THE REPUBLIC OF UGANDA

NATIONAL BIODIVERSITY STRATEGY AND ACTION PLAN II (2015-2025)

Theme: Supporting Transition to a Middle Income Status and Delivery of Sustainable Development Goals

NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY (NEMA)

October 2016

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P.O. Box 22255
Kampala Uganda
info@nemaug.org
http://www.nemaug.org

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Front cover photograph: The Grey Crowned Crane *(Balearica regulorum)*, courtesy of Dr. Barirega Akankwasah

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ACRONYMS

ABS	Access and Benefit Sharing
AWF	African Wildlife Foundation
BER	Biodiversity Expenditure Review
BIOFIN	Biodiversity Finance Initiative
CBD	Convention on Biological Diversity
CDC	Curriculum Development Center
CEPA	Communication, Education and Public Awareness
CITES	Convention on International Trade in Endangered Species of wild flora and fauna
CNOOC	China National Offshore Oil Cooperation
IEC	Information, Education Communication
CFM	Collaborative Forest Management
CFR	Central Forest Reserve
CHM	Clearing House Mechanism
COP	Conference of the Parties
CSO	Civil Society Organization
DEAP	District Environment Action Plan
DEAT	Department of Environment Affairs & Tourism,
DRR	Disaster Risk Reduction
DRM	Disaster Risk Management
ENR	Environment and Natural Resources
FAO	Food and Agriculture Organization of the United Nations
FSSD	Forest Sector Support Department
GDP	Gross Domestic Product
GEF	Global Environment Facility
GMO	Genetically Modified Organism
GTF	Gender Task Force
GoU	Government of Uganda
GTI	Global Taxonomy Initiative
HFA	Hyogo Framework of Action
IGAD	Intergovernmental Authority on Development
IK	Indigenous Knowledge
IPLC	Indigenous Peoples and Local Communities
IPR	Intellectual Property Right
IUCN	International Union for Conservation of Nature
LFR	Local Forest Reserve
LGDP	Local Government Development Plan
LMO	Living Modified Organism
MAAIF	Ministry of Agriculture, Animal Industry and Fisheries
MP	Medicinal Plants
MT	Metric Tonnes
MEAs	Multilateral Environmental Agreements
MGLSD	Ministry of Gender, Labour and Social Development

MOEST	Ministry of Education Sports and Technology
MOH	Ministry of Health
MOJCA	Ministry of Justice and Constitutional Affairs
MTWA	Ministry of Tourism, Wildlife and Antiquities
MTIC	Ministry of Trade, Industry and Cooperatives
MWE	Ministry of Water and Environment
NAADS	National Agricultural Advisory Services
NAPA	National Adaptation Programme of Action
NAMA	Nationally Appropriate Mitigation Action
NARO	National Agricultural Research Organization
NBI	Nile Basin Initiative
NBSAP	National Biodiversity Strategy and action Plan
NCRI	National Chemotherapeutics Research Institute
NDP	National Development Plan
NEMA	National Environment Management Authority
NFA	National Forestry Authority
PAs	Protected Areas
PIR	Policy Institutional Review
PMA	Plan for the Modernization of Agriculture
PSFU	Private Sector Foundation of Uganda
REDD	Reducing Emissions from Deforestation and Forest Degradation
REDD+	Reducing Emissions from Deforestation and Forest Degradation including conservation of forest carbon stocks, sustainable management of forests and enhancement of forest carbon stocks
SDGs	Sustainable Development Goals
SPB	Strategic Plan for Biodiversity
SIP	Sector Investment Plan
SLM	Sustainable Land Management
SOER	State of Environment Report
TCBC	Technical Committee on Biodiversity Conservation
TWG	Thematic Working Group
UEPB	Uganda Export Promotion Board
UJA	Uganda Journalists Association
UMA	Uganda Manufacturers Association
UBOS	Uganda National Bureau of Statistics
UNCCD	United Nations Convention to Combat Desertification
UNCST	Uganda National Council for Science and Technology
UNFCCC	United Nations Framework Convention on Climate Change
UNFF	Uganda National Farmers Federation
URA	Uganda Revenue Authority
UWA	Uganda Wildlife Authority
UWCEC	Uganda Wildlife Conservation and Education Center
WMD	Wetlands Management Department

FOREWORD

Uganda ratified the Convention on Biological Diversity (CBD) on 8th September 1993. Uganda is also a Party to the Protocols made under the CBD namely the Cartagena Protocol on Biosafety, the Nagoya Protocol on Access to Genetic Resources and Benefit Sharing (ABS) and the Nagoya-Kuala Lumpur Supplementary Protocol on Liability and Redress to Cartagena Protocol on Biosafety.

Uganda developed its first National Biodiversity Strategy and Action Plan (NBSAPI) in 2002 with a rolling life span of 10 years and a major review planned for 2012. The review and updating of the NBSAPI started in June 2012 with support from the Global Environment Facility (GEF) through the United Nations Environment Programme (UNEP). Government of Uganda is grateful for this support.

NBSAPI was reviewed and updated taking into account the guidance from the Conference of the Parties to CBD contained in decision X/2 which among others urged Parties and other Governments to review and as appropriate update their NBSAPs, in line with the Strategic Plan for Biodiversity 2011 -2020. The Parties were also urged to develop national targets using the Strategic Plan for Biodiversity and its Aichi Targets, as a flexible framework in accordance with national priorities and capacities taking into account both the global targets and the status and trends of biological diversity in the country.

Unlike NBSAPI which did not have targets, **NBSAPII has national biodiversity targets** in accordance with the guidance in decision X/2 and similarly using the Strategic Plan for the Cartagena Protocol on Biosafety 2011-2020. The national biodiversity targets provide a framework for measuring progress in the implementation of NBSAPII and will be **implemented by target champions.** NBSAPII has incorporated Government priority development agenda in the National Vision 2040. As result of this, the NBSAPII has been mainstreamed in the National Development Plan II. Furthermore NBSAPII has been aligned to the Sustainable Development Goals (SDGs). Biodiversity has a very big contribution towards the achievement of SDGs in Uganda. The National Vision 2040 and SDGs in Uganda are implemented through National Development Plans. Therefore implementing NBSAPII contributes to implementation of NDPII, SDGs and the National Vision 2040.

Government of Uganda is committed to ensuring that all its policies, programmes and strategies incorporate gender and accordingly. **NBSAPII has integrated gender issues to make it gender-responsive.** The necessary tools to support resource mobilization for implementing NBSAPII have been developed namely Guidelines and Action Plans for Financing Biodiversity Conservation in Uganda, Policy and Institutional Review, Biodiversity Expenditure Review, Financial Needs and Gap Analysis and the Biodiversity Finance Plan. These support tools should be used as reference material in planning for implementation of NBSAPII. I call upon all ministries, departments, and agencies (MDAs), local governments, the academia and research institutions, NGOs, CSOs, the private sector, development partners, individuals and the general public to support the implementation of NBSAPII.

For God and my country.

HON. SAM CHEPTORIS
MINISTER OF WATER AND ENVIRONMENT

ACKNOWLEDGEMENT

The National Biodiversity Strategy and Action Plan II (NBSAPI) is a result of wide stakeholder consultations including consultations with National Focal Points of other Multi-lateral Environmental Agreements (MEAs). I would like to thank the Board of Directors of NEMA[1] for providing guidance during the development of NBSAPII and on behalf of Government thank the GEF for providing the financial support for reviewing and updating the NBSAPI. I am grateful to the United Nations Environment Programme (UNEP) for assisting Uganda in accessing the funds from GEF.

I would like to extend appreciation to IUCN/Japan Biodiversity Fund, International Institute for Environment and Development (IIED) and the United Nations Development Programme (UNDP) for the additional financial support. The support from IUCN/Japan Biodiversity Fund made it possible to include gender in NBSAPII while the support from IIED was critical for addressing mainstreaming of biodiversity into other sectors including NDPII. The support from UNDP under the Biodiversity Finance Initiative (BIOFIN) has resulted into the production of the following support tools for implementing NBSAPII:

a) Policy and International Review (PIR) which provides information on the policies and how their implementation contributes to or affects biodiversity conservation and management;
b) Biodiversity Expenditure Review (BER) that gives information on expenditures on biodiversity in Uganda for the period 2005/6 to 2014/15;
c) Financial Needs and Gap Analysis which analyzed the needs and estimated the cost of implementing biodiversity activities; and,
d) Biodiversity Finance Plan (BFP) which gives guidance on resource mobilization to address the funding gap for implementing NBSAPII.

I thank all the experts, representatives from Government institutions, the private sector, indigenous peoples and local communities (IPLCs), CSOs for the time they committed in developing NBSAPII and for their valuable input. I am especially grateful to the following institutions for their active participation in developing the NBSAPII:

Office of the Prime Minister
Ministry of Water and Environment
Ministry of Tourism, Wildlife and Antiquities
Ministry of Finance, Planning and Economic Development
Ministry of Gender, Labour and social Development
Ministry of Agriculture, Animal Industry and Fisheries
National Planning Authority
Uganda National Council for Science and Technology
National Agricultural Research Organization and the affiliate research institutes
National Forestry Authority
Uganda Wildlife Authority
Uganda Export Promotion Board
Uganda Bureau of Statistics
Natural Chemotherapeutic Research Institute, Ministry of Health
Makerere University
Oyam District Local Government
Jinja District Local Government
Kayunga District Local Government
Buikwe District Local Government
Mukono District Local Government

1 Provided in Annex 1

Moroto District Local Government
Wildlife Conservation Society
Technical Committee on Biodiversity Conservation
Economic Policy Research Centre
World Wide Fund for the Conservation of Nature
International Institute for Environment and Development
The Secretariat of the Convention on Biological Diversity
United Nations Environment Programme
United Nations Environment Programme World Conservation Monitoring Centre
Dodoth Agro Pastoralist Development Organization
Advocates for Research in Development
Action for Development
Nature Palace Foundation
Support for Women in Agriculture
Women and Child Advocacy Network
Karma Rural Women's Development Organization
Uganda Women Entrepreneurs Association
Mama Water Africa Foundation
Karamoja Women Cultural Group
United Organization for Batwa Development in Uganda
Kyibumba Young Women Community Development Initiative
Women and Rural Development Network
African Women's Economic Policy Network
Council for Economic Empowerment for Women
Mak Pur Farmers Centre (U) Ltd
Uganda Women's Network
Uganda Women's Parliamentary Association
IUCN Uganda Office
IUCN Global Gender Office
Environmental Alert
Action Aid
ECOTRUST
Advance Africa
Total E&P Uganda
Nature Uganda
Caritas Kotido Diocese
CARE, Uganda

Lastly, I commend the CBD National Focal Point Mr. Sabino Francis Ogwal for effectively coordinating and guiding the development of NBSAPII on behalf of NEMA, and thank Ms. Monique Akullo, Dr. Evelyn Lutalo and Mr. Junior Musinguzi for supporting the CBD National Focal Point during the development of NBSAPII.

Dr. Tom .O. Okurut
EXECUTIVE DIRECTOR
NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY (NEMA)

EXECUTIVE SUMMARY

Government of Uganda is committed to promoting the conservation and sustainable use of its biological resources and protection of the vital ecosystem services provided by biodiversity for sustainable development, wealth creation, job creation and improvement of livelihoods of local communities. This is supported by the goal of NBSAPII which is to enhance biodiversity conservation, management and sustainable utilisation and fair sharing of its benefits by 2025 and its vision to maintain a rich biodiversity benefiting the present and future generations for socio-economic development.

NBSAP is the main instrument for implementing the Convention on Biological Diversity (CBD) at country level. NBSAP provides Government with a framework for implementing its obligations under the CBD as well as the setting of conservation priorities, channeling of investments and building of the necessary capacity for the conservation and sustainable use of biodiversity in the country.

During the tenth meeting of the Conference of the Parties to the CBD, the new Strategic Plan for Biodiversity 2011-2020[2] with 20 Aichi Biodiversity Targets was adopted. Parties then committed themselves to revising their NBSAPs and adopting them as policy instruments by 2015. Parties also committed themselves to developing national biodiversity targets that would support the achievement of the Strategic Plan and the Aichi Targets. The revision of the NBSAP has enabled Uganda to demonstrate its commitment to the achievement of the Strategic Plan for Biodiversity 2011-2020 with its Aichi Biodiversity Targets, while having its own national targets. Through a gender mainstreaming process to strengthen social and gender considerations in the NBSAP revision, Uganda has also implemented core elements of the CBD Gender Plan of Action.[3]

NBSAPI was developed in 2002. The process was coordinated by NEMA which is the institution coordinating the implementation of the CBD in Uganda through the CBD National Focal Point. NBSAPI had an initial implementation period of 10 years with a major review after 10 years. The key obstacles to NBSAPI implementation included:

a) Inadequate financial resources for implementing planned activities;
b) Inadequate awareness of NBSAPI;
c) Inadequate human and infrastructure capacity in certain fields of biodiversity conservation such as taxonomy and characterization of germplasm in the National Gene Bank;
d) Lack of a central node/Clearing House Mechanism (CHM) to facilitate information sharing among institutions involved in biodiversity conservation; and,
e) Inadequate managerial and technical capacity at the District and lower local Government levels for implementation of NBSAPI.

A number of these obstacles have since been overcome. The CHM for example is now operational and can be visited at www.chm.nemaug.org. Capacity has also been built at the district and lower levels to handle critical issues of biodiversity conservation at those levels. NBSAPII has put in place measures to significantly increase the resource envelope for biodiversity conservation by exploring various sources of innovative sustainable funding mechanisms from the BIOFIN process.

NBSAPII addresses the key concerns regarding biodiversity management in Uganda. These include, among others, declining species abundance largely due to over-harvesting and exploitation of biological resources including trees and woody biomass, shrinking habitats especially wetlands and forests. These loses are largely attributed to unsustainable use of biodiversity resources or habitat loss due to conversion of habitats into other commercial land uses or habitat degradation. Additional concerns include local species extinctions, invasive species, human-wildlife conflicts, encroachment on protected areas, agricultural expansion, climate

2 www.cbd.int
3 https://www.cbd.int/doc/decisions/cop-12/cop-12-dec-07-en.pdf

change and variability, illegal wildlife trade and pollution. There are also socio-economic pressures in the country including human population increase, gender inequality and poverty.

While government continues to make every effort to address these concerns through strengthening of policy, legal and institutional frameworks, there have also been emerging challenges such as the recent discovery of oil and gas in the Albertine Graben, the increasing use of biofuels, and the more frequent incidences of disasters such as droughts, floods and mudslides associated with climate change impacts which can have a disastrous impact on biodiversity if not urgently attended to.

The development of NBSAPII was through wide stakeholder consultations, including a gender mainstreaming process, to ensure ownership and smooth implementation. It also included strong aspects of other Multilateral Environmental Conventions to enhance synergies and leverage additional funding from these Agreements.

The Vision of Uganda's NBSAPII is" to maintain a rich biodiversity benefiting the present and future generations for socio-economic development".

The Goal is "to enhance biodiversity conservation, management and sustainable utilisation and fair sharing of its benefits by 2025".

NBSAPII has 7 Strategic Objectives, namely:

1. To strengthen stakeholder co-ordination and frameworks for biodiversity management;
2. To facilitate and enhance capacity for research, monitoring, information management and exchange on biodiversity;
3. To put in place measures to reduce and manage negative impacts on biodiversity;
4. To promote the sustainable use and equitable sharing of costs and benefits of biodiversity;
5. To enhance awareness and education on biodiversity issues among the various stakeholder;.
6. To harness modern biotechnology for socio-economic development with adequate safety measures for human health and the environment; and,
7. To promote innovative sustainable funding mechanisms for implementation of NBSAPII.

Each of the Strategic objectives is tied to an Action Plan stretching from 2015 to 2025. A separate action plan has also been prepared for critical new and emerging issues of oil and gas discovery and production, biofuel production and natural disasters. The minimum cost for implementing the Strategy and Action Plan over the 10 year period (2015-2025) is estimated at **USD105,809,000,** approximately **USD10,580,900** annually. This is very modest considering the importance of biodiversity to Uganda's economy and sustainable livelihoods of local communities including women and men. The Policy Institutional Review (PIR), the Biodiversity Expenditure Review (BER), Financial Needs and Gap Analysis and the Biodiversity Finance Plan (BFP) provide more information on the costs for scaling up activities on biodiversity conservation and management in four sectors namely water and environment, tourism, agriculture and energy.

Funds allocated and/or proposed by Government, donors and trusts will represent a core source of funding for the action plan. Therefore stakeholders in Government, private sector and civil society will have to work together to lobby parliament and the Finance Ministry to ensure that the current levels of funding for biodiversity are at least maintained or at best increased in the medium and long-term. Other innovative financing mechanisms will also be actively explored and exploited with guidance from NEMA, including payments for ecosystem services, biodiversity offsets, environmental fiscal reforms, green markets through natural resource trade and value chains, climate finance and the Global Environment Facility (GEF) and other donor-funded programmes.

NBSAPII will have a rolling life span of 10 years. The first review will be carried out after the first 5 years of implementation, and a major review during the 10th year of implementation. Overall coordination and monitoring progress of implementation will be done by NEMA. Institutions assigned the national targets (herein referred to as **target champions**) will take lead in implementing and reporting on progress towards

the achievement of national biodiversity targets. The priority areas for NBSAPII which is also in line with National Vision 2040, the Sustainable Development Goals (SDGs) and the National Development Plan II (NDP II) are:

1. Restoration of degraded ecosystems (wetlands, forests, rangelands, hilly and mountainous areas)
2. Preventing extinction of threatened/endangered species and curbing illegal wildlife trade
3. Building capacity for effective implementation of the access and benefit sharing arrangements
4. Managing pollution and invasive alien species
5. Research, awareness, information sharing and valuation of biodiversity and ecosystem services
6. Mainstreaming biodiversity into sectoral, cross-sectoral and district development plans
7. Enhancing participation of indigenous peoples and local communities, women, men and youth in the implementation of NBSAPII
8. Building capacity of local governments for effective implementation of NBSAPII at the district level
9. Capacity enhancement, regulatory framework and public awareness on biotechnology and biosafety
10. Resource mobilization for implementing NBSAPII

1. INTRODUCTION

1.1 Background information

Uganda is a landlocked country that lies astride the equator between 4°N and 1°S and stretches from 29.5°W – 35°W (Figure 1). It is one of the smaller states in Eastern Africa covering an area of 236,000 square km comprising 194,000 square km dry land, 33,926 square km open water and 7,674 square km of permanent swamp (Langdale-Brown et al 1964, Langlands, 1973).

Figure 1: Location of Uganda in Africa.

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 (Figure 1), combined with high altitude ranges, the country has a high level of biological diversity. Internationally and in Africa, for its size, Uganda is among those countries endowed with the greatest diversity of animal and plant species. Although Uganda occupies only 2% of the world's area, with a recorded 18,783 species of fauna and flora (NEMA, 2009), Uganda ranks among the top ten most bio-diverse countries in the world. Uganda is host to 53.9% of the World's population of mountain gorillas, 11% (1,063 species) of the world's recorded species of birds (50% of Africa's bird species), 7.8% (345 species) of the Global Mammal Diversity (39% of Africa's Mammal Richness), 19% (86 species) of Africa's amphibian species richness and 14% (142 species) of Africa's reptile species richness, 1,249 recorded species of butterflies and 600 species of fish. There are 30 species of antelope, 24 species of primates including charismatic species of Mountain Gorillas and Chimpanzees, and more than 5,406 species of plants so far recorded of which 30 species of plants are endemic to Uganda (MPS, 2013/2014).

Figure 2: Mountain Gorillas in Bwindi Impenetrable National Park.

The country's immense biological diversity is important both nationally and internationally, and offers good opportunities for cost-effective multiple species conservation. Uganda's endemic species are primarily associated with high mountains, forests, and the major pleistocene refugium of the Albertine Rift Valley. Among the larger mammalian species, Uganda is endowed with relatively stable populations of among others, Elephant, Buffalo, Hippopotamus, Eland, Zebra, Hartebeest, Waterbuck, Reedbuck, and Uganda Kob. The country is also home to the Lions, Cheetahs, Leopards, Hunting Dog and Hyenas among others. Uganda therefore has all the big five animals. Currently Uganda has 159 species listed in the IUCN Red List, 2008; which includes 38 plants, 21 mammals, 18 birds, 6 amphibians, 54 fishes, 10 molluscs and 12 being other invertebrates.

1.2 Status of Biodiversity in Uganda

Biodiversity is a fundamental element of the earth's life support system and is the basis for all ecosystem services and thus plays a fundamental role in maintaining and enhancing the world's population as it supports many basic natural services for humans for example fresh water, fertile soils and clean air. Biodiversity includes diversity at the genetic level, the diversity of species, and the diversity of ecosystems.

1.2.1 Biodiversity at the Species level

Uganda is exceptionally rich in biodiversity with surveys reporting occurrence of over 18,783 species of flora and fauna. Knowledge of the species present is confined to the more known taxa such as birds, mammals, butterflies, higher plants, reptiles, amphibians and fish (Table 1). This is because of their relative conspicuousness and economic importance. Little is known about the less conspicuous ones including important forms such as belowground biodiversity.

Table 1: Recorded flora and fauna species in Uganda

Taxon	Total number of species	% of global species	No. of globally threatened spps
Amphibians	86	1.7	10
Birds	1,012	10.2	15
Butterflies	1,242	6.8	-
Dragon flies	249	4.6	-
Ferns	389	3.2	-
Fish	501	2.0	49
Flowering plants	4,500	1.1	40
Fungi (poly pore)	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 (2009)

Considering the various threats, several Ugandan species have qualified to be included on the IUCN Red Data list as shown in Table 2.

Table 2: Status of Uganda's biodiversity according to the IUCN Red List (2008)

Conservation status	No. of Species 2004	No. of Species 2008
Extinct	34	34
Extinct in the wild	4	4
Critically endangered	27	28
Endangered	31	36
Vulnerable	72	67
Lower risk/conservation dependent	18	18
Threatened	54	51
Near threatened	64	66

1.2.2 Biodiversity description based on taxa

The key fauna and flora biodiversity resources in Uganda may be described under the following categories: mammals, birds, fishes, reptiles, amphibians, plants and insects.

Mammals: Uganda has approximately 380 mammal species and is ranked 13 in the world in terms of mammal species richness (IUCN RED Data List 2008). The number of mammal species has been changing due lo local extinctions and introductions (UWA, 2010).

Birds: Uganda has approximately 1,016 species of birds (10% of world total). There are over 2,250 species recorded on the African continent and the total list of Uganda species represents nearly half (47%) of all species recorded on the continent. There are 143 palaearctic migrants, 56 afro-tropical migrants and 25 Albertine endemics. A total of 189 species are forest specialists while 160 species are water dependent (Byaruhanga et al, 2001; NBI, 2010).

Figure 3: Ostriches in Kidepo National Park.

Fishes: The fish biodiversity in Uganda is dominated by the cichlid family consisting of 324 species of which 292 are endemic to Lake Victoria. Of the over 600 fish species found in Uganda, the only commercial fish species include Nile perch (*Lates niloticus*) found in all the major lakes except Edward/George. Other commercially exploited species include the Nile Tilapia (*Oreochromis niloticus*) found in all major water bodies, Mukene (*Rastreneobola argentea*) from Lakes Victoria and Kyoga, Muziri/Mukene, (*Neobola bredoi*) of L. Albert, Catfish (*Clarias gariepinus*) and the Silver catfish (*Bagrus documak*) from all major water bodies. *Alestes Baremose, Brycinus nurs*e and *N. bredoi* currently constitute about 80% of fish biomass in Lake Albert. The most common fish species to almost all the water bodies is the Lungfish (*Protopterus aethiopicus*) .

Figure 4: *Bagrus documak*(Semutundu - a delicacy in Uganda) from Lake Bisina.

Amphibians: There are 98 species of amphibians recorded in Uganda, representing 1.65% of global species. Most of the amphibian species in Uganda have an IUCN category of Least Concern because they either have a wide distribution, tolerant to broad range of habitats or presumed to have large populations. However, a few species are recorded as restricted, 5 species vulnerable, 1 specie is near threatened, 1 species critically endangered and 1 specie (Northern clawed frog) is extinct while 3 species are data deficient (NBI, 2010). Overall, little is known or documented about this taxa.

Reptiles: There are an estimated 150 reptile species in Uganda which represent approximately 1.5 % of total global species. Very little is currently known or documented about these taxa (NBI, 2010).

Domestic Animals: This category includes cattle, goats, sheep, pigs, poultry, rabbits, donkeys, horses, domestic buffalo, dogs and cats.

Plants: There are approximately 5,000 species of higher plants in Uganda, of which 70 are endemic and mainly concentrated in tropical forests in the western region. 58 Ugandan taxa of higher plants are listed on the Global Red Data List by IUCN. There is concern that more of Uganda's plant taxa will appear under the Red List due to habitat changes or loss unless immediate remedial measures are taken (NBI, 2010). The lower plants are generally poorly documented in Uganda. They fall under three main types: Algae (115 species), *Bryophytes* and *Pteridophytes* (ferns) (386 species). *Bryophytes* (mosses (500 species), liverworts (250 species) and hornworts) represent the most ancient lineage of land plants (UNESCO, 2012).

Fungi: Fungi are generally poorly known or documented in Uganda. However, available records show that there are 420 species of fungi (NBSAP, 2002) in Uganda. Fungi exists in form of ecological (saprophytic, symbiotic and parasitic fungi, edible and medical mushrooms), industrial (for instance, brewing and baling yeast), medicines and pathogenic organisms in human health (candidiasis, ring worms, athlete foot) or agricultural forms (crop and animal pathogens of domestic and wild animals).

Lichens: There are 296 species of lichens in Uganda represented in 51 genera. These represent 1.6% of world species (NBI, 2010).

Insects: Uganda houses 8.999 species of insects (1.2% of the global species) in 3,170 genera (NBI, 2010).

1.2.3 Biodiversity distribution in Uganda

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 number is also found in other natural ecosystems such as mountains, savannahs, wetlands, lakes and rivers. Agricultural biodiversity on altered man-made ecosystems is also abundant; however great interest is given to biodiversity confined to natural ecosystem because of harboring most of the uncommon or rare species in their more preferred original states. Box 1.1 below shows the biodiversity hot spots in Uganda.

Box 1.1 Biodiversity hot spots in Uganda

- Mgahinga Gorilla National Park and Bwindi Impenetrable National Park - the mountain gorilla (Gorilla gorillaberengei) and other regionally and globally endemic species
- Rwenzori Mountain National Park - bay duiker (Ceplahophu.cleucogaster)
- Sango bay wetlands and forest ecosystem - biodiversity of global significance
- Kibale National Park - globally and regionally endemic species, primate species richness
- Dry mountains of Karamoja (Napa, Morungole, Kadam, Timu and Moroto) - regional and global endemics
- Lake Victoria - cichlid and nile perch species (alien species invasion)
- Papyrus swamps of Lake Edward, George and Bunyonyi which have, among others, the endemic papyrus (hioropetagracilirosiris)

Source: SOER 2000/2002

1.2.4 Biodiversity in protected areas

Protected Areas (PAs) in Uganda mainly fall under two resources, namely forestry and wildlife. Out of a total surface area of 241,551sq.km (both land and water), 25,981.57sq.km (10%) is gazetted as wildlife conservation areas, 24% is gazetted as forest reserves and 13% is wetlands.

Biodiversity in Wildlife Conservation Areas: Uganda has 10 National Parks, 12 Wildlife Reserves, 10 wildlife sanctuaries, 5 community wildlife areas, 506 central forest reserves and 191 local forest reserves. It is however estimated that over 50% of Uganda's wildlife resources still remain outside designated protected areas, mostly on privately owned land which is of most urgent concern for protection and development.

Uganda's wildlife conservation areas are very rich in biodiversity. According to UWA (2012), there are 405 species of mammals, 177 species of reptiles, 119 species of amphibians and approximately 1,000 bird species in Uganda's wildlife conservation areas.

Figure 5: A lion in Queen Elizabeth National Park.

Some mammal species are restricted in their distribution. For example, zebras are restricted to Lake Mburo and Kidepo National Parks, giraffes to Murchison Falls and Kidepo National Parks and, mountain gorillas to Bwindi Impenetrable and Mgahinga National Parks. There are three local extinctions among the large mammals, namely; Oryx, black rhino and Derby's eland (UWA, 2012).

Biodiversity in forest reserves: Uganda's tropical forests are also very rich in biodiversity. Central Forest Reserves (CFRs) are known to house some 1,259 species of trees and shrubs, 1,011 species of birds, 75 species of rodents, 12 species of diurnal primates and 71 butterfly species (NFA, 2011).

Among the key forest biodiversity species, 4 primates species, 2 other mammals species, 6 bird species, and 2 butterflies are listed in IUCN Red Data Book (2008) to be globally threatened with extinction (NFA, 2011). Four species of mammals (Chimpanzee, L'Hoest monkey, elephant and leopard), one species of birds (Grauers rush warbler) and one species of butterfly (Cream-banded swallowtail butterfly) are also listed as "vulnerable". Four species of forest birds (Nahan's francolin, African green broadbill, Flycatcher and Forest ground thrush) are classified as "rare". The Uganda red collobus monkey and Kibale ground thrush are categorized as "intermediate" species since not enough information is available about them (NFA, 2011).

1.2.5 Biodiversity outside protected areas

Uganda's 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.

The bulk of the forests (64%) in Uganda are found on private land (NFA, 2011) which is outside protected areas. These forests harbour the same extent of biological diversity as those inside the forest reserves. This situation shows that private land owners and communities could play a significant positive role in managing forest biodiversity in Uganda given the right incentives to do so.

As with wildlife, the status of plants outside PAs is not known. 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.

Biodiversity in wetlands: Uganda's wetlands are known to support some 43 species of dragon flies (of which 20% are known to occur in Uganda only), 9 species of molluscs, 52 species of fish (which represent 18% of all fish species in Uganda), 48 species of amphibians, 243 species of birds, 14 species of mammals, 19 species of reptiles and 271 species of macrophytes (NBSAP, 2002). Papyrus and other wetland plants have commercial value, and many other plants are used for medicinal purposes (MWE, 2003).

Biodiversity in savannah ecosystems: Grasslands/savannas cover more than 50% of the land area of Uganda and are dominated in different locations by species of grasses, palms or acacias. A diversity of other plant and animal species are also closely associated with various natural savanna types. Much of this habitat has been converted to human use for agriculture and grazing. The remaining pockets of natural savannas and grasslands are primarily found in various protected areas in Uganda.

Figure 6: Uganda Kobs in the Savanna Ecosystem of Queen Elizabeth National Park.

Biodiversity in aquatic ecosystems: About 20% of the surface area of Uganda is under water comprising lakes (46,900 sq. km), swamps (7,300 sq. km) and rivers (2,000 sq. km). Uganda's fisheries landscape therefore includes the diverse resources ranging from the five large lakes Victoria, Kyoga, Albert Edward, George and Kazinga Channel, over 160 small lakes, a network of rivers, swamps and flood plains all of which are critical habitats, breeding and nursery grounds for fish and potential sites for Aquaculture development. The 160 small water bodies occur in Eastern and western Uganda but their potential for fish production is largely unknown.

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 fish. 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 form an important habitat for fish biodiversity. Uganda has about 600 fish species in terms of biodiversity and all edible but the commonly encountered in trade are dominated by the Nile Perch, Nile Tilapia and small fishes (*mukene, ragoogi* and *nkejje*).

Figure 7: Aquatic biodiversity habitat.

Figure 8: Hippos in River Nile within Murchison Falls National Park.

Belowground biodiversity: Little is known about the status of soil biodiversity because it has received less attention from researchers and planners (Rwakaikara, 2008). As far as biodiversity conservation is concerned, the most important of these is the soil bacteria (Okwakol, 2007). The major species of soil microflora are given in Table 3 below.

About 20% of the surface area of Uganda is under water comprising lakes (46,900 sq. km), swamps (7,300 sq. km) and rivers (2,000 sq. km). Uganda's fisheries landscape therefore includes the diverse resources ranging from the five large lakes Victoria, Kyoga, Albert Edward, George and Kazinga Channel, over 160 small lakes, a network of rivers, swamps and flood plains all of which are critical habitats, breeding and nursery grounds for fish and potential sites for Aquaculture development. The 160 small water bodies occur in Eastern and western Uganda but their potential for fish production is largely unknown.

Table 3: Major species of soil micro flora in Uganda

Form	Genera	Species
Bacteria	37	92
Fungi	184	420
Algae	149	115

Source: NBSAP (2002)

1.3 Biodiversity trends in Uganda

1.3.1 Species trends

The rate of biodiversity loss in Uganda is high and was calculated in 2004 to be between 10-11% per decade (MWLE, 2003). Over-all, there is concern over the downward trend of Uganda's biodiversity on global scale. The number of known species recorded on the IUCN Red List is high as shown in Table 4 below.

Table 4: Status of Uganda's biodiversity according to IUCN Red List (2008)

Conservation status category	No. of Spp 2004	No. of Spp 2008
Extinct	34	34
Extinct in the Wild	4	4
Critically endangered	27	28
Endangered	31	36
Vulnerable	72	67
Lower risk/conservation dependant	18	18
Threatened	54	51
Near threatened	64	66
Data deficient	41	36
Least concern	1,562	1,508

Source: IUCN Red lists of 2004 and 2008.

For mammals, the population of some species seems to be on the decline while others have increased. For example, the populations of chimpanzees, mountain gorillas and elephants have continued to rise during the last several years. Table 5 shows the trends in some mammalian species.

Figure 9: Elephant population in Uganda is slowly increasing.

Table 5: Trends in large mammal populations in Uganda

Species	1960s	1982-1983	1995-1996	1999-2003	2004-2006	2007-2010	2011	Status in Uganda
Buffalo	60,000	25,000	18,000	17,800	30,306	21,565	21,639	Population increasing
Burchell's Zebra	10,000	5,500	3,200	2,800	6,062	11,814	n/a	Population stable
Elephant	30,000	2,000	1,900	2,400	4,322	4,393	n/a	Population stable
Rothschild's Giraffe	2,500	350	250	240	259	984	n/a	Population stable
Hartebeest	25,000	18,000	2,600	3,400	4,439	4,099	4,001	Population stable
Hippo	26,000	13,000	4,500	5,300	7,542	6,580	n/a	Population stable
Impala	12,000	19,000	6,000	3,000	4,705	33,565	n/a	Population stable
Topi	15,000	6,000	600	450	1,669	845	n/a	Population stable
Uganda kob	70,000	40,000	30,000	44,000	34,461	54,861	54,080	Population stable
Waterbuck	10,000	8,000	3,500	6,000	6,493	12,925	13,128	Population increasing
Common Eland	4,500	1,500	500	450	309	1,409	n/a	Population stable
Bight's gazelle	1,800	1,400	100	50	n/a	n/a	57	Population precarious but recovering
Roan	700	300	15	7	n/a	5	20	Population precarious but recovering
Oryx	2,000	200	0	0	0	0	0	Extinct in Uganda
Black Rhino	400	150	0	0	0	0	0	Extinct in Uganda
Derby's eland	300	0	0	0	0	0	0	Extinct in Uganda
Northern While Rhino	300	20	0	0	0	0	0	Extinct in Uganda
Eastern Black Rhino	400	150	0	0	0	0	0	Extinct in Uganda
Southern White Rhino					6	11	14	This is a breeding population at the Rhino Sanctuary which is increasing
Lions				600		416		Population declining fairly rapidly

Source: UWA (2011)

It should be noted that before the civil strife in the 1970's and 1980's, Uganda had both the northern white rhinos (*Ceratotherium simum cottoni*) and eastern black rhinos. All these rhinos got extinct in the 1980s and we currently have none of the orginal indigenous rhinos. What we now have is the Southern white rhino (*Ceratotherium simum simum*) which is just an out of range sub-species (new introduction) in Uganda. Six of them were got from Kenya and 2 from United States of America. Their population now stands at 14 individuals in the country.

Figure 10: A Rhino at Uganda Wildlife Conservation Education Centre.

Trends in bird populations: As for birds, 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. In terms of trends, some species seem to be recovering from a downward trend. For example, the population of pied king fisher is increasing while fish eagles have remained fairly constant (Pomeroy et al 2004).

Trends in commercial fish production: Total fish production potential in Uganda stands at about 560,000 metric tonnes with about 82% (460,000 MT) contribution from the major water bodies and 18 % (100,000 MT) from aquaculture fisheries. The general production has averaged about 220,000 metric tonnes per year in the last decade after peaking at 276,000 metric tonnes in 1993. Increasing fishing effort is exerting high fishing pressure on capture fisheries thereby causing fish scarcity and prompting use of destructive fishing gears and technologies. This has continually led to increased investment costs in fishing operations in an effort to chase and catch the fish.

The fisheries resources in Uganda have been on the decline due to various pressures and threats. The Nile perch stocks on Lake Victoria for example have decreased from an estimated 1.9 million tons in 1999 to 0.35 million tons in 2009. Currently 40 percent of the catch of large species in the lake is immature fish. Available information indicates that use of illegal fishing gears and malpractices have increased over years. On Lake Victoria, the use of illegal monofilament nets increased by 1,220 percent between 2004 and 2008. A declining trend in export levels and reduction in fish species diversity should be expected in the long term if this trend continues.

The major threats to fish production in Uganda include the following:

a) Use of destructive fishing gears and technologies especially when they are used in fish breeding and nursery grounds resulting in harvesting of young fish;

b) Open access fisheries management regime has led to many fishermen to compete for fish without consideration for long-term resource sustainability;

c) Environmental problems such as water pollution, degradation of Lake Shoreline and riverine wetlands leading to siltation, use of agro-chemicals industrial and urbanization in lake and river catchments all alter fish habitat conditions; and,

d) Lack of realistic fish stock data for capture fisheries creates a weak basis for policy formulations, poor management decisions, under valuation of fisheries.

Several measures are currently being taken to address threats to fisheries including:

a) Restocking Lakes Victoria and Kyoga with native fish species to replenish the stocks of fish fed on by Nile perch;

b) Establishing and maintaining proper base data/information on fish stocks, fish species reproductive biology and their resilience potential,

c) Strengthening fisheries co-management;

d) Promoting and supporting aquaculture;

e) Gazetting a limited number of landing sites to reduce and concentrate landing sites to facilitate monitoring, surveillance and control;

f) Establishing no fishing zones especially fish breeding areas and protecting them from destructive fishing;

g) Controlling the size of fishing gear and establishing regional fisheries management institutions (like Lake Victoria Fisheries Organization on Lake Victoria); and,

h) Harmonizing regional policies and laws governing trans-boundary fisheries.

1.3.2 Habitat trends

Forests

Forest land in Uganda is presently estimated at 3.3 million hectares or 16% of the total country area declining from 4.9 million hectares or 20% in 2001. Of the total area of forests, 30% are in protected areas (forest reserves, national parks and wildlife reserves) while 70% is found on private and customary land. Uganda is estimated to be losing its forest cover at a rate of 200,000 hectares per year implying a loss in forestry biodiversity as well. The size of forest and woodlands has significantly declined from 45% to 20% of total land surface between 1890 and 1990 (NFA, 2011). The majority of the forest loss has occurred outside of protected areas largely due conversion of forest lands into agriculture and over-harvesting wood for energy supply in form of firewood and charcoal (NFA, 2011). Threats to forests and its biodiversity include the following:

a) **Deforestation:** Due to high population growth rate and the rapid development in Uganda, the forest sector faces a huge problem of over harvesting through deforestation to satisfy the high demand for forest land for agriculture and forest products like charcoal, fuel wood and timber. Deforestation of the widely abundant woodlands is very rampant for the production of charcoal and conversion to agriculture and grazing land. About 78% of Ugandans are said to use firewood for cooking, a highly contributing factor to deforestation, and a deeply gendered issue, as women are primarily responsible for household care, and for collection and use of cooking fuels.

b) **Diseases and pests** have also attacked some of the tree species reducing their quality in ecological functions and production for timber products yet it's difficult to prevent spread; very costly and tasking to spray affected areas for their area coverage and irregularities in forests.

c) **Urbanization and Industrialization** have exerted great pressures on mainly peri-urban forest reserves for expansion of urban and industrial centers. For instance Namanve Forest near Kampala (1000 ha) and Wabisi-Wajala in Nakasongola District (8,744 ha) were degazetted for industrial expansion. The drive to modernization has also witnessed a dramatic increase in construction of residential, commercial and institutional buildings. Hence the demand for burnt bricks has translated into increased use of firewood. Timber for construction is also in high demand (SOER 2004/5).

d) **Encroachment** especially in the savanna woodland for the purpose of agricultural expansion and pastures for livestock grazing. For example in the forests reserves of Kiboga, Mubende, Luwero, Nakasongola, Bundibugyo, Soroti and Iganga, the reserves' boundaries in question were re-opened and demarcated especially in search of grazing grounds and at times farm land

e) **Alien species introduction:** Several tree and other plant species were introduced during the colonial period for example the eucalyptus, that have adapted quite well, colonizing and replacing indigenous species such as Lantana camara.

f) **Poor policies** have also contributed to the loss of forest cover for example during the 1972 to 1985; Box 1.1 shows poor policies of 1970s. In addition other good policies are impartial for example they at times lack public participation while other substantive laws lack subsidiary implementation.

Box 1.2: Effect of misguided policies on forest resources

After 1972 forest encroachment started on an unprecedented level. After the expulsion of the Asians the President declared an "economic war" followed by the "double production campaign" and in 1973 he declared that Ugandans were free to settle anywhere. The land reform decree of 1975 strengthened peoples' hands in acquiring land supposedly for "development". Under these concepts, forests were sometimes regarded as wastelands' which could be cleared Government officials started allocating gazetted forest land to either individuals or millstones for 'development Tree planting and other silvi-cultural activities came to a standstill

Source: FAO, 1988

Wildlife Protected areas

As mentioned above, Uganda's wildlife protected areas include 10 National Parks, 12 Wildlife Reserves, 7 Wildlife Sanctuaries and 5 Community Wildlife Areas. The biodiversity in the wildlife conservation areas has in some cases declined and in other cases increased over the years as can be seen from Table 5 above.

The major threats to PAs are related to the seemingly high population growth rate of Uganda (estimated at 3.2 percent per annum) which results in high demand for resources including land, fuel and income but also failure by local communities to recognize the value of PAs and associated biodiversity. Population growth has increased the demand for agricultural land and fuel wood for domestic use. Although, opportunities to ameliorate PA degradation exist through sound exploitation, rural poverty restricts the ability of local communities to invest in sustainable land use practices. More specifically, the stakeholder consultation stage highlighted the following threats:

a) Encroachment: Loss of habitat is perhaps the serious negative factor and is certainly the most difficult to halt and reverse. Encroachment is prevalent in all types of PAs. There was much clearance of forest cover to make settlements in the forest reserves during Uganda's civil strife of the 1970s and 1980s; residual encroachment in PAs still continues. Most of the boundaries of the encroached reserves have not been reopened and are not clearly demarcated, and this forms part of the reason for the current challenge of protecting these areas.

b) Human-wildlife conflicts: The perennial crash between human beings and wild animals continues to present stiff challenges in the management of PAs. Given the high population growth, 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 buffaloes. This has prompted the local communities to either poison the animals or become antagonistic towards conservation programmes.

c) **Illegal grazing in National Parks**: Communities neighbouring PAs continue to graze their domestic animals inside the game parks and reserves, and in most cases intruders are not deterred by fines. A number of factors contribute to the intrusion into Pas. These include disregarding the existing laws, failure to recognize the importance of the areas and desperation due to lack of other pasture options, among others.

d) **Poaching**: Poaching is a serious problem in the wildlife areas and is largely attributed to the demand for products from wild animals and plants for food, cash, medicine and game trophies. This activity has caused a significant decline in wild population and in some cases resulted to localized species extinction.

Wetlands

There is a fair level of complexity in categorizing Uganda's wetlands and inconsistence in the size. However, wetland cover is presently estimated at 10% of the country's area, or about 26,000 km2 (WMD, 2009) of which one-third are permanently flooded. In Uganda most wetlands occur outside protected areas and their range and quality is rapidly being eroded for agricultural land, urban settlement and industrial development. In Eastern Uganda alone 20% of wetlands have been destroyed, Central region 2.8%, Northern 2.4% and western 3.6% of wetlands have been destroyed (NEMA 2008). This has implications on wetlands biodiversity, especially for wetland dependent species such as Sitatunga. Current threats to wetlands and their biodiversity include the following:

a) **Encroachment of wetlands** due to extended demand for land for grazing and agriculture especially rice in the Eastern region, dairy farming and vegetables in South West and postural land in the North and East)this wetland conversion is most common in rural and sub-urban areas.
b) **Drainage of wetlands** in urban centers especially in the central region, driven by the force of urban expansion or development.
c) **Pollution of wetlands** especially in urban places from discharging and dumping untreated industrial and municipal wastes while in rural areas from large agricultural farms and mining areas.
d) **Overharvesting or over-exploitation of wetland resources** which includes over fishing, over harvesting of wetland plants for domestic and commercial use and harvesting of construction materials like clay, sand, firewood, timbre, papyrus and ornaments among others.
e) **Siltation of wetlands**; this is due to poor methods of farming surrounding the wetland area that may cause massive erosion into the wetland

Aquatic ecosystems

The Status of these ecosystems has remained fairly stable in size, save for the fringing wetlands that have been dwindling in size over time. However, information on the ecological condition e.g. water quality is inadequate. There are reported increases in sedimentation in some water bodies e.g. Lakes Victoria, Kyoga, George and Bisina (NEMA, 2008).

Figure 11: Fishing in Uganda's waters.

1.3.3 Status and trends of biodiversity in agricultural landscapes

There is no complete record of biodiversity status within agricultural landscape in Uganda. Table 4 shows the diversity of common plants as far as they are known at present.

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. Common documented categories of agricultural plants are given in Table 6.

Table 6: Diversity of common agriculture crop plants in Uganda

Plants	Status
Exotic plants	• 58 families in 180 tree species • 55 species of other plants which are dominated by ornamental and fruit trees/plants and vegetables
Edible plants	>200 species of non-cultivated edible plants
Indigenous edible fruit trees	37 families represented by 75 species

Source: NBSAP (2002)

Of the estimated, 1,400 indigenous plant 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 plant species, some of which are very important to this country.

Modern agriculture enforces use of improved cultivars but some farmers have retained their varieties. 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 is 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 available.

Figure 12: Fresh mangoes in Uganda.

Threats to Plant Genetic Resources (PGR) for food and agriculture include the following:

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

b) 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);

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

d) Introduction of new varieties in preference to indigenous species;

e) Genetic erosion of indigenous plant genetic resources due to changes in land use; and,

f) Climatic change, leading to drought, diseases, pests, famine.

Potential interventions to address threats to PGR

Threats to PGR can be addressed through many interventions including capacity building for plant inventory techniques, for developing and maintaining plant databases, for developing models for plant conservation and sustainable use, for boosting law enforcement and for plant conservation at technical and apprenticeship levels. Other interventions include the provision of incentives to taxonomists to retain staff in this valuable field, , supporting domestication of useful plants, designing strategies and plans to protect threatened species on private lands, continuous collection and inventory of useful plant species, designing and maintaining a comprehensive database inclusive of species diversity, spatial distribution and taxonomic information to target collection sites and improvement of infrastructure and other working facilities for plant conservation. Building awareness in communities is also key, as is learning from women's and men's indigenous and traditional knowledge and techniques toward the protection and safeguarding of PGR, such as through community and women-led seed banks.

Animal Genetic Resources

The indigenous breeds of cattle are the main source of beef in Uganda constituting almost 95% of the total cattle population. Table 7 shows the diversity of common livestock species in Uganda.

Table 7: Diversity of animal breeds/varieties in Uganda

Animals	No. of breeds or varieties	Status
Cattle	>16	• 4 indigenous breeds, 12 exotic breeds • Indigenous 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 being given to goats for dairy and meat favouring exotic breeds.
Sheep	7	• 3 indigenous, 4 exotic species • 3 Exotic breeds are not well adapted, they are concentrated in highland areas.
Pigs	4	• 1 mixed breed, several breed related to wild forms; 3 breeds introduced • Economic value increasing as "pork" continues to become popular especially in urban areas
Poultry	9	• 3 indigenous; 6 introduced breeds • Exotics concentrated in and around urban areas.
Horses	1	• Little known in Uganda • Owned privately for leisure
Donkeys	1	• Little known • Reared mainly for providing "labour" especially in Karamoja and kapchorwa
Rabbits	7	• Little known • Economic value is increasing as they continue to be valued as a protein diet and source of household income

Source: Mbuza et al. (1999)

Trends in Domestic Animal Diversity: 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 the demand for high-yielding breeds 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 5), although systematic monitoring needs to be undertaken to discern future trends in species composition. Threats to domestic animal diversity include the following:

a) **Poverty** - Large proportions of Ugandans live below the poverty line, are deeply dependent on the natural resources around them for subsistence livelihoods, 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.

b) **Introduction of new breeds** - 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.

c) **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. 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.

1.3.4 Status and trends of Pollinators

A pollinator is biological agent that moves pollen from the male of a flower to a female flower to accomplish fertilization. The most recognized pollinators are the various species of bees while others include butterflies, moths, wasps, and bats, birds particularly humming birds, honeyeaters and sunbirds. Pollinators are very important in agricultural production and their status is therefore of concern not only to the farmers but to the Government as it has a direct impact on people's livelihoods and the economy.

Status of pollinator bees in Uganda: In a study by the National Environment Management Authority (NEMA) in 2009 on the integrated assessment of the potential impacts of the EU ACP Economic Partnership Agreements (EPAs) on Uganda's biodiversity, local communities raised concern that pollinator bees were disappearing from commercial flower growing areas due to heavy use of agrochemicals thus affecting other agricultural activities within the vicinity of the flower growing areas. Although the study was inconclusive, there were indicators pointing to the need to phase out the use of some agro-chemicals in flower farms that may have adverse impacts on pollinator bees thus reducing agricultural productivity.

2. THE IMPORTANCE OF BIODIVERSITY TO NATIONAL DEVELOPMENT AND POVERTY ERADICATION

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. While people may rely heavily on natural resources utilization, women and men have varying levels of control over those resources, making conservation—and understanding the importance of conservation—more challenging.

Natural ecosystems provide many essential services such as the provision of clean water and air, prevention of soil erosion, pollination of crops, provision of medicinal plants, nutrient cycling, provision of food and shelter 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 (from wildlife biodiversity), livestock industry, 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 its society, 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 in Uganda, 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).

2.1 The contribution of Agriculture

Uganda's enormous biodiversity is a major supporter of agriculture in Uganda, which sector is one of Uganda's biggest economic contributors, employing more than 70% of the population. The agricultural sector is composed of crop and animal production, forestry and fisheries and the associated trade and processing industries. The major crops produced include cotton, coffee, tea, sugarcane, tobacco, maize, bananas among others. The contribution of agriculture to GDP is currently around 23%.

One of the major challenges to sustainable agriculture in Uganda today is the unprecedented levels of biodiversity loss including loss of indigenous crop and animal species and varieties, as well as indigenous and traditional cultural knowledge and practices. The loss mainly emanates from habitat conversion, high population growth rate, climate change, poverty, and poor farming practices. This loss not only undermines the potential of the sector but also threatens the sustainability of the current roles of the sector. Uganda's population is projected to reach 61 million in the next 30 years (Uganda vision 2040) which calls for increased productivity to meet the anticipated demand increase. Agro-diversity provides various species whose productivity can be enhanced through biodiversity conservation to meet the projected demand increase of food.

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 3.2% of the total gross domestic product (GDP) (Behnke and Nakirya, 2012). For the past decade, agricultural GDP growth has averaged about one percent per annum while that of the livestock sub-sector has remained steady at 3% per annum. This implies that the livestock industry has been one of the major contributors to agricultural GDP growth. According to the Uganda Census of Agriculture 2008/9, up to 26 percent of households in the country own cattle, 39 percent own goats, 9 percent own sheep and 18 percent own pigs (MAAIF and UBOS 2009).

2.2 The contribution of forestry

At the sectoral level, the contribution of forestry to Uganda's Gross Domestic Product (GDP) for example, 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 over 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 over US$ 130.7 million annually (Glenn Bush, 2004).

Biomass Energy: The contribution of forestry to national energy demands is mostly expressed through woody biomass use by households and institutions for heating purposes. In 1994, charcoal production utilized 6 million cubic meters of round wood. This increased to 11 million cubic meters in 2007. In addition, the national consumption of firewood was estimated at 32.8 million cubic meters of woody biomass energy annually. The National Biomass Study (2003) indicates that 73 per cent of the districts in Uganda are experiencing a shortage of accessible woody biomass for fuel.

In addition to its contribution to ecological and energy concerns, forestry also supports the economy through forestry-related commercial products and services. These include timber products, ecotourism, arts & crafts, bee products, herbal medicine and rattan-cane. There is very little information to indicate trends in these products and services.

2.3 The contribution of wildlife and tourism

Wildlife resources yield direct benefits such as local and national income from tourism activities and are important sources bush meat, food, medicine, wildlife hunting, cropping and ranching. Tourism currently represents the major legitimate value accruing from wildlife resources.

Wildlife is therefore very important in Uganda's economy in terms of its contribution to GDP, foreign exchange earnings, direct and indirect employment, direct income to local communities, and creation of market for other national trade products, traditional medicine and biomedical research advancement, energy production, shelter construction materials, and a number of social-cultural and aesthetic values.

Figure 13: Bwindi National Park Headquarters. *(Internet picture)*

In terms of employment, the wildlife sector provides employment to Ugandans directly and indirectly through conservation, wildlife based tourism, trade and civil societies. For instance, by 2009, over 80,000 people were directly employed in the wildlife sector countrywide (MPS 2012/2013). Uganda Wildlife Authority alone employs over 1300 permanent staff. The concessions given to private businesses to operate hotels within the protected areas have also boosted employment opportunities for local people. Hotels within and outside conservation areas employ a number of people from the surrounding areas and contribute to the National Treasury through taxes.

Figure 14: A community lodge in Bwindi National Park.

Tourism which is largely wildlife based plays a key role in Uganda's export earnings. The sector is now the leading foreign exchange earner for Uganda contributing more than US$1,003,000,000 as of 2013 (MPS 2012/2013) in the form of foreign exchange earnings.

Tourist arrivals rose from 806,658 in 2009 to 1,233,000 in 2013 representing about 17% annual growth rate. Uganda's tourism relies significantly on wildlife and visitors to wildlife protected areas have been steadily growing. Annual visitor arrivals to wildlife protected areas grew at an average annual growth rate of 35% in the last ten years.

Figure 15: Kibale Primate Lodge.

Direct revenue generated from wildlife protected areas into national revenues has also been steadily rising, having grown from only UGX 3,305,000,000 in 2000 to now about UGX 46,000,000,000 in 2013. Uganda Wildlife Authority is now able to finance over 80% of its annual budget without direct government subvention by 2013, up from 27% in 2006. This is an indication that the sector in increasingly becoming sustainable. The 20% of all gate entrance fees to all Wildlife Protected Areas goes directly to local communities neighboring the respective Protected Areas. With increasing tourist arrivals and spending, local communities are bound to significantly benefit from wildlife resources. While tourism continues to be the fastest growing sector globally, Uganda could be a leading tourist destination in Africa as the security stabilizes and infrastructure improves.

2.4 The contribution of 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.

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.

Other 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 stabilization, micro-climate regulation and biodiversity habitat provision. Papyrus and other wetland plants have commercial value (e.g. Table 8), at least 22 species of plants growing in wetlands are edible, and many other plants are used for medicinal purposes.

Table 8: 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

2.5 The contribution of fisheries resources

The aquatic environment is a major source of food, employment, local income and of export earnings. 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.

Contribution of fish to GDP: The fisheries sector contributes approximately 2.5% of the national GDP and 12% of the agricultural GDP. The total fish production in Uganda stands at about 560,000 metric tonnes annually with about 82% (460,000 MT) contribution from the five water bodies/several small lakes and only 18% (100,000 MT) from culture fisheries. The sub-sector has significantly contributed to food, health, economy, exports, employment and tourism of the country. In terms of aquaculture, the country has about 2,000 individual farmers or farmer groups with over 5,000 ponds, 750 cages and over 100 tanks.

Contribution of fish to livelihood: In Uganda an estimated 1,000,000 – 1,500,000 are directly engaged full time or part time in capture fisheries with about 5,000 working with industrial processing fisheries sector and an additional 2,000 in aquaculture. An estimated 300,000 people, including a majority of poor men and women, are directly involved in fishing, fish processing and fish trading and nearly 5.3 million people (which is 15% of the total population) are directly dependent on the fisheries sector as one of their main sources of livelihoods.

Contribution of fish to food security: The worldwide per capita fish consumption increased from an average of 9.9 kg in the 1960s to 12.6 kg in the 1980s to 14.4 Kg in the 1990s reaching 17.3 Kg in 2010 but in Africa it is only 8.3 kg (FAO, 2010) and 10 Kg in Uganda (UBOS, 2010), which is still below the recommended WHO/FAO level of 12.5 Kg per capita. Fish has a highly desirable nutrient profile and provide an excellent source of high-quality animal protein that is easily digestible and of high biological value.

2.6 Biodiversity and Health

The practice of using herbs dates back to the African traditional societies that entirely depended on biodiversity to satisfy their health needs. This knowledge of plants with herbal value was passed on from one generation to another and is referred to as traditional or Indigenous Knowledge (IK) in the present day. There are various plants associated with medicinal value in Uganda including Moringa, Aloe Vera, *Prunus africana*, African tulip and African Tonic among others (NEMA 2011). Recent ethno botanical research has identified more than 300 plants (trees, shrubs, flowers and weeds) growing wild across the country associated with medicinal value. Some of these crops have gained value in the pharmaceutical industry and are now grown on a commercial value while others are harvested by herbalists at a zero price.

Figure 15: Aloe vera - a medicinal plant.

Medicinal plants are of special importance to Uganda because of their wide application in traditional medicine by both the rural and urban population. It is estimated that approximately 80% of Ugandans depend on indigenous medicine. This is because they are less costly and more widely available than western medicine and, in Uganda, traditional health practitioners are widely supported within local cultures. With the emergence of HIV/AIDS and other non-communicable diseases like diabetes, cancer and hypertension, and the lack of curative western medicine, many patients have turned to traditional healing systems (that predominantly depend on local medicinal plants) to treat related opportunistic diseases and infections. This is in addition to the treatment of zoonotic and other diseases like malaria, abdominal pain, skin diseases, headache, worms, ulcers and epilepsy, among others.

The wide application and use of medicinal plants may have negative and far-reaching implications for biodiversity and its conservation. The implications for the conservation of medicinal plants include the non-sustainable harvesting of widely used species. On the other hand, implications for the healthcare system include the deterioration of knowledge of the correct plant materials to use and lack of adequate quality control measures in the preparation and administration of medicines among the users.

Government of Uganda (GoU) recognizes the need to establish standards for safety and efficacy of such traditional remedies. In this regard the National Chemotherapeutics Research Institute (NCRI) in the Ministry of Health has over the years developed collaborative relationships with key stakeholders (including but not limited to traditional healers, medical practitioners, ecologists, gender specialists, researchers, religious leaders, policy makers/government officials and members of local communities), under the following objectives:

a) To encourage an approach to evaluating and improving the safe, effective, and sustainable use of medicinal plants in Uganda that integrates the professional expertise and knowledge of traditional healers with that of health workers
b) To develop a policy to regulate the production and use of herbal medicine
c) To assess the collection, trade, and conservation status of the target medicinal plant species
d) To strengthen the capacity of the Natural Chemotherapeutics Research Laboratory to develop and implement valid, ethical, and feasible protocols for evaluating the safety and efficacy of traditional remedies in Uganda
e) To clarify and establish equitable arrangements for intellectual property ownership and benefits from information contributed to this research by traditional healers and communities
f) To disseminate the research findings concerning safe, effective, and sustainable use of the targeted traditional remedies among current and potential users, including traditional healers, community health specialists and practitioners of western medicine within Uganda and internationally; and,
g) To propose to the National Drug Authority and the National Environment Management Authority in Uganda, recommendations and implementation guidelines for the sustainable harvesting of medicinal plants and improved preparation of traditional remedies.

The major threats to medicinal plants include the following;

a) Gaps in institutional framework: While NCRI as a lead institution has endeavoured to conserve medicinal plants (MP), It currently lacks both infrastructure and human capacity. There is need for the institution to expand for impact in conservation of MP; and,

b) Gaps in research and development: Although various individual researchers are involved in research in MP, there are no research programmes to link (indigenous knowledge) IK and MP research to development in science and technology in the country. Besides, there are very few research institutions that are involved in research in MP. Moreover, the existing institutions of research and higher learning lack adequate human and infrastructure capacity for validating therapeutic properties of MP. Furthermore, the process of patenting innovation arising from MP research does not also motivate scientist, since it is very costly and lengthy.

c) Gaps in Sensitization and advocacy

i) There is limited awareness with respect to potential opportunities of IK and biodiversity that could be tapped for the health sector to improve the health status of Ugandans
ii) There is also misinformation and lack of understanding on the nature and scope of IK and MP. This is because there is less documentation of IK and medicinal plants. Most of the formally educated population consider IK practices and traditional medicine as primitive which has stigmatized their utilization for improvement of the livelihood of the people
iii) Lack of a specific government programme to promote IK and MP in particular has led to their under-utilization in the development programme in the country.

d) Gaps in production and commercialization of medicinal plants

i) The potential of IK to contribute to the national economy through industrialization and commercialization has not yet fully been exploited in Uganda. The country does not have adequate technologies to develop MP on a commercial scale

ii) The existing pharmaceutical industries are not involved in the manufacture of herbal products from medicinal plants. Most of these pharmaceutical companies do not have production lines for processing medicinal plants into herbal medicine, since they are designed only for synthetic medicine

iii) Most herbal processors have limited education and skill to produce good quality products. Even those who have interest in scaling up their production for herbal products have limited funding and lack the technology for production of quality herbal products from medicinal plants

iv) Whereas, NDA has development guidelines for production of herbal medicine, this information has not been disseminated to key stakeholders. Most herbal processors have little knowledge of the registration of herbal medicine which is a requirement for commercialization of herbal products. Streamlining the commercialization process will cater for conservation of medicinal plants which is the backbone of the value chain.

e) Gaps in capacity building and training: Although a few of the traditional health practitioners have obtained the required training, most of them still need to be trained further.

3. NEW AND EMERGING ISSUES

There are a number of issues that were not adequately addressed at formulation of NBSAPI but which have now gained prominence and must be included in the revised version (NBSAP II). A few of these are briefly discussed below.

3.1 Taxonomy

During the 9th Conference of the Parties (COP9), the Global Taxonomy Initiative (GTI) of the CBD:

i) recognized the importance of taxonomic capacities to achieve the goals of the CBD and the need to support taxonomic research;

ii) urged the contracting parties, the GEF, and other key players to provide adequate support to developing countries in implementation of the GTI; and,

iii) encouraged contracting parties to give full support to the taxonomic work needed in support of the implementation of the CBD.

Taxonomy is a key pillar in national development, conservation and everyday life. Development of pharmaceutical, nutritional products, medicinal, botanical insecticides such as pyrethrum and other products from nature begins with correct identification of the species with the required ingredient. The choice of mushrooms for food requires taxonomy for distinguishing safe from poisonous species for consumption. Taxonomy is also handy in telling a rare or threatened kind of animal, fungus or plant from the closely related but different kinds so that conservation measures may be put in place to save the former.

In order to be able to get the necessary service of correct identification of plants, animals, fungi, bacteria, viruses and other organisms; there must be a cadre of well trained and experienced taxonomists in the relevant group of organisms. There is therefore need to build capacity to have a critical mass of trained personnel in the field of taxonomy, who can render this critical supportive role to other sectors of socio-economic development. Furthermore, there should be necessary infrastructure and taxonomic tools to facilitate the work of taxonomists.

In Uganda, the institutions that are key in providing the necessary training of personnel in taxonomy are higher institutions of learning, particularly universities. Makerere University Department of Biological Sciences is currently taking a lead in this formal training. The Department houses the largest collection of botanical specimens (Herbarium) in the country and a sizeable collection of zoological specimens. For generations, the Department has trained personnel in taxonomy of lower and higher plants, fungi, birds, mammals and other vertebrates.

Despite the training mentioned above, there are still major challenges to taxonomy and its application in Uganda (Godfray 2002). The general perception in Uganda is that currently there is inadequate taxonomic capacity in terms of personnel, infrastructure and taxonomic tools. Often times, the personnel trained do not get the opportunity to practice taxonomy as they find it difficult to get employment in that field. There is an urgent need to make the role of taxonomy clearer to the would-be end-users and encourage taxonomists to employ them as necessary. Although there have been some initiatives to assess this capacity (e.g. the Botanical and Zoological taxonomic network process (Isabirye-Basuta et al. 2006, Kakudidi & Kabuye 2006; and Hafashimana et al. 2009), the initial findings were not put to any specific use.

In order to maximize on the value of taxonomy for biodiversity conservation, the following needs to be undertaken:

a) Taxonomic capacity development can effectively be achieved through building an education base that promotes taxonomy training in primary and middle schools. The National Curriculum Development Center should follow this up and build taxonomy education and practice strongly into the school syllabi. Moreover, the capacity of teachers to teach taxonomy should also be developed at that level.

b) To support the development and maintenance of taxonomic capacity and tools, government agencies such as UWA, NEMA, NARO, Wetlands Management Department and Customs Department should deploy and retain taxonomists with job descriptions in their institutions.

c) There is need to develop a taxonomic knowledge base for biodiversity in formats that are accessible to end users (in form of identification kits/keys - such as popular bird books, fact sheets among others).

d) Taxonomic institutions, such as research institutes, universities and museums which hold representative natural history collections, with valuable information such as presence data, distribution, use and related indigenous knowledge, should be enabled (through funding, increased personnel and better infrastructure) to make this information available to end users.

e) Concerted efforts should be made to create awareness of the need for application of taxonomic information in many production sectors of the country such as agriculture, trade, health, development and regulatory agencies as well as local communities.

f) The Global Taxonomy fund was set under the GTI of CBD to enable member countries establish Centers of Taxonomic excellence. Lead Institutions in Taxonomy in Uganda (such as Makerere University Herbarium and Zoological Museum) should work towards setting this up for Uganda.

3.2 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).

Uganda has had its share of effects of climate change characterized by severe droughts and floods and evidence of change in glacial extent (area) on Mount Rwenzori (UWA, 2010). The main impact of climate change in Uganda has been observed to be climatic variability, the results of which are droughts and floods; while droughts lead to the drying of rivers and streams, floods result in submerged ecosystems. Although Uganda was assumed to be a net-sink for greenhouse gases, as part of this planet, the country also experienced adverse effects of global warming which contributed to the alteration of climates as was evidenced by the increasing frequency of droughts and floods which alter various ecological systems in Uganda.

Figure 16: The legendary Mountains of the Moon in Rwenzori National Park. (*Internet photo*)

Impacts of climate change on biodiversity have already been observed in some areas. As a result of global warming the ice caps on the Rwenzori ranges (the legendary mountains of the moon) have largely melted, leading to increased volumes of water in the Semliki River. This has led to erosion, siltation ad shifting of the course of the river, which all lead to habitat disturbance, as reported in the Uganda National Adaptation Programmes of Action report (MWE, 2007). Species reported to be affected include the Mountain Gorilla, alpine and sub-alpine species on the Rwenzoris such as the Giant Lobelia, Tree Senecio, the Rwenzori Leopard and the Rwenzori Red Duiker. The Three-horned Chameleon and Senecio are reported to have already shifted their ranges upwards due to warmer temperatures.

Uganda's National Adaptation Programme of Action (NAPA) cites an average temperature increase of 0.28°C per decade in Uganda between 1960 and 2010, with the months of January and February especially exhibiting this warming trend, averaging a 0.37°C increase per decade (GoU, 2007, MWE, 2010). The frequency of hot days in the country has increased significantly, while that of cold days has decreased (MWE, 2010). The malaria parasite is spreading into new areas in the country (Namanya, 2009). Analysis of records on Uganda's glaciers has shown that the ice cap on Rwenzori has shrunk significantly in the last 100 years (IGAD, 2010). The rate of ice loss is highest on Mount Baker (96%) followed by Mount Speke (91%). Mount Stanley has the lowest rate of ice loss (68%). The changing temperature patterns have been linked with drought and consequent increased cattle deaths in the cattle corridor (Oxfam, 2008).

Droughts undoubtedly have adverse effects on biodiversity. Droughts increase the changes of wild fires which destroy a lot of biodiversity. Droughts also result into migration of people into protected areas, migrations of animals, drops in water levels and disruption of the biological clock, especially in reproductive cycles. While there have always been droughts in Uganda, evidence suggests they are becoming more frequent and more severe (IGAD, 2010). The increased frequency and duration of droughts is the most significant climate-related change being experienced in Uganda (GoU, 2007; MWE, 2010). With respect to floods, the 1997/1998 El Nino flood, also attributed to climate change, caused a lot of habitat disturbance in addition to other economic and health effects. Floods in general destroy fauna and flora, a direct impact on biodiversity.

During the 1997/1998 floods, there was a 60 per cent drop in coffee exports and suspension of tea estates operations in eastern parts of the country, while 300 hectares of wheat were lost in the Kapchorwa District due to these floods (GoU, 2002). According to the Ugandan Agricultural Census (UBOS, 2011), at national level, 7 per cent of the 3.95 million agricultural households reported that they were prone to flooding, with most incidences reported in the Eastern Region. Efforts to enhance biodiversity conservation and ecosystems resilience to climate change are covered under activities 3.2.1-3.2.6 in the text while REDD (Reducing emissions from Deforestation and Forest Degradation) together with REDD+(including conservation of forest carbon stocks, sustainable management of forests and enhancement of forest carbon stocks) are also covered under activities 3.2.1-3.2.8, 3.6.2, 3.6.6, 3.6.7 and climate induced disasters may also be dealt with under activities 8.3.1-8.3.6.

3.3 Biotechnology and Biosafety

Agricultural biotechnology developments in Uganda were initiated more than five decades ago with the introduction of clonal coffee as a means of providing sufficient planting materials for farmers. By the end of the last century, various molecular level techniques such as development of bio-fertilizers (Rhizobia), tissue culture, and disease diagnostics were widely in use in the country. In the 1990s, a number of studies involving Ugandan scientists were seconded to external laboratories to understand the molecular nature of the major biotic constraints to crop production, such as Cassava mosaic virus and Maize streak virus. Since mid-2000's genetic engineering work has been going on in Ugandan research laboratories especially at the National Agricultural Research Organization (NARO), and has been on the increasing trends to address various agricultural production constraints.

The establishment of the laboratory and associated infrastructure was catalyzed by the needs and challenges at the time. Initially, focus was on building capacity, which led to the establishment of the National Biotechnology Centre at Kawanda Agricultural Research Institute in 2008. Thereafter, focus was on the need to generate complementary solutions to broader problems in the agricultural sector. This led to the establishment of the Biosciences Facility at the National Crop Resources Research Institute, Namulonge, and similar facilities in other NARO institutes. Parallel laboratory capacity development has also been undertaken by academic institutions such as Makerere University, Gulu University, and Kyambogo University.

Uganda has made significant progress in biotechnology R&D. Since its establishment in 1996, the National Biosafety Committee (NBC) has approved over twenty applications. To date, improvement of five (5) crops for nine (9) plant novel traits (PNTs) using recombinant gene technologies are under various stages of Confined Field Trials (CFTs) in three geographical regions of Uganda suggesting that in the near future

several technologies at field level testing will be due for commercialization. Locally developed improved varieties of bananas, cotton, maize and cassava with novel traits currently under CFT are anticipated to be ready for open release in the next 5-10 years.

Currently biotechnology research in Uganda is mainly being conducted in the public domain by NARO as the apex body for guidance and coordination of all agricultural research activities within the National Agricultural Research Systems (NARS). In line with the government's commitment to foster national development using modern biotechnology, NARO through its public research institutes is conducting a number of studies to improve priority crops for key desired traits. R&D efforts involving the use of genetic engineering are at different stages for crops such as bananas, maize, rice, cassava, sweet potatoes and cotton. However, in the absence of an explicit law, biotechnology research is presently restricted to contained and confined experimentation.

The Draft Biotechnology and Biosafety Bill is presently being debated in Parliament. Once passed into law, it will operationalize the National Biotechnology and Biosafety Policy of 2008 and will provide a more unified approach to the safe development and application of modern biotechnology in Uganda. The bill spells out a regulatory framework for biotech R&D in line with provisions of the Biosafety Protocol; it designates a Competent Authority and a National Focal Point, establishes a National Biosafety Committee, Institutional Biosafety Committees and provides an overall framework for the regulation for the research, development and general release of genetically modified organisms (GMOs) in Uganda.

The key challenges to the protocol in Uganda include the following: The country only recently (June 2014) ratified the Nagoya-Kuala Lumpur Supplementary Protocol on liability and redress; Uganda does not yet have a Biosafety Clearing House mechanism for information sharing; the border points of entry officers lack capacity and are not empowered to withhold suspected GM materials; the post entry quarantine laboratory at Namalere does not have adequate capacity (infrastructural and human) for GM detection to regulate GM seed imports and the capacity for management of transboundary movements of GMOs has generally been limited. These are challenges that need to be addressed as a matter of urgency for Uganda to swiftly benefit from biotechnology development.

3.4 Genetically Modified Organisms

Genetically Modified Organisms (GMOs) are organisms that are modified in the laboratory to have characteristics derived from genes of other species. Under Uganda's Biosafety 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 loss of natural habitat. A number of institutions such as the National Agricultural Research Organization (NARO) are presently undertaking biotechnology related research and development activities. These activities are being guided by the Uganda Biosafety Framework that prescribes mechanisms for the judicious application of biotechnology in Uganda. Although the Biotechnology Policy has now been approved, there is still no law or regulations for implementing the Cartagena Protocol to allow for importation and testing of GMOs on a large scale. A National Biotechnology and Biosafety Bill was tabled in Uganda's Parliament and is presently under debate before approval to become law. Since Uganda does not yet have adequate control mechanisms for GM materials, NARO has not yet authorized large scale importation of any GM crop seeds. The challenges in the use of GMOs in Uganda include:

a) Limited awareness on the potential use and applications of biotechnology;
b) Inadequate skilled human resource capacity for biotechnology and bio safety management;
c) Limited institutional capacity for training in biotechnology;
d) Limited institutional and infrastructural capacity to handle biotechnology research and development;
e) Inadequate public-private partnerships in biotechnology use and applications; and,
f) Lack of a coherent policy and regulatory framework for biotechnology and bio-safety that specifically addresses national bio-safety regulations.

Issues of biotechnology and Biosafety are covered under Strategic objective 6.

3.5 Oil Discovery in the Albertine Graben

Oil and gas discovery has been a recent phenomenon in Uganda's socio-economic development. Efforts to establish Uganda's oil and gas potential have been reported to be successful. After the injection of significant capital investments for acquisition of meaningful data, the first oil seepage discovery was reported in 2000. By 2008, four oil fields namely Mputa, Waraga, Nzizi and Kingfisher had been discovered and a minimum of three hundred million barrels of oil was estimated to be in the Kaiso Tonya area alone that covers only less than 5% of the entire prospective belt. As of to-date Uganda has observed the best oil exploration success rates: so far out of the 77 wells dug, 70 have been successful. In addition Uganda has registered a number of shallow wells with Jobi as the biggest and shallowest well globally known.

The oil and gas exploration and prospect regions include the following regions the Albertine graben that runs from Arua to Kisoro: L. Wamala basin; L. Victoria basin Lake and L. Kyoga basin. The companies that have so far participated in oil and gas exploration in Uganda include: China National Offshore Oil Cooperation (CNOOC), Neptune (U) Ltd, Alpha Oil Ltd and Dominion which later pulled out, Tullow (U) Ltd (formerly Energy Africa), Heritage Oil and Gas Limited and Total. It has been reported that to complement the discoveries, the government plans to develop an inland refinery at Kabaale (Hoima district) in the Albertine Graben of which the feasibility study has already been done.

The Albertine Graben, which is the main oil and gas exploration region, is an ecologically sensitive region, harbouring most of the nation's unique species of high conservation value, distinct ecosystems and several tourist destinations. Therefore oil and gas exploration in this region faces the major challenge of minimizing its various negative effects on surrounding ecosystems, including adjacent and downstream communities; coping with pollution problems such as soil contamination by drill wastes and oil spills which affect the nearby water and aquatic life like fish around lake Albert and coping with air emissions due to combustion as the primary source of gaseous pollution (CO2, CO, HCO3, SO2) will be key challenges at both local and national level (e.g., to mitigate climate change and its effects).. Oil exploration requires vegetation clearance, causing loss of plant species and leaving the soil bare to erosion. Although issues linked to oil and gas exploration and production are not covered under a separate Strategic Objective, they are clustered under new and emerging issues in activities 8.1.1-8.1.7.

3.6 Development and use of biofuels in Uganda

Biofuels are liquid or gaseous fuels produced from biomass that can be used to replace petrol, diesel and other fuels. Biofuel production is being sought in preference to fossil fuels so as to harness the perceived benefits of biofuels, which include a reduction in greenhouse gas emissions, increased energy security, creation of employment opportunities, increased income for rural households and improved balance of trade through reduced importation of petroleum. As such, the biofuel industry is expanding globally.[4]

However, the production of biofuel could have negative impacts on biodiversity, water availability, food security and land ownership. Aware of these and other impacts of biofuel production, the global community has recommended measures that Governments should take to minimize the potential negative impacts of biofuel production. The Conference of the Parties (COP) to the Convention on Biological Diversity (CBD) has adopted decisions to guide biofuel production. In decision X/37 on biofuels adopted in October 2010 in Nagoya, Japan, COP among others called upon Parties to the CBD to:

a) Ensure that sustainable agricultural practices and food and energy security of indigenous and local communities are addressed and respected;

b) Promote the positive and minimize or avoid the negative impacts of biofuel production on biodiversity;

c) Develop and implement policies that promote the positive and minimize or avoid the negative impacts of biofuel production on biological diversity;

d) Develop and use environmentally-sound technologies, and support the development of research programmes and undertake impact assessments, which promote the positive and minimize or avoid the negative impacts of biofuel production and use on biodiversity;

4 Biodiesel 2020: A Global Market Survey

e) Identify areas of high biodiversity value, critical ecosystems, and areas important to indigenous and local communities which should not be used for biofuel production;

f) Assess and identify areas and, where appropriate, ecosystems that could be used in, or exempted from, the production of biofuels so as to assist policy-makers in applying appropriate conservation measures and identifying areas deemed inappropriate for biofuel feedstock production;

g) Include biofuel production in national plans such as national biodiversity strategies and action plans and national development plans; and,

h) Address impacts of the production and use of biofuels on biodiversity and the services it provides.

The decisions adopted by the COP are meant to ensure that when Governments decide to promote the production of biofuel, it should be consistent with the objectives of the CBD namely, conservation of biodiversity, sustainable use of the components of biodiversity and a fair and equitable sharing of benefits arising from the utilization of genetic resources.

The rationale for promoting the use of biofuels in Uganda stems from the deficit in energy needs for the country. Out of an estimated 2,000 MW potential of hydropower along River Nile, only 380 MW (from Kiira and Nalubaale) and 250 MW from Bujagali hydropower plant and only 53 MW of the estimated 200 MW of mini- hydropower potential have been developed. In the case of geothermal energy, there is still no facility that has been put in place to develop it. Uganda also imports all her petroleum product requirements as no petroleum products are produced locally although this is expected to change with the recent oil discovery in the Albertine Graben.

In light of these developments, Government is promoting the production of biofuel mainly to supplement petroleum fuels in the transport sector among other uses and also to increase the country's energy security. Guidelines and legislation that shall regulate the production, blending and utilization of biofuels are underway.

Biofuel production and utilization is not new in Uganda. Currently, biofuel production and utilization in Uganda is ongoing albeit on a small scale. Studies carried out indicate that biofuel production by the private sector is gaining momentum. Government is encouraging investment in biofuel developments to harness the perceived benefits of biofuels, which include a reduction in greenhouse gas emissions, increased energy security, creation of employment opportunities, increased income for rural households, improved balance of trade through reduced importation of petroleum and enhanced National Economic development.

Figure 17: Young Jatropha plantation (a biofuel crop) in Uganda.

Uganda has the potential to produce substantial amounts of ethanol and biodiesel from a variety of feed stocks which are either already grown on-farm for oil extraction and food or are growing in the wild. Much as Uganda is moving into biofuel production with zeal, it is important to understand that the advent of biofuel production is likely to lead to biodiversity loss, food insecurity, water stress, land conflict as well as the introduction of invasive alien species. Biofuel actions are covered under new and emerging issues.

3.7 Biodiversity Disasters and hazards

Disaster risk management is a systematic process used to implement strategies, policies and improved coping capacities in order to lessen the adverse impacts of hazards and the possibility of a disaster. In 2005, at the World Disaster Reduction Conference held in Kobe, Japan, 168 member states of the United Nations adopted the Hyogo Framework of Action (HFA). This framework details priorities for risk reduction to be adopted by participating countries.

NBSAPI did not handle the Framework of Action but NBSAP I incorporates the HFA to handle the disasters that arise from natural phenomena's like floods, climate change and oil spillage. The key success for disaster risk management (DRM) is to protect ecosystems through participatory valuation and management of ecosystem services and mainstreaming of ecosystem approaches in DRM. This will prevent, lessen or transfer risks by using various risk treatment measures, mitigation and preparedness; and addressing issues related to policies, institutions, systems and risk reduction programs at the strategic and operational levels.

During the last five years Uganda has faced serious environmental disasters such as mudslides in Bududa District in Eastern Uganda and floods in Kasese District (south western Uganda) which devastated human livelihoods and biodiversity of the two areas. In 2003, scores of hippos perished in Lake Edward due to some mysterious disease. The disaster risk reduction (DRR) strategy in this NBSAPII is directly relevant to a number of Aichi Biodiversity Targets including: Target 7 (where DRR is a core element of sustainability for forestry and agriculture), Target 11 (regarding the role of protected areas in DRR), Target 14 (where essential services include those underpinning DRR and contribute to the health, livelihoods and well-being of women, indigenous peoples and local communities, and the poorest and most vulnerable populations), and Target 15 (where ecosystem resilience is a key requirement for DRR and ecosystem restoration a major opportunity to achieve DRR).

3.8 Pollution

There are various sources of pollution in Uganda including those due to agricultural, industrial, municipal waste discharges and dumping and e-waste. These wastes pollute and alter fragile ecological systems leading to death of indigenous organisms. Other effects include bio-accumulation and bio-concentration of harmful chemicals in organisms which pose a grave threat to human livelihood.

The discharge of industrial effluents into water systems including rivers and lakes as well as the runoff from agricultural lands and urban settlements, bringing with it the chemicals leached from these areas, pollute these water systems negatively affecting aquatic biodiversity. High nutrient contents caused by fertilizers or other nutrients reaching aquatic ecosystems result in eutrophication where the system becomes anaerobic depriving many organisms with oxygen necessary for their very survival. 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; pollution associated with urban areas (solid waste, air pollution, among others.) all pose potential threats 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. These threats to biological diversity need to be addressed.

3.9 Green Procurement

Green Procurement is the purchase of environmentally preferable products or services, taking into account the necessity, not only for quality and price, but also for an environmentally-conscious business. Promotion of green purchasing will allow us to create a green market place and encourage businesses to develop environmentally-preferable products and services through the market and promote sustainable management of the environment including biodiversity. Therefore green procurement has a power to change society as well as business behaviour.

Green procurement of a selection of products and services can minimize environmental impacts and damage to biodiversity. It includes extraction of raw materials, manufacturing, transportation, storing, handling using and disposing of the product. It also includes the purchase of products and services that cause minimal adverse environmental impacts such as recycled content products, energy efficient products, water efficient products and non-ozone depleting substances. Role of green procurement in biodiversity conservation normally encompasses a variety of practices including the following:

a) Prevention of pollution which strives to eliminate or reduce risks to human health and environment. This basically looks at air quality, water quality, soil quality and land quality for biodiversity sustainability;
b) Selection of products and services that minimize environmental impacts e.g. those products that have high level of degradability;
c) High demand from consumers, investors, shareholders and regulatory agencies for purposes of maintaining and promoting future businesses that directly or indirectly depend on biodiversity;
d) Reduction or prevention of waste by use of products with recyclable materials, less packaging, reversal logistics among others;
e) Eco-efficiency i.e. creating more goods and services while using fewer resources and creating less waste and pollution;.
f) Green products are generally produced in a manner that consumes less natural resources or uses them more sustainably;
g) Organizations that practice green procurement are recognized as good corporate citizens and can easily influence those around them; and,
h) Green products generally offer cost savings. They are easily recycled or re-used and therefore money is saved on waste disposal.

The Green Procurement concept is embedded in Uganda Government's procurement process. This is exhibited at the time of bid evaluation to determine the most compliant bidder. Biodiversity conservation is implied in the Public Procurement and Disposal of Assets (PPDA) Regulation 327 (3), (b) and (c), 314 (4), 297 (2) (g) and (i) which prioritizes:

a) Minimal use of virgin material in the product (e.g. recycled paper rather than virgin paper);
b) Replacement of disposables with reusable or recyclables (e.g. reusable cups rather than paper cups), minimal environmental impact from the entire product or service life cycle (e.g. use of degradable products), minimal packaging or elimination of packaging (e.g. avoid individual products packaging for bulk purchases), reduced energy/water consumption (e.g. use energy efficient equipment);
c) Toxicity reduction or elimination (e.g. products without toxic substances);
d) Durability and maintenance requirements (e.g. avoid single-use disposable items); and,
e) Waste disposal requirements (e.g. products that can be easily recycled),

3.10 Invasive alien species

Invasive alien species (IAS) pose a global threat to the conservation of biodiversity through their proliferation and spread, displacing or killing native flora and fauna and affecting ecosystem services, including water and nutrient cycles and food chains. In Uganda, the water hyacinth (*Eichhornia crassipes*) had a profound impact on the socio-economic development of Uganda in terms of curtailment of water transport, reduction of hydropower output, interference with urban water supply and reduction in fish production from Lake Victoria in the 1990's. The cost of controlling and managing water hyacinth was estimated to be in millions of dollars.

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). Examples of IAS introductions include the following:

a) The present tree planting activities of NFA are focused on introduced species (*Eucalyptus spp., Pinus spp.* and *Grevillea robusta*). Although useful to meet short term 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) encourages the use of '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.

b) 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 the Water hyacinth has been extremely damaging to biodiversity in Lake Victoria. Lake Victoria is the largest tropical lake in the world, with 68,000 km^2 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.

c) Over the last 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.

d) The Water hyacinth (*Ecihhornia crassipes*), an invasive IAS, also known as the waterweed and arguably the most noxious aquatic weed in the world, was first reported in Lake Victoria in December 1989, having entered the Lake from River Kagera. The plant is native to South America where it occurs 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.

e) Invasive plant species have also been reported in several forest reserves e.g., in Mabira, Budongo and Matiri forest reserves whereby paper mulberry and Senna Cassia species have been recorded (NFA, 2011). Within Wildlife Conservation areas, changes in vegetation due to invasive species of Acacia and other pasture grasses have been reported in Lake Mburo and Queen Elizabeth National parks.

f) *Parthenium hysterophorus,* a native of Central America, is believed to have entered Uganda less than 10 years ago. It was first identified at Bugembe, near Jinja in 2008. Since then it has been seen in most towns and trading centers along the Busia-Kampala-Masaka-Mbarara-Kasese highway. In 2010, it was observed in Queen Elizabeth National Park, in Ibanda town and in Pader district, northern Uganda. In 2013, UWA reported that it was spreading in Queen Elizabeth National Park, and was anxious to get it under control. *Parthenium* has the potential to dominate and eradicate most grass species and other short perennial shrubs in open land. It has also been reported to be poisonous to cattle, buffalos and antelopes and causes allergic reactions in humans after prolonged contact.

4. GENERAL THREATS TO BIODIVERSITY IN UGANDA

4.1 Causes of Biodiversity Loss

Quite a number of factors are responsible for the trends described in the preceding chapters. They include habitat loss, agricultural encroachment and expansion, climate change effects, over-harvesting of resources, diseases, pollution, introduction of alien species, demographic factors, poverty and national policies, among others. The rate of biodiversity loss in Uganda 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 1980. 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 are the main thrust of the strategies and action plans in this NBSAP and they are elaborated in the following sections.

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 their 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 by private or public collections.

In other cases, fish have been extensively exploited for food. Illegal fishing through the use of wrong fishing gear is reported to pose a serious threat the 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 animal 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.

Unsustainable utilization of trees and wood biomass: There is an increasing trend in conversion of trees in woodlands and forests on both public and private land into charcoal, fuel wood and timber thus depleting tree resources from these habitats. These actions continue to affect biodiversity associated with these habitats and yet forests contain the biggest pool of biodiversity in Uganda.

Encroachment on protected areas: According to National Forest Authority (NFA, 2011), encroachment into forested areas is caused by people who have come from other locations and have been "facilitated" by or are "protected" by local leaders or protected areas personnel. There have been reports that by 2008, there were over 300,000 illegal settlements in Central Forest Reserves country wide. Agricultural encroachment is also common in National Parks and wetlands. With regard to evictions of encroachers, efforts have generally not been very effective, partly due protection given by authorities or political interests which compromise law enforcement. This has generally been compounded by weak institutional capacity when handling evictions.

Agricultural expansion: The key agents of agricultural expansion into hitherto undisturbed landscapes and protected areas are small-scale farmers (over 70 % of the population of Uganda), immigrants and private large scale monoculture farming (Palm Oil and Sugar Cane) (NFA. 2011). It is reported that between 1990

and 2005, agricultural land area expanded by 2% (from 8,400,789 ha to 8, 847,591 hectares mostly in form of small-scale agriculture (NFA, 2011). Subsistence agriculture expanded into wetlands, grasslands, and forests. Agricultural expansion remains a major deforestation driver in Uganda especially in high population areas or areas with high influx of immigrants. Large-scale agriculture is not so wide-spread but has increased from 68,446 to 106,630 hectares between 1990 and 2005 (NFA, 2011).

Climate change and variability: Uganda has had its share of effects of climate change characterized by severe droughts and floods and evidence of change in glacial extent (area) on mount Rwenzori (UWA, 2010). It is believed that change in micro and macro climate may result in changes in habitats in terms of species composition and also the extent of the forest coverage. It may also reduce the resilience of crops to grow in certain regions. There is need for further research to ascertain the extent of change expected and the possible implications on the conservation of biodiversity and associated habitats.

Poaching and other incidental causes of animal mortality: Poaching of wildlife resources is a serious problem in Uganda. Wild animals are hunted for their products such as hides, ivory, horns and teeth. In others cases animals are poached for game meat and for cultural and medicinal values. Methods of poaching include wire snaring, trap nets, spears and dogs, pitfalls, arrows and bows, guns and many kinds of traps. Mountain gorillas and chimpanzees are sometimes hunted for body parts and infants captured for sale as pets. It is believed however that international trade in live gorillas and chimpanzees or their parts, declined with the listing of the species on Appendix I of CITES. Besides poaching, there are reported incidences of wild animal mortality due to road accidents, fires set by poachers and deliberate poisoning.

Human Wildlife Conflict: Human - wildlife - conflict is a situation that arises when wildlife's requirements overlap with those of human populations, creating costs to affected people and wildlife. It also arises as a result of competition between humans and wildlife for space and resources. In most wildlife protected areas conflicts occur in areas with a high and increasing human population density with an ever-increasing demand for land and natural resources. The major forms of human wildlife conflicts in Uganda arise out of the following factors, among others:

i) Crop raiding by wildlife and loss of livestock mainly in communities adjacent to protected areas;
ii) Problem animals such as elephants and mountain gorillas which destroy crops and result in displacement of people in nearby villages;
iii) Disease transmission between wildlife e.g. by mountain gorillas, buffaloes, zebras, etc. to humans and livestock; and,
iv) Lack of direct benefits such as sharing cash payments with private land owners from tourism revenues paid to view game found on privately owned land.

Diseases in wildlife: Disease spread and outbreaks pose a great threat to wildlife health and production. Some of the diseases are transmitted through human-wildlife interactions because of tourism or interaction with livestock. Disease outbreaks due to natural causes such as Anthrax continue to take their toll on wildlife populations. The Anthrax outbreak in Queen Elizabeth National park in 2002 is reported to have killed over 300 hippos (UWA, 2003). There is no scientific documentation of significant outbreaks of plant diseases in natural forests although outbreaks have been recorded in soft wood plantations.

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 study, the evidence is clear: the problem of soil erosion is increasing with the ever increasing human population and this calls for urgent action. 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 mono-cultural 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.

Pollution: Due to Government policy of modernization of agriculture, Uganda has witnessed progressively increased use of pesticides, acaracides, fertilizers and other agricultural chemicals country wide. Although there are no national levels records of toxicity or pollution resulting from these uses, it is acknowledged that continued use without proper guidance and handling will affect biodiversity. Increased urbanization and industrial development is creating waste capable of polluting the environment. Both actions are increasingly becoming a source of problem for biodiversity management.

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.

Human population increase: A principal cause of habitat conversion is human population pressure. Despite the high incidence of fatal diseases, 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 is somewhere around 1.3%. Consequently, more land must be brought under cultivation annually to feed the increasing population.

i) In places such as Kabale and Kisoro Districts, which are located within the Albertine Rift region, the increased demand for agricultural land has led to serious land fragmentation, which is a generalized pattern observed across all of Uganda. Fragmentation eliminates connectivity between natural habitats negatively impacting on wildlife movements.

ii) 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.

iii) In the eastern region, population density is also highest in the highlands. For example, Bududa District has a population density of 952 persons/km2 compared to the national average of 124 people/km2. Elsewhere, population increase has put pressure on biodiversity in form of food and tradable products.

iv) At national level, increasing human population and declining economic conditions have resulted into increased urbanization. Approximately 17% of Uganda's population is now living in an urban setting with increased concentration along major trade routes. The effect of this urbanization on biodiversity, especially in relation to wetlands and vegetation in general is evident.

Poverty: The relationship between biodiversity management and poverty may be measured using indicators of wealth status such as land ownership, ability to hire labour, resources to ensure education, quality of housing, and income levels. Based on these indicators, it has been reported that communities who live around protected areas in Uganda are generally poor (Plumptre et al., 2003). Poor communities around protected areas depend largely on resources from within the protected areas because of their low poverty levels. Resources demanded include fuel wood, timber, non-timber forest products, game meat and water. Because of poverty, there is limited capacity to develop alternatives to resources found within the biodiversity protected areas. The community's priority areas may be focused on growing enough food to feed their families and possibly having a bit left for sale. Using their meagre resources to grow alternatives to resources which can easily be got from the biodiversity protected areas is not a priority. Thus the demand for natural resources is not likely to diminish in the near future, but rather to increase, unless the issue of poverty in such areas is urgently addressed.

Situation of women, gender equality, and women's poverty: While Uganda has made tremendous strides over the last decade in particular in gender-responsive policy making across sectors, gender inequality is still deeply entrenched in women's and men's relationships, division of labor, and traditional and cultural life, especially at household level, with extremely high national fertility and gender-based violence rates among the symptoms of gender inequality. While women and men use natural resources differently and have unequal access to and control over natural resource management at all levels, priorities and strategies for conservation will require gender-responsive attention.

Illegal trade in plants, animals and derived parts: The low levels of enforcement and the very high prices for some crop and animal species and their derived products increases the levels of poaching and contributed heavily to the loss of the country's rich biodiversity with the loss of priceless species to extinction for example the white and black rhinos. This 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.

4.2 Current efforts to Reduce Biodiversity Loss in Uganda

Despite the above threats to biodiversity conservation, the Government of Uganda still recognizes the importance of biodiversity in national development and has therefore made significant progress in putting in place policies, laws and institutional frameworks on the conservation and management of biodiversity.

4.2.1 National Policies

A number of policies have been put in place to protect the Ugandan environment, including the conservation and sustainable use of biodiversity. The key National Policy framework for management of biodiversity in Uganda is the National Environment Policy (1994). The Policy provides for the institutional structure as well as policy measures for biodiversity management in Uganda. The specific objectives of the policy are to:

i) Enhance health and quality of life of all Ugandans and promote long-term sustainable economic development through sound environmental and natural resources management and use.

ii) Integrate environmental concerns in all development-oriented policies, planning and activities at national, district and local levels, with participation of the people.

iii) Conserve, preserve and restore ecosystems and maintain ecological processes and life support systems, including conservation of national biodiversity.

iv) Optimize resource use and achieve sustainable level of resource consumption.

v) Raise public awareness to understand and appreciate linkages between environment and development.

vi) Ensure individual and community participation in environmental improvement activities.

Sectoral Policies: Sectoral policies regulating the management of Uganda's natural resources provide measures for Biodiversity management in the various sectors of Government (Table 9).

Table 9: Sectoral Policies relevant to biodiversity management in Uganda

Policy	Relevance	Provision for Biodiversity Management
Uganda Wildlife Policy, 1999	Promotes the long term conservation of the country's wildlife and biodiversity in a cost effective manner which maximizes the benefits for the people of Uganda.	• Enhance health and quality of life of all Ugandans and promote long-term sustainable economic development through sound environmental and natural resources management and use. • Integrate environmental concerns in all development-oriented policies, planning and activities at national, district and local levels, with participation of the people, • Conserve, preserve and restore ecosystems and maintain ecological processes and life support systems, including conservation of national biodiversity. • Optimize resource use and achieve sustainable level of resource consumption. • Raise public awareness to understand and appreciate linkages between environment and development. • Ensure individual and community participation in environmental improvement activities.

Policy	Relevance	Provision for Biodiversity Management
Forestry Policy (2001)	Promotes management of forestry resources	• Protect and manage sustainably the Permanent Forest Estate. • Promote the development and sustainable management of natural forests on private and customary land. • Promoting profitable and productive forests plantation business. • Promote collaborative partnerships with rural communities for the sustainable management of forests. • Promote tree growing on farms in all farming systems and innovative methods for delivering forestry extension and advisory services through decentralized and farmer - driven mechanisms. • Conservation and management of biodiversity in support of local, national social and economic development and international obligations. • Establish, rehabilitate and conserve watersheds. • Promote urban forestry • Support sustainable forest sector development through education, training and research • Promote innovative mechanisms for the supply of high quality tree seed and improved planting_stock
Land Policy (2000)	Promotes the land use and physical planning	• Grants ownership of land-to-land owners and *bona fide* occupants of land in Uganda • Grants the use of land and all resources in accordance with other laws
National Wetlands Policy (1995)	Promote the conservation of Uganda's wetlands in order to sustain their ecological and socio-economic functions for the present and future well being of the people.	• Establish the principles by which wetland resources can be optimally used, and their productivity can be maintained into the future. • End existing unsustainable exploitative practices in wetlands to avert the decline in their productivity. • Maintain a biological diversity in wetlands either in the natural community of plants and animals or in the multiplicity of agricultural activity. • Maintain the functions and values derived from wetlands resources throughout Uganda. • Promote the recognition and integration of wetland functions in resource management and economic development decisions making about sector policies and programmes such as forestry, agriculture, fisheries, and wildlife and sound environmental management
Tourism Policy (2003)	Ensure that tourism becomes a vehicle for poverty reduction	• Develop tourism in a sustainable manner, focusing on Agenda 21 issues in respect of the development of tourism facilities and encouraging nature friendly product development • Ensure that conservation programmes between Government Agencies (UWA, NFA and Wetlands Department) are well coordinated. • Develop facilities and products in the national parks in accordance with the park management plans. • Provide for channeling of tourism revenues towards the protection of the natural resource base
Fisheries Policy (2003)	Conserve and manage sustainably fisheries and other aquatic resources for sustainable production	• Compilation of inventories of aquatic biodiversity resources, species distribution and role in aquatic systems for all waters. • Strengthen the role of enforcement and extension and involve NGOs, among others, in implementation and extension. • Give local communities better control over the management of fisheries resources and strengthen local management capacity. • Increase knowledge on the role of non-fish aquatic life in aquatic ecosystem dynamics and develop safeguards to ensure their protection and sustainable use. • Contain over-exploitation, the destruction of habitat and control species introduction through strengthened research efforts and better planning and monitoring.

Policy	Relevance	Provision for Biodiversity Management
		• Identify and map critical and sensitive habitats and take appropriate steps (gazetting) to minimize damage and disturbance to breeding, nesting, aestivation and feeding areas of al! Aquatic species. • Put in place mechanisms, including research, planning and monitoring, to encourage the revival of endangered fish species in the waters and ensure sustainable utilization. • Regulate the disposal of water and wastes from fish processing areas, plants and other industries. • Increase training opportunities, develop more appropriate curricula and develop better local capacity in the fisheries manpower sector. • Collaborate and participate with the neighboring countries to harmonize the management and development of shared aquatic resources.
National Agriculture Policy (2009)	Promote farming systems and land-use practices that conserve and enhance land productivity in an environmentally sustainable manner	• Enhance and strengthen the environmental concerns in the agricultural extension system, including research and training for extension workers, NGOs and land-users • Place greater emphasis on environmentally friendly means of increasing agricultural production • Undertake a national soil survey and mapping programme and formulate a national soil policy • Where appropriate and practicable, offer land users tax incentives for soil and water conservation and good husbandry practices. • Support researches to develop farming systems that combine optimum production with land resources conservation and which are compatible with the socio-economic conditions of the target population.
Decentraliza-tion Policy (1993)	Districts are empowered to plan for development in the district and to manage the environment and Sectoral natural resources such forestry, wetlands, wildlife,	• Transfer political, administrative, financial and planning authority from the center to local governments. • Promote popular participation, empower local people to make own decisions and enhance accountability and responsibility. • Introduce efficiency and effectiveness in the generation and management of resources, and in the delivery of services.
Nation-al Gender Policy (1997)	Integrate gen-der concerns in environmental policy planning, decision making and implementa-tion at all lev-els to ensure sustainable social and economic development.	• Integrate gender concerns in existing and proposed policies and programmes. • Collect gender dis-aggregated information related to the environment including the human factors. • Include gender roles and analysis in environmental management training programmes tit all levels. • Facilitate participation of both men and women in formal and informal education, training, public awareness campaigns and decision making in environmental and natural resources management. • Establish an institutional mechanism to review existing and proposed programmes to integrate gender issues. • Carry out research on the local knowledge and use of natural resources.
National Culture Policy (2006)	Conserve, protect and promote Uganda's tangible and intangible cultural heritage	• Manage Uganda's cultural heritage (Cultural sites, Monuments and Antiquities) and associated biodiversity values • Promote cultural practices and norms including those dependent on a variety of biological resources.

Policy	Relevance	Provision for Biodiversity Management
National Population Policy (1995)	Involve a society that is both informed and conscious of population and development issues at all levels	• Increasing awareness on the impact of population change on the environment through environmental awareness campaigns. • Promoting proper waste management in urban and rural areas. • Developing an early warning system on the effect of population pressure on the ecosystem. • Discouraging traditional inheritance systems whereby land is fragmented at every successive generation, in light of increasing population. • Promoting research in and adapting use of alternatives sources of energy and energy saving devices.
Education Policy (1992)	Promotes human resources development	• Promote education that is relevant to Uganda's development priorities • Promote science based training and skills development
National Community Development Policy (2015)	To guide on identification of inclusive projects in communities to improve citizen participation in Uganda's development process.	• Communities playing a greater role in designing programs for their infrastructure, health, education and agri-business needs • Small-scale industries and other value addition initiatives directly linked to the unique agricultural raw materials and other inputs produced in the different parts of Uganda. • Mass sensitization of communities and other stakeholders undertaken to ensure that the new Policy translates into deliverables that reduce poverty levels further, and ensure rapid national development and modernization.

4.2.2 Legal Frameworks

Besides the above Policy frameworks, there are also elaborate legal regimes for the management of biodiversity in Uganda. These are grounded in the Constitution of the Republic of Uganda, 1995. Objective XIII of the Constitution requires the State to protect important natural resources, including land, water, wetlands, minerals, oils, fauna, and flora on behalf of the people of Uganda. Article 245 provides for Parliament to enact laws intended to protect the environment from abuse, pollution and degradation as well as for managing the environment for sustainable development. Parliament has, in conformity with Article 245 of the Constitution, enacted both national and sectoral laws on the management of the environment, some of which are discussed below.

The National Environment Act Cap 153 provides for the over-all management, coordination and monitoring of environment management and conservation in Uganda. It provides for the protection and conservation of natural resources in Uganda as well as promotion of international cooperation in the field of the environment.

Sectoral Legislation: Requirements for biodiversity management by the different sectors are provided in several legislations (Table 10).

Table 10: Sectoral laws for biodiversity management in Uganda

Framework	Provisions for biodiversity management
Forestry and Tree Planting Act (2003)	• Declaration of forest reserves for purposes of protection and production of forests and forest produce • Sustainable use of forest resources and the enhancement of the productive capacity of forests • Promotion of tree planting • Consolidation of laws relating to forest sector and trade in forest produce • Establishment of a National Forest Authority • Establishment of District Forest Services • Recognition of privately owned forests through, registration and requirement for such forests to be managed according to approved management plans • Repealing of the Forest Act (Cap 147) and Timber (Export) Act Cap 151

Framework	Provisions for biodiversity management
Wildlife Act Cap 200	• Conservation of wildlife throughout Uganda, so that the abundance and diversity of their species are maintained at optimum levels commensurate with other forms of land use. In order to support sustainable utilization of wildlife for the benefit of the people of Uganda • Sustainable management of wildlife conservation areas • Conservation of selected wildlife communities in Uganda • Protection of rare, endangered and endemic species of wild plants and animals • Ecologically acceptable control of problem animals • Enhancement of economic and social benefits from wildlife management by establishing wildlife use rights and the promoting of tourism • Control of import, export and re-export of wildlife species and specimens • Implementation of relevant international treaties, conventions, agreements or other arrangements to which Uganda is a party • Public participation in wildlife management
Local Government Act, 1997	• Planning and management of environment and wetlands • Management of Local Forest Reserves and for over-all development of forestry resource within the district
The Land Act, Cap 227	• Acquisition of land by government for purposes of common good, which would include biodiversity management • Management and use of privately owned land in accordance with laws governing forestry, mining, environment, water, wildlife and other such laws • Holding in trust for the people of Uganda and protecting environment sensitive areas such as natural lakes, rivers, wetlands, forest reserves, national parks and any other land reserved for ecological and touristic purposes.
The Water Act, Cap 152	• Use, protection and management of water resources and supply • Promoting the rational management and use of water resources, including management of water resources for preservation of flora and fauna • Recreation m ways that minimize harmful effects to environment • Control pollution of water resources • Water and Sanitation Subsector Gender Strategy (2010-2015) aims to empower women, men and vulnerable groups by ensuring equity in access and control of resources in the water and sanitation sector in order to reduce poverty
Plant Protection Act, Cap 31	• Prevention of the introduction and spread of diseases destructive to plants. • Regulating introduction of exotic plant materials and managing the spread of plant disease or those plants capable of out competing dangerous plants (invasive species)
Animal Breeding Act, 2001	• Promoting, regulating and controlling, marketing and quality assurance of animal and fish genetic materials and generally for implementing the breeding policy • Establishment of National Genetic Resources Centre and Databank
Fisheries Act, Cap 197	• Controlling fishing, conservation of fish, purchase and marketing fish • Regulating the introduction or transfer of fish species or their eggs or progeny not indigenous to Uganda • Gender and equity as guiding principles and priority in fisheries sector
Tourism Act (2008)	• Formulating and implementing the marketing strategy(s) for tourism in which ought to be done in consultations and cooperation of the private sector and other relevant entities • Promoting domestic tourism • Encouraging investments in the tourism sector, targeting, among others, less developed tourism areas • Developing tourism revenues management strategies • Provision of financial support and incentives to promote private entities in tourism sector

Framework	Provisions for biodiversity management
The Animal Diseases Act (1964) Amended (2006) Cap 218	• Prevention of introduction and spread of diseases that may endanger the lives of Animals and Humans • Rules and regulations for disease control and compensation for purposes of disease control and procedures for importation or exportation of animals and their products
The Animals (Prevention of Cruelty) Act of 1964.	• Provides measures for modes of transportation of animals to prevent cruelty and exposure to diseases
Agricultural Chemicals Act Cap 29	• Control and regulation of the manufacture, storage, distribution and trade in, use, importation and exportation of, agricultural chemicals and for other purposes connected therewith

In alignment with the policy section above, coherence and collaboration across sectors will be key to successful implementation of the NBSAP and conservation efforts more broadly. Cross-cutting issues such as gender and IPLC concerns, and strategies and action plans on the same, need specific attention to ensure national and subnational efforts to bridge these gaps are not piecemeal but cohesively addressed, creating synergistic results across various sectors. This can be supported by already existing national (and international) frameworks to address gender inequality and women's empowerment in social, cultural and economic means as well as the various Ugandan environmental policies which include conditions, principles, or action items on gender mainstreaming. These can, and should be, utilized to contribute to a cross-sectoral collaborative approach on conservation of biodiversity and implementation of the NBSAP which simultaneously considers and responds to gender and social issues.

Multi-Lateral Environmental Agreements: Uganda is a signatory to a number of international Conventions, Protocols and Agreements relating to biodiversity management. These include the Convention on Biological Diversity (1992); the Cartagena Protocol on Biosafety (2000); the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) (1973); Convention on Wetlands of International Importance Especially as Water Fowl Habitat (the RAMSAR Convention); the United Nations Convention to Combat Desertification (UNCCD) (1994); the United Nations Framework Convention on Climate Change (UNFCCC) (1992); Convention on the Protection of the World Cultural and Natural Heritage (1972), Paris; the Convention Relating to the Preservation of Flora and Fauna in their Natural State (1933), London.

African Convention on the Conservation of Nature and Natural Resources (1968), Algiers; Lusaka Agreement on Cooperative Enforcement Operations Directed at Illegal Trade in Wild Fauna and Flora (1994); the International Treaty on Plant Genetic Resources for Food and Agriculture (2001) and the World Trade Organization (Sanitary and Phytosanitary Rules). Each Convention is implemented through a national Focal Point in a designated Ministry or Lead Agency in Uganda. A challenge is lack of awareness of and coherence with other Agreements that include environmental issues as priority or cross-cutting issues, such as the Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW) (1979) and the Beijing Platform for Action (1995). One of the biggest challenges in the implementation of the Conventions and Agreements is the lack of coordination among the Focal Points which results in frequent duplication of effort.

Regional Frameworks: Uganda is also a signatory to a number of regional protocols and agreements including the East African Community Treaty, East African Community Protocol on Environment and Natural Resources Management, Protocol for Sustainable Development of Lake Victoria Basin, Convention for the Establishment of the Lake Victoria Fisheries Organization (LVFO), East African Community Protocol on Wildlife Conservation and Law Enforcement, Tripartite Management Agreement for Transboundary Wildlife Protected Area and Cooperative Framework Agreement on the River Nile. Each regional framework is implemented through a National Focal point in a Government Ministry or Lead Agency. These Focal Points also lack a coordinating mechanism which results in a lot of duplication of effort especially in regional reporting.

5. BACKGROUND TO THE NATIONAL BIOIDVESITY STRATEGY AND ACTION PLAN 2015-2025

5.1 Introduction

Uganda signed and ratified the Convention on Biological Diversity (CBD) on 12th June 1992 and 8th September 1993, respectively. The CBD has three objectives namely: the conservation of biological diversity, its sustainable use and the fair and equitable sharing of the benefits arising from the utilization of genetic resources. Article 6 (a) of the CBD requires Parties to the Convention to develop national strategies, plans or programmes for the conservation and sustainable use of biological diversity.

The National Biodiversity Strategy and Action Plan (NBSAP) is the main instrument for implementation of the Convention at country level. NBSAP provides Government with a framework for implementing its obligations under CBD as well as the setting of conservation priorities, channeling of investments and building of the necessary capacity for the conservation and sustainable use of biodiversity in the country.

At its tenth meeting in Nagoya, Japan, the CBD Conference of the Parties (COP 10) adopted the new Strategic Plan for Biodiversity 2011-2020, with 20 Aichi Biodiversity Targets. The Parties then committed themselves to revising their NBSAPs and to adopt them as policy instruments by 2015. Parties also committed themselves to developing national targets that would support the achievement of the Strategic Plan and Aichi Targets. The revision of the NBSAP enabled Uganda to demonstrate its commitment to the achievement of the Strategic Plan for Biodiversity 2011-2020, with its Aichi Biodiversity Targets while having its own national targets.

At its twelfth meeting in Pyeongchang, Republic of Korea, the CBD Conference of the Parties (COP 12) adopted a decision to mainstream gender into efforts to promote and protect biodiversity and recognized that gender mainstreaming was key to effective biodiversity conservation via the Aichi Targets. The Gender Plan of Action (among other things) called for gender considerations to be integrated into NBSAP revisions. Through a gender mainstreaming process to strengthen social and gender considerations in the NBSAP revision, Uganda has thus begun implementation of core elements of the CBD Gender Plan of Action.[5]

5.2 Overview of the first NBSAP for Uganda

Uganda developed its first National Biodiversity Strategy and Action Plan (NBSAP1) in 2002. The process was coordinated by the National Environment Management Authority (NEMA) which is the institution coordinating the implementation of the CBD in Uganda. The NBSAP had an initial implementation period of 10 years.

5.3 Lessons learnt from implementing NBSAPI for Uganda

A number of lessons were learnt from implementation of NBSAPI (2002-2012). The NBSAP was effective in addressing various biodiversity concerns in the country such as:

a) Improving coordination among various agencies through the formation of TCBC;
b) Improving collaboration between the CBD and other international conventions at national level;
c) Addressing a number of Articles of the Convention such as the CBD programme of Work on Protected Areas (PAs), formulation of Regulations on Access to Genetic Resources and Benefit Sharing, establishment of a Biodiversity information sharing mechanism, 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 Biosafety; and,

5 https://www.cbd.int/doc/decisions/cop-12/cop-12-dec-07-en.pdf

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

The key obstacles to NBSAPI implementation included:

a) Inadequate financial resources for implementation of planned activities;
b) Inadequate awareness of NBSAPI among implementing partners and the general public;
c) Inadequate human and infrastructure capacity in relevant field of biodiversity conservation such as taxonomy and capacity to carry out conservation and characterization of germplasm in the National Gene Bank;
d) Lack of a central node to facilitate information sharing among institutions involved in biodiversity conservation;
e) Limited information on indigenous farm plant and animal genetic resources;
f) Inadequate managerial and technical capacity at the District and lower local Government levels for implementation of the NBSAP; and,
g) Inadequate mainstreaming of biodiversity into sectoral plans, programmes and strategies.

A number of these obstacles have since been overcome. The CHM, for example, is now operational and very active in NEMA. A lot of capacity, through NEMA, has now been built at the District and lower levels to handle critical issues of biodiversity conservation at those levels. The current NBSAP will attempt to significantly increase the resource envelope for biodiversity conservation by exploring various sources of innovative sustainable funding mechanisms arising from the outcomes of the BIOFIN process.

5.4 The updated context of NBSAPII

The revised and updated NBSAP brings on board key developments and emerging issues which have taken place since the first NBSAP was prepared in 2002. Among these are:

a) The National biodiversity targets developed within the framework of the Aichi targets;
b) The vision, goal and objectives of the second NBSAP have been aligned to the vision, mission and strategic goals of the Strategic Plan for Biodiversity 201-2020;
c) Two new strategic objectives have been added in the second NBSAP to cater for Resource mobilization and Biotechnology/Biosafety;
d) New and emerging issues have also been incorporated including oil exploration and production, the production of biofuels and natural disaster management; and,
e) Gender issues have been incorporated.

5.5 Overarching principles of NBSAPII

The Strategic Plan for Biodiversity (2011-2020) and the complementary Aichi Biodiversity Targets, the National Vision 2040 and the National Development Plan (NDP) have all closely guided the formulation of NBSAPII. NBSAPII will be implemented in line with the following overarching principles:

a) Sustainable development and environmental sustainability;
b) Mainstreaming of biodiversity conservation, sustainable use of biological resources and equitable sharing of benefits from biological resources into existing policy, legislative, institutional and development frameworks as appropriate;
c) Stakeholder participation in the development and implementation of biodiversity strategy and action plans;
d) Awareness creation, education, training and capacity building at local, national and institutional levels to enhance effective participation and implementation of biodiversity measures;
e) Recognition, promotion and upholding of traditional and indigenous knowledge of biological resources and sustainable resource management and where benefits arise from the use of this knowledge;

f) Engagement and collaboration with international partners to enhance conservation and sustainable use of Uganda's biological diversity;

g) Integrated implementation of Multi-Lateral Environmental Agreements;

h) Equal consideration of the three objectives of the CBD – conservation; sustainable use; and benefit sharing arising from the use of biological resources.

5.6 Linking NBSAPII to Uganda's Vision 2040, NDP and SDGs

In 2007, Government adopted a comprehensive National Development Planning Framework which provides for the development of a 30-year Vision (2010-2040) that will be implemented through: three 10-year plans; six 5-year National Development Plans (NDPs); Sector Investment Plans (SIPs); Local Government Development Plans (LGDPs); Annual work plans; and Budgets. The first five year National Development Plan operationalizing this Vision was launched in April 2010.

Uganda Vision 2040 provides development paths and strategies to operationalize Uganda's Vision statement which is "A Transformed Ugandan Society from a Peasant to a Modern and Prosperous Country within 30 years" as approved by Cabinet in 2007. It aims at transforming Uganda from a predominantly peasant and low income country to a competitive upper middle income country. NBSAPII will assist Uganda to reach its long-term goals as outlined in its Vision 2040, National Development Plans and the Sustainable Development Goals (SDGs) as illustrated in the figure 18 below. The 12 highlights key elements of the National Vision 2040, NDPII and SDGs that implementation of NBSAPII contributes to their achievement.

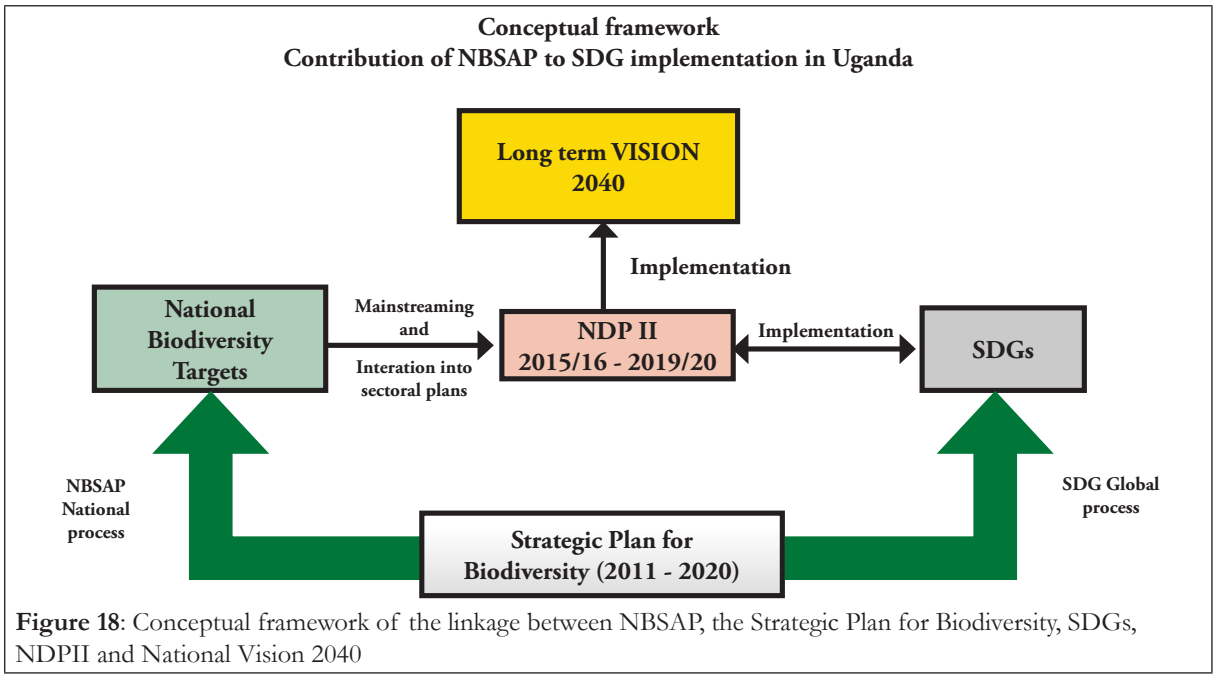

Figure 18: Conceptual framework of the linkage between NBSAP, the Strategic Plan for Biodiversity, SDGs, NDPII and National Vision 2040

Table 11: NBSAP key contribution areas towards Vision 2040, NDP and the SDGs

NBSAP II: Key contribution areas to Vision 2040, NDPII and SDGs		
Vision 2040	NDPII	SDGs
• **Green Economy**: poverty eradication, sustained economic growth, creating opportunities for employment, maintaining the healthy functioning of ecosystems	• **Theme:** Strengthening Uganda's Competitiveness for Sustainable Wealth Creation, Employment and Inclusive Growth • **Goal –**to attain middle income status by 2020	**Goal 1.** End poverty in all its form everywhere **Goal 2.** End hunger .improve nutrition and promote sustainable agriculture
• **Protection and sustainable use of natural resources**: promoting re-forestation, afforestation, tree planting and green agriculture practices; restoration of wetlands, hilltops and other fragile ecosystems • **Sharing of environmental costs and benefits:** conservation of ENR and cultural diversity; adoption of environmental patterns of production and consumption; promotion of the development, adoption and equitable transfer of environmentally sound technologies	• **Development objectives –**Increase sustainable production, productivity and value addition to key growth opportunities • **Priority sectors:** Agriculture, tourism, minerals, oil and gas • **ENR Objectives** • **Objective 1:** Restore and maintain the integrity and functionality of degraded fragile ecosystems • **Objective 2:** Increase the sustainable use of ENR • **Objective 3:** Increase wetland coverage and reduce degradation • **Objective 5:** Increase Uganda's resilience to the impacts of climate change • **Objective 6:** Increase afforestation, reforestation, adaptation and mitigate deforestation for sustainable development	**Goal 5.** Attain gender equality, empower women and girls everywhere. **Goal 6.** Ensure availability and sustainable use of water and sanitation for all **Goal 12.** Promote sustainable consumption and production patterns **Goal 13.** Tackle climate change and its impacts **Goal 14.** Conserve and promote sustainable use of oceans, seas and marine resources **Goal 15.** Protect and promote sustainable use of terrestrial ecosystems, halt, desertification, land degradation and biodiversity loss

5.7 Creating Synergies between the CBD and other international Conventions

Implementation of NBSAPII needs to be harmonized as far as possible with that of the two sister Rio Conventions and other relevant international multilateral agreements. Common thematic areas for synergies between these Conventions and agreements have been identified in NBSAPII and include:

a) The CEPA/IEC Strategy which is relevant to all multi-lateral environmental agreements;
b) Support to sustainable land management (SLM) practices that conserve agro-biodiversity;
c) Pioneer a holistic and inclusive approach to law enforcement (focusing on intelligence, interception and prosecution) with regard to poaching and illegal trade in wildlife;
d) Create synergies between the different multilateral Environmental Conventions;
e) Implement climate change mitigation and adaptation programmes for biodiversity conservation;
f) Wetland ecosystems providing essential services are being sustainably managed, and where necessary restored, taking into account environmental, economic and social needs; and,
g) Knowledge, science and research which is relevant to all multi-lateral environmental agreements.

6. THE NATIONAL BIODIVERSITY STRATEGY AND ACTION PLAN: PRIORITIES AND TARGETS

6.1 Guiding Principles for the Development of NBSAPII

While addressing any gaps in the implementation of the just ended first edition of the NBSAP, the revised NBSAPII will be based on the following guiding principles:

1. NBSAPs are key implementation tools for the Convention on Biological Diversity and NBSAPII will therefore address all three objectives of the Convention.
2. The NBSAPII will highlight and seek to maintain the contribution of biodiversity and ecosystem services to human wellbeing, poverty eradication, gender equality and national development as well as the economic, social, cultural and other values of biodiversity
3. NBSAPII will be used to identify and prioritize the actions required in order to meet the objectives of the CBD at national level, and to devise a plan of how to implement those actions.
4. In order to be effective, NBSAPII will be jointly developed, adopted, and owned by a full range of stakeholders involved.
5. NBSAPII will also include measures to mainstream biodiversity into sectoral and cross-sectoral policies and programs.

6.2 Vision, Goal and Strategic Objectives of NBSAPII

6.2.1 The Vision

To maintain a rich biodiversity benefiting the present and future generations for socio-economic development.

6.2.2 Goal

To enhance biodiversity conservation, management and sustainable utilisation and fair sharing of the benefits.

6.2.3 The Strategic Objectives

1. To strengthen stakeholder co-ordination and frameworks for biodiversity management;
2. To facilitate and enhance capacity for research, monitoring, information management and exchange on biodiversity;
3. To put in place measures to reduce and manage negative impacts on biodiversity;
4. To promote the sustainable use and equitable sharing of costs and benefits of biodiversity;
5. To enhance awareness and education on biodiversity issues among the various stakeholders;
6. To harness modern biotechnology for socio-economic development with adequate safety measures for human health and the environment; and,
7. To promote innovative sustainable funding mechanisms to mobilize resources for implementing NBSAPII.

The linkage between the Strategic Objectives of NBSAPII, the Strategic Plan for Biodiversity 2011-2020 and its Aichi targets as well as linkage to the Strategic Plan for the Cartagena Protocol on Biosafety 2011 - 2020 is provided in the table below.

Table 12: Linking the Strategic Objectives of NBSAP2 to the Strategic Plan for Biodiversity and its Aichi targets

No	Strategic Objective of NBSAP2	Linkage to Goals of SPB[6] 2011-2020 and Focal Area for SPCPB[7] 2011-2020	Linkage to the Aichi targets
1	To strengthen stakeholder co-ordination and frameworks for biodiversity management	SPB goal A and E	Aichi targets 2 and 17
2	To facilitate and build capacity for research, monitoring, information management and exchange on biodiversity	SPB goal E	Aichi targets 18 and 19
3	To reduce and manage negative impacts while enhancing positive impacts on biodiversity	SPB goal B, C and D	Aichi targets 10, 11,12,13,14 and 15
4	To promote the sustainable use and equitable sharing of costs and benefits of biodiversity	SPB goal A,C and D	Aichi Targets 3, 13 and 16
5	To enhance awareness and education on biodiversity issues among the various stakeholders	SPB goal A	Aichi Target 1
6	To harness modern biotechnology for socio-economic development with adequate safety measures for human health and the environment	SPB goal E; Focal area 1 – 4 of SPCPB 2011-2020	Aichi target 19
7	To promote innovative sustainable funding mechanisms	SPB goal E	Aichi targets 20

6 Strategic Plan for Biodiversity
7 Strategic Plan for the Cartagena Protocol on Biosafety

6.3 The National Biodiversity Strategies and Action Plans

Thematic area one: Coordination framework for biodiversity management

Strategic Objective 1: To strengthen stakeholder co-ordination and frameworks for biodiversity management

In order to effect this objective and address the underlying causes of biodiversity loss, the following steps should be implemented:

a) Mainstream biodiversity issues in the NDP, sectoral, district and local development Plans.
b) Mainstreaming should be an important component of the NBSAPII implementation.
c) Initiate a participatory and inclusive process of implementation.
d) Put in place a monitoring and evaluation framework.

The strategies, actions, activities and indicators as well as alignment to the Aichi biodiversity target (s) are provided in the table that follows.

Table 13: Strategic Objective 1: To strengthen stakeholder co-ordination and frameworks for biodiversity management								
1.1	**National target:** By 2020, biodiversity values integrated into the National Development Plan, Budget Framework Papers, Ministerial Policy Statements and District Development Plans				**Corresponding Aichi targets 2:** By 2020, at the latest, biodiversity values have been integrated into national and local development and poverty reduction strategies and planning processes and are being incorporated into national accounting, as appropriate, and reporting systems			
	Key Outcome Indicator: 1. Trends in allocation of financial resources to biodiversity conservation and management							
	Strategy	**Action**	**Proposed Activities**	**Baseline 2014**	**Output indicators**	**Lead Agency (Target8 Champions)**	**Partner institutions9**	**Costs10 in US$**
	Mainstream biodiversity issues in the NDP, Sectoral and District Development Plans	Put in place measures to enhance inclusive and equitable stakeholder participation and coordination	1.1.1 Strengthen the capacity of the biodiversity coordination mechanism	CBD Focal Point is currently overstretched	Collaboration and information flow among stakeholders improved	NEMA NPA Local governments	UWA NFA MoLoG MWE MAAIF MoEMD	800,000
			1.1.2 Develop an integrated biodiversity management policy framework	Biodiversity related polices are disjointed	A national Biodiversity policy framework in place	NEMA	MWE MDAs Local governments	100,000
			1.1.3 Map relevant stakeholders (women and men) at different levels, and establish/reinforce networks and task forces, including especially on gender and women's empowerment	Limited stakeholders have been identified and engaged. Thematic working groups/networks can benefit from wider inclusion, especially of women and women's representatives.	Stakeholders and stakeholder groups are identified and established Gender disaggregated database of stakeholders	NEMA MGLSD Local governments	MDAs, CBOs NGOs CSOs	125,000
			1.1.4 Conduct capacity building sessions on the NBSAP, gender and biodiversity, and implementing conservation plans and initiatives with a gender perspective across the environmental sector	Limited coordination and capacity to address gender issues in environment sector	Number of women and men trained	NEMA MGLSD	MDAs NGOs CSOs Cultural institutions	100,000
			1.1.5 Lobby Government and other relevant stakeholders to put in place a coordination mechanism for implementation of Multilateral Environmental Conventions	Weak coordination among biodiversity related conventions	A coordinated mechanism put in place for enhanced information sharing across sectors	NEMA	MWE MDAs Local governments	150,000

			1.1.6 Develop and utilize biodiversity and ecosystem services valuation tools to quantify and monitor the environmental, economic and social value of biodiversity	Examples of biodiversity valuation is limited in Uganda	Integration of biodiversity issues in the NDP, sectoral and District Development Plans	NEMA Academia	MDAs NGOs Local governments	80,000
			1.1.7 Develop guidelines for mainstreaming biodiversity into national, sectoral and district plans	Lack of guidelines for mainstreaming biodiversity exist	Biodiversity issues planned and budgeted for at National and Local levels	NEMA	NPA MDAs Local governments Cultural institutions	100,000
			1.1.8 Undertake and utilize biodiversity and ecosystem services valuations to mainstream biodiversity into decision making and to develop a business case for biodiversity	Limited integration of biodiversity in local, sector and national plans	Biodiversity issues planned and budgeted for at National and Local levels	NEMA	NPA UWA NFA MoFPED Local governments Academia	250,000
			1.1.9 Undertake mapping of the status and trends of ecosystems (especially forests, wetlands and rangelands)	Limited spatial data/ information available to guide decision making	Number of maps produced and disseminated	UWA NFA	NEMA Local governments Academia NGOs	500,000

8 Institution(s) that will take lead in the implementation of national target in collaboration with the partner institutions
9 Institution(s) that will play a critical role in the implementation of the national target. They may also plan for and implement the national target in collaboration with the target champions.
10 Minimum estimate needed. Guidelines for Financing Biodiversity, PIR, BER and BFP has more information.

1.2	**National target**: By 2015, NBSAPI reviewed, updated and adopted and being effectively implemented				**Corresponding Aichi 17**: By 2015 each Party has developed, adopted as a policy instrument, and has commenced implementing an effective, participatory and updated national biodiversity strategy and action plan (NBSAP)			
	Key Outcome Indicator: Level of integration of biodiversity issues within NDP, sectoral and local government plans with respective budgetary allocations							
	Strategy	**Action**	**Proposed Activities**	**Baseline 2014**	**Output indicators**	**Lead Agency (target champion)**	**Partner institutions**	**Costs in US$**
	Review, update and initiate a participatory and inclusive process of implementation of NBSAP	Mainstream biodiversity in NDP, sectoral and district plans	1.2.1 Develop a gender responsive guidelines for implementing NBSAPII	No guidelines	Gender-responsive guidelines and budgets in place	MGLSD NEMA	MDAs Local governments Cultural institutions	100,000
			1.2.2 Produce and disseminate NBSAPII to stakeholders	NBSAPII development in progress	-Number of stakeholders with NBSAPII -Devise a monitoring and feedback mechanism on NBSAP information on consumption	NEMA	MDAs Local governments NGOS IPLCs Cultural institutions	80,000
			1.2.3 Facilitate the mainstreaming of NBSAPII actions in national, sectoral and district plans and programmes	Not yet done	Key issues in NBSAPII mainstreamed and budgeted for in national, sectoral and district plans and programmes Equitable and gender responsive budgets and allocation	NEMA NPA Local governments	MDAs	150,000
			1.2.4 Undertake regular cross-sectoral consultations on NBSAPII implementation	Not yet done	Revise strategies for implementation of NBSAP as appropriate	NEMA	MDAs Academia Local governments	200,000

1.3	**National target**: By 2015 an effective Monitoring and Evaluation strategy for the implementation of NBSAP developed and is in operation				**Aichi target 17**: By 2015 each Party has developed, adopted as a policy instrument, and has commenced implementing an effective, participatory and updated national biodiversity strategy and action plan (NBSAP)			
	Key Outcome Indicators: - Monitoring and Evaluation Strategy used by stakeholders to report on progress of implementing NBSAPII							
	Strategy	**Action**	**Proposed Activities**	**Baseline 2014**	**Output indicators**	**Lead Agency Target champions)**	**Partner institutions**	**Costs in US$**
	Put in place a monitoring and evaluation framework for NBSAP	Carry out periodic monitoring and evaluation of NBSAP2	1.3.1Develop and implement a gender responsive NBSAPII Monitoring and Evaluation strategy with SMART indicators	An M&E yet to be prepared Gender data in sectors is limited	A Monitoring and Evaluation Strategy in place Disaggregated data and gender-specific indicators exist as part of M&E	NEMA MGLSD	MDAs Districts Academia IPLCs NGOs CSOs CBOs	200,000
			1.3.2 Undertake Monitoring and Evaluation of the implementation of NBSAPII	Not yet done	Periodic monitoring and evaluation of NBSAP2	NEMA NPA	MDAs Local governments	150,000

Thematic area 2: Information management, monitoring and research

Strategic Objective 2: To facilitate and build capacity for research, monitoring and information management on biodiversity

One of the highlights of this objective stresses the importance of taxonomy as well as indigenous knowledge in biodiversity conservation. The Global Taxonomy Initiative (GTI) of the CBD requires country-based taxonomic needs assessments and identification of priorities and nation capacity-building to support access to and generation of taxonomic information for improved taxonomic knowledge. In Uganda, awareness on the role and importance of taxonomy in biodiversity conservation and economic development is generally low. This is compounded by the relatively few well trained and experienced taxonomists who normally do not even find taxonomic jobs in relevant institutions.

Traditional knowledge, innovations and practices of indigenous peoples and local communities (IPLCs) also need to be carefully harnessed and regulated so that these communities can benefit in an inclusive manner to a greater extent from their biodiversity-related expertise. This will also promote equitable sharing of benefits arising from the utilization of natural resources thus promoting biodiversity conservation and its sustainable use. In order to effect this objective and address the underlying causes of biodiversity loss, the following strategies should be implemented:

a) Support research in strategic areas of biodiversity conservation and sustainable use;
b) Build capacity for information management and exchange in taxonomy; and,
c) Strengthen the role of indigenous peoples and local communities in biodiversity conservation and management, with particular respect to gender considerations

The strategies, actions, activities and indicators as well as alignment to the Aichi biodiversity targets are provided in the tables that follows.

Table 14: Strategic Objective 2: To facilitate and build capacity for research, monitoring and information management on biodiversity								
2.1	**National target**: By 2020, knowledge, research and science base relating to biodiversity has been significantly improved, and relevant technologies have been improved, shared and applied				**Corresponding Aichi targets 19**: By 2020, knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied			
	Key Outcome Indicator: Trends in investment and partnerships in biodiversity-related research, monitoring and information management							
	Strategy	**Action**	**Proposed Activities**	**Baseline 2014**	**Output indicators**	**Lead Agency (target champion)**	**Partner institutions**	**Costs in US$**
	Support research in strategic areas of biodiversity conservation and sustainable use	Support research, knowledge and information	2.1.1 Support innovative research, science and technology in the management of biodiversity with particular focus on value addition, product development and innovation with due considerations of women, men and youth	Research on value addition of natural products including medicinal plants is presently limited	Industrial development and commercialization of innovations and new biodiversity–based products	UNCST NEMA	MDAs Academia	300,000
			2.1.2 Support Product testing and quality assurance and standards development	Product testing and quality assurance e.g. for herbal medicine is still lacking	Standards developed for new biodiversity – based products	UNBS NCRI	UEPB UNCST NARO NEMA	150,000
			2.1.3Undertake taxonomic research to improve knowledge of little known taxa (especially those which may have commercial value)	Our knowledge of little known taxa such as lower plants and fungi and their potential value still limited	Number of research initiatives on underutilized taxa undertaken	Academia NARO	UNCST NEMA UWA NFA MDAs Local Governments IPLCs NGOs CBOs	250,000
			2.1.4 Develop sector research priorities in biodiversity	Presently there is no systematic prioritization of biodiversity research agenda in the relevant sectors	National biodiversity research agenda (guideline) in place Number of functional biodiversity research Institutions with identified priority research areas in biodiversity	UWA NFA MAAIF MoEMD MTWA MWE	UNCST NEMA MoLoG Local Governments CBOs, NGOs	150,000
			2.1.5 Promote research and bioprospecting on PGR, including medicinal plants	Research on bioprospecting on PGR is presently limited	Number of Discoveries of valuable natural products Number of innovations/ patents made	UNCST NARO	Academia NCRI Local Governments	200,000

			2.1.6 Enhance national capacity in information management and research which supports biodiversity conservation	National capacity in specialized areas such as taxonomy, information management, biodiversity valuation is inadequate	-Infrastructure for biodiversity information management -Human resource in place	UNCST NEMA	MDAs UWA NFA MWE NGOs CBOs Local Governments	500,000
			2.1.7 Ensure that Uganda benefits from international cooperation and opportunities for information exchange and support in the field of biodiversity at the local, national, regional and international levels	Level of international cooperation in biodiversity support and management is still low	-Number of research grants received -Number of programmes funded -Level of funding and information exchange on biodiversity achieved	NEMA	UWA NFA MWE MTWA MAAIF NGOs CBOs Media	200,000

2.2	**National target**: By 2020, basic taxonomic information is packaged in user-friendly formats and widely disseminated, including use of school systems				**Corresponding Aichi target 19**: By 2020, knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied			
	Key Outcome Indicators: - Taxonomic information in appropriate formats deposited in Uganda's Clearing House Mechanism (CHM) - Taxonomic data and information used to guide decision making							
	Strategy	**Action plan**	**Proposed Activities**	**Baseline 2014**	**Output indicators**	**Lead Agency (target champion)**	**Partner institutions**	**Costs in US$**
	Build capacity for information management and exchange in taxonomy	Integrate taxonomic information in decision making	2.2.1 Conduct awareness raising on the role of taxonomy in biodiversity conservation in public and private institutions	Role of taxonomy not well articulated in many relevant institutions	Role of taxonomy in biodiversity conservation well understood in relevant institutions	Academia NARO	NEMA UNCST MDAs Local governments	150,000
			2.2.2 Create awareness on the application of taxonomic information in many production sectors of the country such as agriculture, trade, health, development and regulatory agencies as well as local communities	Very little taxonomic information is used by the production sectors	Number of production sectors beginning to use taxonomic information	Academia	MDAs UNCST NARO CBOs CSOs NGOs	200,000
			2.2.3 Support institutions with taxonomic data and information (through funding, increased personnel or better infrastructure) to make this information easily available to end -users	Presently institutions with taxonomic data are reluctant to share data and information with other institutions	Mechanisms for taxonomic data acquisition and sharing are in place and being used	Academia	NEMA UNCST NARO Cultural institutions	150,000
			2.2.4 Support and train women, including women's indigenous groups and women's organizations, on taxonomy, taxonomic data, information	Limited number of women taxonomists	Number of women taxonomists or para-taxonomists trained	Academia NARO	MGLSD CBOs NGOs CSOs MDAs NEMA	150,000
			2.2.5 Develop taxonomic knowledge bases of biodiversity in formats that are accessible to women and men and other end users	Simple taxonomic knowledge bases are not widely available	Number of kits distributed to women and men	Academia	NARO NEMA CBOs NGOs CSOs Cultural institutions Local governments	80,000
			2.2.6 Improve taxonomic infrastructure and tools to provide adequate taxonomic information	Taxonomic infrastructure and tools in relevant institutions are inadequate	Improved taxonomic infrastructure and tools in place in relevant institutions	Academia	NEMA UNCST NARO MDAs	200,000
			2.2.7 Establish Center(s) of Taxonomic excellence	No designated center of excellence in taxonomy	A center of excellence for taxonomy established	Academia	NEMA UNCST NARO	400,000

			2.2.8 Undertake human resource capacity development in taxonomy at all levels and retain taxonomists with job descriptions in their institutions	There are few qualified human resource in taxonomy	Increased number of taxonomists in the country	Academia	NEMA MDAs UNCST NARO	300,000
			2.2.9 Provide incentives/employment opportunities to women and men graduates with taxonomic backgrounds to retain them e.g. prioritizing taxonomy in Environmental Impact Assessments (EIA)	There are very few job opportunities for taxonomist in the country	Number of women and men graduates employed	NEMA	Academia UNCST NARO MGLSD	150,000

2.3	**National target**: By 2019, traditional knowledge and practices of indigenous peoples and local communities integrated into biodiversity conservation and sustainable use at all levels				**Aichi target 18**: By 2020, the traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological resources, are respected, subject to national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the Convention with the full and effective participation of indigenous and local communities, at all relevant levels			
	Key Outcome Indicators: 1. System(s) in place to document traditional knowledge as a basis for research and development of commercial biodiversity products 2. Traditional knowledge and practices integrated biodiversity conservation and management							
	Strategy	**Action**	**Proposed Activities**	**Baseline 2014**	**Output indicators**	**Lead Agency (target champion)**	**partner institutions**	**Costs in US$**
	Strengthen the role of indigenous peoples and local communities in biodiversity conservation and management including gender considerations	Integrate traditional knowledge and practices in biodiversity management, especially through action-learning practices	2.3.1 Promote the role of traditional knowledge, innovations and practices in the management and use of biodiversity	Indigenous knowledge and practices for biodiversity conservation and use is generally ignored	Indigenous knowledge and practices are being widely applied in biodiversity conservation	NCRI Academia	UNCST UWA NFA NEMA Local governments MDAs	150,000
			2.3.2 Document traditional knowledge and practices of women and men that promote conservation and sustainable use of biodiversity e.g. in herbal medicine	There are limited numbers of traditional knowledge and practices that have been formally documented	Number of groups and communities whose IK and TK, respectively, have been integrated during NBSAP implementation	Academia NCRI MGLSD Local governments	MDAs NEMA NGOs CBOs CSOs	90,000
			2.3.3 Develop Community Action Plans for biodiversity conservation in strategic areas	Community based Action plans are generally lacking in many strategic areas	Number of sector-based Community Action Plans for biodiversity conservation	NEMA Local governments	UWA NFA MDAs NGOs CBOs	300,000
			2.3.4 Develop access and benefit sharing arrangements with indigenous peoples and local communities, with respect to intellectual property rights	Not many viable access and benefit sharing arrangements involving indigenous and local communities are in place	Number of access and benefit sharing arrangements with indigenous and local communities Number of MTAs and MATs signed with local communities, IPLCs, women and women's groups	UNCST	MoJCA MWE NEMA Academia UWA NFA Local governments NGOs CBOs	150,000

Thematic area three: Reducing and managing negative impacts on biodiversity

Strategic Objective 3: To reduce and manage negative impacts while enhancing positive impacts on biodiversity

The main causes of biodiversity loss in Uganda may be summarized as habitat destruction and conversion, introduction of invasive alien species (IAS), pollution, impacts of climate change, oil and gas exploration, unsustainable land management practices, human wildlife conflict, illegal trade in plants, animals or their derived parts. It is planned in NBSAPII to address these threats through various strategies including the following:

a) Improve management effectiveness of Protected Areas
b) Improve and support management of fragile and degraded ecosystems outside PAs
c) Identify and put in place measures for protection of threatened and vulnerable species
d) Improve management of agricultural practices, forests and aquaculture for biodiversity conservation and sustainable use
e) Monitor and support management of pollution and waste in vulnerable ecosystems
f) Put in place eradication and control measures for alien invasive species
g) Introduce appropriate incentives for conservation and sustainable use of biodiversity

The strategies, actions, activities and indicators as well as linkage to the Aichi biodiversity targets are provided in the table that follows.

Table 15: Strategic Objective 3: To reduce and manage negative impacts while enhancing positive impacts on biodiversity								
3.1	**National target**: By 2020, at least 17% of terrestrial and inland water ecosystems in Uganda are conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas for socio-economic benefit of the population				**Corresponding Aichi target 11**: By 2020, at least 17 per cent of terrestrial and inland water areas, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes			
	Key Outcome Indicator: 1. Trends in coverage of protected areas 2. Trends in the coverage connectivity/corridors of protected areas							
	Strategy	**Action**	**Proposed Activities**	**Baseline 2014**	**Output indicators**	**Lead Agency (target champion)**	**Partner institutions**	**Costs in US$**
	Improve management effectiveness of Protected Areas	Effectively and equitably manage protected areas in Uganda	3.1.1Develop and implement participatory PA management plans	Presently few PAs especially CFRs are effectively managed	Number of PA management developed and implemented	UWA NFA Local governments	MWE MDAs NGOs CBOs	300,000
			3.1.2 Promote protected areas as core drivers for nature-based tourism development in the local economy	Few PAs especially CFRs have adequate tourism development contributing to the local economy	-Number of visitors to protected areas -Tourism revenue generated form protected areas -Tourism related infrastructure in place	UWA NFA	NEMA MTWA MWE Local governments NGOs CBOs	500,000
			3.1.3 Establish/maintain viable wildlife/biodiversity corridors with respect to community safeguards	Many PAs lack connectivity which is important for gene dispersal	number of wildlife/biodiversity corridors established through community-government dialogue	UWA NFA Local government	MTWA MWE NGOs CBOs	200,000
			3.1.4 Support gender-responsive alternative livelihood options for communities adjacent to Pas	There is massive encroachment especially for agriculture in PAs	Number of women and men with livelihood improvement initiatives in place Trends in revenue shared with communities	UWA NFA MGLSD	MoFPED MWE NEMA NGOs CBOs	800,000
			3.1.5 Identify and implement PA networks to conserve ecologically sensitive vegetation types, habitats, species and genetic diversity	There quite a number of PAs with conservation concerns that need to be addressed	Number of PA networks with well-protected ecosystems, species and genetic resources	UWA NFA Local governments	NEMA MWE NGOs CBOs	500,000
			3.1.6 Mitigate human wildlife conflicts	There are PAs with alarming human wildlife conflicts	-Number of incidences of human wildlife conflicts in previously vulnerable areas -Number of human wildlife mitigation initiatives in place	UWA	MTWA NFA NEMA NGOs CBOs	600,000
			3.1.7 Strengthen partnerships with adjacent communities to PAs for mutual benefits (Supporting REDD+)	Such partnerships are weak or non-existent with communities adjacent to Central Forest Reserves (CFM)	-Number of partnerships with community groups	FSSD	NFA CCU UWA NEMA Local governments NGOs CBOs	250,000

3.2	**National target**: By 2020,ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15%of degraded ecosystems				**Corresponding Aichi target 15**: By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15 per cent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification.			
	Key Outcome Indicators: 1. Status and trends in extent and condition of habitats that provide carbon storage 2. Trends in coverage of protected areas							
	Strategy	**Action**	**Proposed Activities**	**Baseline 2014**	**Output indicators**	**Lead Agency (target champion)**	**Partner institutions**	**Costs in US$**
	Implement climate change mitigation and adaptation for biodiversity conservation including disaster risk reduction from climate change impacts	Enhance ecosystem resilience, including community resilience, to climate change	3.2.1 Reduce deforestation and increase timber stocks countrywide to reduce pressure on current stocks, especially in natural forests	Rampant forest destruction is being promoted due to inadequate timber resources	-Reduced emissions from deforestation -Reduced emissions from forest degradation -Conservation of forest carbon stocks -Sustainable management of forests -Enhancement of forest carbon stocks Improved livelihoods of adjacent communities	NFA UWA Local governments	FSSD CCU NGOs NEMA	500,000
			3.2.2 Develop guidelines and capacities for ensuring gender-responsive, equitable and transparent implementation of REDD+in partnership with CSOs, including women's organizations	Close collaboration between government institutions and CSOs is weak with respect to REDD+implementation	- Guidelines developed -Numbers of beneficiaries of REDD+trained	FSSD	CBOs NGOs CSOS NFA NEMA CCU Local governments	150,000
			3.2.3 Enhance carbon stocks and storage by mainstreaming climate change into the REDD+strategy as well as in sector policies, plans and projects	There is limited mainstreaming of REDD+in sector plans and policies with respect to biodiversity and ecosystem protection	Number of sector policies and plans that have mainstreamed climate change	FSSD	NFA CCD NEMA	100,000

			3.2.4 Support afforestation, tree planting and re-forestation activities at all levels	-This is on-going on some parts of the country -About 200,000 ha of forest are lost annually, 3,769,235 ha have been lost by 2014 since 1990, and only 3% of this restored since 1990.	Acreage afforested Plant a least 200,000 ha trees annually to contribute to national target in Vision 2040	FSSD NFA Local governments	NEMA NGOs CBOs	7,500,000
			3.2.5 Promote and support restoration of degraded wetlands	This is on-going on some parts of the country but on a small scale and is not commensurate with the level of degradation	Wetland areas restored Restore at least 11,250 ha annually to contribute to the achievement of the national target in Vision 2040	WMD NEMA Local governments		3,500,000
			3.2.6 Enhance biodiversity and ecosystems' resilience to climate change especially in biodiversity hotspots	Policy makers, technocrats and local communities find it difficult linking climate change impacts to biodiversity conservation and ecosystem resilience	Number of Policy makers, technocrats and local communities appreciate the linkage between biodiversity conservation and climate change	FSSD	UWA NFA NEMA	400,000
			3.2.7 Establish buffer zones for protection of critical conservation areas with high biodiversity within Pas	Some buffer zones impacted negatively by climate change might require adjustments	-Number of protected areas with buffers -Area under Buffers	UWA NFA Local governments	NEMA	400,000
			3.2.8 Monitor and control bush burning in fire prone areas	Uncontrolled fires is common in many biodiversity rich areas	-Number of fire control mechanisms put in place -Trends in acreage affected by fires	Local governments UWA NFA	NEMA	300,000
			3.2.9 Collect and store diverse gene pools, including through community and women-led seed banks as a basis of genetic adaptation to climate change and for enhancing food and nutritional security	Drought resistant plant varieties are not yet adequately collected and stored for distribution to farmers	Number of accessions of drought resistant crop varieties in adequate quantities in gene banks/seed banks	NARO	UWA NFA Local governments IPLCs NGOs	200,000

3.3	**National target**: By 2020, the extinction of known threatened species plants and animals inside and outside protected areas has been prevented and their conservation status improved				**Corresponding Aichi target 12**: By 2020, the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained			
	Key Outcome Indicators: 1. Trends in abundance of selected species							
	Strategy	**Action**	**Proposed Activities**	**Baseline 2014**	**Output indicators**	**Lead Agency (target champion)**	**Partner institutions**	**Costs in US$**
	Identify and implement measures for protection of threatened and vulnerable species	Prevent extinction of threatened species	3.3.1 Protect threatened, endemic and vulnerable species inside and outside protected areas	There are a number of anthropogenic factors which are threatening species survival in various ecosystems	Reduction in the number nationally extinct, threatened and vulnerable species Number of Species Management Plans under implementation Number of previously extinct species re-introduced	UWA NEMA NFA Local governments	Academia Cultural institutions NGOs CBOs	1,000,000
			3.3.2 Support ex-situ conservation of plant and animal resources	Inadequate conservation measures for plant and wildlife conservation ex-situ	Number of functional ex situ institutions	NARO	UWCEC MAAIF UWA NFA NEMA	400,000
			3.3.3 Engage local communities including women, men and youth in curbing destructive use of threatened plant species	Illegal trade in wildlife and charcoal burning is increasing leading to loss of ecosystems, species and ecosystem services	Number of strategies developed and implemented Number of women and men participating enforcement measures	UWA NEMA NFA FSSD Local governments	NGOs CBOs Cultural leaders	500,000
			3.3.4 Effectively combat poaching and illegal wildlife trade and trafficking through strengthening law enforcement	Poaching and illegal trade in wildlife is still rampant in Uganda	-Deterrent laws in place -Number of points of entry and exit controlled -Number of cases reported and successfully prosecuted -Number of well trained, motivated, equipped and coordinated law enforcement personnel	UWA MTWA	NFA NEMA Local governments	800,000
			3.3.5Strengthen the capacity of CITES Management Authority and CITES Competent Authorities	Capacities of CITES Management Authority and CITES Competent Authorities are presently inadequate	-Number of cases reported and successfully prosecuted -Number of trophies confiscated at border points	MTWA	UWA MWE	300,000
			3.3.6 Strengthen PA institutional capacity and coordination for effective monitoring of wildlife	UWA has inadequate capacity for effective monitoring of wildlife	Availability of up to date data on wildlife species trends	UWA	MWE NFA NEMA	500,000

3.4	**National target**: By 2020, The genetic diversity of cultivated plants and domesticated animals including their wild relatives and other socio-economically valuable species conserved				**Corresponding Aichi target 13**: By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity			
	Key Outcome Indicator: 1. Collection of at least 20% of the genetic diversity of important crops and animals in Uganda together with their wild relatives undertaken and conserved after estimating their baseline 2. Trends in genetic diversity of selected species							
	Strategy	**Action**	**Proposed Activities**	**Baseline 2014**	**Output indicators**	**Lead Agency (target champion)**	**Partner institutions**	**Costs in US$**
	Put in place measures for protection of genetic diversity cultivated plants and domesticated animals	Minimize loss of genetic diversity of cultivated plants and domesticated animals	3.4.1 Collect through local and gender-responsive approach information on availability of plant and animal germplasm	Information on availability of PGR germplasm presently inadequate	Information on germplasm documented	NARO MAAIF	UWA NFA FSSD NEMA Local governments Academia	200,000
			3.4.2 Support national and local repositories for plant and animal genetic resources	The repositories are not well facilitated	Fully functional national and local repositories for plant and animal genetic resources	NARO MAAIF	Academia NEMA UWEC NARO	250,000
			3.4.3 Identify, collect and conserve indigenous species and varieties	Species and varieties ex-situ conservation presently inadequate	Important species and varieties are adequately conserved	NARO MAAIF	NFA UWA Academia Local governments NEMA	200,000
			3.4.4 Reintroduce germplasm of species extinct in the country	A number of Ugandan germplasm are held outside the country	Number of germplasm reintroduced	NARO MAAIF	NFA UWA NEMA	300,000
			3.4.5 Strengthen human and infrastructural capacity for genetic resources conservation and management	Presently there is inadequate capacity for PGR	Genetic resources conservation and management is effective	NARO MAAIF	UWA NFA NEMA Local governments	350,000
			3.4.6 Educate local farmers including women, men and youth on the importance of preserving genetic diversity	Local communities, women, men and youth have limited knowledge on the importance and benefits of preserving genetic diversity	Number of local community groups, women, men and youth trained on issue, risks and benefits of genetic diversity	NARO MAAIF	Local governments CBOs NGOs NEMA	100,000

3.5	**National target**: By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero to reduce degradation				**Corresponding Aichi targets 5**: By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced. **Corresponding Aichi target 14**: By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable			
	Key Outcome Indicator: 1. Restoration programmes for critical fragile and degraded/threatened ecosystems in place and implemented 2. Trends in proportion of degraded/threatened habitats 3. Trends in proportion/coverage of land affected by degradation							
	Strategy	**Action**	**Proposed Activities**	**Baseline 2014**	**Output indicators**	**Lead Agency (target champion)**	**Partner institutions**	**Costs in US$**
	Institute and implement measures to stop further loss of natural habitats	Restore degraded natural habitats	3.5.1 Identify, map and prioritize degraded habitats including forests and wetlands	Information on mapping is incomplete	Trends in extent of selected forests and wetlands	FSSD NFA WMD NEMA Local governments	Academia NGOs CBOs	200,000
			3.5.2 Assess the rate of conversion of the degraded/ threatened habitats by human activities	Some information is available but incomplete	Trends in the proportion of natural habitats converted	NFA FSSD NEMA	UWA Academia	150,000
			3.5.3 Estimate the productivity of the degraded/threatened habitats	Some information is available but incomplete	Trends in primary productivity	Academia	UWA NFA FSSD WMD	400,000
			3.5.4 Estimate the proportion of land affected by desertification	Some information is available but incomplete	Trends in the proportion of land affected by desertification	Academia MAAIF	UWA NFA WMD NEMA	150,000
			3.5.5 Promote awareness on regulations that protect fragile ecosystems	Lack of awareness of the general population about regulations which protect fragile ecosystems	Increased awareness of laws and regulations regarding the protection of fragile ecosystems	NEMA Local governments	NGOs CBOs Cultural leaders	300,000

			3.5.6 Sensitize policy makers on drivers of habitat loss, and for support to reverse the rate of habitat loss	There is awareness among policy makers on the importance of protecting ecosystems	Number of policy makers advocating for protection of ecosystems	NEMA NFA UWA WMD FSSD	Local governments NGOs, CSOs	200,000
			3.5.7 Put in place species recovery plans for the degraded/ threatened habitats	Some information is available but incomplete	Extinction risk trends of habitat dependent species	UWA NFA Local governments	NGOs NEMA	250,000
			3.5.8 Restore and safeguard ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being	Inadequate protection of ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being	Vulnerable areas restored and protected	NEMA NFA UWA WMD Local governments	NGOs CSOs Cultural institutions	500,000
			3.5.9 Develop mechanisms for fair and equitable sharing of costs and benefits of using wetlands	No mechanisms exist for sharing the costs and benefits of wetlands	Number of cost and benefit sharing mechanisms implemented	NEMA WMD	NFA FSSD UWA Local government	400,000

3.6	**National target**: By 2020, management plans are in place and implemented for areas under agriculture, aquaculture and forestry				**Corresponding Aichi target 7**: By 2020, areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity			
	Key Outcome Indicator: Trends in area and productivity of agricultural land, forests under sustainable management							
	Strategy	**Action**	**Proposed Activities**	**Baseline 2014**	**Output indicators**	**Lead Agency (target champion)**	**Partner institutions**	**Costs in US$**
	Improve management of agricultural practices, and forests for biodiversity conservation and sustainable use	Sustainably manage areas under agriculture, aquaculture and forestry in an equitable manner	3.6.1Promote agricultural practices which minimize the negative impacts of agricultural production on biodiversity and ecosystem functioning	There are a number of agricultural practices which threaten biodiversity e.g. rice cultivation and large scale commercial farming	Measures put in place to ensure a win-win situation for agricultural production and biodiversity conservation	NARO MAAIF Local governments	NEMA NGOs CBOS CSOs	200,000
			3.6.2 Promote agro-forestry practices among local communities with particular focus on women and men farmers (supporting REDD+)	Agro-forestry practices still confined to certain regions of Uganda	Significant increase in area and distribution of agro-forestry practices in the country Number of women and men engaged in agroforestry practices	NARO FSSD MAAIF local governments	NEMA NGOs CBOs CSOs	400,000
			3.6.3 Strengthen tenure rights, including of women farmers to support sustainable land management (SLM) practices that conserve agro-biodiversity	SLM practices still confined to certain regions of Uganda	Significant increase in area and distribution of SLM practices in the country	NARO MAAIF MGLSD	Local governments CSOs NGOs CBOs	200,000
			3.6.4Promote sustainable management practices to support the conservation and sustainable use of biodiversity in forests	Biodiversity conservation and sustainable use in forests still face a number of challenges	Mechanisms put in place to protect biodiversity in forests	NFA FSSD Local governments		300,000
			3.6.5 Support local communities including IPLCs, women and men to diversify their livelihoods through biodiversity friendly enterprises which ease pressure on the resource base	Over-harvesting of resources is rampant in key ecosystems such as forests	Livelihoods initiatives put in place	MTIC MGLSD Local governments	NEMA MWE IPLCs NGOs CBOs Private sector	400,000

			3.6.6 Promote women's enterprises to enhance their participation and leadership in biodiversity conservation	It is unknown if women's enterprises exist to specifically promote leadership in conservation.	Number of women's enterprises promoted	MGLSD UEPB MTIC	NEMA NGOs CSOs NFA UWA MWE	500,000
			3.6.7 Implement forest management planning that zones and protects timber production to meet demand whilst restocking for future needs (supporting REDD+)	Over-harvesting of resources is rampant in key ecosystems such as forests	-Reduced emissions from deforestation - Reduced emissions from forest degradation -Conservation of forest carbon stocks	NFA FSSD	NFA FSSD	200,000
			3.6.8 Improve forest timber harvesting and utilization technologies (supporting REDD+)	Over-harvesting of resources is rampant in key ecosystems such as forests	-Reduced emissions from deforestation - Reduced emissions from forest degradation -Conservation of forest carbon stocks	NFA FSSD	UWA NEMA CCU	200,000

3.7	**National target**: By 2020, pollution levels in critical urban ecosystems has been brought to levels that are not detrimental to ecosystem function and biodiversity				**Corresponding Aichi target 8**: By 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity			
	Key Outcome Indicators: 1. Pollution standards in place and enforced 2. Pollution levels due to various anthropogenic practices such agriculture, waste water, oil and gas development activities are compliant with national and international standards 3. Trends in water quality in aquatic ecosystems 4. Trends in sediment transfer rates 5. Trends in proportion of wastewater discharged after treatment							
	Strategy	**Action**	**Proposed Activities**	**Baseline 2014**	**Output indicators**	**Lead Agency (target champion)**	**institutions**	**Costs in US$**
	Monitor and support management of pollution levels and waste in vulnerable ecosystems	Reduce pollution levels that are detrimental to biodiversity	3.7.1 Monitor and enforce compliance to effluent standards requirements	Management of pollution is still confined to very few vulnerable ecosystems e.g. Lake Victoria	Trend in pollution levels Management Enhanced capacity (infrastructure, human resources and financial) to detect and manage pollution in place	WQMD WRMD Municipalities authorities City Authorities	NARO Local governments NEMA Academia	300,000
			3.7.2 Monitor the impact of agrochemicals on selected pollinators	Not much data is available in the country regarding the impact of agrochemicals on pollinators which are important for agricultural production	More data is available on the impact of agrochemicals on pollinators	NARO MAAIF	NEMA Academia	150,000
			3.7.3 Manage all forms of waste in an effective and efficient manner to reduce its negative impact on the environment, including through local-level waste management and recycling initiatives	Emerging waste productions such as e-waste and from oil and gas are not yet being adequately managed Some CSOs/NGOs currently promoting recycling and ready to scale.	Effective and efficient options for managing all forms of waste are under implementation Increased number of waste management/ recycling options being adopted Number of new facilities operating (or planned)	NEMA	MoH NGOs CSOs Private sector UNBS	500,000

3.8	**National target**: By 2020, invasive alien species harmful to biodiversity, socio-economic development and human health are managed to prevent their introduction and establishment				**Corresponding Aichi target 9**: By 2020, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment			
	Key Outcome Indicator: 1. Management Plans in place to control most threatening invasive alien species 2. Trends in the economic impacts of selected invasive alien species 3. Trends in area covered invasive alien species							
	Strategy	**Action**	**Proposed Activities**	**Baseline 2014**	**Output indicators**	**Lead Agency (target champion)**	**Partner institutions**	**Costs in US$**
	Put in place eradication and control measures for alien invasive species	Control IAS that have adverse impacts on biodiversity and human health and gender-differentiated livelihoods	3.8.1 Develop and implement management plans to prevent the establishment and introduction of alien invasive species	Alien invasive species are seriously affecting biodiversity in agricultural landscapes, aquatic ecosystems	-National guidelines on invasive species in place -Adequate measures to contain alien invasive species in vulnerable ecosystems are in place -An inventory of alien invasive species Management plans developed and implemented	NARO NEMA MAAIF WMD NFA Local governments	FSSD NGOs CSOs CBOs	5,000,000
			3.8.2 eradication or control existing alien invasive species	Bottlenecks such as inadequate monitoring of seeds at Uganda's border control points still inadequate	-Capacity (personnel, equipment and human resource) built for monitoring alien invasive species -Trends in alien invasive species	NARO NEMA MAAIF NFA Local governments	URA NGOs CBOs CSOs Cultural institutions	7,000,000

3.9	**National target**: By 2020, the impacts of fisheries activities on fish stocks, species and ecosystems are within safe ecological limits				**Corresponding Aichi target 6**: By 2020, all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits			
	Key Outcome Indicators: 1. trends in catch per unit effort 2. Trends in area, frequency, or intensity of destructive fishing practices							
	Strategy	**Action**	**Proposed Activities**	**Baseline 2014**	**Output indicators**	**Lead Agency (target champion)**	**Data sources Partner institutions**	**Costs in US$**
	Sustainable manage fisheries resources	Put in place measures to control illegal fishing and over exploitation	3.9.1 Put in place effective control measures to manage fishing and alien fish species such as the Nile Perch *Salvinia molesta* including promoting awareness of existing regulations	No control measures are in place to protect other fish species	-Trends in fish catch -Measures put in place to control alien fish species	MAAIF	NARO NEMA CBOs CSOs NGOs Local governments	400,000
			3.9.2 Put in place and implement control measures for the Water Hyacinth, and the congress weed	Water Hyacinth is still abundant in some open waters such as lakes	Reduced surface area under Water Hyacinth, congress weed and *Salvinia molesta*	MAAIF Local governments	MAAIF NEMA NARO NGOs CSOs CBOs	800,000
			3.9.3 Promote sustainable aquaculture for local communities including women and men for socio-economic development	Number of farmers engaged in aquaculture is low compared to its potential	Trends in farmers (women and men) and local community groups engaged in aquaculture Trends in catch	MAAIF Local governments	NEMA NARO NGOs CBOs CSOs	600,000
			3.9.4 Undertake SEA/EIA on policies, programmes or projects that are likely to have significantly negative impacts on aquatic biodiversity	Some key projects and programmes have not been subjected to EIA	All key projects and programmes are subjected to SEA/EIA	NEMA	NARO MAAIF Local governments	200,000

			3.9.5 Develop and or implement appropriate mitigation measures against habitat degradation of open water resources including by identifying and promoting alternative livelihood sources for women and men	Habitat degradation of open water resources is rampant due to poverty and lack of alternative livelihoods	Number of mitigation Measures put in place to restore degraded open water habitats Number of alternative livelihood options identified and promoted	MAAIF MWE Local governments	NARO NEMA	300,000
			3.9.6 Promote private sector investment and participation in aquatic biodiversity conservation	Presently the interest of private sector is more towards commercial fishing operations	Trends in private sector investment in aquatic biodiversity conservation	MAAIF	NARO Private sector NEMA	400,000
			3.9.7 Support transboundary management of fisheries resources	Transboundary management of fisheries resources is still inadequate	-Harmonized fisheries legislations and management practices -Transboundary fisheries management initiatives in place	MAAIF Local governments	NEMA NARO NGOs CBOs	1,000,000

3.10	**National target**: By 2020, fish are managed and harvested sustainably, legally, overfishing is avoided and recovery plans and measures are in place for all depleted species				**Corresponding Aichi target 6**: By 2020, all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits			
	Key Outcome Indicators: 1-Trends in fish stocks 2-Trends in fish species abundance and diversity 3-Trends in fish catch rates (Catch per Unit Effort) 4-Trends in the use of destructive fishing methods and gears							
	Strategies	**Action**	**Proposed Activities**	**Baseline 2014**	**Output indicators**	**Lead Agency (target champion)**	**partner institutions**	**Costs in US$**
	Promote sustainable harvesting of fish and invertebrate stocks	Strengthen measures for sustainable harvesting of fish and other aquatic life	3.10.1 Strengthen community and resource use groups participation in fisheries management, including by identifying gender-differentiated roles across the sector	There is still inadequate participation of local communities in fisheries management Gender roles are changing because of different roles along the value chain.	Number of fishing communities groups including women and men in landing sites actively participating in fisheries management Documentation of gender-differentiated roles	MAAIF Local governments	NEMA NARO NGOs CBOs CSOs	500,000
			3.10.2 Regulate and control importation and usage of fishing gears	There is still rampant use of illegal fishing gears in lakes and rivers	-Number of reported and successfully prosecuted cases -Trends in fish population structure	MAAIF Local governments	NARO	150,000
			3.10.3 Strengthen monitoring, control and surveillance fishing activities	There is inadequate monitoring of fishing activities in the major water bodies	-Number of reported and successfully prosecuted cases -Trends in fish population structure	MAAIF Local governments	NARO CBOs NGOs	500,000
			3.10.4 Develop and implement gender-responsive community fisheries management plans	Community management plans are lacking in most landing sites	Number of community fisheries management plans Number of women and men participating in the plan development and implementation	MAAIF MGLSD Local governments	NARO NEMA	400,000
			3.10.5 Provide adequate support to Beach Management Units (BMU)	Managers of Beach Management Units lack resources to efficiently perform their duties	Number of BMUs supported	MAAIF Local governments	NARO	800,000

Thematic area four: Sustainable Use, sharing costs and benefits

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

This objective advocates for benefits of biodiversity conservation and sustainable use to flow back to the local communities, women and men whose livelihoods are affected, and who are often the real stewards of a natural resource. All Ugandan, especially IPLCs, can benefit financially or from training, employment, provision of infrastructure and equipment arising from development activities or projects on biodiversity conservation. Both costs as well as benefits from biodiversity conservation must be shared equitably otherwise many stakeholders may not see any reason to support new approaches to biodiversity management in their areas.

Access and benefit sharing (ABS)[6] is considered a key instrument to ensure local communities, women and men benefit from the commercialization and use of their natural resources. Institutional structures; increased funding and mechanisms for research and development; and increased awareness are all necessary so that the potential of ABS can be harnessed. These are elaborated in the strategies and action plans outlined below:

6 The national ABS legislation is due for revision and will be through an inclusive and participatory approach involving all stakeholders including local communities, IPLCs, women and men

Table 16: Strategic Objective 4: To promote the sustainable use and equitable sharing of costs and benefits of biodiversity								
4.1	**National target**: By 2020, appropriate incentives for biodiversity conservation and sustainable use are in place and applied				**Aichi target 3**: By 2020, at the latest, incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimize or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the Convention and other relevant international obligations, taking into account national socio-economic conditions			
	Key Outcome Indicator: 1. Trends in the number and value of incentives, including subsidies, harmful to biodiversity, removed, reformed or phased out							
	Strategies	**Action**	**Proposed Activities**	**Baseline 2014**	**Output indicators**	**Lead Agency (target champion)**	**partner institutions**	**Costs in US$**
	Introduce incentives for conservation and sustainable use of biodiversity	Phase out incentives harmful to biodiversity	4.1.1 Develop economic instruments to encourage activities that enhance biodiversity conservation and discourages activities that impact negatively on biodiversity	Economic instruments are still inadequately being used to manage biodiversity in Uganda	Number of economic instruments supporting biodiversity conservation and sustainable use	NEMA	MoFPED NPA MDAs EPRC Academia	150,000
			4.1.2 Identify and support women groups to adopt more sustainable alternatives for household and income-generating activities to enhance livelihoods and biodiversity conservation	There are limited initiatives to target women's sustainable use of natural resources but women are key users, and thus drivers of degradation.	Number of women's alternative strategies identified and promoted Number of alternative practices adopted/promoted by women	MGLSD Local governments	NEMA NGOs CBOs CSOs	500,000
			4.1.3 Introduce pro-poor environmental taxes and levies and market-based instruments	Environmental taxes and market based instruments are still inadequately being used to manage biodiversity in Uganda	Effective taxes and other instruments to manage biodiversity are under implementation	MoFPED	NEMA NPA EPRC Local governments	300,000
			4.1.4 Promote and support Green Procurement through purchasing of environmentally preferable products or services, taking into consideration the necessity, not only for quality and price, but also for biodiversity conservation-conscious business	Green procurement is still a relatively new concept in Uganda for protecting biodiversity and its sustainable use	Green procurement is being widely used to protect biodiversity and its sustainable use	PPDA	NEMA MoFPED MDAs Local governments	250,000

			4.1.5 Undertake Environmental Impact Assessments (EIA) of all policies, programmes or projects which have the potential for negative—or positive—impacts on biodiversity	Some policies, programmes and projects have not been subjected to EIAs	Number of EIAs completed for policies, programmes and projects Number of EIA processes that include community participation	NEMA	MDAs Local governments	150,000
			4.1.6 Integrate biodiversity accounting into national accounting and reporting processes	Biodiversity accounting not included national accounting and reporting	Biodiversity accounting reflected national accounting and reporting processes	NEMA NPA	UWA NFA MWE MDAs	300,000

4.2	**National target**: By 2020 at least 2 partnerships established to ensure that wild harvested plant-based products are sourced sustainably				**Aichi target 13**: By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity			
	Key Outcome Indicator: Partnerships with the private sector developed							
	Strategy	**Action**	**Proposed Activities**	**Baseline 2014**	**Output indicators**	**Lead Agency (target champion)**	**Partner institutions**	**Costs in US$**
	Promote Public Private Partnership (PPP) for sustainable use of biodiversity	Establish PPP	4.2.1 Promote PPP to collect, harvest and process plant based products for commercialization	Private companies currently collect and process some plant based products in isolation of important public institutions	Evidence of collaborative ventures between the private sector and public institutions	UNCST NARO	NEMA NFA FSSD Private sector	400,000
			4.2.2 Support value addition on plant based products for commercialization by local community groups	Very limited processing of plant based products such as medicinal plants is undertaken particularly with local communities	Private sector and local communities engaged in processing for value addition on plant based products	MTIC UEPB NEMA Local governments	UNCST NGOs CBOS CSOs Private sector	1,000,000
4.3	**National target**: By 2020, a well established framework for implementing the Multilateral System of accessing and sharing of benefits arising from access to PGR in place				**Aichi target 13**: By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity			
	Key Outcome Indicators: - A framework in place for sharing the benefits from access to PGR in the country - Documents prepared on indigenous knowledge on PGR for food, agriculture and medicine - Several community based PGR management initiatives in place							
	Strategy	**Action**	**Proposed Activities**	**Baseline 2014**	**Output indicators**	**Lead Agency (target champion)**	**Partner institutions**	**Costs in US$**
	Promote synergies in the implementation of ITPGRFA, CBD and the Nagoya Protocol on ABS		4.3.1 Develop and implement mechanisms for sharing the benefits from access to PGR in the country	Presently there are no clear mechanism for sharing benefits from access to PGR	Effective and documented mechanisms for sharing benefits from access to PGR put in place and are being implemented	NARO NEMA UNCST	MDAs Local governments	200,000

			4.3.2 Document traditional knowledge, innovations and practices in PGR	There is limited documentation of indigenous knowledge, innovations and practices in PGR	-Detailed documentation of traditional knowledge, innovations and practices in PGR available	NARO	UNCST NEMA NCRI Local governments Academia	250,000
			4.3.3 Disseminate traditional knowledge information/ documents to enhance sustainable use of biodiversity (planning for food security and health care, i.e. medicinal plants)	Documents not distributed	Documents on indigenous knowledge distributed to relevant stakeholders	NCRI	UNCST NEMA Local governments Academia	150,000
			4.3.4 Initiate and support community based PGR management initiatives in various parts of the country	PGR management initiatives are absent up-country	Some PGR management activities initiated in some parts of the country	NARO Local governments	UNCST NEMA NCRI	350,000

4.4	**National target**: By 2016, the Nagoya Protocol on Access to Genetic Resources and Benefit Sharing in force				**Aichi target 16**: By 2015, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization is in force and operational, consistent with national legislation.			
	Key Outcome Indicators: Improved regulatory framework for ABS in Uganda enforced with involvement of IPLCs							
	Strategy	**Action**	**Proposed Activities**	**Baseline 2014**	**Output indicators**	**Lead Agency (target champion)**	**Partner institutions**	**Costs in US$**
	Domesticate the Nagoya Protocol on ABS, with particular consideration of social safeguards	Enforce the Nagoya Protocol on ABS	4.4.1 Accede to the Nagoya Protocol on ABS	Accession to the Nagoya Protocol on ABS by 2015	Instrument of accession	NEMA	MWE Ministry of Justice UNCST	30,000
			4.4.2 Review the ABS Regulations and incorporate relevant elements of the Nagoya Protocol	ABS Regulations have not been reviewed since 2005	ABS Regulations reviewed incorporating elements of the Nagoya Protocol	NEMA	UNCST MDAs Local governments NGOs IPLCs CSOs	200,000
			4.4.3 Build capacity to enforce the Nagoya protocol on ABS	There is limited capacity for enforcement of the Nagoya Protocol on ABS	Number of institutions trained	NEMA	UNCST Local governments	2,500,000
			4.4.4 Promote and regulate bioprospecting and biotrade activities	Biotrade activities are presently not regulated	Both bioprospecting and biotrade are regulated for the benefit of the local communities	UNCST	UEPB NEMA MDAs Local government	300,000
			4.4.5 Support the Establishment of a functional Intellectual Property (IP) regime on ABS	No functional IP regime specific to genetic resources	Joint ownership of patents and other IP rights reserved	UNCST	NEMA MDAs Districts	150,000

Thematic area five: Awareness and education

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

The review process of NBSAP1 revealed low levels of awareness of the NBSAP document itself as well as low levels of understanding of the term biodiversity. Very few implementing partners and the general public at large had ever seen or heard of NBSAPI. This was a serious impediment to the implementation of NBSAPI. For this reason a comprehensive and targeted communication, education and public awareness (CEPA)/Information, Education and Communication (IEC) strategy should be one of the key priorities of NBSAPII both to raise awareness of NBSAPII itself and for better understanding of the importance of biodiversity generally.

The ultimate goal of the CEPA/IEC Strategy will be to achieve a positive change in the behavior of stakeholders towards biodiversity, based on effectively demonstrating its value and importance to the Ugandan society. The CEPA/IEC strategy will also seek to ensure that equitable, economic, ecological and social benefits from the conservation and sustainable use of biodiversity are known, understood and emphasized.

The CEPA/IEC strategy will focus on three key strategic areas: awareness and information, education, networking

Awareness/Information

a) Develop and implement stakeholder awareness and education programmes on biodiversity and its values
b) Promote and facilitate development of stakeholder awareness and education materials on biodiversity
c) Promote awareness and education of NBSAPII to stakeholders

Education

a) Develop and implement educational programs on biodiversity issues relevant to Uganda
b) Mainstream biodiversity into school curricula at all levels

Networking

a) Strengthen and enhance collaboration, linkages and networking among stakeholders involved in biodiversity and environment-related issues including other Conventions
b) Participate in regional and international cooperation programs and activities on biological diversity
c) Mobilise support and financial resources for biodiversity conservation programs at international level

Table 17: Strategic Objective 5: To enhance public awareness and education on biodiversity issues among the various stakeholders								
5.1	**National target**: By 2020 people are aware of the meaning and values of biodiversity and the steps they can take to use it sustainably				**Aichi targets 1**: By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably			
	Key Outcome Indicator: 1. Trends in behavioral change particularly among decision makers and the general public towards biodiversity conservation and sustainable use 2. Trends in communication programmes and actions promoting social corporate responsibility							
	Strategies	**Action**	**Proposed Activities**	**Baseline 2014**	**Output indicators**	**Lead Agency (target champion)**	**Partner institutions**	**Costs in US$**
	Promote awareness of NBSAPII among key stakeholders Policy makers, professionals, private sector, general public	Conduct public awareness on biodiversity	5.1.1 Undertake intensive awareness raising on the content of NBSAPII at all levels	Not yet done	Number of stakeholders at all levels are aware of NBSAPII	NEMA Local governments	MDAs UNCST	500,000
	Develop stakeholder /public awareness programmes on biodiversity and its values		5.1.2 Develop and disseminate user-friendly and gender-responsive Information Education and Communication materials (IECs) for popular campaigns targeting women as agents of change for conservation	Women have not been promoted as users and stewards of sustainable natural resource management, and communication materials on this don't exist	Number and types of IEC materials produced Number of institutions/ districts where IEC materials disseminated Responses and feedback from IEC users Number of women's organizations/ mechanisms engaged	MGLSD NEMA	Local governments NGOs CSOs CBOs	200,000
			5.1.3 Sensitize local communities including IPLCs on biodiversity conservation	Not yet done	Number of IPLCs and community groups sensitized on biodiversity conservation	Local governments	NEMA MDAs	250,000
			5.1.4 Develop and disseminate gender-responsive biodiversity public awareness materials	Not yet done	Regular surveys Attitude and behavioural change among communities Increased participation in biodiversity conservation Number and type of IEC materials	MGLSD	NEMA MDAs Local governments	300,000

5.2	**National target**: By 2020 at the latest, students and teaching staff are aware of the values of biodiversity				**Aichi targets 1**: By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably			
	Key Outcome Indicator: 1. Positive attitude and behavioral change among students and teachers in educational institutions 2. Biodiversity integrated into the National School Curriculum							
	Strategy	**Action**	**Proposed Activities**	**Baseline 2014**	**Output indicators**	**Lead Agency (target champion)**	**Partner institutions**	**Costs in US$**
	Develop and implement educational programs on biodiversity issues relevant to Uganda	Integrate biodiversity in national curriculum	5.2.1Develop and implement educational programs on biodiversity issues relevant to Uganda	Has been done to a limited extent	Biodiversity incorporated in school curricula at various levels	NEMA	MDAs Academia MoES Local governments	200,000
			5.2.2 Strengthen and/or establish environmental clubs or societies	Has been done to a limited extent	Biodiversity incorporated in environmental activities in educational institutions at all levels, including clubs and competitions	NEMA	MDAs NGOS CSOs	200,000
			5.2.3 Develop and disseminate gender-responsive educational materials on biodiversity	Has been done to some extent	A variety of educational materials developed, produced, accessed, used, and appreciated	NEMA MGLSD	MOES MDAs UWCEC NGOs CSOs	200,000
5.3	**National target**: By 2020, international cooperation and networking is effective enough to enhance communication of the value of biodiversity conservation and sustainable use				**Corresponding Aichi target 1**: By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably			
	Key Outcome Indicator: 1. Adequate and active participation in regional and global fora by Ugandans							
	Strategies	**Action**	**Proposed Activities**	**Baseline 2014**	**Output indicators**	**Lead Agency (target champion)**	**Partner institutions**	**Costs in US$**
	Support equitable participation in regional and international cooperation programs on biological diversity	Represent Uganda at regional and global fora on biodiversity	5.3.1 Seek support to enable women and men personnel to attend regional and international fora relevant to biodiversity	On-going	-Number of women and men at international conferences and workshops on biodiversity and related areas -Number of biodiversity regional and international workshops organized and held in Uganda -Number of Reports	NEMA	MDAs	500,000
	Mobilize support and financial resources at international level for biodiversity programs		5.3.2 Develop proposals for supporting biodiversity conservation programs at national level		Project proposals on biodiversity programs developed and implemented	NEMA	MoFPED MDAs Local governements	400,000

Thematic area six: Harnessing benefits from modern biotechnology

Strategic Objective 6: To harness modern biotechnology for socio-economic development with adequate safety measures for human health and the environment

Uganda has made significant progress in biotechnology Research and Development (R&D) compared to many countries in Sub-Saharan Africa. There has been steady increase in the number of applications for research on genetically modified (GM) crops received by UNCST and reviewed and approved by the National Biosafety Committee (NBC) over the years. This trend shows a positive prospect for development and application of modern biotechnologies in the country for the years to come. Uganda is also a signatory to the Cartagena Protocol on Biosafety and, is therefore, mandated to promote, preserve, conserve, protect and develop her biodiversity. Despite the remarkable progress Uganda has made in biotechnology and Biosafety, a number of bottlenecks still prevail including the following:

a) There is lack of capacity for implementation
b) There is presently no Biotechnology Clearing House Mechanism
c) Limited application of biotech tools for biodiversity conservation
d) Low public awareness and low level of participation in Biosafety and Biotechnology matters
e) There is limited infrastructural and human capacity for biotechnology in the country
f) There is inadequate legal environment for Biotech development and application
g) Capacity for management of transboundary movements of GMOs is also generally limited
h) At present, GMOs have not been officially approved beyond confined field trials, so social economic considerations have therefore not been high on the national agenda

Strategies for biotechnology and biosafety in Uganda include:

a) Assess national capacities in biotechnology and Biosafety
b) Enhance the availability and exchange of information on Biotechnology and Biosafety
c) Establish a mechanism(s) for continuous Human and Infrastructural Resource Capacity Development, deployment and retention
d) Develop a fully functional National Biosafety System
e) Enhance regulatory performance of the National Biosafety Committee and the Institutional Biosafety Committees
f) Establish a national repository for plant and animal genetic resources
g) Promote research in medical, agricultural, environmental and other areas of biotechnology and Biosafety
h) Update information on biotechnology and biosafety
i) Establish a strong and effective monitoring system for biotechnology use and application
j) Undertake EIA or risk assessments on biotechnology policies, programmes or projects that are likely to have significantly negative impacts on human health and the environment including biodiversity
k) Develop mechanisms for sharing costs and benefits of biotechnology
l) Promote integration of biotechnology values into macroeconomic frameworks
m) Develop and disseminate biotechnology awareness materials

Table 18: Strategic Objective 6: To harness modern biotechnology for socio-economic development with adequate safety measures for human health and the environment								
6.1	**National target**: By 2018, public awareness, education and participation in biotechnology and biosafety are enhanced				**Corresponding Aichi target 19**: By 2020, knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied			
	Key Outcome Indicators: - Increased participation and support of biotechnology by policy makers and the general public							
	Strategies	**Action**	**Proposed Activities**	**Baseline 2014**	**Output indicators**	**Lead Agency (target Champion)**	**Partner institutions**	**Costs in US$**
	CEPA strategy implemented for biotechnology and Biosafety	Create awareness on the benefits of modern biotechnology	6.1.1Conduct a baseline study on level of public awareness and education on the benefits and risks of biotechnology and Biosafety	Low level of public awareness and participation in Biosafety and Biotechnology matters	Increased stakeholder involvement in biotechnology and Biosafety practices	UNCST NEMA NARO	Local governments	100,000
			6.1.2 Establish and operationalize Biosafety Clearing House (BCH)	No BCH	A National Biosafety Clearing House Mechanism or similar entity in place	UNCST	NARO NEMA	200,000
			6.1.3 Conduct specialized trainings in Biosafety for regulators and inspectors	Limited trained Technical Personnel on biotechnology and Biosafety	Increased number of trained Technical Personnel in biotechnology and Biosafety	UNCST	NARO NEMA UNBS Academia	200,000
			6.1.4 Conduct specialized biotechnology communication for media specialists	Imbalanced and low reporting on Biotechnology and Biosafety by the Media	Balanced and informed reporting by the media on Biotechnology and Biosafety.	UNCST	NARO NEMA UNBS Academia	100,000
			6.1.5 Conduct trainings in biotechnology and biosafety for women and men	Low level of awareness on Biotechnology and Biosafety in the general Public	Increased levels of appreciation on Biotechnology and Biosafety in communities	UNCT	NARO NEMA UNBS Academia	150,000

6.2	**National target**: By 2020, national capacity for biotechnology applications and use is adequate				**Corresponding Aichi target 19**: By 2020, knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied Strategic Plan for the Cartagena protocol on Biosafety 2011-2020			
	Key Outcome Indicators: Mechanisms for continuous Human and Infrastructural Resource Capacity Development, deployment retention put in place - Biotech tools developed and optimized for biodiversity conservation							
	Strategies	**Action**	**Proposed Activities**	**Baseline 2014**	**Output indicators**	**Lead Agency (target champion)**	**Partner institutions**	**Costs in US$**
	Support capacity building for biotechnology and Biosafety	Build capacity on the application of biotechnology	6.2.1Assess national capacities in biotechnology and Biosafety	Capacity has not been assessed	National capacity for biotechnology and Biosafety assessed	UNCST	NEMA MAAIF MOH Academia	80,000
			6.2.2 Support the development of skilled human resources for biotechnology and Biosafety	National capacity is low	Number of scientists trained in Biotechnology and Biosafety	UNCST	UNCST NARO NEMA Academia	300,000
			6.2.3 Promote infrastructural Development and Research on biotechnology and Biosafety.	Inadequate infrastructure	Accredited Biotechnology and Biosafety infrastructure developed.	UNCST	NEMA MOFPED MAAIF MOE	400,000
			6.2.4 Develop and apply biotechnology tools for identification, characterization and conservation of biodiversity	Inadequate tools in place	Adequate tools developed for identification, characterization and conservation of biodiversity	UNCST	NEMA NARO ACADEMIA UNBS	300,000

6.3	**National target**: By 2018, the national biotechnology and biosafety law in place				**Corresponding Aichi target 19**: By 2020, knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied Strategic Plan for the Cartagena protocol on Biosafety 2011-2020			
	Key Outcome Indicators: National Biotechnology and Biosafety Bill 2012 passed into law -National Biosafety Committee effectively supported to perform its functions							
	Strategies	**Action**	**Proposed Activities**	**Baseline 2014**	**Output indicators**	**Lead Agency (target champion)**	**Partner institutions**	**Costs in US$**
	Support the passing into law of the Biotechnology and Biosafety Bill 2012	Expedite approval of the Bill	6.3.1 Undertake widespread awareness on the benefits and risks associated with biotechnology	There is limited awareness and knowledge of biotechnology	Increased appreciation of biotechnological developments	UNCST	UNCST MFPED MAAIF MOES	100,000
			6.3.2 Popularize the Biotechnology and Biosafety Policy	Limited awareness and knowledge on the Biotechnology and Biosafety policy, 2008	Increased Awareness and knowledge on Biotechnology and Biosafety policy.	UNCST	NEMA MFPED MOLG MAAIF MOES MWE	100,000
			6.3.3 Advocate for the approval of the National Biotechnology and Biosafety Bill to enable regulation of Biotechnology and Biosafety developments in the country.	The Bill has not been passed by parliament.	A Biotechnology and Biosafety law in place.	UNCST	NEMA MOJCA MWE MAAIF MOH	300,000
			6.3.4 Popularize the Biosafety and Biotechnology Policy and Bill/Act	Many stakeholders and the general population understand little of the benefits of the law	Stakeholders and the general population develop a positive attitude towards the law	UNCST	NEMA MWE	150,000
			6.3.5 develop guidelines on compliance to biosafety	No guidance on Biosafety compliance at the moment	Guidance on Biosafety compliance in place	UNCST	NEMA MDAs MWE	80,000
			6.3.6 Enhance the regulatory performance of the National Biosafety Committee (NBC) and the Institutional Biosafety Committees (IBC)	The NBC and IBCs are inadequately remunerated.	The NBC and IBCs are adequately remunerated and perform their duties diligently.	UNCST	MWE NEMA MAAIF Academia MOH	150,000
			6.3.7 Promote public-private partnerships (PPP) in biotechnology development	There are limited public-private partnerships in Biotechnology development.	Vibrant public-private partnerships in biotechnology development.	UNCST	NARO MAAIF Academia Private sector	200,000

6.4	**National target**: By 2018, the Nagoya–Kuala Lumpur Supplementary Protocol on Liability and Redress under the Cartagena Protocol on Biosafety in operation and implemented				**Corresponding Aichi target 19**: By 2020, knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied Strategic Plan for the Cartagena protocol on Biosafety 2011-2020			
	Key Outcome Indicators: Increased compliance with national and international requirements							
	Strategy	**Action**	**Proposed Activities**	**Baseline 2014**	**Output indicators**	**Lead Agency (target champion)**	**Partner institutions**	**Costs in US$**
	Domestic the Nagoya-Kuala Lumpur Supplementary Protocol on liability and redress	Popularize the Nagoya-Kuala Lumpur Protocol on ABS	Engage high level government including parliamentarians Accede to the Supplementary Protocl	Accession to the Supplementary Protocol planned for 2015	Accession Instruments	NEMA	UNCST Ministry of Justice	20,000
		Create awareness on biosafety	6.4.1 Organize and conduct gender-responsive national and local stakeholder awareness creation campaigns on biosafety	Limited knowledge on benefits to be shared, low capacity to review prepare and negotiate material transfer agreement MTA including mutually agreed terms and prior informed consent	Increased understanding of ABS issues by the Government and communities	UNCST NEMA Local governments	MDAs MGLSD NGOs CBOs CSOs	250,000
			6.4.2 Support tertiary Institutions to run short courses on biosafety	No tertiary Institution training on ABS	Increased capacity to support scientific research and development in genetic resources	UNCST	NEMA MOES URA MOLG	200,000
			6.4.4 Support the full implementation of the Nagoya Supplementary Protocol on Liability and Redress	Uganda acceded to the Nagoya Protocol in June 2014	The Protocol on Liability and Redress is enforced	UNCST	NEMA MDAs NGOs Development partners	200,000

6.5	**National target**: By 2020, there is widespread application and use of biotechnology and its products for national development				**Corresponding Aichi target 19**: By 2020, knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied Strategic Plan for the Cartagena protocol on Biosafety 2011-2020			
	Key Outcome Indicator: - Biotechnology applications and use widely accepted by the Ugandan public							
	Strategies	**Action**	**Proposed Activities**	**Baseline 2014**	**Output indicators**	**Lead Agency (target champion)**	**Partner institutions**	**Costs in US$**
	Support biotechnology applications and use for National development	Carry out research on biotechnology	6.5.1 Promote management oriented research and development in medical, agricultural land industrial biotechnology.	Limited modern biotechnology research is on-going in agricultural sector mainly	Vibrant biotechnology and Biosafety research applied in the fields of medicine, agriculture and Industry	UNCST	NEMA MWE MAAIF NARO MoH	400,000
			6.5.2 Undertake ESIA or risk assessments on biotechnology plans, programmes and projects	The third schedule of the National Environment Act requires EIA to be undertaken	ESIAs conducted and complied with by developers in biotechnology,	NEMA	UNCST MoLoG MWE MAAIF NARO Private sector	100,000
			6.5.3 Establish a strong and effective monitoring system for biotechnology use and applications	Inadequate human, physical and financial infrastructure to effectively and efficiently monitor biotechnology use and applications.	A strong monitoring system in place for biotechnology use and applications	NEMA	UNCST Private sector MLG	200,000
			6.5.4 Develop and implement mechanisms for sharing costs and benefits of biotechnology	Mechanisms for sharing costs and benefits of biotechnology are not yet in place	Effective mechanisms in place for sharing costs and benefits of biotechnology	UNCST	NEMA MDAs NARO MAAIF	400,000
			6.5.6 Promote integration of biotechnology values into macroeconomic frameworks	No socioeconomic study so far conducted in biotechnology,	Biotechnology applications mainstreamed in National macroeconomic programmes.	NPA	NEMA NARO UNCST MDAs	200,000

Thematic area seven: Funding mechanisms

Strategic Objective 7: To promote innovative and sustainable funding mechanisms to support NBSAP implementation

While the costs for implementing NBSAPII have only been roughly estimated in this document, Uganda recognizes that increased resource mobilization is needed to maximize Uganda's contribution to the achievement of the CBD Strategic Plan. It is equally important that a methodology to undertake and establish baseline assessments of total investment into biodiversity conservation is put in place to monitor trends in resource mobilization.

Uganda is committed through NBSAPII to implementing decision XI/5 of CBD COP11 in Hyderabad, India which called on governments to implement the following measures among others:

a) Identify and seek funding support from diverse sources including regional and international donor agencies, foundations and, as appropriate, through private-sector involvement
b) Establish strategic partnerships with other Parties and other Governments and with various organizations, regional bodies or centers of excellence with a view to pooling resources and/or widening opportunities and possibilities for mobilizing resources from various sources
c) Identify and maximize opportunities for technical cooperation with regional and international organizations, institutions and development assistance agencies
d) Ensure efficient use of available resources and adopt cost-effective approaches to capacity-building.

Table 19: Strategic Objective 7: Promote innovative and sustainable funding mechanisms to support NBSAP implementation								
7.1	**National target**: By 2015, a study is undertaken in respect of CBD Decision X/3 and guidelines for financing biodiversity in Uganda developed				**Aichi target 20**: By 2020, at the latest, the mobilization of financial resources for effectively implementing the Strategic Plan for Biodiversity 2011-2020 from all sources, and in accordance with the consolidated and agreed process in the Strategy for Resource Mobilization should increase substantially from the current levels.			
	Key Outcome Indicator: 1. Guidelines and action plans for financing biodiversity in Uganda developed and implemented 2. Trends in financial resources mobilized 3. Biodiversity Finance Plan for resource mobilization developed and implemented							
	Strategy	**Action**	**Proposed Activities**	**Baseline 2014**	**Output indicators**	**Lead Agency (target champion)**	**Partner institutions**	**Costs in US$**
	Put in place measures for sustainable biodiversity financing	Develop guidelines and action plans for financing biodiversity in Uganda	7.1.1 Undertake a study to collect information which will guide in the development of guidelines for financing biodiversity in Uganda	No guidelines at present	Study undertaken and information collected to use in the development of guidelines	NEMA	Development partners MDAs NGOs MWE	70,000
			7.1.2 Develop and implement guidelines for financing biodiversity in Uganda	No guidelines at present	Guidelines developed	NEMA	Development partners MDAs NGOs MWE	500,000
			7.1.3 Develop Biodiversity Finance Plan	No Resource mobilization plan	Biodiversity Finance Plan	NEMA	MoFPED Development partners MWE	300,000
7.2	**National target**: By 2017, finance resources for effectively implementing NBSAPII is increased by at least 10% from the current level				**Target 20**: By 2020, at the latest, the mobilization of financial resources for effectively implementing the Strategic Plan for Biodiversity 2011-2020 from all sources, and in accordance with the consolidated and agreed process in the Strategy for Resource Mobilization should increase substantially from the current levels.			
	Key Outcome Indicator: Trends in National financial resource allocation for biodiversity conservation							
	Strategy	**Action**	**Proposed Activities**	**Baseline 2014**	**Output indicators**	**Lead Agency (target champion)**	**Partner institutions**	**Costs in US$**
	Mobilize financial resources for biodiversity conservation	Engage stakeholders on resource mobilization	7.2.1 Identify and seek funding support from diverse sources including regional and bilateral development partners, foundations and private sector	Presently there is limited financial support for biodiversity from various sources	Increased funding from diverse sources mobilized	NEMA	MoFPED MDAs NGOs Development partners MWE Local governments	200,000

			7.2.2 Support capacity building for writing project proposals that are gender-responsive	There is low capacity for preparing project proposals targeting GEF and other agencies	Capacity built for writing project proposals	NEMA	MFPED MDAs NGOs CSOs Development partners MWE MGLSD Local governments	80,000
			7.2.3 Develop project proposals to target designated donors under the CBD	Proposals need to be prepared regularly	Number of project proposals submitted Number of projects approved	NEMA	MoFPED MDAs NGOs CSOs Development partners MWE Local governments	200,000
			7.2.5 Mobilize resources by creating synergies between the different multilateral Environmental Conventions	There is limited synergy between the CBD implementation and other Conventions	Mobilize additional resources through partnership with the other Conventions	NEMA	MFPED MDAs NGOs Development partners MWE MAAIF	10,000,000
			7.2.6 Budget for activities of biodiversity and incorporate in annual budget of Line ministries, NGOs, private sector	There is limited allocation of funds for biodiversity conservation in the various sectors	Proportion of funds annually budgeted for by line ministries for biodiversity activities Gender-responsive allocation for activities	NEMA MDAs Local governments	MoFPED	40,000,000
			7.2.7 Promote accountability, transparency, gender mainstreaming in implementation of biodiversity projects	These elements are often lacking in biodiversity projects	Biodiversity projects which incorporate aspects of accountability, transparency, gender mainstreaming	NEMA	MoFPED MDAs MWE Local governments	80,000

7.3	**National target**: By 2018, new financing mechanisms are operational and new funding mobilized for biodiversity conservation				**Target 20**: By 2020, at the latest, the mobilization of financial resources for effectively implementing the Strategic Plan for Biodiversity 2011-2020 from all sources, and in accordance with the consolidated and agreed process in the Strategy for Resource Mobilization should increase substantially from the current levels.			
	Key Outcome Indicators: - Trends in funding for biodiversity conservation							
	Strategies	**Action**	**Proposed Activities**	**Baseline 2014**	**Output indicators**	**Lead Agency (target champion)**	**Partner institutions**	**Costs in US$**
	Promote innovative financing mechanism	Identify and implement new financial mechanisms for biodiversity conservation	7.3.1 Put in place an enabling policy or legislative framework for new biodiversity financing mechanisms	No enabling framework in place	A policy or regulations in place	NEMA	MoFPED MDAs Development partners MWE Local governments MoLoG	80,000
			7.3.2 Issue environment bonds	No bonds have been issued	Environment bonds issued and bought	NEMA	MoFPED MWE MoLoG Local governments	2,000,000
			7.3.3 Provide incentives that promote green production and purchase of green goods	No incentives have been articulated	Incentives to promote purchase of green goods identified and provided	PPDA	MoFPED NEMA MDAs NGOs Development partners MWE districts	1,000,000
			7.3.4 Institute appropriate pricing mechanisms for biodiversity goods and services	Pricing mechanisms have not been put in place	Pricing mechanisms put in place for biodiversity goods and services	MoFPED	NEMA NPA MWE	400,000
			7.3.5 Support green marathon	This has not been tried in Uganda	The concept of green marathon promoted and supported	NEMA	MFPED MDAs NGOs Development partners MWE Local governments Private sector	500,000
			7.3.6 Promote green products and technologies	This has not been tried in Uganda	Clear mechanisms identified to promote green products and technologies	NEMA NPA	MoFPED MDAs NGOs Development partners MWE Local governments	300,000

			7.3.8 Support sensitization and capacity development to companies about benefits from ecosystem services	This has not been done	Number of sensitization and capacity building undertaken	NEMA	MoFPED MDAs NGOs Development partners MWE Local governments	300,000
			7.3.9 Enhance payment for ecosystem services and biodiversity offsets	PES and biodiversity offsets are still limited	Increased level of payments for ecosystems services and application of biodiversity offsets	NEMA	MoFPED MDAs NGOs Development partners MWE Local governments	4,000,000

Thematic area 8: New and emerging issues

Strategies and Action Plans for New and Emerging Issues

As mentioned earlier, new and emerging issues are those issues that were not adequately addressed during the formulation of NBSAPI but which have now gained prominence and must be included in the revised version (NBSAPII). Some of these have been integrated in different strategic objectives above while the remaining ones including oil exploration and discovery, biofuels and management of natural disasters are addressed below, conveniently numbered as 8 although not a strategic objective per se:

8.1	**National target**: By 2016, oil exploration and production are being guided by biodiversity friendly regulations				**Related Aichi target 8**: By 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity			
	Key Outcome Indicator: Biodiversity conservation and ecosystem resilience are being maintained adjacent to oil exploration and production areas							
	Strategies	**Action**	**Proposed Activities**	**Baseline 2014**	**Output indicators**	**Lead Agency (target champion)**	**Partner institutions**	**Costs in US$**
	Support ecosystem conservation in oil rich regions of Uganda	Manage negative impacts of oil and gas development on biodiversity	8.1.1Set up environmental standards to limit the production or discharge of harmful (hazardous) wastes or products in sensitive ecosystems	Some of the standards are not yet in place	Ensure that all the required standards have been formulated	NEMA	UWA NFA MDAs UNBS Local governments	250,000
			8.1.2 Strengthen compliance to t EIAs for all petroleum explorations and extractive industries	EIAs being undertaken for all oil activities and communities	All oil and gas activities are being subjected to EIA Communities are aware of EIA results	NEMA	UWA NFA MDAs Local governments	200,000
			8.1.3 Support protection and restoration measures for degraded ecosystems, threatened species and migratory routes in oil exploration and production regions	Some of the ecosystems and species may be adversely affected by oil activities	Affected degraded ecosystem put under restoration activities and special species are protected	NEMA UWA	NFA MDAs Local governments Private sector	300,000
			8.1.4 Routinely improve/update the Sensitivity Atlas for the Albertine Graben	The 2010 version has not yet been updated	The Atlas is routinely updated	NEMA	UWA NFA MDAs Local governments	200,000
			8.1.5 Support comprehensive awareness programmes and information flow regarding petroleum processes and biodiversity	Awareness and information flow is often lacking especially to the communities adjacent to the oil exploration areas	Awareness and information flow is adequately managed	NEMA	UWA NFA MDAs NGOs	200,000
			8.1.6 Build the capacity and mobility of district and municipal environment officers (DEO/MEO) to effectively monitor oil and gas activities	Some DEOs/MEOs lack resources (transport, equipment, budget) for regulation and thus less effective	Resources allocated to DEO/MEOs	NEMA	MoEMD UWA MoLoG Local governments	200,000

			8.1.7 Set up a biodiversity offset trust fund to ensure no net loss biodiversity due to petroleum activities	No biodiversity offset trust fund is presently in place	Biodiversity offset trust fund is available for use when needed	NEMA	MoEMD UWA NFA MDAs NGOs Local governments	500,000
			8.1.8 Examine and implement opportunities for translocation of animals from sensitive areas where oil exploration is already taking place to other PAs	This has not yet been necessary	Translocation to other areas effected where necessary	UWA	MoEMD NEMA NFA MDAs NGOs NEMA Local governments	400,000

8.2	**National target**: By 2018, the development and use of biofuels are widespread in Uganda to complement hydrocarbon fuel sources				**Related to Aichi target 7**: By 2020, areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity			
	Key Outcome Indicator: Proportion of hydrocarbon fuel sources substituted by biofuels							
	Strategies	**Action**	**Proposed Activities**	**Baseline 2014**	**Output indicators**	**Lead Agency (target champion)**	**Partner institutions**	**Costs in US$**
	Promote sustainable use use of biofuels in Uganda	Control production of biofuel	8.2.1Undertake awareness at all levels on the positive and negative impacts of biofuels on biodiversity	Not many Ugandans know about biofuels	Increased area allocated to biofuel crops	NEMA	MDAs MoEMD MWE Local governments	100,000
			8.2.2 Develop a framework that promotes the positive and minimizes the negative impacts of biofuel production on biodiversity	No such a policy framework presently exist	A policy framework in place for production and use of biofuels	MoEMD	NEMA MoEMD MWE Local governments	80,000
			8.2.3 Put in place measures to protect food and energy security of local communities including women and men when introducing biofuel crops	No such measures exist at present	Measures in place	MAAIF Local governments	MDAs MoEMD MWE NEMA	100,000
			8.2.4 Assess and identify areas suitable for biofuel production and areas inappropriate for biofuel production	Such areas have not yet been systematically identified	Suitable and inappropriate areas for biofuel production identified and mapped	NEMA Local governments	MDAs MoEMD MWE Academia	250,000
			8.2.5 Ensure that EIAs are conducted for all biofuel projects and programmes	EIAs have not yet been conducted in the few biofuel production areas	Most biofuel production areas are subjected to EIAs	NEMA Local governments	MDAs MoEMD MWE	100,000
			8.2.6 Promote and support research programmes on biofuels	Very limited research has so far been initiated on biofuels in Uganda	More research on biofuels being undertaken	Academia NARO	MDAs MoEMD MWE NEMA	300,000
			8.2.7 Promote and support the use of environmentally-sound technologies which promote the positive and minimize the negative impacts of biofuel production on biodiversity	Environmentally – sound technologies are not yet being applied without guidance	Environmentally-sound technologies have been identified and are being widely used	NARO Academia	MDAs NEMA NARO MoEMD MWE Local governments	300,000

8.3	**National target**: By 2020, Uganda's biodiversity is reasonably protected from natural disasters				**Related to Aichi target 14**: By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable **Related to Aichi target 15**: By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15 per cent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification			
	Key Outcome Indicator: Disaster Risk management strategy in place to address potential biodiversity risks and hazards							
	Strategies	**Action**	**Proposed Activities**	**Baseline 2014**	**Output indicators**	**Lead Agency (target champion)**	**Partner institutions**	**Costs in US$**
	Minimize the impact of natural disasters on biodiversity	Integrate disaster risk management in biodiversity management	8.3.1 Identify and implement risk management, mitigation and preparedness measures for biodiversity	Such measures have not yet been put in place	Appropriate measures to protect biodiversity in place	OPM	NEMA MWE NGOs MDAs Local governments	400,000
			8.3.2 Develop a Disaster Preparedness, Risk Reduction and Management Plan for protecting biodiversity	There is presently no such a plan for protecting biodiversity	Biodiversity Risk Management Plan in place	OPM	NEMA MWE NGOs MDAs	200,000
			8.3.3 Mainstream Disaster Preparedness, Risk Reduction and Management Plan in key National, sectoral and Districts planning frameworks for protection of biodiversity	There is presently no such a plan to mainstream national, sectoral and district planning frameworks	Disaster Preparedness Plan to protect biodiversity mainstreamed in key national, sectoral and district planning frameworks	OPM	NEMA MWE NGOs MDAs UNMA Local governments	200,000
			8.3.4 Improve disaster management systems, like early warning systems	There are problems of accuracy in prediction of onset of disasters	Reliable early warning systems put in place for dissemination to stakeholders Number of women and men seeking relief services pre/post-disaster	OPM	NEMA MWE NGOs MDAs MGLSD UNMA Local governments	200,000
			8.3.5 Support participatory valuation and management of ecosystem services	The concept of participatory valuation is not yet widely used for disaster management	Active participatory valuation and management of ecosystem services in place in disaster prone areas	NEMA	OPM UNMA MWE NGOs MDAs districts	300,000

			8.3.6 Strengthen the capacity of Disaster Reduction and Management Committees at all levels	The Committees are usually not effective because they are not well facilitated	Effective capacity built in the Disaster Reduction and Management Committees at all levels	NEMA	OPM MWE MFPED NGOs MDAs districts	250,000

The minimum estimated funding for NBSAPII is USD 105,809,000 over the ten year period which is approximately USD10,580,900 annually.

7. IMPLEMENTATION ARRANGEMENTS

7.1 National Coordination

NEMA, which is the CBD Focal Point in Uganda, will be responsible for the over-all co-ordination of the implementation of NBSAPII. The specific role of NEMA will involve overseeing and co-ordinating the implementation of various strategies and actions spelt out in NBSAPII and taking lead in specific actions for which it also a target champion. Other functions of NEMA will include, among others, the following:

a) Acting as an information clearing house on biodiversity through the CHM
b) Providing strategic guidance on biodiversity matters
c) Supporting awareness, communication and outreach on biodiversity
d) Ensuring the integration of biodiversity issues into overall national planning through coordination with the relevant ministries, districts, departments and government agencies
e) Providing secretarial services to the Technical Committee on Biodiversity Conservation
f) Coordinating and monitoring the implementation of NBSAPII
g) Compiling, consolidating and sharing annual reports received from lead agencies and partners involved in the implementation of NBSAPII

7.2 The role of Sectoral Agencies

Sectoral agencies will be responsible for ensuring the implementation of the Sectoral strategies and action plans in the sectors. Specifically they will be responsible for:

a) Implementing and reporting on national biodiversity targets as specified in NBSAPII
b) Providing guidance and support to their respective links at district and local levels to ensure biodiversity issues are addressed
c) Integrating biodiversity issues into their sectoral policies, plans and programmes
d) Monitoring and disseminating information on their activities affecting biodiversity
e) Collaborating with NEMA on relevant issues in NBSAPII
f) Preparing and submitting annual reports on progress of implementation of NBSAPII to NEMA.

7.3 The role of District Local Governments

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

a) Co-ordinating the implementation of the NBSAPII in the District;
b) Formulating and enforcing local policies and bye-laws related to biodiversity conservation and use;
c) Assisting in documenting indigenous knowledge, technologies and practices in biodiversity conservation;
d) Monitoring biodiversity conservation including maintaining and disseminating accurate information;
e) Integrating biodiversity issues in District Environment Action Plans and subsequently incorporating them in District Development Plans;
f) Mobilizing resources, including community contributions, and allocation of resources for the implementation of NBSAPII;

g) Mobilizing local communities, resource use groups, NGOs and CBOs in biodiversity conservation;
h) Identifying vital critical ecosystems, biodiversity hotspots and critical species that need protection and where required ensuring fulfilment of Uganda's obligations to the Convention on Biological Diversity and other related international agreements; and,
i) Preparing and submitting annual reports on progress of implementation of NBSAPII to NEMA.

7.4 The role of Local Communities

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

a) Participation in planning processes such as DEAPs to identify and prioritise issues and actions related to the NBSAPII;
b) Implementing measures and activities geared towards ensuring land improvement and biodiversity conservation and sustainable utilization;
c) Participating in training and capacity - building activities;
d) Sharing information on traditional knowledge, technology and practices with communities and other stakeholders.

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

7.5 The role of NGOs

NGOs will be crucial in NBSAP2 implementation. Their functions, among others, will include:

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

7.6 The role of the Private Sector

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

a) Invest in sustainable and environmentally-sound technologies;
b) Invest in alternative income-generating activities;
c) Contribute resources to support programmes on land management and biodiversity conservation; and,
d) Provide support to the new financing mechanisms proposed in NBSAP2.

8. MONITORING AND EVALUATION

8.1 Rationale for Monitoring and Evaluation of NBSAPII

NBSAPII will be monitored at different levels and intervals with the full involvement of different stakeholders. NEMA will be the lead organization to coordinate monitoring and evaluation of NBSAPII with support of the TCBC. NEMA should take responsibility to compile these reports received from stakeholders to produce an annual state of biodiversity report, which will provide a baseline of implementation and serve as a guide for future strategic planning. Monitoring and evaluation of NBSAPII is critical and will be undertaken for the following reasons:

a) Regular monitoring and evaluation will help to assess the level of progress made by different stakeholders towards achievement of each target in the NBSAPII strategy and action plan. Thus it will guide on areas of progress and areas of neglect and allow NEMA and the TCBD to adjust and strengthen its programmes of intervention as needed.

b) Specifically regular monitoring and evaluation of NBSAPII will provide a platform to identify gaps, opportunities and weaknesses and a basis for revising the NBSAPII when it expires in 2025.

c) Many stakeholders will be involved in the implementation of NBSAPII. Regular monitoring and evaluation will promote the continuous involvement and participation of stakeholders in the implementation of NBSAPII.

d) Monitoring and evaluation of NBSAPII will also serve as part of an ongoing, continuous and cyclical process to align the actions outlined in the NBSAPII strategy to Uganda's long-term development framework as articulated in Vision 2040.

e) Monitoring and evaluation of NBSAPII will help to assess the level of mainstreaming of NBSAP2 into strategic and other plans of different stakeholders or sectors, including the monitoring of gender issues.

f) Substantial funding is required to implement NBSAPII. Regular monitoring and evaluation of NBSAPII will help monitor financial resources set aside for NBSAPII and to identify funding needs for planned biodiversity activities. This will reveal if scarce national resources are being effectively allocated and utilized.

g) As a signatory to the CBD, Uganda is required to present national reports to the Convention every four years on biodiversity measures that have been carried out to implement the provisions of the Convention and the effectiveness of these measures. The information generated through regular monitoring and evaluation of NBSAPII will facilitate this process.

8.2 Key Strategic Aims for Monitoring and Evaluation of NBSAPII

The main strategic aim of the monitoring and evaluation of NBSAPII is to facilitate the effective implementation of planned activities in order to achieve Uganda's national biodiversity goals and Uganda's contribution to international biodiversity targets. The monitoring and evaluation strategy will also track the level of participation and contribution of different women and men stakeholders to the goals of NBSAPII.

In order to ensure impartiality, an independent mid-term evaluation of NBSAPII should be undertaken in 2020. A final evaluation of NBSAPII can then be taken in 2025, by which time it will be possible to assess Uganda's contribution towards the achievement of the CBD Strategic Plan (2011-2020) and the Aichi Targets. The final evaluation will also provide valuable insights, lessons and direction for the development of Uganda's third NBSAP

9. FINANCING AND RESOURCE MOBILIZATION

The minimum cost for implementing the various action plans outlined within this document was carried out to cover the period 2015-2025 which amounted to USD 105,809,000 translating into USD 10,580,900 annually. The Policy Institutional Review, the Biodiversity Expenditure Review, the Financial Needs and Gap Analysis and the Biodiversity Financial Plan which are outcomes of the BIOFIN process as part of the NBSAPII resource mobilization should be referred to for purposes of getting background information to support resource mobilization for implementing NBSAPII. In general terms, funding for NBSAPII will come from various public and private sources. The main sources and financial instruments that can be tackled are detailed in the NEMA Guidelines (2015) and the Biodiversity Finance Plan. These include the following:

9.1 Traditional Financing Mechanisms

Traditional financing mechanisms in Uganda include financial disbursements from the central government, budget support allocations from donors, and trust funds. Biodiversity conservation stakeholders should aim at working with the government, donors and environment conservation trusts to ensure that the funds currently allocated and/or proposed in medium term and long-term expenditure frameworks are maintained.

Funds allocated and/or proposed by government, donors and trusts represent a core source of funding for biodiversity. Therefore stakeholders in government, private sector and civil society will work together to lobby parliament, and the Ministry of Finance, Planning and Economic Development to ensure that the current proposals are at least maintained or at best increased in the medium and long-term.

The key areas of public finance that need to be increased are for the agricultural sector to attain the 10% allocation agreed to by African Union countries. Public financing for the environment and natural resources, tourism, wildlife and antiquities sub-sectors need to be raised. One of the key ways of ensuring better effort in biodiversity conservation is matching sub-sector allocations with releases from the Ministry of Finance as indicated in the Medium Term Expenditure Framework (MTEF).

The Agricultural Sector, ENR and Tourism, Wildlife and Antiquities sub-sector should provide for local government to support biodiversity conservation. This will be achieved when National agencies such as the National Environment Management Authority (NEMA), National Forestry Authority (NFA), and Uganda Wildlife Authority (UWA) provide an allocation for local government activities in the areas of wetlands management, watershed protection and biodiversity conservation, sustainable fisheries management, and tourism development at local government level.

Local governments need to raise the percentage of the local revenue for environment and natural resource management from the current 2-5% to 10%. The financing should go towards improvements in compliance and enforcement, and investments that will generate additional revenue from natural resource management.

9.2 Conservation Trust Funds

The primary benefit of Conservation Trusts is to provide financing for essential conservation services, research and sustainable development, and in many cases, support the integrity of a national park or protected area. Conservation Trusts have become established in national or regional institutions that deliver a range of long-term benefits and services. These include the following: creating economic improvement, opportunities and rural investment to improve quality of life in rural areas; enhancing transparency in project and fund management as well as government accountability; establishing long-term community buy-in to sustain nature; changing local behavior patterns around nature and the environment; building corporate and institutional partnerships; leveraging expertise to attract and manage new sources of funding; and supporting partner NGOs to explore new areas (e.g. incentive payments) and take on additional mission related projects.

Whereas conservation trusts generally fund operating expenses, spend-down or 'sinking' funds, which are typically distributed over three to five years but can extend to 10 years to execute a project or accomplish a specific objective and endowment, providing perpetual funding to sustain a park or protected area. Conservation funds are encouraged to invest in sink-funds as long as these lead to increased productivity and resilience of ecosystems.

9.3 Innovative financing mechanisms

9.3.1 Payments for ecosystem services

In the NEMA Guidelines (2015), a payment for environmental services scheme is defined as (i) a voluntary transaction in which, (ii) a well-defined environmental service (ES), or a form of land use likely to secure that service, (iii) is bought by at least one ES buyer, (iv) from a minimum of one ES provider, and (v) if and only if the provider continues to supply that service (conditionality). The biodiversity conservation options proposed in the guidelines include, but are not limited to purchase of high-value habitat, payment for access to species or habitat, payment for biodiversity-conserving management practices, tradable rights under cap & trade regulations, and support to biodiversity-conserving businesses.

To achieve success with PES systems in biodiversity conservation, it is important to include the following considerations in design:

i) A pro-poor PES program is one that maximizes its potential positive impact and minimizes its potential negative impact on the poor.

ii) Keep transaction costs low. This is important in all PES programs, as it affects their efficiency. Keeping transaction costs low is particularly important when many potential participants are poor, as they will be relatively more heavily affected.

iii) Devise specific mechanisms to counter high transaction costs. When many potential participants are smallholders, transaction costs will inherently be high. Specific mechanisms should be developed to reduce these costs, such as collective contracting.

iv) Provide targeted assistance to overcome problems that impede the participation of poorer households. This may take the form of technical assistance or credit programs, for example.

v) Avoid implementing PES programs in areas with conflicts over land tenure.

vi) Ensure that the social context is well understood, so that possible adverse impacts are anticipated and appropriate remedial measures can be designed.

9.3.2 Biodiversity offsets

Offsets are measures taken to compensate for any residual significant, adverse impacts that cannot be avoided, minimized and/or rehabilitated or restored, in order to achieve no net loss or a net gain of biodiversity. Offsets can take the form of positive management interventions such as restoration of degraded habitat, arrested degradation or averted risk, protecting areas where there is imminent or projected loss of biodiversity.

Developers of large infrastructure projects such as hydroelectric power projects, mines, oil and gas projects and large agricultural production projects will be encouraged to use biodiversity offsets as part of the review of the Environmental Impact Statement (EIS). Results of cost-effectiveness, cost-benefit analyses and other economic instruments will be used to demonstrate the benefits of biodiversity offsets over alternative biodiversity loss mitigation measures. The main stakeholders, beneficiaries or losers, will use available incentives of acknowledgement in publications, international media, websites and use of environmental compliance audit reports and sector reporting to encourage project developers establish biodiversity offsets.

9.3.3 Environmental fiscal reforms

"Environmental fiscal reform" (EFR) refers to a range of taxation and pricing measures which can raise fiscal revenues while furthering environmental goals. EFR measures include (i) taxes on natural resource extraction, (ii) product subsidies and taxes, (iii) taxes on polluting or harmful emissions and (iv) user charges or fees. The feasibility of EFRs depends on: (i) natural resource pricing measures, such as taxes for forests and fisheries exploitation; (ii) reforms of product subsidies and taxes; (iii) cost recovery measures; (iv) pollution charges.

i) **Fiscal instruments** i.e. taxes and subsidies, are mechanisms for raising and transferring funds between sectors. While economic development is critical for lifting people out of poverty and raising living standards for the broader population, it also causes harmful side effects—particularly for the environment—with potentially sizeable costs for the macro-economy.

ii) **Fiscal instruments** (emissions taxes, trading systems with allowance auctions, fuel taxes, charges for scarce road space and water resources, etc.) can and should play a central role in promoting greener growth. Fiscal instruments for biodiversity conservation should be employed based on three criteria: (i) *effective at reducing environmental harm*—so long as they are carefully targeted at the source of the problem (e.g., emissions); (ii) *cost-effectiveness* (i.e. they impose the smallest burden on the economy for a given environmental improvement)—so long as the fiscal dividend from these policies is exploited (e.g., revenues are used to strengthen fiscal positions or reduce other taxes that discourage work effort and investment); (iii) *strike the right balance between environmental benefits and economic costs*—so long as they are set to reflect environmental damages.

iii) **Charge systems:** Charges are defined as payments for use of resources, infrastructure, and services and are akin to market prices for private goods. In Uganda charge systems are used as permits. Charges include pollution charges, user charges e.g. for wetlands, betterment charges (imposed on private property which benefits from public investments), impact fees, access fees and administrative charges

iv) **Financial instruments:** The financial sector is the set of institutions, instruments, and the regulatory framework that permit transactions to be made by incurring and settling debts, that is, by extending credit. *All companies, regardless of sector, both impact on biodiversity and ecosystems and depend on ecosystem services.* There is an important role for the financial sector in this regard, including: the management of biodiversity risks in lending and investment decisions and setting up of new innovative financial mechanisms for pro-biodiversity businesses and biodiversity conservation areas. Business can show leadership on biodiversity and ecosystems:

9.3.4 Performance bonds

Environmental performance bonds and deposit refund systems are economic instruments that aim to shift responsibility for controlling pollution, monitoring, and enforcement to individual producers and consumers who are charged in advance for the potential damage. Performance Bonds require that proponents of environmentally damaging enterprises, such as mining, timber harvesting, and road building, post-performance or assurance bonds. In order to be effective, bonds must be set at a level which accurately reflects all anticipated environmental damages that could result. Government agencies must monitor and enforce compliance effectively. The bonds must be held long enough to ensure the proponents have complied with their obligations.

9.3.5 Green markets through natural resource trade and value chains

Market for green products refers to the trade mechanism for products certified using criteria that support the three objectives of the CBD. Such products are either natural products including wild plant and animal products used as food sources or used for bio-chemicals, new pharmaceuticals, cosmetics, personal care, bioremediation, bio-monitoring, and ecological restoration, or nature-based products involving many industries, such as agriculture, fisheries, forestry, biotechnology based on genetic resources, recreation and ecotourism.

Uganda is promoting green markets products through the organic agricultural value chains, sustainable non-wood and wood forest products, and wildlife products. The NEMA Guidelines (2014) support the outcomes of the National Bio-trade Strategy and draft national organic agriculture policy.

Uganda's priorities under bio-trade are: (i) ecotourism; (ii) wildlife use rights; (iii) non-wood forest products; and natural ingredients; and (iv) carbon trade. Organic agriculture in Uganda has generally focused on agricultural product lines for coffee, cotton and fruits and vegetables. Scenarios have suggested that bio-trade and organic agriculture can grow to up to between 5 and 10% of Uganda's commodity exports.

Bio-trade and organic agriculture in Uganda will be promoted through: (i) community based interventions such as collaborative natural resource management for communities living near protected areas, as well as communities living in biodiversity-rich areas. For farming systems biodiversity conservation seeks to create premiums from certified organic agriculture production; (ii) take advantage of available indigenous traditional knowledge in developing production practices; (iii) promote growth of local and regional markets alongside international markets; (iv) take advantage of favourable climate conditions to promote various products. Therefore semi-arid areas products as well as wet area products should be promoted concurrently. In Uganda's drier areas products such as Gum Arabica, hides and skins, beef and grains will be important products, while coffee, cotton and fish are important for the wetter areas; and (v) there will be a need to attract vocational skills and entrepreneurship training for viable value chains to emerge around product and services produced.

Institutional support will be needed to ensure that products are eligible to compete for markets. The markets in Europe, the United States, Asia and within Africa require appropriate standards attainment, volumes and regularity of supply. Other considerations such as market information, transaction costs and other business skills are acquired through product based entrepreneurship training.

9.3.6 Climate finance

The more frequently implemented carbon projects focus on climate change mitigation. Communities and project developers are urged to implement voluntary carbon standards that have explicit biodiversity conservation criteria such as Plan Vivo, CCB and VCS. For CDM and REDD Plus projects, biodiversity is generally embedded in forestry projects.

Biodiversity conservation stakeholders supporting projects that could affect some form of biodiversity such as wetlands, fisheries, vegetation, insect and animal population as well as agro-ecosystems should seek specific biodiversity criteria. NEMA, UWA and NFA, among others, should indicate this dimension if EIAs are undertaken.

The development of Nationally Appropriate Mitigation Actions (NAMAs) and National Adaptation Plans (NAPs) should make provisions, such as higher scores, where necessary, to convince providers of carbon finance to integrate biodiversity into the carbon projects.

There is a need to work with partners who have a strong interest in biodiversity conservation such as the United States Agency for International Development (USAID), the World Bank, the German, Norwegian, Belgian, Swedish and United Kingdom Governments and other development partners to integrate biodiversity in their climate change support programmes.

Buyers of carbon credits should have the option of buying bundled carbon credits demonstrated. The possible bundled should include carbon, watershed and biodiversity conservation. If premiums are earned, they should be reflected as market incentives to attract more buyers.

There is a need to upscale community carbon finance initiatives and facilities that promote bundled carbon finance with other forms of PES. The early initiatives currently being promoted should be promoted with additional facility support.

9.3.7 The Global Environment Facility and other donor-funded Projects

Uganda has been one of the most successful countries in Africa in attracting funding for biodiversity-related projects through the Global Environment Facility (GEF) and also benefits from excellent bilateral cooperation in the area of biodiversity management with a number of countries. These projects typically play an important role in providing catalytic funding for innovative interventions relating to biodiversity and will directly contribute to the implementation of NBSAP2.

Between 2006 and 2010, Aid allocated to multi-sector cross cutting activities such as environmental management was only 4.2 percent (US$266.4 million) (Development Initiative 2012). This is an average of $53.4 million/year to environment related sectors. However, these calculations include a large amount allocated to the water sub-sector and that the allocations to biodiversity conservation activities is small and was not clearly articulated. Over the last five years, donors have targeted watershed management, tree planting, protected area management, tourism and climate change activities related to biodiversity conservation among others.

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Kakudidi E.K. &. Kabuye C. S. 2006 Needs Assessment, Conservation and Development of Taxonomic Tools in Botany- A National Consultancy Report to BOZONET

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ANNEXES

Annex 1: NEMA Sixth Board of Directors

NO.	NAME	POSITION
1.	Prof. J.H.Nyeko Pen-Mogi	Chairman
2.	Mr. Gideon Badagawa	Vice Chairman
3.	Prof. Elly N. Sabiiti	Member
4.	Dr. Alex Opio	Member
5.	Dr. Wilson Kasolo	Member
6.	Mr. James Lutalo	Member
7.	Mr. Paul Mafabi	Member
8.	Mr. Simon Apolo Lowot Nangiro	Member
9.	Mr. William Ndoleriire	Member
10.	Mrs. Miriam Tumukunde	Member
11.	Ms. Byarugaba B Beatrice	Member
12.	Dr. Tom .O. Okurut	Ex-Officio

Annex 2: The Technical Committee on Biodiversity Conservation

NO.	NAME	POSITION
1.	Prof. Joseph Obua	Chairman
2.	Dr. Gerald Eilu	Member
3.	Dr. Mary Namaganda	Member
4.	Dr. James Kalema	Member
5.	Dr. Esther Katuura Mwebesa	Member
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7.	Mr. Innocent Akampurira	Member
8.	Ms Norah Namakambo	Member
9.	Mr. Michael Opige	Member
10.	Mr. Aventino Bakunda	Member
11.	Mr. Obed Tumgumisirize	Member
12.	Mr. Sabino Francis Ogwal	Secretary

Annex 3: Members of the Thematic Working Groups

Mr. Sabino Francis Ogwal - Overall Coordinator
Natural Resources Management Specialist (Biodiversity and Rangelands)
CBD National Focal Point
National Environment Management Authority (NEMA)
NEMA House 2nd Floor
Plot 17/19/21 Jinja Road
P.O. Box 22255, Kampala, Uganda.
Tel: +256-414-251064/5/8; Mobile: +256-772-517045
Fax: +256-414-257521
E-mail: fogwal@nemaug.org; sabinoframcis@gmail.com

Assistant Coordinators

Dr. Evelyn Lutalo
National Environment Management Authority (NEMA)
P.O. Box 22255, Kampala, Uganda.
Tel: +256-414-251064/5/8; Mobile: +256 772652728
Fax: +256-414-257521
E-mail: elutalo@nemaug.org

Monique Akullo
National Environment Management Authority (NEMA)
P.O. Box 22255, Kampala, Uganda.
Tel: +256-414-251064/5/8; Mobile: +256-754 837935
Fax: +256-414-257521
E-mail: makullo@nemaug.org

Junior Musinguzi
National Environment Management Authority (NEMA)
P.O. Box 22255, Kampala, Uganda.
Tel: +256-414-251064/5/8; Mobile: +256-754310018
Fax: +256-414-257521
E-mail: jmusinguzi@nemaug.org

Consultant

Dr. Bob Humphrey Ogwang
Greenbelt Consult Limited
P.O. Box 24854, Kampala, Uganda.
Mobile: +256-772-841264
E-mail: bogwang@greenbelt.co.ug

A. Thematic Working Group on Policy, Legislation and Institutional Framework

1. **Christine Akello**
   National Environment Management Authority (NEMA)
   P.O. Box 22255, Kampala, Uganda.
   Tel: +256-414-251064/5/8; Mobile: +256 772 595252
   Fax: +256-414-257521
   E-mail: cakello@nemaug.org

2. **Sarah Naigaga**
   National Environment Management Authority (NEMA)
   P.O. Box 22255, Kampala, Uganda.
   Tel: +256-414-251064/5/8; Mobile: +256782 436700
   Fax: +256-414-257521
   E-mail: snaigaga@nemaug.org

3. **Akankwasah Barirega**
   Ministry of Tourism, Wildlife and Antiquities (MTWA)
   Tel: +256-414-341242; Mobile +256-772-831348
   Email: akankwasah@gmail.com/abarirega@tourism.go.ug

4. **Fred Onyai**
   National Environment Management Authority (NEMA)
   P.O. Box 22255, Kampala, Uganda.
   Tel: +256-414-251064/5/8; Mobile: +256772 517303
   Fax: +256-414-257521
   E-mail: fonyai@nemaug.org

5. **Jessica Naiga**
   National Environment Management Authority (NEMA)
   P.O. Box 22255, Kampala, Uganda.
   Tel: +256-414-251064/5/8; Mobile: +256 772 960199
   Fax: +256-414-257521
   E-mail: jnaiga@nemaug.org

6. **Ann Nawe**
   National Environment Management Authority (NEMA)
   P.O. Box 22255, Kampala, Uganda.
   Tel: +256-414-251064/5/8; Mobile: +256 781 551316
   Fax: +256-414-257521
   Email: naweanna@yahoo.com

7. **Akampurira Innocent**
   Uganda National Council for Science and Technology (UNCST)
   Tel: +256 414 705500/+256 312 314800; Mobile: +256 782828271
   Fax: +256 414 234579
   Email: iakampurira@gmail.com

8. **Boaz Musimenta**
   Office of the Prime Minister (OPM)
   Mobile: +256 756500900/773483856
   Email: musiboazi@gmail.com

9. **Moses Opio**
   Oyam District Local Government
   Mobile: +256 772676733
   Email: opiomoses@gmail.com

10. **Margaret Aanyu**
    National Environment Management Authority (NEMA)
    P.O. Box 22255, Kampala, Uganda.
    Tel: +256-414-251064/5/8; Mobile: +256 772984826
    Fax: +256-414-257521
    Email: maanyu@nemaug.org

B. Thematic Working Group on Aquatic and Terrestrial Biodiversity

1. **Obed Tugumisiriza**
   National Forestry Authority (NFA)
   Tel: +256 31 264 035/6, 041 230 365
   Tel: +256 712200141/776 211013
   Fax: +256-414 230 369
   E-mail: obetug@yahoo.com/obedt@nfa.org.ug

2. **Michael Opige**
   Nature Uganda
   P. O Box 27034, Kampala, Uganda.
   Tel.: +256-414-540719, Fax: +256-414-533528; Mobile: +256-712-126126
   Email: michael.opige@natureuganda.org

3. **Justine Namara**
   Uganda Wildlife Authority (UWA)
   P.O.Box 3530, Kampala, Uganda
   Tel: +256 414 355000, +256 312 355000; Mobile: +256772 413432
   Fax: 256 414 34629
   Email: justine.namara@ugandawildlife.org

4. **Aggrey Rwetsiba**
   Uganda Wildlife Authority (UWA)
   P.O.Box 3530, Kampala, Uganda
   Tel: +256 414 355000, +256 312 355000; Mobile: +256772499735
   Fax: +256 414 34629
   Email: aggrey.rwetsiba@ugandawildlife.org

5. **George Lubega**
   National Environment Management Authority (NEMA)
   P.O. Box 22255, Kampala, Uganda.
   Tel: +256-414-251064/5/8; Mobile: +256 705 806055/772 615222
   Fax: +256-414-257521
   E-mail: glubega@nemaug.org

6. **David Ochanda**
   Total E&P Uganda
   Mobile: +256 782 637390
   Email: david.ochanda@total.com/dochanda@hotmail.com

7. **Dr. Festus Bagoora (RIP)**
   National Environment Management Authority (NEMA)
   P.O. Box 22255, Kampala, Uganda.
   Tel: +256-414-251064/5/8; Mobile: +256 772551340
   Fax: +256-414-257521
   E-mail: fbagoora@nemaug.org

8. **Richard Waiswa**
   National Environment Management Authority (NEMA)
   P.O. Box 22255, Kampala, Uganda.
   Tel: +256-414-251064/5/8; Mobile: +256 712079329
   Fax: +256-414-257521
   E-mail: rwaiswa@nemaug.org

9. **Aventino Bakunda**
   Ministry of Agriculture, Animal Industry and Fisheries (MAAIF)
   Department of Fisheries
   Mobile: +256 772592547
   Email: aventino_b@yahoo.com

10. **Dr. Esther Katuura**
    Natural Chemotherapeutic Research Institute (NCRI)
    Mobile: +256 776 977388
    Email: katuurae@gmail.com

11. **Dr. Gerald Eilu**
    Department of Forestry, Biodiversity& Tourism
    Makerere University
    Mobile: +256 772642640
    Email: gerald.eilu@gmail.com

12. **Dr. Grace Nangendo**
    Wildlife Conservation Society (WCS)
    Mobile:+256 782 738248
    Email: gnagendo@wcs.org

13. **Simon Etimu**
    Department of Water Resources Management (DWRM)
    Ministry of Water & Environment
    Mobile: +256 782894075
    Email: simon.etimu@mwe.go.ug/simon.etimu@gmail.com

14. **Norah Namakambo**
    Wetland Management Department (WMD)
    Ministry of Water & Environment
    Mobile: +256 772437447
    Email: namakambo@yahoo.com

15. **Dr. Robert Kityo**
    Makerere University
    Department of Biological Sciences
    Mobile:+256 772945963
    Email: jkalema@botany.mak.ac.ug

16. **Dr. James Kalema**
Makerere University
Department of Biological Sciences
Mobile: +256 772 501291
Email: rkityo@zoology.mak.ac.ug

17. **Michael Mugarura**
Ministry of Water and Environment (MWE)
Climate Change Unit
Mobile: +256 783 215882
Email: mugarura.michael@ccu.go.ug

18. **Isaac Ntujju**
National Environment Management Authority (NEMA)
P.O. Box 22255, Kampala, Uganda.
Tel: +256-414-251064/5/8; Mobile: +256 772699828
Fax: +256-414-257521
E-mail: iigntujju@nemaug.org

19. **Grace Birikadde**
National Environment Management Authority (NEMA)
P.O. Box 22255, Kampala, Uganda.
Tel: +256-414-251064/5/8;
Fax: +256-414-257521
E-mail: kbirikadde@nemaug.org

20. **Mr. Ogwal Sabino Francis**
Natural Resources Management Specialist (Biodiversity and Rangelands)/
CBD National Focal Point – Uganda
National Environment Management Authority (NEMA)
NEMA House 2nd Floor
Plot 17/19/21 Jinja Road
P.O. Box 22255, Kampala, Uganda.
Tel: +256-414-251064/5/8; Mobile: +256-772-517045
Fax: +256-414-257521
E-mail: fogwal@nemaug.org; sabinofrancis@gmail.com

21. **Patrick Musaazi**
Kayunga District Local Government
Mobile: +256 772392684
Email: mpbmusaazi@yahoo.com

22. **Firipo Mpabulungi**
National Environment Management Authority (NEMA)
P.O. Box 22255, Kampala, Uganda.
Tel: +256-414-251064/5/8; Mobile: +256 712417749
Fax: +256-414-257521
E-mail: fmpabulungi@nemaug.org

23. **Solomon Musoke**
Buikwe District Local Government
Mobile: +256 772460327
Email: musokesolomon@gmail.com

24. **Catherine Kiwuka**
Plant Genetic Resource Center (PGRC)
National Agricultural Research Organization (NARO)
Mobile: +256 782678056
Email: kiwukakathyrn@gmail.com

25. **Muhammad Semambo**
Climate Change Unit (CCU)
Ministry of Water and Environment
Kampala, Uganda
Mobile: +256 704993344
Email: medi.semambo@yahoo.com

26. **Margaret Lomoyang**
Karamoja Women Cultural Group
P.O. Box 58, Moroto, Uganda
Mobile: +256772901081
E-mail: mlomoyang@gmail.com; mlomoyang@yahoo.com

27. **Penninah Zaninka**
United Organization for Batwa Development in Uganda
Plot 3 Bazanyamaso Road
P.O. Box 169, Kisoro, Uganda
Tel: +256772 660 810
E-mail: zaninkapen@gmail.com

28. **Issa Katwesige**
Forest Sector Support Department
Ministry of Water and Environment
P.O.Box 7124, Nakawa, Kampala, Uganda
Tel: +256-414-340684
Mobile: +256-782-432048
Email: issakatwesige@gmail.com

C. Thematic Working Group on Biotechnology and Biosafety

1. **Dr. Evelyn Lutalo**
National Environment Management Authority (NEMA)
P.O. Box 22255, Kampala, Uganda.
Tel: +256-414-251064/5/8; Mobile: +256 772652728
Fax: +256-414-257521
E-mail: elutalo@nemaug.org

2. **Gilbert Gumisiriza**
Uganda National Council Science and Technology (UNCST)
Tel: +256 794-012525
Email: g.gumisiriza@uncst.go.ug

3. **Christine Kasedde**
National Environment Management Authority (NEMA)
P.O. Box 22255, Kampala, Uganda.
Tel: +256-414-251064/5/8; Mobile: +256 702 833813
Fax: +256-414-257521
E-mail: ckasedde@nemaug.org

4. **Elizabeth Mutayanjulwa**
   National Environment Management Authority (NEMA)
   P.O. Box 22255, Kampala, Uganda.
   Tel: +256-414-251064/5/8; Mobile: +256 772 411245
   Fax: +256-414-257521
   E-mail: emutayanjulwa@nemaug.org

5. **Arthur Makara**
   SCIFODE
   Tel: +256 712 935664
   Email: makakraauthur@yahoo.co.uk/scifode@scientist.com

6. **Dr. David Hafashimana**
   National Agricultural Research Organization (NARO)
   Bulindi Zonal Agricultural Research and Development Institute,
   P.O.Box 101, Hoima, Uganda
   Tel (Off.): +256- (0) 465443276 Mobile: +256- 782 964 358 / +256-750576280
   Email (Off.) bulindizardi@yahoo.com
   Email (private): davidhaf2000@yahoo.com

7. **Dr. Andrew Kiggundu**
   National Agricultural Research Organization (NARO)
   National Agricultural Research Laboratory, Kawanda
   Mobile: +256 772516652
   Email: akiggundu@kari.go.ug

8. **Annet Bukirwa**
   National Environment Management Authority (NEMA)
   P.O. Box 22255, Kampala, Uganda.
   Tel: +256-414-251064/5/8
   Mob. +256-772842214
   E-mail: abukirwa@nemaug.org

9. **Anne Nakimbugwe (RIP)**
   Mukono District Local Government
   Mobile: +256 772470285
   Email: mariannekavuma@yahoo.com

10. **Monique Akullo**
    National Environment Management Authority (NEMA)
    P.O. Box 22255, Kampala, Uganda.
    Tel: +256-414-251064/5/8; Mobile: +256-754 837935
    Fax: +256-414-257521
    E-mail: makullo@nemaug.org

D. Thematic Working Group on Biodiversity for Poverty Eradication and National Development

1. **Aaron Werikhe**
   National Planning Authority (NPA)
   Mobile: +256 774693761
   E-mail: aronwerikhe@yahoo.com

2. **Ronald Kaggwa**
   National Environment Management Authority (NEMA)
   P.O. Box 22255, Kampala, Uganda.
   Tel: +256-414-251064/5/8;
   Fax: +256-414-257521
   E-mail: rkaggwa@nemaug.org

3. **Eva Mutongole**
   National Environment Management Authority (NEMA)
   P.O. Box 22255, Kampala, Uganda.
   Tel: +256-414-251064/5/8; Mobile: +256 756709292
   Fax: +256-414-257521
   E-mail: emutongole@nemaug.org

4. **Dr. Dismas Mbabazi**
   National Agricultural Research Organisation (NARO)
   National Fisheries Resources Research Institute (NaFIRRI)
   Aquaculture Research & Development Centre - Kajjansi
   P.O.Box 530, Kampala (Uganda)
   Tel: +256414375668 (Off.) Mobile: +256-772-393452
   Fax: +256-434-120192
   Email: mbabazidismas@yahoo.com or mbabazi@firi.go.ug or mbabazidismas@gmail.com

5. **Martin Wamwaya**
   National Environment Management Authority (NEMA)
   P.O. Box 22255, Kampala, Uganda.
   Tel: +256-414-251064/5/8; Mobile: +256-772-590-522
   Fax: +256-414-257521
   E-mail: mwamwaya@nemaug.org, wamwayamartin@yahoo.com

6. **Junior Musinguzi**
   National Environment Management Authority (NEMA)
   P.O. Box 22255, Kampala, Uganda.
   Tel: +256-414-251064/5/8; Mobile: +256 754 310018
   Fax: +256-414-257521
   E-mail: jmusinguzi@nemaug.org

7. **Dr. Daniel Babikwa**
   National Environment Management Authority (NEMA)
   P.O. Box 22255, Kampala, Uganda.
   Tel: +256-414-251064/5/8; Mobile: +256772 667066
   Fax: +256-414-257521
   E-mail: dbabikwa@nemaug.org

8. **Wilberforce Turyamubona**
   National Environment Management Authority (NEMA)
   P.O. Box 22255, Kampala, Uganda.
   Tel: +256-414-251064/5/8; Mobile: +256 772 520125
   Fax: +256-414-257521
   E-mail: wturyamubona@nemaug.org

9. **Francis Mwaura**
   Economic Policy Research Centre (EPRC)
   Makerere University
   Email: mwaura@eprc.org

10. **Naomi Obbo**
    National Environment Management Authority (NEMA)
    P.O. Box 22255, Kampala, Uganda.
    Tel: +256-414-251064/5/8; Mobile: +256 774 391306
    Fax: +256-414-257521
    E-mail: nobbo@nemaug.org

11. **Shirley Aiik**
    National Environment Management Authority (NEMA)
    P.O. Box 22255, Kampala, Uganda.
    Tel: +256-414-251064/5/8
    Fax: +256-414-257521
    E-mail: saiik@nemaug.org

12. **Joy Kagoda**
    National Environment Management Authority (NEMA)
    P.O. Box 22255, Kampala, Uganda.
    Tel: +256-414-251064/5/8; Mobile: +256 772440706
    Fax: +256-414-257521
    E-mail: jkagoda@nemaug.org

13. **Francis Waiswa**
    Uganda Export Promotion Board (UEPB)
    Email: wasachief@gmail.com

14. **Menyha Emmanuel**
    Uganda Bureau of Statistics (UBOS)
    Mobile: +256 772 889554/711 706094
    Email: emenyha@gmail.com

15. **Angella Rwabutomize**
    Ministry of Finance, Planning and Economic Development (MFPED)
    Tel: +256 414 707193 Mobile:+256 752537988
    Email: angella.rwabutomize@finance.go.ug

16. **John Lotyang**
    Moroto District Local Government
    Mobile: +256 782740147/752740147
    Email: j-lotyang@yahoo.com

Annex 4: Participants for the Gender Mainstreaming workshop

LIST OF PARTICIPANTS FOR GENDER MAINSTREAMING IN BIODIVERSITY WORKSHOP, 13th – 14th June 2016					
No.	**Name**	**Sex**	**Designation**	**Organisation**	**Contacts**
Women organisations					
1.	Yossa Daisy	F	Program Officer	ACFODE	yossa@acfode.org 0775 454 461
2.	David J. Nkwanga	M	Director	Nature Palace Foundation	naturepald@gmail.com 0772 625 963
3.	Gertrude Kenyangi	F	Executive Director	Support for Women in Agriculture - SWAGEN	ruralwomenug@yahoo.com 0711685332
4.	Ebuu M. Odwong	M	Projects Coordinator	Women & Child Advocacy Network (WACANE)	martineebuu@gmail.com 0772 946 225
5.	Kamya Ronald	M	Projects Coordinator	Karma Rural Women's Development Organization (KRUWODO)	ronkamya@gmail.com
6.	Adrine Kirabo	F	Program Coordinator	ECOTRUST	adkirabo@gmail.com 0774 087 452
7.	Mulimira Hormisdas	M	Program Officer	AWEPON	mulimira@yahoo.com 0755 609 994
8.	Hannah Awot	F	Member	Uganda Women Entrepreneurs Association	0772400657 hanawot@gmail.com
9.	Katusiime Rhita	F	Program Officer	CEEWA - UG	info@ceewa.org 0774 010 556
10.	Carolyne Gift Nakajubi	F	Program Assistant	Environmental Alert	giftcarolyne@gmail.com 0774 441 031
11.	Nantege Robinah	F	Social Scientist	MW/WMD	matoovuronah@yahoo.com 0704 601 698
12.	Miwanda Bagenda	F	Project Manager	Mama Water Africa Foundation	mbagenda@yahoo.com 0778 372 461
13.	Harriet Gimbo	F	Program Director	Action Aid	Harriet.gimbo@actionaid.org Info.uganda@actionaid.org
14.	Zaninka Peninah	F	Coordinator	UOBDU - Kisoro	zaninkapen@yahoo.com 0772 660 810
15.	Agwang Sarah Jesca	F	Program Coordinator	UWONET	Sarah.jesca@gmail.com 0782 688 743
16.	Betty Iyamuremye	F	Programm Coordinator	UWOPA	bettyiyamuremye@gmail.com 0756 444 443

17.	Mugisha Grace	F	Director	Kyibumba Young Women Community Development Initiative	Mugishamaria4@gmail.com 0783387541
18.	Santa Laker	F	Vice Chairperson	Uganda Women Entrepreneurs Association	refeal2014@gmail.com
19.	Ednace Kiiza	F	Programme Coordinator	ActionAid	Ednance.kiiza@actionaid.org 0772562381
20.	Patrick Byakagaba	M	Lecturer	School of Forestry - MUK	Byaks2001@yahoo.com 0782 563 709
21.	Abbo Evelyn	F	C/P BOD	Women and Rural Development Network	lynnaeve@yahoo.com 0759713137
22.	Annet Kabarungi		Senior Gender Officer	Gender & Women Affairs Department	Akabarungi@yahoo.com 0703205353
23.	Florence Kasule N.S	F	Executive Director	AWEPON	ssebbowaflorence@rocketmail.com 0772 496 431
24.	Anguparu Monica		Program Development Specialist	CARE	manguparu@co.care.org 0758 379 874
25.	Francis Ogwal	M	CBD Focal Person	NEMA	+256-772-517045 fogwal@nemaug.org, sabinofrancis@gmail.com
26.	Sarah Naigaga/ Christine Akello	F	CAM/LO	NEMA	cakello@nemaug.org
27.	Yoonkyung Shin	F	Programme Analyst	UNDP CO - KAMPALA	Yoon-kyung.shin@undp.org
IUCN					
28.	Cotlida Nakyeyune	F	Programme Officer	IUCN/Uganda Office	Cotilda.nakyeyune@iucn.org 0772 602697
29.	Sandra Amongin	F	Programme Assistant	IUCN/Uganda Office	Sandra.amongin@iucn.org 0788842936
30.	Doreen Ruta	F		Independent Consultant	0772 449 042
31.	Owren Cate	F	Senior Gender Officer	IUCN Global Gender Office	Cate.OWREN@iucn.org
32.	Margaux Granat	F	Climate Change Policy specialist	IUCN Global Gender Office	Margaux.GRANAT@iucn.org
33.	Tanya Mcgregor	F	Gender Specialist	CBD	tanya.mcgregor@cbd.int

Annex 5: Mainstreaming NBSAP in policies, strategies, plans and programmes

A. Mainstreaming NBSAP in stakeholder policies, strategies, plans and projects

Mainstreaming is the focus and central issue of the CBD Biodiversity Strategy 2011-2020. The international community has realised that it is not possible to achieve greater results in implementation of biodiversity strategies without effective mainstreaming.

The complex and intricate linkages between biodiversity and poverty eradication in Uganda demand that great attention be given to mainstreaming biodiversity concerns into all development sectors and programmes. Investment in sound conservation and sustainable utilisation of biodiversity in Uganda not only makes economic sense, but is also important for developing new opportunities to help overcome poverty, improve health and livelihoods for the marginalised and rural poor. The mainstreaming of biodiversity must thus take place at all levels of government and society. Mainstreaming can target two main levels:

- Improved understanding among decision and policy makers of the linkages between biodiversity, poverty and economic development; and,
- Integration of biodiversity into national, regional, local and sectoral policies, plans, strategies and budgets

B. The current status of mainstreaming biodiversity in Uganda

a) Biodiversity has been mainstreamed into NDP – mainly on ecosystem restoration – wetlands, forests
b) The sector (outside forestry, wetlands and wildlife) in which biodiversity conservation is mainstreamed most is the energy sector – hydropower development, oil and gas sub sectors
c) Biodiversity is among the key issues assessed during the EIA process for proposed energy projects
d) The energy policy has provisions on environment which includes biodiversity
e) Collaborative natural resource management and revenue sharing are embedded in legislation on environment
f) Aspects of offset is being taken on board especially energy projects and especially hydropower projects
g) The CSOs/NGOs contributing to mainstreaming biodiversity in development activities
h) Biodiversity conservation is an integral part of REDD initiatives

C. Elements of biodiversity that needs to be mainstreamed

Income opportunities from the sustainable use of biodiversity: For biodiversity to be given a greater value by society there is a need to continuously provide evidence of its intrinsic value, both to the economy and wider development. Evidence on the number of biodiversity-related jobs created; the values of various ecosystem services; biodiversity-based income generating activities; and the contribution of biodiversity to poverty reduction needs to be continuously measured and communicated to decision-makers to mobilize resources and political will (see activity 1.1.4).

Ecosystem services and their importance for human well-being: Ecosystems provide both tangible and non-tangible benefits essential for human survival and development. Therefore the link between developmental processes and ecosystem services needs to be mainstreamed and emphasized in sectoral plans and activities to ensure conservation of biodiversity and the integrity of ecosystem functioning and processes (see activity 1.1.6).

Complex terminology, which requires simplification for common understanding,: Biodiversity is a term that is poorly understood outside of the scientific community and technical experts. The need to make biodiversity messages more practical and accessible by simplifying jargon and scientific terms is

a crucial means to address this problem, and will foster improved understanding of the term by non-technical stakeholders and day-to-day resource managers (see CEPA strategy in strategic objective 5).

Sustainable utilization of resources/ biodiversity / ecosystem services: Sustainable utilisation of natural resources is a cornerstone of Uganda's approach to biodiversity conservation and provides the strategic link between conservation and long-term equitable benefit sharing. Sustainable utilisation thus needs to be promoted across all sectors (see sections … in action plan).

Fair and equitable benefit-sharing from the use of biodiversity with special emphasis on genetic resources: Access and benefit sharing is considered a key instrument to ensure that communities benefit from the commercialisation and use of their natural resources. Institutional structures; increased funding and mechanisms for research and development; and increased awareness are all necessary so that the potential of ABS can be harnessed (see strategic objective 4 Section 6.3.4).

D. Approach to mainstreaming

A three phase approach to mainstreaming biodiversity is proposed as presented in Table 7 below covering:

Phase 1: Making the case: poverty-biodiversity linkages

Phase 2: Integrating biodiversity into national development processes

Phase 3: Building implementation capacity

Table 20: Simplified approach to mainstreaming biodiversity

Phase 1: Preparatory phase: Making the case: Poverty-Biodiversity linkages	Phase 2: Integrating biodiversity into national development processes	Phase 3: Building implementation capacity
Preliminary assessments Review policy processes Identify key poverty-biodiversity linkages Show contribution of biodiversity to economic development	**Country-specific evidence** Integrated ecosystem assessment Economic analysis and valuation studies	**Poverty-biodiversity monitoring** Indicators and data collection
	Influencing policy processes National processes NDPs/MDGs/Vision 2040	**Budgeting and financing for biodiversity management** Budget processes and finance options
Awareness raising and partnership building General Consensus and commitment	**Policy interventions and programme integration of biodiversity** Strategies and policy reforms	**Policy and programme implementation** Sectoral and local implementation
Institutional and capacity development Undertake needs assessment	**Institutional and capacity development** Targeted capacity building	**Institutional and capacity development** Longer-term strengthening
Stakeholder engagement and in-country donor coordination **Involve lead agencies and other actors**: Environment, finance, planning, statistics, Parliament, Inter-sectoral committees **Non-Governmental Actors**: Academic Institutions, private sector, civil society, media, and general public **Donors**: Bilateral and Multi-lateral in-country donors		

E. Institutional framework for mainstreaming

Mainstreaming requires a well-defined institutional framework to coordinate the effective integration of biodiversity issues into sectoral plans and strategies. The TWG and TCBDC are appropriate structures to convey the importance of biodiversity to the different sectors and to facilitate improved coordination of activities. It is furthermore a useful platform for integrating biodiversity considerations and opportunities into national, sectoral and local policies, plans and programmes, including those relating to poverty eradication, socio-economic development, health and natural resource management. Some of these institutions have been described in Chapter 1 of the NBSAP. Special mention should be made on the Ministry of Finance, Planning and Economic Development as well as the National Planning Authority as these are extremely crucial for the success of any mainstreaming effort.

F. Tools for mainstreaming

A variety of tools will be pursued through NBSAP2 to effectively mainstream biodiversity issues across the Ugandan society, including the following:

- **Sensitization of key stakeholders:** Communication and Dissemination is a key tool for the successful mainstreaming of biodiversity. This area is covered extensively in Objective 5 (CEPA strategy).
- **Valuations of Biodiversity and Ecosystem Services**: Economic evaluations of biodiversity and ecosystem services are important tools to demonstrate the importance of biodiversity to other stakeholders and decision makers. Valuations of biodiversity through natural resource accounts has been carried out in Uganda in a few isolated studies but not on a regular basis and the results are not adequately fed into the conventional national economic accounts or disseminated to key stakeholders. This is a key target area for improvement under NBSAP2.
- **Penalties:** Possible mechanisms for penalties and incentives must be investigated as part of the implementation of mainstreaming. Penalties should be linked to strict law enforcement around issues such as permits and quotas for the harvesting of natural resources as well as the enforcement of environmental management plans for entities such as companies and local authorities. Strengthened legislative instruments and enforcement capacity to promote sustainable development through EIAs. EIAs are mandatory for all activities that have significant negative impacts on the environment. They include environmental descriptions of the project area and the potential environmental impacts of the particular development. EIAs have been useful in improving our knowledge of local biodiversity including plant and animal species. A major challenge for the successful implementation of EIAs is that their outcomes and resulting environmental management plans are weakly monitored by NEMA and lead agencies due to limited funding as well as their limited enforcement capacity.
- **Decentralization Process:** Through the Decentralization Policy (1993), Government empowered Districts to plan at the district and lower local government levels and to manage environmental and sectoral natural resources such as forestry and wetlands. With this process lies an opportunity for effective implementation of NBSAPII at District and grass roots level through the District Development Plans and Sub-county Development Plans.

NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY (NEMA)
NEMA House Plot 17/19/21 Jinja Road
P.O. Box 22255 Kampala Uganda
Tel: +256 -414-251064/5/8;
Fax: +256 -414-257521
Email: info@nemaug.org
Website: http://www.nemaug.org