THE REPUBLIC OF UGANDA

NATIONAL BIODIVERSITY STRATEGY AND ACTION PLAN III (2025-2030)

ADVANCE COPY

Theme: Conservation and sustainable use of biodiversity for inclusive wealth creation

NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY (NEMA)
P.O. Box 22255
Kampala Uganda
info@nema.go.ug
https://www.nema.go.ug/

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Anne Lilian Nakafeero
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Design and layout
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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 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

It is with great pride and a profound sense of responsibility that I present Uganda's National Biodiversity Strategy and Action Plan (NBSAP III) for the period 2025-2030. Since Uganda ratified the Convention on Biological Diversity (CBD) on September 8, 1993, it has made significant strides in her commitment to preserving the country's rich natural heritage. As a Party to several important Protocols under the CBD, including the Cartagena Protocol on Biosafety and the Nagoya Protocol on Access to Genetic Resources and Benefit Sharing, Uganda stands at the forefront of global efforts to ensure conservation and sustainable use of our biodiversity. In pursuit of this goal, Uganda developed its first National Biodiversity Strategy and Action Plan in 2002, which provided a framework for action over a decade. The Plan was further refined with the introduction of NBSAP II (2015-2025).

I am proud to introduce NBSAP III which aligns with the Kunming Montreal Global Biodiversity Framework (KMGBF), that was adopted during the fifteenth meeting of the Conference of the Parties to the CBD. NBSAP III reflects our unwavering commitment to the conservation and sustainable use of the country's rich biodiversity. NBSAP III not only establishes national targets that align with the global goals and the global targets outlined in the KMGBF; it is also designed as a flexible framework that respects Uganda's unique priorities and capacities. Our vision remains clear: to maintain a rich biodiversity that benefits both present and future generations, advancing the socio-economic development of our country. The overarching goal of NBSAPIII is to enhance biodiversity conservation, reduce biodiversity loss and ensure equitable sharing of benefits arising from utilization of genetic resources.

NBSAPIII is an integral component of our National Development Plan IV and aligns with our National Vision 2040, incorporating government priorities and the developmental agenda that is pivotal for our nation's progress. Importantly, NBSAP III embraces a whole-of-government and whole-of-society approach, ensuring inclusivity and gender responsiveness. It is also designed for seamless integration into sectoral plans, making it easier to implement within existing mandates. Moreover, to support the mobilization of necessary resources, we have developed a National Biodiversity Finance Plan, which underscores our commitment to financing our biodiversity initiatives sustainably.

In conclusion, I call upon all ministries, departments, agencies (MDAs), local governments, academic and research institutions, non-governmental organizations (NGOs), civil society organizations (CSOs), the private sector, development partners, individuals, and the general public to join hands in supporting the successful implementation of NBSAP III. Together, let us safeguard Uganda's biodiversity for the benefit of generations to come.

For God and my country.

Hon. Sam Mangusho Cheptoris
MINISTER OF WATER AND ENVIRONMENT

ACKNOWLEDGEMENTS

The National Biodiversity Strategy and Action Plan (NBSAPII) III has been developed through extensive consultations with a diverse range of stakeholders, embodying a collaborative whole-of-government and whole-of-society approach. On behalf of the Government, I would like to express my sincere gratitude to the Global Environment Facility (GEF) for the financial support, facilitated through the United Nations Environment Programme (UNEP), in developing NBSAP III. I appreciate UNEP's assistance in helping Uganda to secure the funds from GEF as well as the support by the United Nations Development Programme (UNDP) that made possible for Uganda to develop the road map for implementing the Kunming Montreal Global Biodiversity Framework.

I would like to extend my gratitude to the Board of Directors of NEMA for their invaluable guidance throughout the development of NBSAP III. Furthermore, I acknowledge the contributions made by the National Focal Points of various Multilateral Environmental Agreements (MEAs) and extend my gratitude to the Uganda Country Office of the United Nations Food and Agricultural Organisation (FAO) as well as the Center for International Forestry Research and World Agroforestry (CIFOR-ICRAF) for their financial support and collaboration.

I thank all the experts, representatives of Government institutions, the private sector, indigenous peoples and local communities (IPLCs), Civil Society Organisations (CSOs), Non-Government Organisations (NGOs), cultural institutions and professional bodies for the time they committed in developing NBSAPIII and for their valuable input. I am particularly grateful to the following institutions/organizations for their active participation in developing this NBSAPIII:

Ministry of Agriculture, animal Industry and Fisheries
Ministry of East African Community Affairs
Ministry of Energy and Mineral Development
Ministry of Finance, Planning and Economic Development
Ministry of Gender, Labour and Social Developmemnt
Ministry of Lands, Housing and Urban Development
Ministry of Tourism, Wildlife and Antiquities
Ministry of Water and Environment
National Agricultural Research Organisation
National Biodiversity Data Bank
National Chemotherapeutics Research Institute
National Forestry Authority
National Forestry Resources Research Institute
National Planning authority
Uganda National Council for Science and Technology
Uganda National Meteorological Authority
Uganda Wildlife Authority
Busitema University
Makerere University
Buikwe District Local Government
Jinja City Local Government
Jinja District Local Government
Kayunga District Local Government
Mukono District Local Government
Wakiso District Local Government
Buganda Kingdom

United Organisation for Batwa Development in Uganda
Karamoja Women Cultural Group
Ecotrust
Environmental Alert
Global Youth Biodiversity Network-Uganda Chapter
Jane Goodall Institute, Uganda
Nature Uganda
Private Sector Foundation of Uganda
Total Energies Limited
Uganda Biodiversity Fund
Uganda Manufacturers' Association
Uganda Youth Biodiversity Network
Wildlife Conservation Society
World Wide Fund for Nature
Youth Go Green Uganda
International Union for the Conservation of Nature
United Nations Development Programme
United Nations Food and Agricultural Organisation

Finally, I would like to express my gratitude to the team of National Environment Management Authority (NEMA) led Mr. Francis Sabino Ogwal, the CBD National Focal Point, for his outstanding coordination and leadership in the development of NBSAPIII on behalf of Government of Uganda. I also extend my thanks to Ms. Anne Nakafeero and Mr. Patrick Elolu for their invaluable support to the CBD National Focal Point throughout the process of developing NBSAPIII.

Barirega Akankwasah, PhD
EXECUTIVE DIRECTOR
NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY

EXECUTIVE SUMMARY

The Government of Uganda is committed to the conservation and sustainable utilization of the country's biological resources, recognizing the crucial ecosystem services that biodiversity offers for sustainable development, wealth and job creation, and improvement of the livelihoods of local communities. The National Biodiversity Strategy and Action Plan (NBSAP) serves as the primary mechanism for implementing the Convention on Biological Diversity (CBD) and its Protocols in the country. NBSAP establishes a comprehensive framework for the government to fulfill its obligations under the CBD and the Protocols adopted under the Convention, set conservation priorities, direct investments, and strengthen the capacity needed for effective biodiversity conservation and sustainable use in the country.

At the fifteenth meeting of the Conference of the Parties to the CBD (COP 15), the Kunming-Montreal Global Biodiversity Framework (KMGBF), comprising four global goals and 23 targets adopted. Under Decisin 15/6 Parties committed themselves to revising and updating their NBSAPs and to submit them through the clearing-house mechanism by the sixteenth meeting of the Conference of the Parties. Uganda's revision of its NBSAPII reflects its dedication to these goals while establishing its own national biodiversity targets. Moreover, through a process of gender mainstreaming, Uganda has prioritized social and gender considerations in its NBSAP revisions, thereby implementing essential aspects of the CBD Gender Plan of Action.

In conducting the revision and updating their NBSAPs, Parties were strongly encouraged to ensure that national targets not only address the goal and targets of KMBGF but also to reflect a coherent strategy that takes resource availability and implementation capabilities into account. To effectively contribute to KMGBF goals and targets, specific actions, policies, and programs were to designed, considering critical spatial, temporal, and financial dimensions. In addition, the revision process taking into account the use of headline indicators, as well as relevant complementary, supplementary and national indicators to monitor progress and track towards implementation of KMGBF goals and targets, while taking national circumstances into account.

NBSAP III outlines national biodiversity targets that conform to the guidance from decision 15/6 and the Implementation Plan for the Cartagena Protocol on Biosafety 2022. These targets establish a framework for assessing progress in the execution of NBSAPIII, with designated champions responsible for their implementation. In addition, NBSAPIII is aligned with the Sustainable Development Goals (SDGs), recognizing the significant role of biodiversity in advancing implementation of SDGs in Uganda. The priority areas identified in NBSAPIII are also aligned with the National Vision 2040, the Sustainable Development Goals (SDGs), and the National Development Plan (NDP) IV. The NBSAP III has been mainstreamed in NDP IV.

NBSAP III addresses critical issues in biodiversity conservation and management, including protected areas, access to genetic resources and benefit sharing, digital sequence information on genetic resources, invasive species, pollution, restoration, climate change, sustainable use, mainstreaming, biotechnology, gender, youth, indigenous peoples and local communities, spatial planning and resource mobilization. NBSAPII also address habitat loss - particularly in wetlands and forests - driven by the conversion of natural spaces for commercial developments and habitat degradation. Other vital concerns covered by the NBSAP III include human-wildlife conflicts, encroachment into protected areas, agricultural expansion and illegal wildlife trade. Socio-economic challenges such as population growth, gender inequality, and poverty that complicate biodiversity conservation efforts are given due consideration.

The vision of Uganda's NBSAPIII is "Rich biodiversity benefiting the present and future generations." Its goal is to "To enhance biodiversity conservation, reduce biodiversity loss and ensure equitable sharing of benefits arising from utilization of genetic resources" This will be achieved through seven strategic objectives, namely:

1. To increase the connectivity, integrity and resilience of ecosystems
2. To harness biotechnology for socio-economic transformation with adequate safety measures for human health and environment
3. To promote inclusive, fair and equitable sharing of benefits arising from utilization of genetic resources, including digital sequence information on genetic resources, and of traditional knowledge associated with genetic resources
4. To strengthen stakeholder co-ordination, inclusive participation, partnerships and frameworks for biodiversity conservation
5. To facilitate and build capacity for research, technology development, innovation, monitoring and knowledge management
6. To enhance stakeholder awareness, education and stewardship of biodiversity conservation
7. To promote innovative and sustainable funding solutions for implementing NBSAPIII

Each of the Strategic objectives is tied to an Action Plan stretching from 2025 to 2030. The minimum cost for implementing NBSAP III over the 5-year period (2025-2030) is estimated at USD105,809,000 annually. This is very modest considering the importance of biodiversity to Uganda's economy and sustainable livelihoods of local communities including women and men. Resource mobilization will be central to implementation of NBSAPIII and in this regard a National Biodiversity Finance Plan was developed currently with the review and updating of NBSAP II to NBSAP III. The development of NBFP was informed by the Policy Institutional Review (PIR), the Biodiversity Expenditure Review (BER) and Financial Needs and Gap Analysis.

Funding by Government and resource mobilization from all sources including bilateral and multi-lateral, Global Environment Facility (GEF), the Global Biodiversity Framework Fund (GBFF) and the Multilateral Benefit Sharing Fund from the Use of Digital Sequence Information; Conservation Trust Funds; payments for ecosystem services; biodiversity offsets; ecological fiscal transforms; performance bonds; green markets through natural resource trade and value chains; Climate finance; private sector; Non-Government Organisations and blended finance.

NBSAPIII has a dynamic five-year lifecycle, with a comprehensive review conducted following the implementation phase of the KMGBF. A mid-term review is expected to be carried out in 2027. The National Environment Management Authority (NEMA) is responsible for overall coordination and monitoring of progress of implementation of NBSAP III. Designated institutions responsible for implementing national targets, referred to as "target champions," will lead the implementation efforts and report on advancements toward achieving the targets in their jurisdiction.

1.0 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 1.1). 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).

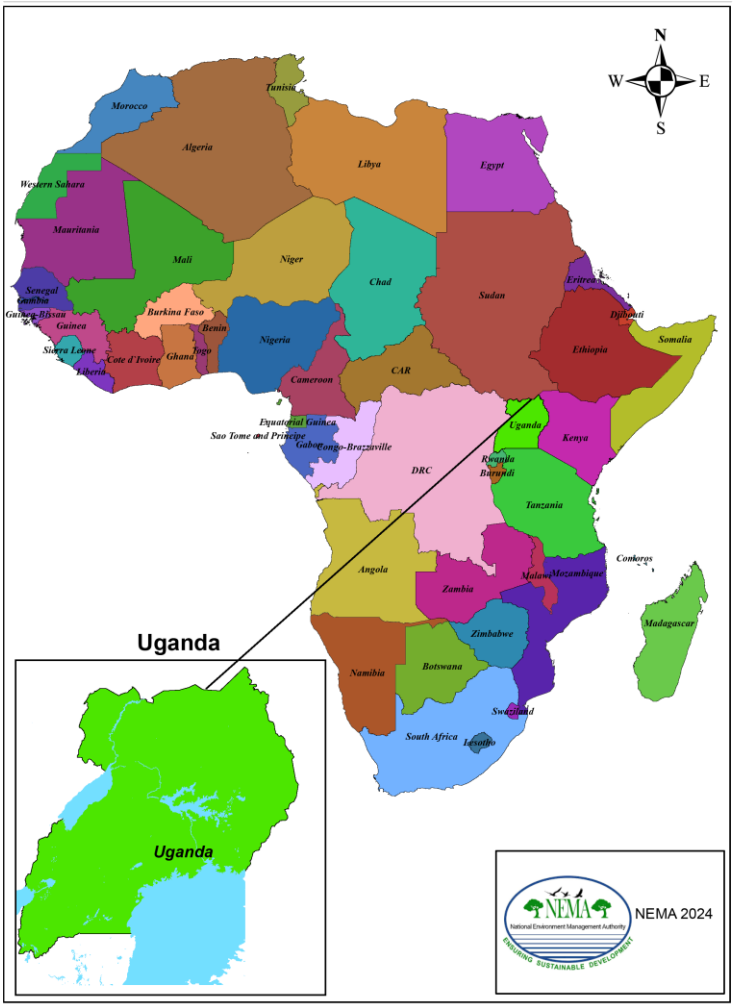

Figure 1.1: Location of Uganda in Africa

1.1.1 Status and trends of biodiversity in Uganda

Uganda's location in a zone between the ecological communities that are characteristic of the drier East African savannas and the moister West African rain forests, 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.

1.1.1.1 Biodiversity at the Species level

Uganda is a country gifted by nature with extraordinary diversity of biological resources. 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 (Uganda Wildlife Policy, 2014). Uganda has 322 species listed as threatened in the IUCN Red List, 2024; which includes plants 158, mammals 32, birds 33, reptiles 8, amphibians 2, fishes 55, molluscs 17 and other invertebrates 17.

According to the Red list of Threatened Species in Uganda Report (2018), the total number of species per taxa found to be nationally threatened in Uganda are; 77 species of mammals, 83 birds, 31 reptiles, 19 amphibians, 44 dragon flies, 184 butterflies and 99 plant species. Of these, 110 species are critically endangered, 174 endangered and 253 vulnerable (MTWA, 2023)

Knowledge of the species present is confined to the more known taxa such as birds, mammals, butterflies, higher plants, reptiles, amphibians and fish (Table 1.1). This is because of their relative conspicuousness and economic importance. Little is known about the less conspicuous ones including important forms such as below ground biodiversity.

Table 1.1: Recorded flora and fauna species in Uganda

Taxon	Total number of species	% of global species	No. of globally threatened spp
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)

1.1.1.2 Biodiversity description based on taxa

Uganda has approximately 380 mammal species and is ranked 13th in the world in terms of mammal species richness (IUCN RED Data List 2008). The number of mammal species including mountain gorilla (Figure 1.2) and chimpanzees (Figure 1.3) has been changing due to local extinctions and introductions (UWA, 2010). In terms of 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 1.2: The mountain gorilla in Bwindi Impenetrable National Park (Photo credit: Uganda Wildlife Authority)

Figure 1.3: Orphaned and rescued chimpanzees at Ngamba Island Chimpanzee Sanctuary (Photo credit: Chimpanzee Sanctuary and Wildlife Conservation Trust)

1.1.2 Biodiversity of Fish

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 nurse and *N. bredoi* currently constitute about 80% of fish biomass in Lake Albert. The most common fish species in almost all the water bodies is the Lungfish (*Protopterus aethiopicus*).

	*Laciris pelagica* This small species with a maximum length of 8 cm (total length) is endemic to the deep waters of Lake Edward. For this reason, its presence in the lake is not known to many people including fishermen. Source: The Freshwater Biodiversity Portal for the Fishes of Uganda (https://freshwaterbiodiversity.go.ug/species/?code=VQNTHK48)
	*Haplochromis* (*Neochromis*) *simotes* This species is endemic to the middle of Upper Victoria Nile, between Kirindi and Kakindu, a stretch of about 20 km of the Nile River that connects Lakes Victoria and Kyoga. The species is a flagship species in this part of the River Nile that is undergoing heavy modification by hydro-electric power dams. The species Endangered on the national red list for the fishes of Uganda and Data Defient on IUCN red list. Source: The Freshwater Biodiversity Portal for Uganda (https://freshwaterbiodiversity.go.ug/species/?code=3F1XO645)

Figure 1.4: *Blaciris* and *Haplochromissimotes* - endemics of Lakes Edward and Victoria respectively.

1.1.3 Conservation status of Amphibians and Reptiles in Uganda

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 species is near threatened, 1 species critically endangered and 1 species (Northern clawed frog) is extinct while 3 species are data deficient (NBI, 2010). There are an estimated 150 reptile species in Uganda including the 3 horned chameleon (Figure 1.5) which represent approximately 1.5 % of total global species but very little is currently known about these taxa (NBI, 2010). The conservation status of these two classes of Amphibians and Reptile is shown in the table 1.2 below.

Table 1.2: Conservation status of amphibia and reptilia in Uganda

IUCN STATUS	Amphibia species	Reptilia species
CR = Critically Threatened	01 (*Arthroleptides dutoiti*)	06 (including *Trionyx triunguis*)
EN = Endangered	06	04
VU = Vulnerable	06	06
NT = Near Threatened	08	06
LC = Least Concern	48	73
DD = Data Defficient	11	80

(MTWA, 2023)

Figure 1.5: The three horned chameleon in the Rwenzori Mountain National Park

1.1.4 Plant Genetic Resources

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 (Table 1.3). PGR is distributed across the diverse ecological zones of Uganda. 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. Fifty-eight Ugandan taxa of higher plants are listed on the Global Red Data List by IUCN. 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).

Table 1.3: 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)

1.1.5 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 1.4 shows the diversity of common livestock species in Uganda.

Table 1.4: 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 “labor” 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)

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. 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.

At the National Gene Bank, more than 5,000 accessions are being conserved in both the active (short term storage 5°C) and base (long term storage -20°C) collections (Figure 1.6). The bank ensures that seeds placed in storage are of the highest quality and achieve maximum longevity. The seeds are occasionally regenerated to ensure their genetic integrity is maintained. Species whose seed cannot survive desiccation and very low temperature levels (referred to as recalcitrant) are conserved in the botanic gardens as live collections. The germplasm held is available for different users on request. The bank includes a database on all stored collections in the Uganda National Gene Bank under priority activity of ex situ conservation.

Figure 1.6: A display of part of the 5000 accessions comprising 102 species of Plant Genetic Resources Conserved at the Plant Genetic Resources Centre (Photo credit: Plant Genetic Resource Centre)

Figure 1.7: Collecting millet wild relatives for conservation and research at the PGRC. Such material has potential to provide genes tolerant to water stress and other climatic vagaries for crop improvement

Figure 1.8: The giant lobelia in Rwenzori mountains national park (Photo credit: Speciation Clock)

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). There are 296 species of lichens in Uganda represented in 51 genera. These represent 1.6% of world species (NBI, 2010). Uganda houses 8.999 species of insects (1.2% of the global species) in 3,170 genera (NBI, 2010).

1.1.6 Biodiversity in protected areas

Uganda's rich biodiversity is distributed across both terrestrial and aquatic habitats. In the early 1930's Government created Central Forest Reserves. These offered important habitats for wildlife. Around 1950s and 1960s, Government established a network of national parks and game reserves to protect wildlife. Government prohibited settlement, cultivation and hunting in the national parks and Game Reserves. Queen Elizabeth and Murchison Falls and Kidepo Valley were the first three National Parks established in early 1950's.

Two of the national parks namely Bwindi Impenetrable and Rwenzori Mountains National Parks are also inscribed as World Heritage Sites while Queen Elizabeth and Mount Elgon National Parks are recognized as Man and Biosphere Reserves by UNESCO in recognition of the importance of man as part and parcel of these ecosystems. Uganda has 12 Ramsar sites, namely: Lake George, Lake Mburo-Nakivali Wetland System (LMP), Lake Bisina Wetland System (BSN), Lake Nakuwa Wetland System (NKW), Lake Opeta Wetland System (OPT), Lutembe Bay (LTB), Mabamba Bay Wetland System (MBB), Murchison Falls-Albert Delta Wetland System (MFP), Nabajjuzi Wetland System, Rwenzori Mountains (RM) and Sango Bay-Musambwa-Kagera Wetland System.

Most of the biodiversity is found in natural forests, but a considerable number is also found in other natural ecosystems such as mountains, savannahs, wetlands, lakes and rivers. Protected Areas (PAs) in Uganda mainly fall under two resources, namely forestry and wildlife. Out of a total surface area of 241,551 sq. 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. Uganda has 10 National Parks, 12 Wildlife Reserves, 10 wildlife sanctuaries, 5 community wildlife areas, 506 central forest reserves and 191 local forest reserves.

Uganda's wildlife conservation areas are very rich in biodiversity comprised of 405 species of mammals, 177 species of reptiles, 119 species of amphibians and approximately 1,000 bird species in Uganda's wildlife conservation areas (UWA, 2012). There are three local extinctions among the large mammals, namely, Oryx, southern black rhino and Derby's eland (UWA, 2012).

1.1.7 Wildlife population

Uganda is a home to a number of the wild animals including the elephant (Figure 1.9), Giraffe (Figure 1.10), and the Buffalos (Figure 1.11). In the 1970s, wildlife in Uganda faced drastic decline due to heavy commercial poaching following breakdown of law and order that characterized the country in the 1970s and early 1980s. A number of aerial surveys conducted from 1980-1983 reported drastic decline in wildlife in general, and Elephants in particular, throughout the protected areas (Eltringham and Malpas 1980, 1983; Douglas Hamilton et al 1980). Throughout the 1970s, Elephants in Uganda were intensively hunted for their ivory to supply an expanding international ivory market (Eltringham and Malpas 1980). Over the period 1979-1985, there was continued and increased slaughter of

Elephants and other wildlife in protected areas with automatic weapons due to civil wars and political instability (Edroma 1984). By 1980 the Elephant population in Queen Elizabeth National Park had declined from the 1960s estimates of 2,500-4,000 to just 150 and from 12,000 to 1,420 in Murchison Falls National Park (Douglas-Hamilton et al 1980).

When National Resistance Movement Government came into power in 1986, Uganda enjoyed greater political stability and peace. Government embarked on securing wildlife protected areas and rebuilding tourism infrastructure. This included expansion of a network of national parks in which six forest reserves namely Kibale, Semliki, Mount Elgon, Rwenzori Mountains, Bwindi Impenetrable and Mgahinga Gorilla hitherto managed by the defunct Uganda Forest Department were upgraded to national park status. To enhance protection, reduce encroachment and restore degraded habitats, Government implemented institutional reforms that saw the creation of Uganda Wildlife Authority (UWA) in 1996 through the merger of the defunct Uganda National Parks with the Uganda Game Department. This was a key turning point in the conservation history of the country. UWA was established to manage wildlife within and outside protected areas

Government has over the years implemented re-stocking programmes. The previously extinct rhino of the southern white subspecies was introduced into the country in 2006. To date, there are 38 southern white rhinos at Ziwa Rhino Sanctuary in Nakasongola District and another two (2) at Uganda Wildlife Education Centre. The carrying capacity for Ziwa Rhino Sanctuary is about 40 individuals. Government intends to relocate some individuals to previous home ranges including the Ajai Wildlife Reserve and other suitable sites. Management and relocation of rhinos is guided by the National Rhino Conservation and Management Strategy (2018) and Habitat Suitability Assessment Report (2020).

Government has also conducted several wildlife translocation exercises to restock key protected areas with local wildlife species. Successful translocations of zebra, topi, impala have been executed in Katonga Wildlife Reserve from Lake Mburo. Similar restocking involving waterbuck, Jackson's hartebeest and giant forest hog has been done for Kabwoya Wildlife Reserve ,Uganda kob, giraffe for Kidepo Valley National Park (15 giraffe relocated from Murchison to Lake Mburo National Park (multiplied to 60 to date)and giraffe and impala from Murchison to Pian Upe Wildlife Reserve.In Murchison Falls National Park, 15 giraffes were successfully moved from the northern bank to the southern bank in 2017 to expand their range and the number of giraffes has since increased to 23 in about five years.

Wildlife Populations have steadily increased for some key species since late 1980s despite the decline in numbers observed in the 1970s and early 1980s (Table 1.5). The elephant population has for instance increased from 2,000 in late 1983 to 7,975 individuals by 2020; buffaloes have increased from 25,000 (1983) to over 40,000 by 2020; giraffe population increased from an estimate of 250 individuals in 1995 to over 2,000 in 2020 and many others. Lions on the other hand have declined from a population of about 490 in 2010 to an estimated 350 in 2022 due to several factors including habitat loss, poisoning by livestock farmers and illegal trade in lion body parts.

Figure 1.9: An elephant in Murchison Falls National Park (Photo credit: Uganda Wildlife Authority)

Figure 1.10: The giraffe in Kidepo Valley National Park (Photo credit: Uganda Wildlife Authority)

Figure 1.11: A buffalo in Lake Mburo National Park (Photo credit: Uganda Wildlife Authority)

Some species especially the Beisa Oryx, Lord Derby's eland, northern white rhino and eastern black rhino have become extinct in the country mainly due to poaching of the 1970s and 1980s. Government imported 4 southern white rhinos from Kenya and 2 from Disney Wildlife Zoo (USA) in 2006 to start a breeding program for re-introduction of rhinos in the national parks. The rhinos have been breeding very well at the rhino sanctuary and the population is now 37 rhinos at the sanctuary. Government has commenced processes to introduce some of these rhinos to Ajai Wildlife Reserve and Kidepo Valley National Park. Meanwhile, Total Energies which is involved in oil and gas exploration and activities in the Albertine Graben that also includes part of Murchison Falls National Park has under their Net Gain commitment to government of Uganda agreed to support Government in re-introducing the eastern black rhinos into Murchison Falls National Park. Uganda is on track in having the rhinos back into the wildlife protected areas in the coming two to three years. Table 1.5 gives the population estimates of key wildlife species in Uganda.

Table 1.5: Population estimates of selected key wildlife species in Uganda

Species	1960s	1982-1983	1995-1996	1999-2003	2004-2006	2000-2010	2011-2014	2015-2017	2020 - 2022
Buffalo	60,000	25,000	18,000	17,800	30,308	21,565	36,953	36,900	44,163
Burchell's Zebra	10,000	5,500	3,200	2,800	6,062	11,814	11,888	11,900	17,516
Elephant	30,000	2,000	1,900	2,400	4,322	4,393	5,739	5,700	7,975

Rothschild's Giraffe	2,500	350	250	240	259	984	880	880	2,072
Hartebeest	25,000	18,000	2,600	3,400	4,439	4,099	9,667	9,700	17,274
Hippopotamus	26,000	13,000	4,500	5,300	7,542	6,580	5,838	6,000	10,165
Impala	12,000	19,000	6,000	3,000	4,705	33,565	33,565	33,600	53,636
Topi	15,000	6,000	600	450	1,669	845	2,222	492	2,713
Ugandan Kob	70,000	40,000	30,000	44,000	34,461	54,861	77,759	80,000	175,590
Waterbuck	10,000	8,000	3,500	6,000	6,493	12,925	12,222	13,000	22,244
Common Eland	4,500	1,500	500	450	309	1,409	1,351	1,800	2.492
Grant's Gazelle	1,800	1,400	100	50	0	0	57	60	750
Roan Antelope	700	300	15	7	0	5	118	150	190
Beisa Oryx	2,000	200	0	0	0	0	0	0	0
Lord Derby's Eland	300	0	0	0	0	0	0	0	0
Northern White Rhino	300	20	0	0	0	0	0	0	0
Eastern Black Rhino	400	150	0	0	0	0	0	0	0
Southern White Rhino					8	11	17	22	38
Lion						408	493	493	350
Mountain Gorilla				320	302		400	400	459
Chimpanzee				4,950	4,950	4,950	4,950	5,000	5,072

(Source: MTWA, 2023)

1.1.8 Biodiversity outside protected areas

It 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. The existing land tenure systems of land holdings, leasehold and customary holdings offer little incentive for protection and management of biodiversity outside PAs. The bulk of the forests (64%) in Uganda are found on private land (NFA, 2011) which is outside protected areas. Private landowners and communities could play a significant positive role in managing forest biodiversity in Uganda given the right incentives to do so. 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.

1.1.9 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.

1.1.10 Below ground 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 1.6 below.

Table 1.6: Major species of soil micro flora in Uganda

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

Source: NBSAP (2002)

1.1.11 Conservation status of birds in Uganda

Over 1,057 bird species occur in Uganda including the African fish eagle (Figure 1.12) and the Shoebill (Figure 1.13) and this is mainly because of a high diversity of habitats that makes Uganda one of the countries with high bird species diversity compared to its size in Africa (MTWA, 2023). The habitats include forests, woodlands, grasslands, agricultural lands, wetlands and open waters. Africa is estimated to have 2,477 species (BirdLife International, 2018). According to BirdLife International (2014), Uganda has 24 (2%) globally threatened bird species and 29 (3%) near-threatened species and the rest of the species are of least concern. The globally threatened species include 9 endangered species namely; the three vulture species, White-backed Vulture, Rüppell's Vulture and Hooded Vulture, and the Grey-crowned Crane species and 15 vulnerable species. The conservation status of

the 1057 bird species (Table 1.7 and table 1.8).

Table 1.7: Conservation Status of Birds in Uganda

Total Bird Species	**1,057**
Extinct	0
Extinct in the Wild	0
Globally Threatened	24
Critically Endangered	0
Endangered	9
Vulnerable	15
Near Threatened	29
Least Concern	1,004
Land birds	847
Migratory Birds	236
Breeding Endemic	1
Water birds	140

(Source: NEMA, 2016)

Table 1.8: Globally threatened Birds of Uganda: EN= Endangered, VU= Vulnerable

Scientific name	**Common name**	**Red List Category**
Acrocephalus griseldis	Basra Reed-warbler	EN
Apalis karamojae	Karamoja Apalis	VU
Ardeola idea	Madagascar Pond-heron	EN
Balaeniceps rex	Shoebill	VU
Balearica regulorum	Grey Crowned-crane	EN
Bradypterus graueri	Grauer's Swamp-warbler	EN
Bucorvus leadbeateri	Southern Ground-hornbill	VU
Chloropeta gracilirostris	Papyrus Yellow Warbler	VU
Circaetus beaudouini	Beaudouin's Snake-eagle	VU
Cryptospiza shelleyi	Shelley's Crimson-wing	VU
Eremomela turneri	Turner's Eremomela	EN
Falco fasciinucha	Taita Falcon	VU
Gyps africanus	White-backed Vulture	EN
Gyps rueppelli	Rüppell's Vulture	EN
Hirundo atrocaerulea	Blue Swallow	VU
Muscicapa lendu	Chapin's Flycatcher	VU
Necrosyrtes monachus	Hooded Vulture	EN
Polemaetus bellicosus	Martial Eagle	VU
Pseudocalyptomena graueri	African Green Broadbill	VU
Psittacus erithacus	Grey Parrot	VU
Ptilopachus nahani	Nahan's Partridge	EN
Sagittarius serpentarius	Secretarybird	VU
Torgos tracheliotos	Lappet-faced Vulture	VU

Trigonoceps occipitalis	White-headed Vulture	VU

Source: BirdLife International (2014) Country PROFILE: Uganda. Available from: http://www.birdlife.org/datazone/country/uganda. Checked: 2018-05-23

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.

The Grey Crowned Crane is also on the decline globally and is listed as Endangered on the IUCN Red List. In Uganda, its habitat (seasonally flooded wetlands) is seriously degraded and quickly disappearing. However, they are also under threat from illegal trade and domestication. Records since 2000 show signs of recovery due to increased public awareness, a national crane species action plan was developed and is being implemented to protect the species.

Figure 1.12: The African fish eagle in Lake Mburo National Park (Photo credit: Nature Uganda)

Figure 1:13: The Shoebill in Mamaba wetlands, a Ramsar site (Photo credit: Nature Uganda)

1.1.12 Conservation status of insects in Uganda

Uganda has a wide spectrum of insects with over 1400 recorded butterfly species, over 100 species of Emperor months, over 115 species of hawkmoths, 240 species of dragonflies, 300 species of grasshoppers, several species of dung beetles, several species of bees (including honey bees and 3 stingless bee species) and several species of flies (MTWA, 2023). Insects (e.g. ants, beetles, Lepidoptera and grasshoppers, are potential ingredients for animal feed and human food, provide pollination services (e.g. bees, Lepidoptera, coleopterea and dipteral), biodegradation services (beetles such as Tenebrio molitor), commercial enterprises (bee hive products, pheromones and sericulture),ecotourism ('buttermonths' excursions, 'odontours' and green house exhibitions), biocontrol agents (e.g. dragoneflies), pests and vectors (veterinary, agriculture and medical) and forensic.

1.1.13 Forests

Forests play a crucial role in human well-being and environmental health, providing essential goods such as medicines, edible fruits, and game meat, while also serving as a source of income for over a billion people worldwide. In Uganda, the significance of forests is evident through the presence of approximately 506 Central Forest Reserves (CFRs), covering an expansive 1,262,090 hectares. These forests are classified into four main groups: Central Forest Reserves, Local Forest Reserves, Community Forests, and Private Forests.

Uganda's tropical forests are also very rich in biodiversity and 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 specie. 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.

In 1990 over 24% of Uganda's land surface was covered by forests. This coverage declined to less than 9.5% by 2015, implying that, considerable wildlife ranging areas and habitats have been lost

through deforestation and this further means that wildlife that depends on forests as their key habitat has been affected. However, the area increased by three percent from 2017 to 2019 (Table 1.9) attributed to the restoration policies of leasing degraded national forest land to private individuals for tree planting.

Table 1.9: Status of Forest ecosystem in Uganda.

Type	**1990**	**2000**	**2005**	**2010**	**2015**	**2017**	**2019**
Forest Cover	4,933,730	3,786,547	3,604,219	2,199,309	1,938,990	2,505,266	2,729,159
Land Area	20,465,767	20,474,477	20,448,880	20,466,001	20,405,110	20,409,126	20,454,009
Forest % of land area	24.1%	18.5%	17.6%	10.7%	9.5%	12.30%	13.3%

(**Source:** NEMA, 2022)

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, 2019). 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.

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.

d) Encroachment especially in the savanna woodland for the purpose of agricultural expansion and pastures for livestock grazing.

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. In addition, other good policies are impartial for example they at times lack public participation while other substantive laws lack subsidiary implementation.

1.1.14 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).

The coverage of wetlands in 1994 was at 15.6%, 2015 at 13% and 2021 at 13.9% of Uganda's surface area (Figure 1.14). The intact wetland covers as recorded in 2021 is 9.3% compared to 8.9% intact cover in 2015 indicating a positive trend and this is attributed to several efforts including awareness raising, demarcation and restoration of wetlands.

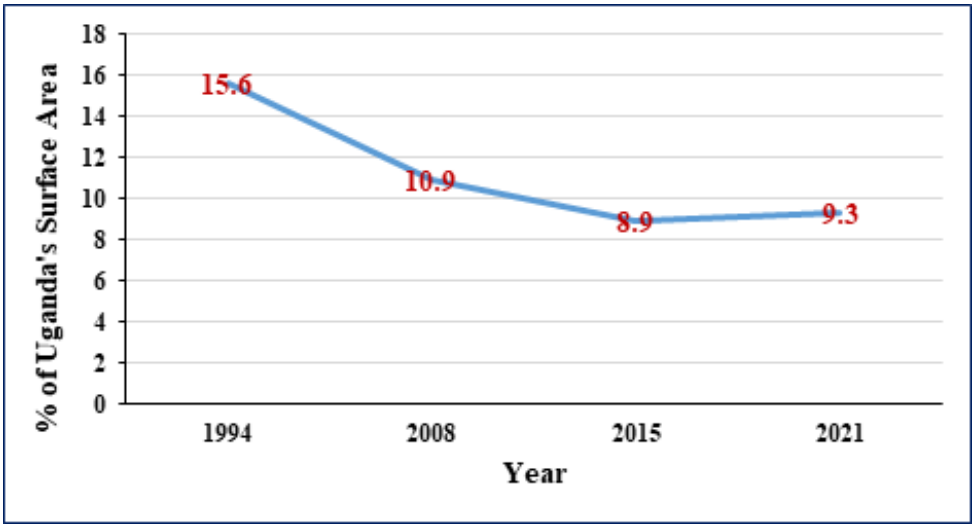

Figure 1.14: Coverage of intact wetlands in Uganda in 1994, 2008, 2015, and 2021(Source: State of wetland report, 2021).

The wetlands form part of the eight main drainage basins in Uganda namely; Albert Nile, Aswa, Lake Edward, Lake Kyoga, Kidepo, Lake Victoria, Victoria Nile and Lake Albert. Wetland cover is presently estimated at 10% of the country's area, or about 26,000 km^2 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 overfishing, 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

2.0 BIODIVERSITY AND HUMAN WELLBEING IN UGANDA

2.1 Introduction

Biodiversity is fundamental to human well-being, a healthy planet, and economic prosperity for all people, including for living well in balance and in harmony with Mother Earth. We depend on it for food, medicine, energy, clean air and water, security from natural disasters as well as recreation and cultural inspiration, and it supports all systems of life on Earth. Thus biodiversity underpins human wellbeing through the ecosystem services is provides namely provisioning, regulating, supporting and cultural services. The Millennium Assessment (MA) report (2006) categorized them as; provisioning, regulating, supporting and cultural services. The provisioning services, that are the most known provide basic needs for human survival such food, freshwater, wood and fibre and fuel. The regulating services on the other hand are responsible for functions such as water purification, climate regulation, flood control, carbon sequestration and control of disease. The Supporting services are the basis for the function and the maintenance of other services such as nutrient cycling, soil formation and primary production. While cultural services consist of aesthetic, spiritual, educational and recreational service.

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 also supports 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 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).

2.2 Fisheries sector

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 2015 and 2022. In terms of export revenue, fish and fish products earned Uganda US$ 174.164 million in 2019, declining slightly to US$ 124.9 in 2020/21 and US$ 116.2 million in 2021/22 (Figure 2.1) (UBOS, 2023). 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*.

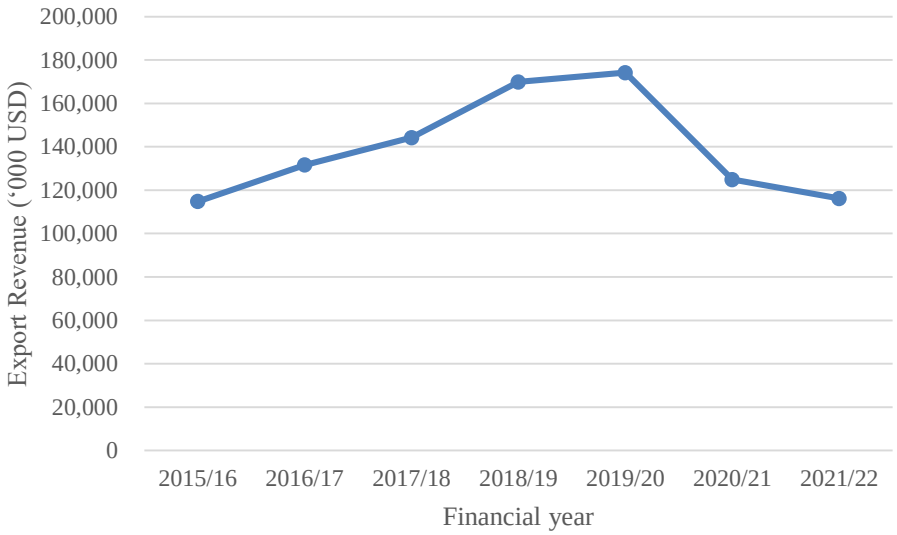

Figure 15: Trend in fish catches in Uganda from 2015 - 2021.

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.

In Uganda an estimated 1,000,000 – 1,500,000 people 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.

In the financial year 2021/22, the fishing sector displayed a positive trend, with a 0.3 percent growth in value added, contrasting the 8.8 percent decline observed in the preceding financial year, 2020/21. In terms of nominal prices, the sector generated a value addition of 3,298 billion shillings in 2021/22, slightly lower than the 3,351 billion shillings recorded in 2020/21. Despite this, fishing activities contributed 2 percent to the GDP in 2021/22, showing a marginal decrease of 0.3 percentage points from the 2.3 percent contribution observed in 2020/21. The fishing sector encompasses activities such as freshwater lake and river fishing, as well as fish farming.

Uganda holds the position of Africa's third-largest aquaculture producer, following Egypt and Nigeria, and secures the second-largest spot in Sub-Saharan Africa, as indicated by research by Egessa et al. in 2022. The country has witnessed a significant shift in aquaculture dynamics, notably with the rise of Nile tilapia cage aquaculture. This transformation, coupled with a favorable international market standing, has attracted investor attention, leading to a notable increase in Nile tilapia production.

Consequently, Nile tilapia has surpassed catfish production in Uganda.

The production landscape reflects this shift, with Nile tilapia currently standing as the foremost cultured species in the country. This trend has been consistent since 2016, with Nile tilapia consistently outpacing African catfish in terms of production volume. The estimated production figures for 2020 underscore this shift, with African catfish registering 37,488 tons, whereas Nile tilapia dominated with an estimated production of 86,011 tons (Figure 2.2).

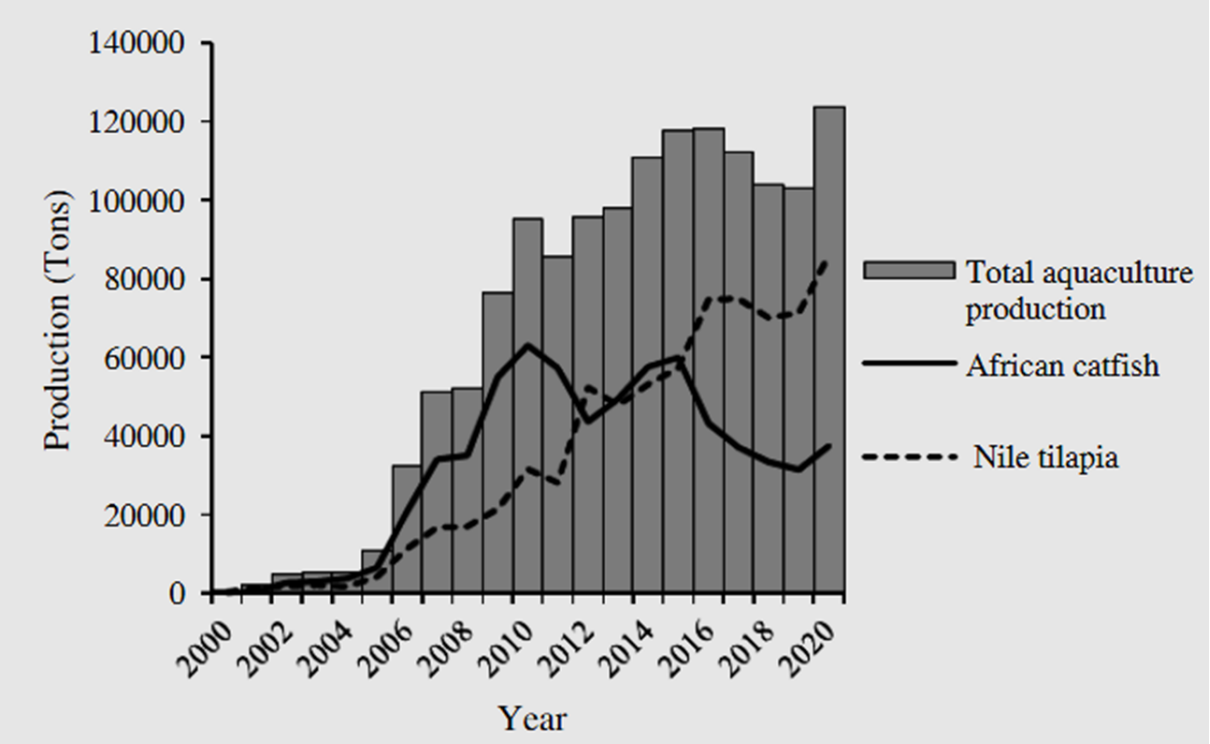

Figure 16 Trends in annual aquaculture production (tons) in Uganda (2000-2020) (Egessa et al., 2022).

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.

There has been a gradual increase in catches from 2001 (220,700 metric tons) to 2016 (467,530 metric tons) although anomalies of high catches occurred in 2004-2005 (434,800 - 416,800 metric tons) and 2011 (493,840 metric tons). However, catches declined sharply between 2017 and 2018 (345,800 metric tons) (Table 2.1). This decline has been attributed to overfishing and use of illegal and an unregulated fishing gears that have caused a decline in the fish stocks.

Table 10: Fish Catch by water body (‘000 tons) 2001-2018

Year	Lake Victoria	Lake Albert	Lake Kyoga	Lake Edward, George, Kazinga Channel	Lake Wamala	Albert Nile	Other water bodies	Total
2001	131.80	19.60	8.40	6.40	-	-	4.50	220.70
2002	136.10	9.40	5.60	5.20	-	-	5.60	221.90
2003	175.30	9.50	2.90	5.90	-	5.60	8.30	247.50
2004	253.30	56.40	68.50	9.60	-	6.40	40.60	434.80
2005	253.30	56.40	68.40	9.60	-	5.00	24.10	416.80
2006	215.90	56.40	60.00	8.80	-	5.00	21.10	367.20
2007	223.10	6.40	0.00	8.80	-	5.00	21.00	374.30
2008	219.50	56.50	60.00	8.80	-	-	20.00	364.80
2009	221.30	6.50	60.00	8.80	-	-	20.00	366.60
2010	162.93	55.81	1.71	4.50	5.60	5.20	10.30	396.05
2011	175.82	163.95	61.59	5.30	75.11	5.00	7.08	493.84
2012	185.00	52.56	44.05	5.21	5.71	5.04	9.55	407.12
2013	193.00	60.00	40.00	6.25	4.50	5.50	10.00	419.25
2014	245.00	152.00	38.00	6.25	4.59	5.39	10.50	461.73
2015	238.63	149.04	41.77	6.35	4.19	5.12	9.77	454.87
2016	252.80	148.16	40.71	6.64	3.96	5.38	9.88	467.53
2017	133.23	171.77	41.54	3.07	5.06	2.54	9.32	366.53
2018	138.04	148.64	40.13	3.07	4.30	2.79	8.82	345.80

(Source : DFR, NaFIRRI, 2016; NSoER, 2016/2017; MAAIF, UBOS, 2019)

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.

Aquaculture production in Uganda faces various pressures that impact its sustainability and growth.

These pressures include environmental challenges such as water pollution, habitat destruction, and climate change. Additionally, the industry is influenced by socio-economic factors including inadequate infrastructure, and fluctuating market demand. These pressures have notable impacts on production including water quality deterioration which affect fish health and growth, the habitat destruction may result in the loss of critical breeding grounds for fish species.

A number of responses have been initiated in Uganda's aquaculture sector to address the pressures and mitigate their impacts. Government and non-governmental organizations are working towards improving water management practices, promoting sustainable farming techniques, and implementing regulations to curb environmental degradation. Efforts are also being made to develop market linkages to improve socio-economic conditions for aquaculture practitioners.

2.3 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.

2.3.1 Plant and animal genetic resources

PGR for food and agriculture are the biological basis of world food security and, directly or indirectly support the livelihoods of every person on earth. The PGR for food and agriculture in Uganda range from little known indigenous wild fruits and vegetables, pastures and forages, medicines, indigenous staples like millets and sorghum to introduced crops such as maize, tobacco, cotton, and beans. These form the basis for the livelihoods of most Ugandans in terms of both food security and sources of income.

In terms of domestic animal diversity: livestock production in Uganda contributes 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).

More than 5,000 seed accessions comprising vegetables, indigenous fruit species, gum, cereals, crop wild relatives, legumes, forage and oil crops are being conserved in the Uganda National Gene Bank operated by the center. The germplasm conserved ex-situ includes those of most traditional crops including sorghum, maize, finger millet, pearl millet, cowpea, beans, groundnuts, sweet potato and

cassava. Farmers generally use several seed storage methods. There are15 farmer groups with seed banking initiatives; five located in south-western, three in northern, five in West Nile region and one from the eastern part of Uganda, and one established in the central region. The seed banks are managed by farmers themselves and are registered as community based organizations (CBOs). The gene banks have management committees composed of the gene bank manager, records manager, distribution manager, quality assurance manager and community mobilisers.

Uganda stands as a treasure trove of genetic resources, spanning plants, animals, and microorganisms, each holding invaluable hereditary units. Renowned for its diverse ecosystems, Uganda's wealth of genetic resources not only presents a promising avenue for driving socio-economic development but also holds the key to fostering wealth creation and improving the well-being of local communities (Snyman, 2021).

The country showcases a diverse range of animal genetic resources, ranging from wildlife to livestock, and plant genetic resources encompassing indigenous wild fruits, vegetables, medicinal plants, and introduced crops like maize, tobacco, coffee, cotton, and beans. People's daily lives are intricately connected with various semi-domesticated and wild plant species, distributed across the diverse ecological zones of Uganda (NEMA, 2016). Notably, research on Ugandan Robusta coffee has unveiled distinct genetic clusters, underscoring the nation's unique genetic diversity (Kiwuka et al., 2021).

2.4 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.

2.5 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. Queen Elizabeth and Murchison Falls and Kidepo Valley were the first three National Parks established in early 1950’s. These parks became famous world-wide for their variety of scenery and spectacular concentrations of wildlife, and Uganda quickly surpassed Kenya and Tanzania in the development of wildlife-based tourism. Lodges were built, road networks expanded, and there were scheduled flights

to the parks' airfields from Entebbe International Airport. Murchison Falls National Park became the most popular destination for wildlife-viewing tourists in East Africa, attracting some 60,000 visitors annually. Safari lodges were constructed at Paraa, Chobe and later Pakuba to cater for the tourist influx. The boat/launch trip to the base of the Water Falls on River Nile was the primary attraction, and at the peak of tourist visitations up to 12 launch trips were made each day.

Tourism currently represents the major legitimate value accruing from wildlife resources. Tourism is the leading foreign exchange earner and contributes significantly to employment, however, its potential has not been fully exploited. Tourism foreign exchange earnings have increased to USD1.0 billion in FY2023/24 from USD0.4 billion in 2020/21, however, this is below the pre-COVID level of USD1.5 billion in 2018/19. Similarly, the direct employment in the tourism industry increased to 610,806 in FY2022/23 from 489,000 in 2020/21 which is also below the pre-COVID level of 671,000. These attractions include gorilla tracking, mountain climbing (Figure 2.3), nature-guided walks, village excursions, butterfly and bird watching, as well as the opportunity to explore rare fauna and flora species. Notably, Murchison Falls and Queen Elizabeth National Parks stand out as the most frequented destinations.

Figure 17: Tourist climbing the Rwenzori Mountains National Park (Photo credit: Speciation Clock)

Over the years, there has been a positive trend in tourism, with a notable increase in the number of both local and foreign tourists to Uganda National parks. In 2017, the country welcomed 285,671 tourists to the various national parks in the country, a figure that rose to 323,861 in 2019. However,

the global impact of the Covid-19 pandemic in 2020 led to a substantial drop in tourism, with only 101,331 visitors recorded in the various national parks across the country. Despite the challenges posed by the pandemic, there was a modest recovery in 2021, witnessing an increase in the number of tourists to 189,988 (Figure 2.4). The fluctuation in tourism numbers highlights the resilience of Uganda's tourism sector in the face of external challenges, with efforts to adapt and recover evident in the post-pandemic rebound. The diverse attractions offered by the National Parks and reserves continue to position Uganda as an appealing destination for nature enthusiasts and wildlife lovers.

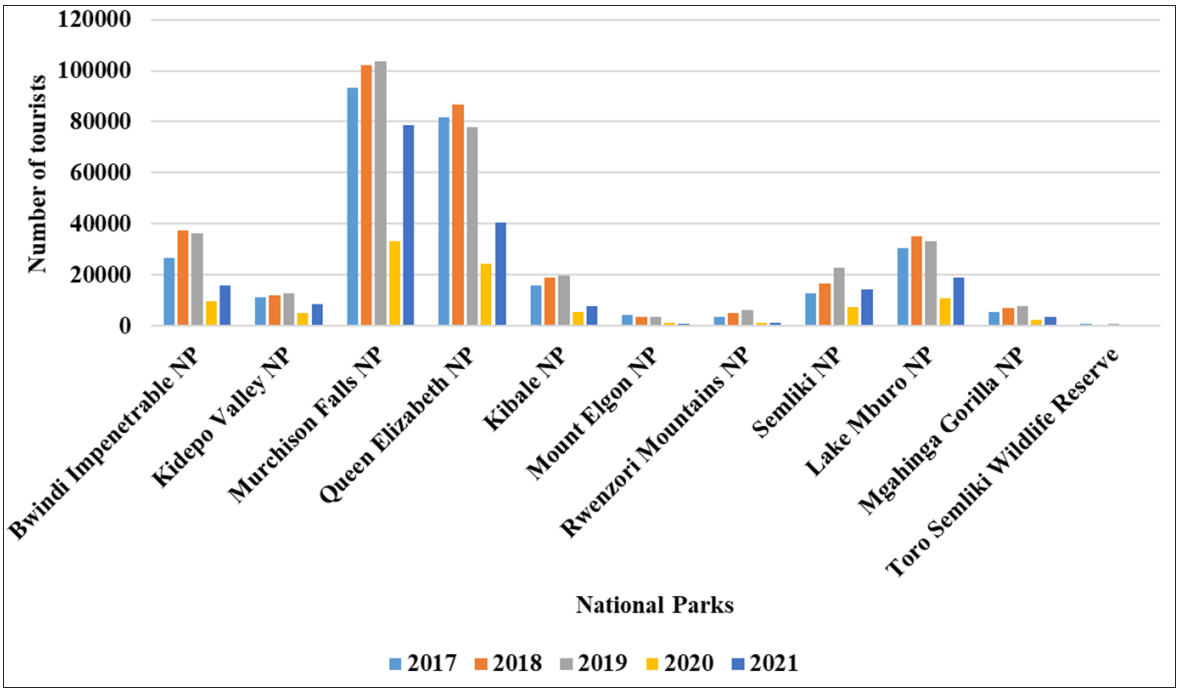

Figure 18 Visitors to National Parks (Citizens and Foreigners), 2017 – 2021 (Data Source: UBOS Statistical

Tourism plays a vital role in economic development by generating significant revenue, creating jobs, and stimulating infrastructure development. As a major source of foreign exchange earnings, tourism boosts a country's balance of payments and fosters economic diversification. It drives employment not only within the tourism sector itself such as in hotels, restaurants, and travel agencies but also in related industries, including transportation, retail, and agriculture, which supply goods and services to tourists. Further, tourism encourages investment in infrastructure such as roads, airports, and ICT. It also promotes cultural preservation and conservation of cultural and natural heritage. By promoting local economic development and creating opportunities for small and medium-sized enterprises, tourism contributes to broader economic stability and growth, enhancing the overall quality of life.

Tourism development is critical for the realization of global and regional development aspirations. The Agenda 2030 (SDG 8.9, 11.4) emphasizes the need to promote sustainable tourism for job creation, and promotion and conservation of culture & products. Africa Agenda 2063 (Goal 4) targets increasing the contribution of tourism to GDP. The EAC Vision 2050 advocates for joint interventions in highly competitive and high-return tourism activities including issuance of an East African Visa, joint marketing of tourism in EAC, and standardized joint classification of hotels. The Uganda Vision 2040 identifies tourism as one of the opportunities to be harnessed for socio-economic transformation.

Wildlife protected areas in Uganda are thus not only for safeguarding biodiversity but also for providing crucial ecosystem services. These areas play important roles in flood control, water retention, purification, soil erosion prevention, landslide mitigation, carbon storage, and pest and disease control. Beyond conservation, they significantly contribute to Uganda's economy and development goals by offering these vital services. 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.

2.6 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. 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. Eleven (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 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 (Table 2.2), at least 22 species of plants growing in wetlands are edible, and many other plants are used for medicinal purposes.

Table 11: Economic value of Nakivubo urban wetland in Kampala

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

Source: NEMA 2007

2.7 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 ethnobotanical research has identified more than 300 plants (trees, shrubs, flowers, and weeds) growing wild across the country associated with medicinal value. Some of these plants have gained value in the pharmaceutical industry and are now grown commercially, while others are harvested by herbalists at zero price.

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.

As wildlife and human populations interact more closely, the risk of zoonotic spillover increases. Zoonotic diseases, such as monkeypox (Mpox), present significant health challenges in Uganda and have implications for biodiversity. Monkeypox, for example, has been reported following contact with infected animals, leading to outbreaks among human populations. This intersection of animal health, human health, and environmental factors exemplifies the interconnectedness of health systems in addressing zoonotic diseases, emphasizing the importance of a One Health approach that seeks to optimize health outcomes by recognizing the links among people, animals, plants, and their shared environment.

The Government of Uganda (GoU) recognizes the need to establish standards for the safety and efficacy of 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.

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) While NCRI as a lead institution has endeavored to conserve medicinal plants (MP), it currently lacks both infrastructure and human capacity. There is a need for the institution to expand for impact in the conservation of MP

b) Although various individual researchers are involved in research in MP, there are no research programs to link (indigenous knowledge) IK and MP research to development in science and technology in the country. Besides, there are very few research institutions 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 motivate scientists, since it is very costly and lengthy.

c) 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.

d) There is also misinformation and lack of understanding of 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 considers IK practices and traditional medicine as primitive, which has stigmatized their utilization for improving the livelihood of the people.

e) Lack of a specific government program to promote IK and MP in particular has led to their under-utilization in the development programs in the country.

The potential of indigenous knowledge to contribute to the national economy through industrialization and commercialization has not yet been fully exploited in Uganda. The country does not have adequate technologies to develop MP on a commercial scale. 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. Most herbal processors have limited education and skill to produce good quality products.

Even those who have an 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. Whereas

NDA has development guidelines for the 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 the commercialization of herbal products. Streamlining the commercialization process will cater to the conservation of medicinal plants, which is the backbone of the value chain.

2.8 Biotechnology and Biosafety

Uganda has taken measures to meet its obligations under the Cartagena Protocol on Biosafety. An interim biosafety system to regulate modern biotechnology research and development has been adopted in the absence of holistic legislation. Uganda National Council for Science and Technology (UNCST) was designated the Competent National Authority that provides regulatory oversight for genetic engineering research and development initiatives. The UNCST Act, 1990 gives it mandate to clear all scientific research and development activities in the country. As part of efforts to develop a holistic biotechnology and biosafety regulatory and development framework, Uganda adopted the National Biotechnology and Biosafety Policy in 2008. The Policy recognizes GE as a tool that can be used to enhance agricultural productivity, improve food and nutrition security, promote conservation and sustainable use of natural resources, and enhance human and environmental health.

The first application for research using genetic engineering was made in 1992 when Makerere University requested for approval to test bovine somatotropin hormone developed using recombinant DNA technology.
Biotechnology research in Uganda is also being done for environmental management, human and animal health. Genetic Modification pharmaceutical products such as insulin are already being used and there was research conducted on HIV and Ebola vaccines which are also products of modern biotechnology. Similarly, there is research to use GMOs or their ingredients in the industrial sector and environmental management. Medical biotechnology in health research efforts under the different institutions in Uganda are conducted in the production of medicines, hormones, vaccines, and other bio-engineered products such as the ALVAC-HIV vaccine, gene therapy, Covid 19 vaccines developments. At the forefront of this breakthrough, research efforts are carried out by scientists from Makerere University, Joint Clinical Research Centre (JCRC), the Uganda Virus Research Institute (UVRI) and the Presidential Initiative on Epidemics. National Agricultural Research Organisation and Makerere University are championing anti tick vaccine studies for effective control of ticks. The annual loss attributed to ticks and tickborne diseases (TTBDs) is estimated at USD 1.1 billion in Uganda.

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.

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. Table 2.3 indicates the status of the genetically modified crops in Uganda.

Table 12 Status of genetically modified crops in Uganda as of 2024

Crop	Trait of interest	Status	National and International Partners	Location
Banana	Bacterial wilt resistance	Confined Field Trial (CFT), multilocational-completed	• National Agricultural Research Organisation, NARO • International Institute of Tropical Agriculture, IITA • African Agricultural Technology Foundation, AATF	• Kawanda • Mbarara • Serere
Banana	Black sigatoka resistance	CFT - completed	• NARO • AATF	• Kawanda
Banana	Pro-vitamin A	CFT – completed	• NARO • Queensland University of Technology, QUT	• Kawanda
Banana	Pro Vitamin A	Multilocational trials on going	• NARO • Queensland University of Technology, QUT	• Kawanda • Hoima • Buginyanya • Mbarara
Banana	Nematode and weevil resistance	Completed	• NARO • Leeds University • International Institute for Tropical Agriculture, IITA	• Kawanda
Cassava	Cassava mosaic disease virus	CFT - completed	• NARO • DDPSC	• Namulonge

Crop	Trait of interest	Status	National and International Partners	Location
Cassava	Whiteflies	CFT on going	• NARO • Tel viv University, Israel	• Namulonge
Cassava	Cassava mosaic disease virus, cassava brown streak disease virus resistance	CFT, multi-locational trials-completed	• NARO • Donald Danforth Plant Science Center, DDPSC • IITA	• Namulonge • Serere • Kasese
Cotton	Bollworm resistance, herbicide tolerance	CFT, multi-locational trials-completed	• NARO • Monsanto	• Serere • Kasese
Maize	Insect resistance (stem borer)	CFT – completed	• NARO • AATF	• Namulonge, • Kasese
Maize	Drought tolerance	CFT-completed	• NARO • AATF	• Namulonge • Kasese
Maize	Drought tolerance and insect resistance (stacked genes)	CFT, multi locational completed	• NARO • AATF	• Namulonge • Kasese • Serere
Rice	Nitrogen use efficiency, salt tolerance, water use efficiency	CFT – completed	• NARO • AATF	• Namulonge
Sweet potato	Weevil resistance	Greenhouse – completed	• NARO • International Potato Center, CIP	• Namulonge
Soya bean	Herbicide tolerance	Green house completed	• Makerere University • Michigan State University	• Kabanyoro
Potato	Potato blight resistance	CFT-completed Multilocation completed	• NARO • International Potato Center, CIP	• Kabale • Buginyanya • Fort Portal

(Source : UNCST records 2024)

3.0 THREATS TO BIODIVERSITY IN UGANDA

3.1 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). Many major mammal species, such as rhinos, cheetahs, and oryx were extirpated during Uganda's decades of internal turmoil between 1970s and 1980s. 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.

3.1.1 Over-harvesting and exploitation of biological resources

Biodiversity is mainly lost through uncontrolled harvesting or removal without replacement and use of poor harvesting methods which affect regeneration of the species. Over-exploitation depletes Uganda's stock of animal and plant resources, lowering 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.

3.1.2 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.

3.1.3 Encroachment on protected areas

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.

3.1.4 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). Uganda's farmlands are dominated by subsistence farms. Whereas the land under commercial agriculture has increased four-fold from 68,580 to 256,746 hectares, the increase is modest in magnitude when compared to the 2.1 million hectare increased in farmlands between 1990 to 2015 (NFA 2017). Farmlands increased, from 8.5 to

10.6 million hectares by nearly 25%, and the land under subsistence agriculture also increased by 1.8 million hectares over the same time.

3.1.5 Poaching

Poaching and unregulated hunting have in the past, contributed to the loss of the country species richness. As already highlighted, during the 1970s, elephant and buffalo populations declined drastically due to massive poaching (Aleper and Moe 2006). Poaching remains the most serious threat to wildlife population growth and species diversity in Uganda. Animals are poached for meat, wildlife products, and some species are also captured and traded live. Poaching for international trade in trophies like ivory, hippopotamus teeth, pangolin scales as well as live trade in these products constitute serious threats. In Uganda poaching still a major threat to wildlife inside and outside protected areas.

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 other 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.

3.1.6 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.

3.1.7 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.

3.1.8 Livestock

In recent years, livestock numbers have been increasing, in line with human population trends. 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 concern that indigenous breeds are being undermined 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, although systematic

monitoring needs to be undertaken to discern future trends in species composition. Threats to domestic animal diversity include the following:

a) **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.

b) ***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 concern 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.

3.1.9 Loss of plant and animal genetic resources

Threats to Plant Genetic Resources (PGR) 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.

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. Creating 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.

Genetic Resources for Food and Agriculture (GRFA) directly or indirectly contribute to approximately 24.1% of the Gross Domestic Product (GDP) (UBOS 2021/22). However, a cause for concern arises

as genetic erosion poses a serious threat to these invaluable genetic resources.

The country's genetic diversity not only serves as a cornerstone for tourism, earning Uganda the moniker "Pearl of Africa" (UWA, 2021) but also proves indispensable in agriculture, industry, and pharmaceuticals, playing a pivotal role in research and development. As Uganda grapples with the challenge of genetic erosion, it becomes imperative to implement strategies that safeguard and sustainably manage these genetic resources for the benefit of current and future generations.

Genetic resources in Uganda are facing significant threats arising from the shift from a subsistence-oriented agrarian economy to a consumption-driven cash economy. These challenges encompass competing land-use, poaching of wild flora and fauna, localized overharvesting of timber, human-wildlife conflicts, and the impact of climate change. The endangerment of domestic animal diversity, as highlighted by the National Environment Management Authority (NEMA) in 2016, is attributed to various factors:

a) Economic struggles, where the best animals are often sold for slaughter during difficult times, leaving inferior ones for breeding purposes, contributing to genetic degradation.

b) Introduction of new breeds, leading to the erosion of the genetic base of indigenous animals, as breeds designed for more intensive management replace local livestock.

c) Systematic breed substitution and irrational genetic transformation, involving practices like crossbreeding and breed replacement for intensified livestock management, potentially replacing valuable indigenous breeds.

The Uganda government recognizes the importance of its genetic resources and has undertaken several initiatives towards the conservation and improvement of farm genetic resources (MAAIF, 2002). For conservation efforts, the National Animal Genetic Resources Centre and Databank (NAGRC&DB) was established as a result of the Animal Breeding Act in 2001. The NAGRC&DB plays a leading role in the production of quality livestock genetics as well as in developmental activities such as training and awareness raising of extension staff and farmers to improve their breeding techniques as well as their management of livestock. It also plays a leading role in commercial activities such as the production, procurement and sale of genetic resources.

Geared towards the conservation of plant genetic resources (PGR), Uganda established the Plant Genetic Resource Centre (PGRC) under the National Agricultural Research Laboratories (NARL) of the National Agricultural Research Organisation (NARO). The center has the mission to ensure the conservation, management, and sustainable use of Uganda’s plant genetic resources for food and agriculture (PGRFA). These PGRFA contributes to Uganda’s development goals such as poverty eradicaion, food security, medical and industrial advancement. To support the development goals, PGRC, among other activities, collects and maintains stocks of diverse plant germplasm, enhances its utilization, develops information and documentation systems, and promotes community based and on-farm conservation of plant genetic resources.

3.1.10 Human wildlife conflict

The country continues to register an increase in cases of human – wildlife conflicts mainly emanating from crop destruction, livestock predation and human attacks by elephants, crocodiles, lions, leopards, chimpanzees, gorillas, baboons among others. Crop raiding compromises local food security, impacts on attitudes towards wildlife and reduces tolerance and support for conservation. Human- wildlife conflicts also emerge when individuals or communities invade wildlife conservation for poaching,

illegal logging, cultivation, grazing and other related illegal resource access practices. Such activities negatively impact on habitats and survival of wildlife. For instance, in retaliation, local people killed 11 lions (*Panthera leo)* in Queen Elizabeth National Park in March 2018. Also fatal cases of chimpanzee-human attacks have been occurring mainly targeting children and women around Kibale National Park and in Bunyoro area (Masindi, Hoima, Kagadi, Kakumiro and Kibaale districts). Over 30 cases of crocodile-human attacks have occurred and reported around Mayuge, Kasese, Mpigi, Nakasongola districts among others. Cases involving elephants, lions, hippos and buffaloes have occurred across a number of districts.

Several interventions (separate report) have been employed by government to address the increasing challenge of human-wildlife conflicts but more resources need to be invested in pro-active approaches to mitigating human-wildlife conflicts. There is a general feeling that fencing of protected areas will significantly reduce the cases of human-wildlife conflicts around protected areas but this will require significant investment worth about 600 billion shillings as initial capital investment to fence all areas that can be fenced but more resources will be required to maintain the fences so that they remain effective. Importantly, fencing alone will not address the challenge. It needs to be complemented with other interventions.

Human-wildlife conflict persists as a significant challenge in wildlife management, with incidents on the rise, particularly involving elephants (Table 3.1). The Uganda Wildlife Act of 2019, in Section 84, acknowledges this issue by providing compensation for injury, death, or property loss caused by wildlife listed in the Fourth Schedule of the Act. While compensation is a positive step, it may not offer a comprehensive solution. Additional measures are imperative to safeguard people and their property from such conflicts. Therefore, addressing the root causes, enhancing community awareness, and implementing proactive strategies for coexistence between wildlife and communities are essential steps to mitigate human-wildlife conflict and ensure the long-term harmony between local populations and wildlife conservation efforts.

Table 13 Human-Wildlife Conflict incidents across the Conservation Areas 2009 – 2020

Year	LMCA	BMCA	QECA	KCA	MFCA	KVCA	UWA Qqtrs	Total
2009	54	1,230	24	89	238	0	69	**1,704**
2010	61	1,153	16	128	216	0	89	**1,663**
2011	67	80	45	148	231	5	138	**714**
2012	103	127	65	182	236	35	165	**913**
2013	75	114	16	210	864	25	142	**1,446**
2014	50	260	71	166	1,192	33	179	**1,951**
2015	86	190	131	206	1,082	20	182	**1,897**
2016	99	104	212	161	1,173	149	179	**2,077**
2 017	210	169	302	287	774	208	136	**2,086**
2018	135	150	590	364	1336	408	133	**3,116**
2019	199	202	879	386	573	368	241	**2,848**
2020	190	228	1,066	1,152	992	356	234	**4,218**
TOTAL	**1,511**	**4,124**	**4,421**	**4,473**	**9,926**	**1,704**	**2,110**	**2,8269**

In 2018 Government initiated a project aimed at constructing electric fences within Protected Areas. The initial phase of the project was executed in Queen Elizabeth National Park (QENP), followed by

implementation in Murchison Falls National Park (MFNP). Presently, over 100 kilometers of electric fencing have been successfully installed and are operational in both MFNP and QENP, leading to a noticeable reduction in human-wildlife conflicts based on preliminary assessments.

Funded by the World Bank Project, there are plans to extend the electric fencing, with a target of constructing an additional 161 kilometers in both QENP (Table 3.2) and MFNP (Table 3.3).

In 2019 Government formulated the National Strategy to Manage Human-Wildlife Conflict in Uganda, with the overarching goal of fostering harmonious coexistence between wildlife and communities to contribute to national development. Various interventions have been implemented across different sections of Protected Areas, including the installation of electric fencing, trenches, crocodile cages, beehives, and the provision of support to community scouts. These collective efforts aim to mitigate human-wildlife conflicts and promote sustainable cohabitation between wildlife and local communities.

Table 14: Proposed areas to be fenced in Queen Elizabeth National Park

Area	**Number of km**
Nyamugasani -Isango	18 km
KCCL- Karusandara	21 km
Ishasha - Bwentale	9 km
Kagarama - Mahyoro	13 km
Total	**61 KM**

Table 15 Proposed areas to be fenced in Murchison Falls National Park

District	**Total boundary distance**	**Distance fenced so far**	**Distance to be fenced under World Bank Project**
Nwoya	141.99	34	31
Buliisa	81.27	00	20
Masindi	35.9	00	20
Kiryandongo	62.2	00	30
Total	**321.36**	**44**	**101 KM**

(Source: NEMA, 2022)

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.

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.

3.1.11 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. The introduction of exotic species into natural systems can affect biodiversity in many ways. Exotic species can out-compete native species and replace them in the system, thus reducing the species diversity, lowering genetic diversity, and increasing the homogeneity of the landscape.

A preliminary list of IAS for Uganda (NARO 2002) includes species such as *Lantana camara*, *Broussonetia papyrifera*, *Mimosa pigra* and *Senna* spp. whose threat on native species has increased considerably. For example, *Senna spectabilis* has invaded over 1,000 ha of the Budongo Forest Reserve and vast areas of the Matiri Forest Reserve (Kyenjojo District) while *Broussonetia papyrifera* has covered vast areas of the Mabira Forest Reserve. *Salvinia molesta* has been recently added onto the list of the world's 100 most invasive species and ranks second to water hyacinth (Eichhornia crassipes, (Mart.) Solms-Laub.) as the most invasive aquatic plant in the world due to its environmental, economic and human health impacts (CABI 2017; Madsen and Wersal 2008). *S. molesta* poses similar problems as those posed by Water Hyacinth and Water Lettuce including clogging canals, rivers and lakes; displacing native plants and animals; and interfering with irrigation, navigation, fishing and electric power generation activities (Labrada and Fornasari 2002).

Table 3.4 shows the distribution of what is considered the 30 species with the greatest impact in terms of transforming natural vegetation within Uganda (Witt et al. 2018). The habitats commonly impacted by invasive species include forests, savannahs, grasslands, forest plantation, farm lands or arable lands, wetlands and drylands, among others.

Table 16 Distribution of what is considered the 30 species with the greatest impact in terms of transforming natural vegetation

Species and family	**Growth form & invasive type**	**Distribution**		**Habitat types invaded**	**Negative impacts**
		% of surveyed grid cells present	% of surveyed grid cells present		
Cascabela thevelia (L.) Lippold (Syn: Thevelia peruviana (pers.) k. Schum (Apocynaceae)	Tree or shrub	48.6	6.0	Sa, Tr, Rr, Ha, PA, Ws, Gr	Form dense thickets, especially in low-lying areas and along water courses, displacing native plants and animal species.
Chomolaena odorota (L.) R.M. King and H. Rob. (Asteraceae)	Shrub	1.9	1.5	Sa, Tr, Rr, Ha, PA, Ws, Wc	Displaces native plant species and alters fuel properties of vegetation, increasing fire intensities. Reduces the

Species and family	Growth form & invasive type	Distribution		Habitat types invaded	Negative impacts
		% of surveyed grid cells present	% of surveyed grid cells present		
					productivity of the rangelands and causes serious health problems in livestock and people
Parthenium hysterophorus (Asteraceae)	Herb	31.6	25,4	Sa, Tr, Rr, Ha, PA, Ws, Wc	Allelopathic and able to suppress natural vegetation. Severely reduces the productivity of rangelands, and causes allergenic reactions (dermatitis, hay fever and asthma) in a large proportion of people who come into contact with it, as well as in livestock and wildlife.
Tithonia diversifolia (Hemsl.) A Gray (Asteraceae)	Shrub	29.4	23.5	Sa, Tr, Rr, Ha, Pl, Ar, PA, Ws, Wc	Displaces native vegetation and reduces species diversity and the productivity of rangelands. Contributes to the local extinction of valued native species.
Xanthium strumarium L. (Asteraceae)	Herb	34.1	28.4	Sa, Tr, Rr, Ar, Ws, Wc	Rapidly forms large stands, displacing other plant species. Toxic to livestock and can lead to death if eaten.
Austrocylindropuntia subulata (Muelenpf.) Backeb. (Cactaceae)	Succulent tree or shrub	12.1	4.0	Sa, Rr, Ha, Pa, Wc, Dr	Forms impenetrable thickets that prevent access to grazing pastures and water resources. Infestations reduce the livestock-carrying capacities of pastures. Spines cause injuries to livestock, wildlife and people.
Bryophyllum delagoense (Eckl. & Zeyh.) Druce (Crassulaceae)	Succulent herb	5.2	2.5	Sa, Tr, Rr, Ha, Pa, Ws, Wc	Forms dense monotypic stands, which displace native plant species. Toxic to livestock and humans and probably also to wildlife.
Acacia mearnsii De Wild (Fabaceae)?	Tree or shrub	15.4	6.4	Fo, Gr, Tr, Rr, Ha, Pl, Ws, Wc	Displaces natural vegetation, reducing native biodiversity and rangeland productivity. Reduces surface water runoff. Increases soil nitrogen levels,

Species and family	Growth form & invasive type	Distribution		Habitat types invaded	Negative impacts
		% of surveyed grid cells present	% of surveyed grid cells present		
					altering soil nutrient cycling.
Caesalpinia decapetala (Roth) Alston (Fabaceae)	Climber	35.6	12.6	Fo, Sa, TR, Rr, Ha, Pl, Pa, Ws, Wc	Climbs over vegetation, forming tangled, impenetrable thickets, detrimental to fauna and flora. Grows into forest and woodland canopies, causing canopy collapse. Impedes forest management operations and is a fire hazard. Reduces livestock-carrying capacities and inhibits the movement of livestock and people. The large spines on the stems can cause injuries to wildlife, livestock and people.
Leucaena leucocephala (Lam.) de Wit (Fabaceae)	Tree or shrub	53.9	15.4	Sa, Tr, Rr, Ha, Pa, Ws, Wc	Forms large monocultures, displacing native plant and animal species. Invasions alter secondary succession processes and render areas unusable and inaccessible.
Mimosa diplotricha Sauvalle (Fabaceae)	Tree or shrub	3.2	3.0	Fo, Sa, Gr, Tr, Rr, Ha, Pl, Ar, Pa, Ws, Wc	Smothers other plants, shading out light-demanding species and preventing their natural regeneration. Dense stands may prevent or inhibit the movement of livestock and wildlife. Toxic to both sheep and pigs.
Mimosa pigra L. (Fabaceae)	Tree or shrub	15.1	11.7	Sa, Tr, Rr, Ha, Ar, Pa, Ws, Wc, Wt	Dense infestations can eliminate native plant and animal species, and lead to steep declines in the abundance of others. Hampers fishing activities, and blocks access to waterbodies.
Senna spectabilis (DC.) H.S. Irwin & Barneby (Fabaceae)	Tree or shrub	36.0	4.5	Fo, Tr, Rr, Ha, Ws, Wc	Grows rapidly, dominating other species and displacing native flora and fauna. Inhibits regeneration of native plant species.

Species and family	Growth form & invasive type	Distribution		Habitat types invaded	Negative impacts
		% of surveyed grid cells present	% of surveyed grid cells present		
Psidium guajava L. (Myrtaceae)	Tree or shrub	42.0	9.8	Fo, Sa, Tr, Rr, Ha, Pl, Pa, Ws, Wc	Establishes dense stands, displacing native plant and animal species. Allelopathic, impacting negatively on some crop species. Invasive in secondary forests.
Eichhornia crassipes (Mart.) Solms (Pontederiaceae)	Aquatic	5.6	4.3	Wc, Wt	Forms thick mats which hamper water transport; inhibit or prevent fishing-related activities; blocks waterways; hampers hydroelectricity generation; and provides habitats for vectors of human and animal diseases.
Datura stramonium L. (Solanaceae)	Herb	45.2	34.1	Sa, Gr, Tr, Rr, Ha, Ar, Pa, Ws	Competes aggressively with native plants and crops, forming dense monospecific stands. Toxic to people and animals.
Solanum mauritianum Scop. (Solanaceae)	Tree or shrub	10.4	5.5	Fo, Tr, Rr, Ha, Pl, Ws, Wc	Displaces native plant and animal species. By producing copious amounts of edible seeds, it disrupts natural seed dispersal mechanisms, leading to declines in affected native plant species. The plant, if consumed, is toxic to livestock.
Lantana camara L. (Verbenaceae)	Tree or shrub	54.4	38	Fo, Sa, Gr, Tr, Rr, Ha, Pl, Ar, Pa, Ws, Wc	Displaces natural vegetation, impacting negatively on biodiversity. Toxic to livestock, causing animal deaths, reduced productivity, and loss of pasture.

Habitat types invaded (Fo, forest; Sa, savannah; Gr, grassland; Tr, transformed; Rr, road/rail side; Ha, around habitation; Pl, plantation; Ar, arable/ploughed land; Pa, pastoral; Ws, wasteland; Wc, watercourse; Wt, wetland; Dr, dryland/well drained; Kl, kloof/ravine; Ro, rocky site), and impacts. A

full set of references to accounts of impact are contained in Witt and Luke (2017). **Source: Witt et al. 2018**

The present tree planting activities of 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.

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.

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.

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.

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.

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.

Kariba weed (*Salvinia molesta*), an invasive waterweed, was first recorded in Uganda's Lake Kyoga in June 2013 and has since spread to other lakes, including Kwania, Albert, and Lake Victoria. It has spread to South Sudan through the Nile. This free-floating weed forms dense mats on still or slow-moving waters, blocking light and disrupting gas exchange. It reproduces vegetatively through fragile stolons that easily fragment, facilitating rapid propagation. Under optimal conditions, it can double its biomass every two to three days. By October 2016, 9,090 ha of Lake Kwania had been covered with the weed. In 2020, the weed was reported in Lake Victoria in Lutembe bay at Dewe landing site in Wakiso distict. T

he immediate negative impacts of the *Salvinia molesta*, are; many of the communities that live near these water bodies have abandoned fishing because the water weed sweeps away the fishing gear as it moves with the water current, navigation is impeded, difficulty in docking of ferries and boats has been reported at many docking sites in the affected water bodies, fishing communities that used to survive on fishing have had to change their livelihoods to alternative livelihoods which include charcoal burning, and further de-forestation and Environmental degradation as fishing communities resort to charcoal burning.

Dodder (*Cuscuta* spp.) is a highly invasive parasitic weed found in Uganda, known for its distinct yellow or orange threading appearance that can engulf and overwhelm host plants. Lacking chlorophyll, dodder attaches itself to the stems of various plants, deriving nutrients and water, which often leads to the host's decline or death. Its rapid growth and ability to spread through seed dispersion and vegetative means make it difficult to control. The presence of dodder threatens agricultural productivity, especially in crops like beans, tomatoes, and coffee, impacting food security and farmer livelihoods across the region. Efforts to manage dodder focus on cultural practices, mechanical removal, and public awareness to mitigate its spread and ecological impacts.

The spread of invasive species has become a major concern and challenge to wildlife conservation especially in protected areas. Invasive plant species have contributed to degradation of natural habitats and displacement of native biodiversity. For instance, changes in vegetation due to invasive species of acacia and other pasture grasses have been reported in Lake Mburo and Queen Elizabeth National Parks. In Lake Mburo National Park, the proliferation of *Acacia hockii* is considered a threat to the population of herbivorous animals because this species has transformed some areas that were previously open savannah into closed woodland ecosystems. Some naturally occurring species appear to be becoming invasive. In Queen Elizabeth National Park spear grass (*Imperata cylindrica) and Dichrostachys spp* (Karem njojo) are spreading across large areas of the park. Exotic plant species such as *Lantana camara* and *Parthenium* are also taking over parts of Queen Elizabeth National Park, resulting in limited feed availability and ecosystem destabilization.

Major invasive species of concern in wildlife protected areas of Uganda are *Lantana camara, Dichrostachys cinerea, Parthenium hysterophorus, Imperata cylindrical (omushojo), Leucaena leucocephala, Broussonetia papyrifera, Cymbopogon nardus, Senna spectabilis (Cassia), Mimosa pigra, Acacia hockii (Obugando) and Vossia cuspidate.*The spread of *Dichrostachys cinerea, Parthenium hysterophorus,Lantana camara* and *Imperata cylindrical* is worrying and has affected most of the suitable habitats for grazers in the parks (NARO 2002). Recognizing the urgent need for effective, efficient and sustainable management of invasive species in protected areas, UWA adopted an integrated approach involving the application and use of mechanical control approaches to selectively eradicate priority invasive species. The aim is to reduce the density, abundance and spread of the identified priority invasive species to keep them below an acceptable threshold. More resources are needed to be invested in invasive species management across the country.

Most of the Protected Areas are facing invasion from invasive alien species (Table 3.5), which has affected the quality of habitat.

Table 17 Invasive species that continue to affect the Protected Areas in Uganda

Protected Area	**Invasive species**

Queen Elizabeth National Park	*Dicrostarchys cinerea, Chromelaena ordorata, Opuntia Vulgaris, Imperata cylindrical. Parthenium hystorophorus, Lantana camara*
Lake Mburo National Park	*Acacia hockii*, Cymbopogon nardus
Murchison Falls National Park	*Chromelaena ordorata, acacia spp,*
Semuliki National Park	*Cedrella odorata spp* and Terminalia, senna spectabilis
Toro Semuliki Wildlife Reserve	*Dichrostachys cinerea, Lantana Camara*

(NEMA, 2022)

Invasive species diminish habitat quality, compelling wildlife to relocate, disrupting animal distribution, and potentially affecting tourism. Uganda has proactively targeted the eradication of invasive species in selected Protected Areas. From 2017 to 2021, over 5,588.13 hectares were successfully cleared of invasive alien species in wildlife protected areas. This strategic effort has yielded positive outcomes, with wildlife returning to areas where invasive species have been effectively removed, contributing to habitat restoration and promoting a healthier ecosystem for both wildlife and tourism.

Eradicating invasive species requires a multipronged approach, combining various methods for significant impact. Several strategies were employed, including community-led uprooting, the use of excavators, debarking, cutting, and removing stumps and seeds from previously uprooted areas. Additionally, biological control measures involved using Zygo grama insects to manage Pathenium, a method successfully applied in Queen Elizabeth National Park (QENP). Implementing a diverse range of methods is crucial to effectively combat the spread of invasive species and restore the ecological balance in Protected Areas.

3.1.12 Emerging zoonotic diseases

There have been known outbreaks of zoonotic diseases like rinderpest and anthrax in wildlife protected areas. In the last fifteen years, QENP has experienced three outbreaks of anthrax that has affected most herbivores especially hippos and buffaloes. The cases of diseases recorded in wildlife include anthrax outbreak especially in hippos and Buffaloes, scabies in mountain Gorillas, skin disease in Giraffe, and brucellosis and canine distemper virus in lions. Other threats include avian flu, Marburg, Ebola that are not only a danger to wildlife but also humans and livestock. Experience from the outbreak of Anthrax in 2004 in Queen Elizabeth National Park (Environmental Brief No 1, 2004) showed the potential impacts of such disease outbreaks.

In 2004, an estimated 300 hippopotamuses in Uganda's Queen Elizabeth National Park died after drinking water contaminated with anthrax while in 2020 another outbreak claimed over 200 hippos. The lethal bacteria can frequently be found in the pools of stagnant water that form during Uganda's dry season. Uganda will continue to work with other partners under the One Health approach to address the disease pandemics and has also established a Biosafety level II laboratory in Queen Elizabeth National Park (Figure 3.1) to spearhead research in zoonotic diseases and their management. The facility was constructed with support from DITRA.

Figure 19: Biosafety Level Two Wildlife Veterinary Diagnostic Laboratory at Mweya (Photo credit : Uganda National Council for Science and Technology)

There have been intermittent disease outbreaks in some Protected Areas including anthrax in hippos, respiratory infections in gorillas, Foot and Mouth Disease (FMD) in buffaloes, and fungal skin infections in zebras among others (Table 3.6). These diseases lead to wildlife mortality which affects the wildlife numbers. Government undertakes periodic disease surveillance for early detection of diseases among the animal population. This has helped in arresting disease outbreaks before spreading. Where sicknesses are discovered, interventions are undertaken to minimize animal mortality. In some areas, Government has facilitated vaccination of infected domestic animals to prevent spread of the disease to wildlife. UWA has also facilitated placing of tsetse fly traps in some areas to attract tsetse flies and in order to minimize disease transmission.

Table 18 Cases of disease outbreaks in Protected Areas

Protected Area	**Diseases**
Kidepo Valley NationalPark	Ketaro conjunctivitis (IKC) causing blindness in Uganda kobs, Oribis, Hartebeests and Reedbucks in KVNP
Queen Elizabeth National Park	Anthrax
Lake Mburo National Park	Foot and Mouth Disease

Protected Areas in Uganda have experienced intermittent disease outbreaks, impacting various wildlife species, including hippos contracting anthrax, gorillas suffering respiratory infections, buffaloes affected by Foot and Mouth Disease (FMD), and zebras experiencing fungal skin infections. These outbreaks contribute to wildlife mortality, influencing overall population numbers. To address this challenge, regular disease surveillance is conducted enabling the early detection of illnesses within animal populations and preventing the spread of diseases.

Upon discovering illnesses, UWA implements interventions to minimize animal mortality. In some instances, UWA facilitates the vaccination of infected domestic animals to curb the spread of diseases to wildlife. Moreover, tsetse fly traps are strategically placed in certain areas to attract tsetse flies, minimizing disease transmission.

Due to the potential threat of zoonotic diseases, Uganda with support from DITRA in 2019, initiated the construction of a biosafety and biosecurity level two diagnostic laboratory in Queen Elizabeth National Park (QENP). This facility, completed and commissioned in 2021(Figure 3.1) above, is operational and serves as a crucial tool for detecting and monitoring wildlife zoonotic diseases, enhancing the overall health management of both wildlife and domestic animals.

3.1.13 Climate Change impacts

Climate change and associated impacts like proliferation of invasive species has had an indirect impact on wildlife populations. In QENP, most formerly savanna areas have been invaded by *Dichrostachys cinerea* which is woody and no animal seems to eat it. This has therefore displaced many herbivores from their habitats and affected the breeding of wildlife. Other observed climate impacts include floods, landslides and mudslides that have destroyed wildlife habitats and affected wildlife populations.

Wildlife populations fluctuate seasonally and from year to year based on seasonal weather patterns. Climatic factors also regulate wildlife populations through changes in rainfall amounts, temperatures and levels of irradiation. These influence the quality and availability of food for wild animals resulting into high levels of inter and intra competition for food thereby affecting reproduction and survival rates and species shifts. Ponce-Reyes *et al* 2017, noted that due to climate change, many of the habitats in the Albertine Rift region where endemic and threatened species occur are predicted to decline in this area over the next 70 years unless species can adapt to warming temperatures, with predictions of 70% or more of habitat loss. Fourteen (14) of Uganda's wildlife protected areas are found in the Albertine Rift, thereby constituting a significant portion of critical wildlife habitats that will be affected by changes in climate.

Wild animals and plants that are able to adjust are shifting their ranges to higher altitudes as a means of adapting to rising temperatures. For instance, the three horned chameleon found on the Rwenzori Mountains has shifted to higher altitudes as a result of increase in temperatures at the lower altitudes (UWA report 2013). 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) and has also led to the melting of the snow on the mount Rwenzori (Figure 3.2).

Figure 20 The legendary Mountains of the Moon in Rwenzori National Park. The snow on the mountain is receding due to climate change (Photo credit: Speciation Clock).

3.1.14 Poaching

Poaching remains a critical challenge for wildlife management in Uganda, with both subsistence and commercial activities posing significant threats. Subsistence poaching, often driven by poverty, coexists with more organized and well-funded commercial poaching, particularly in Murchison Falls National Park (MFNP) and Queen Elizabeth National Park (QENP). Commercial poaching is typically armed and is financially backed by business individuals for international trade. Uganda Wildlife Authority (UWA), in collaboration with various partners, has implemented measures to combat poaching and reduce animal mortality. However, Uganda continues to grapple with malicious killings leading to wildlife losses. A notable incident in 2020 saw the tragic loss of eight lions to poisoning in Queen Elizabeth National Park, highlighting the persistent challenges and the urgent need for enhanced conservation efforts to protect the country's precious wildlife resources.

3.1.15 Wetland degradation

The degradation of wetlands is a cause for concern due to its adverse effects on the ability of ecosystems to provide essential ecological and socio-economic services, thereby posing a threat to the livelihoods of dependent communities. The impacts of wetland degradation manifest across varying time frames, ranging from short-term to long-term consequences. Loss of wetland vegetation cover, alterations in water regimes, and soil deterioration are primary contributors to these impacts, all of which are intrinsic characteristics of wetlands.

As a consequence of degradation, wetlands have experienced significant reductions in areas that once served as habitats for wildlife. Additionally, their capacity to store and filter water has diminished, along with their ability to store carbon. This degradation amplifies negative repercussions such as

heightened risks of floods, increased prevalence of diseases, and prolonged periods of drought.

Uganda's wetlands harbor diverse and often endemic biodiversity, serving as temporary refuges for nearly 100 migratory bird species and hosting over 1057 bird species in total across 34 Important Bird Areas, predominantly wetlands and forests (Nature Uganda, 2015). Despite their ecological significance, these wetlands face degradation, resulting in the loss of critical habitat and biological diversity.

Most of Uganda's wetlands are riverine and lacustrine, playing a crucial role in buffering water bodies from sediment and pollution. Unfortunately, pollution from agricultural activities, industrial developments, and settlements has compromised the integrity of these wetlands. The loss of wetland cover and channelization accelerate the discharge of water loaded with sediments and pollutants into lakes and rivers without undergoing natural sieving processes. This results in the cumulative siltation of remaining wetland areas, affecting habitat quality, aquatic biodiversity, and the health of communities reliant on wetlands for water and food.

3.16 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 biodiversity. Other effects include bio-accumulation and bio-concentration of harmful chemicals in organisms which pose a grave threat to human livelihood. Over past five years Uganda has been industrializing rapidly with the share of industrial value in GDP reaching 26.5% in 2020 from only 4% in the 1980s (World Bank, 2020b). Uganda has about 45.7 million people, with a population growth of over 3.3% annually since 2014, showing that the population is growing at the same pace with the GDP. About 25% of the country's population currently lives in urban areas such as Kampala and other areas. However, both population and industrial growth in Uganda has been causing pressures on the country's natural environment and at the cost of increasing pollution and inefficiencies in resource use.

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 of 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 poses 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.

Uganda's urban air pollution has much higher particulate matter ($PM_{2.5}$) and nitrogen dioxide levels

than the WHO recommends for healthy living; $PM_{2.5}$ in Kampala ranges at least 39 µg/m^3, compared to the WHO's recommended threshold of 25 µg/m^3 (NEMA, 2019). In Uganda, $PM_{2.5}$ is the leading risk factor for death and caused 27,600 premature deaths in 2019 (IHME, 2020). While household air pollution accounted for more than 80% of this estimate, ambient $PM_{2.5}$ pollutions has been a growing health problem in urban areas. The health effects attributable to ambient $PM_{2.5}$ include premature mortality and morbidity associated with long-term exposure (e.g., ischemic heart disease, lung cancer, lower respiratory infections among others) and short-term exposure (e.g., eye irritation and cough). Based on the available (Figure 3.3) data for various locations over 2022 and 2023, there is a noticeable trend of slight improvements in air quality across most areas. In 2023, Kampala's central area experienced a reduction in $PM_{2.5}$ levels, dropping from 38.66 µg/m³ to 35.77 µg/m³. Notably, there is a general decrease in $PM_{2.5}$ levels across multiple locations from 2022 to 2023, suggesting an improvement in air quality over the year.

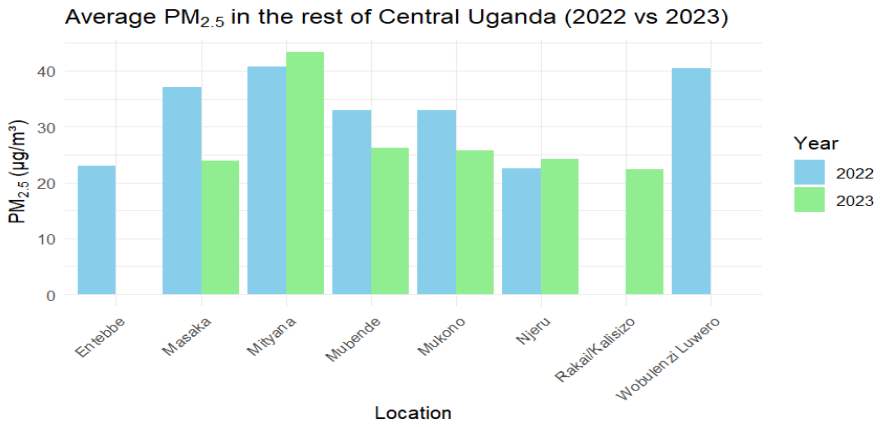

Figure 21 The overall $PM_{2.5}$ averages for 2022 and 2023 for available data points in Central Uganda

Pollution from solid waste also deteriorates environmental health in a region, particularly when citizens openly burn solid waste and emit toxic gases into the air. Unmanaged solid waste also breeds infectious diseases, including parasites and bacteria, which ultimately can increase illness, particularly in urban areas. Solid waste can also cause environmental disasters, such as when unmanaged street trash clogs waterways and floods areas. This pollutes water, makes it unhealthy to drink or use for domestic purposes, and limits many workers' ability to improve their lives economically because of illness and obstructed public infrastructure.

Recognizing the increasing risks of pollution, the general public and governments gradually increase their awareness and willingness to pollution management, and sustainable and green growth has become a government policy priority. Uganda's National Environment Act (2019) replaced the previous environment management policy 30 years prior and highlighted the need to address pollution from different media, including air, water, and land. Other policies buttress the environment act, focusing on different aspects of environmental management such as land use and public health.

The quality of Uganda's water resources (ground and surface) is declining over time due to pollution from different sources. Population increase, hunger, poverty, and socioeconomic development are the major drivers of water resource pollution. Agriculture, industrial development, forest, land, and wetland degradations are the major pressures exacerbating the pollution of freshwater resources in the country. Pollution threats are from natural and anthropogenic sources, which include physical, chemical, and biological constituents.

Natural causes of water pollution are mainly from geological formations forming the base of the water resources or drained by the water resources. An example is the high salinity in the Rift Valley waters in western Uganda due to salt formations in the geology. Anthropogenic activities are however the biggest sources and threats to pollution in Uganda. Land use and land cover changes are degrading catchments leading to the pollution of water resources. These sources are not only national but transboundary. Pollution impacts the ecosystems, species and human health since water is central to most health and the environment. It also affects the socioeconomic development of the country.

Policy and legislative measures reduce biodiversity loss in Uganda

3.2.1 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:

a) 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.

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

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

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

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

f) 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 3.7).

Table 19 Sectoral Policies relevant to biodiversity management in Uganda

Policy	Relevance	Provision for Biodiversity Management

Uganda Wildlife Policy, 2014	Promotes the long-term conservation of the country's wildlife and biodi-versity 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.
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
Uganda National Land Policy (2013)	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 wellbeing 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
Uganda Tourism Policy (2015)	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
National Fisheries and Aquaculture Policy (2017)	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. • 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 (2013)	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.

Uganda Gender Policy (2007)	Integrate gen- der concerns in environmental policy planning, decision making and implementa- tion at all levels 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.
Uganda 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.
National Population Policy (2020)	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 Sector Policy as contained in the Government White Paper on Education (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.

3.2.2 National 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.

Requirements for biodiversity management by the different sectors are provided in several legislations (Table 3.8).

Table 20 Sectoral laws for biodiversity management in Uganda

Framework	Provisions for biodiversity management
National Forestry and Tree Planting Act (Cap. 160)	○ 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

Uganda Wildlife Act Cap. 315	○ 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 ar- rangements to which Uganda is a party ○ Public participation in wildlife management
Local Governments Act, Cap. 138	○ Planning and management of environment and wetlands ○ Management of Local Forest Reserves and for over-all development of forestry resource within the district
Land Act, Cap. 236	○ 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.
Water Act, Cap. 164	○ 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 and Health Act - (CAP. 39)	○ 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, Cap 47	○ 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 and Aquaculture Act, Cap 314	○ 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
Uganda Tourism Act, Cap 82	○ 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
The Animal Dis- eases Act, Cap 48	○ 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, Cap 49	○ Provides measures for modes of transportation of animals to prevent cruelty and expo- sure to diseases
Agricultural Chemicals (control) Act, Cap 35	○ Control and regulation of the manufacture, storage, distribution and trade in, use, im- portation 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.

3.2.3 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.

3.2.4 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 Trans-boundary 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.

NATIONAL BIOIDVESITY STRATEGY AND ACTION PLAN III 2025-2030

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 management of biodiversity in the country.

At its fifteenth meeting of the Conference of the Parties (COP15) in Montreal, Canada, Parties to the CBD adopted the Kunming-Montreal Global Biodiversity Framework (KMGBF). The KMGBF has four long-term goals to 2050 and 23 action targets to 2030. The Parties committed themselves to revising their NBSAPs and to adopt them as policy instruments by 2024. Parties also committed themselves to developing national targets that would support the achievement of the KMGBF and its 23 Targets.

The revision of the NBSAP enabled Uganda to demonstrate its commitment to the achievement of the KMGBF, by setting its own national targets in line with the GBF targets. At its fifteenth meeting in Montreal, Canada, the CBD Conference of the Parties (COP 15) adopted a decision to support advancing gender mainstreaming and gender responsive GBF implementation. The Gender Plan of Action calls for gender considerations to be integrated into NBSAP revision, and to include gender-specific indicators in the development of national indicators, collecting data disaggregated by sex, age and other demographic factors and gender indicators, where possible. 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.

Overview of the third NBSAP for Uganda

Uganda developed its second National Biodiversity Strategy and Action Plan (NBSAP II) in 2015. 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 II had an implementation period of 10 years.

3.1.1 Lessons learnt from implementing NBSAPII for Uganda

A number of lessons were learnt from implementation of NBSAPII (2016-2025). These included the following:

a) Successful integration of NBSAP targets into national and sectoral plans is essential, yet further efforts are needed to ensure similar integration at the district level.
b) Engaging a diverse range of stakeholders is critical to effectively mainstreaming biodiversity considerations at all levels of governance.
c) Advocacy efforts have resulted in improved funding for biodiversity initiatives, demonstrating the importance of collaborative platforms like NBSAP for resource mobilization.
d) The NBSAP functions as a valuable forum for resource mobilization, linking various initiatives

and programs, such as Kidepo and Elgon projects.

e) Establishing expert working groups enhances efficiency and effectiveness in service delivery by addressing diverse themes, including gender, Indigenous Peoples and Local Communities (IPLCs), youth, and collaboration with private sectors, NGOs, and civil society.
f) Limited mainstreaming of NBSAP within local governments severely hinders effective implementation and results in diminished local impact.
g) The availability of comprehensive data is crucial for bridging gaps between policy and biodiversity, helping to identify needs and inform decision-making.
h) Improved data accessibility facilitates better research proposal writing and financial planning, ensuring projects align with biodiversity targets.
i) Understanding financial requirements for biodiversity projects is essential to secure necessary funding and ensure sustainability.
j) Ongoing monitoring and evaluation of biodiversity initiatives are vital for assessing progress, adapting strategies, and ensuring effective implementation of the NBSAP objectives.

The key obstacles to NBSAPII implementation included:

a) Inadequate financial resources for implementation of planned activities;
b) Inadequate awareness of NBSAPII among implementing partners especially at the sub-national level;
c) Inadequate human and infrastructure capacity in relevant field of biodiversity conservation such as taxonomy, biotechnology 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. NBSAP III 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.

4.2.2 Guiding Principles for the Development of NBSAPIII

While addressing any gaps in the implementation of NBSAP III, the development of NBSAPIII was based on the following guiding principles:

a) NBSAPs are key implementation tools for the Convention on Biological Diversity and NBSAPIII will therefore address all three objectives of the Convention.

b) The NBSAPIII 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

c) NBSAPIII 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.

d) In order to be effective, NBSAPIII will be jointly developed, adopted, and owned by a full range of stakeholders involved.

e) NBSAPIII will also include measures to mainstream biodiversity into sectoral and cross-sectoral policies and programs.

4.2.3 The updated context of NBSAPIII

The revised and updated NBSAP brings on board key developments and emerging issues which have taken place since the NBSAPII was prepared in 2015. Among these are:

a) The National biodiversity targets developed within the framework of the KMGBF;
b) The vision, goal and objectives of the NBSAP have been aligned to the vision, mission and goals of the KMGBF;
c) New and emerging issues have also been incorporated including digital sequence information, synthetic biology and artificial intelligence; and
d) Gender issues have been incorporated.
e) Linkage of NBSAP III to the National Vision 2040, the National Development Plan (NDP) and the SDGs

4.2.4 Linking NBSAPIII to Uganda's Vision 2040, NDP, SDGs and KMGBF

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) (later referred to as Programme Implementation Action Plans); 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. NBSAPIII 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 4.1 and Table 4.1 below; demonstrating the linkage of the National Vision 2040, NDPIV and SDGs that implementation of NBSAPIII contributes to their achievement.

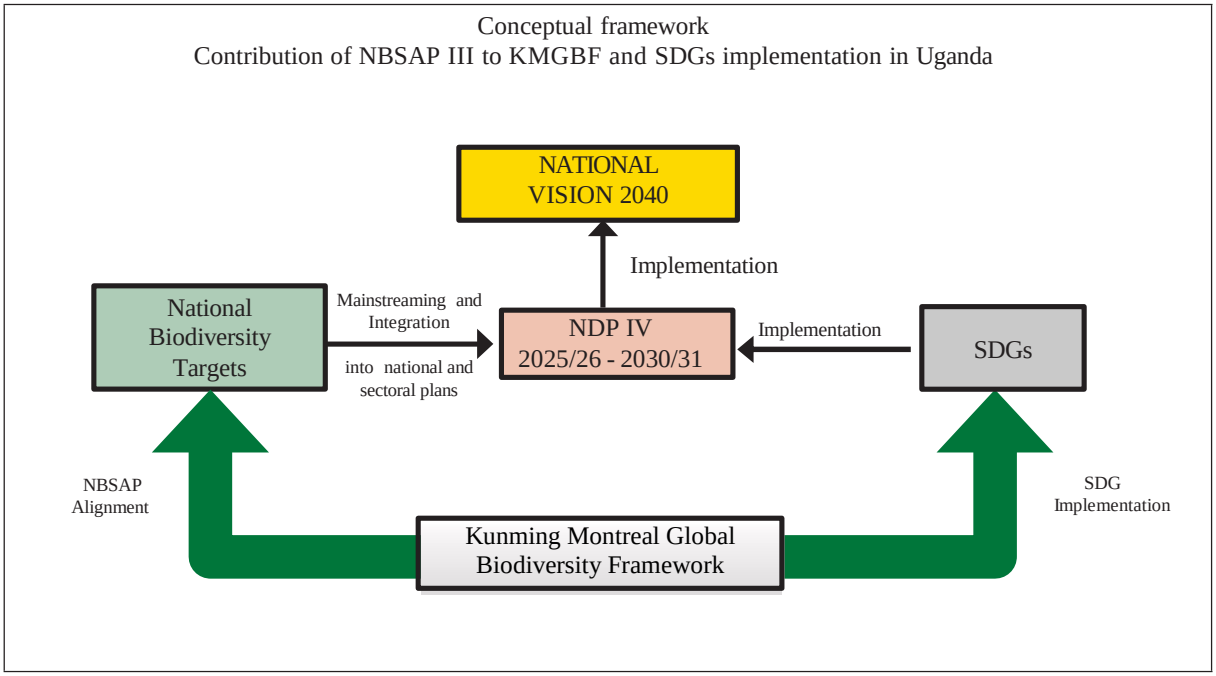

Figure 22 Conceptual framework of the linkage between NBSAP III, the Kunming Montreal Global Biodiversity Framework, SDGs, NDPIV and National Vision 2040

Table 21 NBSAP key contribution areas towards Vision 2040, NDP and the SDGs

NBSAP III: Key contribution areas to Vision 2040, NDPIII and SDGs		
Vision 2040	NDPIV	SDGs
○ Green Economy: poverty eradication, sustained economic growth, creating opportunities for employment, maintaining the healthy functioning of ecosystems	○ Theme: Sustainable Industrialization for inclusive growth, employment and wealth creation ○ Goal: Higher household incomes and employment for sustainable socio-economic transformation.	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	○ Strategic Objectives: 1). Sustainably increasing production, productivity and value addition in agriculture, minerals, oil and gas. 2). Tourism, ICT & financial services. 3). Enhancing human capital development. 4). Supporting private sector to drive growth. 5). Building & maintaining strategic sustainable infrastructure. 6). Strengthening good governance, security and role of the state in development. ○ Priority sectors: Agriculture, tourism, minerals, oil and gas ○ ENR Objectives 1). Ensure availability of adequate and reliable quality freshwater resources for all uses; 2). Increase forest, tree and wetland coverage, restore bare hills and protect mountainous areas and rangelands; 3). Strengthen land use and management; 4). Maintain and/or restore a clean, healthy, and productive environment; 5). Promote inclusive climate resilient and low emissions	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

	development at all levels; 6). Reduce human and economic loss from natural hazards and disasters; 7). Increase incomes and employment through sustainable use and value addition to water, forests and other natural resources.	

The linkage between the Strategic Objectives of NBSAPIII, the Kunming Montreal Global Biodiversity Framework and its 23 targets as well as linkage to the Implementation Plan for the Cartagena Protocol on Biosafety is provided in the table 4.2 below.

Table 22 Linking the Strategic Objectives of NBSAPIII to the Kunming Montreal Global Biodiversity Framework

No	Strategic Objective of NBSAPIII	Linkage to Goals of KMGBF [1] and Goals of the IPCPB[2]	Linkage to the KMGBF targets
1	To increase the connectivity, integrity and resilience of ecosystems	KMGBF Goals A; IPCPB Goal A.6	Global targets 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 14
2	To harness biotechnology for socio-economic transformation with adequate safety measures for human health and environment	KMGBF Goals B; IPCPB Goals A.4, A.5, A.7, A.8 and A.9	Global target 17
3	To promote the sustainable use and equitable sharing of costs and benefits of biodiversity	KMGBF Goal C	Global targets 9, 13, 14, 15, 18
4	To strengthen stakeholder co-ordination and frameworks for biodiversity management	KMGBF Goal D; IPCPB Goals A.2 and B.4	Global targets 14 and 21
5	To facilitate and build capacity for research, monitoring, information management and exchange on biodiversity	KMGBF Goals D; IPCPB Goals A.1, A.10 and B.1	Global targets 20, 21 and 22
6	To enhance awareness and education on biodiversity issues among the various stakeholders	KMGBF Goals D; IPCPB Goals A.3 and B.3	Global target 14, 15, 16, 20, 21
7	To promote innovative sustainable funding mechanisms to mobilize resources for implementing NBSAPIII	KMGBF Goal D; IPCPB Goal B.2	Global targets 18, 19

4.2.5 Overarching principles of NBSAPIII

The KMGBF and its global Targets, the National Vision 2040 and the National Development Plan

[1]Kunming Montreal Global Biodiversity Framework

[2]Implementation Plan for the Cartagena Protocol on Biosafety (2022). The Implementation Plan is a framework of broad desirable achievements and accomplishments to help guide Parties in their implementation of the Cartagena Protocol on Biosafety and measure progress in this regard for the period up to 2030.

(NDP) have all closely guided the formulation of NBSAPIII. NBSAPIII will be implemented in line with the following overarching principles:

1. Inclusive and participatory approach through application of the whole of government and whole of society approach to bring all stakeholders board, including indigenous peoples and local communities, women and youth in the planning, implementation, and monitoring of biodiversity conservation efforts.

2. Recognize and respect the diverse values and perspectives of different cultures and societies in the country.

3. Gender equality that recognizes the different roles and contributions that men and women, girls and boys, youth and elderly people play in biodiversity conservation and sustainable development.

4. Human rights-based approach to biodiversity conservation by respecting and protecting human rights of all individuals to participate in decision-making processes related to biodiversity conservation and sustainable development.

5. Ecosystem approach recognizing that ecosystems are interconnected systems with multiple components interacting with each other, hence considering the broader ecological context in which species live, including habitats, landscapes, ecosystem services, and the impacts of human activities on these systems.

6. Inter-generational equity by balancing short-term needs (human well-being) with long-term needs (conservation) and considering the needs of future generations in decision-making processes related to biodiversity conservation efforts.

7. Ensuring gender equality and empowerment of women, girls and the youth including boys.

8. Integration with other national development plans and policies, such as the National Development Plan, the National Poverty Reduction Strategy, and the National Environment Policy.

9. The implementation of the NBSAP III will involve application of science, technology and innovation and traditional knowledge and practices.

10. NBSAP III acknowledges interlinkages between biodiversity and health. It thus be implemented with consideration of the One Health Approach

11. The goals and targets of the KMGBF are to be implemented in accordance with national circumstances, priorities and capabilities

12. Monitoring and evaluation to track progress towards biodiversity conservation goals and targets, based on robust indicators for tracking changes in species populations, ecosystem health, and ecosystem services, as well as evaluating the effectiveness of conservation actions.

13. Capacity building and training for conservation staff, researchers, and stakeholders to enhance their skills and knowledge in biodiversity conservation.

14. Public awareness and education on biodiversity issues to engage citizens in conservation efforts and promote behaviour change.

15. Collaboration and cooperation with other biodiversity-related conventions to promote synergies among the multi-lateral environmental agreements as well as regional and sub-regional strategies on KMGBF.

16. Budgeting and financing through diverse sources to ensure that sufficient resources are available to support conservation activities. Several financing mechanisms are mentioned in the Financing and Resource mobilisation section of this NBSAP.

4.3 Vision, Goal and Strategic Objectives of NBSAPIII

4.3.1 Vision

Rich biodiversity benefiting the present and future generations

4.3.2 Goal

To enhance biodiversity conservation, reduce biodiversity loss and ensure equitable sharing of benefits arising from utilization of genetic resources.

4.3.3 Strategic Objectives

8. To increase the connectivity, integrity and resilience of ecosystems
9. To harness biotechnology for socio-economic transformation with adequate safety measures for human health and environment
10. To promote inclusive, fair and equitable sharing of benefits arising from utilization of genetic resources, including digital sequence information on genetic resources, and of traditional knowledge associated with genetic resources
11. To strengthen stakeholder co-ordination, inclusive participation, partnerships and frameworks for biodiversity conservation
12. To facilitate and build capacity for research, technology development, innovation, monitoring and knowledge management
13. To enhance stakeholder awareness, education and stewardship of biodiversity conservation
14. To promote innovative and sustainable funding solutions for implementing NBSAPIII

4.4 The National Biodiversity Strategies and Action Plans

4.4.1 Thematic area One: Increasing the connectivity, integrity and resilience of ecosystems

Strategic Objective 1: To increase the connectivity, integrity and resilience of ecosystems (Corresponds to KMGBF Goal A: Protect and Restore) (Table 4.3).

In Uganda, many protected areas (PAs) are rapidly becoming isolated due to growing human population, new settlement in previously unpopulated areas, land use changes towards agriculture and changing infrastructure. The fragmentation of habitat into small patches is a major threat to terrestrial biodiversity as it can inhibit dispersal, reduce gene flow, decrease food availability, and increase the amount of edge effects. Fragmentation can impede range shifts, especially in those species that have

trouble crossing gaps between patches to move to new habitats in the landscape. Yet the long term viability of PAs depends on watersheds outside the protected areas, on the ability of animals to disperse and return to their original habitat on an annual basis and on a flow of animals from other PAs. However, the opportunities for establishing, maintaining or managing corridors between PAs are rapidly diminishing, endangering the future of the ecosystem services and the biodiversity provided by PAs.

The Government of Uganda recognizes the fact that its people depend increasingly on PAs for the ecosystem services they provide such as clean and abundant water, revenues from tourism, and traditional and future medical products. It is important therefore, that vegetation remnants and vegetated corridors are maintained and enhanced as a network across all lands both private and public. In this way private landscapes can contribute to wider landscape conservation efforts by enhancing and linking existing reserves and conservation networks. A holistic approach is required across both public and private lands to protect and manage natural ecosystems and ensure connectivity between remaining habitats.

In 2018, the Government embarked on a process of gazetting and declaring some of Uganda's wetland cover as protected areas. According to the 2016, Uganda Wetland Atlas Volume II, Uganda's wetlands cover an area of 11% of the land area; seasonal wetlands (7.7%), permanent (3.4%) and swamp forests (<0.1%) (MWE, 2016). If all wetlands in the country are gazetted and considered protected area as proposed by Cabinet Decision of 16-04-2014, under Minute 114 (CT2014), then the area of terrestrial and inland water ecosystems in Uganda that are conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas for socio-economic benefit of the population is expected to increase to about 28%, (about 3% of the wetlands are already located in wildlife and forest protected areas).

The area and condition of natural habitats is generally getting worse. Increasingly, natural forests, grasslands and wetlands are being replaced with subsistence agriculture and/or degradation into inferior natural land covers. The trends and proportion of degraded and threatened habitats were based on work assessing the future trends of land cover and land use. The highest gains in the land amongst the land use systems were experienced in subsistence agricultural land and protected grasslands, while the highest losses were seen in unprotected grasslands and woodland/forest with low livestock densities. In 2015, agricultural, grassland, and wetland-related land use systems remained the most dominant. Between 1990 and 2015, agricultural and woodland-related land use systems experienced the most significant changes in terms of gains or losses. Agriculture-related land use systems increased by 8.56%, while those related to woodland reduced by 11.86% compared to their original values.

It is planned in NBSAPIII will address these threats and address connectivity, integrity and resilience of ecosystems through various strategies including the following:

a) Implement climate change mitigation and adaptation for biodiversity conservation including disaster risk reduction from climate change impacts
b) Identify and implement measures for protection of threatened and vulnerable species
c) Put in place measures for protection of genetic diversity cultivated plants and domesticated animals
d) Institute and implement measures to stop further loss of natural habitats
e) Improve management of agricultural practices, and forests for biodiversity conservation and

sustainable use

f) Monitor and support management of pollution levels and waste in vulnerable ecosystems
g) Put in place eradication and control measures for alien invasive species
h) Sustainably manage fisheries resources
i) Promote sustainable harvesting of fish and invertebrate stocks
j) Support ecosystem conservation in oil rich regions of Uganda

Table 23: Strategic Objective 1: To reduce and manage negative impacts while enhancing positive impacts on biodiversity

1.1	By 2030, at least 30% of terrestrial and inland water ecosystems in Uganda are conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas and other effective area based conservation measures for socio-economic benefit of the population	Corresponding KMGBF target 1: Plan and manage all areas to reduce biodiversity loss. Corresponding KMGBF target 2: Restore 30% of all degraded ecosystems. Corresponding KMGBF target 3: Conserve 30% of land, waters and seas. Corresponding KMGBF target 10: Enhance biodiversity and sustainability in agriculture, aquaculture, fisheries, and forestry. Corresponding KMGBF target 11: Restore, maintain and enhance nature's contributions to people. Corresponding KMGBF target 12: Enhance green spaces and urban planning for human well-being and biodiversity.
	National Indicators The proportion of area under terrestrial and inland water ecosystems effectively and equitably managed National forest cover as a proportion of the total land area National wetland covers as a proportion of the total land area Trends in the area of corridors connecting protected areas Trends in abundance of selected species Trends in coverage of protected areas **Headline Indicators** A.1 Red List of Ecosystems A.2 Extent of natural ecosystems A.3 Red List Index 3.1 Coverage of protected areas and other effective area-based conservation measures 12.1 Average share of the built-up area of cities that is green/blue space for public use for all **Component Indicators** Red List of Ecosystems	

Connectivity Indicator
Species Protection Index
Area of forest under sustainable management
Annual mean levels of fine particulate matter like PM2.5 and PM10) in cities
Recreation and cultural ecosystem services provided

Complimentary Indicators
Biodiversity Habitat Index
Red List Index
Red List of Ecosystems
Living Planet Index
Species habitat Index
Extent of indigenous peoples and local communities' lands that have some form of recognition
Species Protection Index

Strategy	**Action**	**Proposed Activities**	**Baseline 2023**	**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	1.1.1. Develop and/or review, update 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
		1.1.2. Ensure robust application of the MH to all proposed plans, projects and activities (loosely 'developments'), prioritizing avoidance or	Presently few projects in Uganda have considered adequate application of Mitigation Hierarchy	Number of projects that have adequately applied the Mitigation Hierarchy Number of biodiversity offsets projects in progress	UWA, NFA, NEMA, local governments, UIA, MDAs	NGOs, CBOs	300,000

			prevention of significant negative impacts over minimization or other forms of mitigation, recognizing that there are limits to what can be lost and compensated					
			1.1.3 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
			1.1.4 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, NEMA, Local government	MTWA, MWE ,NGOs, CBOs	200,000
			1.1.5 Support gender-responsive alternative livelihood options	There is massive encroachment especially for	Number of women and men with livelihood improvement	UWA, NFA, MGLSD	MoFPED, MWE, NEMA, NGOs, CBOs	800,000

			for communities adjacent to Pas	agriculture in PAs	initiatives in place Trends in revenue shared with communities			
			1.1.6 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
			1.1.7 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
			1.1.8 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

1.2	By 2030, at least 30% of degraded ecosystems are restored to enhance biodiversity conservation, connectivity, resilience and ecosystem services	Corresponding KMGBF target 2: Restore 30% of all degraded ecosystems. Corresponding KMGBF target 8: Minimize the impacts of climate change on biodiversity and build resilience.
	National Indicators The proportion of the area of degraded ecosystems restored Status and trends in extent and condition of habitats that provide carbon storage **Headline Indicators** A.1 Red List of Ecosystems A.2 Extent of natural ecosystems A.3 Red List Index **Component Indicators** Extent of natural ecosystems by type Maintenance and restoration of connectivity of natural ecosystems Red List of Ecosystems Ecosystem Intactness Index Species Habitat Index National greenhouse inventories from land use and land-use change **Complimentary Indicators** Forest area as a proportion of total land area Forest distribution Wetland Extent Trends Index Biomass of selected natural ecosystems Biodiversity Habitat Index Red List Index Red List of Ecosystems Species habitat Index	

	National greenhouse inventories from land use and land-use change Carbon stocks and annual net greenhouse gas emissions, by land-use category, split by natural and non-natural land cover							
	Strategy	**Action**	**Proposed Activities**	**Baseline 2023**	**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	1.2.1 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 and/or lack of access to affordable energy sources	-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
			1.2.2 Develop guidelines and capacities for ensuring gender-responsive, equitable and transparent implementation of REDD+ in partnership with	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

			CSOs, including women's organizations					
			1.2.3 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
			1.2.4 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

			1.2.5 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	NGOs	3,500,000
			1.2.6 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
			1.2.7 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
			1.2.8 Monitor and control bush burning in fire prone areas	Uncontrolled fires is common in many biodiversity	-Number of fire control mechanisms put in place -Trends in acreage affected by fires	Local governments UWA, NFA	NEMA	300,000

				rich areas				
			1.2.9 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
1.3	By 2030, the extinction of known threatened species of plants and animals inside and outside protected areas has been prevented and their conservation status improved		Corresponding KMGBF target 2: Restore 30% of all degraded ecosystems. Corresponding KMGBF target 4: Halt species extinction, protect genetic diversity, and manage human-wildlife conflicts. Corresponding KMGBF target 5: Ensure sustainable, safe and legal harvesting and trade of wild species. Corresponding KMGBF target 9: Manage wild species sustainably to benefit people. Corresponding KMGBF target 11: Restore, maintain and enhance nature's contributions to people.					
	National Indicators Number of species delisted from the IUCN Red List Trends in genetic diversity of selected species **Headline Indicators** A.1 Red List of Ecosystems A.2 Extent of natural ecosystems A.3 Red List Index 5.1 Proportion of fish stocks within biologically sustainable levels **Component Indicators** Extent of natural ecosystems by type							

Maintenance and restoration of connectivity of natural ecosystems
Red List of Ecosystems
Ecosystem Intactness Index
Species Habitat Index
Living Planet Index for used species
Sustainable use of wild species
Ecosystem Intactness Index
Red List Index (species used for food and medicine)
Living Planet Index for used species

Complimentary Indicators
Forest area as a proportion of total land area
Forest distribution
Wetland Extent Trends Index
Biomass of selected natural ecosystems
Biodiversity Habitat Index
Red List Index
Red List of Ecosystems
Species habitat Index
Tree cover loss
By-catch of vulnerable and non-target species
Proportion of fish stocks within biologically sustainable levels

Strategy	**Action**	**Proposed Activities**	**Baseline 2023**	**Output indicators**	**Lead Agency (target champion)**	**Partner institutions**	**Costs in US$**
Identify and implement measures for protection of threatened and	Prevent extinction of threatened species	1.3.1 Protect threatened, endemic and vulnerable species inside and outside protected areas	There are a number of anthropogenic factors which are threatening species	Reduction in the number nationally extinct, threatened and vulnerable species Number of Species	UWA, NEMA, NFA, Local governments	Academia, Cultural institutions, NGOs, CBOs	1,000,000

	vulnerable species			survival in various ecosystems	Management Plans under implementation Number of previously extinct species re-introduced			
			Prioritise avoidance or prevention of impacts in the areas of irreplaceable biodiversity (ecosystems, species, internationally recognised areas of importance to conservation such as Key Biodiversity Areas, Ramsar sites, World Heritage Sites) outside protected areas	Inadequate consideration of project alternatives to avoid impacts on irreplaceable biodiversity areas	▪ Project alternatives sites considered to avoid adverse impacts on irreplaceable biodiversity hotspots	NEMA	MDAs, NFA, UWA, local governments	
			1.3.2 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, MUK Herbarium	400,000

			1.3.3 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
			1.3.4 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
			1.3.5Strengthen the capacity of CITES Management Authority and CITES Competent Authorities	Capacities of CITES Management Authority and CITES Competent Authorities are	-Number of cases reported and successfully prosecuted -Number of trophies confiscated at border points	MTWA	UWA, MWE	300,000

				presently inadequate				
			1.3.6 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
1.4	By 2030, the genetic diversity of cultivated plants and domesticated animals including their wild relatives and other socio-economically and culturally valuable species is conserved		Corresponding KMGBF target 4: Halt species extinction, protect genetic diversity, and manage human-wildlife conflicts.					
	National Indicators Number of cultivated plant species in genebanks Number of domesticated animal species in genebanks Number of cultivated plants in-situ Area under in-situ conservation **Headline Indicators** A.1 Red List of Ecosystems A.2 Extent of natural ecosystems A.4 The proportion of populations within species with an effective population size > 500 **Component Indicators** Species Habitat Index Living Planet Index Number of plant and animal genetic resources secured in medium or long-term conservation facilities							

	Trends in effective and sustainable management of human-wildlife conflict and coexistence Conservation status of species listed in the CITES Appendices has stabilized or improved **Complimentary Indicators** Living Planet Index Number of plant and animal genetic resources secured in medium or long-term conservation facilities Trends in effective and sustainable management of human-wildlife conflict and coexistence Conservation status of species listed in the CITES Appendices has stabilized or improved Percentage of threatened species that are improving in status Red List Index (wild relatives of domesticated animals) Rate of invasive alien species establishment							
	Strategy	**Action**	**Proposed Activities**	**Baseline 2023**	**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	1.4.1 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
			1.4.2 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

			1.4.3 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
			1.4.4 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
			1.4.5 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
			1.4.6 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
1.5	By 2030, the rate of loss of all natural habitats, including forests, is at least halved and		Corresponding KMGBF target 1: Plan and manage all areas to reduce biodiversity loss. Corresponding KMGBF target 2: Restore 30% of all degraded ecosystems. Corresponding KMGBF target 3: Conserve 30% of land, waters and seass.					

	where feasible brought close to zero	Corresponding KMGBF target 10: Enhance biodiversity and sustainability in agriculture, aquaculture, fisheries, and forestry. Corresponding KMGBF target 12: Enhance green spaces and urban planning for human well-being and biodiversity.

National Indicators
Trends in change in extent of selected forests, grasslands and savannah, wetlands
Trends in the proportion of degraded land
Trends in the extent of protected areas

Headline Indicators
A.1 Red List of Ecosystems
A.2 Extent of natural ecosystems
A.3 Red List Index
3.1 Coverage of protected areas and other effective area-based conservation measures
10.1 Proportion of agricultural area under productive and sustainable agriculture
10.2 Progress towards sustainable forest management
12.1 Average share of the built-up area of cities that is green/blue space for public use for all

Component Indicators
Extent of natural ecosystems by type
Maintenance and restoration of connectivity of natural ecosystems
Extent of natural ecosystems by type
Maintenance and restoration of connectivity of natural ecosystems
Protected area coverage of key biodiversity areas
Protected Area Management Effectiveness (PAME)
Red List of Ecosystems
Connectivity Indicator
Species Protection Index
Area of forest under sustainable management
Recreation and cultural ecosystem services provided
Annual mean levels of fine particulate matter like PM2.5 and PM10) in cities

	Complimentary Indicators Biodiversity Habitat Index Red List Index Red List of Ecosystems Living Planet Index Species habitat Index Extent of indigenous peoples and local communities' lands that have some form of recognition Species Protection Index							
	Strategy	**Action**	**Proposed Activities**	**Baseline 2023**	**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	1.5.1 Identify, map and prioritize degraded habitats including natural 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
			1.5.2 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
			1.5.3 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
			1.5.4 Determine 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

			1.5.5 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
			1.5.6 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
			1.5.7 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
			Include the application of the Mitigation Hierarchy to manage impacts on biodiversity, i.e. to avoid, minimize, repair/ restore and compensate/offset, with offsets as the final mitigation	Presently few projects in Uganda have considered adequate application of Mitigation Hierarchy	▪ Number of projects that have adequately applied the Mitigation Hierarchy	NEMA, local governments, UIA, MDAs	NGOs, CBOs	300,000

			option to counterbalance residual negative impacts					
			1.5.8 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
			1.5.9 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
1.6	By 2030, integrated management plans for areas under agriculture, forestry, fisheries and livestock, including protected areas, are in place and supported by spatial planning technologies and tools		Corresponding KMGBF target 1: Plan and manage all areas to reduce biodiversity loss. Corresponding KMGBF target 10: Enhance biodiversity and sustainability in agriculture, aquaculture, fisheries, and forestry. Corresponding KMGBF target 14: Integrate biodiversity in decision-making at every level.					

National Indicators
Number of integrated land use plans in place
Trends in area and productivity of agricultural land, forests under sustainable management

Headline Indicators
A.1 Red List of Ecosystems
A.2 Extent of natural ecosystems
10.1 Proportion of agricultural area under productive and sustainable agriculture
10.2 Progress towards sustainable forest management

Component Indicators
Species Habitat Index
Area of forest under sustainable management
Forest Certification

Complimentary Indicators
Agrobiodiversity Index
Changes in soil organic carbon stocks
Red List Index (wild relatives of domesticated animals)
Red List Index (pollinating species)
Proportion of local breeds classified as being at risk of extinction
Proportion of land that is degraded over total land area
Percent of total land area that is under cultivation
Extent of natural ecosystems by type
Ecosystem Integrity Index

Strategy	**Action**	**Proposed Activities**	**Baseline 2023**	**Output indicators**	**Lead Agency (target champion)**	**Partner institutions**	**Costs in US$**
Improve management of	Sustainably manage areas under	1.6.1Promote agricultural practices which	There are a number of agricultural	Measures put in place to ensure a win-win situation	NARO, MAAIF, Local	NEMA, NGOs, CBOS,	200,000

	agricultural practices, and forests for biodiversity conservation and sustainable use	agriculture, aquaculture and forestry in an equitable manner	minimize the negative impacts of agricultural production on biodiversity and ecosystem functioning	practices which threaten biodiversity e.g. rice cultivation and large-scale commercial farming	for agricultural production and biodiversity conservation	governments	CSOs	
			1.6.2 Developing integrated spatial land use plans at national and sub-national (regional, district) levels to direct particular types of development and land or resource use to areas best suited to support and sustain them in the long term	At present zero land use plans all over the country	No. of national and/or sub-national land use plans developed	MLHUD	MDAs	200,000
			1.6.3 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	NARO, FSSD, MAAIF, Local governments	NEMA, NGOs, CBOs, CSOs	400,000

					practices			
			1.6.4 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
			1.6.5 Promote 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
			1.6.7 Apply Strategic Environment Assessments (SEA) on a landscape level as part of spatial planning frameworks for Agricultural	Most development projects, plans consider independent project based ESIA rather than SEA on entire	▪ SEA considered on a landscape level for large projects such as industrial parks	NEMA, UIA,	MDAs, Local governments, CSOs, NGOs, CBOs	300,000

			projects	landscape				
			1.6.8 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
			1.6.9 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
			1.6.10 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
			1.6.11 Incorporate biodiversity as a	Inadequate consideration	▪ Strategic risks considered in	NPA, local governments,	CBOs, NGOs,	

			strategic risk in planning and decision making in the private sector, and ensure the regular, transparent disclosure of their impacts, mitigation measures taken, and compliance with legal requirements and condition	of biodiversity conservation as a strategic risk in planning	planning for biodiversity conservation	NFA, UIA	MDAs	
			1.6.12 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
1.7	By 2030, all sources of pollution, including those in critical agricultural and urban ecosystems, extractive industries and energy that threaten biodiversity in both terrestrial and aquatic systems, effectively managed to levels that do not detrimentally impact ecosystem functions and biodiversity.		Corresponding KMGBF target 7: Reduce pollution to levels that are not harmful to biodiversity. Corresponding KMGBF target 10: Enhance biodiversity and sustainability in agriculture, aquaculture, fisheries, and forestry. Corresponding KMGBF target 12: Enhance green spaces and urban planning for human well-being and biodiversity.					
	National Indicators The national pollution index (air, water and soil quality indicators)							

	The proportion of urban land under green and blue belts **Headline Indicators** A.2 Extent of natural ecosystems 12.1 Average share of the built-up area of cities that is green/blue space for public use for all 10.1 Proportion of agricultural area under productive and sustainable agriculture **Component Indicators** Species Habitat Index Percent of total land area that is under cultivation Extent of natural ecosystems by type Ecosystem Integrity Index Fertilizer use Proportion of domestic and industrial wastewater flow safely treated Red List Index (impact of pollution) Agrobiodiversity Index Changes in soil organic carbon stocks Red List Index (wild relatives of domesticated animals) Red List Index (pollinating species) Proportion of local breeds classified as being at risk of extinction Proportion of land that is degraded over total land area **Complimentary Indicators** Municipal solid waste collected and managed Hazardous waste generation Agrobiodiversity Index Changes in soil organic carbon stocks Red List Index (wild relatives of domesticated animals) Red List Index (pollinating species) Proportion of local breeds classified as being at risk of extinction Proportion of land that is degraded over total land area

	Total number of permits, or their equivalent, granted for access to genetic resources							
	Strategy	**Action**	**Proposed Activities**	**Baseline 2023**	**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	1.7.1 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, Municipality authorities, City Authorities	NARO, Local governments, NEMA, Academia	300,000
			1.7.2 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

			1.7.3 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
1.8	By 2030, invasive alien species harmful to biodiversity, socio-economic transformation and human health are managed		Corresponding KMGBF target 2: Restore 30% of all degraded ecosystems. Corresponding KMGBF target 6: Reduce the introduction of invasive alien species by 50% and minimize their impact. Corresponding KMGBF target 10: Enhance biodiversity and sustainability in agriculture, aquaculture, fisheries, and forestry.					
	National Indicators Number of known invasive alien species managed Type of invasive alien species managed Area under invasive alien species **Headline Indicators** A.2 Extent of natural ecosystems 6.1 Rate of invasive alien species establishment 10.1 Proportion of agricultural area under productive and sustainable agriculture 10.2 Progress towards sustainable forest management							

Component Indicators
Extent of natural ecosystems by type
Maintenance and restoration of connectivity of natural ecosystems
Rate of invasive alien species spread
Number of invasive alien species introduction events
Rate of invasive alien species spread
Number of invasive alien species introduction events
Area of forest under sustainable management
Forest Certification

Complimentary Indicators
Increase in secondary natural forest cover
Annual tropical primary tree cover loss
Forest Landscape Integrity Index
Percentage of cropped landscapes with at least 10 per cent of natural land
Status of key biodiversity areas
Biodiversity Habitat Index
Red List Index
Red List of Ecosystems
Living Planet Index
Species habitat Index
Agrobiodiversity Index

Strategy	Action	Proposed Activities	Baseline 2023	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	1.8.1 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
			1.8.2 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
1.9	By 2030, the impacts of fisheries activities on fish stocks, species and ecosystems are within safe ecological limits and recovery plans and measures are in place for all depleted species		Corresponding KMGBF target 5: Ensure sustainable, safe and legal harvesting and trade of wild species. Corresponding KMGBF target 9: Manage wild species sustainably to benefit people. Corresponding KMGBF target 10: Enhance biodiversity and sustainability in agriculture, aquaculture, fisheries, and forestry.					

National Indicators
Trends in fish stocks of different species
Trends in fish species
Conditions of fisheries ecosystems
Fish catch recorded
Number of species-specific recovery plans of depleted species in place

Headline Indicators
5.1 Proportion of fish stocks within biologically sustainable levels
10.1 Proportion of agricultural area under productive and sustainable agriculture
10.2 Progress towards sustainable forest management

Component Indicators
Red List Index (species used for food and medicine)
Living Planet Index for used species
Living Planet Index for used species
Sustainable use of wild species

Complimentary Indicators
Proportion of fish stocks within biologically sustainable levels
Sustainable watershed and inland fisheries index
Agrobiodiversity Index

Strategy	**Action**	**Proposed Activities**	**Baseline 2023**	**Output indicators**	**Lead Agency (target champion)**	**Data sources Partner institutions**	**Costs in US$**
Sustainably manage fisheries resources	Put in place measures to control illegal fishing and over exploitation	1.9.1 Put in place effective control measures to manage fishing and alien fish species such as the Nile Perch Salvinia molesta	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

			including promoting awareness of existing regulations					
			Identify, map and effectively manage or protect all fresh water Key Biodiversity Areas	10 freshwater KBAs have been identified and mapped so far	No. of freshwater KBAs submitted to the Global KBA secretariat	NaFiRRI	MAAIF, MDAs, NGOs	
			1.9.2 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
			1.9.3 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
			1.9.4 Undertake SEA or EIA on policies, plans and programmes or projects respectively that are likely to have	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

			significantly negative impacts on aquatic biodiversity					
			1.9.5 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
			1.9.6 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
			1.9.7 Support transboundary management of fisheries resources	Transboundary management of fisheries resources is still inadequate	-Harmonized fisheries legislations and management practices -Transboundary fisheries	MAAIF, Local governments	NEMA, NARO, NGOs, CBOs	1,000,000

					management initiatives in place			
1.10	By 2030, fish are managed and harvested sustainably, legally, overfishing is avoided and recovery plans and measures are in place for all depleted species		Corresponding KMGBF target 5: Ensure sustainable, safe and legal harvesting and trade of wild species. Corresponding KMGBF target 6: Reduce the introduction of invasive alien species by 50% and minimize their impact. Corresponding KMGBF target 9: Manage wild species sustainably to benefit people. Corresponding KMGBF target 10: Enhance biodiversity and sustainability in agriculture, aquaculture, fisheries, and forestry.					
	National Indicators Trends in fish stocks of different species Trends in fish species Fish catch recorded **Headline Indicators** 5.1 Proportion of fish stocks within biologically sustainable levels 6.1 Rate of invasive alien species establishment 10.1 Proportion of agricultural area under productive and sustainable agriculture 10.2 Progress towards sustainable forest management **Component Indicators** Proportion of legal and illegal wildlife trade consisting of species threatened with extinction Illegal trade by CITES species classification Rate of invasive species impact and rate of impact Rate of invasive alien species spread Number of invasive alien species introduction events Number of people using wild resources for energy, food or culture (including firewood collection, hunting and fishing, gathering, medicinal use, craft making, etc.) Red List Index (species used for food and medicine) Living Planet Index for used species Area of forest under sustainable management							

Complimentary Indicators
Rate of invasive species impact and rate of impact
Rate of invasive alien species spread
Number of invasive alien species introduction events
Number of invasive alien species in national lists as per the Global Register of Introduced and Invasive Species
Trends in abundance, temporal occurrence, and spatial distribution of non-indigenous species, particularly invasive, non-indigenous species, notably in risk areas (in relation to the main vectors and pathways of spreading of such species)
Red List Index (impacts of invasive alien species)
Proportion of fish stocks within biologically sustainable levels
Agrobiodiversity Index

Strategies	**Action**	**Proposed Activities**	**Baseline 2023**	**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	1.10.1 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
		1.10.2 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	MAAIF, Local governments	NARO	150,000

					population structure			
			1.10.3 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
			1.10.4 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
			1.10.5 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
1.11	By 2030, impacts of extractive industries and energy are mitigated			Corresponding KMGBF target 1:Plan and manage all areas to reduce biodiversity loss. Corresponding KMGBF target 6: Reduce the introduction of invasive alien species by				

		50% and minimize their impact. Corresponding KMGBF target 7: Reduce pollution to levels that are not harmful to biodiversity. Corresponding KMGBF target 14: Integrate biodiversity in decision-making at every level. Corresponding KMGBF target 15: Businesses assess, disclose and reduce biodiversity-related risks and negative impacts.
	National Indicators Trends in the species and abundance within oil and gas exploration and production areas Pollution index (water, soil and air indicators within oil and gas exploration and production areas **Headline Indicators** A.1 Red List of Ecosystems A.2 Extent of natural ecosystems 6.1 Rate of invasive alien species establishment **Component Indicators** Rate of invasive species impact and rate of impact Rate of invasive alien species spread Number of invasive alien species introduction events Fertilizer use Red List Index (impact of pollution) **Complimentary Indicators** Extent of natural ecosystems by type Ecosystem Integrity Index Rate of invasive species impact and rate of impact Rate of invasive alien species spread Number of invasive alien species introduction events Number of invasive alien species in national lists as per the Global Register of Introduced and Invasive Species Trends in abundance, temporal occurrence, and spatial distribution of non-indigenous species, particularly invasive, non-indigenous species, notably in risk areas (in relation to the main vectors and pathways of spreading of such species)	

	Red List Index (impacts of invasive alien species) Municipal solid waste collected and managed Hazardous waste generation Number of companies publishing sustainability reports							
	Strategies	**Action**	**Proposed Activities**	**Baseline 2023**	**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	1.12.1Set 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
			1.12.2 Strengthen compliance to ESIAs 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
			Monitor the propositions in the Strategic Environment Assessment developed for the Albertine Graben	Strategic Environment Assessment has not yet been conducted	Strategic Environment Assessment for the Albertine Graben in Uganda - Petroleum Authority of	NEMA, MEMD	UWA, UNRA, PAU, CSOs	200,000

					Uganda (PAU).			
			1.12.3 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
			1.12.4 Routinely improve/update the Sensitivity Atlas for the Albertine Graben	The 2010 version is currently being updated	The Atlas is routinely updated	NEMA	UWA NFA, MDAs Local governments	200,000
			1.12.5 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
			1.12.6 Build the capacity and mobility of district	Some DEOs/MEOs lack resources	Resources allocated to DEO/MEOs	NEMA	MoEMD, UWA, MoLoG, Local	200,000

			and municipal environment officers (DEO/MEO) to effectively monitor oil and gas activities	(transport, equipment, budget) for regulation and thus less effective			governments	
			1.12.7 Set up a biodiversity offset trust fund to ensure no net loss biodiversity due to petroleum activities	Uganda Biodiversity Fund has been established but is not specifically for biodiversity offsets	Biodiversity offset trust fund is available for use when needed	NEMA	MoEMD UWA NFA MDAs NGOs Local governments	500,000
			1.12.8 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

4.4.2 Thematic area Two: Harnessing benefits from modern biotechnology

Strategic Objective 2: To harness biotechnology for socio-economic transformation with adequate safety measures for human health and environment (Corresponds to KMGBF GOAL B: Prosper with Nature) (Table 4.4).

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

At present, GMOs have not been officially approved beyond confined field trials, so socio-economic considerations have therefore not been high on the national agenda. Strategies for biotechnology and biosafety in Uganda include:

a) Communication, Education & Public Awareness (CEPA) strategy implemented for biotechnology and biosafety
b) Support capacity building for biotechnology and Biosafety
c) Support the passing into law of a national biosafety law
d) Develop an Integrated Risk Assessment and Management Framework for establishment of safety protocols for handling, storage and disposal of biotechnology products and waste
e) Domesticate the Nagoya-Kuala Lumpur Supplementary Protocol on liability and redress
f) Support biotechnology applications and use for national development

Table 24 Objective 2. To harness biotechnology for socio-economic transformation with adequate safety measures for human health and environment

2.1	By 2030, public awareness, education and participation in biotechnology and biosafety are enhanced	Corresponding KMGBF target 17: Strengthen biosafety and distribute the benefits of biotechnology.

National Indicators
Proportion of the population aware of biotechnology/biosafety
Yes/No the necessary measures and means for the detection and identification of products of biotechnology are in place and being implemented
Yes/No implementing the relevant provisions of the Cartagena Protocol on Biosafety

Headline Indicators
N/A

Component Indicators
N/A

Complimentary Indicators
Yes/No the necessary biosafety legal and administrative measures in place
Yes/No biosafety measures implemented
Yes/No the necessary measures and means for the detection and identification of products of biotechnology
Yes/No carry out scientifically sound risk assessments to support biosafety decision-making
Yes/No establish and implement risk management measures
Yes/No implementing the relevant provisions of the Cartagena Protocol on Biosafety
Yes/No legal and technical measures for restoration and compensation are in place
Yes/No systems in place for restoration and compensation of damage to conservation and sustainable use of biological diversity
Yes/No establish and implement risk management measures
Yes/No with mechanisms to facilitate the sharing of and access to information on potential adverse impacts of biotechnology on biodiversity and human health

Strategies	**Action**	**Proposed Activities**	**Baseline 2023**	**Output indicators**	**Lead Agency (target Champion)**	**Partner institutions**	**Costs in US$**

	Communication, Education & Public Awareness (CEPA) Strategy strategy implemented for biotechnology and biosafety	Create awareness on the benefits of modern biotechnology	2.1.1Conduct 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
			2.1.2 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
			2.1.3 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
			2.1.4 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
			2.1.5 Conduct trainings in biotechnology	Low level of awareness on Biotechnology	Increased levels of appreciation on	UNCT	NARO NEMA UNBS Academia	150,000

			and biosafety for women and men	and Biosafety in the general Public	Biotechnology and Biosafety in communities			
2.2	By 2030, national capacity for biotechnology applications and use contribute to socio-economic transformation			Corresponding KMGBF target 17: Strengthen biosafety and distribute the benefits of biotechnology.				
	National Indicators Yes/No- biotechnology integrated into sector strategies and plans Yes/No the necessary measures and means for the detection and identification of products of biotechnology are in place Percentage contribution of biotechnology to GDP **Headline Indicators** N/A **Component Indicators** N/A **Complimentary Indicators** Yes/No the necessary biosafety legal and administrative measures in place Yes/No biosafety measures implemented Yes/No the necessary measures and means for the detection and identification of products of biotechnology Yes/No carry out scientifically sound risk assessments to support biosafety decision-making Yes/No establish and implement risk management measures Yes/No implementing the relevant provisions of the Cartagena Protocol on Biosafety Yes/No legal and technical measures for restoration and compensation are in place Yes/No systems in place for restoration and compensation of damage to conservation and sustainable use of biological diversity Yes/No establish and implement risk management measures Yes/No with mechanisms to facilitate the sharing of and access to information on potential adverse impacts of biotechnology on biodiversity and human health							
	Strategies	**Action**	**Proposed Activities**	**Baseline 2023**	**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	2.2.1Assess 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
			2.2.2 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
			2.2.3 Promote infrastructural Development and Research on biotechnology and Biosafety.	Inadequate infrastructure	Accredited Biotechnology and Biosafety infrastructure developed.	UNCST	NEMA, MOFPED, MAAIF, MOE	400,000
			2.2.4 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
2.3	By 2030, the national biotechnology and biosafety law in place			Corresponding KMGBF target 17: Strengthen biosafety and distribute the benefits of biotechnology.				
	National Indicators Yes/No-Biotechnology and Biosafety law in place Yes/No the necessary measures and means for the detection and identification of products of biotechnology **Headline Indicators**							

N/A

Component Indicators
N/A

Complimentary Indicators
Yes/No the necessary biosafety legal and administrative measures in place
Yes/No biosafety measures implemented
Yes/No the necessary measures and means for the detection and identification of products of biotechnology
Yes/No carry out scientifically sound risk assessments to support biosafety decision-making
Yes/No establish and implement risk management measures
Yes/No implementing the relevant provisions of the Cartagena Protocol on Biosafety
Yes/No legal and technical measures for restoration and compensation are in place
Yes/No systems in place for restoration and compensation of damage to conservation and sustainable use of biological diversity
Yes/No establish and implement risk management measures
Yes/No with mechanisms to facilitate the sharing of and access to information on potential adverse impacts of biotechnology on biodiversity and human health

Strategies	**Action**	**Proposed Activities**	**Baseline 2023**	**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	2.3.1 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
		2.3.2 Popularize the Biotechnology and Biosafety Policy	Limited awareness and knowledge on the Biotechnology	Increased Awareness and knowledge on Biotechnology and Biosafety	UNCST	NEMA, MFPED, MOLG, MAAIF, MOES, MWE	100,000

				and Biosafety policy, 2008	policy.			
			2.3.3 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
			2.3.4 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
			2.3.5 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
			2.3.6 Enhance the regulatory performance of the National Biosafety Committee (NBC) and the	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

			Institutional Biosafety Committees (IBC)					
			2.3.7 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
2.4	By 2030, develop and implement safety protocols for handling, storage and disposal of biotechnology products and waste			Corresponding KMGBF target 17: Strengthen biosafety and distribute the benefits of biotechnology.				
	National Indicators Yes/No- safety protocols on storage and disposal are in place Yes/No the necessary measures and means for the detection and identification of products of biotechnology are in place **Headline Indicators** N/A **Component Indicators** N/A **Complimentary Indicators** Yes/No the necessary biosafety legal and administrative measures in place Yes/No biosafety measures implemented Yes/No the necessary measures and means for the detection and identification of products of biotechnology Yes/No carry out scientifically sound risk assessments to support biosafety decision-making Yes/No establish and implement risk management measures Yes/No implementing the relevant provisions of the Cartagena Protocol on Biosafety Yes/No legal and technical measures for restoration and compensation are in place Yes/No systems in place for restoration and compensation of damage to conservation and sustainable use of biological diversity							

	Yes/No establish and implement risk management measures Yes/No with mechanisms to facilitate the sharing of and access to information on potential adverse impacts of biotechnology on biodiversity and human health							
	Strategies	**Action**	**Proposed Activities**	**Baseline 2023**	**Output indicators**	**Lead Agency (target champion)**	**Partner institutions**	**Costs in US$**
	Develop an Integrated Risk Assessment and Management Framework for establishment of safety protocols for handling, storage and disposal of biotechnology products and waste	Develop a handling and reporting system for conditions related to biotechnology products and waste.	2.4.1.Conduct Risk Assessment and Management for biotechnology products and waste			UNCST	NARO, MAAIF, Academia, Private sector	200,000
			2.4.2.Develop detailed SOPs and emergency response plans for all processes involving biotechnology products and waste.			UNCST	NARO, MAAIF, Academia, Private sector	200,000
			2.4.3.Establish protocols for the segregation, labeling, and disposal of biotechnology products and waste			UNCST	NARO, MAAIF, Academia, Private sector	200,000
			2.4.4. Clearly classify waste			UNCST	NARO, MAAIF,	200,000

			types and align them with appropriate disposal methods as per local regulations.				Academia, Private sector	
2.5	By 2030, the Nagoya–Kuala Lumpur Supplementary Protocol on Liability and Redress under the Cartagena Protocol on Biosafety in operation and implemented			Corresponding KMGBF target 17: Strengthen biosafety and distribute the benefits of biotechnology.				
	National Indicators Yes/No-protocol under implementation Yes/No the necessary measures and means for the detection and identification of products of biotechnology are in place **Headline Indicators** N/A **Component Indicators** N/A **Complimentary Indicators** Yes/No the necessary biosafety legal and administrative measures in place Yes/No biosafety measures implemented Yes/No the necessary measures and means for the detection and identification of products of biotechnology Yes/No carry out scientifically sound risk assessments to support biosafety decision-making Yes/No establish and implement risk management measures Yes/No implementing the relevant provisions of the Cartagena Protocol on Biosafety Yes/No legal and technical measures for restoration and compensation are in place Yes/No systems in place for restoration and compensation of damage to conservation and sustainable use of biological diversity Yes/No establish and implement risk management measures Yes/No with mechanisms to facilitate the sharing of and access to information on potential adverse impacts of biotechnology on biodiversity and human health							
	Strategy	**Action**	**Proposed**	**Baseline 2023**	**Output**	**Lead**	**Partner**	**Costs**

			Activities		**indicators**	**Agency (target champion)**	**institutions**	**in US$**
	Domesticate 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	2.4.1 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
			2.4.2 Support tertiary Institutions to run short courses on	No tertiary Institution training on ABS	Increased capacity to support scientific	UNCST	NEMA MOES URA MOLG	200,000

			biosafety		research and development in genetic resources			
			2.4.4 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
2.6	By 2030, there is increased application and use of biotechnology and its products for socio-economic transformation			Corresponding KMGBF target 17: Strengthen biosafety and distribute the benefits of biotechnology.				
	National Indicators Proportion of biotechnology products available on the market Proportion of the target beneficiary population accessing biotechnology products for socio-economic transformation Yes/No the necessary measures and means for the detection and identification of products of biotechnology are in place **Headline Indicators** Yes/No the necessary biosafety legal and administrative measures in place Yes/No biosafety measures implemented Yes/No the necessary measures and means for the detection and identification of products of biotechnology Yes/No carry out scientifically sound risk assessments to support biosafety decision-making Yes/No establish and implement risk management measures Yes/No implementing the relevant provisions of the Cartagena Protocol on Biosafety Yes/No legal and technical measures for restoration and compensation are in place Yes/No systems in place for restoration and compensation of damage to conservation and sustainable use of biological diversity Yes/No establish and implement risk management measures Yes/No with mechanisms to facilitate the sharing of and access to information on potential adverse impacts of biotechnology on biodiversity and human health							

Component Indicators
N/A

Complimentary Indicators
N/A

Strategies	Action	Proposed Activities	Baseline 2023	Output indicators	Lead Agency (target champion)	Partner institutions	Costs in US$
Support biotechnology applications and use for National development	Carry out research on biotechnology	2.5.1 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
		2.5.2 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
		2.5.3 Establish a strong and effective monitoring system for biotechnology use and	Inadequate human, physical and financial infrastructure to effectively and efficiently	A strong monitoring system in place for biotechnology use and applications	NEMA	UNCST, Private sector, MLG	200,000

			applications	monitor biotechnology use and applications.				
			2.5.4 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
			2.5.6 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

4.4.3 Thematic area Three: Inclusive, Fair and Equitable Sharing of Benefits

Strategic Objective 3: To promote inclusive, fair and equitable sharing of benefits arising from utilisation of genetic resources, including digital sequence information on genetic resources, and of traditional knowledge associated with genetic resources (Corresponds to KMGBF GOAL C: Share Benefits Fairly) (Table 4.5).

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)[3] 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:

1. Introduce incentives for conservation and sustainable use of biodiversity
2. Promote Public Private Partnership (PPP) for sustainable use of biodiversity
3. Promote synergies in the implementation of ITPGRFA, CBD and the Nagoya Protocol on ABS
4. Domesticate the Nagoya Protocol on ABS, with particular consideration of social safeguards
5. Develop and implement a comprehensive incentive program that includes subsidies or tax breaks for farmers and businesses adopting eco-friendly agricultural practices and technologies
6. Develop and implement a national agroecological systems strategy for sustainable farming practices, integrated support services, and financial incentives.

[3]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 25 Strategic Objective 3: To promote inclusive, fair and equitable sharing of benefits arising from utilisation of genetic resources, including digital sequence information on genetic resources, and of traditional knowledge associated with genetic resource

3.1	By 2030, appropriate incentives for biodiversity conservation and sustainable use are in place and applied	Corresponding KMGBF target 13: Increase the sharing of benefits from genetic resources, digital sequence information and traditional knowledge. Corresponding KMGBF target 14: Integrate biodiversity in decision-making at every level. Corresponding KMGBF target 15: Businesses assess, disclose and reduce biodiversity-related risks and negative impacts. Corresponding KMGBF target 18: Reduce harmful incentives by at least $500 billion per year, and scale up positive incentives for biodiversity.
	National Indicators Number of incentives repurposed/reformed for biodiversity conservation or eliminated or phased out Number of companies publishing sustainability reports Yes/No biodiversity-relevant taxes Yes/No biodiversity-relevant charges and fees Yes/No biodiversity-relevant tradable permit schemes **Headline Indicators** C.1 Indicator on monetary benefits received C.2 Indicator on non-monetary benefits 18.1 Positive incentives in place to promote biodiversity conservation and sustainable use 18.2 Value of subsidies and other incentives harmful to biodiversity that have been eliminated, phased out or reformed **Component Indicators** Number of permits or their equivalents for genetic resources (including those related to traditional knowledge) by type of permit Value of subsidies and other incentives harmful to biodiversity, that are redirected, repurposed or eliminated **Complimentary Indicators** Total number of permits, or their equivalent, granted for access to genetic resources Number of companies publishing sustainability reports Yes/No biodiversity-relevant taxes Yes/No biodiversity-relevant charges and fees Yes/No biodiversity-relevant tradable permit schemes Trends in potentially environmentally harmful elements of government support to agriculture (producer support estimate)	

	Trends in the number and value of government fossil fuel support measures Amount of fossil-fuel subsidies per unit of gross domestic product (production and consumption)							
	Strategies	**Action**	**Proposed Activities**	**Baseline 2023**	**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	3.1.1 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
			3.1.2 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
			3.1.3 Introduce pro-poor environmental taxes and levies	Environmental taxes and market-based instruments	Effective taxes and other instruments to manage	MoFPED	NEMA, NPA, EPRC, Local governments	300,000

			and market-based instruments	are still inadequately being used to manage biodiversity in Uganda	biodiversity are under implementation			
			3.1.4 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
			3.1.5 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
			3.1.6 Integrate biodiversity accounting into national accounting	Biodiversity accounting not included national	Biodiversity accounting reflected national	NEMA, NPA	UWA, NFA, MWE, MDAs	300,000

			and reporting processes	accounting and reporting	accounting and reporting processes			
3.2	By 2030, at least 2 partnerships established to ensure that wild harvested flora and fauna-based products are sourced sustainably			Corresponding KMGBF target 9: Manage wild species sustainably to benefit people. Corresponding KMGBF target 15: Businesses assess, disclose and reduce biodiversity-related risks and negative impacts.				
	National Indicators Number of partnerships established Number of companies publishing sustainability reports **Headline Indicators** 9.1 Benefits from the sustainable use of wild species 9.2 Percentage of the population in traditional occupations **Component Indicators** Number of people using wild resources for energy, food or culture (including firewood collection, hunting and fishing, gathering, medicinal use, craft making, etc.) Red List Index (species used for food and medicine) Living Planet Index for used species **Complimentary Indicators** Proportion of fish stocks within biologically sustainable levels Degree of implementation of international instruments aiming to combat illegal, unreported and unregulated fishing Number of companies publishing sustainability reports							
	Strategy	Action	Proposed Activities	Baseline 2023	Output indicators	Lead Agency (target champion)	Partner institutions	Costs in US$
	Promote Public Private Partnership (PPP) for sustainable	Establish PPP	3.2.1 Promote PPP to collect, harvest and process plant-based products for commercialization	Private companies currently collect and process	Evidence of collaborative ventures between the private sector and public	UNCST, NARO	NEMA, NFA, FSSD, Private sector	400,000

	use of biodiversity			some plant-based products in isolation of important public institutions	institutions			
			3.2.2 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
3.3	By 2030, a well-established framework for implementing the Multilateral System of accessing and sharing of benefits arising from access to genetic resources, and from digital sequence information on genetic resources, as well as traditional knowledge associated with genetic resources, in place and operational			Corresponding KMGBF target 13: Increase the sharing of benefits from genetic resources, digital sequence information and traditional knowledge. Corresponding KMGBF target 9: Manage wild species sustainably to benefit people.				
	National Indicators Yes/No-well established framework on ABS in place Number of people using wild resources for energy, food or culture (including firewood collection, hunting and fishing, gathering, medicinal use, craft making, etc.) **Headline Indicators** C.1 Indicator on monetary benefits received							

C.2 Indicator on non-monetary benefits
9.1 Benefits from the sustainable use of wild species
9.2 Percentage of the population in traditional occupations

Component Indicators
Number of permits or their equivalents for genetic resources (including those related to traditional knowledge) by type of permit
Number of people using wild resources for energy, food or culture (including firewood collection, hunting and fishing, gathering, medicinal use, craft making, etc.)
Red List Index (species used for food and medicine)
Living Planet Index for used species

Complimentary Indicators
Total number of transfers of crop material from the Multilateral System of the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) received in a country
Total number of permits, or their equivalent, granted for access to genetic resources
Proportion of fish stocks within biologically sustainable levels

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	Develop a framework for sharing of benefits from access to PGR including from digital sequence information on genetic resources that does not	3.3.1 Develop and implement mechanisms for sharing the benefits from access to PGR, including from access to DSI on PGR, in the country	Presently there are no clear mechanism for sharing benefits from access to PGR, including from access to DSI on PGR,	Effective and documented mechanisms for sharing benefits from access to PGR, including from access to DSI on PGR, put in place and are being implemented	NARO, NEMA, UNCST	MDAs, Local governments	200,000

		run counter to other related international instruments	3.3.2 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 government, Academia	250,000
			3.3.3 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
			3.3.4 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
3.4	By 2028, the Nagoya Protocol on Access to Genetic Resources and Benefit Sharing in force and being implemented including fair and equitable sharing arising from utilization of genetic resources,		Corresponding KMGBF target 13: Increase the sharing of benefits from genetic resources, digital sequence information and traditional knowledge.					

	associated traditional knowledge, and digital sequence information							
	National Indicators Yes/No-Nagoya protocol being implemented **Headline Indicators** C.1 Indicator on monetary benefits received C.2 Indicator on non-monetary benefits **Component Indicators** Number of permits or their equivalents for genetic resources (including those related to traditional knowledge) by type of permit **Complimentary Indicators** Total number of transfers of crop material from the Multilateral System of the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) received in a country Total number of permits, or their equivalent, granted for access to genetic resources							
	Strategy	**Action**	**Proposed Activities**	**Baseline 2023**	**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	3.4.1 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
			3.4.2 Build capacity to enforce the Nagoya protocol on ABS	There is limited capacity for enforcement of the Nagoya	Number of institutions trained	NEMA	UNCST, Local governments	2,500,000

				Protocol on ABS				
			3.4.3 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
			3.4.4 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
3.5	By 2030, appropriate incentives for biodiversity conservation and sustainable use, including subsidy redesign strategies on the importation, purchase, and use of agrochemicals harmful to biodiversity, are in place and applied			Corresponding KMGBF target 18: Reduce harmful incentives by at least $500 billion per year, and scale up positive incentives for biodiversity.				
	National Indicators Number of incentives/subsidies repurposed for biodiversity conservation or the harmful ones eliminated or phased out Trends in potentially environmentally harmful elements of government support to agriculture (producer support estimate) Trends in the number and value of government fossil fuel support measures Amount of fossil-fuel subsidies per unit of gross domestic product (production and consumption) **Headline Indicators** 18.1 Positive incentives in place to promote biodiversity conservation and sustainable use 18.2 Value of subsidies and other incentives harmful to biodiversity that have been eliminated, phased our or reformed **Component Indicators** Value of subsidies and other incentives harmful to biodiversity, that are redirected, repurposed or eliminated							

	Complimentary Indicators Yes/No biodiversity-relevant taxes Yes/No biodiversity-relevant charges and fees Yes/No biodiversity-relevant tradable permit schemes Trends in potentially environmentally harmful elements of government support to agriculture (producer support estimate) Trends in the number and value of government fossil fuel support measures Amount of fossil-fuel subsidies per unit of gross domestic product (production and consumption)							
	Strategy	**Action**	**Proposed Activities**	**Baseline 2023**	**Output indicators**	**Lead Agency (target champion)**	**Partner institutions**	**Costs in US$**
	Develop and implement a comprehensive incentive program that includes subsidies or tax breaks for farmers and businesses adopting eco-friendly agricultural practices and technologies	Implement measures to lower the volumes of harmful agrochemicals used and promote the adoption of sustainable agricultural practices among farmers to reduce environmental impact.	3.5.1. Develop subsidies or tax incentives for farmers who use environmentally friendly agrochemicals and sustainable farming technologies.	Uknown number (few) farmers who have obtained subsidies or tax incentives for use of environmentally friendly agrochemicals and sustainable farming technologies.	Number of farmers receiving subsidies or tax incentives for adopting environmentally friendly agrochemicals and sustainable farming technologies.	MAAIF	MFEPD, NOGAMU, NARO	300,000
			3.5.2. Provide training to farmers about sustainable agricultural practices, integrated pest management, and the benefits of reducing	Very few farmers trained in sustainable agricultural practices, integrated pest management, and the	Number of farmers trained in sustainable agricultural practices, integrated pest management, and the benefits of reducing agrochemical	MAAIF	MFEPD, NOGAMU, NARO	300,000

			agrochemical use.	benefits of reducing agrochemical use	use.			
			3.5.3. Establish certification programs for organic or sustainable farming practices	Few farms have been certified locally (some internationall y) for organic or sustainable farming practices	Number of farms certified under organic or sustainable farming certification programs.	MAAIF	MFEPD, NOGAMU, NARO	300,000
			3.5.4. Provide on-farm technical assistance to farmers in sustainable practices and effective agrochemical use.	Very few farms have received technical assistance to farmers in sustainable practices and effective agrochemical use.	Number of farms receiving on-farm technical assistance in implementing sustainable practices and managing agrochemical use.	MAAIF	MFEPD, NOGAMU, NARO	300,000
3.6	By 2030, a comprehensive National Agroecological Systems Strategy for enhancing the sustainability, resilience, and productivity of smallholder and large-scale farmers established and fully operational			Corresponding KMGBF target 14: Integrate biodiversity in decision-making at every level.				
	National Indicators Yes/No-availability of national agro-ecological system strategy **Component Indicators** Yes/No System of Environmental-Economic Accounting in place							

	Strategy	Action	Proposed Activities	Baseline 2023	Output indicators	Lead Agency (target champion)	Partner institutions	Costs in US$
	Develop and implement a national agroecological systems strategy for sustainable farming practices, integrated support services, and financial incentives.	Implement measures to increase the overall sustainability and resilience of agricultural systems	3.6.1. Provide training and technical support to farmers on agroecological practices and their benefits.		Number of farmers trained and receiving technical support in agroecological practices.	MAAIF	NOGAMU, NARO	300,000
			3.6.2. Implement soil health improvement programs that include soil testing, organic matter application, and crop rotation practices.		Number of farms participating in soil health improvement programs and implementing recommended practices.	MAAIF	NOGAMU, NARO	300,000
			3.6.3. Establish and promote biodiversity enhancement projects, such as planting cover crops, creating habitat patches, and introducing beneficial insects.		Area (in hectares) of farms where biodiversity enhancement projects have been established and promoted.	MAAIF	NOGAMU, NARO	300,000

			3.6.4. Introduce and support climate-resilient crop varieties and adaptive farming techniques to improve yield stability and resilience.		Number of farms adopting climate-resilient crop varieties and adaptive farming techniques.	MAAIF	NOGAMU, NARO	300,000

4.4.4 Thematic Area Four: Coordination framework for biodiversity management

Strategic Objective 4: To strengthen stakeholder co-ordination, inclusive participation, partnerships and frameworks for biodiversity conservation (Corresponds to KMGBF GOAL D: Invest and Collaborate) (Table 4.6).

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 NBSAPIII 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 KMGBF target (s) are provided in the table that follows.

a) Mainstream biodiversity issues in the NDP, Sectoral and District Development Plans based on available biodiversity mapping and data, for improved land use planning
b) Review, update and initiate a participatory and inclusive process of implementation of NBSAP III
c) Put in place a monitoring and evaluation framework for NBSAP III
d) Implement a comprehensive multi-stakeholder engagement framework for biodiversity conservation and management
e) Establish a Multi-Stakeholder Alliance Platform. to serve as a structured forum for stakeholders from the private sector, development partners, civil society, Indigenous Peoples and Local Communities (IPLCs), cultural, and faith-based institutions
f) Enhance networking by scientists, policymakers, non-governmental organizations (NGOs), and local communities from both the Global North and South to share knowledge, research, and best practices related to biodiversity, conservation

Table 26 Strategic Objective 4: To strengthen stakeholder co-ordination, inclusive participation, partnerships and frameworks for biodiversity conservation

4.1	By 2028, biodiversity values integrated into the National Development Plan, Sector Strategic Plans, Local Government Development Plans, Budget Framework Papers, Ministerial Policy Statements, regulatory instruments and budgets.	Corresponding KMGBF target 14: Integrate biodiversity in decision-making at every level.

National Indicators
Yes/No-integration of biodiversity into the National Development Plan
Number of sectors and local governments that have integrated biodiversity in their development plans and budgets
Proportion of the national, sector program and local governments' budgets allocated for biodiversity conservation
Proportion of the national, sector program and local governments' budgets allocated for biodiversity released/disbursed and spent

Component Indicators
Yes/No System of Environmental-Economic Accounting in place

Strategy	Action	Proposed Activities	Baseline 2023	Output indicators	Lead Agency (Target Champions)[4]	Partner institutions[5]	Costs in US$[6]
Mainstream biodiversity issues in the NDP, Sectoral and District Development Plans based on available biodiversity	Put in place measures to enhance inclusive and equitable stakeholder participation and coordination	4.1.1 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
		4.1.2 Develop an integrated biodiversity management	Biodiversity related polices are disjointed	A national Biodiversity policy framework in	NEMA	MWE, MDAs, Local governments	100,000

[4] Institution(s) that will take lead in the implementation of national target in collaboration with the partner institutions
[5] 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.
[6] Minimum estimate needed. Guidelines for Financing Biodiversity, PIR, BER and BFP has more information.

	mapping and data, for improved land use planning through use of the MH		policy framework		place			
			4.1.3 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
			4.1.4 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
			4.1.5 Lobby Government and other relevant stakeholders to put in place a coordination	Weak coordination among biodiversity related conventions	A coordinated mechanism put in place for enhanced information sharing across	NEMA	MWE, MDAs, Local governments	150,000

			mechanism for implementation of Multilateral Environmental Conventions		sectors			
			4.1.6 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
			4.1.7 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
			Ensure that priority areas for biodiversity vital for ecosystem services provisions such as KBAs, Ramsar Sites are mainstreamed in sectoral, cross-sectoral and district development	Inadequate incorporation of biodiversity priority areas in the sectoral, cross-sectoral and district development plans	Integration of irreplaceable biodiversity hotspots such as KBAs, Ramsar sites in the NDP, sectoral and District Development	▪ NEMA	NPA, MDAs, Local governments,	200,000

			plans					
			4.1.8 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
			4.1.9 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
4.2	By 2025 Monitoring, Evaluation, Accountability and Learning strategy for the implementation of NBSAP III in line with national reporting guidelines reviewed			Corresponding KMGBF target 14: Integrate biodiversity in decision-making at every level.				
	National Indicators Yes/No-Availability of Monitoring, Evaluation, Accountability and Learning (MEAL) Framework for NBSAPIII **Headline Indicators** N/A **Component Indicators** N/A							

	Complimentary Indicators N/A							
	Strategy	**Action**	**Proposed Activities**	**Baseline 2023**	**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	4.2.1 Develop gender responsive guidelines for implementing NBSAPIII	No guidelines	Gender-responsive guidelines and budgets in place	MGLSD, NEMA	MDAs, Local governments, Cultural institutions	100,000
			4.2.2 Produce and disseminate NBSAPIII to stakeholders	NBSAPIII development in progress	-Number of stakeholders with NBSAPIII -Devise a monitoring and feedback mechanism on NBSAP information on consumption	NEMA	MDAs, Local governments, NGOS, IPLCs, Cultural institutions	80,000
			4.2.3 Facilitate the mainstreaming of NBSAPIII actions in national, sectoral and district plans and programmes	Not yet done	Key issues in NBSAPIII 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

			4.2.4 Undertake regular cross-sectoral consultations on NBSAPIII implementation	Not yet done	Revise strategies for implementation of NBSAP as appropriate	NEMA	MDAs, Academia, Local governments	200,000
	Put in place a monitoring and evaluation framework for NBSAP	Carry out periodic monitoring and evaluation of NBSAPIII	4.2.5 Develop and implement a gender responsive NBSAPIII 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
			4.2.6 Undertake Monitoring and Evaluation of the implementation of NBSAPIII	Not yet done	Periodic monitoring and evaluation of NBSAPIII	NEMA, NPA	MDAs, Local governments	150,000
4.3	By 2030, ensure the inclusive and meaningful representation and participation by IPLCs, women and girls, children and youth, and persons with disabilities			Corresponding KMGBF target 22: Ensure participation in decision-making and access to justice and information related to biodiversity for all. Corresponding KMGBF target 23: Ensure gender equality and a gender-responsive approach for biodiversity action				
	National Indicators Number of MOUs signed (partnerships established with special interest groups (organized groups of or responsible for IPLCs, women, girls, children, youth, and persons with disabilities). Yes/No MOUs available and implemented Yes/No-participation of the different interest groups **Headline Indicators** N/A **Component Indicators**							

Proportion of total adult population with secure tenure rights to land, (a) with legally recognized documentation, and (b) who perceive their rights to land as secure, by sex and type of tenure

Complimentary Indicators

Percentage of positions in national and local institutions, including: (a) the legislatures; (b) the public service; and (c) the judiciary, compared to national distributions, by sex, age, persons with disabilities and population groups

Yes/No systems to track and make public allocations for gender equality and women's empowerment

Proportion of total agricultural population with ownership or secure tenure rights over agricultural land, by sex; and share of women among owners or rights-bearers of agricultural land, by type of tenure

Yes/No legal framework (including customary law) guarantees women's equal rights to land ownership and/or control

Number of protected areas that have completed a site-level assessment of governance and equity (SAGE)

Trends in number of environmental human rights defenders killed annually, disaggregated by country and gender; and number of indigenous environmental human rights defenders killed

Land tenure of indigenous peoples and local communities by sex and type of tenure

Proportion of population who believe decision-making is inclusive and responsive, by sex, age, disability and population group

Strategy	**Action**	**Proposed Activities**	**Baseline 2023**	**Output indicators**	**Lead Agency (Target Champions)[7]**	**Partner institutions[8]**	**Costs in US$[9]**
Implement a comprehensive multi-stakeholder engagement framework for biodiversity conservation and management	Develop and implement an inclusive biodiversity stewardship platform that includes IPLCs, women and girls, children and youth, and persons with	4.3.1 Develop inclusive community-centric capacity building events to empower IPLCs, women, girls, children, and persons with disabilities with knowledge and skills related to	Although community capacity building events are held, they do not cover all disadvantaged categories of people	Number of participants from IPLCs, women, girls, children, and persons with disabilities who actively engage in capacity-building events focused on	NEMA	MGLSD, UNCST, MWE	200,000

[7] Institution(s) that will take lead in the implementation of national target in collaboration with the partner institutions

[8] 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.

[9] Minimum estimate needed. Guidelines for Financing Biodiversity, PIR, BER and BFP has more information.

		disabilities	biodiversity conservation and stewardship		biodiversity conservation			
			4.3.2 Develop and implement interactive biodiversity action projects involving IPLCs, women and girls, children and youth, and persons with disabilities in biodiversity conservation efforts.	The current biodiversity actions need to be enhanced to include more IPLCs, women and girls, children and youth, and persons with disabilities	Number of interactive biodiversity action projects developed and implemented that include the participation of Indigenous Peoples and Local Communities (IPLCs), women and girls, children and youth, and persons with disabilities	NEMA	MGLSD, UNCST, MWE	200,000
			4.3.3 Create inclusive stakeholder engagement forums to ensure the voices and concerns of IPLCs, women and girls, children and youth, and persons with disabilities are specifically	The current stakeholder engagement forums need to be enhanced further for more engagement of IPLCs, women and girls, children and youth, and persons with disabilities	Number of inclusive stakeholder engagement forums held that actively involve IPLCs, women and girls, children and youth, and persons with disabilities.	NEMA	MGLSD, UNCST, MWE	200,000

			addressed					
4.4	By 2030, collaboration and partnerships strengthened with private sector, development partners, civil society, IPLCs, cultural and faith-based institutions			Corresponding KMGBF target 21: Ensure that knowledge is available and accessible to guide biodiversity action.				
	National Indicators Number of partnerships established (MOUs signed and implemented) with the private sector, development partners, civil society, cultural and faith-based institutions **Headline Indicators** N/A **Component Indicators** N/A **Complimentary Indicators** N/A							
	Strategy	**Action**	**Proposed Activities**	**Baseline 2023**	**Output indicators**	**Lead Agency (Target Champions)[10]**	**Partner institutions[11]**	**Costs in US$[12]**
	Establish a Multi-Stakeholder Alliance Platform. to serve as a structured forum for stakeholders	Define and implement shared goals, identify key issues, and create an actionable roadmap for collaboration	4.4.1 Organize collaborative sessions that bring together stakeholders from the private sector, civil society, and Indigenous	The current sessions need to be enhanced to include more stakeholders, including the private sector, civil society, and Indigenous	Number of collaborative sessions organized that include representatives from the private sector, civil society,	NEMA	MWE, NFA, UWA, MAAIF, NARO, UNCST, Academia, Industry	200,000

[10] Institution(s) that will take lead in the implementation of national target in collaboration with the partner institutions
[11] 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.
[12] Minimum estimate needed. Guidelines for Financing Biodiversity, PIR, BER and BFP has more information.

	from the private sector, development partners, civil society, Indigenous Peoples and Local Communities (IPLCs), cultural, and faith-based institutions	in biodiversity conservation.	Peoples and Local Communities (IPLCs).	Peoples and Local Communities (IPLCs).	and Indigenous Peoples and Local Communities.			
			4.4.2 Establish regular forums and dialogues to facilitate open communication among private sector players, development partners, civil society organizations, and faith-based institutions.	The current forums and dialogues are not frequent enough for adequate communication among private sector players, development partners, civil society organizations, and faith-based institutions.	Number of forums and dialogues held per year to facilitate open communication among the diverse stakeholders in biodiversity conservation..	NEMA	MWE, NFA, UWA, MAAIF, NARO, UNCST, Academia, Industry	200,000
			4.4.3 Develop and implement collaborative programs that involve participation of the private sector, government, and philanthropic organizations that benefit communities and the environment.	The current collaborative programs need to be ahanced and increased for more participation of the private sector, government, and philanthropic organizations that benefit communities and the environment	Number of collaborative programs developed and implemented involving private sector, government, and philanthropic organizations.	NEMA	MWE, NFA, UWA, MAAIF, NARO, UNCST, Academia, Industry	200,000
4.5	By 2030, international cooperation and networking, including south-south cooperation, north-south cooperation, is effective to enhance and foster			Corresponding KMGBF target 20: Strengthen capacity-building, technology transfer, and scientific and technical cooperation for biodiversity				

	scientific, technical and communication advancements that support the value of biodiversity conservation and sustainable use							
	National Indicators Yes/No- international cooperation agreements available Number of international cooperation partnerships established **Headline Indicators** N/A **Component Indicators** N/A **Complimentary Indicators** N/A							
	Strategy	**Action**	**Proposed Activities**	**Baseline 2023**	**Output indicators**	**Lead Agency (Target Champions)[13]**	**Partner institutions[14]**	**Costs in US$[15]**
	Enhance networking by scientists, policymakers, non-governmental organizations (NGOs), and local communities from both the	Promote communication and collaboration among diverse stakeholders from both the Global North and South	4.5.1 Organize periodic workshops that bring together scientists, policymakers, NGOs, and community leaders from both the Global North and South.	There have been little attempts to organise deliberate workshops for networking between the global north and south	Number of collaborative research projects initiated as a result of networking at these conferences, tracked annually.	NEMA	UNCST, Academic, Research institutions, NGOs, CBOs, IPLCs, Youth, Women, Girls	300,000

[13] Institution(s) that will take lead in the implementation of national target in collaboration with the partner institutions
[14] 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.
[15] Minimum estimate needed. Guidelines for Financing Biodiversity, PIR, BER and BFP has more information.

	Global North and South to share knowledge, research, and best practices related to biodiversity, conservation technologies, and sustainable practices.		4.5.2 Create an online platform that serves as a hub for stakeholders to share research, resources, and best practices about biodiversity conservation.	There exists online platforms but these are not specifically focused on supporting biodiverity conservation	Number of registered users from diverse stakeholder groups (scie	NEMA	UNCST, Academic, Research institutions, NGOs, CBOs, IPLCs, Youth, Women, Girls	300,000
			4.5.3 Develop and implement training programs aimed at enhancing the skills of stakeholders in biodiversity conservation and sustainable practices.	There exists some training programs for skills enhancement in biodiversity conservation but this still needs enhancement	Percentage increase in training participants reporting improved knowledge and skills related to biodiversity conservation and sustainable	NEMA	UNCST, Academic, Research institutions, NGOs, CBOs, IPLCs, Youth, Women, Girls	300,000

4.4.5 Thematic Area Five: Knowledge Management, Monitoring and Research

Strategic Objective 5: To facilitate and build capacity for research, technology development, innovation, monitoring and knowledge management (Corresponds to KMGBF GOAL D: Invest and Collaborate) (Table 4.7)

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:
Support research in strategic areas of biodiversity conservation and sustainable use;

a) Build capacity for information management and exchange in taxonomy; and,
b) 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 KMGBF targets. The NBSAP III will be implemented through the following targets:

a) Support research in strategic areas of biodiversity conservation and sustainable use
b) Build capacity for information management and exchange in taxonomy
c) Strengthen the role of indigenous peoples and local communities in biodiversity conservation and management including gender considerations
d) Implement AI and data analytics for enhanced decision making in biodiversity conservation

Table 27 Strategic Objective 5: To facilitate and build capacity for research, technology development, innovation, monitoring and knowledge management

5.1	By 2030, knowledge, research and science base relating to biodiversity has been significantly improved, and relevant technologies have been improved, shared and applied			Corresponding KMGBF target 20: Strengthen capacity-building, technology transfer, and scientific and technical cooperation for biodiversity. Corresponding KMGBF target 21: Ensure that knowledge is available and accessible to guide biodiversity action..				
	National Indicators Number of knowledge products about biodiversity available Number of technologies developed Proportion of developed technologies shared and applied **Headline Indicators** 21.1 Indicator on biodiversity information for monitoring the Kunming-Montreal Global Biodiversity Framework D.1 International public funding, including official development assistance (ODA) for conservation and sustainable use of biodiversity and ecosystems D.2 Domestic public funding on conservation and sustainable use of biodiversity and ecosystems D.3 Private funding (domestic and international) on conservation and sustainable use of biodiversity and ecosystems **Component Indicators** N/A **Complimentary Indicators** Finance resources mobilized for development of technology							
	Strategy	Action	Proposed Activities	Baseline 2023	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	5.1.1 Support innovative research, science and technology in the management of biodiversity with particular focus on value	Research on value addition of natural products including medicinal plants is presently limited	Industrial development and commercialization of innovations and new biodiversity–	UNCST, NEMA	MDAs, Academia	300,000

			addition, product development and innovation with due considerations of women, men and youth		based products			
			5.1.2 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
			5.1.3Undertake 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
			5.1.4 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	UWA, NFA, MAAIF, MoEMD, MTWA, MWE	UNCST, NEMA, MoLoG, Local Governments, CBOs, NGOs	150,000

					research areas in biodiversity			
			5.1.5 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
			5.1.6 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
			5.1.7 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	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	NEMA	UWA, NFA, MWE, MTWA, MAAIF, NGOs, CBOs, Media	200,000

			international levels		achieved			
5.2	By 2030, basic taxonomic information is packaged in user-friendly formats and widely disseminated, including use of school systems			Corresponding KMGBF target 21: Ensure that knowledge is available and accessible to guide biodiversity action.				
	National Indicators Number of information packages available Number of information packages disseminated through the school system **Headline Indicators** 21.1 Indicator on biodiversity information for the monitoring the Kunming-Montreal Global Biodiversity Framework **Component Indicators** Species Status Index Extent to which (a) global citizenship education and (b) education for sustainable development, including gender equality and human rights, are mainstreamed at all levels in: (i) national education policies, (ii) curricula, (iii) teacher education and (iv) student assessments **Complimentary Indicators** Proportion of known species assessed through The IUCN Red List of Threatened Species™ Number of assessments on the IUCN Red List of Threatened Species™ Species Status Information Index							
	Strategy	Action plan	Proposed Activities	Baseline 2023	Output indicators	Lead Agency (target champion)	Partner institutions	Costs in US$
	Build capacity for information management and exchange in taxonomy	Integrate taxonomic information (including on little-known	5.2.1 Conduct awareness raising on the role of taxonomy in biodiversity	Role of taxonomy not well articulated in many relevant institutions	Role of taxonomy in biodiversity conservation well	Academia, NARO	NEMA, UNCST, MDAs, Local government	150,000

		taxa which may have commercial value) in decision making	conservation in public and private institutions		understood in relevant institutions		s	
			5.2.2 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
			5.2.3 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

			5.2.4 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
			5.2.5 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
			5.2.6 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
			5.2.7 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

			5.2.8 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
			5.2.9 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
5.3	By 2028, traditional knowledge and practices of indigenous peoples and local communities integrated into biodiversity conservation and sustainable use at all levels			Corresponding KMGBF target 21: Ensure that knowledge is available and accessible to guide biodiversity action. Corresponding KMGBF target 22: Ensure participation in decision-making and access to justice and information related to biodiversity for all.				
	National Indicators Yes/No-integration of traditional knowledge and practices into program strategies **Headline Indicators** N/A							

	Component Indicators N/A **Complimentary Indicators** N/A							
	Strategy	**Action**	**Proposed Activities**	**Baseline 2023**	**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	5.3.1 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
			5.3.2 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
			5.3.3 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	NEMA, Local governments	UWA, NFA, MDAs, NGOs, CBOs	300,000

					conservation			
			5.3.4 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
5.4	By 2030, the digital revolution, including artificial intelligence, is harnessed for operational efficiency and sustainable conservation practices			Corresponding KMGBF target 20: Strengthen capacity-building, technology transfer, and scientific and technical cooperation for biodiversity.				
	National Indicators Proportion of institutions/organizations that have harnessed the digital revolution for biodiversity conservation Trends in the proportion of the population using artificial intelligence for biodiversity conservation **Headline Indicators** N/A **Component Indicators** N/A							

	Complimentary Indicators N/A							
	Strategy	**Action plan**	**Proposed Activities**	**Baseline 2023**	**Output indicators**	**Lead Agency (target champion)**	**Partner institutions**	**Costs in US$**
	Implement AI and data analytics for enhanced decision making in biodiversity conservation.	Develop AI-Driven Monitoring Systems	Create and deploy AI-based monitoring systems that use remote sensing and data analytics to track biodiversity changes	No AI based monitoring systems are in use currently	Number of biodiversity components (e.g. species) monitored using AI-driven systems	NEMA	MFPED, MAAIF, NARO, UNCST, NGOs, Academia	500,000
		Adopt predictive analytics biodiversity conservation	Utilize predictive analytics to allocate resources efficiently for conservation	Predictive analytics are currently not in use for biodiversity resource allocations	Percentage increase in effectiveness of resource allocation and use	NEMA	MFPED, MAAIF, NARO, UNCST, NGOs, Academia	500,000

4.4.6 Thematic Area Six: Awareness and Education

Strategic Objective 6: To enhance stakeholder awareness, education and stewardship of biodiversity conservation (Corresponds to KMGBF GOAL D: Invest and Collaborate) (Table 4.8).

The review process of NBSAPII 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 NBSAPII. This was a serious impediment to the implementation of NBSAPII. 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 NBSAPIII both to raise awareness of NBSAPIII 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 NBSAPIII 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 28 Strategic Objective 6: o enhance stakeholder awareness, education and stewardship of biodiversity conservation

6.1	By 2030, stakeholders are aware of the meaning and values of biodiversity and how to use it sustainably	Corresponding KMGBF target 14: Integrate biodiversity in decision-making at every level. Corresponding KMGBF target 15: Businesses assess, disclose and reduce biodiversity-related risks and negative impacts. Corresponding KMGBF target 16: Enable sustainable consumption choices to reduce waste and overconsumption. Corresponding KMGBF target 21: Ensure that knowledge is available and accessible to guide biodiversity action.

National Indicators
Proportion of the population aware of the value of biodiversity and its use
Trends in the proportion of the population aware of the value of biodiversity and its use

Headline Indicators
21.1 Indicator on biodiversity information for the monitoring the Kunming-Montreal Global Biodiversity Framework

Component Indicators
Yes/No the System of Environmental-Economic Accounting in place
Food waste Index
Ecological footprint
Species Status Index

Complimentary Indicators
Number of companies publishing sustainability reports
Proportion of known species assessed through The IUCN Red List of Threatened Species™
Number of assessments on the IUCN Red List of Threatened Species™
Species Status Information Index

Strategies	Action	Proposed Activities	Baseline 2023	Output indicators	Lead Agency (target champion)	Partner institutions	Costs in US$
Promote	Conduct	6.1.1 Undertake	Not yet done	Number of	NEMA,	MDAs,	500,000

	awareness of NBSAPIII among key stakeholders Policy makers, professionals, private sector, general public	public awareness on biodiversity	intensive awareness raising on the content of NBSAPIII at all levels		stakeholders at all levels are aware of NBSAPII	Local governments	UNCST	
	Develop stakeholder /public awareness programmes on biodiversity and its values		6.1.2 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
			6.1.3 Sensitize local communities including IPLCs on biodiversity	Not yet done	Number of IPLCs and community groups	Local governments	NEMA, MDAs	250,000

			conservation		sensitized on biodiversity conservation			
			6.1.4 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	MGLSD	NEMA, MDAs, Local governments	300,000
					Number and type of IEC materials			
6.2	By 2030, learners and teaching staff are aware of the values of biodiversity and are knowledgeable/skilled about systematic conservation planning including use of spatial planning tools applicable in biodiversity conservation.			Corresponding KMGBF target 21: Ensure that knowledge is available and accessible to guide biodiversity action. Corresponding KMGBF target 14: Integrate biodiversity in decision-making at every level.				
	National Indicators Proportion of learners knowledgeable about the value of biodiversity in the country Proportion of teaching staff aware of the value of biodiversity and its use **Headline Indicators** 21.1 Indicator on biodiversity information for the monitoring the Kunming-Montreal Global Biodiversity Framework **Component Indicators** Extent to which (a) global citizenship education and (b) education for sustainable development, including gender equality and human rights, are mainstreamed at all levels in: (i) national education policies, (ii) curricula, (iii) teacher education and (iv) student assessments Yes/No the System of Environmental-Economic Accounting in place Species Status Index							

Complimentary Indicators
Proportion of known species assessed through The IUCN Red List of Threatened Species™
Number of assessments on the IUCN Red List of Threatened Species™

Strategy	Action	Proposed Activities	Baseline 2023	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	6.2.1Develop 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
		6.2.2 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
		6.2.3 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

4.4.7 Thematic Area Seven: Funding mechanisms

Strategic Objective 7: Objective 7: To promote innovative and sustainable funding solutions for implementing NBSAPIII *(Corresponds to KMGBF GOAL D: Invest and Collaborate) (Table 4.9).*

While the costs for implementing NBSAPIII 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 NBSAPIII to implementing decision 15/7 of CBD COP15 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 29 Strategic Objective 7: To promote innovative and sustainable funding solutions for implementing NBSAPIII

7.1	By 2025, a biodiversity finance plan is developed and operationalized			Corresponding KMGBF target 18: Reduce harmful incentives by at least $500 billion per year, and scale up positive incentives for biodiversity. Corresponding KMGBF target 19: Mobilize $200 billion per year for biodiversity from all sources, including $30 billion through international finance.				
	National Indicators **Headline Indicators** **Component Indicators** **Complimentary Indicators** Yes/No- Biodiversity finance plan available							
	Strategy	**Action**	**Proposed Activities**	**Baseline 2023**	**Output indicators**	**Lead Agency (target champion)**	**Partner institutions**	**Costs in US$**
	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	By 2030, the financing gap for implementing NBSAPIII is reduced	Corresponding KMGBF Target 19: Mobilize $200 billion per year for biodiversity from all sources, including $30 billion through international finance

National Indicators
TBD

Headline Indicators
D.1 International public funding, including official development assistance (ODA) for conservation and sustainable use of biodiversity and ecosystems
D.2 Domestic public funding on conservation and sustainable use of biodiversity and ecosystems
D.3 Private funding (domestic and international) on conservation and sustainable use of biodiversity and ecosystems*

Component Indicators
N/A

Complimentary Indicators
Amount of funding provided through the Global Environment Facility and allocated to the biodiversity focal area
Foreign direct investment, official development assistance and South-South cooperation
Amount and composition of biodiversity-related finance reported to the OECD Creditor reporting system
Dollar value of financial and technical assistance (including through North-South, South-South and triangular cooperation) committed to developing countries
Dollar value of all resources made available to strengthen statistical capacity in developing countries
Amount of biodiversity-related philanthropic funding
Yes/No payments for ecosystem services (PES) programmes in place
Yes/No assessed values of biodiversity in accordance with the Convention, (b) identified and reported funding needs, gaps and priorities, (c) developed national financial plans for biodiversity, (d) provided with the necessary funding and capacity building to undertake the above activities

Strategy	Action	Proposed Activities	Baseline 2023	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	By 2025, new financing solutions are operational and new funding mobilized for biodiversity conservation			Corresponding KMGBF Target 19: Mobilize $200 billion per year for biodiversity from all sources, including $30 billion through international finance				
	National Indicators Number of finance solutions implemented Amount of funding mobilized aggregated by finance solution **Headline Indicators** D.2 Domestic public funding on conservation and sustainable use of biodiversity and ecosystems D.3 Private funding (domestic and international) on conservation and sustainable use of biodiversity and ecosystems* **Component Indicators**							

N/A

Complimentary Indicators
Yes/No payments for ecosystem services (PES) programmes in place

Strategies	**Action**	**Proposed Activities**	**Baseline 2023**	**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	MoFPED	NEMA NPA MWE	400,000

					services			
			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	Understanding and appreciation of PES and biodiversity offsets among stakeholder groups is still limited	Increased level of payments for ecosystems services and application of biodiversity offsets	NEMA, MWE	MoFPED MDAs NGOs Development partners MWE Local governments	4,000,000

			7.3.10 Empower existing Organizations to manage Conservation Trust Funds.	Existing Conservation Organizations have limited support to manage Conservation Trust Funds	Number of habitat/ conservation banks established	MoFPED	MWE, NEMA, MDAs, NGOs, Development partners	400,000

5 IMPLEMENTATION OF NBSAPIII

5.1 Implementation approach

5.1.1 Inclusive and Participatory Approach

This NBSAP III will be implemented in a participatory and inclusive process that involves all stakeholders, including indigenous peoples and local communities, in the planning, implementation, and monitoring of biodiversity conservation efforts. This approach recognizes that biodiversity conservation is a shared responsibility that requires the involvement of all stakeholders, including those who depend on natural resources for their livelihoods. A participatory approach will ensure that diverse perspectives and values are considered, which will lead to more effective and sustainable conservation outcomes. For example, indigenous peoples may have traditional knowledge and practices that can inform conservation efforts, while local communities may have a deep understanding of the ecosystems they depend on.

To achieve this, Uganda will establish a multi-stakeholder platform for dialogue and coordination among government agencies, civil society organizations, private sector companies, and local communities. This platform will provide opportunities for regular meetings, consultations, and information-sharing to ensure that all stakeholders are informed and involved throughout the process. The platform will also facilitate collaboration and cooperation among stakeholders, which will help to identify synergies and address conflicts early on. Furthermore, Uganda will establish clear mechanisms for stakeholder engagement, such as public consultations and community-based participatory research, to ensure that all voices are heard.

In addition to establishing a multi-stakeholder platform, Uganda will also provide capacity-building opportunities for stakeholders to develop their skills and knowledge on biodiversity conservation. This may include training programs for government officials, community members, and private sector representatives on topics such as ecological principles, conservation practices, and sustainable development strategies. Capacity-building programs will help to build trust and understanding among stakeholders, which will then facilitate cooperation and collaboration.

5.1.2 Recognize and Respect Cultural Diversity

Implementation of this revised NBSAP will recognize and respect the diverse values and perspectives of different cultures and societies in the country. Cultural heritage and traditional knowledge is critically important in biodiversity conservation and sustainable development. Uganda recognizes the rights of indigenous peoples and local communities (IPLCs) and has a track record of working with them, as such these efforts should be upheld to develop culturally sensitive conservation strategies that respect their values and beliefs. Uganda's IPLCs should therefore be involved in the development of conservation strategies and participate in training on conservation practices. While the country recognizes the cultural diversity of its population, Uganda should also put in place mechanisms for recognizing the cultural significance of specific ecosystems or species which will ensure that biodiversity conservation efforts are socially responsible and effective.

In addition to recognizing the cultural diversity of its population, Uganda will also take steps to address any conflicts or tensions between different cultural groups. This will include establishing mechanisms for conflict resolution, providing education on cultural differences, or promoting inter-cultural dialogue. By promoting inter-cultural understanding and cooperation, Uganda will build stronger relationships between different cultural groups and promote social harmony while enhancing cultural heritage in biodiversity conservation. By recognizing the importance of cultural heritage in biodiversity conservation, Uganda can promote social cohesion and build a sense of national identity.

5.1.3 Whole-of-Government Approach

The revised NBSAP should be implemented through a whole-of-government approach that involves all government agencies working together to achieve common goals. This will require coordination among government ministries, departments, and agencies to ensure that biodiversity conservation efforts are integrated into various sectors such as agriculture, energy, infrastructure, health, education, and environment. For example, the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) could work with the Ministry of Water and Environment (MWE) to develop agricultural practices that promote biodiversity conservation on agricultural landscapes. Similarly, the Ministry of Health could work with the Ministry of Water and Environment to develop health education programs that promote sustainable consumption patterns. By taking a whole-of-government approach to biodiversity conservation, Uganda will ensure that all government agencies are working together towards common goals.

In addition to coordinating among government agencies, Uganda should also establish mechanisms for inter-agency collaboration. This will include establishing joint working groups or task forces to address specific issues related to biodiversity conservation. For example, a joint working group could be established between the Ministry of Water and Environment and the Ministry of Energy and Mineral Development to develop renewable energy sources that promote biodiversity conservation. Such whole-of-government approaches to biodiversity conservation will ensure that all government agencies are working together towards common goals.

5.1.4 Gender Equality

Gender equality recognizes the different roles and contributions that men and women, girls and boys, youth and elderly people play in biodiversity conservation and sustainable development. Women's participation in decision-making processes will be increased, and their concerns and perspectives should be taken into account in the planning and implementation of biodiversity conservation efforts. For example, women's groups will be involved in community-based monitoring programs to monitor changes in ecosystem health or species populations. Similarly, women's organizations will be involved in developing policies on sustainable land-use planning or sustainable agriculture practices. By approaching biodiversity conservation and management in this NBSAP through the lens of different gender categories, Uganda will surely capture all concerns to its national development.

5.1.5 Human Rights

The revised NBSAP should adopt a human rights-based approach to biodiversity conservation by recognizing the rights of all individuals to participate in decision-making processes related to biodiversity conservation and sustainable development. This includes the right to access information, education, participation, justice, and freedom from discrimination. Uganda should ensure that all stakeholders have access to their rights to participate in decision-making processes related to biodiversity conservation efforts. As such, Uganda should establish mechanisms for public participation in decision-making processes related to biodiversity conservation efforts. This can include holding public hearings or meetings to discuss proposed conservation plans or projects. Additionally, Uganda should establish a complaints mechanism for individuals who feel that their rights have been violated in the context of biodiversity conservation efforts. These complaints can then be addressed to ensure that all individuals have access to their rights and can participate fully in decision-making processes related to biodiversity conservation efforts.

5.1.6 Ecosystem Approach

This NBSAP recognizes that ecosystems are interconnected systems with multiple components interacting with each other. As such, during implementation of the NBSAP, there should be

consideration of the broader ecological context in which species live, including habitats, landscapes, ecosystem services, and the impacts of human activities on these systems. An ecosystem approach will help to identify synergies between different species conservation efforts and ensure that conservation actions are effective at multiple scales. Uganda has already developed and implemented several ecosystem-based conservation plans that consider the interdependence of different species and ecosystems e.g. in the Kidepo Critical Landscape and the Mt. Elgon Landscape. This has involved developing conservation plans for entire landscapes, rather than focusing on individual species or habitats. In implementing this NBSAP, existing ecosystem-based plans and strategies should provide useful lessons for maintaining ecosystem services such as pollination, pest control, and climate regulation in other ecosystems or regions. Moreover, mechanisms for monitoring and evaluating the effectiveness of ecosystem-based conservation efforts should be developed and/or strengthened.

5.1.7 Intergenerational Equity

The recently concluded National Housing and Population Census (2024) showed that the Uganda is a young country with children (0 – 17 years) forming 50.5% of the population.[16] The youth (18 – 30 years) make up 22.7% while the older persons (60+ years) comprise only 5.0% of the population. Implementation of this NBSAP should therefore consider intergenerational equity by balancing short-term needs (human well-being) with long-term needs (conservation). This will require consideration of the needs of future generations in decision-making processes related to biodiversity conservation efforts. Uganda should ensure that its actions today do not compromise the ability of future generations to meet their own needs. Uganda could, for example, develop long-term conservation plans that take due consideration of the impacts of climate change on ecosystems and species populations, including developing strategies for adapting to climate change or mitigating its impacts on ecosystems. While doing this, mechanisms should be established to involve young people in decision-making processes related to biodiversity conservation efforts.

5.1.8 Integration with Other National Development Plans

The revised NBSAP should be integrated with other national development plans and policies, such as the National Development Plan, the National Poverty Reduction Strategy, and the National Environment Policy. This will ensure that biodiversity conservation is mainstreamed into national development efforts and that biodiversity conservation goals are aligned with broader national development objectives. As already noted, mechanisms for coordination and collaboration between different government agencies and stakeholders involved in different national development plans and policies need to be established. This may include establishing joint working groups or task forces to address specific issues related to biodiversity conservation and sustainable development.

5.1.9 Monitoring and Evaluation

As already indicated in the Monitoring and Evaluation section of this NBSAP, a robust monitoring and evaluation system to track progress towards biodiversity conservation goals and targets is very essential. This will be based on indicators for tracking changes in species populations, ecosystem health, and ecosystem services, as well as evaluating the effectiveness of conservation actions. It will also be imperative to establish guidelines for monitoring and evaluation of biodiversity conservation efforts, including for example, guidelines for data collection, analysis, and reporting, as well as establishing a system for sharing data and information among stakeholders. A robust monitoring and evaluation system will ensure that Uganda's biodiversity conservation efforts are transparent, accountable, and effective.

5.1.10 Capacity Building and Training

Capacity building and training for conservation staff, researchers, and stakeholders to enhance their skills and knowledge in biodiversity conservation should be considered as a priority during the implementation of this NBSAP. This can include providing training on conservation techniques, research methods, and policy development. A national training program for conservation staff on topics such as species identification, habitat restoration, community-based conservation, monitoring and evaluation of biodiversity conservation efforts may be established. Uganda will need to position herself strategically to benefit from the capacity development and scientific cooperation programmes of the CBD and other sister UN treaties. This will greatly support the development of local capacity in biodiversity conservation.

5.3.11. Public Awareness and Education

One of the strongest pointers of the success of this NBSAP will be the level of stakeholder awareness on biodiversity conservation. Implementation of this NBSAP should therefore prioritize public awareness and education on biodiversity conservation issues to engage citizens in conservation efforts and promote behaviour change. Public awareness campaigns should be developed to raise awareness about the importance of biodiversity conservation or the impacts of human activities on ecosystems. This should involve the development of educational materials or programs for schools on biodiversity conservation topics such as species identification, habitat conservation, or sustainable agriculture practices. Mechanisms for engaging the private sector in public awareness and education efforts should be established. This may include partnering with companies to develop public awareness campaigns or educational materials.

5.1.12 Budgeting and Financing

Implementation of this NBSAP will require financing. As part of the implementation, implementation "champions" mentioned in this NBSAP should ensure that a certain level of awareness exists to include biodiversity conservation in their budgets. Budgeting and financing for biodiversity conservation efforts should be made a priority to ensure that sufficient resources are available to support conservation activities. Several financing mechanisms are mentioned in the Financing and Resource mobilisation section of this NBSAP

5.2 Implementation Arrangements

The implementation arrangement for this NBSAP III will be stakeholders based as highlighted (Table 5.1).

Table 30 Implementation Arrangements

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

	NBSAPIII
Sectoral Agencies	○ Implementing and reporting on national biodiversity targets as specified in NBSAPIII ○ Providing guidance and support to their respective links at district and local levels to ensure biodiversity issues are addressed ○ Integrating biodiversity issues into their sectoral policies, plans and budgets ○ Monitoring and disseminating information on their activities affecting biodiversity ○ Collaborating with NEMA on relevant issues in NBSAPIII ○ Preparing and submitting annual reports on progress of implementation of NBSAPIII to NEMA.
District Local Governments	○ Co-ordinating the implementation of the NBSAPIII in the District; ○ Formulating and enforcing local policies and bye-laws related to biodiversity conservation and use; ○ Assisting in documenting indigenous knowledge, technologies and practices in biodiversity conservation; ○ Monitoring biodiversity conservation including maintaining and disseminating accurate information; ○ Integrating biodiversity issues in District Environment Action Plans and subsequently incorporating them in District Development Plans; ○ Mobilizing resources, including community contributions, and allocation of resources for the implementation of NBSAPIII; ○ Mobilizing local communities, resource use groups, NGOs and CBOs in biodiversity conservation; ○ Identifying vital critical ecosystems, biodiversity hotspots and critical species that need protection and where required ensuring fulfilment of Uganda's obligations to the Convention on Biological Diversity and other related international agreements; and, ○ Preparing and submitting annual reports on progress of implementation of NBSAPIII to NEMA.
Local Communities	○ Participation in planning processes such as DEAPs to identify and prioritise issues and actions related to the NBSAPIII; ○ Implementing measures and activities geared towards ensuring land improvement and biodiversity conservation and sustainable utilization; ○ Participating in training and capacity - building activities; ○ Sharing information on traditional knowledge, technology and practices with communities and other stakeholders.
Non-Government Organizations (NGOs)	○ Carrying out awareness-raising activities on the NBSAPIII; ○ Assisting to strengthen the capacity of community-based organizations to implement NBSAP; ○ Facilitating technology transfer at community level; ○ Promoting networking opportunities, especially among NGOs and other civil society organizations; ○ Documenting indigenous knowledge, technologies and practices in biodiversity conservation ○ Assisting CBOs and communities to formulate and implement projects related to biodiversity conservation.
Private Sector	○ Invest in sustainable and environmentally-sound technologies; ○ Invest in alternative income-generating activities;

	○ Contribute resources to support programmes on land management and biodiversity conservation; and, ○ Provide support to the new financing mechanisms proposed in NBSAPIII.

6 MONITORING AND EVALUATION

6.1 Rationale for Monitoring and Evaluation of NBSAPIII

NEMA will be the lead institution to coordinate the monitoring and evaluation of NBSAP III, supported by the Technical Committee on Biodiversity Conservation and a Technical Working Group on Monitoring and Evaluation. NBSAP III will be monitored at different levels and intervals with the full involvement of various stakeholders. The responsible institutions and organizations will submit quarterly reports on the respective indicators and targets to NEMA as programmed. NEMA will consolidate these reports received from stakeholders to produce an annual State of Biodiversity report, which will provide a baseline for implementation and serve as a guide for future strategic planning. Monitoring and evaluation of NBSAP III is critical and will be undertaken for the following reasons:

a) NEMA, the national CBD focal point, will be responsible for overall coordination of monitoring and evaluation of the NBSAP III.
b) The Monitoring, Evaluation, Accountability, and Learning framework will be used to review and report on the NBSAP III
c) A standard reporting format will be developed by NEMA to be used during the implementation of the NBSAP by the relevant stakeholders.
d) The monitoring and evaluation of NBSAP will utilize national and global indicators as per Decision 15/5.
e) Uganda will use the National Biodiversity Databank and other biodiversity data sources for the monitoring and evaluation of NBSAP III.
f) NBSAP III will be the main vehicle for monitoring and evaluation of biodiversity conservation and management in Uganda.
g) Uganda will conduct a mid-term evaluation of NBSAP III by 2027, and the terminal evaluation of NBSAP III will be conducted by 2030.
h) NEMA, in collaboration with the National Biodiversity Databank, will produce the National State of Biodiversity report by 2027.

6.2 Key Strategic Aims for Monitoring and Evaluation of NBSAPIII

The main strategic aim of the monitoring and evaluation of NBSAPIII 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 NBSAPIII.

In order to ensure impartiality, an independent mid-term evaluation of NBSAPIII should be undertaken in 2027. A final evaluation of NBSAPIII can then be taken in 2030, by which time it will be possible to assess Uganda's contribution towards the achievement of the KMGBF and its global targets. The final evaluation will also provide valuable insights, lessons and direction for the development of Uganda's fourth NBSAP

7 FINANCING AND RESOURCE MOBILIZATION

7.1 Introduction

The minimum cost for implementing the various action plans outlined within this document was carried out to cover the period 2025 - 2030 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 Early Action project as part of the NBSAPIII resource mobilization should be referred to for purposes of getting background information to support resource mobilization for implementing NBSAPIII. Funding for NBSAPIII will come from all sources, including public and private sources.

7.2 Current funding of biodiversity in Uganda

7.2.1 Domestic 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.

7.2.2 The Global Environment Facility

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 NBSAPIII.

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.

7.2.3 The Global Biodiversity Framework Fund

The Global Biodiversity Framework Fund (GBFF) is an essential resource mobilization tool designed to support countries in implementing their biodiversity strategies and action plans. For Uganda, the GBFF can facilitate access to financial resources that enable the nation to fulfill its commitments under the Convention on Biological Diversity (CBD). This fund is structured to provide financial backing for a wide range of biodiversity initiatives, including habitat restoration, species protection, and ecosystem preservation. By leveraging on funding from the GBFF, Uganda can enhance the implementation of its NBSAP and achieve its biodiversity goals with the objectives. This can help to promote sustainable development that integrates biodiversity conservation with socio-economic growth.

7.2.4 The Bilateral and Multilateral Financing Sources

Bilateral and multilateral financing sources can play a crucial role in bolstering Uganda's efforts to conserve its rich biodiversity. These funding avenues include grants, loans, and technical assistance from international partners, development agencies, and donor countries. By leveraging these financial resources, Uganda can implement its biodiversity projects more effectively, ranging from conservation initiatives to innovative sustainable practices. Collaboration with bilateral and multilateral entities not only provides necessary funding but also fosters the exchange of knowledge and expertise, enhancing the capacity of local institutions to address biodiversity challenges.

7.2.5 The Multilateral Benefit Sharing Fund from the Use of Digital Sequence Information

The Multilateral Benefit Sharing Fund (MBSF) from the use of DSI on genetic resources promises to be a transformative approach to resource mobilization for biodiversity conservation in Uganda. As countries increasingly recognize the importance of DSI on genetic resources and associated traditional knowledge, Uganda can participate in this evolving framework to obtain financial support for its biodiversity initiatives. Although the The MBSF has not yet been adopted (expected at CBD COP 16 later in 2024), negotiations for this fund are geared to ensure fair and equitable sharing of benefits arising from the utilization of DSI on genetic resources, thus promoting conservation efforts that recognize the value of biodiversity. By effectively engaging with this fund, Uganda can enhance its capacity to protect its unique ecosystems while contributing to global biodiversity goals, thereby fostering sustainable development and the well-being of local communities who depend on these resources.

7.3 Resource mobilization

Information on finance solutions for funding biodiversity conservation is contained National Biodiversity Finance Plan.

7.3.1 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.

7.3.2 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:

a) A pro-poor PES program is one that maximizes its potential positive impact and minimizes its potential negative impact on the poor.
b) 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.
c) 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.
d) 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.
e) Avoid implementing PES programs in areas with conflicts over land tenure.
f) Ensure that the social context is well understood, so that possible adverse impacts are anticipated and appropriate remedial measures can be designed.

7.3.3 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, and introducing more sustainable livelihoods to reduce biodiversity loss.

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). 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.

7.3.4 Ecological fiscal transforms

"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.

- 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.

- 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.

- 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

- 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:

7.3.5 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.

7.3.6 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.

7.3.7 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.

7.3.8 Private Sector

The private sector is a crucial source of resources through innovative funding solutions and partnerships. Companies can invest in biodiversity initiatives through corporate social responsibility (CSR) programs, sponsorships, and multi-stakeholder partnerships that align with their sustainability goals. Engaging the private sector not only enhances financial resources but also fosters corporate accountability towards biodiversity conservation. By leveraging the resources and expertise of businesses, Uganda can harness technological advancements and efficient practices that contribute to sustainable development while also promoting biodiversity resilience.

7.3.9 Non-Government Organisations

Non-Government Organizations (NGOs) are pivotal in the resource mobilization landscape for Uganda's NBSAP, serving as advocates, facilitators, and implementers of biodiversity projects. Uganda can mobilize resources through grant funding, donations, and partnerships with international organizations, governments, and the private sector. NGOs often have community-level networks that enable them to engage local populations in conservation efforts, ensuring that initiatives are relevant and sustainable. The expertise and innovative approaches that NGOs bring to biodiversity management enhance the efficacy of NBSAP implementation, promoting a collaborative approach that strengthens civil society participation in conservation.

7.3.10 Blended Finance

Blended finance is an innovative financing model that combines public and private resources to achieve sustainable development objectives. This approach mobilizes private investments by using public funds to mitigate risks, thereby attracting capital for biodiversity-related projects that may otherwise be viewed as too risky by investors. Blended finance can facilitate a range of funding mechanisms, including grants, loans, equity investments, and guarantees, which help scale up biodiversity initiatives. By effectively leveraging blended finance strategies, Uganda can enhance its capacity to implement NBSAP actions, optimize resource utilization, and foster public-private partnerships that drive sustainable growth and conservation outcomes.

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Annex 1: NEMA Sixth Board of Directors

NO.	NAME	POSITION
1.	Prof. James Okot-Okumu	Chairman
2.	Dr. Priscilla Nyadoi	Member
3.	Dr.Charles Ekure	Member
4.	Dr. Florence Grace Adongo	Member
5.	Eng. Katwiremu Yorokamu Bategana	Member
6.	Ms. Christine Mayengo	Member
7.	Mr. Can Amos Lapenga	Member
8.	Mr. Jimmy Chemonges Kuka	Member
9.	Barirega Akankwasah. PhD	Executive Director & Board Secretary

Annex 2: The Technical Committee on Biodiversity Conservation

NO.	NAME		POSITION
1.	Prof. Joseph Obua	Makerere University	Chairperson
2.	Prof. Gerald Eilu	Makerere University	Member
3.	Prof. James Kalema	Makerere University	Member
4.	Dr. Mary Namaganda	Makerere University	Member
5.	Dr. Robert Kityo	Makerere University	Member
6.	Dr. Esther Katuura	Makerere University	Member
7.	Dr. Samson Gwali	National Forestry Resources Research Institute	Member
8.	Mr. Aggrey Rwetsiba	Uganda Wildlife Authority	Member
9.	Mr. Aventino Bakunda	Ministry of Agriculture, Animal Industry & Fisheries	Member
10.	Mr. Innocent Akampurira	Uganda National Council for Science and Technology	Member
12.	Mr. Francis Sabino Ogwal	National Environment Management Authority	Secretary

Annex 3: Persons who participated in the development of NBSAP III

Francis Sabino Ogwal
Senior Manager (Environment Planning and Coordination)
National Environment Management Authority (NEMA)
Coordinator for the Development of NBSAP III

Name	Institution	email	Tel. No.
Achuu Simon Peter	NEMA	peter.achuu@nema.go.ug	0751702025
Aggrey Rwetsiba	UWA	aggrey.rwetsiba@wildlife.go.ug	0772499735
Ayebazibwe Edson	Uganda Biodiversity Fund	eddieayebazibwe1974@gmail.com	0772483412
Bakisuula Dalton	MoGLSD	bakidalton@gmail.com	0703796957
Bakunda Aventino	NTCB	aventino@yahoo.com	0772592547
Balimunsi Moses	Buikwe DLG	balimunsimoses@gmail.com	0752625862
Caroline Aguti	MEMD	caguti1977@gmail.com	0772619300
Daniel Waiswa	NBDB-Mak	daniel.waiswa@gmail.com	0778131265
Denis Mutaryebwa	FAO	denis.mutaryebwa@fao.org	0772544033
Derrick Emmanuel Mugisha	UYBN	mugishaderrickemmanuel@gmail.com	0701749162
Dorasario Volentin	Total Energies	volentin.dorasario@totalenergies.com	
Dr. Freddrick Kabayo	MAAIF	kabayofred@gmail.com	0704160410
Dr. Patrick Byakagaba	Makerere University	byaks2001@yahoo.com	0782563709
Edwin Muhumuza	Youth Go Green	edwin@youthgogreen.org	0701030673
Egaru Martin	MLHUD	matinengaru@gmail.com	0782237274
Esther Nabeeta	PSFU	enabeta@psfu.org.ug	0704317782
Gerald Eilu	MUK	gerald.eilu@gmail.com	0753642640
Gilbert Kibekityo	UMA	k.gilbert@uma.org.ug	0788392948
Gokaka Geoffrey	MWE	gokakag@gmail.com	0772341241
Harold Turinawe B	WWF	nturinawe@wwfuganda.org	0752827939
Innocent Akampurira	UNCST	i.akampurira@gmail.com	0754426247
Irene Natukunda	GYBN	natukundairene01@gmail.com	0787975517

Isabirye Moses	Busitema University	katura@gmail.com	0772885692
Issa Katwesige	MWE	issakatwesige@gmail.com	0782432048
Ivan Amanhigaruhanga	UBF	I.amani@ubf.	0772584063
Iyango Lucy	MWE	iyangoI2010@gmail.com	0772886422
James Omoding	IUCN	james.omoding@iucn.org	0772437169
Joanita Nabulime	NFA	nabulimejoanita3@gmail.com	0771291012
Kaasa Paul	Natural Resource Environment	paulkaasa65@gmail.com	0709452709
Kalangwa Eseza	CCD/MWE	Kalangwa.eseza@gmail.com	0777237838
Katura Esther	Muk	nturinawe@wwfuganda.org	0776977388
Kebirungi Elizabeth	NPA	kebirngi@gmail.com	0772955952
Kibono Jamali	MWE/CCD	jkibono@gmail.com	0787238836
Kijjambu Charles	MTWA	charles.kijjambu@tourism.go.ug	0787307430
Kisakye Harriet	Min. of EAC Affairs	haperuth@gmail.com	0772665030
Kisembo Ivan	Buikwe DLG	stella.stacy1@gmail.com	0783068898
Kisembo Stella	Buikwe DLG	stella.stacy1@gmail.com	0783068898
Kityo Robort	Zoology	kityrob@gmail.com	0772501291
Kusuro Micheal	NFA	kusuromicheal@gmail.com	07882562379
Kwelagare Musa	UNCST	musakwehangare@gmail.com	0785118392
Lokwii Arnold	KWGG	arnoldreal@gmail.com	0772174769
Lomonyang Margaret	Karamoja Women Cultural Group	mlomunyang@gmail.com	0772901081
Lutakome Ephraim	NEMA	lutakomeephraim@gmail.com	0772521307
Lynette Julian Namukwaya	MOFPED-CFU	lynettejulian242@gmail.com	0706643140
Maganda Moses	SEO	magandam@yahoo.com	0772984826
Maholo Mulongo Denis	MAAIF	dmmaholo@gmail.com	0772685931
Mary Namaganda	Makerere University	namagandam@gmail.com	0705185374
Monique Akullo	UNDP	monique.akullo@undp.org	0772837935
Muheki Oscar	MEMD	muhekioscar@gmail.com	0757189014
Muhwezi Henry	MAAIF		0704881577
Mujuni William	Mukono DLG	wb.mujuni@gmail.com	0772414509
Musaazi Patrick	Kayunga DLG	musaazipatrick@gmail.com	0772392684
Muwanika Fred Roland	MUK	rfmuwanika@gmail.com	0779604453
Mwase Johnson Paul	PSFU	mwesejp@yahoo.com	0775433060
Nabbika Mildred. R	MAAIF	nabbika@gmail.com	0772652391
Nabihamba Ernest Moses	Jinja City	enabi65@gmail.com	0776945046
Nakumitsa Samali	Jinja DLG	nakumista@gmail.com	0704595822

Namususwa Zakia	Jinja DLG	zakianamu@gmail.com	789517196
Nkitto Vanessa	Environment Alert	vanessanakitto66@gmail.com	0751554234
Obua Joseph	Makerere University	jobuo09@gmail.com	0772444492
Okot James	NFA	okotjames90@gmail.com	0774696875
Omonyi William George	UNMA	georgewilliam448@gmail.com	772853975
Omujal Francis	NCRI	fumujal@gmail.com	0772625055
Ongua Fanuel	NARO	fanpat2010@yahoo.com	0779162623
Oundo Martin	NFA	martinoundo0@gmail.com	0782308662
Patrick Byakagaba	MUK	byaks2001@yahoo.com	0782563709
Pauline Nantogo Kalunda	Eco Trust	pnantongo@ecotrust.or.ug	0772743562
Peace Nahyuha	UWA	peacenahyuha@gmail.com	0759289818
Peter Apell	Jane Goodall	peter@janegoodall.org	0772221637
Phionah Mwesige	Nature Uganda	phionahmwesige@natureuganda.org	0789702576
Rebecca B. Ssebagowzi	Wakiso DLG	rssabagawzi@gmail.com	0772465657
Ronald Kaggwa	NPA	ronald.kaggwa@npa.go.ug	0772461828
Sam Gwali	NAFFORI	gwalis@yahoo.co.uk	0772410665
Simon Peter Weredong	WWF	spweredong@wwfuganda.org	0782312428
Ssekebh Geofrey	MWE	ssekebigeofrey1993@gmail.com	0781819263
Teddy Nabakooza Galiwango	Buganda Kingdom	teddynabakooza91@gmail.com	0775886100
Tom Geme	WCS	tgeme@wcs.org	0783732890
Tumusiime Boaz	MTWA	boaztumusiime@gmail.com	0774103722
Turyasima Titus	MOFPED-CFU	turyasiimat@gmail.com	0788815603
Margaret Lomonyang	KWCG (IPLC Organisation)	mlomonyang@gmail.com	0772901081
Zaninka Penninah	UOBDU (IPLC Organisation	zaninkapenj21@gmail.com	0772660810

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