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USAID/UGANDA

FOREIGN ASSISTANCE ACT 118/119

TROPICAL FORESTS AND BIODIVERSITY

ANALYSIS

DECEMBER 2022

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USAID/UGANDA

FOREIGN ASSISTANCE ACT 118/119

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DECEMBER 2022

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ACRONYMS

ADS	Automated Directives Systems
CBO	Community Based Organization
CDCS	Country Development Cooperation Strategy
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CMS	Convention on Migratory Species of Wild Animals
CNOOC	China National Offshore Oil Corporation
DO	Development Objective
ETOA	Environmental Threats and Opportunities Assessment
FAA	Foreign Assistance Act
GBV	Gender-based violence
GDP	Gross Domestic Product
GFW	Global Forest Watch
GIS	Geographic Information System
GoU	Government of Uganda
HWC	Human-wildlife conflict
IGCP	International Gorilla Conservation Programme
IRs	Intermediate Result
IUCN	International Union for Conservation of Nature
MWE	Ministry of Water and Environment
NEA	National Environment Act
NEMA	National Environment Management Authority
NEMP	National Environment Management Policy
NFA	National Forestry Authority
NGO	Non-governmental Organization
PA	Protected Area
PES	Payment for Ecosystem Services
PGRC	Plant Genetic Resources Centre of Uganda
RFU	Rhino Fund Uganda
THF	Tropical High Forest Well-stocked
THFL	Tropical High Forest Low-stocked
USAID	United States Agency for International Development
UWA	Uganda Wildlife Authority

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EXECUTIVE SUMMARY

INTRODUCTION

This Executive Summary presents key findings for the United States Agency for International Development (USAID) Uganda Foreign Assistance Act (FAA) Sections 118/119 Tropical Forests and Biodiversity Analysis (Analysis) and accomplishes the following:

- Highlights the status of tropical forests and biodiversity throughout Uganda.
- Identifies primary threats and underlying drivers of those threats to tropical forests and biodiversity.
- Provides recommendations to better integrate tropical forests and biodiversity conservation into the new country strategy.

The Analysis informs development of the USAID/Uganda Country Development Cooperation Strategy (CDCS), which will frame USAID foreign assistance programming in Uganda for the period 2022 – 2027. The Analysis considers tropical forests and biodiversity issues across the entire country.

STATUS OF TROPICAL FORESTS AND BIODIVERSITY

Three major ecosystems are present in Uganda:

- Forests. As of 2020, approximately 11.5 percent of Uganda’s land consists of tree cover, including tropical forests, woodlands, and plantations (The World Bank 2020). Approximately 36 percent of the tree cover is in Protected Areas (PAs). In both protected and unprotected areas, the area of tropical high forests and woodlands declined while the area of plantations¹ increased between 1990 and 2015.
- Wetlands. Approximately 11 percent of Uganda’s land cover consists of wetlands (Ministry of Water and Environment, 2016). Wetlands function as a critical system for biodiversity conservation, a vital component of the water cycle, and an essential breeding and feeding habitat for many species of fish, reptiles, birds, invertebrates, and other wildlife (Ramsar 2018). Ugandan wetlands range from permanent to seasonal. Swamps and marshes, which are more permanent forms of wetlands, typically occupy areas such as lakeshores and riverbanks. Seasonal wetlands are typically situated in upstream regions of wetland systems and river flood plains (Ramsar 2018). Acknowledging their vital importance, the GoU established the National Conservation and Management of Wetlands Resources Policy of 1995, and 12 wetland areas in Uganda are designated as wetlands of international importance under the Ramsar convention (Ramsar 2018).
- Grasslands/Savanna. Over 50 percent of the land area in Uganda is made up of grasslands and savannas, which are dominated by a variety of different plant species such as grasses, palms, and acacias (USAID 2006). This major ecosystem is home to many of the large mammals of Uganda that provide a draw for ecotourism.

Despite occupying only 2 percent of the world’s area, Uganda has some of the richest concentrations of species and genetic diversity in the world, ranking among the top 10 most biodiverse countries globally.

¹ Plantations are generally made up of monotypic stands of non-indigenous trees and lack biodiversity or the level of ecosystem function of intact tropical forests.

The country supports numerous endemic species, most of which occur in the Albertine Rift Valley of Western Uganda. The high number of large, charismatic species in Uganda has made it one of the top tourist destinations for safaris in the world.

THREATS TO BIODIVERSITY

Direct threats to biodiversity in Uganda are summarized below. See Section 5 for a more comprehensive description of threats.

- Over-exploitation of natural resources (timber, non-timber forest products, oil, gas)
- Habitat loss/fragmentation
- Agricultural expansion/encroachment and changes in land use
- Pollution
- Climate change
- Invasive alien species
- Human-induced fires
- Wildlife crime/poaching/human-wildlife conflict

DRIVERS OF THREATS

A number of underlying drivers, listed below, contribute to threats to biodiversity in Uganda. See Section 5 for a more comprehensive description of drivers.

- Poverty, reliance on unsustainable livelihoods, food insecurity, and population growth
- Institutional and economic failures
- Corruption and patronage
- Poor governance capacity and lack of political will to enforce existing laws
- International/local demand for natural resources
- Climate change
- Growing agricultural demand
- Lack of public understanding of biodiversity and tropical forests values

RECOMMENDATIONS

This section presents the Analysis Team's recommendations to USAID/Uganda on incorporating the analysis' results into subsequent programming. The recommendations are composed of the following five broad actions, with detailed recommendations under each action.

- Support financial incentives for the conservation of tropical forests and biodiversity, reduce pressure on forested lands and biodiversity by supporting local livelihoods aligned with conservation, and engage local communities in conservation efforts.
- Promote education and messaging on biodiversity and forest conservation.
- Support programs that improve governance as it relates to biodiversity and tropical forests conservation, and strengthen the capacity of government and civil society to manage natural resources.
- Strengthen and improve resource management practices
- Encourage and support long-term, collaborative regional conservation planning

Section 8 includes a complete list and discussion of recommendations. Table ES-1 lists the recommendations identified in Section 8, starting with readily actionable recommendations, followed by strategic opportunities, and concluding with recommendations for future consideration. Under each of these three categories, recommendations are provided for each office, with the detailed recommendations nested under the associated broad actions.

TABLE ES 1. RECOMMENDATIONS

A. READILY ACTIONABLE

ENVIRONMENT AND NATURAL RESOURCES UNIT – ECONOMIC GROWTH

Support financial incentives for the conservation of tropical forests and biodiversity, reduce pressure on forested lands and biodiversity by supporting local livelihoods aligned with conservation, and engage local communities in conservation efforts.

- Support community-based conservation efforts by: (1) promoting collaborative management (using CFM model) by engaging local communities in activities such as patrols to collect snares, surveille poacher; and (2) by strengthening the role and capacity of UWA community conservation officers and NFA CFM coordinators. Continue promotion of Farmer Managed Natural Regeneration (FMNR) interventions that provide wildlife habitat and indigenous plant species, and support climate change adaptation and mitigation. Continue to work with the NFA to facilitate collaboration with the CFM groups and to develop resource management plans for seven clusters of CFRs in the Karamoja and Achwa ranges (currently implemented under B4R activity.). Continue collaboration with the NFA and the UWA to facilitate collaboration with community conservation groups in protected areas in Karamoja. Continue to work with communities and the NFA in the Moroto area (Katikekile Sub County) to resolve conflicts on using natural resources (e.g., water sources) in CFRs (currently implemented under Apolou BHA Activity).
- Promote programs that improve the mineral extraction value chain in the Karamoja region, focusing on providing local community benefits.
- Promote eco-tourism at PAs by: (1) supporting, via grants and loans, private sector actors by requiring each to co-fund community projects including health centers and schools around the PA; (2) by supporting revenue sharing programs that distribute a portion of tourism earnings directly to communities neighboring PAs; and (3) by targeting partners that drive and promote eco-tourism as a forest management tool (e.g., the model for Bwindi-Nkuringo Eco-lodge).
- Promote natural wetland conservation and restoration by incentivizing sustainable markets for wetland plants that can be harvested for rattan or raffia, or other non-timber forest products (NFTP).
- Support development of climate action plans at local community levels. In the Karamoja region, include a focus on sustainable pastoral livelihoods and strategic planning for agricultural enhancements/settlements outside key biodiversity areas/wildlife corridors. For example, incorporate strategic planning into ongoing efforts to establish, train and support resilience action committees (RACs) (currently implemented under the Apolou activity), to ensure that climate-resilient

TABLE ES 1. RECOMMENDATIONS

development and agriculture are in areas that do not conflict with biodiversity conservation or wildlife corridors. Incorporate sustainable pastoralism into climate action plans in Karamoja region, with the understanding that pastoral lifestyles can be more resilient to climate change than sedentary farming.

- Continue evaluation of wildlife ranching potential in the Karamoja region (currently a B4R activity).

Support programs that improve governance as it relates to biodiversity and tropical forests conservation, and strengthen the capacity of government and civil society to manage natural resources.

- Provide technical and financial support to the district-level government forest management staff (i.e., forest officers) to: (1) identify and perform inventories of the local forests on private land, and (2) develop and implement forest management plans. The District Environmental Action Plans developed during the 2002-2003 USAID COBS project could be used as a basis.

ECONOMIC GROWTH AND ENVIRONMENT

Support financial incentives for the conservation of tropical forests and biodiversity, reduce pressure on forested lands and biodiversity by supporting local livelihoods aligned with conservation, and engage local communities in conservation efforts.

- Provide technical assistance, equipment, and inputs to promote agro-forestry, on-farm tree management and tree planting using native trees to enhance tree cover outside CFRs. Promote market-based incentives for sustainable agriculture and forestry management through public-private partnerships, with an emphasis on biodiversity and cultivation of indigenous plant species. Distribute seedlings to farmers and support raising trees to full growth (to address fuel wood collection from forests). The On Farm Tree management approach will enhance fuelwood supply. Promote agroforestry in and around the buffer zone of protected areas (e.g., shade-grown coffee planted with indigenous trees). Promote existing agroforestry efforts that involve growing a diversity of crops (coffee, maize, beans, etc.) and not large monocultures of rice, sugar cane, or other unsustainable crops.
- Continue to support ecosystem restoration activities with community grants, by funding tree nurseries, micro-water catchment protection, riverbank restoration, and other activities (currently implemented under the Apolou activity in the Karamoja region).
- Increase biodiversity and forest resources associated with ongoing land use practices by: (1) Enhancing selective harvesting for timber and replanting with native species (NFA); (2) Promoting agroforestry that involves planting trees along boundaries of fields or in fields with indigenous plants; (3) Promoting agroforestry that involves co-planting multiple agricultural species, preferably multi-layered. These practices can benefit small landowners.

Support programs that improve governance as it relates to biodiversity and tropical forests conservation, and strengthen the capacity of government and civil society to manage natural resources.

TABLE ES 1. RECOMMENDATIONS

- Along with the Humanitarian Assistance and Transition Office (HATO), collaborate with, provide technical assistance to, and provide capacity development to the Office of the Prime Minister (OPM) Ministry for Relief, Disaster Preparedness and Refugees, UWA, NFA, NEMA, and local authorities to: (1) develop and execute comprehensive land use policy and land use plans for refugee resettlement areas; (2) create partnerships for the restoration of degraded habitat around settlements; and (3) strengthen the enforcement and monitoring mechanisms for implementing existing conservation regulations, to address the degradation of ecosystems around such settlements.
- Provide technical assistance, capacity building, and financial support to Community Based Organizations (CBOs) and local government for environment and natural resources management at the district level, by (1) supporting the promulgation and enforcement of bylaws that strengthen biodiversity and tropical forests conservation; (2) adopting technology to address management challenges (e.g., use of drone technology, consistent with Uganda’s Civil Aviation regulations, to cover monitoring large areas; provide toll free telephone lines to communities to report illegal activities in conservation areas).
- Provide financing, technical support, or capacity development for UWA and NFA for the enforcement of existing laws in and around PAs, consistent with Section 703 I of the annual appropriations act and FAA Section 660.
- Develop and implement strategic messaging on the value of biodiversity/forest conservation through Social and Behavioral Change programming.

HEALTH AND HIV/AIDS

Support financial incentives for the conservation of tropical forests and biodiversity, reduce pressure on forested lands and biodiversity by supporting local livelihoods aligned with conservation, and engage local communities in conservation efforts

- Incentivize domestication of tree species with traditional medicinal uses on private land by providing low cost subsidized seedlings to communities to plant them on their private land.

Support programs that improve governance as it relates to biodiversity and tropical forests conservation, and strengthen the capacity of government and civil society to manage natural resources.

- Provide financial and technical support to increase the number of veterinary scientists on the UWA team to monitor transmission of zoonotic diseases that spread to the wildlife, and to track diseases in national parks. Collaborate with GoU Animal Health Department village level veterinarian teams (CAWHs) to message connection of livestock health, wildlife health, zoonoses, and public.

DEMOCRACY, HUMAN RIGHTS, AND GOVERNANCE

Promote education and messaging on biodiversity and forest conservation

TABLE ES 1. RECOMMENDATIONS

- Support CSOs and NGOs to promote national environmental advocacy through media platforms and influencers.

EDUCATION, YOUTH, AND CHILD DEVELOPMENT

Promote education and messaging on biodiversity and forest conservation

- Provide technical assistance to support environmental awareness and education in after school programs. For example, support Uganda Wildlife Clubs to create/revive these clubs in schools and promote conservation awareness.
- Provide technical assistance to develop curricula and programs for vocational training in green practices and skills by providing practical training on relevant topics/skills including for example, environmental management, climate-smart agricultural, non-invasive bamboo value chains and bamboo-based charcoal, and renewable energy technology.

B. STRATEGIC OPPORTUNITIES

PROGRAM OFFICE

Strengthen and Improve Resource Management Practices

- In coordination with Environment and Natural Resources, ensure long-term benefits of conservation projects and support executing projects to ensure benefits continue beyond the life of the project by: (1) providing sustainable financing for a period longer than 3 to 5 years; and (2) requiring an operation and maintenance strategy for sustaining conservation benefits after the project is completed.

ENVIRONMENT AND NATURAL RESOURCES UNIT – ECONOMIC GROWTH

Strengthen and Improve Resource Management Practices

- Provide technical assistance to the UWA and NFA to develop and implement national programs to identify and restore key wildlife migration corridors and riparian corridors. The program should prioritize restoration efforts that are strategically placed to contribute to regional strategies aimed at increasing habitat connectivity. For example, continue the support and collaborate with the five districts of Kitgum, Agago, Kotido, Kaabond, and Abim (KAKKA) governing structure for the Karenga Community Wildlife Management Area (KCWMA) to preserve this critical wildlife migration corridor in the Kidepo landscape (currently implemented under the B4R activity).
- Provide financing or technical assistance to the NFA, UWA, and the other relevant agencies in gazetting and demarcation of PAs both on maps via GIS on publicly available websites, and on the ground via permanent stanchions or pillars

TABLE ES 1. RECOMMENDATIONS

- Establish buffers around PAs, sensitive habitats, and wildlife corridors, by collaborating with and providing technical assistance to District-level local governments, UWA, NFA, farmers associations, and CBOs, to plant coffee or other sustainable crops that do not have large indirect effects on adjacent land uses.
- Provide financial support or technical assistance to GoU agencies to control invasive species in PAs, using the best available technologies, focusing on invasive species that pose the greatest threats to biodiversity such as *Acacia hockii*, spear grass (*Imperata cylindrica* and *Dichrostachys* spp.), *Lantana camara*, *Parthenium hysterophorus*, *Leucaena leucocephala*, *Broussonetia papyrifera*, *Cymbopogon nardus*, *Senna spectabilis*, *Mimosa pigra*, and *Vossia cuspidata*.

ECONOMIC GROWTH AND ENVIRONMENT

Support financial incentives for the conservation of tropical forests and biodiversity, reduce pressure on forested lands and biodiversity by supporting local livelihoods aligned with conservation, and engage local communities in conservation efforts.

- Provide financing and technical assistance for research, and grants to SME and private sector partners to implement pilot projects, on innovative energy sources and energy-efficient technology, such as renewable energy (e.g., solar PV, wind, biogas, micro-hydropower) and cleaner and efficient burning systems (e.g., fuel efficient stoves) to provide inexpensive access to energy in urban and peri-urban areas.
- Upgrade and expand the electricity generation, transmission, and distribution infrastructure to provide low cost, reliable access to adequate power in urban and peri-urban areas that do not conflict with wildlife corridors or other wildlife conservation needs.
- Promote the carbon market with focus on scaling up performance-based carbon credits to ensure long-term viability. If possible, financing of 15 years or more can provide local financial incentives as well as realize benefits by allowing trees to continue to grow and sequester carbon, rather than allowing trees to be harvested after a few years.
- Provide funding or technical assistance to local government and CBOs to establish ecotourism markets for Ugandan tourists near PAs. For example, to implement the Conservation Investment Plan for Sango Bay using the 2016 ecotourism package (developed by USAID and MWE). Encourage domestic tourism to support awareness of conservation values. Encourage conservation groups who interact with domestic tourists. Use traditional totems or clans that are associated with a specific animal.
- Promote livelihood activities in and around selected PAs by providing technical assistance to: (1) identify and support key value chains (e.g., honey, coffee, non-timber forest products); and, (2) support sustainable practices in traditional livelihoods like small-scale agriculture and fishing/aquaculture.
- Provide technical assistance and funding to evaluate the sustainability of “bio char” production (from agro residual wastes, e.g., from sugar processing), as alternative to charcoal from forests.

TABLE ES 1. RECOMMENDATIONS

- Facilitate establishment of woodlots for sustainable fuelwood supply in urban and peri-urban areas (woodlots of non-indigenous species do not contribute to tropical forests conservation but relieve pressure of exploiting natural forests).
- Provide microfinancing or subsidies for alternatives to wood fuel and charcoal (e.g., natural gas or propane) to reduce financial barriers to subsistence farmers and traders. This may involve subsidizing LPG cylinder distribution (e.g., provide free cylinders to customers, but require them to pay for filling needed amounts).
- Improve predictability for agricultural outputs by: (1) establishing weather stations and enhancing weather monitoring programs to better understand weather patterns to reduce unpredictability associated with climate change (greater predictability could also help inform forest management practices such as wildfire management); and (2) Improve weather forecasts and dissemination of weather information to farmers to enhance agricultural production and improve nutrition, thereby reducing the driver of using resources in intact forests and other natural areas.
- Improve agricultural productivity: support programs that are aimed at increasing soil fertility to increase productivity on existing agricultural lands. Use simple low cost technologies such as irrigation to improve crop production. Subsidize prices of fertilizers and other agricultural inputs to encourage communities to till unfertile lands instead of encroaching on wetlands and forests. An integrated approach to improve soil fertility should be implemented including the use of organic sources of nutrients. These organic sources would augment or replace inorganic fertilizers under this approach. (Stewart et al. 2020, Fairhurst et al. 2012).

Promote education and messaging on biodiversity and forest conservation.

- Collaborate with the GoU Ministry of Water and Environment to perform, and to distribute via accessible websites, Uganda-wide natural resource value assessments to demonstrate the monetary value of conservation and educate the public on these values.

HEALTH AND HIV/AIDS

Promote education and messaging on biodiversity and forest conservation.

- Incorporate outreach and messaging on biodiversity conservation through reducing human-animal contact and wildlife offtake as a way to prevent zoonotic disease spillover.

DEMOCRACY, HUMAN RIGHTS AND GOVERNANCE

Encourage and support long-term, collaborative regional conservation planning

- Develop collaboration platforms for central ministries and district governments involved in natural resources management to perform a comprehensive evaluation of existing natural resources management policies with the goal of recommending actions to integrate natural resources

TABLE ES 1. RECOMMENDATIONS

management policies and regulations

EDUCATION, YOUTH, AND CHILD DEVELOPMENT

Promote education and messaging on biodiversity and forest conservation

- Incorporate outreach and messaging on best conservation practices and best nutritional uses for resources, across interventions, notably with youth and OVC beneficiaries.

FOR FUTURE CONSIDERATION

ENVIRONMENT AND NATURAL RESOURCES UNIT – ECONOMIC GROWTH

Encourage and support long-term, collaborative regional conservation planning

- Provide capacity development, technical assistance, or financial support to GoU and local governments to develop and implement regional, landscape-level conservation planning documents. Planning documents should address conservation at a landscape level to minimize fragmentation of habitats and forests and provide habitat connectivity. Planning should promote regional efforts that go beyond site-level or patch-level conservation and beyond boundaries of PAs.
- Provide capacity development, technical assistance, or financial support to GoU and local governments to develop and implement watershed-level conservation planning documents (as a type of landscape-level planning) aimed at protecting catchment basins (i.e., watersheds) upstream from agriculture and domestic uses and facilitating a multi-benefit approach. This effort should focus on the water quality (and potable water production) linkage to preservation of forests in upstream watersheds (i.e., connect costs of treating sediment-laden raw water to potable water at water treatment facilities).

I. INTRODUCTION

I.1 PURPOSE

The purpose of this Foreign Assistance Act (FAA) Sections 118/119 Tropical Forests and Biodiversity Analysis (hereafter, the Analysis) is to inform the development and implementation of United States Agency for International Development (USAID) Uganda’s Country Development Cooperation Strategy (CDCS). Preparation of this Analysis complies with Sections 118 and 119 of the FAA of 1961, as amended; USAID guidance on country strategy development, under Automated Directives System (ADS) 201 and ADS 204; the [USAID Biodiversity Policy](#); and the [USAID FAA Sections 118/119 Tropical Forests and Biodiversity Analysis Best Practice Guidance 2.0](#) (Best Practice Guide).

I.2 BRIEF DESCRIPTION OF THE USAID PROGRAM

The 2016-2021 USAID/Uganda CDCS aims to foster self-reliance and stability within Uganda with a cross-sectoral focus on health and HIV/AIDS, economic growth through agricultural development, improved early-grade literacy, sustainable natural resource management, the promotion of accountable, effective democratic governance, and the protection of basic human rights for all. The next CDCS, now under development, will be substantially similar to the 2016-2021 in its strategy. USAID/Uganda’s strategic approach is designed for short-term results linked to long-term substantive returns, working within, rather than parallel to, Uganda’s local country systems, and engaging Ugandans in ways in which the country’s development is done “with” and “by” them, rather than “to” them.

Technical programming under the CDCS is implemented in pursuit of three Development Objectives (DOs),² as summarized in Figure 1, that aim toward the 5-year goal of “Uganda’s systems are accelerating inclusive health, education, and economic growth” and the 25-year goal of “Ugandan-Led Inclusive and Sustainable Development”:

- **DO 1:** Health Security Increased
- **DO 2:** Resilient Growth Enhanced
- **DO 3:** Accountability Strengthened

² This report is based on a review and assessment of the 2017 version of the USAID/Uganda CDCS.

Goal: A partnership with the Ugandan people to put Uganda on a path to achieve its Vision 2040

DO 1: Health Security Increased

Partner with Ugandans to develop capacity and commitment to prevent, detect, and respond to health threats, and accelerate reductions in preventable diseases

1.1. Prevention and Treatment of HIV, Malaria, TB, and Other Infectious Diseases Enhanced

- outbreaks follow 7-1-7 protocols*
- 95-95-95
- Proportion of malaria deaths (of total deaths) in health facilities reduced from 10 percent (2019) to 2.5 percent by 2025

1.2. Health Systems Strengthened

- Government of Uganda health expenditure as a percentage of total government expenditure increases by at least 10 percent

1.3. Quality of Care for Family Health Services Improved

- Reduce maternal mortality rate from 90 to 72 (per 100,000)
- Reduce under-five mortality rate from 21 to 16 (per 100,000)

KEY

✓ Success Metrics.
Internal mission targets that guide programmatic decision making

* From outbreak emergence, it should take not more than 7 days to detect the outbreak, not more than 1 day to notify public health authorities to start an investigation, and not more than 7 days to complete an initial response

DO 2: Resilient Growth Enhanced

Jointly with Ugandans, facilitate agriculture, climate and conflict sensitive, private sector-led growth, and human capital that lifts the most vulnerable in target regions out of extreme poverty

2.1. Economic Opportunities, Incomes, and Assets Increased

- Increase sustained economic output by 4 percent

2.2. Food and Nutrition Security of Vulnerable Households Improved

- Percentage of households with a poor food consumption score reduced by 20 percent

2.3. Natural Resources and Biodiversity are Sustainably and Inclusively Managed

- 87,662 hectares showing improved biophysical conditions

2.4. Education and Social Support for Children and Youth Delivered

- 20 percent increase in the number of learners progressing from a low to a higher level of reading proficiency

DO 3: Accountability Strengthened

Utilize Ugandan perspectives and know-how to increase transparency, accountability, and effectiveness in local and national government systems

3.1. Civic Space Maintained

- 60 percent reduction in reported annual cases of violations of freedom of assembly and expression of citizens

3.2. Anti-Corruption Efforts Increased

- 30 corruption cases fully prosecuted

3.3. Domestic Resource Mobilization Improved

- \$600 million in new revenue generated as a result of U.S. Government assistance
- \$400 million in private sector resources mobilized

FIGURE I. MISSION DEVELOPMENT OBJECTIVES (DOS) AND INTERMEDIATE RESULTS (IRS)

I.3 METHODOLOGY

To comply with FAA Sections 118/119 and to contribute to USAID/Uganda’s CDCS, this Analysis:

- Summarizes the status of tropical forests and biodiversity throughout Uganda.
- Provides an overview of the legal framework, institutions, and organizations affecting conservation.
- Identifies primary threats and underlying drivers of those threats to tropical forests and biodiversity.
- Characterizes “Actions Necessary” to conserve and sustainably manage forests and biodiversity and the “Extent to Which” the Mission meets the Actions Necessary.

- Develops recommendations/opportunities to better integrate tropical forests and biodiversity conservation into the new CDCS.

The Analysis consisted of five primary tasks:

TASK 1: DATA COLLECTION AND ANALYSIS

Task I included a general orientation and work planning that included a kickoff meeting and a desk analysis to identify tropical forests and biodiversity status, key biodiversity issues, stakeholders, and policy and institutional frameworks.

TASK 2: WORK PLAN AND LOGISTICAL PREPARATIONS

The Analysis Team planned stakeholder interviews (conducted under Tasks 3 and 4) based on Mission recommendations and planned the itinerary for field-based consultations and site visits. Stakeholder interviews were scheduled for U.S.-based stakeholders, including within USAID, other parts of the U.S. Government, and non-governmental and private-sector areas. The Analysis Team conducted weekly planning meetings between the Mission activity manager and the Analysis Team to discuss the work plan and logistics for in-country consultations and site-based visits.

TASK 3. PRE-FIELDWORK RESEARCH/WRITING, AND CONSULTATIONS

In coordination with the USAID activity manager, the Analysis Team conducted meetings and interviews with the USAID program office, technical teams, and other Mission environmental compliance points of contact. The Analysis Team also conducted interviews and collected information from Implementing Partners, stakeholders, and others with specific local, national, or regional knowledge that could inform the Analysis. The Analysis Team conducted a desk-based literature review and conducted pre-field work stakeholder consultations.

TASK 4. MISSION AND IN-COUNTRY CONSULTATIONS AND SITE-BASED VISITS

In coordination with the Mission, the Analysis Team conducted in-country consultations and site visits in Uganda over two weeks based on the Mission's recommendations and the team's preliminary review of key topics and information gaps. Stakeholder interviews supplemented information gathered from the literature review and other second-hand sources. The first week of the in-country visits occurred in Kampala for consultations with USAID/Uganda, government, donor, and Non-governmental Organization (NGO) stakeholders. The second week of the in-country visits occurred as field visits to other parts of the country. Based on preliminary information, the Analysis Team developed the initial findings in a PowerPoint presentation which was discussed during the Out Briefing at the Mission. This was designed to solicit discussion and early feedback from key Mission staff on threats, drivers, and recommendations.

TASK 5. PREPARATION OF FAA | 18/119 ANALYSIS

The Analysis Team analyzed the information gathered and prepared a draft and this final Analysis report in accordance with the Best Practices Guide. The final report will be delivered under this task that follows 508-compliance.

Analytical Methods used for this Analysis:

- Desk-based review of the relevant scientific literature, published reports, and media accounts
- Stakeholder consultations with United States (U.S.) and Uganda-based key informants from civil society, NGOs, United States Government, GoU, multilateral donors, implementing partners, and the private sector.

2. COUNTRY CONTEXT

2.1 LOCATION AND COUNTRY DEVELOPMENT CONTEXT

Uganda is a landlocked country that lies astride the equator between 4°N and 1°S and from 29.5°W – 35°W. It covers an area of 241,038 square kilometers (km²), comprising 197,100 km² of dry land and 43,938 km² of open water (Central Intelligence Agency 2022). Uganda has an abundance of natural resources such as fertile soils, rich vegetation, plentiful water resources, and small deposits of oil, copper, gold, and other minerals (World Bank Data 2020). Thirty-four percent of the land is arable, with its current climate conditions permitting two or even three harvests per year.³

According to the World Bank, Uganda's human population in 2021 is estimated at 44.71 million with an annual growth rate of about 3.3 percent, which translates to an increase of 1.5 million people per year (Central Intelligence Agency 2022) (World Bank Data 2020). Population is an important factor that affects environmental management in Uganda. It influences the availability and renewability of natural resources; the use of natural resources is directly proportional to population increase. The vast majority of Uganda's population is highly dependent on natural resources. For example, the decline in forest cover at 1.8 percent per annum is attributed to the increasing demand for land for agriculture and fuelwood by the rapidly increasing population. The country's population density has increased from 161.7 people/km² in 2000 to 228.1 people/km² in 2020, and most of the population is concentrated in the central and southern parts of the country, particularly along the shores of Lake Victoria and Lake Albert (Central Intelligence Agency 2022). Uganda's total fertility rate is among the world's highest at 5.8 children per woman (Central Intelligence Agency 2022). The high fertility rates and exponential increase in Uganda's population is indicative of the lack of access to contraceptives, family planning services, and an overall cultural preference for large families (Central Intelligence Agency 2022). If the country's population continues to grow at such a rate, this will further strain Uganda's ability to provide food, water, healthcare, and other basic services as a result of draining their natural resources.

Climate change has exacerbated issues relating to poverty in Uganda. As of 2020, nearly 8.3 million people (both rural and urban) are living in poverty (Uganda Bureau of Statistics 2021). Droughts have led to immense crop failures, where a majority of vulnerable rural populations live and rely on farming to supply for their families. Many rural farmers rely on subsistence agriculture techniques, which requires a heavy reliance on rainfall. Variation in rainfall due to climate change has led to rapidly changing micro-climates that introduce new vector borne diseases to previously unexposed populations. With an increasing prevalence of drought, development driven pollution, and variable rainfall, the country is expected to increasingly suffer from consequences of climate change within their agricultural, livestock and human health sectors (Green Climate Fund 2020).

³ This report reflects the 2021 version of the USAID/Uganda Results Framework/CDCS.

2.2 BIOPHYSICAL SETTING

Uganda is a landlocked country bordering Rwanda, the Democratic Republic of Congo, South Sudan, Kenya, and Tanzania (Central Intelligence Agency 2022). Uganda has an altitudinal range of between 600 meters above sea level (Nimule) to more than 5,000 meters above sea level (Mount Rwenzori) (USAID 2014). The general topography of Uganda is mostly plateau with rims of mountains. The world's largest tropical lake, Lake Victoria, is shared among Kenya, Tanzania, and Uganda (Central Intelligence Agency 2022). The central region of Uganda is dominated by grasslands and tropical forests, accompanied by volcanic foothills in the east (Uganda Parks 2020). The Virunga Volcanoes are found in the southwest of the country; these are a chain of volcanoes that stretch across East Africa, resulting in scalable mountains with a rich diversity of wildlife and vegetation (Uganda Parks 2020). Refer to Figure 2 for land cover characteristics of Uganda.

The country experiences moderate temperatures throughout the year, around 22.8°C, with monthly temperatures ranging between 21.7°C (July) and 23.9°C (February) (Climate Change Knowledge Portal 2020). Uganda has a tropical climate with a relatively high frequency of rainfall in the spring and fall, and dry seasons occurring from December to February and June to August. While the country lies in a largely equatorial climate zone, factors such as topography and prevailing winds can contribute to varying rainfall patterns throughout the country (Ministry of Foreign Affairs 2018). The majority of Uganda, with the exception of the northeast, have an annual rainfall between 1,000 and 2,000 millimeters. The northeastern region of Uganda is semiarid. Total annual precipitation varies, but Uganda has statistically shown a significant reduction of annual and seasonal rainfall over time. Particularly, seasonal rainfall between March and May has seen the highest reduction, with a decrease of about 6.0 millimeters per month, per decade (Climate Change Knowledge Portal 2020). Droughts have also increased in Uganda over the last 60 years, and particularly the last 20 years, where western, northern and northeastern regions have experienced longer lasting and more frequent occurrences (Climate Change Knowledge Portal 2020). Changes in rainfall will continue to present additional stress on economic development for Uganda, as a majority of rural farmers rely on subsistence agriculture. This could decrease the amount of arable land, reduce current annual harvests, decrease ground water resources, and transform the occurrence and distribution of pests (Ministry of Foreign Affairs 2018).

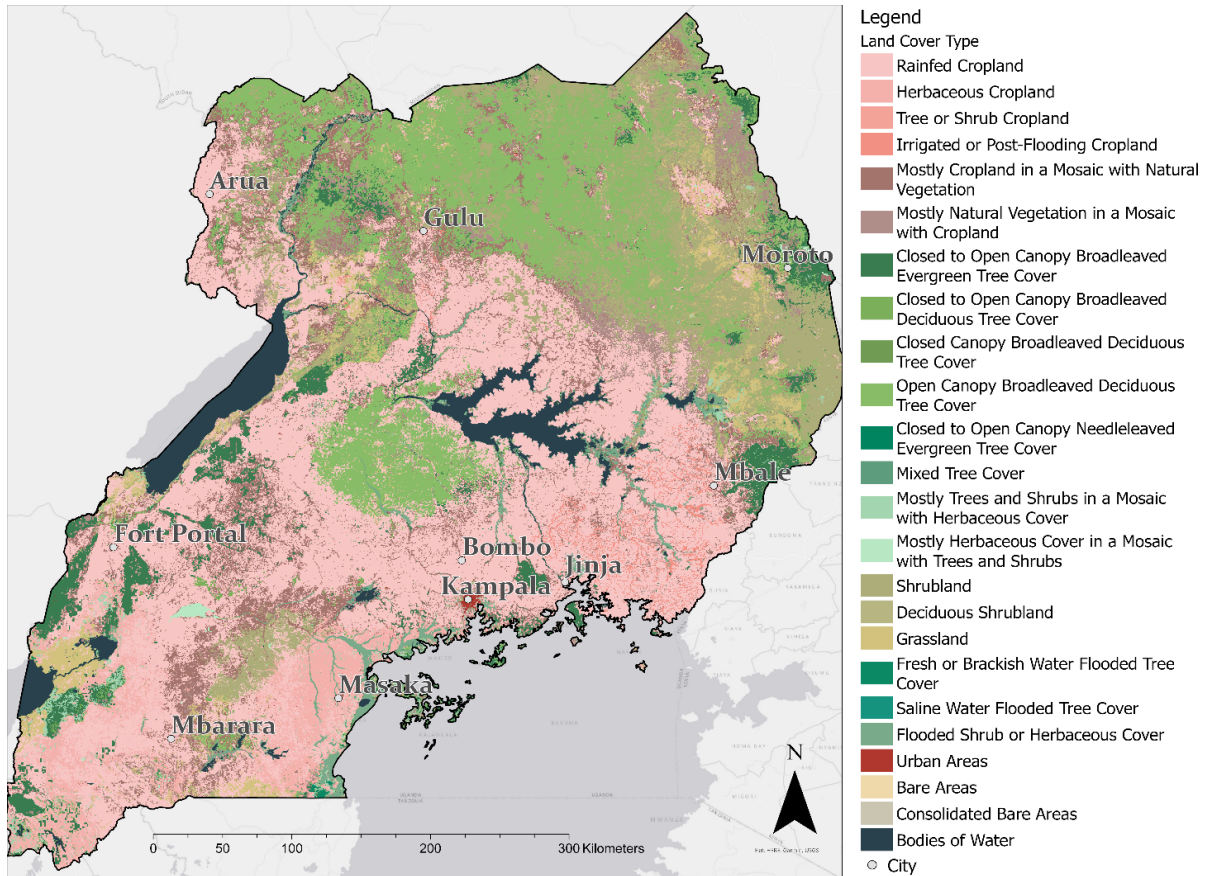


FIGURE 2. LAND COVER BY TYPE IN UGANDA

Data Source: Esri, ESA. Land Cover CCI Product User Guide Version 2. Tech. Rep. (2017). Available at: maps.elie.ucl.ac.be/CCI/viewer/download/ESACCI-LC-Ph2-PUGv2_2.0.pdf

3. STATUS OF UGANDA'S BIODIVERSITY (INCLUDING TROPICAL FORESTS)

Uganda's biodiversity offers an extraordinary array of wildlife such as birds, gorillas, elephants (*Loxodonta africana*) and big cats, making it one of the most biodiverse countries in the world and an international tourist destination. Uganda is host to 54 percent of the world's population of mountain gorillas (*Gorilla beringei beringei*), 10 percent (1,063 species) of the world's recorded species of birds (50 percent of Africa's bird species), 7.8 percent (345 species) of the global mammal diversity (39 percent of Africa's mammal richness), 19 percent (86 species) of Africa's amphibian species richness and 14 percent (142 species) of Africa's reptile species richness, 1,249 recorded species of butterflies and 600 species of fish. According to the most recent data available, there are 30 species of antelope, 24 species of primates including charismatic species such as mountain gorillas and chimpanzees (*Pan troglodytes*), and more than 5,406 species of plants, of which 30 species are endemic to Uganda (National Environment Management Authority 2016).

3.1 MAJOR ECOSYSTEM TYPES AND STATUS

Uganda is made up of four of Africa's nine biomes, including: (1) Tropical and Subtropical Moist Broadleaf Forests, (2) Tropical and Subtropical Grasslands, Savannas, and Shrublands and Woodlands, (3) Freshwater, and (4) Montane Grasslands and Shrublands, across eight ecoregions (as described below).

3.1.1 TERRESTRIAL ECOREGIONS⁴

Uganda is composed of eight ecoregions including:

- 1) Albertine Rift Montane Forests.
- 2) East African Montane Forests.
- 3) East African Montane Moorlands.
- 4) East Sudanian Savanna.
- 5) Northern Acacia – Commiphora Bushlands and Thickets.
- 6) Northern Congolian Forest-Savanna Mosaic.
- 7) Rwenzori-Virunga Montane Moorlands.
- 8) Victoria Basin Forest-Savanna Mosaic.

These ecoregions are described briefly below and summarized in Figure 3.

3.1.1.1 ALBERTINE RIFT MONTANE FORESTS

The Albertine Rift montane forests are located primarily in the western and southwestern areas of Uganda. They contain habitat and diverse climate created by the rugged topography that support the highest levels of faunal endemism in Africa. The flora in the ecoregion varies depending on altitude and location, from dense forests at the base of the mountains, to montane forests on the mountain sides, to moorland at the highest peaks. The fauna in the ecoregion includes 34 endemic mammal species including threatened primates such as the mountain gorilla, chimpanzee, and golden monkey, as well as

⁴ Unless otherwise noted, the primary source of descriptions of the eight ecoregions for this section is the following literature source: I. Burgess, N., Hales, J.A., Underwood, E., Dinerstein, E., Olson, D., Itoua, I., Schipper, J., Ricketts, T. and Newman, K. 2004. Terrestrial ecoregions of Africa and Madagascar: a conservation assessment. Island Press.

the Ruwenzori otter shrew. The ecoregion supports 37 endemic species of avifauna, 34 endemic species of amphibians, and 117 endemic species of butterflies. In Uganda, protected areas in the ecoregion include Kalinzu CFR, Bwindi Impenetrable National Park, Mgahinga Gorilla National Park, and Kibale National Park. This ecoregion lies within the broader Albertine Rift region which is one of Africa’s most important areas for biodiversity and contains more than half of Africa’s birds, 40 percent of the continent’s mammals, and approximately 20 percent of its amphibians and plants. The area is also known for conserving more threatened and endemic species than any other region in Africa, making it a biodiversity hotspot, a global 200 ecoregion, and an endemic bird area (WCS Uganda n.d.). (the East Africa montane ecoregion also lies within this global biodiversity hotspot.)

3.1.1.2 VICTORIA BASIN FOREST-SAVANNA MOSAIC

This ecoregion dominates southwestern and central Uganda, in the Lake Victoria basin. The forest and savanna habitats support critical mixes of savannah mammals, including chimpanzees living in the western forests of the ecoregion, and elephants living in the drier areas. The Kibale Forest supports 12 species of primates. The flora in the ecoregion is diverse and includes the unique Sango Bay forest, containing both Guineo-Congolian low-land species and Afromontane species, in the floodplains of the Kagera River where it enters Lake Victoria. The swamps in the ecoregion are often dominated by papyrus which provides habitat for two endemic bird species, papyrus canary and fox’s weaver. The large swamps along Lake Victoria are species rich for avifauna including the rare shoebill. Important protected areas in the ecoregion include Queen Elizabeth National Park, and Kyambura Wildlife Reserve in the Rift Valley, as well as Lake Mburo and Murchison Falls National Parks.

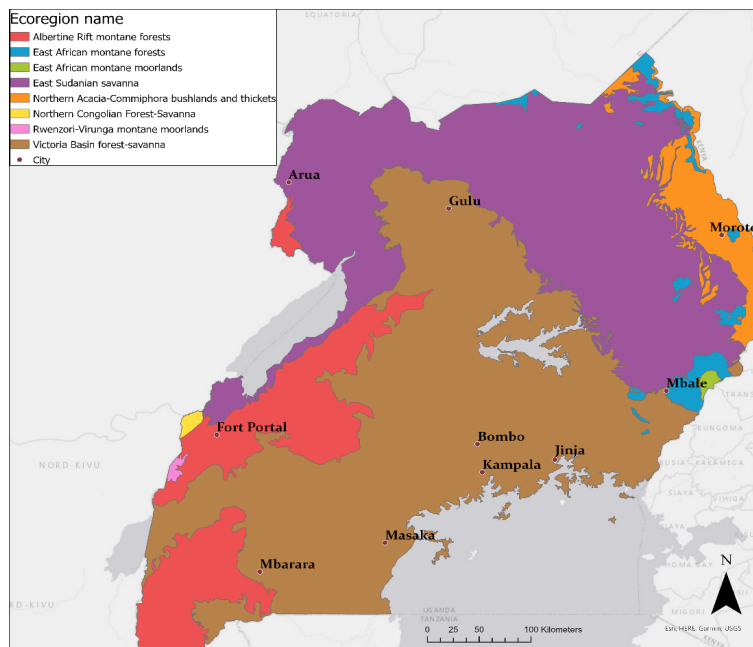


FIGURE 3. ECO-REGIONS IN UGANDA

Data Source: Bioscience, An Ecoregions-Based Approach to Protecting Half the Terrestrial Realm DOI: <https://doi.org/10.1093/biosci/bix014>

3.1.1.3 RWENZORI-VIRUNGA MONTANE MOORLANDS

The high altitude (above 3,000 meters) ecoregion lies entirely within two national parks in the Rwenzori Mountains in Uganda, including the Mgahinga Gorilla National Park and the Rwenzori Mountains National Park. The location at the equator at high altitude results in an extreme climate. Flora is characterized by only 14 endemic species. Large mammals such as gorillas, elephants, buffalo and leopard, occasionally enter or cross the area, but only one endemic mammal, the rare Rwenzori black fronted Duiker lives there.

3.1.1.4 EAST SUDANIAN SAVANNA

The East Sudanian Savanna ecoregion lies south of the Sahel in Central and East Africa, the western portion of which extends across much of northern, and northeastern Uganda as well as the areas along Lake Albert in the western region of the country. This ecoregion is characterized by low altitudes varying between 200 and 1,000 meters in elevation. The East Sudanian Savanna ecoregion supports few endemic faunal species, including one species of mouse, two species of reptiles, and five species of birds. In Karamoja, this ecoregion supports Karamoja apalis (*Apalis karamojae*) which is a near endemic bird species. This ecoregion also supports several charismatic threatened mammal species including the elephant (*Loxodonta africana*), wild dog (*Lycaon pictus*), cheetah (*Acinonyx jubatus*), and lion (*Panthera leo*) in Uganda.

The East Sudanian Savanna as well as the lower elevations of the East African montane forest ecoregion (see Section 5) were formerly habitat for the Eastern Black Rhino which was extirpated in 1983.

When white rhinoceroses nearly became extinct in the late 1980's, the GoU launched the Rhino Fund Uganda (RFU) with the purpose of reintroducing white rhino populations; there are currently 33 white rhinos in the RFU sanctuary. Current projections



FIGURE 4. WHITE RHINOCEROS IN UGANDA

show that white rhinoceroses in the country will achieve overall growth rates of at least 5 percent per annum (allowing a three-year settling-in period after reintroduction) (The Republic of Uganda 2018). Conservation and reintroduction efforts around the white rhinoceros have also contributed greatly to protections for the savannah-forest mosaics across Uganda.

3.1.1.5 EAST AFRICAN MONTANE FORESTS

This ecoregion encompasses narrow areas along the northern and eastern boundaries of Uganda and includes mountainous areas above 1,500 meters around Mount Elgon on the Kenyan border and around Kidepo Valley on the South Sudan border. This ecoregion is characterized by a mosaic of forests and grassland at the middle elevations with woodlands and savanna at the lower elevations. The higher elevations, above 3,000 meters, fall within the Montane Moorlands (see Section 4). These areas in Uganda have been substantially degraded or converted to agricultural uses in the East, except for the area in Mount Elgon National Park, and somewhat degraded and less converted to farmland due to the relative isolation in the northeastern corner of Karamoja around Kidepo Valley National Park, including the 2,750-meter Mount Morungole located in the mountain along the Park southern boundary. The lower elevations of the ecoregion as well as the East Sudanian Savanna (see Section 4) were formerly habitat for the Eastern Black Rhino which was extirpated in 1983. In Uganda, this ecoregion lies within the Eastern Afromontane Biodiversity Hotspot (Critical Ecosystem Partnership Fund 2012) (like the Albertine montane forests). Notable endemic avifauna species in this ecoregion within Kidepo National

Park, in the surrounding Lonyili, Morungole, Zulia and Lomej mountains, and on Mount Elgon, include Little Rock Thrush (*Monticola rufocinereus*) and Brown Parisoma (*Sylvia lugens*) (Birdlife International 2012).

3.1.1.6 NORTHERN ACACIA-COMMIPHORA BUSHLANDS AND THICKETS

In Uganda, this ecoregion lies along the eastern border, and in the northeastern corner in the Karamoja, where Acacia-Commiphora bushland and thicket dominates. It is part of the mosaic in Kidepo Valley National Park and includes the Moroto mountain range along the Kenyan border (although the upper elevations of Mount Moroto contain the East Africa Montane ecoregion). The diversity of mammals in the ecoregion is high although it supports few endemics. Several species of ungulates: Grevy's zebra (*Equus grevyi*), beisa oryx (*Oryx gazella beisa*), gerenuk (*Litocranius walleri*), and lesser kudu (*Tragelaphus imberbis*) also live in this ecoregion. Elephants are found in the ecoregion but are largely confined to protected areas. Like in the East Sudanian Savanna, the Eastern Black Rhino has been extirpated from the ecoregion. Protected areas found in this ecoregion include Kidepo Valley National Park, Karenga Community Wildlife Area, and Bokora Wildlife Reserve which connects Matheniko and Pian Upe Wildlife Reserves (around Moroto) (Martin and N n.d.).

This ecoregion is important for biodiversity due to the high concentration of endemic species. These include 30 species of birds, including the Karamoja apalis (*Apalis karamojae*), currently under threat; the secretary bird (*Sagittarius serpentarius*), and the common ostrich (*Struthio camelus*). There are several species of butterfly endemic to northeastern Uganda, including the noble swallowtail (*Papilio nobilis*) and the western blue charaxes (*Charaxes smaragdilis elgonae*). Additionally, the region is home to other vulnerable mammal species, such as the cheetah (*Acinonyx jubatus*), the lesser kudu (*Tragelaphus imberbis*), the greater kudu (*Tragelaphus strepsiceros*), and the roan antelope (*Hippotragus equinus*).

3.1.1.7 EAST AFRICAN MONTANE MOORLANDS

The moorlands ecoregion comprises the peak of Mount Elgon in Uganda, and includes the peaks of other volcanic mountains (above 3,000 meters) in East Africa. Like other high altitude regions at the equator, the severe climate results in extremely limited flora, with low diversity and high endemism (Martin and N n.d.). There are 16 endemic plant species on Mount Elgon.

3.1.1.8 NORTHERN CONGOLIAN FOREST-SAVANNA MOSAIC

The Northern Congolian Forest-Savanna Mosaic ecoregion extends into a small portion of Uganda, at the boundary with the Democratic Republic of the Congo (DRC) on the western side of the Rwenzori Mountains. This ecoregion includes the forests in Semuliki National Park which are the easterly reaches of the Ituri Forest and share similar flora and fauna with forests in the Congo Basin in Northeastern DRC (Birdlife International 2012). The ecoregion supports 120 mammals, including baboons and chimpanzees, elephants and antelopes, as well as 350 species of birds of which 23 which are endemic (Uganda Wildlife Authority n.d.).

3.1.2 FRESHWATER RESOURCES

3.1.2.1 HYDROLOGY

Uganda’s main drainage basins are Lake Edward, Lake Victoria, Lake Kyoga, Victoria Nile, Lake Albert, Albert Nile, Aswa, and Kidepo as summarized in Table I and shown in Figure 3.

TABLE I. OVERVIEW OF UGANDA RIVER SUBBASINS (USAID 2021)

RIVER BASIN	KEY LAKES	MAJOR RIVERS	BASIN HIGHLIGHTS
Lake Edward	Edward, George	Mpanga	Includes the Albertine Rift (part of Rift Valley), with important forests, national parks, and extensive biodiversity.
Lake Victoria	Victoria	Kagera, Katonga	Provides 85 percent of Uganda’s renewable water supply. Lake outflows are steady across seasons. Direct rainfall over Lake Victoria provides 80 percent of its water. The Kagera River provides 40 percent of overland flow, while the Katonga and Ruizi rivers only provide 5 to 10 percent. The Katonga River can flow in two directions, to Lake Victoria and to Lake George.
Lake Kyoga	Kyoga, Bisina	Victoria Nile (White Nile)	Lake Kyoga Basin covers one quarter of Uganda and has over 40 percent of remaining wetlands. Lake Kyoga is a large but shallow lake.
Victoria Nile	None	Kyoga Nile (White Nile), Kafu	The portion of the White Nile between Lake Kyoga and Lake Albert is called the Kyoga Nile. This stretch of river features the Murchison Falls-Albert Delta Wetland, a key Ramsar site.
Lake Albert	Albert	Semliki River	Lake Edward connects to Lake Albert through the Semliki River, which mostly exists in the Democratic Republic of the Congo (DRC).
Albert Nile	None	Albert Nile (White Nile)	The portion of the White Nile between Lake Albert and the border with South Sudan is called the Albert Nile.
Aswa	None	Aswa, Pager, and Agago	The Aswa River is fed by two main seasonal tributaries, the Pager and Agago.
Kidepo	None	None	The Kidepo is Uganda’s smallest basin and only seasonal rivers that flow to South Sudan.

Nearly 20 percent of Uganda's surface area is covered by aquatic ecosystems. The major lakes in Uganda include Lake Victoria, Lake Albert, Lake Kyoga, Lake Edward, and Lake George. Lake Victoria, one of the largest inland freshwater lakes in the world, provides the upper waters of the Nile River, which is referred to as the Victoria Nile on the eastern side of Uganda (USAID Uganda 2015). Lake Kyoga and the surrounding basin are located in the central part of the country and Lakes Albert, Edward, and George are situated in the western Rift Valley.

The Victoria Nile leaves Lake Victoria at Owen Falls as it travels toward the northwest and widens to form Lake Kyoga. The Nile receives the Kafu River from the west before flowing north to Lake Albert. From Lake Albert, the Nile is known as the Albert Nile as it travels about 200 kilometers to the Sudan border. The Katonga River flows westward from Lake Victoria to Lake George. Lake George and Lake Edward are connected by the Kazinga Channel. The Semliki River flows into Lake Edward from the north, where it drains parts of the Democratic Republic of Congo and forms a portion of the Uganda-Democratic Republic of the Congo border (USAID Uganda 2015). Together, these bodies of water contain some of the largest diversity of freshwater fish species in the entire world (USAID 2006). Lake Victoria, the lakes of the Kyoga basin, and Sango Bay, originally had more than 600 endemic cichlid fish (*haplochromine cichlids*). These areas contain critical biodiversity on the lake islands that is extremely fragile.

3.1.2.2 WETLANDS

Each of Uganda's river networks connect to some of Uganda's largest wetlands. Acknowledging their vital importance, the GoU has taken significant strides in the protection of wetlands throughout the country; such as the establishment of the National Conservation and Management of Wetlands Resources Policy of 1995 and designating 12 wetlands as wetlands of international importance under the Ramsar convention (USAID 2006).

Ugandan wetlands range from permanent to seasonal. Swamps and marshes, which are more permanent forms of wetlands, typically occupy areas such as lakeshores and riverbanks. Seasonal wetlands are typically situated in upstream regions of wetland systems and river flood plains (USAID 2006). An endemic species of papyrus (*Cyperus papyrus*) grows in the shallower parts of Lakes Edward, George, and Bunyonyi; papyrus dominated wetlands have demonstrated a high potential for water quality treatment and decrease the rate and flow of wastewater while also increasing the residence time of pollutants and the interaction of wastewater with plants.

Wetlands in Uganda have declined dramatically. In 1994 wetlands covered 37,575 km² of Uganda's land area. Wetland coverage across Uganda dropped from 37,346.3 km² in 1994 (15.5 percent of the total national surface area) to 21,526.3 km² (8.9 percent of the total national surface area) in 2016 (Atim 2020) (Ramsar 2018). As a result of urban and agricultural expansion, disruptions to soil and surrounding water environments have likely resulted in the gradual decline of wetlands in Uganda. While the GoU has taken initial strides to preserve wetlands through the acknowledgement of their importance and environmentally protective qualities, the lack of legislation to formally protect Uganda's 12 Ramsar sites has also contributed to the overexploitation of wetland resources (The Republic of Uganda 2016).

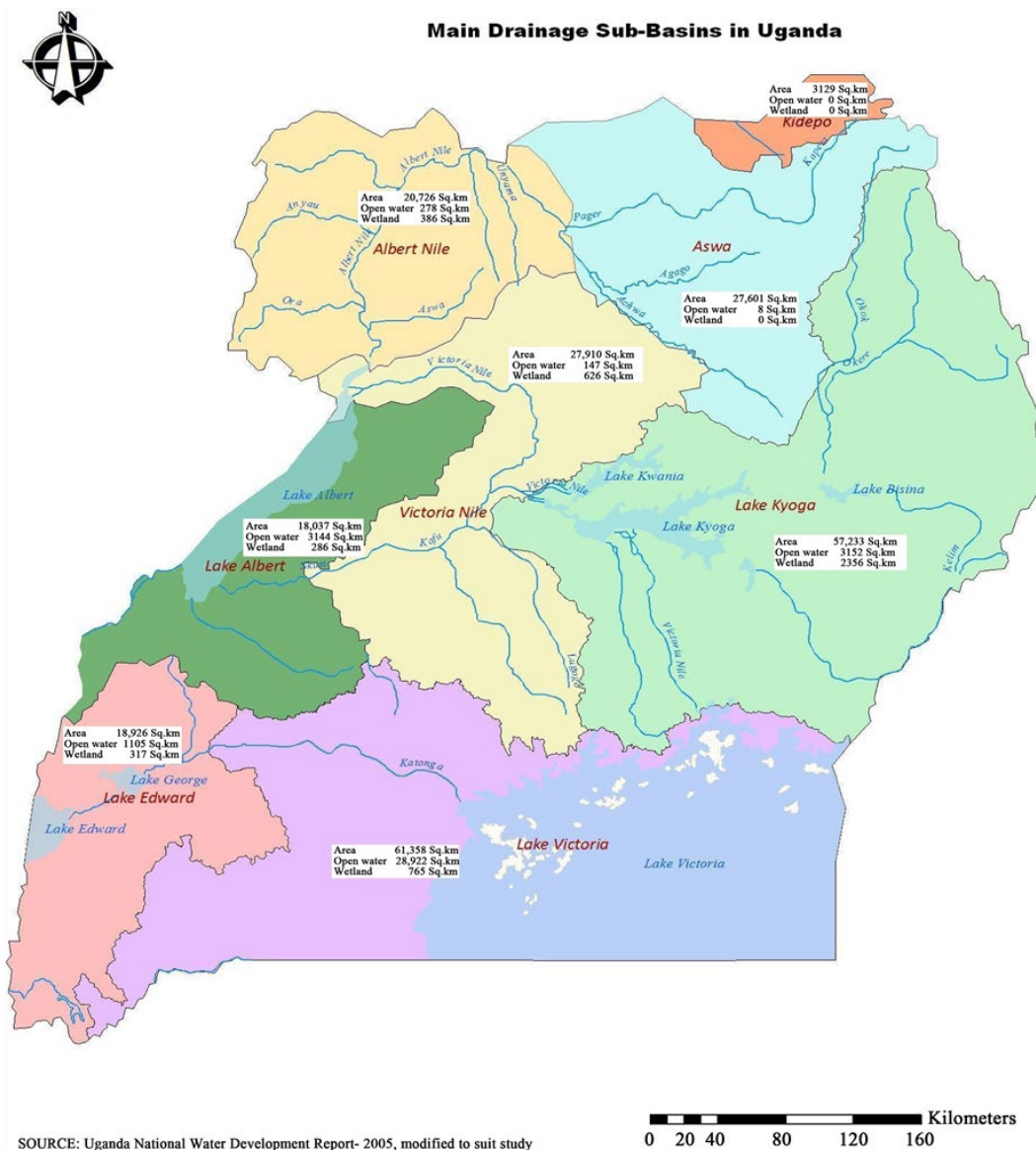


FIGURE 5. MAIN DRAINAGE SUB-BASINS IN UGANDA

Source: Nsubuga, F. , Namutebi, E. and Nsubuga-Ssenfuma, M. (2014) Water Resources of Uganda: An Assessment and Review. Journal of Water Resource and Protection, 6, 1297-1315. doi: 10.4236/jwarp.2014.614120.

3.2 STATUS OF TROPICAL FORESTS

In 2020, the Food and Agriculture Organization of the United Nations (FAO) estimated that approximately 11.5 percent of Uganda’s total land consists of tree cover, including forests and plantations (The World Bank 2020). According to Global Forest Watch, Uganda lost 967,000 hectares (ha) of tree cover, equivalent to a 12% decrease between 2001 and 2021. Furthermore, over the same time period, the total area of humid primary forest in Uganda decreased by 14% which is equivalent to 71,600 ha lost. Primary forests are mature natural forests that have not been disturbed in recent history (Global Forest Watch n.d.). These natural forests provide critical habitats for biodiversity and provisioning services to meet citizens’ socio-economic needs. Natural forests in Uganda are disappearing

at a rate of 1.9 percent per annum, which is one of the highest rates in East Africa, and higher in private forests than in PAs. The GoU aspires to increase its forest cover (as a percent of total land area) by 10 percent by 2040 through joint human development and forest conservation efforts, such as forest and landscape restoration projects.

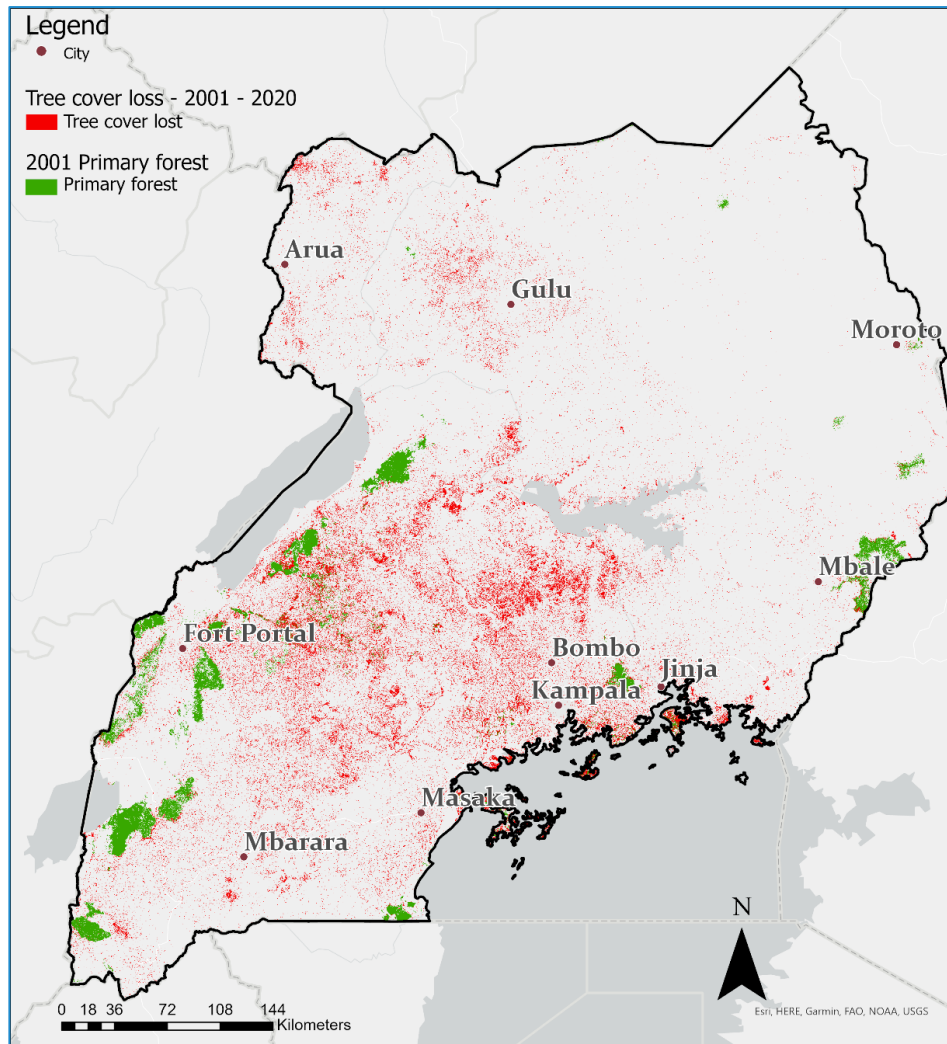


FIGURE 6. TREE COVER LOSS 2001-2020 IN UGANDA

Data Source: Hansen et al. 2013. “High-Resolution Global Maps of 21st-Century Forest Cover Change.” *Science* 342 (15 November): 850–53. Data available on-line from: <https://glad.earthengine.app/view/global-forest-cha>.

According to the FAO report on the Uganda REDD+ Program, between 1990 and 2017, 3.05 million ha of forests were lost, with nearly 2.2 million ha lost from woodlands. As of 2017, deforestation in Uganda was occurring at a rate of 50,147 ha annually (Food and Agriculture Organization of the United States 2020). Data also indicates that forests outside of PAs decreased from 68 percent in 1990 to 61 percent in 2005, and then down to 40 percent in 2017 (Food and Agriculture Organization of the United States 2020). The largest loss of forest cover has been on privately owned land, where 88 percent of tropical high forests have been lost between 1990 and 2017 (Food and Agriculture Organization of the United States 2020).

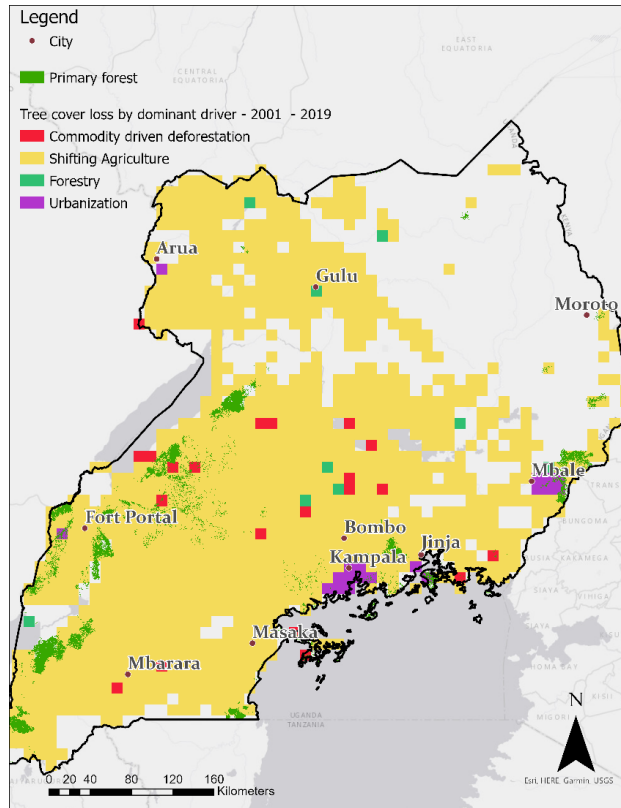


FIGURE 7. TREE COVER LOSS BY DOMINANT DRIVER 2001-2019 IN UGANDA

Data Source: Tree cover loss by dominant driver - Curtis, P.G., C.M. Slay, N.L. Harris, A. Tyukavina, and M.C. Hansen. 2018. "Classifying Drivers of Global Forest Loss." *Science*. Accessed through Global Forest Watch on 22/04/2022. www.globalforestwatch.org; Turbanova S., Potapov P., Tyukavina, A., and Hansen M. (2018) Ongoing primary forest loss in Brazil, Democratic Republic of the Congo, and Indonesia. *Environmental Research Letters* <https://doi.org/10.1088/1748-9326/aacd1c>.

In 2016, the Uganda National Forest Authority (NFA) published a comprehensive analysis of forest cover which illustrates in detail the changes from 1990 through 2015, primarily as related to timber values. The NFA study categorized Uganda’s three main types of natural forest vegetation as Tropical High Forest Well-Stocked (THF), Tropical High Forest Low-Stocked (THFL),⁵ and woodlands. Woodlands were the predominant forest vegetation type in terms of area (nearly 63 percent of total forest area in 2015) (The Republic of Uganda 2019). Plantations, non-endemic and typically consisting of one or a few tree species, were included in Uganda’s tree cover and differentiated into broadleaved and coniferous (nearly 6 percent of total tree cover in 2015) (Ministry of Water and Environment 2017) (The Republic of Uganda 2019) (The World Bank 2020).

From 1990 to 2015, as shown in Table 2 of the NFA study, the area of Tropical High Forest and Woodland, decreased whereas the area composed of plantations increased. In 2015, of the total area of forests and plantations, 36 percent were in PAs (including forest reserves, national parks, and wildlife

⁵ Well-stocked is defined as the situation in which a forest stand contains trees spaced widely enough to prevent competition yet closely enough to utilize the entire site, while low-stocked is defined as trees growing in a stand that do not fully utilize the site’s space and resources, which result in trees with poor timber form and quality. (Per the Glossary of Forestry terms, accessed April 2022, <https://dnr.maryland.gov/forests/pages/gloss.aspx?msclid=f9b4c5fccfc311ecb973462b91d5e445#w>)

reserves), whereas 64 percent were found on private and customary land. At the same time, non-indigenous plantations and woodlands made up nearly 5 million ha) of land, approximately 24 percent of Uganda’s total land area (USAID Uganda 2015). In 2015, of the 924,208 ha of tropical high forests, 35,066 ha of woodlands and forest plantations, nearly 30 percent were located in PAs (forest reserves, national parks and wildlife reserves) (USAID Uganda 2015).

TABLE 2. FOREST COVER STATISTICS 1990-2015 (IN HECTARES)

FOREST OWNERSHIP	FOREST TYPE	1990	2000	2005	2010	2015
PRIVATE	THF well stocked	172,274	127,022	79,789	50,662	20,439
	THF degraded	175,052	160,883	149,008	50,423	35,400
	Woodland including montane	2,971,763	2,258,873	1,948,534	945,221	605,146
	Plantation	12,000	7,000	11,000	19,000	37,000
Sub total		3,331,090	2,553,778	2,188,331	1,065,306	697,986
PROTECTED	THF well stocked	419,456	549,140	419,972	431,259	410,449
	THF degraded	83,911	57,792	36,536	55,160	100,880
	Woodland including montane	1,028,027	842,756	907,752	703,113	556,464
	Plantation	18,000	15,000	21,000	38,000	64,000
Sub total		1,549,394	1,464,688	1,385,260	1,227,532	1,131,793
Grand total		4,880,484	4,018,466	3,573,597	1,292,838	1,829,779
% of total land area		24	20	17	11	9

Source: National Forest Authority Data, 2016

3.3 SPECIES DIVERSITY AND STATUS

Despite occupying only 2 percent of the world’s area, Uganda has some of the richest concentrations of species and genetic diversity in the world. More than half of Africa’s 2,000 bird species, for instance, can be found in Uganda, and about 10 percent of the world’s bird species are found in Uganda (WCS Uganda n.d.). A large portion of Uganda’s economy such as agriculture, fishing, livestock industries, and tourism depend on its rich biodiversity. Even with its small area size, Uganda ranks among the top 10 most biodiverse countries in the world, with recorded totals of 18,783 species of flora and fauna, 54 percent of the world’s population of mountain gorillas, 10 percent of the world’s recorded species of birds, 7.8 percent of global mammal diversity, 19 percent of Africa’s amphibian species richness and 14 percent of Africa’s reptile species richness. According to the most current data available, there are 30 species of antelope; 24 species of primates, including charismatic species such as mountain gorillas and

chimpanzees; and more than 5,406 species of plants so far recorded. Thirty of these species are endemic to Uganda (National Environment Management Authority 2016).

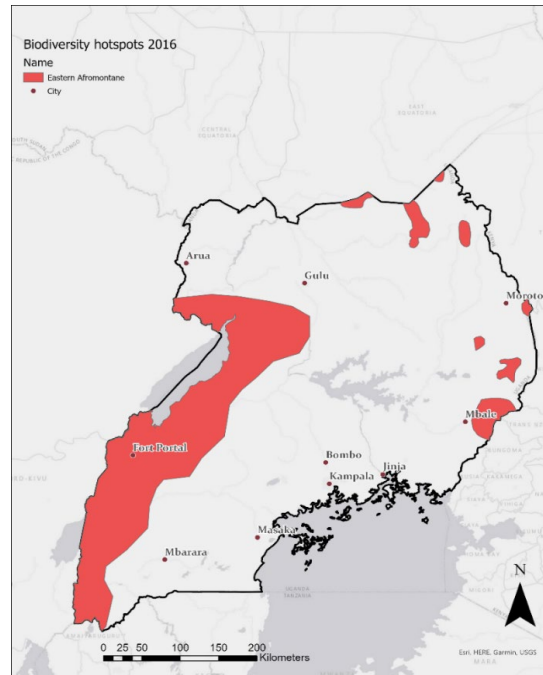


FIGURE 8. KEY BIODIVERSITY HOT SPOTS AND AREAS IN UGANDA (GLOBAL FOREST WATCH N.D.)

Most of Uganda’s endemic species are located in the mountainous regions, forests, and the major Pleistocene refugium of the Albertine Rift Valley in Western Uganda (Global Forest Watch n.d.). Some of the country’s larger species include the elephant, buffalo (*Syncerus caffer*), hippopotamus (*Hippopotamus amphibius*), eland (*Taurotragus oryx*), zebra (*Equus quagga*), hartebeest (*Alcelaphus buselaphus*), waterbuck (*Kobus ellipsiprymnus*), reedbuck (*Redunca arundinum*), and Uganda kob (Global Forest Watch n.d.). Some of the more well known species include lions, cheetahs, leopards (*Panthera pardus*), hunting dogs (*Lycaon pictus*), and hyenas (*Crocuta crocuta*).

TABLE 3. RECORDED FLORA AND FAUNA SPECIES IN UGANDA

TAXA	TOTAL NUMBER OF SPECIES	% OF GLOBAL SPECIES	NO. OF GLOBALLY THREATENED SPECIES
Mammals	345	7.5	27
Birds	1,014	10	33
Fishes & Aquatic Species	600	-	66
Plants	5,406	-	109

Insects	9,000	-	10
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Sources: NEMA 2009, and IUCN Red List, accessed May 2022. Note: Threatened species includes Vulnerable, Endangered, and Critically Endangered. Near Threatened and Least Concern species are not included.

Status and Trends in Biodiversity: In 2004, the rate of biodiversity was calculated at a loss of 10-11 percent per decade, or a 3 percent annual decrease since 2012 (Bortolamiol, et al. 2022). Table 3 summarizes the number of threatened species on the IUCN Red List (National Environment Management Authority 2016). Most of Uganda’s remaining large animals are located in protected areas, with data showing small populations with stable or decreasing numbers (International Union for Conservation of Nature and Natural Resources n.d.). However, many species do not stay confined to park grounds, and frequently migrate to different regions depending on mating seasons and droughts. For example, elephants migrate from Kidepo National Park south to the Karenga Community Managed Area which links to Rom Forest Reserve (WCS Uganda n.d.).

The status and trends of populations for mammals, birds, fish/aquatics, plants, and invertebrates are described briefly below.

Mammals: Of the 345 species of mammals in Uganda, 27 are characterized as threatened (i.e., critically endangered, endangered or vulnerable) by the IUCN Red List. As noted in Table 4, the populations of these threatened species in Uganda are decreasing, except for the vulnerable species of Ruwenzori hybomys and hippopotamus, which remain stable (International Union for Conservation of Nature and Natural Resources n.d.). The Eastern Gorilla is characterized by the IUCN as the single critically endangered mammal species in Uganda. Although the population of the Mountain Gorilla subspecies has been increasing, the population of the Grauer’s Gorilla subspecies continues to decline (77% in one generation), based on recent studies (International Union for Conservation of Nature and Natural Resources n.d.). Unfortunately, the rate of population decline for the Eastern Gorilla species as a whole is predicted to continue by more than 80% over three generations, and if not arrested, could result in only 14% of the 1994 population remaining in 2054 (International Union for Conservation of Nature and Natural Resources n.d.). This expected decline would result from poaching, loss of habitat, and general lawlessness in portions of the Eastern Gorilla habitat (International Union for Conservation of Nature and Natural Resources n.d.).

TABLE 4. RED LIST OF THREATENED MAMMAL SPECIES IN UGANDA

SCIENTIFIC NAME	COMMON NAME	RED LIST CATEGORY	RED LIST CRITERIA	POPULATION TREND
Gorilla beringei	Eastern Gorilla	Critically Endangered	A4bcd	Decreasing
Crocidura stenocephala	Narrow-headed Shrew	Endangered	B1 ab(ii,iii)	Decreasing
Rhinolophus ruwenzorii	Ruwenzori Horseshoe Bat	Endangered	B2ab(ii,iii,v)	Decreasing
Myosorex blarina	Montane Mouse Shrew	Endangered	B1 ab(iii)	Decreasing

TABLE 4. RED LIST OF THREATENED MAMMAL SPECIES IN UGANDA

SCIENTIFIC NAME	COMMON NAME	RED LIST CATEGORY	RED LIST CRITERIA	POPULATION TREND
<i>Crocidura tarella</i>	Ugandan Shrew	Endangered	B1ab(iii)	Decreasing
<i>Otomys barbouri</i>	Barbours Vlei Rat	Endangered	B1ab(iii)c(ii,iv)	Decreasing
<i>Redunca fulvorufula</i>	Mountain Reedbuck	Endangered	A2ad	Decreasing
<i>Dasymys montanus</i>	Montane Shaggy Rat	Endangered	B1ab(iii)	Decreasing
<i>Smutsia gigantea</i>	Giant Pangolin	Endangered	A2cd+4cd	Decreasing
<i>Phataginus tricuspis</i>	African White-bellied Pangolin	Endangered	A2c+4cd	Decreasing
<i>Pan troglodytes</i>	Chimpanzee	Endangered	A4bcde	Decreasing
<i>Piliocolobus tephrosceles</i>	Uganda Red Colobus	Endangered	A4bc	Decreasing
<i>Loxodonta africana</i>	African Savanna Elephant	Endangered	A2abd	Decreasing
<i>Colobus angolensis</i>	Angolan Colobus	Vulnerable	A2cd	Decreasing
<i>Hippopotamus amphibius</i>	Hippopotamus	Vulnerable	A4acd	Stable
<i>Lophuromys mediceaudatus</i>	Medium-tailed Brush-furred Rat	Vulnerable	B1ab(iii)	Decreasing
<i>Acinonyx jubatus</i>	Cheetah	Vulnerable	A2acd; C1	Decreasing
<i>Caracal aurata</i>	Golden Cat	Vulnerable	A2c+3c	Decreasing
<i>Allochrocebus lhoesti</i>	L'Hoest's Monkey	Vulnerable	A4cd	Decreasing
<i>Hybomys lunaris</i>	Ruwenzori Hybomys	Vulnerable	D2	Stable
<i>Panthera leo</i>	African Lion	Vulnerable	A2abcd	Decreasing
<i>Ruwenzorisorex suncooides</i>	Ruwenzori Shrew	Vulnerable	B2ab(iii)	Unknown
<i>Smutsia temminckii</i>	Temminck's Pangolin	Vulnerable	A4cd	Decreasing
<i>Giraffa camelopardalis</i>	Giraffe	Vulnerable	A2acd	Decreasing
<i>Panthera pardus</i>	Leopard	Vulnerable	A2cd	Decreasing

TABLE 4. RED LIST OF THREATENED MAMMAL SPECIES IN UGANDA

SCIENTIFIC NAME	COMMON NAME	RED LIST CATEGORY	RED LIST CRITERIA	POPULATION TREND
Lophocebus albigena	Grey-cheeked Mangabey	Vulnerable	A2cd	Decreasing
Delanymys brooksi	Delany's Swamp Mouse	Vulnerable	B1ab(iii)	Decreasing

Source: IUCN Red List, accessed May 2022, Note: Threatened species includes Vulnerable, Endangered, and Critically Endangered, Note: The species of Least Concern are not included in this table.

Birds: In Uganda, of the 1,014 species of birds, (National Environment Management Authority 2016) 33 are characterized as threatened (i.e., critically endangered, endangered or vulnerable) by the IUCN Red List. As noted in Table 5, the populations of these species are generally decreasing, except for the Basra Reed-Warbler which is stable (International Union for Conservation of Nature and Natural Resources n.d.). Vultures predominate the list of critically endangered species in Uganda, as populations are dwindling due to poisoning, hunting, trade for traditional medicine, habitat loss and conversion to agropastoral uses, amongst other factors (International Union for Conservation of Nature and Natural Resources n.d.).

TABLE 5. RED LIST OF THREATENED BIRD SPECIES IN UGANDA

SCIENTIFIC NAME	COMMON NAME	RED LIST CATEGORY	RED LIST CRITERIA	POPULATION TREND
Necrosyrtes monachus	Hooded Vulture	Critically Endangered	A2acd+3cd+4acd	Decreasing
Gyps africanus	White-Backed Vulture	Critically Endangered	A2abcd+3bcd+4abcd	Decreasing
Gyps rueppelli	Rueppell's Griffon Vulture	Critically Endangered	A2abcd+3bcd+4abcd	Decreasing
Trigonoceps occipitalis	White-Headed Vulture	Critically Endangered	A2abcd+3bcd+4abcd	Decreasing
Balearica regulorum	Grey Crowned-crane	Endangered	A2acd+4acd	Decreasing
Cryptospiza shelleyi	Shelley's Crimson-Wing	Endangered	C2a(i)	Decreasing
Acrocephalus griseldis	Basra Reed-Warbler	Endangered	A3c	Stable
Psittacus erithacus	Grey Parrot	Endangered	A2bcd+3bcd+4bcd	Decreasing
Polemaetus bellicosus	Martial Eagle	Endangered	A2acde+3cde+4acde	Decreasing

TABLE 5. RED LIST OF THREATENED BIRD SPECIES IN UGANDA

SCIENTIFIC NAME	COMMON NAME	RED LIST CATEGORY	RED LIST CRITERIA	POPULATION TREND
<i>Sagittarius serpentarius</i>	Secretary Bird	Endangered	A2acde+3cde+4acde	Decreasing
<i>Terathopius ecaudatus</i>	Bateleur	Endangered	A2acde+3cde+4acde	Decreasing
<i>Oxyura maccoa</i>	Maccoa Duck	Endangered	A2acde	Decreasing
<i>Ardeola idae</i>	Madagascar Pond-Heron	Endangered	C2a(ii)	Decreasing
<i>Kupeornis rufocinctus</i>	Red-collared Mountain-babbler	Endangered	A3c+4c	Decreasing
<i>Neophron percnopterus</i>	Egyptian Eagle	Endangered	A2abcde+3bcde+4abcde	Decreasing
<i>Torgos tracheliotos</i>	Lappet-faced Vulture	Endangered	A2abcd+3bcd+4abcd	Decreasing
<i>Aquila nipalensis</i>	Steppe Eagle	Endangered	A2abcd+3bcd+4abcd	Decreasing
<i>Bucorvus leadbeateri</i>	Southern Ground Hornbill	Vulnerable	A4bcd	Decreasing
<i>Calamonastides gracilirostris</i>	Papyrus Yellow Warbler	Vulnerable	A2c+3c+4c	Decreasing
<i>Ptilopachus nahani</i>	Nahan's Partridge	Vulnerable	B2ab(ii,iii,v)	Decreasing
<i>Apalis karamojae</i>	Karamoja Apalis	Vulnerable	A3c	Decreasing
<i>Bucorvus abyssinicus</i>	Abyssinian Ground Hornbill	Vulnerable	A2bcd+3bcd+4bcd	Decreasing
<i>Balaeniceps rex</i>	Shoebill	Vulnerable	C2a(ii)	Decreasing
<i>Hirundo atrocaerulea</i>	Blue Swallow	Vulnerable	C2a(i)	Decreasing
<i>Falco fasciinucha</i>	Teita Falcon	Vulnerable	A2ab+3b+4ab; C2a(i); D I	Decreasing
<i>Circaetus beaudouini</i>	Beaudouin's Snake Eagle	Vulnerable	A2bcd+3bcd+4bcd	Decreasing
<i>Bradypterus graueri</i>	Grauer's Swamp Warbler	Vulnerable	A3c+4c	Decreasing
<i>Pseudocalyptomena graueri</i>	Grauer's Broadbill	Vulnerable	A3c+4c	Decreasing

TABLE 5. RED LIST OF THREATENED BIRD SPECIES IN UGANDA

SCIENTIFIC NAME	COMMON NAME	RED LIST CATEGORY	RED LIST CRITERIA	POPULATION TREND
<i>Fraseria lendu</i>	Chapin's Flycatcher	Vulnerable	C2a(i)	Decreasing
<i>Chelictinia riocourii</i>	Scissor-Tailed Kite	Vulnerable	A2ace+3ce+4ace	Decreasing
<i>Falco vespertinus</i>	Western Red-footed Falcon	Vulnerable	A2abc+3bc+4abc	Decreasing
<i>Aquila rapax</i>	Steppe Eagle	Vulnerable	A2ace+3ce+4ace	Decreasing
<i>Aythya ferina</i>	Northern Pochard	Vulnerable	A2abcd+3bcd+4abcd	Decreasing

Source: IUCN Red List, accessed May 2022, Note: Threatened species includes Vulnerable, Endangered, and Critically Endangered, Note: The species of Least Concern are not included in this table.

Fishes and Other Aquatic Species: In Uganda, of the more than 600 species of fishes (National Environment Management Authority 2016) and aquatic species (including shellfish), 66 are characterized as threatened (i.e., critically endangered, endangered or vulnerable) by the IUCN Red List. As noted in Table 6, the change in populations of these threatened species are generally unknown (i.e., not documented), with four species documented as decreasing. However, there are exceptions; the populations of three cichlid fishes, the *Haplochromis megalops*, *Haplochromis chromogynos*, and *Haplochromis plagiodon*, are increasing (International Union for Conservation of Nature and Natural Resources n.d.). It appears that these three Haplochromine species have adapted to Nile perch competition by evolving morphologically or by changing feeding behavior (Outa, et al. January 2020).

Of the 13 critically endangered species, nine are cichlids, notably two species, Singida Tilapia and Victoria tilapia, and one cyprinid species, the Ningu fish (Outa, et al. January 2020). The two indigenous tilapia species were numerous in the 1960s but have declined significantly since then due to several factors including predation by the introduced Nile perch and competition from Nile tilapia (Outa, et al. January 2020). The Ningu fish population in Lake Victoria has declined steadily since 1980, apparently due to change in fishing gear from weirs to beach seines and small mesh size net at river mouths (Outa, et al. January 2020).

TABLE 6. RED LIST OF THREATENED FISH AND AQUATIC SPECIES IN UGANDA

SCIENTIFIC NAME	COMMON NAME	COMMON CATEGORY	RED LIST CATEGORY	RED LIST CRITERIA
<i>Caridina subventralis</i>		Shellfish	Critically Endangered	B1ab(v)
<i>Lipochromis</i> sp. nov. 'small obesoid'		Fishes - Cichlids	Critically Endangered	A1acde, B1+2ce
<i>Lipochromis</i> sp. nov. 'backflash cryptodon'		Fishes - Cichlids	Critically Endangered	A1acde, B1+2ce

TABLE 6. RED LIST OF THREATENED FISH AND AQUATIC SPECIES IN UGANDA

SCIENTIFIC NAME	COMMON NAME	COMMON CATEGORY	RED LIST CATEGORY	RED LIST CRITERIA
Lipochromis sp. nov. 'parvidens-like'		Fishes - Cichlids	Critically Endangered	A1acde, B1+2ce
Oreochromis esculentus	Singida Tilapia	Fishes - Cichlids	Critically Endangered	A2bcde
Oreochromis variabilis	Victoria tilapia	Fishes - Cichlids	Critically Endangered	B1ab(i,ii,iii,iv,v)
Haplochromis beadlei		Fishes - Cichlids	Critically Endangered	A1ace, B1+2cd
Haplochromis latifasciatus		Fishes - Cichlids	Critically Endangered	A1acde, B1+2ce
Xystichromis sp. nov. 'Kyoga flameback'		Fishes - Cichlids	Critically Endangered	A1ace, B1+2ce
Haplochromis annectidens		Fishes - Cichlids	Critically Endangered	A1ace, B1+2cde
Labeo victorinus	Ningu	Fishes - Cyprinids	Critically Endangered	A2acde
Gabbiella candida		Mollusks	Critically Endangered	B2ab(iii)
Gabbiella parva		Mollusks	Critically Endangered	B1ab(iii)
Potamonautes gonocristatus		Shellfish	Endangered	B1ab(i,ii,iii,v)
Potamonautes mutandensis	Lake Mutanda Crab	Shellfish	Endangered	B1ab(iii)
Labeo coubie	African Carp	Fishes - Cyprinids	Endangered	B2ab(iii)
Hemichromis bimaculatus	African Jewelfish	Fishes - Cichlids	Endangered	B2ab(ii,iii)
Haplochromis venator		Fishes - Cichlids	Endangered	A1ace, B1+2cd
Prognathochromis sp. nov. 'long snout'		Fishes - Cichlids	Endangered	A1acde, B1+2ce
Lates macrophthalmus	Albert Lates	Fishes	Endangered	B1ab(iii)
Haplochromis simpsoni		Fishes - Cichlids	Endangered	A1ace, B1+2cd
Nothobranchius taiti		Fishes	Endangered	B1ab(iii)+2ab(iii)
Pettancylus toroensis		Mollusks	Endangered	B2ab(iii)

TABLE 6. RED LIST OF THREATENED FISH AND AQUATIC SPECIES IN UGANDA

SCIENTIFIC NAME	COMMON NAME	COMMON CATEGORY	RED LIST CATEGORY	RED LIST CRITERIA
<i>Sphaerium regularis</i>		Mollusks	Endangered	B1ab(iii)
<i>Coelatura cridlandi</i>		Mollusks	Endangered	B1ab(iii)
<i>Caridina pseudonilotica</i>		Shellfish	Vulnerable	D2
<i>Caridina gordonae</i>		Shellfish	Vulnerable	D2
<i>Caridina bunyonyiensis</i>		Shellfish	Vulnerable	D2
<i>Thermodiaptomus galeboides</i>		Shellfish	Vulnerable	D2
<i>Tropodiaptomus stuhlmanni</i>		Shellfish	Vulnerable	D2
<i>Haplochromis maxillaris</i>		Fishes - Cichlids	Vulnerable	D2
<i>Citharinus latus</i>	Moon Fish	Fishes	Vulnerable	A2bd
<i>Auchenoglanis occidentalis</i>	Armoured Catfish	Fishes	Vulnerable	B2ab(ii,iii)
<i>Mormyrus kannume</i>	Bottlenose	Fishes	Vulnerable	B2ab(ii,iii)
<i>Alestes dentex</i>	Nile Robber	Fishes	Vulnerable	B2ab(ii,iii,v)
<i>Enteromius perince</i>	Three Spot Barb	Fishes - Cyprinids	Vulnerable	B2ab(ii,iii)
<i>Malapterurus electricus</i>	Electric Catfish	Fishes	Vulnerable	B2ab(iii)
<i>Distichodus rostratus</i>	Perch	Fishes	Vulnerable	D2
<i>Haplochromis vanoijeni</i>		Fishes - Cichlids	Vulnerable	D2
<i>Haplochromis fischeri</i>		Fishes - Cichlids	Vulnerable	D2
<i>Haplochromis megalops</i>		Fishes - Cichlids	Vulnerable	D2
<i>Haplochromis velifer</i>		Fishes - Cichlids	Vulnerable	A1ae, B1+2c
<i>Haplochromis aeneocolor</i>		Fishes - Cichlids	Vulnerable	D2
<i>Haplochromis petronius</i>		Fishes - Cichlids	Vulnerable	D2

TABLE 6. RED LIST OF THREATENED FISH AND AQUATIC SPECIES IN UGANDA

SCIENTIFIC NAME	COMMON NAME	COMMON CATEGORY	RED LIST CATEGORY	RED LIST CRITERIA
Haplochromis chromogynos		Fishes - Cichlids	Vulnerable	D2
Haplochromis plagiodon		Fishes - Cichlids	Vulnerable	D2
Haplochromis sauvagei	Rock Kribensis	Fishes - Cichlids	Vulnerable	D2
Barbus alluaudi		Fishes - Cyprinids	Vulnerable	D2
Varicorhinus ruwenzori		Fishes - Cyprinids	Vulnerable	D2
Synodontis macrops		Fishes	Vulnerable	D2
Haplochromis obliquidens		Fishes - Cichlids	Vulnerable	D2
Harpagochromis sp. nov. 'frogmouth'		Fishes - Cichlids	Vulnerable	A1ae, B1+2acd
Haplochromis ampullarostratus		Fishes - Cichlids	Vulnerable	D2
Haplochromis commutabilis		Fishes - Cichlids	Vulnerable	D2
Haplochromis expectatus		Fishes - Cichlids	Vulnerable	D2
Haplochromis retrodens		Fishes - Cichlids	Vulnerable	D2
Haplochromis welcommei		Fishes - Cichlids	Vulnerable	D2
Haplochromis bicolor		Fishes - Cichlids	Vulnerable	D2
Haplochromis orthostoma		Fishes - Cichlids	Vulnerable	A1ace; B1+2ce
Labeobarbus huloti		Fishes - Cyprinids	Vulnerable	D2
Nothobranchius albertinensis		Fishes	Vulnerable	B1ab(iii)+2ab(iii)
Nothobranchius elucens		Fishes	Vulnerable	B1ab(iii)
Cleopatra bulimoides		Mollusks	Vulnerable	B1ab(iii)
Ceratophallus bicarinatus		Mollusks	Vulnerable	D2
Bulinus mutandensis		Mollusks	Vulnerable	D2

TABLE 6. RED LIST OF THREATENED FISH AND AQUATIC SPECIES IN UGANDA

SCIENTIFIC NAME	COMMON NAME	COMMON CATEGORY	RED LIST CATEGORY	RED LIST CRITERIA
Coelatura alluaudi		Mollusks	Vulnerable	B1ab(iii)

Source: IUCN Red List, accessed May 2022, Note: Threatened species includes Vulnerable, Endangered, and Critically Endangered, Note: The species of Least Concern are not included in this table.

Plants: In Uganda, of the approximately 5,000 species (National Environment Management Authority 2016) of plants present, 109 are characterized as threatened (eight critically endangered, 37 endangered and 62 vulnerable) by the IUCN Red List. As noted in Table 7, the populations of these critically endangered and endangered species are generally decreasing or unknown (i.e., not documented).

Of the eight critically endangered plant species in Uganda, all the species have been in decline as a result of construction in small areas of habitat and agricultural encroachment. For example, the *Encephalartos whitelockii* species has been in decline due to construction of hydropower infrastructure in 2008 at Mpanga River Falls in/around Queen Elizabeth National Park (International Union for Conservation of Nature and Natural Resources n.d.). The *Bothriocline auriculata* species, although located in the Mount Elgon Biosphere Reserve, has been subject to pressures from agricultural uses including grazing in the forest, as well as recurrent landslides in its habitat (International Union for Conservation of Nature and Natural Resources n.d.).

TABLE 7. RED LIST OF THREATENED PLANT SPECIES IN UGANDA

SCIENTIFIC NAME	COMMON NAME	RED LIST CATEGORY	RED LIST CRITERIA	POPULATION TREND
<i>Encephalartos equatorialis</i>		Critically Endangered	B1ab(ii,iii,v)+2ab(ii,iii,v); C1	Decreasing
<i>Encephalartos whitelockii</i>		Critically Endangered	B1ab(ii,iii,v)+2ab(ii,iii,v)	Decreasing
<i>Afrothismia winkleri</i>		Critically Endangered	B2ab(iii)	Decreasing
<i>Bothriocline auriculata</i>		Critically Endangered	B1ab(iii)+2ab(iii)	Decreasing
<i>Senecio navugabensis</i>		Critically Endangered	B2ab(iii)	Unknown
<i>Diospyros katendei</i>		Critically Endangered	B1ab(iii)+2ab(iii)	Unknown
<i>Pavetta grumosa</i>		Critically Endangered	B2ab(iii)	Unknown
<i>Linderniella ugandensis</i>		Critically Endangered	B2ab(iii)	Unknown
<i>Vigna desmodioides</i>	Ilenabulere	Endangered	B2ab(iii,v)	Decreasing

TABLE 7. RED LIST OF THREATENED PLANT SPECIES IN UGANDA

SCIENTIFIC NAME	COMMON NAME	RED LIST CATEGORY	RED LIST CRITERIA	POPULATION TREND
<i>Bulbophyllum vulcanicum</i>		Endangered	B2ab(iii)	Unknown
<i>Brazzeia longipedicellata</i>		Endangered	B1+2c	
<i>Encephalartos macrostrobilus</i>		Endangered	B1ab(iii,iv,v); C2a(i)	Decreasing
<i>Eggelingia ligulifolia</i>		Endangered	B2ab(iii)	Unknown
<i>Polystachya fallax</i>		Endangered	B2ab(iii)	Unknown
<i>Polystachya meyeri</i>		Endangered	B1ab(iii)+2ab(iii)	Unknown
<i>Uvariadendron magnificum</i>		Endangered	B1ab(ii,iii,v)+2ab(ii,iii,v)	Unknown
<i>Brachystephanus roseus</i>		Endangered	B2ab(iii)	Unknown
<i>Costus foliaceus</i>		Endangered	B2ab(i,ii,iii,iv,v)	Decreasing
<i>Aldrovanda vesiculosa</i>	Common Aldrovanda	Endangered	B2ab(iii,iv,v)	Decreasing
<i>Psilotrichum axilliflorum</i>		Endangered	B2ab(iii)	Unknown
<i>Carpha angustissima</i>		Endangered	B1ab(i,ii,iii)+2ab(i,ii,iii)	Unknown
<i>Lychnis kigesiensis</i>		Endangered	B2ab(iii)	Unknown
<i>Emilia cryptantha</i>		Endangered	B2ab(i,ii,iii,iv,v)	Decreasing
<i>Emilia longifolia</i>		Endangered	B2ab(iii)	Unknown
<i>Vernonia tinctoriosa</i>		Endangered	B2ab(iii)	Unknown
<i>Chlorophytum hirsutum</i>		Endangered	B2ab(iii)	Unknown
<i>Blotiella trichosora</i>		Endangered	B2ab(i,ii,iii,iv,v)	Decreasing
<i>Strophanthus bequaertii</i>		Endangered	B2ab(i,ii,iii,iv,v)	Decreasing

TABLE 7. RED LIST OF THREATENED PLANT SPECIES IN UGANDA

SCIENTIFIC NAME	COMMON NAME	RED LIST CATEGORY	RED LIST CRITERIA	POPULATION TREND
<i>Oxyanthus ugandensis</i>		Endangered	B2ab(iii)	Unknown
<i>Emilia pammicrocephala</i>		Endangered	B2ab(iii)	Unknown
<i>Kniphofia bequaertii</i>		Endangered	B2ab(i,ii,iii,iv,v)	Decreasing
<i>Aframomum spirogigatum</i>		Endangered	B1ab(iii)+2ab(iii)	Unknown
<i>Commelina zenkeri</i>		Endangered	B2ab(i,ii,iii)	Unknown
<i>Erythrina lanigera</i>		Endangered	B2ab(iii)	Unknown
<i>Oldenlandia duemmeri</i>		Endangered	B2ab(ii,iii,iv,v)	Decreasing
<i>Polystachya eurygnatha</i>		Endangered	B1ab(iii)+2ab(iii)	Unknown
<i>Sabicea entebbensis</i>		Endangered	B1ab(iii)+2ab(iii)	Unknown
<i>Tiliacora latifolia</i>		Endangered	B2ab(iii)	Unknown
<i>Aframomum uniflorum</i>		Endangered	B1ab(iii)+2ab(iii)	Unknown
<i>Allanblackia kimbiliensis</i>		Endangered	B1ab(iii)+2ab(iii)	Decreasing
<i>Pavetta ankolensis</i>		Endangered	B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v)	Decreasing
<i>Dicranolepis pyramidalis</i>		Endangered	B2ab(ii,iii,v)	Decreasing
<i>Poa chokensis</i>		Endangered	B2ab(iii)	Unknown
<i>Galega lindblomii</i>		Endangered	B2ab(iii)	Unknown
<i>Coffea neoleroyi</i>		Endangered	B2ab(iii)	Unknown
<i>Xyris ednae</i>		Endangered	B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v)	Decreasing

Source: IUCN Red List, accessed May 2022, Note: *Threatened species includes Vulnerable, Endangered, and Critically Endangered*, Note: The Vulnerable species and the species of Least Concern are not included in this table.

Insects: In Uganda, of approximately 9,000 species (National Environment Management Authority 2016) of insects (including 1,249 butterfly species and 231 species of dragonflies) (Birdlife International 2008) present 10 are characterized as endangered or vulnerable by the IUCN Red List. As noted in Table 8, the change in populations of these threatened species are generally unknown (i.e., not documented) although the population of two species, the Mount Elgon Grass Bush-Cricket, and East African Agile Grasshopper are documented as decreasing (International Union for Conservation of Nature and Natural Resources n.d.).

Of the three endangered species, two are grasshoppers (from the Orthoptera Order), the Moroto Agile Grasshopper, and the Bladder Grasshopper, and one is a dragonfly species (from the Odonata Order), the Bwindi Junglewatcher (International Union for Conservation of Nature and Natural Resources n.d.).

TABLE 8. RED LIST OF THREATENED INSECTS IN UGANDA

SCIENTIFIC NAME	COMMON NAME	ORDER NAME	RED LIST CATEGORY	RED LIST CRITERIA	POPULATION TREND
<i>Neodythemis munyaga</i>	Bwindi Junglewatcher	ODONATA	Endangered	B1ab(i)+2ab(i,iii)	Unknown
<i>Physophorina livingstonii</i>	Bladder Grasshopper	ORTHOPTERA	Endangered	B2ab(iii,v)	Unknown
<i>Phymeurus morotoensis</i>	Moroto Agile Grasshopper	ORTHOPTERA	Endangered	B1ab(iii,v)	Unknown
<i>Papilio leucotaenia</i>	Cream-banded Swallowtail	LEPIDOPTERA	Vulnerable	B1+2c	
<i>Afroaeschna scotias</i>	Shadow Hawker	ODONATA	Vulnerable	B1ab(iii)	Unknown
<i>Agrionemis palaeforma</i>	Papyrus Wisp	ODONATA	Vulnerable	B2ab(iii)	Unknown
<i>Pseudagrion bicoerulans</i>	Giant Sprite	ODONATA	Vulnerable	B2ab(iii)	Unknown
<i>Chlorocypha flammea</i>	Flame Jewel	ODONATA	Vulnerable	B1ab(iii)+2ab(iii)	Unknown
<i>Horatosphaga elgonis</i>	Mount Elgon Grass Bush-Cricket	ORTHOPTERA	Vulnerable	B2ab(iii,v)	Decreasing
<i>Phymeurus granulatus</i>	East African Agile Grasshopper	ORTHOPTERA	Vulnerable	B2ab(iii,v)	Decreasing

Source: IUCN Red List, accessed May 2022, Note: Threatened species includes Vulnerable, Endangered, and Critically Endangered.

Of the insects in Uganda, 954 species are designated Near Threatened and of Least Concern on the IUCN Red List (see Table 9). Of these, there are six spider species, 21 beetle species, 300 butterfly species, two mantis species, 615 dragonfly species, and 10 grasshopper species.

TABLE 9. SUMMARY OF NEAR THREATENED AND LEAST CONCERN INSECT SPECIES IN UGANDA (2022)

ORDER	NO. OF SPECIES
Aranae (Spiders)	6
Coleoptera (Beetles)	21
Lepidoptera (Butterflies)	300
Mantodea (Mantises)	2
Odonata (Dragonflies)	615
Orthoptera (Grasshoppers)	10
TOTAL	954

Source: IUCN Red List, accessed May 2022.

3.4 GENETIC DIVERSITY

The Plant Genetic Resources Centre (PGRC) of Uganda is comprised of the Entebbe Botanic Gardens and the Uganda National Gene bank, aiming to ensure the conservation, management, and sustainable use of Uganda’s plant genetic resources for food and agriculture. The Uganda National Gene bank conserves over 5,000 accessions (Plant Genetic Resource Center (PGRC) n.d.).

Uganda is a contracting party to the International Treaty on Plant Genetic Resources for Food and Agriculture (2004), which strives for the “conservation and sustainable use of all plant genetic resources for food and agriculture and the fair and equitable sharing of the benefits arising out of their use, in harmony with the Convention on Biological Diversity, for sustainable agriculture and food security” (Food and Agriculture Organization 2022). Uganda is also a signatory to the Convention on Biodiversity (1992) and the Global Strategy for Plant Conservation (2002). Uganda’s National Seed Policy and Strategy support the public and private sector to establish crop varieties and facilitate community-based seed producers to access basic seed of crop variations.

According to the most current data available, indigenous plant diversity is under threat in Uganda as the relationship between people and plants shifts (Hamilton, Karamura and Kakudidi 2016). High rates of deforestation and additional environmental pressure for personal and economic use threaten plant diversity in Uganda. An ecosystem-based approach to plant conservation, coupled with sustainable use, will be crucial to the conservation of species and genetic diversity (Martiniello 2020).

Domestic animal (i.e., livestock) numbers have increased with the growth in human population, the increase in animal health services, breeding and management as well as the increase in the demand for

milk products. Indigenous breeds of cattle account for nearly 95% of the total cattle population; however high yielding exotic and cross breeds are becoming more common. Since 1900, Uganda has lost 12 breeds of cattle, three breeds of goats, and one breed of sheep. See Table 10 for the summary of Uganda’s livestock diversity.

TABLE 10. DIVERSITY OF LIVESTOCK IN UGANDA

ANIMALS	NO OF BREEDS	STATUS	NOTES
Cattle	>16	4 indigenous breeds, 12 exotic breeds	Exotics primarily at commercial dairy or beef farms
Goats	7	3 indigenous breeds, 4 exotic breeds	Exotics favored for dairy and meat commercial value
Sheep	7	3 indigenous breeds, 4 exotic breeds	Exotics not well adapted, raised in highlands

Source: Adapted from “National Biodiversity and Strategy Action Plan,” National Environment Management Authority, October 2016, <https://www.cbd.int/doc/world/ug/ug-nbsap-v2-en.pdf?msclid=7bad2e78ba9611ec818aecb1618286b1>

3.5 STATUS AND MANAGEMENT OF PROTECTED AREAS

The International Union for Conservation of Nature (IUCN) defines PAs as “a clearly defined geographical space, recognized, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values” (UNEP-WCMC 2019). Currently, Uganda has 10 National Parks, 12 Wildlife Reserves, 10 wildlife sanctuaries, five community wildlife areas, and as of May 2021, has 711 PAs reported in the World Database on Protected Areas (Convention on Biological Diversity 2021) (National Environment Management Authority 2016). It is currently estimated that over 50 percent of Ugandan wildlife resources still exist outside of PAs, making conservation difficult as most of these resources reside on private land (National Environment Management Authority 2016).

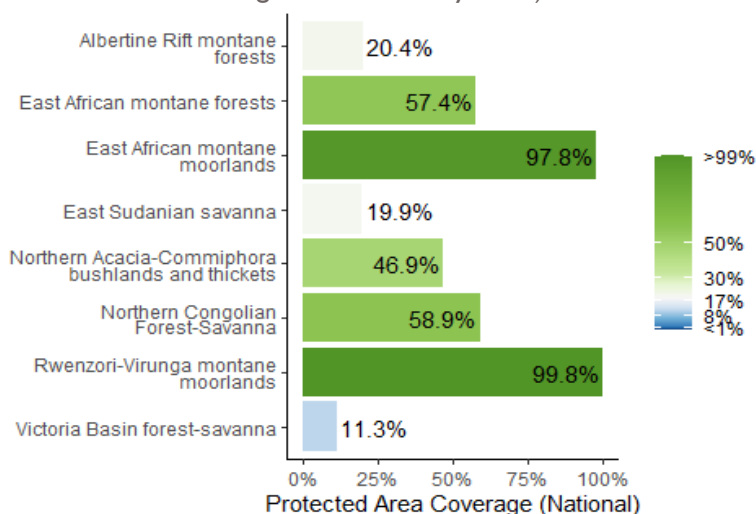


FIGURE 9. TERRESTRIAL ECO-REGIONS OF UGANDA (2017)

Source: Aichi Biodiversity Target 11 Country Dossier: UGANDA

Despite the importance of natural resources to Uganda, the past 60 years have shown a significant degradation of nature, including:

- The loss of wetland ecosystems from 13 percent of total land area (1995) to less than 9 percent (2010).
- Extensive land degradation, with approximately 41 percent of Uganda’s total land area degraded.
- Conversion of approximately 50 percent of Uganda’s natural savannah to agricultural use between 1961 and 2010, leading to a decline in savannah and grassland plants and animals.
- Local extinction of the Giant Eland (*Taurotragus derbianus*), Black Rhino (*D. b. ladoensis*), Oryx (*Oryx beisa*) and White Rhino (which has been reintroduced through previously mentioned conservation efforts) and declining populations of buffalos, elephants, hippopotamuses, and lions in some National Parks.
- Degradation of water sources by pollution and siltation and changes in water flows leading to flooding. Affected rivers include the Nyamwamba and Mobuku in Rwenzori Mountains and the Rwizi in Mbarara, which flows through Lake Mburo National Park. Local streams are also affected (World Wildlife Fund 2019).

The significant decline in Uganda’s natural landscapes has come at a cost to Uganda. In 2003, soil nutrient loss because of erosion was estimated to have cost Uganda nearly US\$ 625 million annually. Waterway siltation had driven up water costs to about US\$ 22 million per year. Between 2005 and 2010, the value of ecosystem services, which are defined as the benefits that humans receive through natural systems, that had been lost in Uganda were estimated to be US\$ 692 million a year (World Wildlife Fund 2019).

Out of a total surface area of 241,551 km² (both land and water), 25,981.57 km² (10 percent) is gazetted as wildlife conservation areas, 24 percent is gazetted as forest reserves and 13 percent is wetlands (National Environment Management Authority 2016). PAs, such as some National Parks, have fared rather well in comparison to non-protected areas, with the exception of Mount Elgon which has suffered a great deal of encroachment from indigenous people who had originally been displaced when the park was established. According to the most current data available, protected areas only suffered a loss of 2 percent well stocked tropical high forests between 1990 and 2015 and have experienced a 20 percent growth in previously degraded tropical high forests. Between 1990 and 2015, 2.6 million ha of unprotected forests were lost, while over 418,000 ha were also lost from protected areas within the same period (National Environment Management Authority 2016).

Government agencies like the Uganda Wildlife Authority (UWA) have faced numerous challenges in their approach to wildlife management. If UWA fails to change its approach from conflict management to ecosystem management, increased incidences of human-wildlife conflict are expected to result due to

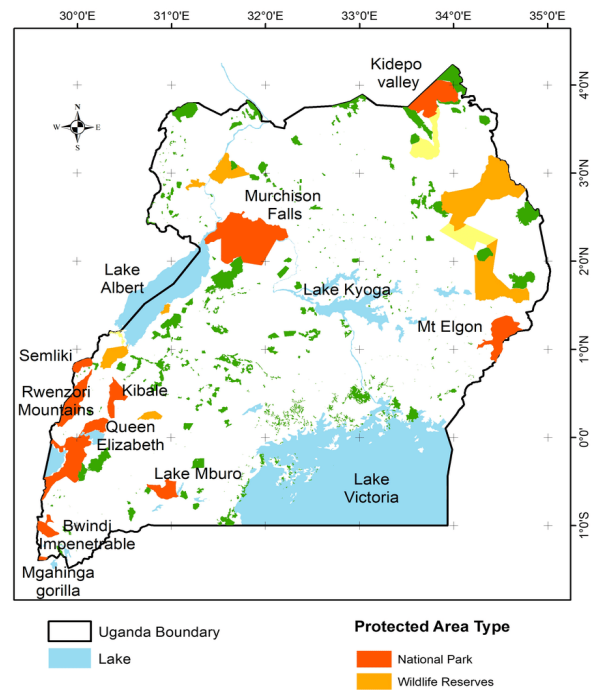


FIGURE 10. PROTECTED AREAS BY TYPE

the high human population growth rate around the PAs. This could result in political decisions to minimize the size of PAs or in complete de-gazettement of some PAs. UWA needs to increase efforts to educate and collaborate with farming communities impacted by wildlife movements to promote community ecosystem management and decrease human retaliation against wildlife.

3.6 STATUS AND MANAGEMENT OF KEY NATURAL RESOURCES OUTSIDE OF PROTECTED AREAS

While Uganda has made great strides in designating PAs throughout the country, many wildlife species still reside in areas that are unprotected. Land use patterns outside of protected areas are typically agricultural, including large areas of sugar and rice crops, tree plantations, and grazing lands, among other agricultural uses. Much of the vegetation that exists in grazed areas are made up of predominantly native plant species, which also provides support for many native animal species (Plumptre, et al. 2019). (Refer to Table II for forest ownership.) Additional anthropogenic activities that are a cause for concern in non-protected areas include bush clearing, charcoal burning, settlements, and timber logging (Uganda Wildlife Authority 2022). While data pertaining to non-protected areas is fairly limited, studies indicate that much of this land area is suffering from wide scale degradation as a result of overexploitation of natural resources. Land ownership and use discrepancies have also posed significant problems for non-protected areas, as many Ugandans currently occupy land that is not well defined under the country’s land tenure systems, causing significant strain on wildlife management authorities’ ability to enforce protections (Uganda Wildlife Authority 2022).

TABLE II. FOREST OWNERSHIP IN 1990 AND 2015

TYPES OF FOREST OWNERSHIP	1990		2015		PERCENT CHANGE
	HECTARES	PERCENT	HECTARES	PERCENT	
All forest area	4,933,271	100%	1,956,664	100%	-60%
Forests under Uganda Wildlife Authority (UWA) (National Parks and Wildlife Reserves)	794,881	16%	624,578	32%	-21%
Forests under NFA (Central Forest Reserves)	791,240	16%	504,391	26%	-36%
Forests on Private Land	3,347,150	68%	827,695	42%	-75%

Source: National Biodiversity Finance Plan 2019/20 – 2027/30

Management of non-protected areas are typically overseen by the National Forest Authority, District Local Governments, Wetlands Department, and private landowners, which include individual land owners, communities, cultural and religious institutions, and other private entities (Uganda Wildlife Authority 2022). In addition to the governing institutions, national policies, laws, and plans as well as regional and international laws also provide management guidance for non-protected areas (Uganda Wildlife Authority 2022). The National Plan for Management of Wildlife Outside UWA Protected Areas 2021/2022 - 2030/2031 is a 10-year plan that seeks to “protect and conserve wildlife in critical

ecosystems outside UWA protected areas” (Uganda Wildlife Authority 2022). Under this plan, Uganda has been subdivided into six zones to be managed under six wildlife stations:

1. **Sango Bay Zone:** This zone covers Kakuuto, Marabigambo, Sango-bay, and islands of Lake Victoria such as Musambwa and Kalangala, to be managed from Kakuuto Wildlife Station.
2. **Kafu Zone:** This zone covers Kyankwanzi, Kiboga, Nakaseke, Nakasongola, Luwero, and all areas south of Lake Kyoga, to be managed from Kyankwanzi Wildlife Station.
3. **Muzizi Zone:** This zone extends from Kagadi, Kyenjojo, Kikuube (including Bugoma), Mubende, to Toro-Semliki, Rwangara and part of Lake Albert, to be managed from Kagadi Wildlife Station.
4. **Aswa Zone:** This zone covers part of North and Northeastern parts of the country including Agago, Pader, Kitgum, Kotido, Kaabong and Lamwo, Abim, Otuke, to be managed from Pader Wildlife Station.
5. **Central Zone:** This zone extends from Kampala, Mukono, Wakiso (including Entebbe), Mpigi, Mityana, Jinja, Mayuge, Kamuli, Kaliro, Buikwe, Namayingo to Busia districts, to be managed from UWA Head Office - Kampala.
6. **Kyoga Zone:** The zone covers Lake Kyoga and its associated wetlands as well as the nearby lakes and rivers, to be managed from Serere Wildlife Station (Uganda Wildlife Authority 2022).

The proposed activities in these zones cover ecosystem management and wildlife resource protection, enhancement of stakeholder-staff coordination and collaboration, community conservation and wildlife-based enterprises development, ecological monitoring and research, and governance and corporate affairs programs (Uganda Wildlife Authority 2022).

Wildlife conflicts occur as a result of wildlife movement from inside protected areas into the surrounding, unprotected agricultural and pasture lands. While Uganda’s principal attraction for tourists is the wildlife they can see in its national parks and reserves, private savannah habitats required by grazing animals are being displaced by woodland habitat. Consequently, some species of animals move outside of the PAs seeking food and water. UWA continues to face challenges by some outdated management styles of resource custody as opposed to a more dynamic and scientifically based ecosystem approach. Conflicts between UWA enforcement and land management arise from local frustrations in perceived prioritization of forest and animal health over community needs for farmable land and industry development. These conflicts contribute to continued killing of displaced animals that wander into farmland and political pressure to reduce forest protections.

3.7 OVERVIEW OF ECOSYSTEM SERVICES

Ecosystem services are the benefits humans receive from nature. These benefits include goods such as food, fuel, and fiber; and services such as carbon sequestration (Science and Policy for People and Nature Secretariat 2019). In seeking to understand and characterize the values provided by ecosystem services, economists typically classify these services into three categories: provisioning services, cultural services, and regulating services. Provisioning services arise from the direct use of ecosystem goods, such as food, fuel, water, timber, non-timber forest products, medicine, and raw materials. Cultural services result from meaningful interactions that people have with ecosystems, which include outdoor recreation, aesthetic enjoyment, education, and the intrinsic spiritual value of land. Regulating services are outputs from the normal functioning of ecosystems that benefit people in both direct and indirect ways, such as the regulation of climate, air and drinking water quality, soil formation and retention, moderation of extreme events, and biological control. Supporting services underlie these three ecosystem service categories through long time horizons and broad-scale processes, such as soil creation and nutrient cycling (De Groot et al. 2010). Biodiversity is critical to the provision and long-term maintenance of these ecosystem services (Balvanera, Patricia, et al 2016, Harrison, Paula et al 2014). High-biodiversity areas provide over half of the ecosystem services on which the global poor depend, and conservation of those areas has an outsized effect: conserving the top 25 percent of the world’s high-biodiversity areas could provide 56–57 percent of the total potential ecosystem goods and service benefits (Turner, et al. 2012).

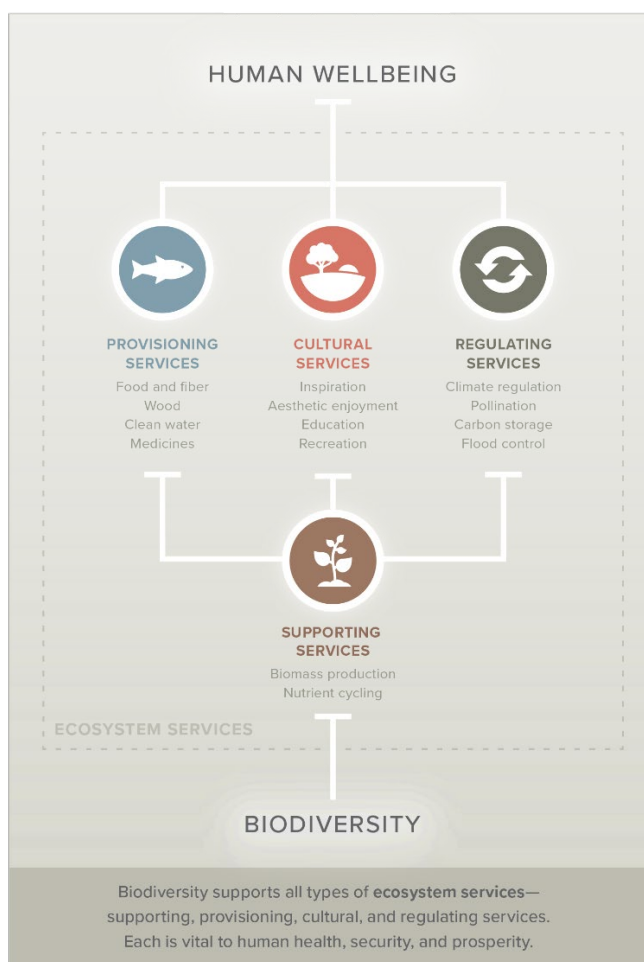


FIGURE 11. ECOSYSTEM SERVICES

This section describes some of the key ecosystem goods and services that provide value to Uganda, broken down by the categories of provisioning services, cultural services, and regulating services.

3.7.1 PROVISIONING SERVICES

Approximately 71 percent of Uganda’s total land area is used for agricultural purposes (Central Intelligence Agency 2022). In 2022, Uganda’s total Gross Domestic Product (GDP) was US\$ 99.61 billion with the agriculture sector accounting for 28 percent of this total (Central Intelligence Agency 2022). The livelihood of much of the population is dependent on agriculture, with roughly 72 percent of the country’s labor force employed by the agricultural sector (Central Intelligence Agency 2022). Uganda’s main agricultural products are sugar cane, plantains, cassava, maize, sweet potatoes, milk, vegetables,

beans, bananas, and sorghum (Central Intelligence Agency 2022). In order to expand Uganda's agricultural sector, the government selected 10 priority commodities: coffee, tea, fisheries, cocoa, cotton, vegetable oil, beef, maize, dairy and cassava (Sanchez, Cicowiez and Fontes 2022). When combined, these commodities account for over 38 percent of crop cultivation, 30 percent of total exports, 3 percent of total imports and 80 percent of Uganda's tropical livestock units (Sanchez, Cicowiez and Fontes 2022). In addition to agricultural outputs, grasslands provide significant grazing opportunities, supporting all forms of livestock production. Grassland production yields include meat, milk, and blood for many Ugandans who rely on livestock for their daily protein intake (Mugerwa and Zziwa 2014).

Uganda is endowed with significant surface and groundwater resources which consist of open water bodies (lakes and rivers), wetlands, groundwater, and rainwater. Of the 241,500 km² total area of the country, freshwater lakes occupy 36,280 km² (15 percent). Uganda's fisheries landscape includes Lake Victoria, Kyoga, Albert Edward, George, the Kazinga Channel, and over 160 smaller lakes, river networks, swamps and floodplains (National Environment Management Authority 2016). Currently, Uganda's total renewable water resources sit at 60.1 billion cubic meters (Central Intelligence Agency 2022). Total fish production potential in Uganda is about 560,000 metric tons annually, with 82 percent of its contributions from major water bodies, and 18 percent from aquaculture fisheries (Central Intelligence Agency 2022). Estimates show that between 1 and 1.5 million people in Uganda work in capture fisheries, and nearly 5,000 people are employed in industrial processing fisheries sectors (UNEP-WCMC 2020).

Forests are estimated to cover 1.96 million ha; forest cover has declined from 4.9 million ha in 2001 (National Biodiversity Finance Plan 2019/20 – 2027/30, National Environment Management Authority 2016). Uganda's forests and woodland resources contribute 6 percent of the national GDP (National Environment Management Authority 2016). The forest sector employs over 1 million people; with forest contribution being valued at over US\$ 130.7 million annually (National Environment Management Authority 2016). Biomass is the most commonly used resource for household sectors, accounting for nearly 74 percent of delivered energy; with fuelwood ranking as the most highly consumed fuel type (Ministry of Energy and Mineral Development 2018). Tree biomass demand is currently about 44 million tons of wood, which produces the equivalent of 440 petajoules of energy (Ministry of Energy and Mineral Development 2018). In addition to fuelwood, nearly 16 million tons of wood are converted into 1.8 million tons of charcoal annually (Ministry of Energy and Mineral Development 2018). Additional forest related services include ecotourism, arts & crafts, bee products, herbal medicine, and rattan-cane (National Environment Management Authority 2016).

Forests are very important to Uganda's economy, social heritage, and the people's well-being. Forests provide ecosystem services such as food, fuel, medicine, biodiversity conservation, soil, and watershed management. Direct economic benefits include timber and non-timber forest products like medicinal plants and food, recreational use such as park permits, grazing, and crop cultivation. Indirect economic benefits of Ugandan forests include soil protection, water conservation, climate control, carbon sequestration, water-related issues (additional expenditure on treatment, longer distance travel to clean water source) (Bush, et al. 2018). Because many ecological services and benefits from natural forests are considered "free", they are often undervalued. An NFA report in 2008 indicated that in 2004 alone, Ugandan forests had an economic value of 593.24 billion Uganda shillings (approximately US\$ 304 million). According to the most current data available, over 95 percent of Ugandans depend on biomass energy sourced from the natural forests; nearly 40 million tons of firewood and one million tons of charcoal are consumed annually in Uganda (Diisi 2017).

3.7.2 REGULATING SERVICES

Uganda's wetlands cover nearly 13 percent (29,000 km²) of the country's total land area and provide valuable water resources for consumption and biodiversity conservation services (Diisi 2017). See Section 3.2.1 for additional discussion of wetlands. Ugandan wetlands are known to support many species (See Section 3.3). Other benefits provided by these wetlands include water purification, water flow, storage and recharge, shoreline stabilization, micro-climate regulation, and biodiversity habitat provision (Diisi 2017). As of 2022, 12 wetland sites in Uganda have been classified as Ramsar sites, providing them with special protections from potential damage. Refer to Section 3.1.1 for additional regulating services provided by forests.

Over 50 percent of the land area in Uganda is made up of grasslands and savannas, which are dominated by a variety of different plant species such as grasses, palms, and acacias (USAID 2006). Grasslands serve a significant purpose within Uganda's natural ecosystem, providing ecosystem functions such as regulating local weather and global climate by influencing albedo, dust movements, evapo-transpiration, and carbon storage (Mugerwa and Zziwa 2014).

3.7.3 CULTURAL SERVICES

Uganda's natural environments play an important role in Uganda's cultural foundation. Benefits of wetlands typically include aesthetic, recreational, educational and spiritual aspects. One example is the Makanaga wetland in Bussi Subcountry, Wakiso District, which hosts the Wanema cultural site of the Genet cat (Kasimba) clan that can be found in the Buyembe Village on Zzinga Island (Ministry of Water and Environment 2016). Tourist attractions play a significant role in the cultural services of Uganda's natural environment. Murchison Falls, Queen Elizabeth, and Lake Mburo national parks are some of the most popular parks in Uganda, offering a number of recreational activities including birding, safaris, and wildlife tracking (Ministry of Water and Environment 2016).

4. LEGAL FRAMEWORK AFFECTING CONSERVATION

4.1 NATIONAL LAWS, POLICIES, AND STRATEGIES

The key legislative, institutional, and policy frameworks that govern natural resource management in Uganda are outlined in Table 12.

TABLE 12. LAWS AND POLICIES GOVERNING BIODIVERSITY AND FOREST RESOURCE MANAGEMENT

LAW/POLICIES	MAIN THEMES AND PROVISION
National Environment Management Policy (NEMP) for Uganda 1994	Designed as a framework policy, the NEMP (1994) was intended to provide an enabling framework for related policies in the environment arena and a roadmap for management of environment resources in Uganda.
National Environment Act (CAP 53, 1995, 2019)	The National Environment Act (NEA) established NEMA as the oversight body charged with management of environmental issues in Uganda, with power to coordinate, monitor and supervise all activities in the sector.
The Uganda Forestry Policy 2001	The Forestry Policy is an integrated forest sector that achieves sustainable increases in the economic, social and environmental benefits from forests and trees by all the people of Uganda, especially the poor and vulnerable.
National Forestry and Tree Planting Act 2003	The National Forestry and Tree Planting Act 2003 provides for tree planting and growing and also regulates sustainable utilization of forest products.
The National Forest Plan 2011/12-2012/22	The National Forest Plan (NFP) is a sector-wide national instrument for managing and utilizing forestry resources in Uganda. The first NFP was developed in 2002 to implement the Uganda Forestry Policy (2001). The policy and natural resources laws proceed from the Constitution, which recognizes the strategic importance of forestry in national and local development.
The Uganda Wildlife Policy 1999	The Policy outlines GoU's commitment to mitigating human wildlife conflicts; eliminating illegal wildlife trade and trafficking, ensuring that oil and gas sustainably coexist with conservation; promoting conservation research and education; enhancing community benefits from conservation; and promoting private sector enterprises in wildlife conservation.
The Uganda Wildlife Act 2019	The purpose of the Act is to provide for the conservation and sustainable management of Uganda's wildlife; strengthen wildlife conservation and management; affirm the Uganda Wildlife Authority; streamline the roles and responsibilities of institutions involved in wildlife conservation and management; affirm the Wildlife Fund; repeal the Uganda Wildlife Act, Cap. 200; and

TABLE 12. LAWS AND POLICIES GOVERNING BIODIVERSITY AND FOREST RESOURCE MANAGEMENT

LAW/POLICIES	MAIN THEMES AND PROVISION
	address related matters. To this end, the Act contains sections addressing wildlife conservation areas; protected species; wildlife use rights; hunting and trapping; management of problem animals; and international trade in species and specimens.
National Policy for the Conservation and Management of Wetlands Resources 1995	The policy aims at curtailing the rampant loss of wetland resources and ensuring that benefits from wetlands are sustainable and equitably distributed to all people of Uganda.
The National Water Policy 1999	The National Water Policy promotes an integrated approach to manage water resources in ways that are sustainable and most beneficial to the people of Uganda.
The Land Act (CAP 227)	This Act governs land issues in Uganda, including land tenure, customary ownership, grant of land in freehold, management of communal land, management of land by the Uganda Land Commission, land-use control, and the functioning of land tribunals.
The National Agricultural Research Act 2005	This Act provides for the development of an agricultural research system for Uganda to improve research services delivery, financing and management; establishes the National Agricultural Research Organization and its governing council, which serves as the authority for guidance and coordination of all agricultural research activities, repeals the National Agricultural Organization Act, Cap 205, and provides for other related matters.
National Forest Stewardship Standard (NFSS)	The National Forest Stewardship Standard is an important and new basis for promoting responsible forest management in Uganda. Achieving economic, social and environmental benefits by being part of an internationally recognized system of forest certification.
Poverty Eradication Action Plan (PEAP) (2000)	The PEAP provides an overarching framework to guide public action to eradicate poverty.
Sector Wide Approach to Planning for Water and Sanitation Sector (SWAP) (2002)	SWAP is a mechanism whereby Government and development partners support a single policy and expenditure programme, which is under Government leadership and follows a common approach.

4.2 INTERNATIONAL AGREEMENTS

Uganda has been a signatory to various international treaties, agreements, and conventions related to forests and biodiversity. These conventions and agreements are aimed at halting environmental degradation and improving the sustainable use of natural resources.

TABLE 13. INTERNATIONAL ENVIRONMENT CONVENTIONS

INTERNATIONAL CONVENTION	UGANDA'S STATUS (RATIFIED/PARTY)
Convention on Biological Diversity, 1992	Ratified
Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)	Ratified
Ramsar Convention on Wetlands, 1971	Ratified
Convention on the Conservation of Migratory Species of Wild Animals (CMS)	Ratified
The World Heritage Convention, 1972	Ratified
The Bonn Convention, 1979	Ratified
The Montreal Protocol, 1987	Ratified
East African Community Protocol on Environment and Natural Resources (2006)	Ratified
Ramsar Convention on Wetlands of International Importance especially as Waterfowl Habitat, 1971	Ratified
The Greater Virunga Landscape (GVL) Collaboration (GVTC)	Ratified

4.3 GOVERNMENT AGENCIES

The following governmental agencies have been established to manage Uganda's natural resources:

- National Environment Management Authority (NEMA):**
 The National Environment Management Authority (NEMA) is a semi-autonomous institution established in May 1995 as the principal agency in Uganda charged with the responsibility of coordinating, monitoring, regulating, and supervising environmental management in the country.

- National Forestry Authority (NFA)**
 The NFA was established under section 52 of The National Forestry and Tree Planting Act and was launched on the 26th April 2004. NFA “manages Central Forest Reserves on a sustainable basis and to supply high quality forestry-related products and services to government, local communities and the private sector”.
- Uganda Wildlife Authority (UWA)**
 The UWA is mandated “to conserve, economically develop and sustainably manage the wildlife and protected areas of Uganda in partnership with neighboring communities and other stakeholders for the benefit of the people of Uganda and the global community.”
- Ministry of Tourism, Wildlife and Antiquities**
 Formulation and Monitoring implementation of Tourism, Wildlife and Cultural heritage Policies, Legislations, Plans, strategies and standards. Ensures ecological integrity of wildlife protected areas and sustainable management of wildlife and cultural heritage conservation areas for socio-economic development and transformation of the country. MTWA is a CITES Management Authority and CITES Enforcement Focal Point.
- Ministry of Water and Environment (MWE)**
 The MWE manages and sustains the utilization of water and environment resources to improve the quality of water resources for the population and to ensure better access of water and environment resources in all parts of the country.
- Ministry of Agriculture, Animal Industry and Fisheries -Department of Fisheries**
 The Ministry oversees the agricultural sector. It formulates, reviews, and implements national policies, plans, strategies, regulations and standards, and enforces laws, regulations and standards along the value chain of crops, livestock, and fisheries.

4.4 CONSERVATION INITIATIVES AND STRATEGIES

The primary conservation initiatives, national policies, and strategies related to conservation are noted in Table 14.

TABLE 14. ADDITIONAL NATIONAL POLICIES, STRATEGIES AND COMMITMENTS RELATED TO BIODIVERSITY AND ENVIRONMENTAL ISSUES

POLICY	OBJECTIVES
International Gorilla Conservation Programme (IGCP)	IGCP’s goal is to ensure the conservation of mountain gorillas and their regional Afromontane forest habitat in Rwanda, Uganda and the Democratic Republic of Congo (DRC). To achieve this, it works to: <ul style="list-style-type: none"> Reduce the threats to mountain gorillas and their forest habitat by creating widespread support for conservation among local communities, interest groups and the general public. Improve the protection of gorillas and their habitat by encouraging the relevant authorities to adopt a consistent,

TABLE 14. ADDITIONAL NATIONAL POLICIES, STRATEGIES AND COMMITMENTS RELATED TO BIODIVERSITY AND ENVIRONMENTAL ISSUES

POLICY	OBJECTIVES
	collaborative approach to conservation policy and legislation throughout the region, grounded in conservation science.
African Rift Lake (ARL) Programme	This regional program works to ensure that the rich tapestry of forests, rivers and lakes of the Africa Rift Lakes region are effectively managed and conserved to sustain locally and globally important ecosystem services and biodiversity, providing a foundation for sustainable development and secure livelihoods for the people of the region. The ARL focuses on 10 priority landscapes and supports the conservation of ecosystems and species in priority landscapes; management of ecological footprint; promotion of sustainable livelihoods and complementary policy work designed to ensure conservation impact on a regional scale. From the evaluation of ARL, it was recommended that a smaller landscape and more focused approach be adopted for effective conservation delivery. The World Wildlife Fund Uganda Country Office (WWFUCO) and partners will steer engagements to develop the Greater Virunga Landscape initiative to be implemented in collaboration with stakeholders in Uganda, DRC and Rwanda.

5. THREATS TO TROPICAL FORESTS AND BIODIVERSITY IN UGANDA

As a result of rapid population growth and urban expansion, forests have faced significant deforestation, driven by the increasing local demand for products such as charcoal, fuel-wood, and timber. Other drivers of deforestation include agricultural expansion, increasing demand for affordable fuel sources (charcoal and firewood), urban expansion, shifting agriculture, and wildfires. However, drivers vary by location and are based on land being either private land or protected forest (such as those protected by the GoU as Central Forest Reserves): illegal charcoal burning and firewood cutting in Central Forest Reserves (CFRs) and agricultural and human expansion in private lands (Uganda Vision 2040 2015). Nearly 70 percent of Ugandans use firewood for cooking, and with an increasing population, the demand for firewood will continue to increase (National Environment Management Authority 2016). In 2007, 11 million cubic meters of round wood were utilized for charcoal production. As forests and essential resources become scarce, biodiversity and essential human services will become threatened.

5.1 DIRECT THREATS TO BIODIVERSITY IN UGANDA

Per the Best Practices Guide, a threat is “a human action or unsustainable use that immediately degrades biodiversity” (Kushnir and Martino 2020). Table 15 below provides an analysis of the most pressing threats to Uganda’s biodiversity in descending order of importance. The Analysis Team sequenced the threats listed below based upon the intensity of the threat, its geographic breadth, and ultimately its imminent impact to biodiversity, as informed by concerns communicated by stakeholders and desk-based research.

TABLE 15. PRIORITIZATION OF DIRECT THREATS TO UGANDA'S BIODIVERSITY

THREAT	DESCRIPTION
Over-Exploitation of Natural Resources	<p>Throughout Uganda, biomass extraction is a primary threat to biodiversity. Biomass is the most commonly used resource for household sectors, accounting for nearly 74 percent of delivered energy with fuelwood ranking as the most highly consumed fuel type (Ministry of Energy and Mineral Development 2018). As of 2018, tree biomass demand was at about 44 million tons of wood, which produces the equivalent of 440 petajoules of energy (Ministry of Energy and Mineral Development 2018). In addition to fuelwood, nearly 16 million tons of wood are converted into 1.8 million tons of charcoal annually (Ministry of Energy and Mineral Development 2018).</p> <p>Prospecting for oil and ultimately the production of oil and gas in the Albertine Graben is a major threat to biodiversity in the Albertine Rift. There is also prospecting for geothermal energy by the Ministry of Water, Minerals and Energy. Exploration activities such as road construction and drilling and movement of heavy machinery are likely to interfere with the behavior of wildlife. The now under construction East African coast pipeline, with the selected route beginning near Hoima, close to Lake Albert, will cross the Uganda border into Tanzania. In Uganda, the pipeline will run through 10 districts and 25 sub-counties, measuring at 296 km long (East African Crude Oil Pipeline n.d.). Habitat loss to construction, pollution, population increase and increased pressure of extraction of resources (as</p>

TABLE 15. PRIORITIZATION OF DIRECT THREATS TO UGANDA'S BIODIVERSITY

THREAT	DESCRIPTION
	<p>more people are attracted to work in oil related activities) will likely result from this expansion.</p> <p>Overharvesting or exploitation of wetland resources is another threat to biodiversity in Uganda. This includes overfishing, over harvesting of wetland plants for domestic and commercial use; and harvesting of construction materials like clay, sand, firewood, timber, and papyrus, among others.</p> <p>Similarly, in Uganda’s lakes and rivers, overfishing is an important threat to biodiversity. Increased fishing efforts have caused a decline in fish stocks and catches, leading to more destructive fishing gear and technologies polluting Uganda’s lakes and rivers.</p>
Habitat Loss/Fragmentation	<p>One of the greatest threats to biodiversity is the reduction in quality, quantity, and connectivity of natural habitats (USAID 2006). Anthropogenic factors such as population growth, encroachment, poaching, and agricultural practices have all significantly contributed to the loss and degradation of natural habitats in Uganda. Some protected areas in Uganda are threatened by agricultural expansion, creating many cases of habitat fragmentation where small islands of protected areas have no interconnectivity (Ministry of Water and Environment 2015). The pressures on authorities and ecosystem health from increasing land demand have also threatened wildlife reserves and national parks. As a result, these habitats have grown insecure and at risk of agrarian settlements, ranching schemes, and nomadic invasions of cattle. Along the Albertine Rift, projections over the next 70 years show nearly 70 percent or more of habitat loss (Uganda Wildlife Authority 2018).</p>
Agricultural Expansion/ Encroachment and Changes in Land Use	<p>There is a growing trend of change of land use of protected areas for urban and agricultural expansion. Sugarcane cultivation has been highly preferred in comparison to more traditional crops such as coffee, cotton, palm oil, etc. Sugarcane has proven to be more profitable and economically valuable (Mwavu, et al. 2018). Commercial sugarcane and palm oil production have shown significant growth in Uganda as data suggests that they increase household income (Mwavu, et al. 2018). Agricultural expansion has also proven to be one of the major drivers of deforestation in Uganda. With the population increasing exponentially, changes in land use for commercial and subsistence agriculture are to be expected.</p> <p>According to the National Forest Authority, encroachment in protected forested areas is typically caused by people who have been “facilitated by or protected” by local leaders and protected areas personnel (National Environment Management Authority 2016). Reports have shown that by 2008, there were over 300,000 illegal settlements in Central Forest Reserves (National Environment Management Authority 2016).</p> <p>Agricultural encroachment is a direct threat to the biodiversity in wetlands. Wetlands have been converted to grazing and agriculture, especially rice</p>

TABLE 15. PRIORITIZATION OF DIRECT THREATS TO UGANDA'S BIODIVERSITY

THREAT	DESCRIPTION
	<p>cultivation in the eastern region, dairy farming and vegetable farming in the southwest, and pasture land in the north and east.</p> <p>Similarly, grasslands are under threat as they often have been converted into agricultural and grazing land. Between 1961 and 2010, nearly 50 percent of Uganda’s natural savannahs had been converted for agricultural use. Fortunately, the remaining grasslands and savannas are primarily located in PAs (National Environment Management Authority 2016).</p>
Pollution	<p>Pollution in the form of waste such as plastics, fishing gear, agricultural runoff, and industrial effluents have permeated Uganda’s many lakes (National Environment Management Authority 2021). Recent studies have shown that nearly one in five fish in Lake Victoria have ingested plastics (National Environment Management Authority 2021). While the levels of industrialization in Uganda are 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 leaching into Uganda’s open waters, particularly Lakes Victoria and George, have contributed to eutrophication (USAID 2006). A 2011 study revealed, “food and beverage industries discharged effluents in noncompliance to Ugandan national regulations (biological oxygen demand (BOD), chemical oxygen demand (COD), electrocoagulation (EC), Nitrogen, Turbidity and Color), while chemical and pharmaceutical industries did not comply as regards heavy metals [sic]. All the industries did not have any wastewater treatment plant” (Walakira 2011). Contaminated water resources are also of pressing concern in Uganda; early childhood diarrhea as a result of contaminated drinking water kills nearly 33 children a day in Uganda (UNICEF Uganda 2022). Widespread cholera outbreaks from contaminated water have been reported across the country; a 2020 study revealed that fishing communities located along major rivers and lakes make up 5 percent of the total population but nearly 58 percent of all cholera cases between 2011 and 2015 (Godfrey, et al. 2020).</p>
Climate Change	<p>Climate models indicate continued increases in average temperatures (and heat waves), as well as the frequency and intensity of heavy rainfall events. The future of overall precipitation changes is less certain, with the majority of models showing increased precipitation for Uganda and much of the East African region but with shifts in seasonality (Ministry of Water and Environment 2014). Despite potential precipitation increases shown in some models, droughts are expected to intensify in the 21st century due to longer dry spells combined with increased evaporation and a greater proportion of precipitation coming in heavy rainfall events (USAID 2020a).</p> <p>These climate hazards may negatively impact biodiversity in Uganda as the major ecosystems are sensitive to climate impacts. Rising temperatures and</p>

TABLE 15. PRIORITIZATION OF DIRECT THREATS TO UGANDA'S BIODIVERSITY

THREAT	DESCRIPTION
	<p>increased frequency and intensity of droughts may convert wetland and riverine systems to other ecosystem types. Climate change will also affect species distribution; while species richness may increase in central Uganda, it may decrease in the southwest and northeast parts of the country. Uganda may also see changes in succession in forest systems and experience an increasing risk of invasive species (Federal Ministry for Economic Cooperation and Development 2021). The Albertine Rift and Karamoja regions, two highly biodiverse areas in Uganda, are very likely to face adverse effects from climate change and may experience loss of ecosystem functions and changes to species distribution.</p>
<p>Invasive Alien Species</p>	<p>The introduction of invasive species into natural systems can change the trajectory and health of an ecosystem. Invasive species have the potential to out-compete and displace native species, which can lower overall species/genetic diversity and destabilize entire ecosystems (National Environment Management Authority 2016). <i>Acacia hockii</i> is a common threat to native species in Lake Mbuho National Park, where its introduction has transformed previously open savannah into closed woodland ecosystems (Ministry of Water and Environment 2015). In Queen Elizabeth National Park, spear grass (<i>Imperata cylindrica</i> and <i>Dichrostachys</i> spp.) have begun spreading across the park. Other exotic plant species including <i>Lantana camara</i>, <i>Parthenium hysterophorus</i>, <i>Imperata cylindrica</i>, <i>Leucaena leucocephala</i>, <i>Broussonetia papyrifera</i>, <i>Cymbopogon nardus</i>, <i>Senna spectabilis</i>, <i>Mimosa pigra</i>, and <i>Vossia cuspidata</i> have also been seen permeating the park, risking the potential for ecosystem collapse (Ministry of Water and Environment 2015).</p>
<p>Human-induced fires</p>	<p>Human-induced fires threaten biodiversity resources. Fires are started to prepare land for agricultural production and rangeland regeneration and to flush out animals and ease visibility during hunting. Fires can affect plant species composition, richness, diversity and cover (Govender, Trollope and Wilgen 2006). These fires have also proven to be a significant threat for forest plantations, as they are often set by herders to encourage regrowth of new grass and in some cases by hostile communities as a form of retaliation over a planter's refusal to allow them access to licensed areas (Uganda Forest Technical Report 2018).</p>
<p>Wildlife Crime/Poaching/Human-wildlife Conflict</p>	<p>Animal poaching is one of the most pressing threats to large game animals in Uganda. Wildlife are hunted for a variety of reasons for trade and sale such as their ivory, horns, teeth, game meat, hides, etc. Poaching surged during the coronavirus lockdown in 2020. Most of this surge was attributed to reduction in ecotourism (which finances anti-poaching work and presence of visitors deters poachers), and local people poaching for personal or community consumption in the wake of tourism's collapse (Maron 2020).</p>

TABLE 15. PRIORITIZATION OF DIRECT THREATS TO UGANDA'S BIODIVERSITY

THREAT	DESCRIPTION
	<p>Poaching methods can include snares, trap nets, spears/dogs, arrows, guns, etc. (National Environment Management Authority 2016). Illegal activities affecting biodiversity inside and outside protected areas and in wetlands and water bodies include hunting for subsistence, commercial trading of wildlife and wildlife products (meat, skins and other trophies), pit sawing and fishing. Animals most affected are elephants for ivory, hippopotamus for meat and ivory, sitatunga and other antelopes for subsistence consumption, and pangolins for their scales. Human-wildlife conflict has also proven to be a threat to local wildlife in Uganda particularly in relation to agriculture and encroachment. As populations continue to settle and convert land for agricultural use, competition for resources between humans and wildlife becomes prevalent. Some of the major conflicts that arise from such conflicts are crop raiding from wildlife, crop destruction from large animals, and disease transmission, among others (National Environment Management Authority 2016).</p>

5.2 DRIVERS OF THREATS

Per the Best Practices Guide, a driver is a “constraint, opportunity or other important variable that positively or negatively influences direct threats.” There are many factors driving the threats identified above, but the most significant and influential drives in the country are as follows:

- Poverty, Reliance on Unsustainable Livelihoods, Food Insecurity, and Population Growth
- Institutional and Economic Failures
- Corruption and Patronage
- Poor Governance Capacity and Lack of Political Will to Enforce Existing Laws
- International/Local Demand for Natural Resources
- Climate Change
- Growing Agricultural Demand
- Lack of Public Understanding of Biodiversity and Tropical Forest Values

Each of these drivers are interrelated and affect numerous threats.

5.2.1 POVERTY, RELIANCE ON UNSUSTAINABLE LIVELIHOODS, FOOD INSECURITY, AND POPULATION GROWTH

The interplay of poverty, population growth, food insecurity and reliance on natural-resource-intensive livelihoods are driving biodiversity loss in Uganda. As of August 2020, poor urban and rural households are still earning “below-normal” incomes as a result of COVID-19 impacts and erratic rainfall and floods on crop reduction. This has reduced much of their ability to meet their needs for food and other necessities, as many Ugandans rely on agriculture for income (Famine Early Warning Systems Network 2022). With population projections expected to reach 100 million by 2050, in addition to Uganda’s

growing refugee population, this will essentially worsen poverty levels, food insecurity and natural resource consumption rates. Nearly 1.4 million refugees and asylum-seekers, including 867,000 South Sudanese and 403,000 Congolese, had sought shelter in Uganda by 2020 (USAID 2020b). Uganda currently hosts some of the largest refugee populations in Africa (USAID 2020b). In addition to South Sudanese and Congolese refugees, Uganda also hosts refugees from Burundi, the Democratic Republic of Congo (DRC), and Somalia (Food and Agriculture Organization 2019). The refugee population has gradually increased, up from the approximately 1.2 million refugees and asylum-seekers registered as of January 2019 (Food and Agriculture Organization 2019). Many Ugandan refugees rely on food assistance to survive. If food assistance programs aren't sustained between February and May, refugees in Uganda could face "Crisis (IPC 3) levels of acute food insecurity, according to the Famine Early Warning Systems Network (FEWS NET)*" (USAID 2020b).

Reliance on unsustainable livelihoods has posed significant challenges for the health of Uganda's biodiversity. Forests provide many resources for livelihoods in Uganda, including firewood and charcoal, which is the country's main domestic energy for cooking (USAID 2020a). Wood fuels are the primary source of energy for more than 90 percent of households in Uganda (UBOS 2022). With the current and expanding refugee and population crisis, demands for biofuels have become increasingly prevalent. This has placed an immense pressure on forest resources, leading to wide scale deforestation for firewood, charcoal, timber and settlements for local and refugee populations.

5.2.2 INSTITUTIONAL AND ECONOMIC FAILURES

Uganda faces many economic challenges. Despite their success in reducing poverty rates, the percentage of people living below the poverty line (i.e., surviving on income below the minimum 1.00 USD per day that is required to meet their basic needs) was 20.3 percent in 2018 (The World Bank 2019). This has been partly due to increasing population growth rate of about 3 percent; bringing Uganda's total population to about 41.6 million in 2020 (National Planning Authority 2020). Population data indicates a strained age structure, where younger populations (0-14 years) constitute 49.3 percent of the population; creating an immense dependency burden that has been difficult to address (National Planning Authority 2020). Cases of poor economic management, failure to invest adequately in the health, education, and economic opportunities for a burgeoning young population have stunted Uganda's ability to show progress in economic and institutional reform (Central Intelligence Agency 2022). As of 2019, only 28 percent of the population had access to electricity (National Environment Management Authority 2016), with efforts to decrease high costs still proving to be a challenge (National Planning Authority 2020). In addition to high costs of electricity, one of the only sources of development finance for businesses are short-term credits, which are typically provided by commercial banks with lending rates averaging at about 20 percent per annum (National Planning Authority 2020). In 2018, only 20 percent of the adult population accessed financial services informally, with nearly 22 percent of adults having no access at all (National Planning Authority 2020). There are currently 206 bank accounts per 1,000 adults in Uganda (National Planning Authority 2020).

5.2.3 CORRUPTION AND PATRONAGE

Uganda has long grappled with issues related to corruption in all sectors. As of 2021, Uganda ranks 144 out of 180 countries in Transparency International's 2021 Corruption Perceptions Index, with a score of 27 out of 100 (Sharpe 2018). Currently, reports have shown risks of corruption in Uganda's natural resources sector, particularly the oil industry as the overall lack of transparency has worried Ugandan

conservation experts (Gain Integrity 2020). In 2017, Global Witness published a report after an 18-month long investigation into Uganda's natural resource sector. The key findings of the report included dangerous working conditions for miners, mining exploration licenses granted in protected areas (including Bwindi National Park), underpayment/absence of tax payments, and mismanaged funds (Global Witness 2017). In 2020, Uganda joined the Extractive Industries Transparency Initiative with aims to strengthen transparency, improve tax collection, promote public debate, improve climate investment and expand overall accountability (Extractive Industries Transparency Initiative 2020). The GoU has been involved in numerous high profile scandals involving ministers and ruling party officials, as the public continues to highlight how justice is not often served due to political interference. According to the most current data available, many Ugandans believe that the "ruling parties systematically secure funds for its patronage network" (Godfrey and Yu 2015). The Auditor General's annual report for the financial year 2012/2013 revealed that officials within the Finance Ministry and the Central bank had taken funds designated for the construction of the Karuma Dam from the Oil Tax Fund and used them for "other purposes without following proper procedures," with an additional US\$38 million in public funds spent on "off-budget activities" which are not accounted for in Uganda's national budget (U.S. Department of State 2015).

5.2.4 POOR GOVERNMENTAL CAPACITY AND LACK OF POLITICAL WILL TO ENFORCE EXISTING LAWS

The Ugandan Government has faced myriad challenges in their efforts to improve overall governance and democracy. In 2021, Uganda ushered in President Yoweri Museveni's sixth term. The U.S. and European Union, among others, noted concerns over the 2021 election's credibility (Titeca and Reuss 2021). A national imbalance of power and leadership, a lack of transparency and accountability in government funding allocations, weak institutional government, and civil society capacity have plagued Uganda (USAID n.d.). Natural Resource Management agencies are known for being poorly facilitated and understaffed. NEMA has assisted the GoU with enacting numerous land use laws and policies to protect the environment such as the Poverty Eradication Action Plan (2000), the Sector Wide Approach to Planning for Water and Sanitation Sector (2002), the National Wetlands Policies (1995), the Environmental Impact Assessment Regulations (1998), the National Environment Management Policy (1994), the National Environment Act (1995, 2019), and the Constitution of the Republic of Uganda (GoU 1995) (Rwakakamba 2009). However, there have been significant gaps in the implementation of these laws and policies. Capacity gaps for policy implementation include weak technical skills and a shortage of qualified staff, insufficient budget, and a low frequency of national strategy review, demonstrating a lack of quality planning exercises (Ministry of Local Government 2020). These institutional gaps have been reflective of Uganda's poor governance and lack of environmental protections enforcement. Uganda's weak governance capacity coupled with issues of corruption and patronage have hindered its ability to establish strong foundations for national government institutions.

5.2.5 CLIMATE CHANGE

Uganda is extremely vulnerable to the effects of climate change. Increased temperatures and droughts pose a significant threat on critical ecosystems and biodiversity. Key climate trends recently observed in Uganda show changes to annual precipitation and temperature are already occurring. Climate change is projected to exacerbate impacts to biodiversity and ecosystems due to increases in annual average temperature and the number of hot days, more variable precipitation, increased and decreased rainfall, longer dry spells, and increased incidence of severe drought.

In a high emissions future scenario, current projections show an average temperature change of 1.8°C by the 2050s and 3.7°C by the 2090s (World Bank Data 2020). In addition, climate change is expected to alter rainfall patterns, with increases in annual precipitation in areas along the Western shores of Lake Victoria, Mount Elgon, Mount Rwenzori, and Lake Kioga and decreased precipitation expected in the northern and northeastern regions (World Bank Data 2020). Increased temperatures may reduce water recharge or retention capacity; for example, decreased snow cover at Mount Rwenzori due to higher temperatures has led to reduced year-round flow in rivers and streams draining from the mountain, affecting aquatic biodiversity (World Bank Data 2021). Changes to water availability and watershed recharge can also have critical consequences for fisheries, further exacerbating Uganda's issues with ecosystem stability (World Bank Data 2021). In areas facing increased precipitation, the risk of floods and landslides will increase, causing significant damage to forests and ecosystems. Climate change may also increase intensity and spread of fires, which could cause changes in plant and animal species composition, increased spread of invasive species and disease, and damage to wetlands and open water bodies.

These climate change impacts may drive further reductions to biodiversity or damage to Uganda's ecosystems. Demand for land that can house infrastructure and cultivate agriculture has led to high rates of deforestation. Climate change impacts such as flooding and landslides that destroy existing human settlements and infrastructure may further exacerbate deforestation to obtain more land (Federal Ministry for Economic Cooperation and Development 2021). Climate change impacts such as altered precipitation patterns and increasing temperatures and dryness may also put further stress on fragile ecosystems (The World Bank 2021).

Climate change impacts to livelihoods could also reduce biodiversity by driving increased human-wildlife conflict and disease transmission between wildlife and livestock or people. Increased temperatures could also trigger human-wildlife conflicts due to migration of cattle searching for water and pasture in the dry season. Furthermore, an increase in temperature can impact the likelihood of droughts, which can be especially damaging for Ugandans, who rely primarily on agriculture as a source of food and income. Temperature changes can also create suitable conditions for crop diseases and pests, worsening the impacts to the agricultural sector. These impacts to climate change could also drive agricultural expansion into highly biodiverse ecosystems, potentially threatening conservation efforts.

5.2.6 INTERNATIONAL/LOCAL DEMAND FOR NATURAL RESOURCES

The global demand for energy, agricultural, and animal products has exacerbated issues of conservation and biodiversity in areas that are rich in natural resources. In 2021, the GoU, Tanzania, China National Offshore Oil Corporation (CNOOC), and TotalEnergies signed agreements for the East Africa Crude Oil Pipeline, which included shareholder, tariff and transportation agreements (International Trade Administration 2021). In addition to these agreements, TotalEnergies also announced that it had granted

a conditional award of US\$2 billion to U.S.'s McDermott International and China's Sinopec for "engineering, procurement, construction, and commissioning (EPCC) for the development of 31 well beds and a central processing facility of the Tilenga onshore oil field that will generate up to 200,000 barrels per day" (International Trade Administration 2021). This investment in oil production and continued oil industry growth signifies the competing priorities Uganda faces between industry growth and ongoing conservation efforts.

Demands for electrification in Uganda have not been met in typically rural areas, leading to an "energy gap" that is supplemented by biofuels such as wood, and more commonly charcoal (Haysom, et al. 2021). While the electrification of Uganda has made progress in recent years, rates are still significantly low, sitting at 24 percent as of 2021 (USAID 2022). As a result, wood fuel remains the main fuel source for cooking. Procurement of wood fuels has had detrimental effects on forests, with increasing demands as a result of population increase further contributing to wide scale deforestation.

5.2.7 GROWING AGRICULTURAL DEMAND

Over 96 percent of farmers in Uganda are considered smallholders and contribute to 75 percent of the country's total agricultural production according to the most current data available (Feed the Future 2018). Agriculture provides the main income stream into smallholder families in Uganda, supporting nearly all household activities (Feed the Future 2018). According to the most current data available, the majority of Uganda's agricultural production is consumed domestically, only 1.7 percent of the country's total calorie consumption comes from imported food (Feed the Future 2018). Agriculture potentially threatens the vitality and health of wetlands through draining of water and clearing wetland vegetation, especially seasonal woodlands, bush and thickets, negatively affecting their capability to provide ecosystem services (Turyahabwe, et al. 2013). The promotion of commercial crops reduces available arable land for the rural poor, which may force them to encroach on forests and other natural ecosystems. With Uganda's population rapidly increasing, the country's agricultural demand is growing rapidly alongside it.

5.2.8 LACK OF PUBLIC UNDERSTANDING OF BIODIVERSITY AND TROPICAL FOREST VALUES

During stakeholder interviews conducted in the field, many stakeholders cited the lack of public understanding of biodiversity and tropical forest values as a primary driver of threats to these resources. Stakeholders emphasized the lack of awareness among youth who have grown up in deforested areas and have never experienced the level of biodiversity previous generations experienced. A general consensus was that the public would engage in more conservation activities and reduce overexploitation of resources if they understood the ecosystem services and values provided by biodiversity and tropical forests.

6. ACTIONS NECESSARY TO CONSERVE AND PROTECT TROPICAL FORESTS AND BIODIVERSITY

This section lists the actions necessary to effectively conserve and protect tropical forests and biodiversity in Uganda for any potential actor, including the GoU, multilateral development banks, bilateral donors, private sector donors, NGOs, and other organizations. These actions necessary for any potential actor, as shown in Table 16, directly inform the “extent to which” analysis conducted in Section 7 which filters these actions based on existing USAID/Uganda activities and guides detailed recommendations for USAID/Uganda programming developed in Section 8. All actions that are proposed as necessary to conserve and protect tropical forests must be implemented consistent with other laws and Agency policies, including Section 660 of the Foreign Assistance Act, Section 7031(a) of the annual appropriations act, and ADS 220. Certain proposed activities, such as directly financing government ministries, departments and agencies, may be foreclosed by law or Agency policy for the life of, or during parts of, the CDCS, in which technical or in-kind assistance may be substituted.

TABLE 16. ACTIONS NECESSARY, DRIVERS ADDRESSED, AND LINKED THREATS

ACTIONS NECESSARY	DRIVER(S) ADDRESSED	LINKED THREATS
Support financial incentives for the conservation of tropical forests and biodiversity, reduce pressure on forested lands and biodiversity by supporting local livelihoods aligned with conservation, and engage local communities in conservation efforts		
<ul style="list-style-type: none"> ● Support community-based conservation efforts ● Promote ecotourism ● Incentivize sustainable markets for native plants ● Incentivize sustainable markets that provide alternatives to natural resource utilization ● Promote sustainable carbon markets ● Improve agricultural productivity and efficiency ● Increase agroforestry practices focusing on biodiversity, climate resilience, and sustainability. ● Implement pilot projects on alternative energy sources and energy-efficient infrastructure. ● Upgrade and expand alternative energy sources and energy-efficient infrastructure 	<ul style="list-style-type: none"> ● Poverty, Reliance on Unsustainable Livelihoods, Food Insecurity, and Population Growth ● Institutional and Economic Failures 	<ul style="list-style-type: none"> ● Over-exploitation of Natural Resources (Oil, Gas, Timber) ● Habitat Loss/Fragmentation ● Pollution ● Agricultural Expansion/ Encroachment and Changes in Land Use ● Climate Change ● Human-induced wildfires ● Wildlife Crime/Poaching

TABLE 16. ACTIONS NECESSARY, DRIVERS ADDRESSED, AND LINKED THREATS

ACTIONS NECESSARY	DRIVER(S) ADDRESSED	LINKED THREATS
Promote education and messaging on biodiversity and forest conservation		
<ul style="list-style-type: none"> ● Prepare and disseminate assessments that demonstrate the monetary value of natural resources. ● Develop and implement strategic messaging on values of biodiversity/forest conservation ● Promote environmental awareness in schools. ● Promote national environmental advocacy through media platforms and influencers. ● Provide vocational training in environmentally friendly practices and skills. 	<ul style="list-style-type: none"> ● Poverty, Reliance on Unsustainable Livelihoods, Food Insecurity, and Population Growth ● Lack of Understanding of Biodiversity and Tropical Forests Values and Conservation Needs 	<ul style="list-style-type: none"> ● Over-exploitation of Natural Resources (Oil, Gas, Timber) ● Habitat Loss/Fragmentation ● Invasive Alien Species ● Pollution ● Agricultural Expansion/ Encroachment and Changes in Land Use ● Wildlife Crime/Poaching
Support programs that improve governance as it relates to biodiversity and tropical forests conservation, and strengthen the capacity of government and civil society to manage natural resources.		
<ul style="list-style-type: none"> ● Improve governance and capacity as it relates to reducing and reversing degradation from refugee settlements. ● Increase enforcement of existing environmental laws. ● Increase capacity of district-level government forest management staff. 	<ul style="list-style-type: none"> ● Institutional and Economic Failures ● Corruption and Patronage ● Poor Governance Capacity and Lack of Political Will to Enforce Existing Laws ● Lack of Understanding of Biodiversity and Tropical Forests Values and Conservation Needs 	<ul style="list-style-type: none"> ● Over-exploitation of Natural Resources (Oil, Gas, Timber) ● Habitat Loss/Fragmentation ● Invasive Alien Species ● Pollution ● Agricultural Expansion/ Encroachment and Changes in Land Use ● Climate Change ● Human-induced wildfires ● Wildlife Crime/Poaching
Strengthen and Improve Resource Management Practices		
<ul style="list-style-type: none"> ● Restore degraded areas in PAs and other key locations. ● Identify and restore key wildlife migration corridors and 	<ul style="list-style-type: none"> ● Institutional and Economic Failures ● International/Local Demand for 	<ul style="list-style-type: none"> ● Over-exploitation of Natural Resources (Oil, Gas, Timber)

TABLE 16. ACTIONS NECESSARY, DRIVERS ADDRESSED, AND LINKED THREATS

ACTIONS NECESSARY	DRIVER(S) ADDRESSED	LINKED THREATS
<p>riparian corridors.</p> <ul style="list-style-type: none"> ● Gazette and demarcate PAs. ● Establish buffers around PAs, sensitive habitats, and wildlife corridors. ● Ensure long-term benefits of conservation projects ● Control spread of invasive species that threaten biodiversity ● Make use of best available technology and tools for resource management. 	<p>Natural Resources</p> <ul style="list-style-type: none"> ● Lack of Understanding of Biodiversity and Tropical Forests Values and Conservation Needs 	<ul style="list-style-type: none"> ● Habitat Loss/Fragmentation ● Invasive Alien Species ● Agricultural Expansion/ Encroachment and Changes in Land Use
Encourage and support long-term, collaborative regional conservation planning		
<ul style="list-style-type: none"> ● Develop and implement comprehensive landscape-level conservation plans. ● Develop and implement watershed-level conservation plans. ● Develop and implement climate action plans. ● Develop platforms to integrate natural resources management policies and regulations across sectors. 	<ul style="list-style-type: none"> ● Institutional and Economic Failures ● Lack of Understanding of Biodiversity and Tropical Forests Values and Conservation Needs 	<ul style="list-style-type: none"> ● Over-exploitation of Natural Resources (Oil, Gas, Timber) ● Habitat Loss/Fragmentation ● Invasive Alien Species ● Pollution ● Agricultural Expansion/ Encroachment and Changes in Land Use ● Climate Change ● Wildlife Crime/Poaching

7. EXTENT TO WHICH THE ACTIONS PROPOSED FOR SUPPORT BY THE AGENCY MEET THE ACTIONS NECESSARY

This section presents the “extent to which” the actions under the proposed CDCS for USAID/Uganda support the “actions necessary” as defined in Section 6. Each sub-section, as shown in Table 17, describes the manner in which current and planned programming contribute to one of the five defined actions necessary, providing examples within current programming of that contribution or describing opportunities for the Mission to improve upon that contribution through the new CDCS.

USAID/Uganda currently supports programs in health, democracy and governance, agriculture, education, energy and infrastructure, with the largest investments in global health programs. Section 1.2 provides a summary of the DOs and IRs addressed in the current CDCS. Table 17 details the extent to which USAID/Uganda sub-IRs contribute towards actions necessary.

TABLE 17. EXTENT TO WHICH THE CURRENT OR PLANNED STRATEGY AND PROGRAMMING CONTRIBUTE TOWARD NECESSARY ACTIONS

ACTION NECESSARY	EXTENT TO WHICH USAID CONTRIBUTES TOWARD ACTIONS NECESSARY
<p>Support financial incentives for the conservation of tropical forests and biodiversity, reduce pressure on forested lands and biodiversity by supporting local livelihoods aligned with conservation, and engage local communities in conservation efforts.</p>	<p>Under DO2, <i>Resilient Growth Enhanced</i>, will consider how best to conserve biodiversity and improve natural resource management.</p> <p>IR 2.3, <i>Natural resources managed sustainably</i>, helps conserve the natural resource base that underpins the livelihoods of most Ugandans as a source of subsistence and the basis of economic activity. The CDCS recognizes that biodiversity management is central to addressing poverty and sustainable economic development in Uganda. Key strategies identified include: support for the development of Integrated Resource Management Systems; encouraging sustainable use of natural assets such as wood, fisheries, and non-timber forest products; and assisting communities to gain more benefits from tourism revenues.</p> <p>The USAID Feed the Future (FtF) initiative in Uganda is aimed at increasing food security, and one of its cross-cutting priorities is environmentally sustainable and climate-resilient agricultural development. It recently included the Commodity Production and Monitoring (CPM) Activity, which was a five-year program aimed at improving agricultural market value chains. This program showed positive gains in agricultural value chains and climate smart agriculture over the 34 districts in which it was implemented.</p> <p>The CDCS identifies increasing electricity generation capacity to offset wood and charcoal burning as planned investment. USAID/Power Africa investments support renewable energy projects such as small hydropower plants, solar, wind, and biomass.</p>

TABLE 17. EXTENT TO WHICH THE CURRENT OR PLANNED STRATEGY AND PROGRAMMING CONTRIBUTE TOWARD NECESSARY ACTIONS

ACTION NECESSARY	EXTENT TO WHICH USAID CONTRIBUTES TOWARD ACTIONS NECESSARY
	<p>Opportunities to Expand Contribution: Although community-based conservation efforts such as CFMs have proven successful, they can be expanded to additional PAs throughout Uganda. Models for promoting ecotourism such as the Bwindi-Nkuringo Eco-lodge can also be expanded to new areas. Financing and technical assistance can be provided for developing and expanding efficient low-cost alternatives to extracting fuel wood and charcoal from forests. Although USAID has been supporting agroforestry through its Feed the Future program, greater emphasis can be placed on incorporating a diversity of native plant species into agricultural practices for shade/companion plants as well as harvest.</p>
<p>Promote education and messaging on biodiversity and forest conservation.</p>	<p>IR 2.4 is aimed at improving education for children and youth, although it is not focused on biodiversity education. USAID partners with the Ministry of Education to improve the quality of basic education in primary schools in Uganda. USAID also works with the GoU, the private sector, and civil society to promote citizen participation in good governance.</p> <p>Opportunities to Expand Contribution: Biodiversity and tropical forest conservation may be incorporated into messaging at the elementary school levels, and as a component of outreach involving civil society as a whole.</p>
<p>Support programs that improve governance as it relates to biodiversity and tropical forests conservation, and strengthens the capacity of government and civil society to manage natural resources.</p>	<p>The CDCS commits to increasing funding to key systems and reducing corruption. It takes a systems approach to focus on fighting corruption by empowering citizens, reinforcing civil society, building local governments capacity and strengthening institutional checks and balances. One of the guiding principles of the CDCS is to incorporate anti-corruption mechanisms across USAID’s portfolio. This in turn is expected to strengthen the implementation of existing environmental laws and policies protecting biodiversity and tropical forests conservation.</p> <p>The CDCS addresses the need to strengthen the capacity of both the GoU and communities to manage biodiversity effectively. The B4R activity includes as one of its performance indicators the number of institutions with improved capacity in land or water management, although no progress had been made as of the end of 2021, largely due to setbacks related to the COVID pandemic.</p> <p>Opportunities to Expand Contribution: USAID can provide financing and technical support to improve governance and build capacity related to enforcing existing environmental laws, and developing and implementing policy nationally, and specifically, related to effects of refugee settlements on biodiversity and tropical forests.</p>
<p>Strengthen and improve resource</p>	<p>IR 2.3, <i>Natural resources managed sustainably</i>, includes key strategies such as: support for the development of</p>

TABLE 17. EXTENT TO WHICH THE CURRENT OR PLANNED STRATEGY AND PROGRAMMING CONTRIBUTE TOWARD NECESSARY ACTIONS

ACTION NECESSARY	EXTENT TO WHICH USAID CONTRIBUTES TOWARD ACTIONS NECESSARY
management practices	<p>Integrated Resource Management Systems; protected area and buffer zone management of forest and wildlife conservation areas; improved land use planning; and management of ecosystem services.</p> <p>Opportunities to Expand Contribution: Although USAID has funded successful restoration efforts, the benefits are sometimes short-lived due to lack of long-term protection and management. Ecosystems remain highly fragmented and in need of restoration/protection of wildlife migration and riparian corridors. Many protected areas are vulnerable due to lack of delineation and lack of buffers from adjacent land uses. USAID can expand programs to focus on habitat connectivity/corridors and buffers, and better ensure long-term viability of improvements through mechanisms such as sustainable financing.</p>
Encourage and support long-term, collaborative regional conservation planning	<p>IR 2.3, <i>Natural resources managed sustainably</i> includes improved land use planning as a key strategy.</p> <p>B4R vegetative/land cover mapping and other regional natural resource mapping is a crucial early step toward developing long-term comprehensive regional conservation plans for integration into county development plans.</p> <p>The CDCS addresses the need for refugee planning but does not include the concept of integrating tropical forests and biodiversity conservation needs into refugee settlement plans.</p> <p>Opportunities to Expand Contribution: USAID can build on ongoing mapping efforts by providing capacity development, technical assistance, and financial support for preparation of regional plans that incorporate mapping and identify key areas to focus on for biodiversity and tropical forest conservation efforts, including core habitat areas and key linkages.</p>

8. PROGRAMMING RECOMMENDATIONS FOR USAID/UGANDA UNDER THE NEW CDCS

Table 18 describes programming recommendations for USAID’s consideration in fulfilling the actions necessary, as filtered in the “extent to which” analysis in Section 7, and detailed in this analysis. These recommendations are organized by technical area of focus. USAID programming is dictated by U.S. congressional directives, which necessarily informs and at times constrains the opportunities to integrate tropical forests and biodiversity conservation into all technical programming areas.

Recommendations in Table 18 are made based upon the Analysis Team’s understanding of any such constraints and framed in a manner practicable for the Mission, understanding that factors beyond the conservation of tropical forests and biodiversity will likewise inform final programming decisions.

Table 18 organizes recommendations into the following three categories:

- **Readily Actionable:** *Working within the boundaries of existing programs to improve the extent to which USAID is meeting the actions necessary to reduce threats;*
- **Strategic Opportunity:** *Adapting programs to improve the extent to which USAID is meeting the actions necessary to reduce threats; and*
- **For Future Consideration:** *Designing long-term activities with an explicit objective of reducing priority drivers of threats or otherwise contributing to biodiversity conservation.*

TABLE 18. RECOMMENDATIONS AND OPPORTUNITIES FOR USAID PROGRAMMING		
READILY ACTIONABLE	STRATEGIC OPPORTUNITY	FOR FUTURE CONSIDERATION
PROGRAM OFFICE		
	<ol style="list-style-type: none"> I. In coordination with Environment and Natural Resources, ensure long-term benefits of conservation projects and support executing projects to ensure benefits continue beyond the life of the project by: (1) providing sustainable financing for a period longer than 3 to 5 years; and (2) requiring an operation and maintenance 	

TABLE 18. RECOMMENDATIONS AND OPPORTUNITIES FOR USAID PROGRAMMING

READILY ACTIONABLE	STRATEGIC OPPORTUNITY	FOR FUTURE CONSIDERATION
	<p>strategy for sustaining conservation benefits after the project is completed.</p>	
<p>ENVIRONMENT AND NATURAL RESOURCES UNIT – ECONOMIC GROWTH</p>		
<ol style="list-style-type: none"> 1. Support community-based conservation efforts by: (1) promoting collaborative management (using CFM model) by engaging local communities in activities such as patrols to collect snares, surveille poacher; and (2) by strengthening the role and capacity of UWA community conservation officers and NFA CFM coordinators. Continue promotion of Farmer Managed Natural Regeneration (FMNR) interventions that provide wildlife habitat and indigenous plant species, and support climate change adaptation and mitigation. Continue to work with the NFA to facilitate collaboration with the CFM groups and to develop resource management plans for 7 clusters of CFRs in the Karamoja and Achwa ranges (currently implemented under B4R activity.). Continue collaboration with the NFA and the UWA to facilitate collaboration with community conservation groups in protected areas in Karamoja. Continue to work with communities and the NFA in the Moroto area (Katikekile Sub County) to resolve conflicts on using natural resources (e.g., water sources) in CFRs (currently implemented under Apolou BHA Activity). 2. Promote eco-tourism at PAs by: (1) supporting, via grants and loans, private sector actors requiring each 	<ol style="list-style-type: none"> 1. Provide technical assistance to the UWA and NFA to develop and implement national programs to identify and restore key wildlife migration corridors and riparian corridors. The program should prioritize restoration efforts that are strategically placed to contribute to regional strategies aimed at increasing habitat connectivity. For example, continue the support and collaborate with the five districts of Kitgum, Agago, Kotido, Kaabond, and Abim (KAKKA) governing structure for the Karenga Community Wildlife Management Area (KCWMA) to preserve this critical wildlife migration corridor in the Kidepo landscape (currently implemented under the B4R activity). 2. Provide financing or technical assistance to the NFA, UWA and the other relevant agencies in gazetting and demarcation of PAs both on maps via GIS on publicly available websites, and on the ground via permanent stanchions or pillars. 3. Establish buffers around PAs, sensitive habitats, and wildlife corridors by collaborating with and providing technical assistance to District-level local governments, UWA, NFA, farmers associations, and CBOs, to plant bamboo, coffee 	<ol style="list-style-type: none"> 1. Provide capacity development, technical assistance, or financial support to GoU and local governments to develop and implement regional, landscape-level conservation legislation, policy and planning documents. Planning documents should address conservation at a landscape level to minimize fragmentation of habitats and forests and provide habitat connectivity. Planning should promote regional efforts that go beyond site-level or patch-level conservation and beyond boundaries of PAs. 2. Provide capacity development, technical assistance, or financial support to GoU and local governments to develop and implement watershed-level conservation legislation, policy and planning documents (as a

TABLE 18. RECOMMENDATIONS AND OPPORTUNITIES FOR USAID PROGRAMMING

READILY ACTIONABLE	STRATEGIC OPPORTUNITY	FOR FUTURE CONSIDERATION
<p>to co-fund community projects including health centers and schools around the PA; (2) by supporting revenue sharing programs that distribute portion of tourism earnings directly to communities neighboring PAs; and (3) by targeting partners that drive and promote eco-tourism as a forest management tool (e.g., the model for Bwindi-Nkuringo Eco-lodge).</p> <ol style="list-style-type: none"> 3. Promote programs that improve the mineral extraction value chain in the Karamoja region, focusing on providing local community benefits. 4. Promote natural wetland conservation and restoration by incentivizing sustainable markets for wetland plants that can be harvested for rattan or raffia, or other NTFPs. 5. Support development of climate action plans at local community levels. In the Karamoja region, include a focus on sustainable pastoral livelihoods and strategic planning for agricultural enhancements/settlements outside key biodiversity areas/wildlife corridors. For example, incorporate strategic planning into ongoing efforts to establish, train and support resilience action committees (RACs) (currently implemented under the Apolou activity), to ensure that climate-resilient development and agriculture are in areas that do not conflict with biodiversity conservation or wildlife corridors. Incorporate sustainable pastoralism into climate action plans in Karamoja region, with the understanding that pastoral lifestyles can be more resilient to climate change than sedentary farming. 6. Continue evaluation of wildlife ranching potential in the 	<p>or other sustainable crops that have minimal indirect effects on adjacent land uses.</p> <ol style="list-style-type: none"> 4. Provide financial support or technical assistance to GoU agencies to control invasive species in PAs, using the best available technologies, focusing on invasive species that pose the greatest threats to biodiversity such as <i>Acacia hockii</i>, spear grass (<i>Imperata cylindrica</i> and <i>Dichrostachys</i> spp.), <i>Lantana camara</i>, <i>Parthenium hysterophorus</i>, <i>Leucaena leucocephala</i>, <i>Broussonetia papyrifera</i>, <i>Cymbopogon nardus</i>, <i>Senna spectabilis</i>, <i>Mimosa pigra</i>, and <i>Vossia cuspidata</i>. 	<p>type of landscape-level planning) aimed at protecting catchment basins (i.e., watersheds) upstream from agriculture and domestic uses and facilitating a multi-benefit approach. This effort should focus on the water quality (and potable water production) linkage to preservation of forests in upstream watersheds (i.e., connect costs of treating sediment-laden raw water to potable water at water treatment facilities).</p>

TABLE 18. RECOMMENDATIONS AND OPPORTUNITIES FOR USAID PROGRAMMING

READILY ACTIONABLE	STRATEGIC OPPORTUNITY	FOR FUTURE CONSIDERATION
Karamoja region (currently a B4R activity).		
ECONOMIC GROWTH AND ENVIRONMENT		
<ol style="list-style-type: none"> 1. Provide technical assistance, capacity development, equipment, and inputs to promote agro-forestry, on-farm tree management and tree planting using native trees to enhance tree cover outside CFRs. Promote market-based incentives for sustainable agriculture and forestry management through public-private partnerships, with an emphasis on biodiversity and cultivation of indigenous plant species. Distribute seedlings to farmers and support raising trees to full growth (to address fuel wood collection from forests). The On Farm Tree management approach will enhance fuelwood supply. Promote agroforestry in and around the buffer zone of protected areas (e.g., shade-grown coffee planted with indigenous trees). Promote existing agroforestry efforts that involve growing a diversity of crops (coffee, maize, beans, etc.) and not large monocultures of rice, sugar cane, or other unsustainable crops. 2. Increase biodiversity and forest resources associated with ongoing land use practices by: (1) Enhancing selective harvesting for timber and replanting with native species (NFA); (2) Promoting agroforestry that involves planting trees along boundaries of fields or in fields with indigenous plants; (3) Promoting agroforestry that involves co-planting multiple agricultural species, preferably multi-layered (CRS). This practice can benefit small landowners. 	<ol style="list-style-type: none"> 1. Provide financing and technical assistance for research, and grants to SME and private sector partners to implement pilot projects, on innovative energy sources and energy-efficient technology, such as renewable energy (e.g., solar PV, wind, biogas, micro-hydropower) and cleaner and efficient burning systems (e.g., fuel efficient stoves) to provide inexpensive access to energy in urban and peri-urban areas. 2. Upgrade and expand the electricity generation, transmission, and distribution infrastructure to provide low cost, reliable access to adequate power in urban and peri-urban areas that do not conflict with wildlife corridors or wildlife conservation needs. 3. Provide funding or technical assistance to local government and CBOs to establish ecotourism markets for Ugandan tourists near PAs. For example, to implement the Conservation Investment Plan for Sango Bay using the 2016 ecotourism package (developed by USAID and MWE). Encourage domestic tourism to support awareness of conservation values. Encourage conservation groups who interact with domestic tourists. Use traditional totems or clans that are associated with a specific animal. 	

TABLE 18. RECOMMENDATIONS AND OPPORTUNITIES FOR USAID PROGRAMMING

READILY ACTIONABLE	STRATEGIC OPPORTUNITY	FOR FUTURE CONSIDERATION
<ol style="list-style-type: none"> 3. Along with Democracy, Human Rights and Governance, HATO, collaborate with, provide technical assistance to, and provide capacity development to the Office of the Prime Minister (OPM) Ministry for Relief, Disaster Preparedness and Refugees, UWA, NFA, NEMA, and local authorities to: (1) develop and execute comprehensive land use policy and land use plans for refugee resettlement areas; (2) create partnerships for the restoration of degraded habitat around settlements; (3) strengthen the enforcement and monitoring mechanisms for implementing existing conservation regulations, to address the degradation of ecosystems around such settlements. 4. Provide financing, technical support or capacity development for UWA and NFA for the enforcement of existing laws in and around PAs. 5. Develop and implement strategic messaging on the value of biodiversity/forest conservation through Social and Behavioral Change programming. 6. In coordination with Environment and Natural Resources, provide technical or financial support to the district-level government forest management staff (i.e. forest officers) to: (1) identify and perform inventories of the local forests on private land, and (2) develop and implement forest management plans. The District Environmental Action Plans developed during the 2002-2003 USAID COBS project could be used as a basis. 7. Provide technical assistance, capacity building, or financial support to CBOs and local government for environment and natural resources management at the 	<ol style="list-style-type: none"> 4. Promote livelihood activities in and around selected PAs by providing technical assistance to: (1) identify and support key value chains (e.g., honey, coffee, non-timber forest products); and, (2) support sustainable practices in traditional livelihoods like small-scale agriculture and fishing/aquaculture. 5. Provide technical assistance and funding to evaluate the sustainability of “bio char” production (from agro residual wastes, e.g., from sugar processing), as alternative to charcoal from forests. 6. Facilitate establishment of woodlots for sustainable fuelwood supply in urban and peri-urban areas (woodlots of non-indigenous species do not contribute to tropical forests conservation but relieve pressure of exploiting natural forests). 7. Provide microfinancing or subsidies for alternatives to wood fuel and charcoal (e.g., natural gas or propane) to reduce financial barriers to subsistence farmers and traders. This may involve subsidizing LPG cylinder distribution (e.g., provide free cylinders to customers, but require them to pay for filling needed amounts). 8. Improve predictability for agricultural outputs by: (1) establishing weather stations and enhancing weather monitoring programs to better understand weather patterns to reduce unpredictability associated with climate change (greater predictability could also help inform forest management practices such as wildfire 	

TABLE 18. RECOMMENDATIONS AND OPPORTUNITIES FOR USAID PROGRAMMING

READILY ACTIONABLE	STRATEGIC OPPORTUNITY	FOR FUTURE CONSIDERATION
<p>district level, by (1) supporting the promulgation and enforcement of bylaws that strengthen biodiversity and tropical forests conservation; (2) adopting technology to address management challenges (e.g., use of drone technology to cover monitoring large areas; provide toll free telephone lines to communities to report illegal activities in conservation areas).</p> <p>8. Continue to support ecosystem restoration activities with community grants, by funding tree nurseries, micro-water catchment protection, riverbank restoration, and other activities (currently implemented under Apolou activity in the Karamoja region).</p>	<p>management); and (2) Improve weather forecasts and dissemination of weather information to farmers to enhance agricultural production and improve nutrition, thereby reducing the driver of using resources in intact forests and other natural areas.</p> <p>9. Improve agricultural productivity: support programs that are aimed at increasing soil fertility to increase productivity on existing agricultural lands. Use simple low cost technologies such as irrigation to improve crop production. Subsidize prices of fertilizers and other agricultural inputs to encourage communities to till unfertile lands instead of encroaching on wetlands and forests. An integrated approach to improve soil fertility should be implemented including the use of organic sources of nutrients. These organic sources would augment or replace inorganic fertilizers under this approach. (Stewart et al. 2020, Fairhurst et al. 2012).</p> <p>10. Collaborate with the GoU Ministry of Water and Environment to perform, and to distribute via accessible websites, Uganda-wide natural resource value assessments to demonstrate the monetary value of conservation and educate the public on these values.</p> <p>11. Promote the carbon market with focus on scaling up performance-based carbon credits to ensure long-term viability. If possible, financing of 15 years or more can provide local financial incentives as well as realize benefits by allowing trees to continue to grow and sequester carbon,</p>	

TABLE 18. RECOMMENDATIONS AND OPPORTUNITIES FOR USAID PROGRAMMING

READILY ACTIONABLE	STRATEGIC OPPORTUNITY	FOR FUTURE CONSIDERATION
	<p>rather than allowing trees to be harvested after a few years.</p> <p>12. Develop collaboration platforms for central ministries and district governments involved in natural resources management to perform a comprehensive evaluation of existing natural resources management policies with the goal of recommending actions to improve and integrate natural resources management policies and regulations.</p>	
HEALTH AND HIV/AIDS		
<ol style="list-style-type: none"> 1. Incentivize domestication of tree species with traditional medicinal uses by giving seedlings to communities to plant them on their private land. 2. Provide financial or technical support to increase the number of veterinary scientists on the UWA team to monitor transmission of zoonotic diseases that spread to the wildlife, and to track diseases in national parks. Provide financial or technical support to increase the number of veterinary scientists on the UWA team to monitor transmission of zoonotic diseases that spread to the wildlife, and to track diseases in national parks. Collaborate with GoU Animal Health Department village level veterinarian teams (CAWHs) to message connection of livestock health, wildlife health, zoonoses, and public. 	<ol style="list-style-type: none"> 1. Incorporate outreach and messaging on best conservation practices and best medicinal/nutritional uses for resources, across interventions. 	
DEMOCRACY, HUMAN RIGHTS, AND GOVERNANCE		

TABLE 18. RECOMMENDATIONS AND OPPORTUNITIES FOR USAID PROGRAMMING

READILY ACTIONABLE	STRATEGIC OPPORTUNITY	FOR FUTURE CONSIDERATION
<ol style="list-style-type: none"> 1. Support CSOs and NGOs to promote national environmental advocacy through media platforms and influencers. 2. In coordination with HATO and Environment and Natural Resources, collaborate with, provide technical assistance to, and provide capacity development to the Office of the Prime Minister (OPM) Ministry for Relief, Disaster Preparedness and Refugees, UWA, NFA, NEMA, and local authorities to: (1) develop and execute comprehensive land use policy and land use plans for refugee resettlement areas; (2) create partnerships for the restoration of degraded habitat around settlements; (3) strengthen the enforcement and monitoring mechanisms for implementing existing conservation regulations, to address the degradation of ecosystems around such settlements. 		
EDUCATION, YOUTH AND CHILD DEVELOPMENT		
<ol style="list-style-type: none"> 1. Provide technical assistance to support environmental awareness and education in after school programs. For example, support Uganda Wildlife Clubs, to create and/revive these clubs in schools and promote conservation awareness. 2. Provide technical assistance to develop curricula and programs for vocational training in green practices and skills by providing practical training on relevant topics/skills including for example, environmental management, climate-smart agricultural, non-invasive bamboo value chains and bamboo-based charcoal, and 	<ol style="list-style-type: none"> 1. Incorporate outreach and messaging on best conservation practices and best nutritional uses for resources, across interventions, notably with youth and OVM beneficiaries. 	

TABLE 18. RECOMMENDATIONS AND OPPORTUNITIES FOR USAID PROGRAMMING

READILY ACTIONABLE	STRATEGIC OPPORTUNITY	FOR FUTURE CONSIDERATION
renewable energy technology.		

ANNEXES

Annex A: References

Annex B: Additional Tables

Annex C: Scope of Work

ANNEX A: REFERENCES

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ANNEX B: ADDITIONAL TABLES

TABLE B- I. RECOMMENDATIONS AND OPPORTUNITIES FOR USAID PROGRAMMING:

CURRENT RECOMMENDATIONS	RECOMMENDATIONS FROM 2015 18/1 19 REPORT
DEMOCRACY, HUMAN RIGHTS, AND GOVERNANCE	
<ul style="list-style-type: none"> ● Strengthen local government (i.e., Districts) manage natural resources and private land by providing: <ul style="list-style-type: none"> ○ Support for development and execution of forest inventories ○ Support for development and implementation of natural resources management plans ○ Support for enforcement of natural resources management bylaws ○ Support for update and implementation of District Environmental Action Plans [from USAID Conserve Biodiversity for sustainable development (COBS) 2002 program] ○ Capacity development on “payment for ecosystem services” mechanisms such as carbon credit systems ● Example Opportunities: <ul style="list-style-type: none"> ○ Develop policies at the national level to encourage close collaboration between NFA technical staff and their counterparts in District offices. ○ Support Collaboration, in enforcement of existing regulations and promotion of conservation, between influencers/leaders, from kingdoms/chiefdoms, churches/mosques and government conservation technical staff at local/regional level. 	<ul style="list-style-type: none"> ● Under DO 1 and DO 3, USAID should establish an EIA capacity-strengthening program for sector lead agencies, including local governments, NEMA, districts, and national EIA practitioners on planning, developing mitigation measures, monitoring, environmental management of different types of infrastructure development, and environmental audits (for developments inside and outside of PAs) ● Integrate climate change into development and sectoral plans at national and district levels and provide funds for implementation. ● Strengthen implementation of key policies and laws, such as the National Range Land Policy. ● Support finalization of the Wetlands Bill to strengthen protection of wetlands. ● Support finalization of the Land Use and Land Use Planning Policy. ● Support mainstreaming of climate change and ENR into national sectoral and Local Government planning as part of implementation of NDP II.

TABLE B- I. RECOMMENDATIONS AND OPPORTUNITIES FOR USAID PROGRAMMING:

CURRENT RECOMMENDATIONS	RECOMMENDATIONS FROM 2015 18/19 REPORT
HEALTH AND HIV	
<ul style="list-style-type: none"> ● Watershed-level conservation planning. Promote watershed-level conservation efforts aimed at protecting catchment basins upstream from agriculture and domestic uses and facilitating a multi-benefit approach. Include a focus on the water quality (and potable water production) linkage to preservation of forests in upstream watersheds (i.e., connect costs of treating sediment laden raw water to potable water at water treatment facilities) If the WASH portfolio is assigned to another technical office, this recommendation will also move. ● Promote family planning in areas/around PA's ● Integrate strategic messaging on value of biodiversity/forest conservation in social and behavioral change (SBC) programming e.g., change in health seeking behavior. ● Example opportunities: <ul style="list-style-type: none"> ○ Support health monitoring of key animal species (e.g., primates and hippos, to (1) detect/track zoonotic disease transmission (primates) and (2) prevent die offs of key animal species (hippos) by: <ul style="list-style-type: none"> ● Supporting wildlife lab quality assurance and capacity to implement internationally recognized diagnostics for priority diseases. ● Increasing the number of community members capable of identifying signals of zoonotic disease through One Health community based surveillance for wildlife and livestock. 	<ul style="list-style-type: none"> ● Since Uganda's high population growth rate is the main underlying cause of threats to biodiversity, under DO 2, USAID should implement family planning programs in underserved areas surrounding PAs and other critical and threatened natural ecosystems.

TABLE B- I. RECOMMENDATIONS AND OPPORTUNITIES FOR USAID PROGRAMMING:

CURRENT RECOMMENDATIONS	RECOMMENDATIONS FROM 2015 18/19 REPORT
EDUCATION	
<ul style="list-style-type: none"> ● Example Opportunities: <ul style="list-style-type: none"> ● Promote extracurricular activities in primary schools, e.g., conservation clubs and “Roots and Shoots” programs, on environmental science and awareness ● Collaborate with local school leaders to promote and support integration of environmental lessons in schools ● Development and support vocational programs for youth e.g., renewable energy, climate-smart agriculture, bamboo value chains and other similar eco-friendly jobs. ● Support construction and operation of environmental education centers in areas around key biodiversity hotspots ● Provide scholarships to children in communities in/around PA’s to pursue studies, either vocational or university level in conservation careers. 	<ul style="list-style-type: none"> ● Improve literacy and access to educational opportunities especially in rural areas (SOER, 2012) ● Focus on girls’ education in areas surrounding PAs and other critical and threatened natural ecosystems. When girls are educated, they are more likely to delay marriage and childbirth and break the cycle of poverty ● Within the Natural Biodiversity Strategy and Action Plan it was recommended to enhance awareness and education on biodiversity issues among the various stakeholders. ● Need to study and protect breeding sites urgently as well as provide education to local population
AGRICULTURE AND ENVIRONMENT	
	<ul style="list-style-type: none"> ● Under DO 3, USAID should support vulnerable communities adjacent to PAs to establish rural livelihood activities that combine climate change resilience and alternatives to subsistence agriculture. ● Promote conservation agriculture/climate-smart agriculture (eco-agriculture) to improve agricultural

TABLE B- I. RECOMMENDATIONS AND OPPORTUNITIES FOR USAID PROGRAMMING:

CURRENT RECOMMENDATIONS	RECOMMENDATIONS FROM 2015 18/19 REPORT
	<p>practices; promote value addition, off-farm opportunities.</p> <ul style="list-style-type: none"> ● Formulate and implement land use plans that balance conservation and agriculture.
CLIMATE CHANGE	
<ul style="list-style-type: none"> ● Support reforestation and carbon sequestration programs ● Minimize development on charcoal, firewood, and fossil fuels ● Support development of climate action plans at local community levels. In the Karamoja region, include a focus on sustainable pastoral livelihoods and strategic planning for agricultural enhancements/settlements outside key biodiversity areas/wildlife corridors. For example, incorporate strategic planning into ongoing efforts to establish, train and support resilience action committees (RACs) (currently implemented under the Apolou activity), to ensure that climate-resilient development and agriculture are in areas that do not conflict with biodiversity conservation or wildlife corridors. Incorporate sustainable pastoralism into climate action plans in Karamoja region, with the understanding that pastoral lifestyles can be more resilient to climate change than sedentary farming. ● Establish corridors/habitat connections to accommodate shifting species distributions over time. ● Establish weather stations and support data collection and research to increase weather predictability for farmers, to improve efficiency and reduce land needs, and to enhance wildfire management ● Update fire management plans and procure fire control 	<ul style="list-style-type: none"> ● Under DO 3, USAID should promote alternative energy, as well as charcoal and fire-wood production, as a sustainable enterprise. ● Develop Community Action Plans for biodiversity conservation in strategic areas ● Establish climate change resilience programs in vulnerable communities around PAs

TABLE B- I. RECOMMENDATIONS AND OPPORTUNITIES FOR USAID PROGRAMMING:

CURRENT RECOMMENDATIONS	RECOMMENDATIONS FROM 2015 18/19 REPORT
<p>equipment</p> <ul style="list-style-type: none"> ● Promote climate-smart agriculture and educate farmers on actions necessary for climate change resilience per Uganda REDD+ Strategy. 	
ECONOMIC GROWTH AND ENVIRONMENT	
<ul style="list-style-type: none"> ● Example Opportunities: <ul style="list-style-type: none"> ● Domestic tourism: Encourage tourism by Ugandans to support awareness of conservation values by: <ul style="list-style-type: none"> ● Supporting conservation groups to interact with domestic tourists. ● Developing/executing publicity campaign to engage Ugandans with each PA by, for example, using traditional totems of clans that are associated with a specific animal ● Ecotourism: promote ecotourism as a forest management tool in key landscapes by: <ul style="list-style-type: none"> ● Supporting existing NFA ecotourism sites ● Supporting strong private sector partners to develop new sites ● Example Opportunities: <ul style="list-style-type: none"> ● Incentivize conservation through mechanisms such as: <ul style="list-style-type: none"> ▪ Carbon offsets. Promote the carbon market, preferably focused on performance-based carbon credits to ensure long-term viability, with financing of 15 years or more. To provide local financial incentives 	<ul style="list-style-type: none"> - Create employment opportunities to absorb the many unemployed youth (SOER, 2012) - Develop, support, and promote off-farm industries and employment opportunities - To complement UWA efforts in HWC management and build capacity for DLGs to manage problem animals, USAID could promote the establishment of wildlife scouts to engage in HWC and wildlife related management programs (e.g., Human-Gorilla (HuGo) scheme for problem mountain gorillas, scouts in Karenga CWMA); this would integrate DO 2, expanded economic opportunities for youth. - Create employment opportunities in the ENR sector, such as with Collaborative Forest Management (CFM) Group, Wildlife Management Area, and conservancy enterprises; sustainable/organic agriculture, sustainable forestry and livestock, and alternative energy enterprises and energy efficient cookstove businesses

TABLE B- I. RECOMMENDATIONS AND OPPORTUNITIES FOR USAID PROGRAMMING:

CURRENT RECOMMENDATIONS	RECOMMENDATIONS FROM 2015 18/1 19 REPORT
<p>as well as sequester carbon to alleviate climate change.</p> <ul style="list-style-type: none"> ● Monetize conservation. Support development of studies/analyses to determine economic value of tropical forests and biodiversity to: <ul style="list-style-type: none"> ▪ Support decision making by central and local governments ▪ Translate into conservation needs and disseminate widely to the Ugandan public to appreciate natural resources management values. ● Distribute seedlings to farmers and support raising to full growth trees (to address illegal collection/harvesting of fuel wood and medicinal plants) ● Promote agroforestry by: <ul style="list-style-type: none"> ▪ Planting trees along boundaries of fields or in with fields with indigenous plants ▪ Co-planting multiple agricultural species, preferably multi-layered on plots of small landowners ● Address charcoal value chain by: <ul style="list-style-type: none"> ▪ Promoting woodlots and plantations for charcoal by planting fast-growing trees (preferably indigenous tree species), alleviating pressure on burning intact forests for charcoal ▪ Supporting scale up of “bio char” production (from Agro wastes like spent cane material from sugar processing, as alternative to charcoal from 	

TABLE B- I. RECOMMENDATIONS AND OPPORTUNITIES FOR USAID PROGRAMMING:

CURRENT RECOMMENDATIONS	RECOMMENDATIONS FROM 2015 18/19 REPORT
<p>forests.</p> <ul style="list-style-type: none"> ● Provide alternative fuel options ● Increase access to affordable electricity ● Promote entrepreneurs and research ● Increase conservation efforts outside protected areas: focus on biodiversity hotspots and key habitat connection areas outside protected areas ● Increase conservation on forest reserves ● Increase focus on conservation of wetlands and freshwater ecosystems. ● Collaborative regional conservation planning: promote proactive regional efforts that go beyond site-level or patch-level conservation and beyond boundaries of protected areas, addressing conservation at a watershed and landscape level to minimize fragmentation of habitats and forests. ● Long-term Management: prioritize supporting restoration and other conservation projects that include a component of long-term management, protection and financial sustainability, to address the problem of conserved areas being degraded or demolished after the projects are complete ● Controlling invasive species: support control of invasive species to address both exotic species and situations where savannahs are threatened by indigenous plan and forest encroachment. 	

TABLE B- I. RECOMMENDATIONS AND OPPORTUNITIES FOR USAID PROGRAMMING:

CURRENT RECOMMENDATIONS	RECOMMENDATIONS FROM 2015 18/19 REPORT
<p>CONSERVATION MANAGEMENT & WILDLIFE PROTECTION</p>	
	<ul style="list-style-type: none"> ● Under DO 1, USAID should strengthen the capacity of UWA’s Human-Wildlife Conflict Unit, including providing training and equipment for PAs to manage problem animals. ● Under DO 1, USAID should support the GoU’s efforts to combat illegal trafficking of natural resources, including wildlife and timber by, among other initiatives, strengthening law enforcement capacity of relevant institutions, especially NFA and UWA, to undertake patrols to detect and control illegal activities ● Under DO 3, USAID should support the conservation and management of key wildlife corridors, where considerable biodiversity exists outside the PA system. ● Under DO 1 and DO 3, USAID should promote the establishment and operation of conservancies and community wildlife areas/local reserves, game ranching, and private reserves to provide alternative livelihood options in areas adjacent to PAs and other areas with important biodiversity ● Opportunities to address ENR concerns include: <ul style="list-style-type: none"> ● Strengthen ENR advocacy roles of NGOs, CSOs, and communities ● Improve citizen participation in the EIA process ● Strengthen EIA practitioner capacity ● Raise awareness of citizens of importance of the ENR sector ● Support development of land use plans in areas adjacent to PA’s
<p>DISASTER RISK REDUCTION</p>	

TABLE B- I. RECOMMENDATIONS AND OPPORTUNITIES FOR USAID PROGRAMMING:

CURRENT RECOMMENDATIONS	RECOMMENDATIONS FROM 2015 18/19 REPORT
	<ul style="list-style-type: none"> ● Strengthen disaster risk reduction programs on zoonotics and emerging pandemics both in humans and wildlife
<p>OPPORTUNITIES AS SUGGESTED BY HUMANITARIAN ASSISTANCE AND TRANSITION OFFICE (HATO)</p>	
<ul style="list-style-type: none"> ● <u>Example Opportunities:</u> <ul style="list-style-type: none"> ● Encourage collaborative strategies for avoiding or mitigating impacts from refugee settlements on the environment, engaging and UWA and NFA with the OPM, Department of refugees. ● Create partnerships with NFA and UWA for restoration of the degraded areas (technical input from NFA and or UWA would ensure high success rates and sustainability) ● Strengthening enforcement and monitoring mechanisms of responsible agencies like NFA, UWA and NEMA, local governments as well as the OPM, Department of refugees ● Improve on weather forecast and dissemination of weather information to refugee settlements to enhance agricultural production and improved nutrition, thereby reducing the driver of refugees using resources in intact forests and other natural areas. ● Refugee settlement planning: Develop a comprehensive land use policy and land use plans for refugee resettlement areas, to address the driver of refugees degrading tropical forests and biodiversity. ● (For HATO activities in Karamoja, see Climate Change example opportunities.) 	

CLEARANCES:

Activity Manager: RUsmani x4647

Mission Clearances	Clearance Status	Date
MD: RNelson	_CLEARED_____	12/22/2022
A/DMD: KBenson	Clear	11/22/2022
RLO: JCone	Clear	11/18/2022*
PO: SAtwoodBarma (On behalf of)	_Clear w/edits____	09/22/2022
OAA: BAaron	INFO	09/21/2022
OHH: SPaige	_clear_____	09/21/2022
HATO: CBury	_clear_____	09/14/2022
DRG: MAzimi	_Clear_____	10/05/2022
EYCD: JGrier-Villatte	__clear_____	09/15/2022
EG: ABeeler	_clear_____	09/09/2022

*Document submitted for clearance on 11/17/2022

ANNEX C: SCOPE OF WORK

USAID/UGANDA BIODIVERSITY AND TROPICAL FOREST ASSESSMENT 2021

STATEMENT OF WORK

I. BACKGROUND

As part of the documentation for the 2022 Country Development Cooperation Strategy (CDCS), USAID Uganda is required by Sections 118 and 119 of the Foreign Assistance Act (FAA), as amended, to prepare an analysis of tropical forests and biodiversity in Uganda.

By mandating FAA 118/119 analyses (hereafter referred to as “the analysis”), the U.S. Congress recognizes the fundamental role of tropical forests and biodiversity in supporting countries as they progress along the journey to self-reliance. The analysis will examine the country-level tropical forest and biodiversity conservation needs and the extent to which the Mission is currently addressing the actions necessary to conserve and sustainably manage tropical forests and biodiversity. The report recommendations will help the Mission identify ways to strengthen host country commitment and capacity to promote biodiversity conservation.

I.2 PURPOSE

The primary purpose of this task is to conduct an analysis of tropical forests and biodiversity in compliance with Sections 118 and 119 of the FAA, as amended, [ADS Program Cycle Operational Policy](#) and [USAID policy on 118/119 analyses](#). The analysis will inform USAID Uganda in the development and implementation of its CDCS. USAID’s approach to development requires that the Agency examine cross-sector linkages and opportunities to ensure a robust development hypothesis. Biodiversity conservation is a critical component in achieving self-reliance and should be considered in Mission strategic approaches to improve development outcomes. The analysis therefore can define opportunities to integrate tropical forest and biodiversity conservation into priority development sectors to support the journey to self-reliance.

2. STATEMENT OF WORK

To achieve the above-stated purpose, the analysis team, under the direction of the Team Lead, will proceed as described in this section. The analysis is based on synthesis and analysis of existing information, coupled with in-country consultations (virtual and/or in person), and site-based visits (if included). The analysis will not generate original primary data.

2.1 PREPARING FOR IN-COUNTRY WORK DESK-BASED DATA COLLECTION AND ANALYSIS

This analysis will mainly involve synthesis and analysis of existing information, coupled with key stakeholder consultations and site visits to ground-truth information. Under the direction of the team leader, the analysis team will evaluate the status of tropical forests and biodiversity in Uganda. The focus of the work will be twofold: A) Identify actions necessary to conserve tropical forests and biodiversity and the extent to which the mission meets the actions necessary, and B) Develop recommendations that will guide the mission in updating the “extent to which” in the new country strategy.

- Gather and begin to analyze existing information to identify tropical forest and biodiversity status, key biodiversity issues, stakeholders, policy and institutional frameworks, and gaps in the

available information. Reports and other documentation to be reviewed include previous I18/I19 analyses, current CDCS and Mission project documents (e.g. project reports and evaluations), information available online (e.g. websites of government ministries) on biodiversity conservation, the National Biodiversity Strategy and Action Plan, the National Forest Policy and the National State of the Environment Report.

Work Plan and Logistical Preparations

Note: The activities described in this section may occur prior to, or in parallel with, desk-based data collection.

- Organize biweekly planning meetings between the Mission activity manager (to be named) and the analysis team to discuss the work plan and logistics for in-country consultations and site-based visits (as applicable). Weekly meetings will include support for planning and logistics, such as lodging and in-country schedules, key informant contacts, meetings, and interview protocols, and political or other sensitivities.
- In coordination with the Mission, the team should begin planning in-country consultations and, if applicable, site-based visits commensurate with the Mission's recommendations and the team's preliminary review of key topics and information gaps. Site-based visits, if included, should take place in areas where less is known about the biodiversity threats and drivers. Consultations should include intensive time in cities/urban areas collaborating with the Mission and conducting key informant interviews or focus groups. Site-based visit locations should be finalized at least two weeks prior to arrival in-country to allow the team to complete necessary logistical preparations.
- Identify the protocol for approaching USAID partners, host country government, and other organizations for consultations and other requests related to the assignment.
- In coordination with the Mission, the team should initiate U.S.-based consultations to key U.S.-based stakeholders, including within USAID, other parts of the U.S. Government, and non-governmental and private-sector actors.
- Develop and submit a draft work plan (10-15) days after the start of the period of performance (Deliverable 1). The draft work plan will include a schedule of tasks and milestones, assessment methods, and a brief discussion of information gaps. The draft work plan will also include a preliminary:
 - List of the type of information to be obtained through further desk research and through consultations.
 - Map of biodiversity hotspots and areas of ecological importance to help inform the analysis and potential site-based visits.
 - Mapping of key people to engage throughout the analysis process. This may include U.S.-based (predominantly Washington) stakeholders; Mission staff, including the program office, all sector technical staff, and the Deputy and Mission Director; implementing partners; and other key in-country stakeholders (e.g., organizations, government bodies, the private sector, and individuals knowledgeable about and/or implementing projects on environment, biodiversity and tropical forest conservation, and other sectors

relevant to tropical forest and biodiversity conservation, such as agriculture, economic growth, health, climate change, and governance).

- Itinerary for in-country or virtual consultations and site-based visits, based upon information made available by the Mission regarding existing programming, areas of known concern and areas being considered for future programming.
- Key informant interview guides to be used for stakeholder consultations.
- Report outline based on the outline attached to the SOW (refer to Annex A, Analysis Report Annotated Outline in the FAA 118/119 Best Practices Guide), with differences noted and explained.
- Schedule for written progress reports to, or calls with, the activity manager and bi-weekly check-ins thereafter during the in-country work. If calls are chosen, they will be documented with written call notes provided to the USAID activity manager.
- Finalize the work plan following receipt of Mission comments and suggestions on the draft work plan.

The final work plan should be submitted five days before commencing data collection.

2.2 MISSION AND IN-COUNTRY CONSULTATIONS AND SITE-BASED VISITS

In coordination with the activity manager, the analysis team will:

- Meet with the key Mission technical staff engaged in Mission coordination and management of the analysis and program office to:
 - Review the approach to the assignment with the Mission and learn specific Mission areas of interest or concerns regarding the planned itinerary and consultations.
 - Identify any additional organizations to be contacted.
 - Learn of any sensitivities related to the exercise (e.g., political constraints, Mission challenges in working with the host country government, or other generalized in-country implementation challenges) that could refine the analysis team's consultations and strategic or programming recommendations (i.e., the potential for raising expectations and the need to be clear about the purpose of the analysis).
 - Understand the Mission's planned timeline for new CDCS development.
 - Gain an understanding of the status of the new CDCS development/results framework and anticipated changes to overarching strategic goals and/or development objectives, to the extent they are known at that time.
- Meet with the USAID front office to:
 - Review the purpose and importance of the analysis, emphasize the role of the entire Mission and help set expectations for the analysis process and use of the report.

- Meet separately with all Mission technical teams to:
 - Understand current programming (geographic areas of focus, earmarks and related mandates or constraints) and the ways in which it supports the actions necessary to conserve and sustainably manage biodiversity.
 - Learn about planned or potential future programming or strategic orientation.
- Conduct in-country consultations with stakeholders and undertake the site-based visits (if included) identified in the work plan.
- Conduct an exit briefing prior to departure with the Mission, including Mission management, program office and all technical teams, to provide them with an overview of the analysis and preliminary report findings (Deliverable 2). The format for the exit briefing will be a 2-hour virtual workshop with Mission staff across Development Objectives to collaboratively develop cross-sectoral recommendations and present and discuss analysis and findings.

2.3 PREPARATION OF THE FAA I 18/I 19 ANALYSIS

- Prepare and submit a draft report (Deliverable 3) in accordance with the outline attached to the SOW and responsive to the legislative requirements listed in Section 1.1 above. The report will:
 - Follow the outline and include the information recommended in SOW Annex A, FAA I 18/I 19 Analysis Report Outline.
 - Be between (min-max page length for report – recommended 50-90 pages, depending on the complexity of the analysis).
 - Be copy edited, formatted, and comply with USAID branding requirements.
- Submit the final report (Deliverable 4). The Mission review period for draft reports will be (20 - 30 days). The Mission should send the analysis report to the relevant Regional Bureau and Pillar Bureau staff in Washington for their review and collate comments before submitting the draft to the team.
- Following receipt of USAID comments on the draft report, the analysis team will prepare and submit a final analysis within (15-20 days) that incorporates USAID comments.

3. DELIVERABLES

The following are the deliverables for this task:

Deliverable 1. Draft work plan and schedule submitted within 12 working days of the Team Lead's period of performance. The work plan will address all elements specified in Section 2.1.

Deliverable 2. Exit briefing or workshop, and associated media such as PowerPoint, hand-outs, etc., prior to the analysis team's departure from the country or at a time requested by the Mission if the team is locally based or unable to travel.

Deliverable 3. Draft FAA 118/119 analysis report, conforming to all requirements specified in Section 2.3 submitted # (15-20) working days after the conclusion of in-country work or at a time requested by the Mission if the team is locally based.

Deliverable 4. Final report incorporating all comments, conforming to all requirements specified in Section 2.3 submitted within # (15-20) working days of the receipt of all USAID review comments on the draft analysis.

4. ROLE OF THE USAID MISSION

USAID acknowledges that substantial Mission engagement is required in support of the analysis team. To this end, the Mission is responsible for arranging the following prior to the analysis team's arrival in-country:

- Scheduling separate consultation meetings with the activity manager and the 1) program office, 2) front office, and 3) each of the Mission technical offices.
- Scheduling the day/time for the exit briefing presentation or workshop.

Effective Mission support includes providing the analysis team with the following:

- A list of key USAID (Mission-wide activity descriptions, reports, and evaluations) and relevant documents to review with links or copies of the documents;
- A list of USAID programs for each technical team with brief descriptions of technical remit, A/COR (and contact info), implementing partners (and key points of contact) and maps, ideally a country map showing the geographic location of all programs;
- A list of recommended stakeholders for consultations with contact information;
- Assistance to the team in making initial contact to arrange interviews, particularly to host country government stakeholders for whom USAID Mission outreach is often required;
- Preparation of letters of introduction, as needed;
- Candidate site-based visits or key criteria to support analysis team identification of potential site-based visits;
- A list of relevant donor projects as available;
- Logistics recommendations for site-based visits, i.e. suggestions for lodging, in-country air travel, rental car agencies, and logistics specialists; and
- Review and feedback on the draft analysis report (including liaising with both the Africa Bureau and USAID/Washington for review and approval of the analysis report).

To ensure continued coordination with the Mission over the course of the project, the analysis team will schedule regular meetings (bi-weekly) with the activity manager to discuss progress, challenges, issues, and key findings to-date. Monthly progress reports will also be provided. .

5. STAFFING AND ESTIMATED EFFORT

The analysis team shall include a Team Lead, with the following qualifications:

- Post-graduate degree qualifications (Master's level degree or higher) or equivalent experience in biology, ecology, zoology, forestry, ecosystem conservation, political economy, political ecology, environmental policy, environmental planning, or a closely related field;
- Knowledge of USAID's strategic planning process both broadly and as related to tropical forests and biodiversity;
- Expertise in assessing environmental threats;
- Experience in the geographic region and the specific country;
- Experience coordinating analyses and leading teams;
- Exceptional organizational, analytical, writing, and presentation skills; and
- Fluency in English and preferably the language spoken in the analysis country.

The team composition shall be proposed to the Mission for approval and should ensure appropriate qualifications and technical expertise tailored to the types of programming and environmental conditions prevalent in the specific country or region of focus.

- Post-graduate qualifications (Master's level degree or higher) or equivalent experience in biology, ecology, zoology, forestry, or ecosystem conservation.
- Agricultural, governance, health, or other non-environment sector specialist who will focus on linkages between tropical forests, biodiversity, and other key technical sectors.
- Aquatic resources specialist and, if in a marine environment, a specialist with marine expertise.
- Environmental political economist or political ecologist that understands the human dimensions of conservation and natural resources management and diverse conservation and management problems including, but not limited to, water, governance, fisheries management, wildlife management, agriculture, economic growth, extractive industries, protected areas, and the scale of the issue, from local, to regional, to global.
- GIS expertise or access to GIS expertise to help identify, use, and analyze geospatial data and maps.

The level of effort (LOE) requirements for this task are:

- A total of 60 days for Team Lead, A total of 45 days for Expert 1 , A total of 45 days for Expert 2.