on wetlands, ensuring that they do not lead to loss of biodiversity or diminish the many ecological, hydrological, cultural or social values of wetlands. Uganda signed the convention on 4th March 1988 and ratified it on 4th July 1988.

Government has made progress in implementing the Convention and wetland management in general including the development of tools, procedures and methodologies for wetland management that incorporated the wise use concept. The National Policy for the Conservation and Management of wetland resources was developed in 1995. The Wetlands Inspections Division (now Wetlands Management Department) in the Ministry of Water and Environment was established in 1998. The Wetland Sector Strategic Plan 2001-2010 to guide wetland management in the country is being implemented. A total of 12 sites spread across the country have been gazetted as Ramsar sites for special protection.

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 African Convention on the Conservation of Nature and Natural Resources, Algiers, 1986

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 fauna resources in accordance with scientific principles and taking into account the interest of the inhabitants. 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.

3.5 Processes by which biodiversity has been integrated into the above policies, laws and plans

Central Government: At the centre, a number of government ministries, statutory and semi-autonomous agencies, and departments provide a wide range of services in biodiversity management. The key services provided at this level include planning and policy formulation; providing technical guidance and technical back-stopping to local governments; setting of standards and quality assurance; inspection, monitoring and evaluation.

Local Governments: Since the adoption of the decentralization policy in the early 1990s, the central Government has continued to ensure that the sector policies devolve environment and natural resource management responsibilities to local governments taking into account the principle of subsidiarity. The creation of the local environment and production committees at the different levels of local governments is part of the strategy to enlist their full participation and those of local communities in the biodiversity management. Some local governments have developed ordinances and bye-laws to regulate environment management at lower levels.

Private sector participation: Private sector involvement is often dismal due to limited interest given the apparent low available markets for biodiversity products. However the biotrade programme being supported by Uganda Export Promotion Board and current efforts by Uganda Investment Authority are gradually identifying biodiversity products which should attract private investment. For private sector to play a positive role in biodiversity management there is need for strong public agencies to provide oversight and monitoring of private sector activities.

Civil Society Organizations: Because of their close relationship with communities and the poor, civil society organizations have become instrumental in delivering key services that support biodiversity conservation and poverty eradication. Civil society organizations are engaged in providing a range of services including planning, community empowerment, capacity building and advisory services. A number of NGOs such as World Wide Fund for Nature (WWF), CARE and Environmental Alert are playing a significant role on direct service delivery to local communities. Other leading national NGOs such as IUCN, Advocates Coalition for Development and Environment (ACODE), Uganda

Wildlife Society and others have been active in the development of sectoral policies and plans which are related to biodiversity conservation.

Local Communities: The involvement of local communities in the effective management of natural resources is cited as one of the principles of the National Environment Policy as well as a strategy of the National Environment Action Plan. The national Environment Act supports greater community participation by providing for the establishment of district and local environment committees. These committees ensure a bottom-up approach from the lowest level of local government to the central government.

Typically, the stakeholder list includes farmers, district staff from line ministries relevant to biodiversity conservation, representatives from the same line ministries, NGOs, the private sector, donors, and research and training institutions. Generally, efforts are made to in-build gender considerations within the participation, analysis of issues and formulation of policies, laws and plans. In practice, however, gender representation is usually biased towards men.

Donors: Government of Uganda considers the Poverty Eradication Action Plan (PEAP) now being transformed into the National Development Plan (NDP) as the key framework under which development assistance should be executed. Donors are discouraged from providing funds through individual projects and programmes, but rather under a common basket or pool fund. Furthermore, in view of the decentralization policy, donor agencies are encouraged to support implementation of District Development Plans (DDPs).

Whereas GEF funds would be helpful in bridging the resource gap to address biodiversity concerns, Government's current policy of restricting foreign funding to ensure macroeconomic stability could limit national capacity to benefit from GEF funding. On the other hand, alternative financing of biodiversity programmes through bilateral or multilateral agencies is usually small and limited to processes rather than tangible actions to address on-the-ground issues affecting local communities.

3.6 The use of EIA to ensure that the policies and plans will avoid adverse impacts on biodiversity

The Environmental Impact Assessment Regulations define the process of undertaking EIA emphasising public participation and environmental auditing. When an EIA proves that a development is going to cause a significant loss of biodiversity, it is either stopped or given a number of mandatory mitigation measures to implement to minimize the foreseen biodiversity loss.

By applying and using the EIA regulations, some proposed projects that would lead to high biodiversity are required to mitigate the foreseen loss and hence biodiversity protected (see Table 13 for examples). The protected biodiversity still forms a basis for providing livelihoods to many, especially rural communities, who directly depend on utilization of natural living resources.

Table 13: Examples of approved EIAs from projects that could significantly impact on biodiversity

District	Project	Physical location	Year EIA approved	E.g. of biodiversity saved
Jinja start	Bujagali Hydropower Project	On Victoria Nile	2007	Aquatic
Home	3D Seismic Survey over Kaiso Tonya	In Kaiso-Tonya Area.	2007	Wildlife & aquatic
Nebbi, Masindi, Gulu	2D Seismic Survey in Exploration Area 1, Pakwach Basin	In Pakwach (Nebbi), Bulisa (Masindi) and Nwoya (in Gulu) areas	2007	Wildlife & aquatic
Bullisa	Oil and Gas Exploration Drilling	Karukaa 1 Well Site, Butiaba Parish, Biiso Sub-County, in Exploration area 2, Northern Albert Basin	2008	Wildlife & aquatic
Hoima	Oil and Gas Exploration Drilling	Taita-1 Site, Kibiro Parish, Kigorobya Sub-County, Northern Albert Nile Basin	2008	Wildlife & aquatic
Buliisa	Heritage, Oil and Gas Exploration Drilling	Crocodile- 1 Well Site, Murchison Falls Exploration Area 1 of the Albertine Graben	2008	Wildlife & aquatic
Amuru	Rehabilitation of Chobe Safari Lodge	Murchison Falls Protected Area (MFWPA),Koc-Goma Sub-County	2008	Wildlife
Hoima	(Tullow) Oil and Gas Exploration Drilling	Mputa–5 Exploration Well in Exploration Area–2, Kaiso–Tonya Exploration Area–2, Northern Lake Albert Basin	2009	Wildlife & aquatic

Source: NEMA records

The use of positive incentives may sometimes contribute to making favourable decisions to reduce biodiversity loss. Examples of positive incentives may be found in collaborative management of protected areas by government institutions and communities living adjacent to the PAs. The common incentive measures used include: revenue sharing, joint decision making where the local community participates in decision making concerning the resources. In the wildlife sector, there are revenue sharing schemes between local communities and Uganda Wildlife Authority while in the forestry sector there is a sow log grant scheme whereby some farmers are facilitated to establish their own forest plantations for their own possession and management.

Perhaps the greatest incentive is provided in the National Constitution, the Land Act, as well as the National Forestry and Tree Planting Act, which recognize the rights of Ugandans to own not only land, but also the natural resources on it. A land owner who has a forest on his land is paid directly by anyone interested in harvesting forest resources from the land, while the land owner can use them freely as long as it is done within the law (ensuring sustainable harvesting). Measures to remove perverse incentives are still not widely recognized and used in Uganda.

3.7 Policy challenges for biodiversity conservation

It is clear from the foregoing discussion that, in general, Uganda has adequate policies, laws and plans to conserve its biodiversity ensure sustainable use and equitable sharing of its benefits. In terms of legislation, the most significant challenge is one of enforcement due to inadequate staff or their motivation. There are also problems associated with inadequate political will. A few examples of policy weaknesses include:

Changes in land use of protected areas

There have been instances where high population growth and densities around highly biodiverse forest reserves have led to a spillage of settlements into the PAs. Government has ultimately had to degazette parts of such reserves in order to maintain social harmony. Examples include Mt. Elgon Forest Reserve (6,000 ha) which was degazetted to resettle the Ndorobo tribe.

Weak Policy and legal mechanisms for wildlife conservation outside PAs

Wildlife outside protected areas has continued to receive little attention as far as conservation is concerned. This has been attributed to the rapidly receding wildlife population outside gazetted areas all over the country. What makes this a very serious omission is that wildlife knows no boundaries. They therefore remain largely unprotected when they stray from the reserves into private or public land.

Extensive deforestation on private, communal and (the former) public lands due to inadequate legal protection

About 70% of Uganda's forests are outside PAs, and is thus more prone to degradation due to lack of legal protection. It is because of this reason that there is noticeable extensive deforestation in non-gazetted tropical high forests, woodlands and bush lands caused by heavy and uncontrolled utilization, encroachment and over-harvesting. In general, conservation of biological diversity outside protected areas has not received the attention that it deserves. Thus deforestation and loss of biological diversity have been more extensive and severe outside the protected areas system. Legal provisions to address the overgrazing and poor farming techniques such as shifting cultivation, which also contribute to extensive and unnecessary clearing of woody vegetation, are inadequate.

3.8 The use of the ecosystems approach

The ecosystem approach is a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way. Application of the ecosystem approach will help to reach a balance of the three objectives of the Convention. At its second meeting, the Conference of the Parties has affirmed that the ecosystem approach is the primary framework for action under the Convention (decision II/8). The Conference of the Parties, at its fifth meeting, endorsed the description of the ecosystem approach and operational guidance and recommended the application of the principles and other guidance on the ecosystem approach. The seventh meeting of the Conference of the Parties agreed that the priority at this time should be facilitating implementation of the ecosystem approach.

Uganda through, NEMA and other sectoral agencies, has been using the Ecosystem Approach in the last eight years to restore degraded ecosystems particularly in wetlands, river banks and lake shores throughout Uganda. Uganda has also been promoting regional cooperation in applying the ecosystem approach across national borders through participation in various regional projects and programmes including Lake Victoria Environment Management Project (LVEMP) and the Mt. Elgon Regional Ecosystem Conservation Programme (MERECP) under the East African Community (EAC), among others. The country has further created an enabling environment for the implementation of the ecosystem approach through the development of the NBSAP and through various national and sectoral policies, laws and regulations for major ecosystems such as inland waters, wetlands, forests, mountainous areas, and dry and sub-humid lands.

3.9 The extent of inclusion of biodiversity in environmental impact assessments and strategic environmental assessments

The relevant environmental impact assessment regulations and guidelines do specifically require clear statements of how any proposed policies, projects and programmes will affect biodiversity or biological resources. The Third Schedule of the National Environment Act, 2005 gives a list of projects to be considered for environmental impact assessments including (a) dams, rivers and water resources; (b) forestry related activities; (c) agriculture and (d) natural conservation areas including creation of national parks, formulation or modification of forest policies, water catchment policies, policies for the management of ecosystems, commercial exploitation of natural fauna and flora and introduction of alien species of fauna and flora into ecosystems.

The First Schedule of the Environment Impact Regulations, 1998 requires that the following issues be considered in the making of environmental impact assessments:

- Biological diversity e.g. effect on number of wild animals and vegetation.
- Sustainable use e.g. wetland resource degradation and breeding populations of fish.

- Ecosystem maintenance e.g. fragile ecosystems

EIA Guidelines also require that statements be made on how a project or policy will affect biological resources including vegetation, animals and aquatic ecology.

Some Sectoral policies and laws also have provision for EIA to be carried out for example the National Forestry and Tree Planting Act, Uganda Wildlife Act and Wetlands Policy. A number of Sector guidelines have also been developed for example in the energy sector and fisheries sector which take into account biodiversity issues.

3.10 Impacts of EIA on observed changes in the status and trends of important biodiversity components

The development of tourism facilities like hotels in PAs are likely to negative impact on the landscapes and biodiversity resources in the PAs. These pressures have generally been kept to a minimum due to strict conduct of EIAs and supervision of such projects. Degradation of riverbanks as a result of hydroelectric power construction has also been significantly minimized by EIA thus reducing siltation and saving important inland water biodiversity such as fish. The construction of extensive infrastructure such as roads and electricity lines to stimulate socio-economic development of Uganda has also had reduced impact on biodiversity due to stringent EIA followed by environmental audit controls. These measures have supported a major objective of the NBSAP which is to reduce and manage negative impacts on biodiversity.

CHAPTER 4: CONCLUSIONS: PROGRESS TOWARDS THE 2010 TARGET AND IMPLEMENTATION OF THE STRATEGIC PLAN

4.1 Progress towards the 2010 target

During the sixth meeting of the Conference of the Parties to the Convention on biological Diversity (The Hague, The Netherlands, 2002) in its decision VI/26, Parties committed themselves to a more effective and coherent implementation of the three objectives of the Convention, to achieve by 2010 a significant reduction of the current rate of biodiversity loss at the global, regional and national level as a contribution to poverty alleviation and to the benefit of all life on earth.

Further to the above, the seventh meeting of the Conference of the Parties, in its decision VII/30 adopted a framework to facilitate the assessment of progress towards the 2010 targets and communication of this assessment, to promote coherence among the programmes of work of the Convention and to provide a flexible framework within which national and regional targets may be set, and indicators identified.

Focal Areas

Framework developed in Dec VII/30, includes the following Focal Areas:

a) Reducing the rate of loss of the components of biodiversity, including: (i) biomes, habitats and ecosystems; (ii) species and populations; and (iii) genetic diversity;
b) Promoting sustainable use of biodiversity;
c) Addressing the major threats to biodiversity, including those arising from invasive alien species, climate change, pollution, and habitat change;
d) Maintaining ecosystem integrity, and the provision of goods and services provided by biodiversity in ecosystems, in support of human well-being;
e) Protecting traditional knowledge, innovations and practices;
f) Ensuring the fair and equitable sharing of benefits arising out of the use of genetic resources;
g) Mobilizing financial and technical resources, especially for developing countries, in particular least developed countries and small island developing States among them, and countries with economies in transition, for implementing the Convention and the Strategic Plan.

In addition, COPVIII (Decision VIII/15) went further and provided a provisional framework of goals, targets and indicators to facilitate parties to consistently and coherently assess progress towards the 2010 targets. The contents of the provisional framework with relevant indicators to show work achieved by Uganda are summarized below:

Protect the components of biodiversity

Goal 1: Promote the conservation of the biological diversity of ecosystems, habitats and biomes.

Target 1.1 At least ten percent of each of the world's ecological regions effectively conserved

- **Global target adopted**

- **Mainstreaming target in Sector plans:** Target has been mainstreamed in wetlands, forestry, wildlife sector plans

- **Global indicator 1:** Coverage of protected areas

- **Progress towards the target:** Uganda has a total area of 241,551km^2 of which 31,076 km^2 are PAs (National Parks, Forest Reserves, Wildlife Reserves and community conservation areas). This translates to a total of 12.86% of the whole country area. All National Parks and Wildlife Reserves have been categorized as Strict Nature Reserves or Buffer Zones while CFRs have been categorized as Strict Nature Reserves (241,200 ha), Buffer Zones (239,300 ha) and the rest (785,300 ha) as Production Zones. In addition, preparations are in final stages to increase the PA coverage by adding Fresh Water aquatic protected areas were found to be under-represented in the existing PA system, yet they are important habitats for biodiversity as well for human well being and livelihoods. A total of 11 Ramsar Sites have now been gazetted with a total surface area of 307,756 hectares. Area under coniferous plantations is increasing at an average rate of 0.1% per year with respect to 1990 level. There exists a Fisheries Development and Strategic Investment Plan (2005) which considers identification, gazetting and protecting of critical fish breeding areas on all major lakes in Uganda.

- **Global indicator 2:** Trends in extent of selected biomes, ecosystems and habitats

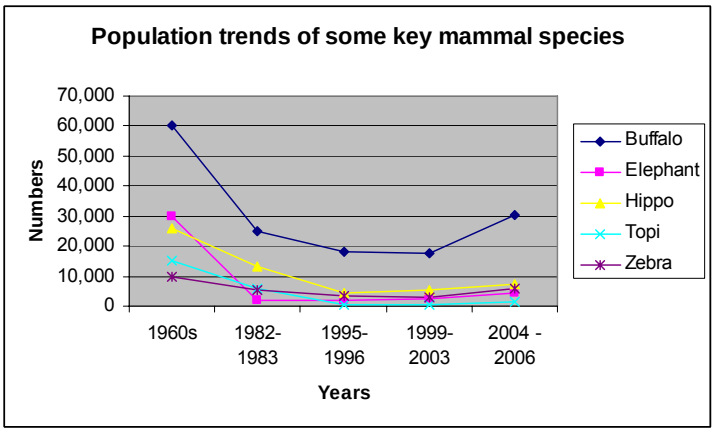
- **Progress towards the target:** Though there are still challenges in maintaining the integrity and extent of all ecosystems, there have been remarkable attempts at rehabilitating formerly degraded forest and woodland ecosystems. About 5,000 ha of timber plantations have been established by the NFA and there are plans to establish about 2,500 annually. There is a gradual recovery in the forest cover within the CFRs particularly in areas where NFA have evicted illegal encroachers (Figure 8). Restoration of wetlands which are critical for biodiversity conservation is on-going.

Fig. 8: Formerly degraded Forest in Uganda recovering after the removal of illegal cultivators that had encroached on the forest

- **Global indicator 3:** Trends in abundance and distribution of selected species

  Progress towards the target: There has been a progressive increase in the number of most wild animals in Uganda's PAs in the last 15 years (Figure 9).

Fig. 9: Population trends of key mammal species



Source: UWA, 2008

Data collected from Important Bird Areas (IBAs) in Uganda show wide variations in trends according to individual bird species and their habitats ((Uganda IBAs, 2008). Recently it was shown that the population of African Skimmer has been rising steadily

between 1998 and 2008 in Queen Elizabeth National Park while its population remained more or less constant in Murchison Falls National Park.

- **Obstacles encountered: There is still** limited baseline data available in Uganda for monitoring of species trends partly because of lack of consensus on indicators as well as inadequate capacity. However a number of taxonomy and environmental monitoring initiatives are being developed at national and sectoral levels that will enable accurate and scientific monitoring of trends in species, ecosystem and genetic diversity to be undertaken. Inadequate financial resources also slow down monitoring activities.

Target 1.2: Areas of particular importance to biodiversity

- **Global target adopted**

- **Mainstreaming target in Sector plans:** Target has been mainstreamed in the NBSAP and sectoral strategies, plans and programmes like the National Wildlife policy, national Forestry Policy 2001, National Forest Plan (2002).

- **Global indicator:** Coverage of protected areas

- **Progress towards the target:** The country has adopted the ecosystem approach in the management of all PA ecosystems, using the multiple use zonation concept. For forest PAs, 20% of the entire forest estate is a Strict Nature reserve, 30% for low impact uses and 50% for production. A similar system applies for wildlife PAs and plans are underway to apply the same concept in aquatic ecosystems. There are also other special areas of particular importance to biodiversity such as the Albertine Rift region, Lake Victoria, Sango Bay Ecosystem, the dry montane forests of Karamoja, Mgahinga Gorilla National Park, Bwindi Impenetrable National Park, Kibale National Park and Mount Elgon National Park. Various activities including projects are on-going to protect the biodiversity in these areas such as the Rwenzori Mountains Conservation and Environmental Management project by World Wide Fund for Nature (WWF), Lake Victoria Environment Management Project by GEF and other funding agencies and Mt. Elgon Regional Ecosystem Conservation Programme (MERECP) funded by Norway and Sweden.

- **Obstacles encountered:** The threats to implementation of this target include population pressure, ecosystem integrity issues such as encroachment, pollution, bushfires and unsustainable exploitation. Other obstacles include inadequate community involvement in PA management, insufficient awareness and inadequate resources.

Goal 2: Promote the conservation of species diversity

Target 2.1 Restore, maintain, or reduce the decline of populations of species of selected taxonomic groups

- **Global target adopted**
- **Mainstreaming target in Sector plans:** The NBSAP addresses all forms of biodiversity known in Uganda, setting actions to be undertaken. Conservation issues have also been integrated in sectoral plans and policies, such as the Wetlands Policy and Wetlands Sector Strategic Plan, the National Environment Policy, National Forestry Policy and the Wildlife Policy. There are also programmes for conservation of agricultural diversity such as the Animal and Plant Genetics Resources programme (MAAIF).

- **Global indicator 1:** Trends in abundance and distribution of selected species

Progress towards the target: Species which were formerly threatened by unsustainable use have since started a steady recovery, particularly primates, crocodiles and other large mammals, mainly due to habitat restoration (Figure 10) and improvement in law enforcement. For example nationally:

- Elephant population has increased by over 100% from 550 in 1995 to 3,000 in 2004.
- Buffaloes have increased by 61% from 7,000 in 1995 to 18,000 in 2004
- Mountain Gorillas have increased by 8% from 292 in 1995 to 315 in 2002
- Giraffe population has increased by 52% from 153 in 1995 to 320 in 2004
- Chimpanzee population increased by 33% from 3, 300 in 1997 to 4,950 in 2003, Uganda has the highest Chimpanzee population in Africa.

Restoration of extinct mammals is also being undertaken. For example, the white rhino which became extinct in Uganda in the 1980s are being re-introduced into the country and presently 2 are at Uganda Wildlife Education Centre and 6 at Ziwa ranches in Nakasongola District.

Fig. 10: Mountain Gorillas in Uganda enjoying the restored montane vegetation and improved protection

- **Global indicator 2:** Change in status of threatened species

- **Progress towards the target:** None has been noticed as yet as this needs a long time frame, but the threats have been drastically reduced, such as illegal trade and illegal hunting, poaching and unsustainable harvesting. There has also been more strict compliance with CITES, which governs and monitors trade in endangered species. Threats have also been reduced through the following conservation measures among others: there are ex-situ breeding programmes for conservation of plant and animal genetic resources by MAAIF/NARO; Fisheries Research Institute has an aquarium and breeding centers for eventual reintroduction of threatened fish species; forests have been zoned under NFA and UWA taking into consideration multiple use, and endangered species.

- **Obstacles encountered:** There has been limited taxonomic information particularly on spatial distribution of threatened species. There are also integrity concerns such as encroachment or degradation of habitats, and limited financial resources for taxonomic work.

Target 2.2: Status of threatened species improved

- **Global target adopted**

- **Mainstreaming target in Sector plans:** The NBSAP and various national laws, regulations, policies and action plans have been developed and implemented to improve status of threatened species.

- **Global indicator 1:** Change in status of threatened species

- **Progress towards the target: N**ationally, significant strides have been made in reduction of the threats and improved protection of endangered species. Sensitization on endangered trees has been carried out and awareness raised amongst PA managers, local communities, civil society and academia to protect endangered species from any threats/ unsustainable exploitation (Figures 11 and 12 below). As a management tool, translocation of wild animals from one National Park to another or from outside has become one of the priorities of UWA especially in attempts to revive the wildlife populations in the country. Between February and June 2005, Rhino Fund Uganda and Uganda Wildlife Authority worked with Kenya Wildlife Service to translocate 8 white rhinos (these rhino are extinct in Uganda) from Kenya to Uganda. The rhinos are currently kept (6) at Ziwa Ranch in Nakasongola District and (2) at Uganda Wildlife Education Centre in Entebbe. During the same year, eleven elands were successfully translocated from Lake Mburo National Park to Kidepo Valley National Park.

- The Process of surveying and consequently gazetting wetland protected areas as Ramsar sites (which had hitherto been inadequately represented in the country's PA system) has been completed and 12 Ramsar sites are now in place and recognized internationally. The Fisheries Department is emphasizing community involvement in conservation through establishment of Beach Management Units (BMU's). FIRRI has aquarium and breeding centers for eventual reintroduction of threatened species. Completion of national biomass inventories by NFA, and national

biodiversity data bank by MUIENR will go a long way in supporting conservation efforts for threatened species.

Fig. 11: Conservationists and PA managers visit Encephalartos whitelockii (CITES Appendix I) near the Mpanga River gorge, Kamwenge district, Uganda

Fig. 12: Mpanga river gorge site, habitat for E. whitelockii partly degraded by Hydropower developers. NEMA later directed the developer to restore degraded part and avoid affecting the survival of the cycads

- **Global indicator 2:** Trends in abundance and distribution of selected species
- **Progress towards the target:** See target 1.1, Global indicator 3
- **Global indicator 3:** Coverage of Protected Areas

Progress towards the target: The coverage of PAs is to increase soon, after the addition of aquatic ecosystem PAs which is underway. Improved management of IBAs currently underway and spearheaded by ***Nature***Uganda is aimed at increasing bird populations in those areas. Similarly, improved management of wildlife, forest and wetland PAs is aimed at improving abundance and distribution of selected species. Examples of on-going activities include the continued gazettement of Ramsar sites, the development of a Wildlife Protected Areas System plan, NFA is leading the reforestation of degraded areas and have a plan to plant an average of 2,500 ha annually for the next 10 years, Uganda Wildlife Authority (UWA) has strengthened law enforcement in curbing trade in wildlife including endangered species like elephants, mountain gorillas, chimpanzees, among others as well as the current initiatives by UWA to re-introduced formerly extinct species such as the white rhino.

- **Obstacles encountered:** There has been limited taxonomic information particularly on spatial distribution of threatened species. There are also integrity concerns such as encroachment or degradation of habitats, and limited financial resources for taxonomic work.

Goal 3: Promote the conservation of genetic diversity

Target 3.1: Genetic diversity of crops, livestock, and of harvested species of trees, fish and wildlife and other valuable species conserved, and associated indigenous and local knowledge maintained

- **Global target adopted**

- **Mainstreaming target in Sector plans:** The NBSAP and various national policies, plans and programmes have mainstreamed this target. Examples of action plans can be found in the Plant and Animal Genetic Resources Programme of NARO, the Rangelands Programme of MAAIF (to conserve grasses) and similar programmes in NFA and UWA.

- **Global indicator 1:** Trends in genetic diversity of domesticated animals, cultivated plants, and fish species of major socio-economic importance

- **Progress towards the target:** An inventory of Plant Genetic Resources for Food and Agriculture (PGRFA) is being undertaken and their in-situ and ex-situ conservation is being carried out Appendix IVA. Following the adoption and ratification of the ITPGRFA, Uganda has drafted a National Policy on PGRFA and the drafting of a law on PGRFA is also on-going. Both the policy and law aim at conservation and sustainable use of PGRFA. A national Gene bank for PGRFA has been established at Entebbe Botanical Garden (Plant Genetic Resources Centre) for ex-situ conservation.

- **Global indicator 2:** Biodiversity used in food and medicine

Progress towards the target: Domestication of and conservation of wild food plants is being undertaken and research in their nutritional values is being undertaken, spearheaded by NARO (National Agricultural Research Organization) in collaboration with other partner institutions. Furthermore, research on the use and efficacy of traditional medicine based on biodiversity is being undertaken in the country, spearheaded by the National Chemotherapeutics Research Laboratory of the Ministry of Health. Research is undertaken in collaboration with the Traditional Medical Practitioners and Traditional Birth Attendants, who are the custodians of TK associated with biodiversity and traditional medicine. Assessments and documentation have also been started in the UNCST with a view of incorporating indigenous knowledge, and innovations in research. There is a Traditional Knowledge Resource Centre at UNCST and the capacity of Uganda Chemotherapeutics Research Laboratory has been strengthened. In addition to NFA, UWA and NARO, MUIENR and other higher institutions of learning are undertaking plant surveys including those with food and medicinal values. *In-situ* conservation activities at the Plant Genetic Resources Centre in Entebbe regularly involve farmer groups and communities that are organized with the aim of fostering the establishment of genetic diversity on farm.

Obstacles encountered: There has been limited taxonomic information to support conservation of genetic diversity. There are also integrity concerns such as encroachment or degradation of habitats, and limited resources for taxonomic work. Efforts to capture indigenous knowledge by MAAIF, UNCST, and the National

Chemotherapeutics Laboratory need to be supported financially. There have been a number of concerns regarding domestic animal genetic resources. Firstly, the indigenous animals of Uganda have survived through in-situ conservation by the communities that have got attached to the various breeds. This attachment is being eroded by the negative publicity being given to local breeds in favour of exotic breeds in pursuit of economic production in changed environments.

Secondly, the current agricultural modernization policy of Government has given impetus to breed substitution through a range of factors including provision of artificial insemination services that provide semen from only exotic breeds and not indigenous breeds; aggressive marketing of the 'superior' exotic bulls as is the case with the village bull scheme; better extension services which tend to favour the change from indigenous to exotic breeds notwithstanding the possible errors involved from using advice based on biased comparisons between indigenous and exotic breeds; the formation of cattle breeders associations for breeds of exotic origin; and, the development of ranches in several parts of the country. In the long run this approach could be counter-productive in terms of indigenous breed conservation. There has also been lack of data on the country's animal genetic resources hampering effective planning for conservation and sustainable utilization.

Promote sustainable use

Goal 4. Promote sustainable use and consumption

Target 4.1: Biodiversity-based products derived from sources that are sustainably managed, and production areas managed consistent with the conservation of biodiversity

- **Global target adopted**

- **Mainstreaming target in Sector plans:** Sectoral laws and regulations dealing with biodiversity management and sustainable use, such as the Forestry and Tree planting Act, Wildlife Act, Fisheries Act, Land Act and National Environment Act have mainstreamed this target. Environmental mainstreaming is also emphasized in most government policies and programmes. Sustainable use of biodiversity-based products has also been incorporated in various sector plans such as the Wetland Sector Strategic Plan, National Forest Plan, National Forestry Authority Business Plan and the Uganda Wildlife Authority Strategic Plan. Sustainable use is again stressed at all levels of management of natural resources in Uganda.

- **Global indicator 1:** Area of forest, agricultural and aquaculture ecosystems under sustainable management

- **Progress towards the target:** The management of all PAs as well as biological resources outside PAs is governed under the principle of sustainable use. This is reflected in all relevant laws on Forestry, Wildlife and Fisheries. All forest and wildlife resource owners, be they within or outside PAs (Figure 13) are supposed to be

managed under a management plan, prescribing how sustainable use will be ensured and enforced. The sustainable use of aquatic ecosystems and their resources especially fisheries is being emphasized, with the creation of no fishing zones and the use of Beach Management Units (with representatives from both government and the fisher communities) at every fish landing site to ensure adherence to the law and the principle of sustainable harvesting.

Fig. 13: Sustainable harvesting of Prunus Africana bark on privately owned land in Mukono district Uganda. Forestry Department officials on a routine visit to ensure the principles of sustainable use are adhered to.

- **indicator 2:** Water quality in aquatic ecosystems

- **Progress towards the target:** Several towns and settlements have sprung up along Lake Victoria and the shorelines of other major lakes in Uganda which have led to a rapid population build up in the areas. The majority of these settlements and towns have no facilities to treat their sewage and organic wastes. These are released direct into the lakes or into streams and surrounding wetlands in untreated or particle treated state. Several industries are operated in these towns such as fish processing plants, textiles, foods, beverages, breweries as well as garbage. Effluent from most of these industries is released into the lakes either untreated or partially treated. The major pollution impact sites in Uganda are located in the towns of Kampala, Entebbe, Mbarara, Masaka, Jinja, Mbale and Kasese. These sites are mainly located on rivers and streams receiving municipal and industrial effluent discharges. In Uganda, water quality is regularly monitored by both the Department of water resources, National Water and Sewerage Corporation and the Wetlands Department each in its areas of jurisdiction. The discharge of raw sewage and industrial effluent is prohibited by law. Non-compliant factories are closed until they install effluent treatment plants.

- **Obstacles encountered:** The threats to implementation of this target include population pressure leading to ecosystem integrity issues such as encroachment and pollution. Inadequate enforcement of the EIA regulations and other laws is also an impediment together with inadequate compliance with the laws. An important obstacle is inadequate financial resources to undertake appropriate assessments on constraints to the target.

Target 4.2: Unsustainable consumption of biological resources, or that impacts upon biodiversity, reduced

- **Global target adopted**

- **Mainstreaming target in Sector plans:** This is evident for wetlands, forestry, fisheries, and wildlife sectors. National and sectoral policies and laws or regulations aiming at reducing unsustainable consumption, such as the Forestry and Tree planting Act, Wildlife Act, Fisheries Act, Land Act and the National Environment Act are being enforced. Sustainable use has also been incorporated in sectoral strategies and action plans. Sustainable use is again stressed at all levels of management of natural resources in Uganda. The Land Act grants ownership rights of land and all resources on it to the landowners; thus giving land owners incentives to sustainably manage biodiversity on their land, since the benefits arising from the use of the resources go directly to the owner.

- **Global indicator:** Ecological footprint and related concepts

- **Progress towards the target:** The Concept of Certification has been introduced and is gradually taking root. Sensitization of consumers and local communities is going on, spearheaded by environmental NGOs and consumers associations to boycott specific products produced through unsustainable means or unsustainable exploitation of natural resources. In forestry, it has been estimated that Uganda's internal market will need about 1.5 million m^3 of timber per year by 2025 (NFA, 2005). To meet this demand, an average of 13,000ha of mature crop will be required annually or nearly 200,000 ha of industrial forest plantations. Short of that, forest product use will be unsustainable. There is evidence to show that timber trees on private lands are likely to be exhausted within the next 3-5 years (by 2011 – 2013) and the current mature timber plantations will also become exhausted around this same time. At the current sustainable harvesting levels of 53,000m3/year over the next 30 years, the available stock in natural forests (Table 14) will not be able to meet the demand for timber after 2011 unless there is a substantial expansion in plantation tree planting.

Table 14: Stocking of Timber Trees in Production zones of Uganda's 5 Main CFRs

Forest	Stocked Area	Net volume (m3)/ha	Net volume (m3)	Harvestable volume (m3) in 30 years	Annual Sustainable harvest (m3)
Itwara	4,496	60	266,056	89,920	2,997
Budongo	29,445	63	1,839,826	588,900	19,630
Bugoma	24,550	77	1,699,447	491,000	16,367
Mabira	13,640	75	1,028,045	272,800	9,093
Kalinzu	7,035	70	490,262	140,700	4,690
Total	**79,166**	**69**	**5,323,636**	**1,583,320**	**52,777**

Source: Mupada et al. 2008

- **Obstacles encountered:** The threats to implementation of this target include population pressure leading to encroachment on PAs, greater demand for biological resources, and unsustainable exploitation. Alternatives to these resources are also lacking such as renewable energy, and given the poverty levels, local communities remain dependent on biological resources.

Target 4.3: No species of wild flora or fauna endangered by international trade

- **Global target adopted**

- **Mainstreaming target in Sector plans:** The NBSAP comprehensively covers different aspects of conservation, stressing sustainable utilization. In addition, a number of natural resource sector plans and programmes also address the principle. In addition, national laws regarding trade in wildlife are being reviewed to bring them in line/conformity with CITES and other relevant regional and international treaties such as the Lusaka Agreement.

- **Global indicator:** Change in status of threatened species

- **Progress towards the target:** No change in status as per international standards as yet, but people have been sensitized and law enforcement improved, reducing the threats considerably as can be seen in the case of sustainable debarking of *Prunus africana* for national and international trade

- **Obstacles encountered:** Obstacles include inadequate human and financial resources for law enforcement; inadequate political support especially during election time; inadequate co-ordination of different sectors involved in law enforcement; inadequate penalties meted out to wildlife law breakers; and poverty among the population making it attractive to break the law even when the people are aware of the consequences.

Address threats to biodiversity

Goal 5: Pressures from habitat loss, land use change and degradation, and unsustainable water use, reduced

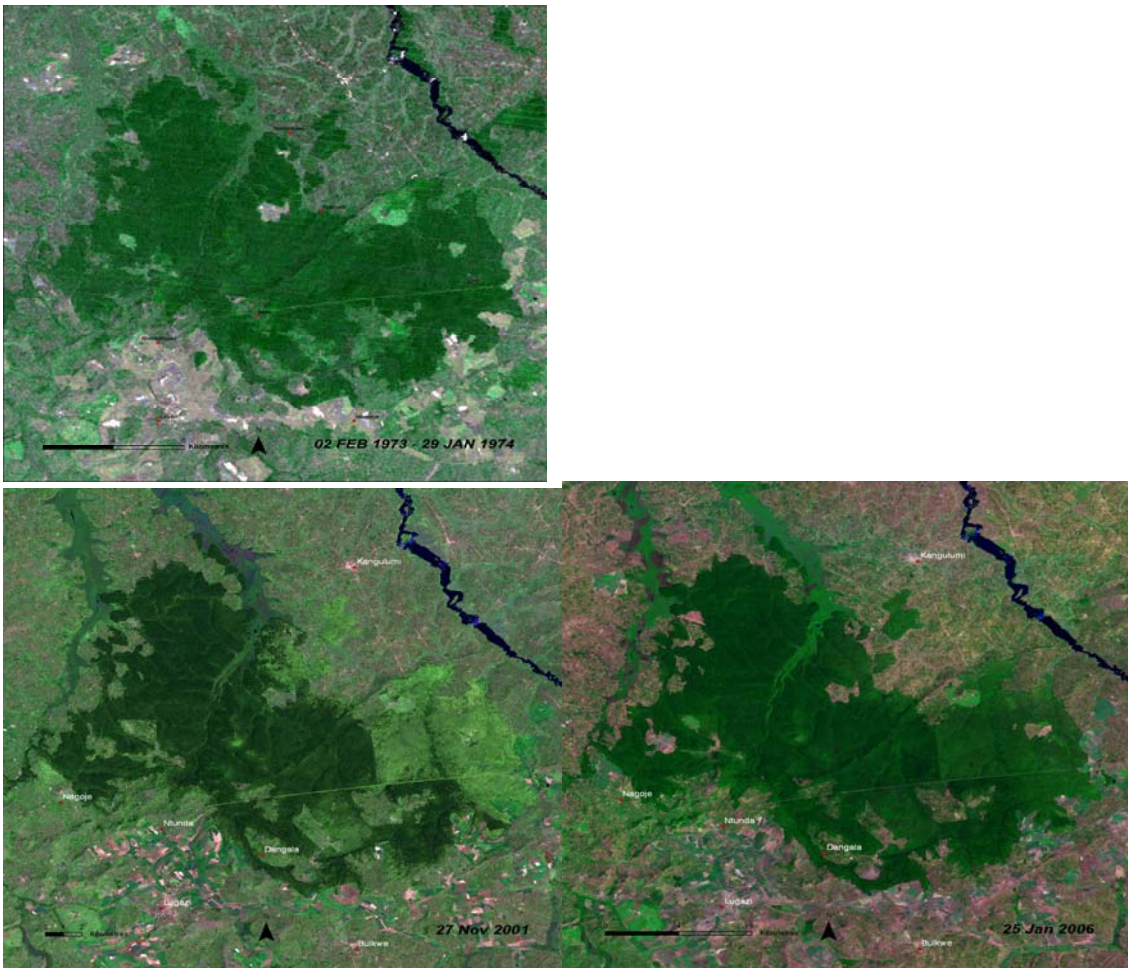
Target 5.1: Rate of loss and degradation of natural habitats decreased

- **Global target adopted**
- **Mainstreaming target in Sector plans:** The NBSAP and various natural resource laws, regulations, policies and action plans have been developed and implemented and enforcement undertaken to reduce pressure on natural resources. Natural resource institutions have also been deliberately strengthened for the same purpose especially those dealing with the environment, forestry, water resources, wetlands, wildlife and agriculture. Many of these institutions also emphasize community participation in reducing degradation. Other partners in ensuring reduced degradation include the private sector, NGO's and research institutions

- **Global indicator 1:** Trends in extent of selected biomes, ecosystems and habitats

- **Progress towards the target:** Various efforts have been made to reduce the loss and degradation of natural habitats (Figure 14). Some of these efforts include the following: Sensitization of political, civic leaders and encroachers in CFRs has been carried have out using radio, print media and workshops. UWA and NFA built at district and national levels, a number of partnerships in the fight against encroachment into the PAs. Major partners include security organs charged with law enforcement, journalists and NGOs. Enrichment planting is on-going in some of the areas of forests vacated by encroachers. As a contracting party to the Ramsar Convention, Government of Uganda has taken a number of steps to implement the Convention. 12 Ramsar Sites have now been gazetted as wetlands of critical importance for strict protection. NEMA, in collaboration with lead agencies, district and local communities has been piloting the use of the *'the ecosystem approach'* for the restoration of fragile ecosystems including wetlands, river banks and lake shores. NEMA, also in collaboration with lead agencies, districts and the police haves started with the exercise of evicting encroachers on wetlands and eventually restoring them to their original status.

Fig. 14: Trends in a section of Mabira Forest Reserve



(Top left: little degradation in 1974, Bottom left: extensive degradation due to encroachment in 2001, and slow recovery after eviction of illegal encroachers by 2006-bottom right) Source: NEMA, 2009

- **Global indicator 2:** Trends in abundance and distribution of selected species

- **Progress towards the target:** See various section above

- **Obstacles encountered:** The main obstacles to successful implementation include high population pressure limited resources for enforcement of regulations, inadequate regulation outside Pas, inadequate involvement of local communities in the management of biodiversity, inadequate capacity of organized local community groups for example Beach Management Units (BMU's) to engage in biodiversity management. Poor fishing methods have also been reported to be a threat to fish production and multiplication. Most grill-nets, boats and mosquito seines currently used for fishing in Uganda by fishermen are of illegal size. Fishermen prefer to use smaller mesh net sizes than those recommended by law, because they are unable to catch adequate numbers of fish using the recommende3d mesh nets. The use of poisons to catch fish, though illegal, has been reported in some landing sites. Such poisonous chemicals kill fish and other aquatic organisms.

Goal 6. Control threats from invasive alien species

Target 6.1: Pathways for major potential alien invasive species controlled

- **Global target adopted**

- **Global indicator 2:** Trends in abundance and distribution of selected species

- **Mainstreaming target in Sector plans:** Invasive alien species are addressed in a few policies, laws and plans. The National Environment Act prohibits planting of exotic species close to the borders and also within wetlands. In addition the government has reviewed the Plant Protection Act. The Act provides for Plant quarantine inspectors at key border/ entry points into Uganda to inspect any plant. The Wildlife Act and the National Forest Plan also make reference to invasive alien species.

- **Global indicator:** Trends in invasive alien species

- **Progress towards the target:** An assessment has been carried out in the Forestry, Wildlife and Agricultural sectors to identify key invasive alien species and the areas that are affected. However, not much has been done yet, regarding measures to eradicate them where they exist.

- Significant progress has been made through a GEF-UNEP regional project 'Removing Barriers to Invasive Plant Management in Africa' which is implemented by NARO. Through this project, an IAS Training Manual has been developed, efforts to manage/control several species such as *Cymbopogon nardus, Senna spectabilis, Lantana camara and Parthenium hysterophorus* are on-going, extensive awareness on the impact of invasive alien species on biodiversity has been created and a National Invasive Species Strategy, Action Plan and Policy Guidelines for Uganda have been prepared.

- **Obstacles encountered:** A major setback has been limited resources for taxonomic work, monitoring and eradication. Most of the work done in the eradication of invasive alien species has mainly been in reaction to an outbreak than regular/routine monitoring work.

Target 6.2: Management plans in place for major alien species that threaten ecosystems, habitats or species.

- **Global target adopted**

- **Mainstreaming target in Sector plans:** Besides on-going assessments (in protected areas and in the agricultural sector including rangelands) and other control programmes, the Plant Protection Act and related regulations are being implemented to control the introduction of alien species in the country. Regulations on Access to Genetic Resources and Benefit sharing have also mainstreamed issues of alien invasive species. A National Invasive Species Strategy, Action Plan

and Policy Guidelines for Uganda also extensively discuss issues of alien invasive species

- **Global indicator:** Trends in invasive alien species

- **Progress towards the target:** A National Invasive Species Strategy, Action Plan and Policy Guidelines for Uganda has been prepared and discussed with key stakeholders, and handed over to the coordinating institution (NEMA). Its implementation will be done at sectoral level, to make use of the specialized expertise for the different ecosystems in the different sectors as opposed to the creation of a new structure, which would have heavy financial implications. Management plans and options for three key invasive alien species were prepared and are being implemented in different relevant sites. The lessons learnt are supposed to be replicated in other sites. Meanwhile the populations of the water hyacinth on Lake Victoria have been brought down to manageable levels using a combination of mechanical harvesting and biological control. The spread of *Senna spectabilis* in one of the pilot areas (Budongo Forest reserve) has been halted and trials on its full control are underway.

- **Obstacles encountered:** Implementation of alien species eradication and control programmes is constrained by inadequate resources (human, financial, technological).

Goal 7: Address challenges to biodiversity from climate change, and pollution

Target 7.1: Maintain and enhance resilience of the components of biodiversity to adapt to climate change.

- **Global target adopted**

- **Mainstreaming target in Sector plans:** The Department of Meteorology is the institution mandated to implement policies related to climate and climate change. The policy goal in this sector is "to maintain a well developed weather and climate monitoring system that provides necessary information and advisories to support sustainable socio economic development. The NAPA (2005) has been prepared and constitutes a short-term means for addressing impacts of adverse effects of climate change. Apart from targeted activities such as the proposed creation of the National Climate Change Secretariat, a number of relevant policy guidelines and objectives related to climate and climate change have been highlighted in various policy documents including the Population Policy, the Health Policy, Disaster Management and Preparedness Policy, the Forestry Policy, the National Environmental Policy, the Water Policy and Action Plan, the Energy Policy, Waste Management Regulations and the National Wetlands Policy. Uganda was actively involved in several IGAD activities and Programmes (IGAD – Inter Governmental Authority on Development, created in 1986 by six drought stricken East African countries to coordinate development in the Horn of Africa). IGAD's major activities included: Water harvesting in dry land areas; Early warning and response network; Joint framework for mainstreaming and partnership for IGAD member states; IGAD Regional Integrated Information System (RIIS); IGAD Disaster and Drought Preparedness Strategy; and Joint capacity building projects undertaken by member states. Uganda

has just completed a pilot capacity building project for synergistic implementation of Multilateral Environmental Agreements (MEAs) under the New Partnership for Africa's Development (NEPAD). This project focuses on UNCCD, CBD and UNFCCC. Uganda was also linked to the UNCCD Regional Action Program through several thematic program networks.

- **Global indicator 1:** Connectivity/fragmentation of ecosystems

- **Progress towards the target:** A national task force has been formed to address the challenges arising from climate change and recommend appropriate mitigation measures. The task force is multi-sectoral but coordinated by the Ministry of Environment. Their recommendations may be the ones that will be used to address such issues as ecosystem fragmentation

- **Global indicator 2:** Water quality in aquatic ecosystems

- **Progress towards the target:** Water quality is regularly monitored by both the Department of water resources, National Water and Sewerage Corporation and the Wetlands Department each in its areas of jurisdiction. The discharge of raw sewage and industrial effluent is prohibited by law. Non-compliant factories are closed until they install effluent treatment plants. For Water Resources, there is now regular water quality monitoring (quarterly) for all major rivers, lakes and pollutant sources. However, lake water and air quality monitoring has been limited to Lake Victoria. A national database has been established from which water quality maps will be produced. The Water Resources management department undertakes storing, processing and disseminating water resources data and information to all users.

- **Obstacles encountered:** The decline in fish catches and fish biodiversity, the disappearance of fish species, the deterioration of fish habitats and breeding grounds have been partly attributed to deterioration in water quality of Lake Victoria as a result of increased pollution from both point and non-point sources. (LVFO). Clear signs of algal productivity have been on the increase since the 1960s. A major challenge to water quality in aquatic ecosystems is inadequate resources for enforcement (human, financial, technological). Lack of resources has also been responsible for limited adoption of cleaner production investments.

Maintain goods and services from biodiversity to support human well-being

Goal 8: Maintain capacity of ecosystems to deliver goods and services and support livelihoods

Target 8.1: Capacity of ecosystems to deliver goods and services maintained

- **Global target adopted**

- **Mainstreaming target in Sector plans:** In maintaining capacity of ecosystems to maintain goods and services, sustainable use has been mainstreamed at various levels of natural resource management including policies, laws and sectoral action

plans. Environmental mainstreaming is emphasized for most government policies and programmes.

- **Global indicator 1:** Biodiversity used in food and medicine

- **Progress towards the target:** Ugandans have for a very long time depended on biodiversity for food, feed, medicine and a number of other socio-economic needs. The right of Ugandans to continue deriving these goods and services from resources under the control of government is ensured and respected in the relevant laws, policies, and management plans as long as it is done sustainably and in accordance with national laws for conservation and sustainable use of fauna and flora.

- **Global indicator 2:** Water quality in aquatic ecosystems

- **Progress towards the target:** See indicator 2, target 7.1

- **Global indicator 3:** Incidence of Human-induced ecosystem failure

- **Progress towards the target:** The rights of Ugandans to derive livelihoods from biodiversity has at times been abused by the beneficiaries, leading to near total destruction of the ecosystems (especially forests and wetlands), with unpredictable but almost certainly catastrophic long term results. This has often resulted into conflicts between local communities and PA managers. The short term results have been more frequent incidences of floods, drying up of wells and springs, siltation of rivers and lakes and more frequent incidences of drought.

- **Obstacles encountered:** Increasing populations, over dependence on ecosystem resources, lack of alternatives, limited resources for implementation of programmes promoting ecosystem productivity, and enforcement of regulations are some of the obstacles which limit the capacity of ecosystems to deliver goods and services.

Target 8.2: Biological resources that support sustainable livelihoods, local food security and health care, especially of poor people maintained

- **Global target adopted**

- **Mainstreaming target in Sector plans:** This target is reflected in the NBSAP as well as other sectoral strategies, plans and programmes. Collaborative management and community conservation have been incorporated in all relevant sector laws and regulations and are being implemented as such

- **Global indicator 1:** Health and well-being of communities who depend directly on local ecosystem goods and services

- **Progress towards the target:** Work is on-going to document wild plants used for food and medicine (in collaboration with local specialized users) with a view to designing more efficient harvesting and processing techniques as well as designing effective conservation methods. A draft National Policy on Traditional Medicine and Medicinal Plants has been developed by the Ministry of Health with the aim of

mainstreaming traditional medicine into national health care delivery system and putting in place mechanisms for conservation and sustainable utilization of traditional medicine and medicinal plants recognizing that economic, social development and poverty alleviation are the first and overriding priorities of the nation. The rights of traditional healers and health attendants are being advocated for these days by civil society organizations.

- **Global indicator 2:** Biodiversity used in food and medicine

- **Progress towards the target:** This has been going on since time immemorial and is being encouraged by government agencies with an aim of making the use of biodiversity for food and medicine more efficient and sustainable

- **Obstacles encountered:** Obstacles include high diversity of peoples' interests; resources sometimes too small compared with peoples' needs (perhaps due to high population density of poverty-stricken people); people mainly interested in accessing the resources rather than contributing towards protection of the biodiversity, the more educated class are rapidly losing interest in traditional foods and medicine opting for the western amenities. More time and effort are needed for community sensitization regarding sustainable use principles.

Protect traditional knowledge, innovations and practices

Goal 9: Maintain socio-cultural diversity of indigenous and local communities

Target 9.1: Protect traditional knowledge, innovations and practices

- **Global target adopted**

- **Mainstreaming target in Sector plans:** The NBSAP and various sectoral policies, plans and programmes have incorporated traditional knowledge, innovations and practices. This is evident in NAPA (2005), forestry action plans, and documentation of indigenous knowledge pertaining to plant genetic resources for food and agriculture by NARO. There have also been efforts by the Uganda National Council for Science and Technology, the National Chemotherapeutics Laboratory, Ministry of Health and some institutions of higher learning to document indigenous knowledge on various facets of biological resources. There is a Uganda National Culture Policy which encourages the development, documentation and quantification of indigenous knowledge and practices and its relationship with environmental degradation.

- **Global indicator:** Status and trends of linguistic diversity and numbers of speakers of indigenous languages

- **Progress towards the target:** A draft National Policy on Traditional Medicine and Medicinal Plants has been developed by the Ministry of which integrates traditional medicine/medicinal plant products and practitioners into the commercial sector to enhance income at the individual, community and national level and improve health

in the country. Uganda has a total of 56 local languages all of which are being encouraged and developed through deliberate government policy such as through encouragement of radio and TV programmes in the various languages in all government owned media as well as in some privately owned media. However, urbanization and globalization have tended to encourage a few dominant languages over the multitude of other local languages

- **Obstacles encountered:** Loss of indigenous knowledge and lack of financial resources for its documentation and protection coupled with local peoples' unwillingness to part with their knowledge.

Target 9.2: Protect the rights of indigenous and local communities over their traditional knowledge, innovations and practices, including their rights to benefit-sharing

- **Global target adopted**

- **Mainstreaming target in Sector plans:** Local community issues and their relation with biodiversity are well catered for in the NBSAP as well as the relevant laws and policies. In terms of forestry, about 70% of the forestry resources in Uganda fall outside protected areas, on lands traditionally owned and controlled by small scale landowner, indigenous and local communities, with government providing a policy and legal framework and advice to them to ensure sustainable management. The Uganda National Culture Policy advocates for the promotion of cultures of indigenous minorities.

- **Global indicator :** To be developed

- **Progress towards the target:** The rights and interests of indigenous and local communities living close to PAs are respected and ensured through collaborative forest managements agreements in place under NFA and community conservation under UWA Community Conservation agreements. There are also revenue sharing arrangements between UWA and local communities living around PAs. In addition, the right of Ugandans to own and use all biological diversity on their land is assured as long as they use such resources in accordance with relevant laws for conservation and sustainable use of biological diversity. The national ABS regulations recognize the inseparable nature of genetic resources and associated traditional knowledge. Benefit-sharing arising from Access to and use of genetic resources or associated traditional knowledge is expected to be respected and ensured under the same law requiring prior informed consent of local communities regarding either the genetic resources existing on their lands or the associated traditional knowledge.

- **Obstacles encountered:** Inadequate financial and human resources to sensitize the population; general poverty which make investment in long-term activities difficult for local people as well as lack of incentives to motivate local people's interest in conservation.

Ensure the fair and equitable sharing of benefits arising out of the use of genetic resources

Goal 10: Ensure the fair and equitable sharing of benefits arising out of the use of genetic resources

Target 10.1: All access to genetic resources is in line with the Convention on Biological Diversity and its relevant provisions

- **Global target adopted**

- **Mainstreaming target in Sector plans:** The NBSAP as well as the Regulations on Access to Genetic Resources and Benefit Sharing which came out in 2005 comprehensively covers this target. Hitherto such matters were handled in accordance with the National Environment Act, which gives basic principles.

- **Global indicator :** To be developed

- **Progress towards the target:** The Regulations on Access to Genetic Resources and Benefit Sharing are being implemented. They were drafted in line with the requirements of the CBD, its Bonn Guidelines and the African Model law on ABS

- **Obstacles encountered:** Inadequate financial and human resources for enforcement of the regulations; trans-boundary nature of some of the genetic resources, making it difficult to trace the exact origin of genetic resources found with a third party; difficulties in differentiating between pre-convention and post convention accessions in possession of countries. Enforcement of the regulations has also been a challenge in the face of modern biotechnology where small quantities of plant tissue is sufficient to use for micro-propagation instead entire seed/cutting, making contraband access easier to conceal.

Target 10.2: Benefits arising from the commercial and other utilization of genetic resources shared in a fair and equitable way with the countries providing such resources in line with the Convention on Biological Diversity and its relevant provisions

- **Global target adopted**

- **Mainstreaming target in Sector plans:** There are general provisions in the Regulations on Access to Genetic Resources and Benefit Sharing covering access to all biodiversity in Uganda and the institutional arrangements for accessing the resources and how the benefit-sharing arrangements will be approached. The institutional arrangements are made to fit with other existing national laws and related institutional set-up rather than being based on CBD thematic areas.

- **Global indicator :** To be developed
- **Progress towards the target:** This is being handled through the implementation of the Regulations on Access to Genetic Resources and Benefit Sharing
- **Obstacles encountered:** Same as in Target 10.1

Ensure provision of adequate resources

Goal 11: Parties have improved financial, human, scientific, technical and technological capacity to implement the Convention

Target 11.1: New and additional financial resources are transferred to developing country Parties, to allow for the effective implementation of their commitments under the Convention, in accordance with Article 20

- **Global target adopted**
- **Mainstreaming target in Sector plans:** N/A
- **Global indicator :** Official development assistance provided in support of the Convention
- **Progress towards the target:** Uganda has been a recipient of ODA in support of the Convention from the GEF, UNEP and a number of bilateral donors such as, but not limited to the EU, Norway, Denmark, USA, UK etc. However, this is still less than adequate and more assistance is still needed if the success made is to be maintained
- **Obstacles encountered:** Access to new and additional financial resources to implement the convention is still a big problem. There has been a general increase in personnel assigned to implementation of the provisions of the Convention

Target 11.2: Technology is transferred to developing country Parties, to allow for the effective implementation of their commitments under the Convention, in accordance with its Article 20, paragraph 4

- **Global target adopted**
- **Mainstreaming target in Sector plans:** N/A
- Global indicator : To be developed
- **Progress towards the target:** Uganda has received some transfer of technologies from a number of bilateral donors though more is till needed

4.2 Progress towards the goals and objectives of the strategic plan of the Convention

During COP VI, the Parties, in Decision VI/26, adopted a strategic Plan in which parties committed themselves “to a more effective and coherent implementation” of the CBD’s three objectives to achieve the 2010 target

The Goals and objectives of the strategic plan of the Convention: There are four broad goals of the strategic plan. Uganda is required to assess progress in meeting, or contributing to, the relevant goals and objectives of the Strategic Plan in the following manner:

Goal 1: If the Convention is fulfilling its leadership role in international biodiversity issues

Goal 2: If Uganda has improved its financial, human, scientific, technical and technological capacity to implement the convention

Goal 3: If the NBSAPs and other biodiversity concerns are sufficiently integrated into relevant sectors as an effective framework for the implementation of the objectives of the Convention

Goal 4: If there is a better understanding of the importance of biodiversity and of the Convention and if this has led to broader engagement across society in implementation

Goal 1: The Convention is fulfilling its leadership role in international biodiversity issues

From Uganda's point of view, the Convention is fulfilling its leadership role. Therefore the agenda of CBD is getting much bigger and it is becoming harder to cope among all Parties and to reach consensus

1.1: The Convention is setting the global biodiversity agenda: This was clearly demonstrated at the World Summit on Sustainable Development in 2002 in South Africa where the CBD took the lead on biodiversity issues.

1.2: The Convention is promoting cooperation between all relevant international instruments and processes to enhance policy coherence: Uganda is of the opinion that the CBD is playing an active role in promoting cooperation between other international instruments such as the UNCCD, UNFCCC and Ramsar. At the national level, Uganda sees more cooperation between the National Focal Points of other Conventions including UNFCCC, UNCCD CITES, CMS and Ramsar. There is also a lot of cooperation at the regional level especially among the three East African States of Uganda, Kenya and Tanzania.

1.3: Other international processes are actively supporting implementation of the Convention, in a manner consistent with their respective frameworks: To some degree this is being done particularly in developed countries

1.4: The Cartagena Protocol on Biosafety is widely implemented: Uganda ratified the Protocol in 2001 and is on course with its implementation. The National Focal Point and a Competent National Authority are in place and so is a National Bio-safety Committee (a multi-sectoral technical Committee responsible for advising the Competent National Authority on how to deal with applications for LMO releases as well as Confined Field Trials as well as any other matters of relevance to Biosafety). No commercial releases of LMOs have been carried out as yet though several confined field trials have been approved. The National Biotechnology and Biosafety Policy has

been passed by Cabinet (April 2008)_while the National Biotechnology and Biosafety Bill is in its final stages of approval. Capacity building activities have been on-going since the 1990s to date, supported by different international and bilateral donors and the Uganda government. Uganda compiled and submitted its first National Report on the Cartagena Protocol, which was submitted to the SCBD in September 2007 as required.

Obstacles encountered: Inadequate resources (financial, human and infrastructural) to adequately implement the provisions of the Protocol.

1.5: Biodiversity concerns are being integrated into relevant sectoral or cross-sectoral plans, programmes and policies at the regional and global levels: In the East African Community, biodiversity concerns have been integrated in the environment and natural resources component. At the regional level, the Intergovernmental Authority on Development (IGAD) one of the Regional Economic Communities that Uganda belongs to has among its 10 objectives, three that are of relevance to biodiversity. The objectives are (a) achieve regional food security and encourage and assist efforts of Member States to collectively combat drought and other natural and man-made disasters and their natural consequences; (b) initiate and promote programmes and projects to achieve regional food security and sustainable development of natural resources and environment protection, and encourage and assist efforts of Member States to collectively combat drought and other natural and man-made disasters and their consequences and (c) facilitate, promote and strengthen cooperation in research development and application in science and technology. Not much is known about progress at the global level.

Obstacles encountered: Inadequate resources (financial, human and infrastructural) at the regional level

1.6 Parties are collaborating at the regional and sub regional levels to implement the Convention: The African Union Commission has integrated CBD issues in its regional agenda and has started programmes of preparing African negotiators for negotiations at key Biodiversity international meetings such as meetings of the CBD Conference of the Parties and related Inter-sessional meetings such as the ABS working group meetings. All AU member states including Uganda are always invited to participate in such preparatory meetings and Uganda has been actively participating in these meetings.

Obstacles encountered: Inadequate resources (financial, human and infrastructural) at the regional and sub-regional levels

Goal 2: Parties have improved financial, human, scientific, technical, and technological capacity to implement the Convention

2.1 All Parties have adequate capacity for implementation of priority actions in national biodiversity strategy and action plans: Uganda's NBSAP was largely focused and pegged onto existing government institutions, so there is reasonable capacity for its implementation. However, there is need for constant capacity building to compensate for staff turnover as well to keep personnel up to date. There is also need for logistical and financial support to ensure more efficiency of the existing personnel and to expedite the implementation of priority activities.

2.2: Developing country Parties, in particular the least developed and the small island developing States amongst them, and other Parties with economies in transition, have sufficient resources available to implement the three objectives of the Convention: Although Uganda occasionally gets financial support from various sources as indicated in section 2.4, financial resources are inadequate due to government's preoccupation with other more pressing aspects of socio-economic development such as poverty alleviation concerns. More funds will therefore continue to be required in the short to medium term from GEF and other bilateral and multilateral agencies.

2.3: Developing country Parties, in particular the least developed and the small island developing States amongst them, and other Parties with economies in transition, have increased resources and technology transfer available to implement the Cartagena Protocol on Biosafety: Uganda has been a recipient of assistance for the implementation of the CPB and associated Capacity-building from UNEP/GEF, USAID, Norwegian Institute for Gene Ecology, BIOEARN and African Union among others since the mid 1990s to date. A number of people have also been trained both within and out of the country in Risk Assessment, Risk Management, Modern Biotechnology and Processing Application for LMO releases in the Environment. Resources and technology transfer continue to be a major impediment to implementation of the Cartagena Protocol on Biosafety. But the capacity built is still inadequate due to aging and staff relocations.

2.4: All Parties have adequate capacity to implement the Cartagena Protocol on Biosafety: A reasonable amount of capacity has been developed in the country, though more is still needed to cater for staff turnover and to create a critical mass of personnel to draw from as and when need arises.

2.5: Technical and scientific cooperation is making a significant contribution to building capacity: The contribution has not been formally assessed.

Goal 3: National biodiversity strategies and action plans and the integration of biodiversity concerns into relevant sectors serve as an effective framework for the implementation of the objectives of the Convention

3.1: Every Party has effective national strategies, plans and programmes in place to provide a national framework for implementing the three objectives of the Convention and to set clear national priorities: Uganda has a NBSAP which is being implemented. Integration of the contents has also been done in the different national programmes and priorities. The NBSAP was formulated in such a way that it directly addresses most of the articles of the Convention, the CBD thematic Programmes of Work as well the cross-cutting issues adopted under the Convention. Effective implementation of the NBSAP is constrained by inadequate financial, human and infrastructural resources for implementation of planned activities and programmes.

3.2: Every Party to the Cartagena Protocol on Biosafety has a regulatory framework in place and functioning to implement the Protocol: Uganda has a National Biosafety framework which is already being implemented. In addition, a policy has been passed and a law is being finalised. Administrative measures have been in place since 1996 and are constantly being strengthened and improved.

Biodiversity concerns are being integrated into relevant national sectoral and cross-sectoral plans, programmes and policies: Uganda has integrated Biodiversity concerns in different sectoral plans and policies. The key sectoral plans for implementing biodiversity concerns include the National Environment Action Plan 1995, the Wetland Sector Strategic Plan 2001-2010, the National Forest Plan 2002, the National Forestry Authority Business Plan, Uganda Wildlife Authority Strategic Plan, the National Biodiversity Strategy and Action Plan 2004,Land Sector Strategic Plan (2001-2011), and District Environment Action Plans. Biodiversity is also an integral part of EIA studies which (EIA) studies are themselves mandatory before any development that will have a significant impact on the Environment can take place or get approved.

Obstacles encountered: Sectors rarely allocate significant funding to support biodiversity concerns in their policies or plans

3.4: The priorities in national biodiversity strategies and action plans are being actively implemented, as a means to achieve national implementation of the Convention, and as a significant contribution towards the global biodiversity agenda: NBSAP priorities are directly linked to various Articles of the Convention thereby contributing to the global biodiversity agenda.

Obstacles encountered: Effective implementation of the NBSAP is constrained by inadequate financial, human and infrastructural resources for implementation of planned activities and programmes.

Goal 4: There is a better understanding of the importance of biodiversity and of the Convention, and this has led to broader engagement across society in implementation

4.1 All Parties are implementing a communication, education, and public awareness strategy and promoting public participation in support of the Convention: In Uganda Communication, Education and public awareness (CEPA) programmes are being implemented at different levels. Biodiversity management and conservation is a taught course at the country's major Universities and other Tertiary institutions and are being gradually integrated at secondary and primary school levels. Informal education and public awareness campaigns are also regularly conducted by government agencies such as NEMA as well as by number of specialized civil society organizations. Public awareness programmes are conducted through the media, radio and television, fact sheets, brochures, posters and banners especially during World Environment Day.

Obstacles encountered: Inadequate financial resources to implement CEPA programmes

4.2 Every Party to the Cartagena Protocol on Biosafety is promoting and facilitating public awareness, education and participation in support of the Protocol: Uganda is promoting public awareness and education at different levels both in formal education institutions and informally to the general public through various channels such as the media and in collaboration with relevant NGOs such as Consumer Education Trust and Uganda Consumers Protection Association. These NGOs have

also been represented in the National Biosafety Committee where they gather up-to-date information to be shared with the public through their NGO programmes.
Obstacles encountered: Inadequate human and financial resources to implement CEPA programmes

4.3 Indigenous and local communities are effectively involved in implementation and in the processes of the Convention, at national, regional and international levels: Indigenous and local community groups occasionally participate in conservation issues especially at Protected Area levels. Indigenous groups such as United Organization for Batwa Development in Uganda (UOBDU) have also been participating in relevant CBD related meetings at international level, such as COP and Article (j) meetings.

Obstacles encountered: Indigenous community groups lack funding to participate in the processes of the Convention at national, regional and global levels.

4.4: Key actors and stakeholders, including the private sector, are engaged in partnership to implement the Convention and are integrating biodiversity concerns into their relevant sectoral and cross-sectoral plans, programmes and policies: The private sector in Uganda for the last 5-10 years have been actively involved in conservation related activities such as Ecotourism (non-consumptive use of Biodiversity to improve livelihoods and alleviate poverty), massive commercial tree planting (afforestation) and reforestation programmes to replace the trees they harvest for timber and other products and provide employment and alternative means of livelihoods to the people). The NFA demonstration plantations have galvanized the private sector into establishing about 10,000 ha of quality timber plantations. The main drivers for this increased private sector investment include:

- Sustained public education which intensified during the consultation phase of the forestry sector transformation
- The Sawlog Grant Production Scheme (SPGS) which provided seed money to catalyse investment. The Scheme put emphasis on quality management as a basis for the investor to get the grant money.
- A more legally secure licensing environment provided by the newly created NFA created confidence in using CFR land.

Obstacles encountered: The Convention and its benefits are still not well known to the private sector

4.3 Conclusion

Generally, the implementation of the CBD has had a positive impact on the conservation and sustainable use of biological diversity in Uganda. Though Uganda had a system of PAs through out the country before the onset of the CBD, there are issues that were brought more in the limelight by the CBD, which have led to better conservation. Among these are issues related to Article 8(j), ABS, Biosafety and technology transfer. In addition, the CBD has led to increase in funding both from within and without the country, more public education and awareness all of which have impacted positively on Biodiversity conservation.

In order to strengthen implementation of the Convention, there is need for more capacity building and public awareness, targeting technical cadres as well as NGOs and local communities at national level. At the regional level, there is need to refine existing programmes of work or to develop new ones to address emerging issues and to suggest goals and objectives that may be included in future Strategic Plans of the Convention; and identify mechanisms that need to be established at various levels. There is also need to strengthen capacity at regional and sub-regional levels to ensure harmonization and synchronization of policies relating to the three objectives of the Convention. This would lead to better conservation of cross-border ecosystems, as well as migratory species. It would also ensure that unscrupulous exploiters of natural resources, such as Bio-prospectors and bio-pirates do not leave one country that has strict regulatory measures and go into a neighbouring country that either has no regulatory measures or weak ones to access and exploit the same resource they could not in a neighbouring country, thereby undermining conservation efforts.

While it can be acknowledged that Uganda has made considerable progress in implementing the three objectives of the convention and towards achieving the CBD's 2010 target and the strategic plan of the Convention, especially through the NBSAP, there are still many gaps that need to be addressed, including:

- There is presently no wwidespread use of agreed indicators by the relevant sectors for measuring status and trends of biodiversity
- National targets for addressing the Goals of the 2010 target needs be developed
- Inadequate financial, human, technical resources
- Inadequate attention to biodiversity outside PAs
- Existing scientific and traditional knowledge not fully utilized
- Poverty among the Ugandan population and their dependence on natural resource use
- Population pressure on biodiversity rich ecosystems
- Inadequate law enforcement .

But support to these deficient areas are constrained by inadequate resources, inadequate manpower, poor infrastructure such as laboratory facilities and the underlying factors such as poverty and the fast growing human population. Adequate support in these areas would go a long way in providing Uganda with a conducive environment for meeting its convention obligations.

4.4 Lessons learned

The implementation of the CBD so far has targeted the national level stakeholders. Success has been achieved in sensitizing stakeholders at headquarters of relevant ministries and nationally based NGOs. With exception of those activities and programmes that have been integrated into national and local programmes of work, the impact at local level remains limited. Though overall implementation of the CBD is done and assessed at national level, the actual impact and activities that lead to ecosystem degradation and species loss and extinction as well as pollution or land-use change actually occur at local level.

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Appendix I: Information concerning Uganda and the process involved in the preparation of this 4th National Report

A. Reporting Party

Box 1.

Contracting Party	UGANDA
NATIONAL FOCAL POINT	
Full name of the institution	***National Environment Management Authority***
Name and title of contact officer	***Dr. Aryamanya-Mugisha Henry*** Executive Director
Mailing address	***Plot 17/19/21 Jinja Road, P.O. Box 22255 Kampala, Uganda***
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CONTACT OFFICER FOR NATIONAL REPORT (IF DIFFERENT FROM ABOVE)	
Full name of the institution	***National Environment Management Authority***
Name and title of contact officer	***Mr. Francis Ogwal*** Natural Resource Management Specialist
Mailing address	***Plot 17/19/21 Jinja Road, P.O. Box 22255 Kampala, Uganda***
Telephone	***256-41-251064/5/8; 342758/9; 342717***
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E-mail	fogwal@nemaug.org
SUBMISSION	
Signature of officer responsible for submitting national report	
Date of submission	***May 2009***

B: Process of Preparation of 4th National Report

A team of national consultants knowledgeable in Biodiversity conservation issues was hired by the National Environment Management Authority (NEMA) to undertake a study and compile this report with a clear Terms of Reference. They were, among other things, required to compile information on important Biodiversity resources in Uganda; look at the Articles of the Convention and the corresponding decisions of the Conference of the Parties; and through interviewing stakeholders and reference to existing reports and institutions, compile a report on the degree of implementation of the Convention articles and corresponding decisions of the Conference of the parties based on the Guidelines for preparation of the Fourth National Report provided by the CBD Secretariat. The consultants prepared and presented an inception report to the technical committee on biodiversity conservation on 23rd January 2009. The technical committee on biodiversity conservation is a statutory body established under the National Environment Act.

The above task was achieved by studying existing national reports and documents (mainly compiled through wide stakeholder participation), consulting relevant stakeholders from key institutions and compiling the information collected into a draft report.. The draft report was submitted to NEMA, which subjected it to a national stakeholders' consultative workshop on 17 April 2009, facilitated by the consultants. Stakeholders included representatives from Government Ministries and institutions, research and academic institutions, NGOs, private sector, Local Governments and Community Groups. The stakeholders' inputs were incorporated into the draft report by the consultants to produce a revised draft which was again presented to the Technical Committee on Biodiversity Conservation, for further input. The report was subsequently endorsed by the Technical Committee on 28 April 2009. The whole process was coordinated and supervised by Mr. Francis Ogwal the CBD National Focal Point on behalf of NEMA.

Appendix II: Further sources of information available in Uganda besides this 4th National Report

Albertine Rift Programme – WCS
http://www.albertinerift.org/

CITES
http://www.cites.org/

IUCN Red List (2006)
http://www.redlist.org/

National Forestry Authority
http://www.nfa.org.ug/

NEMA
http://www.nemaug.org/

Biotechnology and biosafety
www.biosafetyuganda.org

Ramsar Convention on Wetlands
http://www.ramsar.org/

Uganda Wildlife Authority
http://www.uwa.or.ug/

NBSAP, Second and Third National Biodiversity Reports
http://www.cbd.int/reports/

MAAIF (2004): Third National Report to the UNCCD

MAAIF (2002): Second National Report to the UNCCD

MAAIF (1999): First National Report to the UNCCD

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NEMA (2006/2007): National State of Environment Report.

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Invasive Alien species
www.invasivespecies.co.ug

Appendix III: Progress of implementation of priority activities and articles of CBD for each strategic objectives of NBSAP

Strategic Objective: Objective 1: To develop and strengthen coordination, measures and frameworks for biodiversity management

Output	Strategy	CBD Article addressed	Planned Activities	Status of implementation
1.Coordination and inter-sectoral linkages strengthened	1. Establish and strengthen institutional linkages	Article 6	Restructure and strengthen existing arrangements and enhance inter-coordination and cooperation among relevant institutions	• Biodiversity Conservation Coordination Initiative (BCCI) has been established.
	2. Strengthen coordination unit in NEMA to implement the NBSAP	Article 6a	Strengthen an NBSAP monitoring mechanism in NEMA	• Monitoring and reporting guideline yet to be developed
			Develop and implement a monitoring and reporting programme –	Not yet done
			Undertake regular cross-sectoral consultations on NBSP implementation	• One national stakeholder review work was held in August 2006
			Develop guidelines for Districts to implement NBSAP	• Issues on biodiversity are being integrated into the District Development Plans through the District Environment Action Plans
2. Measures for biodiversity management enhanced	1. Develop, strengthen and enforce biodiversity related laws and regulations	Article 8	Strengthen the implementation of biosafety regulations and laws	• National Biotechnology and Biosafety Policy was by Cabinet on 2nd April 2008. • A Biosafety Bill is under preparation to give legal effect to the policy on biotechnology and biosafety.
			Strengthen implementation capacity (institutional, human, infrastructural and legal frameworks) for biodiversity management-	• UNCST through BIO-EARN Programme, trained 5 PhDs in biotechnology between 2002 and 2006; • students were trained at Masters level in Food safety, environment safety and molecular biology through the Programme on Biosafety Systems (PBS) between 2005-2008. • 40 biosafety inspectors and 30 scientists and regulators were trained on risk assessment and management of GMOs through support of UNEP/GEF between 2002-2006.
	2. Integrate biodiversity issues into national and sectoral plans	Article 6b	Develop and implement guidelines for integration of biodiversity into national, sectoral and district plans-	• Guidelines for integrating Global Environment Conventions (CBD, UNFCCC, UNCCD and the Ramsar Conventions) into planning processes have been prepared.

	3. Strengthen biodiversity management outside protected areas	Article 9 & 8c	Encourage collaborative management	• Collaborative Forest Management is being implemented by NFA • UWA is implementing Revenue Sharing Programme and a Wildlife Use Rights Programme • Wetlands Inspection Division is involved promoting Community by UWA • Guidelines have been developed for the above collaborative arrangement for natural resource management • Regulations on ABS was put in place in 2005 and is being implemented
			Develop regulations and guidelines on biodiversity outside protected areas	• Wildlife Act Regulates use of wildlife outside protected areas. • No guidelines have been produced yet
			Integrate biodiversity conservation in district plans	• On-going through the DEAP and DDPs
			Regulate conservation and use of biological resources outside protected areas	• Guidelines for Wildlife Use Rights Programme in Place • Regulations and Guidelines for Accessing Genetic Resources has been developed
			Provide incentives and support to local communities for biodiversity conservation	• UWA is implementing Revenue Sharing Programme and a Wildlife Use Rights Programme • Collaborative natural resource management with local communities in place and being implemented.
			Develop and implement programmes for cross-border shared biodiversity resources	• There are several on-going cross-border initiatives e.g. Nile Transboundary Environment Action Project, among others
	4. Strengthen the role of communities in biodiversity management		Undertake training programmes to promote community based programmes	• Current training Programmes include: Collaborative Forest Management (CFM), Community Based-Wetland management Planning, Multiple Use Programme of UWA
			Assess and document level of dependence on biodiversity for community livelihood	• Various studies on Ethnobotany undertaken by University e.g. Makerere University students as well as NARO on community dependence on biodiversity for their livelihoods

			Document and integrate indigenous knowledge and customary/cultural rights in biodiversity management	This needs to be done
			Develop and implement community based management approaches	• Local communities are usually involved in preparation of management plans for protected areas
			Empower communities to manage the ecosystem better	
			Put in place conflict resolution mechanisms in biodiversity	• Ecosystems approach used in the development of community based-action plans for restoration of degraded ecosystems and resolutions of conflicts on natural resource management • Other approaches for resolution of conflicts are CFM, CWMP • Government agencies, NGOs and CSOs involved in biodiversity conservation have established sections/units specifically to handle issues of local community participation in biodiversity management
3. All key biodiversity ecosystems represented in National Protected Areas System	5. Establish/maintain Protected Areas representing key ecosystems in Uganda	Article 8a – b, 8d, 8g	Review National Protected Area Systems	• A Wildlife Protected Areas System was developed and enacted in 2002 but this has not been reviewed
			Assess viability of all Protected Areas	
			Gazette un-represented ecosystems into Protected areas	• Eight un-represented wetlands have recently been gazetted as Ramsar Sites
4. Biodiversity related Policies and Legislation strengthened	6. Review and update existing biodiversity policies and legislation	Article 6b, 8i, 8g, 8k	Review and update policies and legislation on biodiversity	• To be done when policies and legislation on biodiversity come under review.
			Review and update policies and legislation on Intellectual Property rights	• Policy on IPR yet to be developed. The short term UNCST to develop a Strategy on IPR in collaboration with MTTI and Ministry of Justice • Patent Act enacted in 2004
			Review and update policies and legislation on irrigation and water use and management	• National Policy was formulated in 1999. Not yet reviewed.
	7. Initiate policy development to address “policy gaps" in biodiversity	Article 6b	Initiate biodiversity policy reforms in relevant areas	• Rangelands Policy currently under development
			Develop a national food policy	• Biodiversity issues being integrated into the National Development Plan which is under development

			Develop policies and/or legislation on: -Economic instruments -Biodiversity information and management -Access to Genetic Resources -Land-use planning -Biotechnology and Biosafety	National Food Policy formulated • The National Environment Act has provisions on economic instruments but this requires regulations to operationalize it. • Regulations on Access to Genetic Resources and Benefit Sharing put in place in May 2005 • Policy on Biotechnology and Biosafety approved by Government in April 2008 • Land Policy formulated in 2008. A policy on land use planning yet to be developed.
	8. Review and update existing biodiversity - related regulations and standards		Review regulations and standards on: -Soil conservation -Fisheries management -Water use and management	• Regulations on Minimum Standards for Management of Soil Quality put in place in 2001. It is yet to be reviewed.
			Translate and disseminate regulations and standards	• Regulations on Water Abstraction, Discharge of Effluent into Water or on Land in enacted but are yet to be reviewed • Translation of the regulations into local languages planned.
	9. Initiate the preparation of required regulations and standards where there are gaps	Article 8k	Develop regulations and standards on biodiversity where there are gaps e.g. for Plant and animal pests and disease control	
	10. Develop and implement bye-laws that promote biodiversity conservation	Article 8k	Review District Environment Action plans	• Most districts have developed DEAPs.
			Prepare Environment policies at district and lower levels	
			Formulate bye-laws related to biodiversity conservation	• Developed of DEAPs for the districts that do not have them have been planned. Availability of funds is the major constraint
			Implement the bye-laws	• Formulation of bye-laws is a key priority area for districts. The major constraint here is funds.
5. Funding for biodiversity conservation & sustainable management secured	11. Identify and develop sustainable funding mechanisms	***Article 20.1*** 20.2 - 7 21.4	Identify, publicize and tap into existing and new funding sources	• Opportunities for funding biodiversity activities are through the National Development Plan (NDP) which is under development. Biodiversity issues has been included in the NDP • Other funding sources are GEF, EU, UNEP, NORAD, USAID.
			Promote natural resource accounting at all levels	
			Integrate biodiversity funding requirements	• Biodiversity being integrated in NDP and DDPs

			into government budgets	
			Access global funding tied to the CBD and others	• GEF remains the major source of funding. Other potential sources are EU and USAID
			Encourage private sector investment in biodiversity	
			Lobby for increased government and donor support	• Preparation of a Medium Sized Project on Payment for Ecosystem Services is under way (began in October 2008 and is expected to be completed in May/June 2009). It is project that will be funded by GEF and GoU. • The process is on-going. Increase Government funding is being lobbied through the NDP. • NEMA and UNEP-Geneva are working on a proposal on the valuation of agro-biodiversity which is follow up on a project on Integrated Assessment of the EU-ACP EPA on Uganda's Biodiversity. The project was support by the EU (through UNEP) on the
	12. Promote the provision of economic incentives for biodiversity conservation	Article 11	Develop and publicize incentives	• UWA is promoting WURP and Benefit Sharing
			Document and disseminate "good practices" in biodiversity incentives	• NFA involved in collaborative Forest Management
			Integrate biodiversity incentives into policy frameworks at all levels	• Some policies like the forestry and wildlife policies were reviewed and issues on incentives have been integrated.
6. International and Regional cooperation enhanced	13. Domesticate International Conventions	Article 6a	Integrate biodiversity funding requirements into national policies and legislation to conform with relevant provisions of international Conventions and regional Treaties	• Government is funding biodiversity conservation although this may not be to the level expected by the international conventions and regional treaties
	14. Coordinate and implement the provisions of biodiversity related conventions	Article 6a	Streamline coordination and institutional roles for implementing conventions	• A project on National Capacity Needs Self Assessment (NCSA) was undertaken and this has identified areas of synergies for CBD, UNFCCC and UNCCD
			Implement national obligations	• NEMA (the CBD NFP) and MTTI (CITES MA) jointly implemented a project on the Review of National Wildlife Policies in Support of CITES. This has laid the foundation for further collaboration on joint implementation of activities on CBD and CITES by the two institutions.
	15. Participate effectively in Global and Regional forums, debates	Article 5, 8m, 9e,	Organize regular national level processes to feed into global and regional processes	• A briefing is always done for the relevant Government sector prior to Uganda's participation

	and programs	18.1, 18.3 -5		in CBD COP meeting
			Secure government funding to meet associated costs, including funding for participation in global & regional forums , debates and programs	• Government provides funding for the Minister responsible for environment to participate in global and regional meetings. • Funding for the CBD NFP is mainly from CBD Secretariat

Strategic Objective 2: To facilitate research, information management and information exchange on biodiversity issues

Output	Strategy	CBD Article addressed	Planned Activities	Status of implementation
1. Research activities strengthened	1. Strengthen systems and procedures for research	Article 12a, 12b, 12c 7a – b, 16, 18	Strengthen research capacity	• Training on research skills is done at universities and also through collaborative research with other researchers outside the country
			Strengthen role of UNCST	• Policy on Research was developed to strengthen the role of UNCST
			Identify and document research priorities	
			Undertake research in priority areas	• Some sectors (UWA, NARO, NFA) have identified research priorities. UWA has policy on research in wildlife protected areas
			Develop research guidelines	
			Identify funding sources	• UNCST has received funding from the World Bank (under the Millennium Science Initiative) with Co-financing from GoU for supporting high quality scientific research and development, and for training of more science graduates.
			Invest in research	
2. National Policy on research established	1. Develop a national research policy	Article 7, 12	Develop a national policy on research	• A national policy on research was developed and is being implemented by UNCST.
	2. Develop sectoral research priorities	Article 7, 12	Develop sectoral research priorities -	• UWA identified research priorities in wildlife areas. It also has a policy on research in wildlife protected areas.
3. An effective biodiversity information	1. Establish a national meta-data bank	Article 7d, 17.1, 17.2, 26, 7c	Undertake assessment of all biodiversity components to fill the gaps in information	• Research activities being undertaken by universities. Sharing of information is however very poor.

management system established			Strengthen coordination mechanisms for biodiversity information	
			Strengthen national biodiversity data banks-	• Biodiversity Conservation Coordination Initiative was formed in 2006 and has provided a framework for coordination and collaboration.
			Strengthen the Clearing House mechanism in NEMA	• NEMA in collaboration with UNEP-Nairobi has prepared and submitted a proposal to GEF for establishing CHM. The project will provide opportunities for strengthening of management of biodiversity data in other institutions
			Make functional and strengthen the CHM for products and processes of biotechnology	
			Use CHM as facility for networking	
	2. Improve information acquisition and management	Article 7d	Collect, analyze and disseminate information to relevant stakeholders	• Information on biodiversity is being disseminated to stakeholders through the National State of Environment Reports and State of Biodiversity Reports for Uganda. All these reports are prepared very two years.
			Build capacity to manage biodiversity information -	
	3. Maintain and regularly update biodiversity reports	Article 17.1, 17.2, 7d	Review and update National biodiversity reports	• The State of Biodiversity Report for Uganda takes into account information from the previous reports and in that way provides information on trends on components of biodiversity
			Develop and implement national biodiversity monitoring and reporting programmes	• Monitoring programmes are on-going for relevant sectors involved in biodiversity conservation and management. • Monitoring checklists have been developed by these institutions. However a national monitoring and report guidelines are yet to be developed.
	4. Build capacity for research and information management		Undertake capacity building for research and information management formulate a policy on research	• Training on research skills is done at universities and also through collaborative research with other researchers outside the country • Policy on Research was developed to strengthen the role of UNCST. UNCST approves all research activities in the country.

Strategic Objective 3: To reduce and manage negative impacts of various activities on biodiversity

Output	Strategy	CBD Article addressed	Planned Activities	Status of implementation
1. Degraded critical ecosystems assessed and prioritized	1. Prioritize important degraded ecosystems in the country	Article 8h, 14e	Carry out inventory of different ecosystems	• On-going-wetlands by WMD, Forest, Wildlife by UWA, Forestry by NFA
			Develop criteria for ranking degree of degradation of important ecosystems	• Criteria for ranking degree of degradation yet to be done.
	2. Identify and assess fragile ecosystems	Article 8f	Analyze existing data and information on fragile ecosystems	• Restoration of wetlands and hilly mountainous areas being undertaken by NEMA and districts. Information on fragile ecosystems have been documented by NEMA
			Carry out case studies	
			Develop monitoring indicators-	• NEMA has developed indicators for monitoring environmental trends and quality. Next step in building capacity of lead agencies and districts to use the indicators and this is planned for the FY 2009/2010
			Identify & document degraded fragile ecosystems	
2. Degraded/ Fragile ecosystems rehabilitated /Protected	1. Develop and implement species and habitat recovery and protection programmes	Article 9	Develop and implement species recovery programmes	• The white rhino which was became extinct has been re –introduced at UWEC and at Zziwa Ranches • NEMA involved in the implementation of ecosystem restoration through community based restoration programmes, while WMD is building capacity in local communities to manage wetlands sustainably through wetland management planning
			Develop and implement habitat restoration programmes	
			Promote programmes to maintain species and habitat balance	
	2. Manage causes and threats to degradation	Article 9	Institute measures for managing alien and invasive species	• NARO has developed a draft National Invasive Species Strategy and Action (NISSAP) • ·Pilot activities on management of invasive with local communities is on-going by NARO in Mbarara and Masindi • ·UWEC and Entebbe Botanic Gardens are the main two sites for ex-situ conservation.
			Raise public awareness	• Awareness materials on invasive species have been prepared and disseminated by NARO. Further radio and TV programmes are on-going.

			Identify alternatives to biodiversity resources	
			Strengthen facilities for ex-situ conservation	
			Incorporate biodiversity issues in national EIA guidelines for biodiversity conservation	
			Develop appropriate mitigation measures-	
			Strengthen capacity for planning, monitoring and evaluation of negative impacts	
			Promote active participation of stakeholders in monitoring and predicting biodiversity impact due to utilization	
			Integrate environmentally friendly approaches in "conflict" resolution	
	3. Build capacity to manage and restore degraded ecosystems		Strengthen human, institutional and infrastructural capacity to manage and restore degraded ecosystems	• NEMA, NFA, UWA and WMD have on-going programmes of restoration of degraded ecosystems.

Strategic Objective 4: To promote the sustainable use and fair sharing of costs and benefits of biodiversity

Output	Strategy	CBD Article addressed	Planned Activities	Status of implementation
1. Economic returns from biodiversity resources optimized	1. Develop mechanisms for sustainable economic returns from use of biodiversity resources	Article 15.2, 15.4 15.5, 15.7	Develop economic instruments for biodiversity valuation	• Being done through NDP and during the review of policies, programmes and actions plans • Trade in biodiversity/wildlife is coordinated by UWA and MTTI. Guidelines have been developed to facilitate the process. • ABS regulations have laid down the requirements for export of genetic resources out of the country. UNSCT is responsible for implementing the regulations in collaboration with NEMA, UWA, NFA, local governments and other stakeholders. • Guidelines for accessing genetic resources in Uganda has been developed to facilitate implementation of the ABS regulations.
			Lobby for the inclusion of natural resource accounting in national budgets	
			Develop mechanisms for managing and monitoring local and international trade in biodiversity resources	
			Identify and promote alternative uses and substitutes for biodiversity resources	
			Build capacity for economic valuation of	• Capacity building for valuation of biodiversity is a key

			biodiversity	priority area and resource mobilization for this is on-going.
			Undertake economic valuation of biodiversity	• Valuation of agro-biodiversity has been prioritised and will provided a basis for future work on biodiversity valuation once funding is secured.
2. Collaborative management of biodiversity strengthened	1. Strengthen the role of communities and other stakeholders in biodiversity management	Articles 8j, 10c, 10d, 10e	Promote stakeholder participation in biodiversity management	• Capacity building of districts on the implementation NBSAP and ABS regulations is on-going • CBOs are involved in activities on biodiversity conservation by the relevant • EIA Guidelines for Shared Ecosystems for EAC developed • Protocol on Environment and Natural Resources for EAC in place
			Strengthen community based biodiversity management institutions	
			Strengthen institutional collaboration between sectors, Districts, NGOs etc	
			Put in place conflict resolution mechanisms in shared biodiversity resources-	
3. Mechanisms for sharing costs and benefits established	1. Establish mechanisms for enhanced participation in sharing of costs and benefits		Develop mechanisms for sharing costs and benefits from biodiversity use	The ABS regulations provides the legal framework for sharing of benefits.
			Integrate biodiversity costs and benefits into micro - and macro-economics frameworks	
			Promote access to and responsibility for biodiversity resource use	• Guidelines for CFM and Revenue Sharing in place and being used.
	2. Develop and strengthen legal frameworks to ensure sharing of benefits and costs	Article 10e, 8j, 15.7	Regulate biodiversity access regimes	• A strategy on IPR to be developed.
			Establish a law on property Rights	• A Patents Act in place
4. Role of communities in biodiversity management strengthened	1. Establish mechanisms for enhanced participation in biodiversity management	Article 15.2, 15.4 15.5, 15.7 8j	Assess and document level of community dependence on biodiversity for livelihood	• Documentation of IK is yet to be done • Communities being trained by Government agencies on natural resources/biodiversity conservation • Communities being supported through UWA Revenue Sharing Programmes, CFM programme by NFA, Environmental Restoration Activities by NEMA, among others • A project on PES is being developed by NEMA in collaboration with UNEP to provide incentives to local communities to protect forests on private land that are critical for biodiversity conservation.
			Document and integrate indigenous knowledge and customary/cultural rights in biodiversity management	

			Undertake training programmes to promote community biodiversity conservation	
			Develop and implement community based management approaches	
			Strengthen community based biodiversity management institutions	
			Provide incentives and support to local communities for biodiversity conservation	
			Provide incentives and support to the private sector for biodiversity conservation	

Strategic Objective 5: To enhance awareness on biodiversity issues among the various stakeholders

Output	Strategy	CBD Article addressed	Planned Activities	Status of implementation
1. Public awareness on biodiversity issues enhanced	1. Publicize policies, legislation and other aspects of biodiversity	Article 13	Translate policies and legislation into simpler forms	• Popular (short) versions have been prepared and disseminated. • Translation of the laws into local languages planned.
			Involve stakeholders in policy reforms	
			Undertake awareness campaigns on biodiversity issues	• Capacity building for local governments on NBSAP and ABS is contributing to creation of awareness on biodiversity issues at the local level
	2. Develop and implement informal public education and awareness programs on biodiversity		Encourage and support NGOs	• A handbook for biodiversity conservation has been prepared and will be disseminated to stakeholders
			Encourage public participation on World Biodiversity Days	
			Integrate biodiversity issues in informal education	
			Organize biodiversity courses including bio-safety and biotechnology for community leaders, extension workers	
			Encourage and support biodiversity awareness through music, drama etc	
			Disseminate relevant information to members of the public through radio, TV, newspapers, seminars etc	• Government agencies and NGOS involved in biodiversity conservation are also developing and disseminating awareness materials on biodiversity conservation. • Training on biosafety is on-going by UNCST.
	3. Promote formal education on biodiversity in educational institutions		• Integrate biodiversity into the school and college curricula	• Primary and secondary level curriculum have integrated issues on environment and natural resources including biodiversity management

			• Encourage the development of biodiversity courses in schools and colleges	
	4. Develop and disseminate biodiversity awareness materials		• Translate the provisions of the CBD into simpler and local languages	The following guidelines have been developed to enhance understating of CBD: • Localizing Global Environmental Conventions; A Simple Guide for Uganda • Localizing Global Environmental Conventions: Opportunities for integrating MEAs in Planning Process in Uganda.
			• Develop and disseminate awareness materials, posters, T-shirts etc to the general public	

Appendix IV A: Progress towards targets of the Global Strategy for Plant Conservation

No.	Global target	National target established or global target adopted	Level of incorporation of target in national programmes	Actions taken to achieve the target	Obstacles encountered	Future needs identified
1	A widely accessible working list of known plant species, as a step towards a complete world flora	Global target is used	List of East African Plants in place and is the one regularly consulted and used for various applications There is a National Biodiversity Data Bank at Makerere Institute of Environment and Natural Resources established containing species checklists for various taxa The National Forestry Authority has a data set of (Indicator) species of all woody plants in the country The Wetlands Management Department has conducted national wetlands inventories, targeting plants UWA and NARO both have working lists of plants The Entebbe Botanical Gardens has formed a list of most plants species in Uganda	A national list is being compiled by Makerere University Herbarium Central node for plant data is being developed by the UNCST. The node will coordinate all other databases in the country There has been a review of the policies and laws governing PAs as well as a review of the National Wetlands Policy and formulation of a law	Inadequate finances to finish work as soon as possible Inadequate funds to support collection and compilation of information/data Poor coordination of sectoral policies and programmes Lack of adequately trained taxonomists to do the inventories	Need for continuous collection and inventory
2	A preliminary assessment of the conservation status of all known plant species, at national,	Global target is used	List of East African Plants in place and is the one regularly consulted and used for various applications The distribution of rare and endangered species was taken	In addition to NFA, UWA and NARO, MUIENR and other higher institutions of learning are undertaking plant surveys. Department of Botany, Makerere University in collaboration with Kew Botanical Gardens are developing a	Scarcity of funds to carry out regular inventories, monitoring and documentation; Lack of human capacity such as taxonomists and database and high staff	Building capacity in plant inventory techniques and developing and maintaining plant databases;

No.	Global target	National target established or global target adopted	Level of incorporation of target in national programmes	Actions taken to achieve the target	Obstacles encountered	Future needs identified
	regional and international levels		into consideration by both UWA and NFA in determining which parts within PAs are designated as Strict Nature Reserves, Buffer and Production Zones; Plant lists are Consulted in EIA processes	database of Uganda's plants starting with 800 tree species Makerere University in collaboration with the Plant Resources of Tropical Africa (PROTA) has assessed timber, medicinal, edible and other categories of plants.	turnover of the few skilled personnel; low priority of plant inventories by government	Regular funding sources to facilitate monitoring and documentation; Provide incentives to taxonomists to reduce the high staff turnover; Advocate for interest and financial support from government
3	Development of models with protocols for plant conservation and sustainable use, based on research and practical experience	No target	There is a will at Makerere Herbarium	No action so far	Lack of necessary personnel in the existing research institutions; Inadequate political support and inadequate financial resources	Capacity building in development of models for plant conservation and sustainable use; Funding sources to collect sufficient baseline data for models
4	At least 10 percent of each of the world's ecological regions effectively conserved	Global target is used	Of Uganda's cover area 11% is National Parks and wildlife reserves, 5.9% forest reserves and 13% is covered by wetlands	Regular management plans for Forests Reserves and National Parks are regularly formulated and implemented	Limited resources, widespread poverty leading to ignoring laws and regulations, inadequate law enforcement of regulations, law level of awareness of the value of PAs by local communities	Funding sources, programmes geared to reducing poverty levels, develop and implement a strategy aimed at mass sensitisation on the importance of plant conservation
5	Protection of	Global target is	A few places identified, which	There has been efforts by UWA and	Laws and policies are	Capacity building to

No.	Global target	National target established or global target adopted	Level of incorporation of target in national programmes	Actions taken to achieve the target	Obstacles encountered	Future needs identified
	50% of the most important areas for plant diversity assured	used	were already in protected areas are in reasonable conservation state, but some others are still facing high pressure from other competing land uses.	NFA to zone parts of PAs and Forest Reserves for this purpose	not implemented effectively; Inadequate political support for plant conservation Spread of invasive species such as *Lantana camara*, Low level of collaboration between institutions Limited human capacity for activities and enforcement of regulations	boost law enforcement; Encourage innovation and promote alternative sources of livelihood to reduce dependence on plants in PAs; Facilitate domestication of useful plants;
6	At least 30% of production lands managed consistent with the conservation of plant diversity	Global target is used	Examples of incorporation of the target in plans and projects include restoration of degraded areas (NFA), agroforestry (NAADS), catchment conservation (LVEMP), wetlands management plans (Wetlands Management Department) and several activities by NGO's, and support from conservation agencies (IUCN, CARE) to support Conservation of on farm plant genetic resources National policies, laws (e.g. Land Act, Forestry and Tree planting Act) in place	Establishment of Plant Genetic Resource Centre (PGRC) in NARO. PGRC is creating community gene banks and conducting National and regional forums for stakeholders involvement in on farm conservation; In collaboration with NGOs, NARO has establish on farm trials and training of farmer groups with the aim of conserving plant genetic diversity on farm.	Limited human capacity for PGR activities; The staff recruited at local government level are inadequate and are quite often poorly facilitated and motivated.	Seek for financial support to build adequate human capacity to enforce laws and regulations; Advocate for better facilitation and motivation of staff countrywide; Facilitate awareness, training and extension services on agroforestry practices and benefits of

No.	Global target	National target established or global target adopted	Level of incorporation of target in national programmes	Actions taken to achieve the target	Obstacles encountered	Future needs identified
						maintaining and planting trees in watersheds by use of demonstration plots and farmers
7	60 percent of the world's threatened species conserved in situ	We don't have	Protected areas are recognized in the Constitution and there are sector laws and regulations specific to PAs; There are strict Nature Reserve where no human/ commercial activities are allowed Zoning and protection of core areas in Forest Reserves and Pas have been done PAs and their roles are recognized and taken care of in the NBSAP;	There are provisions in the conservation laws for declaring a species as Protected if found to be highly threatened. PA management system allows for certain areas to be accorded more protection than others depending on their level of threat; Pressure groups are formed at national and international levels e.g have resisted degazettement of a Forest Reserve.	Illegal activities in the PAs, escalated by presidential and parliamentary elections; Poverty and population pressure that lead to encroachment, Failure by authorities to provide alternative sources of plant resources other than PAs; Degazettement of PAs by government e.g oil palm growing in Kalangala district, suggested conversion of part of Mabira Forest Reserve into sugar growing; Lack of plans to protect species outside PAs.	Funding to implement protection of zoned areas in PAs; Advocate and lobby for national commitment toward plant conservation efforts; Design strategies and plans to protect threatened species on private lands
8	60 percent of threatened plant species in accessible ex situ collections,	Global target is used	Plant Genetic Resources Centre, comprising of Genebank and Entebbe Botanical Gardens, was established in 2007;	PGR centre has compiled and computerized passport data of most of the plant collections and ongoing collections have the standard passport data forms filled at time of	Lack of funds to purchase vehicles, equipment and upgrade existing infrastructure;	Funding sources to development an orthodox seed conservation facilities, with

No.	Global target	National target established or global target adopted	Level of incorporation of target in national programmes	Actions taken to achieve the target	Obstacles encountered	Future needs identified
	preferably in the country of origin, and 10 percent of them included in recovery and restoration programmes			collection; Seedling raising for sale to individuals for planting is one of the programmes carried out by the PGRC, NARO. Regular visits are made to different parts of the country to locate and collect samples of threatened species for ex-situ conservation, and the collected plants are propagated PGRC has started public awareness programme on the value of neglected and underutilized crops; Cold storage facilities have been installed at the National gene bank and at Makerere University Kabanyolo farm.	Low appreciation by the public to planting of threatened species just for the sake of it unless they have commercial value Inadequate documentation of threatened species, their distribution and suitable areas to grow them. Most of these plants are appreciated by the elite urban dwellers with limited space) as opposed to rural dwellers who tend to look more at commercial value	centralized cold storage and a better equipped laboratory. There is also need for appropriate facilities and processes that ensure seed longevity; A well designed and maintained comprehensive database inclusive of species diversity, spatial distribution and taxonomic information to target collection sites more efficiently in addition to maximizing scarce resources available.
9	70% of the genetic diversity of crops and other major socio-economically valuable plant species conserved, and	Global target is used	A collection of most of these plants is maintained at the Entebbe Botanical Garden as well as in the different Research stations under NARO The Natural Chemotherapeutics Research laboratory is working with	Plant Genetic resource centre is creating community gene banks; Currently a Policy on Plant Genetic Resources for Food and Agriculture is being formulated	Insufficient logistics e.g vehicles and funds; Inconsistent power due to staff relocation; inadequate number of specialised gene bank personnel; no	Funding sources; Secure a generator to provide constant power to the genebank, Provide professional

No.	Global target	National target established or global target adopted	Level of incorporation of target in national programmes	Actions taken to achieve the target	Obstacles encountered	Future needs identified
	associated indigenous and local knowledge maintained		traditional healers in the country to conserve medicinal plants in their gardens or in natural bushes where they still exist. NARO, PGRC, Seeds and Plant Act, 2006; National Seed Board is operational Specially trained scientists have been employed and facilitated to maintained the selected Plant Genetic resources for each of the Research Institutes		documented list of socio-economically valuable plants;	training in genebank activities; Undertake documentation of socio-economically valuable plant species and their associated local and indigenous knowledge
10	Management plans in place for at least 100 major alien species that threaten plants, plant communities and associated habitats and ecosystems	Global target is used	Management plans of wildlife PAs on specific alien and invasive species, a programme is also in place to eradicate the water hyacinth from the Lake Victoria ecosystem under MAAIF in collaboration with NARO	The National Invasive Species Strategy and Action Plan is in Place; Current control measures include mechanical weeding, biological control as well as using legal and institutional measures	Lack of funds to implement the strategy, and development and implementation of action plans and monitoring programmes	Adequate and regular sources of funding to implement action plans and monitoring the spread and impacts caused by invasive species
11	No species of wild flora endangered by international trade	Global target is used	Provisions have been put in relevant laws (e.g. EIA Regulations, Access to Genetic Resources and Benefit Sharing Regulations), policies and plans, as well as the NBSAP	Plant inspections are regularly undertaken at selected entry points into the country, partly to check unauthorized trade in plants or their products	Lack of capacity - infrastructural, human, financial and expertise to handle management of trade in endangered species	Adequate funding sources; Building capacity through expert and armature training courses on identification of plan species; effective screening

No.	Global target	National target established or global target adopted	Level of incorporation of target in national programmes	Actions taken to achieve the target	Obstacles encountered	Future needs identified
						at international boarders
12	30 percent of plant based products derived from sources that are sustainably managed	Global target is used	Sustainable management measures have been instituted and are being implemented in PAs regarding extraction of timber National Biotrade Policy is in place which incorporates elements of trade in plant based products	A number of national and regional forums for stakeholders have been involved in on farm conservation; On farm activities have been fairly documented by NARO Training of inventory experts, working with local communities and specialized resource users	Inadequate financial resources, limited interest by resource managers as they still regard non-wood forest products as less important even if they are very important to the local communities as a source of food, medicine as well as material for construction and handicrafts	Funding to implement national biotrade policy, mass sensitisation on the benefits of sustainable harvesting of plant resources;
13	The decline of plant resources, and associated indigenous and local knowledge innovations and practices, that support sustainable livelihoods, local food security and health care, halted	Global target is used	Assessments and documentation have been started in the UNCST with a view of incorporating indigenous knowledge, and innovations in research.	*In-situ* conservation activities at the PGRC concentrated on identifying farmer groups and communities that are organized with the aim of fostering genetic diversity on farm; There is a Traditional Knowledge Resource Centre at UNCST and the capacity of Uganda Chemotherapeutics Research Laboratory has been strengthened	Inadequate awareness among the public; inadequate financial resources High human population growth	Source additional funding Increase public awareness

No.	Global target	National target established or global target adopted	Level of incorporation of target in national programmes	Actions taken to achieve the target	Obstacles encountered	Future needs identified
14	The importance of plant diversity and the need for its conservation incorporated into communication, education and public awareness programmes	Global target is used	Conservation education has been incorporated into educational programmes both in formal and informal sectors; The National Information Management and Exchange System o Plant Genetic Resources is in place; Other institutions are engaged in various communication and awareness programmes e.g. NFA , NARO/FORRI, Nature Uganda	Conservation education is taught at all levels in relevant institutions of learning e.g. Universities; Awareness programmes are designed for local communities and other stakeholders by the relevant institutions	The National Information Management and Exchange System on Plant Genetic Resources is weak and hence access to data and information on plant diversity is limited; Research results in Universities are not widely accessible because most are in form of theses and not published;	Advocate and lobby for resources to diversify means of communicating information such as designing plant conservation websites and increasing internet connection and audio-visual and mass media coverage; Train & sensitize policy makers, planners & private entrepreneurs; Programmes
15	The number of trained people working with appropriate facilities in plant conservation increased, according to national needs, to achieve the targets of the strategy	Global target is used	Training has been incorporated into the syllabi of schools, colleges and universities. Those already in service are regularly exposed to refresher courses.	PA area managers are trained with qualifications ranging from college certificates, diplomas, university degrees Professional staff at Makerere University herbarium has been increased from 1 to 3; Over 20 MSc students have been trained in plant conservation and utilisation.	Lack of qualified manpower and financial resources	Support capacity building in plant conservation at technical and apprenticeship levels; Improve infrastructure and other working facilities for plant conservation
16	Networks for plant conservation activities established or	Global target is used	Strong networks exist at national, regional and international levels involving Uganda	At national level, there is NatureUganda's Plant Working group, which facilitate public awareness and education programmes on plant conservation;	Inadequate funding, insufficient knowledge on plant a groups and their activities	Seek additional funding to facilitate plant conservation programmes

No.	Global target	National target established or global target adopted	Level of incorporation of target in national programmes	Actions taken to achieve the target	Obstacles encountered	Future needs identified
	strengthened at national, regional and international levels		Technical and Professional networks and NGO and voluntary organizations are in place, aimed at increasing awareness on plant conservation	UGANEB conducts ethno botanical research and conservation. At regional level, Uganda is part of the Eastern Africa Plant Genetic Resources Network (EAPGREN); participates in ASARECA agro biodiversity and Biotech Program; At the international level, NARO collaborates closely with the Consultative Group on International Agricultural Research (CGIAR); Uganda participates fully in the FAO Commission on Genetic Resources. Uganda also participates in the global activities spearheaded by Biodiversity International, Fauna and Flora international and Plant Resources of Tropical Africa (PROTA).		

Appendix IV B: Progress towards targets of the Programme of Work on Protected Areas

Goal	Global Target	National Target Established or Global Target Adopted	Level of incorporation of target in national strategies, plans and programmes	Actions taken to achieve the target	Obstacles	Future needs and priorities identified
1.1	To establish and maintain comprehensive, representative and effectively managed national and regional protected area systems as a contribution to globally agreed goals by 2010.	Uganda has not made a formal target for this goal instead it adopts global target through other sectoral targets such as wetlands, forestry and wildlife.	Protected area system covers 13% of Uganda's land area and this exceeds IUCN target of 10% of a biome or country. Protected area network in Uganda covers all major biomes (forests, rangelands/savannah, mountains, arid land, and wetlands including inland water bodies such as lakes and rivers) and include public, private and community protected areas.	Uganda prepared and is implementing a Forestry Nature Conservation Master Plan, a Wildlife Protected Area System Plan and a Wetland Sector Strategic Plan. There has been an institutional reform in order to ensure effective management of the PAs: e.g. Uganda Wildlife Authority and National Forest Authority were established to implement the wildlife protected area system plan and the nature conservation master plan respectively. National Environment Management Authority is implementing NBSAP	Low national priority for protected areas due to limited understanding of protected areas benefits, goods and services and their contribution to sustainable development. Limited regional cooperation and lack of framework for trans-boundary protected area management. Inadequate involvement of local communities, scientific and academic institutions in management of protected areas Lack of suitable data. Limited funding resulting into limited implementations of plans, lack of compensatory mechanisms	The wetland program envisages identifying and gazetting vital wetlands by 2010 with a view of ensuring adequate representation of inland water resources in the protected area system. Undertake protected area system gap analysis based on the requirements (i.e. biodiversity values and attributes) for the representative systems of protected areas to guide the country in making decisions on the need and possibility of establishing additional protected areas.
1.2	By 2015 all protected areas and protected area	Global target is used	There is now a sector wide plan for the	EIAs are undertaken for development projects	Inadequate technical capacity and financial	Undertake relevant policy reviews to improve

Goal	Global Target	National Target Established or Global Target Adopted	Level of incorporation of target in national strategies, plans and programmes	Actions taken to achieve the target	Obstacles	Future needs and priorities identified
	systems are integrated into the wider land- and seascape, and relevant sectors, by applying the ecosystem approach and taking into account ecological connectivity and the concept, where appropriate, of ecological networks.		environment and natural resources which creates an enabling environment (legislation, policies, tools, etc) for integration of the protected areas and protected area systems. Issues of protected areas and protected area systems integration into the wider landscape, connectivity and integration with other sectors are captured and included the management plans, policies such as land use policy.	inside and outside protected areas to evaluate and mitigate effects on protected areas. Some level of regional, national and sub national systems of protected areas are integrated into the broader landscapes for managing ecological networks, corridors and/or buffer zones to maintain ecological processes. Regional examples include Mt. Elgon Regional Ecosystem Program, the GEF Albertine Rift Project	resources	integration of Protected Areas. Create awareness of the value of ecological corridors. Assess the extent of degradation of potential corridors and its impact on viability of ecosystem network. Provide training and capacity building for the staff of the implementing agencies.
1..3	By 2010/2012 establish and strengthen transboundary protected areas (TBPAs), other forms of collaboration between neighbouring protected areas across national boundaries and regional networks, to enhance the conservation and sustainable use of biological diversity, implementing the ecosystem approach and improving international cooperation.	Global target is used	Transboundary PA systems are integrated into various regional agreements, plans and programmes	Various transboundary systems are being implemented in Uganda e.g. Transboundary strategic management plan for the protected areas in the Albertine Rift Region The strategic management plan for the protected areas in the greater Virungas (Uganda/DRC) Implementation of the	Lack of regional protocols for joint management, planning and resource allocation. Political instability in the great lakes region.	Strengthen and expand current initiatives e.g. building on the East Africa Community (EAC) initiatives to develop a regional protocol for joint management of Transboundary Protected Areas across national boundaries

Goal	Global Target	National Target Established or Global Target Adopted	Level of incorporation of target in national strategies, plans and programmes	Actions taken to achieve the target	Obstacles	Future needs and priorities identified
				transboundary Mt. Elgon Regional Ecosystem Program (MERECP) under the framework of East African Community Implementation of the Northern Uganda – Sudan transboundary protected areas management frameworks.		
1.4	All protected areas to have effective management in existence by 2012, using participatory and science-based site planning processes that incorporate clear biodiversity objectives, targets, management strategies and monitoring programmes, drawing upon existing methodologies and a long-term management plan with active stakeholder involvement.	Global target is used	10 National Parks and 5 wildlife reserves have long term management plans under implementation. 11% or 13 management plan units of the forest estate are under effective implementation while the rest (89%) covering over 490 central forest reserves is under preparation 13 Community Wetland Management Plans are under preparation.	Preparation and implementation of protected areas' management plans including reviewing and updating of the ones expired. Planning Guidelines within the PA have been prepared to allow for the effective participatory process	Most of the management plans are limited by inadequate "science-based biodiversity conservation data". Lack of targets at ecosystem and species levels for most sites (e.g. for threatened, endangered, endemic, migratory species) Inadequate technical capacity to comprehensively analyze and integrate climate change issues	Support filling of data gaps Support capacity building for identification and monitoring of conservation targets Support capacity building to analyze and integrate climate change issues in PA management plans
1.5	By 2008, effective mechanisms for identifying and	Global target is used	Application of appropriate, timely environmental impact	Implementation of Guidelines to ensure compliance with the	Compliance is sometimes hampered by political considerations	Source for additional financial resources

Goal	Global Target	National Target Established or Global Target Adopted	Level of incorporation of target in national strategies, plans and programmes	Actions taken to achieve the target	Obstacles	Future needs and priorities identified
	preventing, and/or mitigating the negative impacts of key threats to protected areas are in place.		assessments to any plan or project with the potential to have effects on protected areas Various policies and laws in place	requirements EIA is on-going Enforcement of relevant policies and laws are being implemented especially to reduce level of illegal exploitation of resources from protected areas, and to strengthen international and regional cooperation Measures for the rehabilitation and restoration of the ecological integrity of protected areas are on-going e.g. re-introduction of the Northern White Rhino, which had become extinct, is in its final stages Plans are also underway to identify suitable aquatic and wetland ecosystems to gazette as Protected Areas Measures to control risks associated with invasive alien species in protected areas are beginning to be implemented	Inadequate financial and other resources Governance problems e.g. lack of accountability to the law enforcement agencies Capacity to identify, monitor and report on the threats including alien spp;	Identify, assess and evaluate the potential threats to Pas including risks of invasive alien species Support restoration of degraded areas in PAs Undertake capacity building for research and monitoring of the components of PAs
2.1	By 2008 establish	Global target is	Revenue sharing policy	Negotiation and	Initial financial	Undertake sensitization

Goal	Global Target	National Target Established or Global Target Adopted	Level of incorporation of target in national strategies, plans and programmes	Actions taken to achieve the target	Obstacles	Future needs and priorities identified
	mechanisms for the equitable sharing of both costs and benefits arising from the establishment and management of protected areas	used	in place (Uganda Wildlife Authority). Access to Genetic Resources and Benefit Sharing Regulations and Guidelines in place (NEMA) Benefit sharing entrenched in various PA collaborative management agreements Licences and PA access permits in various forms Contain clauses on benefit sharing arrangements	Implementation of Collaborative forest management agreements on-going Governance issues have been brought to the forefront by various civil society organizations A GEF project to document PA governance systems in PAs is being implemented	requirements for involving community groups are high. Limited capacity to engage every community and relevant stakeholders. Limited knowledge and skills in promoting the various types of governance	and awareness meetings/campaigns Undertake a nation wide study to document the costs, benefits and impacts arising from the establishment of PAs Identify and document the various forms of social and economic benefits generated by Pas Promote joint planning and activity implementation by PA institutions. Support capacity building for PA governance types Undertaking a study of the various governance types to enhance biodiversity conservation
2.2	Full and effective participation by 2008, of indigenous and local communities, in full respect of their rights and recognition of their responsibilities, consistent with national law and applicable international obligations,	Global target is used	The various PA related policies (e.g. Wildlife policy) and laws recognize the rights of people including local communities to engage in PA management	Through policy frameworks, mechanisms and guidelines for involving stakeholders, local communities are being engaged in PA management.	Financial resources inadequate to create a critical mass for effective community conservation. Lack of commitment for implementing enabling frameworks	Review of relevant policies, laws and guidelines to fully address the rights of local communities Document all aspects of indigenous knowledge, skills and practices to promote local community

Goal	Global Target	National Target Established or Global Target Adopted	Level of incorporation of target in national strategies, plans and programmes	Actions taken to achieve the target	Obstacles	Future needs and priorities identified
	and the participation of relevant stakeholders, in the management of existing, and the establishment and management of new protected areas					conservation efforts
3.1	By 2008 review and revise policies as appropriate, including use of social and economic valuation and incentives, to provide a supportive enabling environment for more effective establishment and management of protected areas and protected areas systems.	Global target is used	Economic valuation and incentives for management of PA and PA systems are lacking in relevant policies and laws	A GEF project to undertake a country-wide economic valuation of PAs and identify appropriate incentive measures is being implemented	Inadequate financial resources and manpower to address the various aspects of PA incentives and economic valuation	Review the PA policy and institutional gaps and barriers that impede the use of economic valuation and incentives for effective management of PAs Identify and remove perverse incentives to reduce pressure on PAs
3.2	By 2010, comprehensive capacity building programmes and initiatives are implemented to develop knowledge and skills at individual, community and institutional levels, and raise professional standards.	Global target is used	A moderate level of capacity building programmes exist in colleges and institutions of higher learning for staff of PAs Some capacity needs assessment was done in the Forestry sector in the early 1990s Various lead agencies in collaboration with some NGOs have tried to enhance and strengthen capacity of local	Staff training in relevant institutions is on-going Information exchange and lessons/experiences learnt among countries and organisations is done through national, regional and international meetings	Inadequate Financial resources for formal and in-service training of PA staff Inadequate appropriate programmes for local community capacity building	Conduct a capacity needs assessment and establish capacity building programmes for PAs at all levels Undertake documentation on existing knowledge and experiences on PA management Establish a sustainable financing mechanism

Goal	Global Target	National Target Established or Global Target Adopted	Level of incorporation of target in national strategies, plans and programmes	Actions taken to achieve the target	Obstacles	Future needs and priorities identified
			communities			
3.3	By 2010 the development, validation, and transfer of appropriate technologies and innovative approaches for the effective management of protected areas is substantially improved, taking into account decisions of the Conference of the Parties on technology transfer and cooperation.	Global target is used	A National Capacity Needs assessment for the Implementation of the Rio Conventions took care of some technology assessment for the country The Access to Genetic Resources and Benefit Sharing Regulations provide for transfer of technology in return for accessing Uganda's genetic resources	The law on patents / Intellectual Property Rights is currently under review, to bring it in line with the country's current needs and obligations under the different international treaties.	Inadequate capacity and financial resources to implement some of the relevant technologies,	Undertake comprehensive technology assessment relevant to Pas addressing technology needs, opportunities and barriers in relevant sectors as well as related needs in capacity building
3.4	By 2008, sufficient financial, technical and other resources to meet the costs to effectively implement and manage national and regional systems of protected areas are secured, including both from national and international sources, particularly to support the needs of developing countries and countries with economies in transition and small island developing States.	Global target is used	Budgetary allocations in Uganda (including donor support) take a sector-wide approach (Environment and Natural Resources sector including for PAs). Other sources include grazing permits in Forest Reserves and National Park entry fees but these are inadequate	There are now some institutional initiatives to establish sustainable financing mechanisms for PA activities. Integration of PAs concerns in major national plans such as National Development Plan may contribute to meeting the PA costs effectively.	Inadequate financial, human and technical resources PAs not yet ranked highly among the government priories as a result budgetary allocations have not been sufficient	Undertake economic valuation of PAs and use the information gathered to justify more Government funding for PAs PA institutions should continue to source for funding from both the Government and donors Promote additional income generating activities such as tourism
3.5	By 2008, public awareness, understanding and	Global target is used	Although not promoted directly as PA, public education, awareness	PA issues are commonly reported in the public media including	Limited collaboration and joint planning/curriculum	Identify core themes for education and promote their inclusion in primary

Goal	Global Target	National Target Established or Global Target Adopted	Level of incorporation of target in national strategies, plans and programmes	Actions taken to achieve the target	Obstacles	Future needs and priorities identified
	appreciation of the importance and benefits of protected areas is significantly increased.		and communication programmes, such as conservation education are taught in training institutions, Some institutions of higher learning have curricular which address PAs directly PA institutions have within their establishments a position/ positions of information and communication officers	newspapers, radio and TV. Specialized brochures, posters and other print materials are also widely distributed by PA institutions Llocal communities are regularly engaged by PA management.	development of PA institutions with the national curriculum centre. Inadequate financial resources for production and dissemination of awareness strategies	and secondary school curricula Seek more funding for education, awareness and communication. Package and disseminate of information to all target groups Review of the primary and secondary school curricula to integrate PA issues and promote closer cooperation between PA management institutions and the National Curriculum Development Center
4.1	By 2008, standards, criteria, and best practices for planning, selecting, establishing, managing and governance of national and regional systems of protected areas are developed and adopted	Global target is used	New methods, criteria and indicators are still being developed in line with the recent institutional reforms and policy changes in the PA sector At regional level, standards for PA systems are in place including those developed through collaboration with parties such as IUCN.	A GEF project to document PA governance systems in PAs is being implemented	Technical and Financial constraints	Develop MoUs with relevant parties including IUCN for collaboration to strengthen existing standards, criteria and best practices. Support capacity building in relevant areas, identify funding sources and promote joint monitoring by PA institutions
4.2	By 2010, frameworks for	Global target is	This target has not been	No activity has been done	The barriers include	Develop MOUs with

Goal	Global Target	National Target Established or Global Target Adopted	Level of incorporation of target in national strategies, plans and programmes	Actions taken to achieve the target	Obstacles	Future needs and priorities identified
	monitoring, evaluating and reporting PA management effectiveness at sites, national and regional systems, and transboundary protected area levels adopted and implemented by Parties.	used	incorporated in any national strategies, plans and programmes	under this goal.	inadequate capacity, knowledge and financial resources	IUCN and other stakeholders to develop and adopt frameworks for monitoring, evaluating and reporting PAs
4.3	By 2010, national and regional systems are established to enable effective monitoring of protected-area coverage, status and trends at national, regional and global scales, and to assist in evaluating progress in meeting global biodiversity targets.	Global target is used	Some elements of national and regional systems for monitoring and assessing the status and trends of PAs are incorporated in PA management plans of the relevant institutions	Some aspects of this activity is on-going e.g. UWA is monitoring some biodiversity components, NFA is in the process of setting up permanent sample plots There is high level of PA research going on in Universities, research organizations and PA institutions using modern technologies such as GIS and remote sensing tools for monitoring protected areas	Inadequate capacity within PA institutions Framework for coordination of national and regional databases is still lacking	Provide additional resources for implementing monitoring programmes Build capacity to apply new technologies Establish a Clearing House Mechanism for sharing information
4.4	Scientific knowledge relevant to protected areas is further developed as a contribution to their establishment, effectiveness, and management	Global target is used	High level of PA management oriented research is going on in Universities, research institutes and PA institutions PA institutions regularly disseminate information on PAs through various	Regular review and publishing of PA research results Stock popular libraries with PA publications Updating web sites,	Lack of operational Clearing House Mechanism	Support the establishment of a Clearing House Mechanism Promote more collaborative research between scientists and indigenous and local

Goal	Global Target	National Target Established or Global Target Adopted	Level of incorporation of target in national strategies, plans and programmes	Actions taken to achieve the target	Obstacles	Future needs and priorities identified
			channels e.g. Websites, libraries, printed materials to facilitated planning and making informed management decisions. Some working partnerships on PA research exist e.g. between UWA and Makerere University Biological Field Station and Institute of Tropical Forest Conservation	organising research symposiums, etc Sign MoUs with relevant partners		communities