Integrating Natural Capital into Sustainable Development Decision-Making in Uganda

A project funded by the UK Government

Biodiversity and Tourism Accounts for Uganda

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FOREWORD

Uganda's natural capital, including biodiversity, contributes substantially to the economic growth and well-being of its people and their environment. This Darwin Initiative funded project, Integrating Natural Capital into Sustainable Development Decision-Making, seeks to ensure that the value of the biodiversity-related natural capital is considered in national planning processes. This is by employing a Natural Capital Accounting approach that uses consistent and comparable data to show how natural resources contribute to the economy and how the economy affects such resources. This way the approach paints a broader picture of economic development than standard measures such as gross domestic product (GDP) thereby offering a sound background to sustainable development decision-making.

Natural Capital Accounting has become a fundamental tool for environmental management, biodiversity conservation and also the tracking of corresponding Sustainable Development Goals. This importance is acknowledged in Uganda's Third National Development Plan (2020 - 2025) launched last year by the National Planning Authority. The plan identifies the approach as a critical intervention in reducing climate change vulnerability and carbon footprint. This essentially means that the Project on Integrating Natural Capital in Sustainable Development Decision-Making in Uganda is not only timely but also crucial in the sustainable planning narrative in Uganda.

The three sets of biodiversity-related natural capital accounts developed on this project contribute to advancing natural capital accounting. This is in line with the National Plan for Advancing Environmental-Economic Accounting (NP-AEEA) in Uganda launched by the Uganda Bureau of Statistics (UBOS) in 2018. This strategic plan calls for stakeholder collaboration to account for the natural resources on which socio-economic development depends.

The biodiversity and tourism accounts for Uganda presented in this report provide an outlook on how the biodiversity resources that support Uganda's tourism have changed over the years in the different ecosystems that support this tourism. This information is critical for national planning given the increase in pressure on environmental resources on ecosystems as detailed in the 2018/19 National State of Environment Report (NSOER) recently published by the National Environment Management Authority.

COVID-19 is having a devastating effect on the global economy and for Uganda, the tourism sub-sector seems to be one of the most affected sectors. There is no doubt that the industry will recover and continue to grow and serve as an important sector in Uganda's economy. However, the sector's post-COVID recovery and growth will depend on our capacity to sustainably manage the resources that support this industry among which include natural resources. The set of integrated biodiversity and tourism accounts presented herein provide useful insights to this sector before the COVID-19 breakout and essentially, therefore, form the background to the formulation of sound measures for post-COVID recovery for this sector.

On behalf of the Government of Uganda and the National Environment Management Authority, I heartedly welcome the Biodiversity and Tourism Accounts. I congratulate the national and international project partners as well as the national team of experts for the "*Integrating Natural Capital into Sustainable Development Decision Making in Uganda Project*" on the work done and thank the Darwin Initiative for the financial support provided. I believe that these accounts will contribute significantly to holistic planning in the tourism sub-sector in Uganda as well as the advancement of the sustainable use of biodiversity-related resources the industry depends on.

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LIST OF ACRONYMS

GoU	Government of Uganda
IDEEA	Institute for Development of Environmental-Economic Accounting
IIED	International Institute of Environment and Development
IUCN	International Union for Conservation of Nature
MUK	Makerere University Kampala
MDA	Ministries and Designated Authorities
MoFPED	Ministry of Finance Planning and Economic Development
MTWA	Ministry of Tourism, Wildlife and Antiquities
M&E	Monitoring and Evaluation
NBSAP	National Biodiversity Strategy and Action Plan
NDP	National Development Plan
NEMA	National Environment Management Authority
NFA	National Forest Authority
NP-AEEA	National Plan for Advancing Environmental-Economic Accounting
NPA	National Planning Authority
NCA	Natural Capital Accounts
SNA	System of National Accounting
UBoS	Uganda Bureau of Statistics
UNCST	Uganda National Council for Science and Technology
UgX	Uganda Shillings
UWA	Uganda Wildlife Authority
UGGDS	Uganda Green Growth Development Strategy
UN-SEEA	United Nations - System of Environmental-Economic Accounting
UNEP-WCMC	United Nations Environment Programme - World Conservation Monitoring Centre
UNSD	United Nations Statistics Division

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EXECUTIVE SUMMARY

The National Environment Management Authority (NEMA) in collaboration with the Uganda Bureau of Statistics (UBOS) and National Planning Authority (NPA) with support from the UN Environment Programme World Conservation Monitoring Centre (UNEP-WCMC), the Institute for International Environment and Development (IIED) and the Institute for the Development of Environmental-Economic Accounting (IDEEA) is implementing a project on Integrating Natural Capital into Sustainable Development Decision Making in Uganda. The project is funded by the Darwin Initiative. It seeks to support the development of three biodiversity-related natural capital accounts (NCAs): fisheries resource accounts, land and soils improvement accounts, and biodiversity and tourism accounts for Uganda.

This report presents a set of biodiversity and tourism accounts for Uganda. The accounts are designed in an integrated way to provide a clear articulation of the status of natural capital assets underpinning Uganda's wildlife-watching tourism sub-sector, level of tourism activity in that sector and the level of associated expenditures. The accounts focus on the period before the COVID-19 pandemic and its associated impacts on the wildlife-watching tourism sub-sector in Uganda. Whilst the pandemic has had a substantial impact on the tourism sub-sector, the accounts presented can provide useful information for planning the economic recovery of the wildlife-watching tourism sub-sector in Uganda. Pre-COVID visitor trends suggest strong potential for the sub-sector to achieve Uganda's Green Growth Development Strategy (UGGDS) targets.

The accounts have been compiled using the System of Environmental-Economic Accounting (SEEA) framework and with input from an Expert Working Group of national stakeholders. The accounts produced aim to support UBoS on the National Plan for Advancing Environmental-Economic Accounting and other ministries, agencies and stakeholders in planning the development of the wildlife sector in Uganda.

Drawing on the accounting structures proposed in the SEEA Ecosystem Accounting framework (SEEA EA), this report presents a set of integrated ecosystem extent, species, physical and monetary ecosystem services accounts relevant to the wildlife-watching tourism account. These are supplemented with SNA Goods and Services Accounts, which link supply and use of *'recreation-related'* ecosystem services to associated transactions of products and services recorded in the System of Nation Accounts. This reveals, more broadly, the magnitude and range of economic activity underpinned by Uganda's natural ecosystems and iconic species they contain. The accounts are supported with a combined presentation of key aggregates (indicators or totals) from the accounts and additional socio-economic data to support integrated analyses and decision-making.

The set of integrated accounts focuses on Uganda's 10 National Parks, plus two Wildlife Reserves, identified by the Expert Working Group. The National Parks comprise Murchison Falls; Queen

Elizabeth; Bwindi Impenetrable; Kidepo Valley; Lake Mburo; Kibale; Rwenzori Mountains; Mgahinga Gorilla; Mount Elgon; and Semuliki. The Wildlife Reserves comprise Toro-Semliki; and, Katonga. For Katonga Wildlife Reserve, only Ecosystem Extent Accounts have been compiled.

The Ecosystem Extent and Thematic Species Accounts describe the status and trends in natural ecosystems and iconic species that underpin the wildlife-watching tourism sub-sector in Uganda. The Ecosystem Extent Accounts reveal that a vast majority of the protected areas remain natural ecosystems in terms of land cover, typically at least 98% of the total area. The largest area of non-natural land use was for the Mount Elgon National Park (7.5%). Quite large net decreases in the extent of Tropical High Forest Well-Stocked are observed in Mount Elgon and the Rwenzori Mountains National Parks between 2000 and 2017. However, relatively large areas of this ecosystem type remain, which could support more nature-based tourism in mountainous environments.

For the thematic Species Accounts, five iconic species for wildlife-watching tourism were identified by the Expert Working Group. These comprised: chimpanzees; gorillas; lions; elephants and buffalo. Generally, positive recent trends are observed for elephants and buffalo in Murchison Falls and Queen Elizabeth National Parks, although the populations of lions show declines. Kidepo Valley National Park contains a similar complement of species, but lions have shown increases in numbers in this park in recent years. Lake Mburo has a stable population of buffalo. Lions have also been observed in this national park, but only one or two individuals. As lions are considered iconic species for wildlife-watching tourism, establishing a viable population may boost tourism activity at the park.

Increases in elephant and buffalo numbers are also observed in recent years (between 2001 and 2010) in Kibale Park National Park. This park also contains populations of chimpanzees and other primates, which can support wildlife-watching tourism focused on these species. The population of the mountain gorillas in Bwindi Impenetrable National Park shows steady increases in recent years, and an important population of mountain gorillas also exists in Mgahinga National Park.

The ecosystem service accounts provide information on the flows of the *recreation-related* ecosystem service associated with the wildlife-watching tourism sub-sector. Visitor numbers and associated park entrance expenditure are used as proxies for measuring this flow. The physical accounts reveal a substantial increase in visits from 209,806 visits in 2011 to 323,322 in 2019. The monetary ecosystem services accounts indicate total park entrance revenues were UgX. 26 billion in 2019. The highest revenues from the park entrance in 2019 were associated with Murchison Falls (approaching UgX. 8 billion) and Queen Elizabeth and Bwindi Impenetrable (over UgX. 5 billion each).

The SNA Goods and Services accounts provide information on transactions of goods and services associated with wildlife-watching tourism activity, which are underpinned by the *recreation-related*

ecosystem service. For instance, expenditure on recreational activities in national parks (e.g., gorilla tracking); hotels, meals, retail, travel and other services.

The SNA Goods and Services Accounts reveal total wildlife-watching tourism expenditure associated with visits to protected areas rose from UgX. 62 billion in 2012 to approximately UgX. 187.5 billion in 2019. Out of this, expenditure on recreational activities provided by Uganda Wildlife Authority (UWA) comprised UgX. 87 billion in 2019, dominated by revenue associated with gorilla tracking. As an indicator of export revenues associated with visits to protected areas, total expenditure by international tourists presented increased from around UgX. 34.5 billion in 2012 to around UgX. 96.5 billion in 2019. It is highlighted this is an undervaluation, as it is not possible to isolate international tourist expenditure on UWA recreational activities at this stage (including gorilla trekking).

The increase in total expenditure by international wildlife-watching tourists reveals strong performance of this tourism sub-sector with respect to increased export earnings. Increasing the economic contribution of the tourism sector is a key goal of the UGGDS, with an ambition to quadruple revenues by 2030. Based on trends between 2012 and 2019, there appears good potential for this part of the tourism sector to deliver on its promise of a catalytic investment area for the UGGDS.

Expenditure associated with visits to protected areas by wildlife-watching tourists can be an important source of income for businesses and livelihoods local to protected areas. For 2019 imputed expenditure by international tourist only (and excluding EAC visitors) on hotels, bars, restaurants, retail and other services associated with visits approached UgX. 60 billion. As such, developing the wildlife-watching tourism sub-sector also offers potential co-benefits for poverty alleviation and by boosting local incomes, creating livelihoods and increased revenue sharing. In these regards, data on poverty incidence and labour indicates that developing tourism activity around Kidepo Valley and Mount Elgon National Parks would have relatively higher impacts on poverty alleviation and unemployment or labour force participation.

Key to developing the wildlife-watching tourism sub-sector in Uganda will be investments in conserving and enhancing natural ecosystems and species in protected areas, combined with investments in innovative tourism packages, access and tourist facilities. This could encourage tourists to spend an extra day or two in the country as part of their vacation. As the World Bank (2020) identifies this could deliver very large economic benefits. As such, encouraging an additional visit to less-visited national parks could be a fruitful strategy in achieving the UGGDS and national sustainable development goals.

The accounts presented are the first attempt to produce accounts of this nature. There is much room for improvement in future iterations. In particular, they would benefit from capturing information on ecosystem extent, iconic species trends and tourism activities for a more

complete set of protected areas. This includes other UWA managed sites, NFA Central Forest Reserves, Game Reserves and important (e.g., Ramsar) wetlands. It would be useful to disaggregate data for Ugandan and non-Ugandan EAC tourists and integrate information on their expenditure. This would help inform the development of this part of the sector.

There are many other ecosystem services supplied by protected areas in Uganda that were not been considered in the accounts presented. These should also be included in future iterations.

1.0 INTRODUCTION

1.1 Background

The National Environment Management Authority (NEMA), Uganda Bureau of Statistics (UBOS) and National Planning Authority (NPA), in collaboration with the UN Environment Programme World Conservation Monitoring Centre (UNEP-WCMC), the Institute for International Environment and Development (IIED) and the Institute for the Development of Environmental-Economic Accounting (IDEEA) is implementing a project on Integrating Natural Capital into Sustainable Development Decision Making in Uganda.

This project is funded by the Darwin Initiative, through the UK Government, and aims at supporting: (i) the delivery of the Ugandan National Development Plan, Green Growth Development Strategy and the National Biodiversity Strategy and Action Plan (NBSAP); (ii) integration of the value of biodiversity into national reporting, poverty reduction, and planning processes; (iii) organizing biodiversity-related natural capital data using internationally endorsed accounting frameworks; (iv) enabling decision-makers to implement integrated environmental-economic planning for green growth, poverty alleviation and attaining the SDGs and Aichi Targets; and (v) developing the capacity of account compilers and users to institutionalize the accounting approach. These objectives are expected to be achieved through the development of three biodiversity-related natural capital accounts (NCAs): Fisheries Accounts, Land and Soil Improvement Accounts, and Biodiversity and Tourism Accounts (presented herein).

Biodiversity is an essential part of Uganda's 'natural capital stock', underpinning the delivery of the ecosystem services that support economic activity and the well-being of its people. However, the value of biodiversity is often neglected in traditional assessments of economic progress and development planning. This encourages inefficient and unsustainable growth, requiring investment in manufactured infrastructure to replace the benefits provided by nature. The loss of benefits disproportionately impacts the rural poor since much of their real income is dependent upon ecosystem services. Natural capital accounting is one of the tools used to highlight the implications of biodiversity loss to policymakers.

Natural capital accounting involves the use of consistent and comparable data to show how natural resources contribute to the economy and how economic activity affects natural resources. This will facilitate mainstreaming the consideration of the benefits of biodiversity management into sector development planning, which in turn delivers on national priorities for green growth, poverty alleviation and biodiversity enhancement. Natural capital accounts (NCAs) paint a broader picture of economic development than standard measures such as gross domestic product (GDP). NCA is part of environmental-economic accounting and in 2014, the United Nations approved the System of Environmental-Economic Accounting Central Framework (SEEA CF) as a global statistical standard for environmental resources consistent with the System of National Accounts (SNA), the internationally agreed standard set of recommendations on how to compile measures of economic activity. The SEEA Ecosystem Accounting (SEEA EA) complements the SEEA CF and provides the framework for accounting for ecosystems as assets. The United Nations Statistical Commission has very recently adopted the SEEA Ecosystem Accounting as a standard at its 52nd session in March 2021 (see UNSD, 2021).

The Convention on Biological Diversity (CBD) also recognizes the importance of NCA and recommends that governments adopt strategic plans and policies that prioritize biodiversity conservation and explicitly capture the contribution of biodiversity in National Accounts. For instance, Aichi Target 2 states that by 2020, at the latest, biodiversity values should have been integrated into national and local development and poverty reduction strategies and planning processes and incorporated into national accounting, as appropriate, and reporting systems. This is also reflected in SDG Target 15.9.1 and the proposed Target 13 of the Post-2020 CBD framework.

In addition, decision XIII/3 paragraph 18 (b) COP invites Parties and other Governments, in collaboration with relevant national and international organizations and initiatives to introduce or scale up the use of environmental-economic accounting and natural capital accounting, as well as diverse methods and methodologies to assess the multiple values of biodiversity. Uganda recognizes these objectives in Targets 1.1 and 4.1 of her National Biodiversity Strategy and Action Plan (NBSAP). The current project also supports the attainment of NBSAP target 4.1.6 that calls for biodiversity accounting in pursuit of incentives for conservation and sustainable use (reflecting the enabling environment for Aichi Target 3).

The objective of these targets is to establish the information systems to support more holistic integrated economic and land-use planning, which better consider biodiversity, the impacts of managing biodiversity and the ecosystem services biodiversity provides. Such an integrated approach would be a significant improvement from traditional planning regimes. This project, therefore, aims to deepen the implementation of Aichi Target 2. This includes generating the policy support information for natural capital management, as called for in Uganda's Green Growth and Development strategy. It also responds to the Gaborone Declaration for Sustainability in Africa (GDSA) and the support requested by Parties in UNEA Resolution 2/13 specifically relating to natural capital, capacity building and technical assistance. It further supports the National Plan for Advancing Environmental-Economic Accounting (NP AEEA), implemented by the Uganda Bureau of Statistics.

1.2 Purpose of the project

The overall purpose of the project is to develop biodiversity and tourism accounts to support stakeholders such as the Uganda Bureau of Statistics (UBoS), National Planning Authority (NPA); Ministry of Tourism, Wildlife and Antiquities (MTWA) and the Ministry of Finance, Planning and Economic Development (MoFPED) in integrating natural capital accounts in national accounts, reporting systems and their planning cycles. The project will thus support Uganda to deliver on her Green Growth Development Strategy, National Plan for Advancing Environmental-Economic Accounting, National Development Plan, National Biodiversity Strategy and Action Plan (NBSAP), Aichi Target 2 and SDG 15.9 through integrated planning that recognizes the value of biodiversity and its role in poverty reduction.

1.3 Biodiversity and Tourism in Uganda

In the last two decades (2000 to 2020), the country has registered increased numbers of tourists. For example, in 2001, about 0.2 million tourists visited and that has since increased to 1.4 million tourists in 2017 (UBOS, 2018). This implies that the number of tourists to the country has been growing at an average rate of 80,530 tourists per year.

Tourists are attracted to Uganda mainly for four major reasons: Leisure and recreation; business and professional; visiting friends and relatives; and other reasons that are not stated. The recent

increases in tourism numbers include substantial increases in international visitors to Uganda (WTTC, 2015). The tourism industry is identified as the highest foreign exchange earner, contributing US$ 1.37 billion to Uganda's GDP (MTWA, 2017a). Tourism earnings have dropped substantially due to the impact of the COVID-19 crisis (World Bank, 2020). Nonetheless, the recently observed positive trends in international visitors suggest this sector can bounce back strongly following the COVID-19 crisis and when international tourism recovers.

Nature-based tourism is Uganda's primary tourism draw (World Bank, 2020). Indeed, wildlife is the most significant attraction bringing international visitors to Uganda (Kaggwa *et al.,* 2009b). As such, Uganda's National Parks and Wildlife Reserves, including some Forest Reserves, are some of the major tourist destinations in the country. Tourists are attracted to these protected areas due to the unique flora and fauna within these areas, for instance, to observe iconic species, such as gorillas, chimpanzees, lions, elephants and buffalo.

Detailed analysis of the tourism sector is provided by the Tourism Expenditure and Motivation Survey (TEMS), coordinated by the Ministry of Tourism Wildlife and Antiquities. The TEMS has been administered in 2012 (World Bank, 2013) and repeated in 2019 (World Bank, 2020). The World Bank (2020) provides a comparative analysis between the 2012 and 2019 situations. The TEMS for 2019 reveals that between 2012 and 2019, tourist exports grew by 15.2 per cent, a strong performance (World Bank, 2020). Out of the overall number of tourists to Uganda in 2012 and 2019, leisure & recreation tourist comprised 89,400 (or 18%) and 125,800 (or 21%), respectively. The TEMS for 2012 revealed that around 39% of leisure tourists engaged in wildlife safaris when visiting Uganda (World Bank, 2013). The TEMS for 2019 identifies around 55% of leisure tourists engage in gorilla viewing and around 15% in wildlife safari (MTWA, 2020). In addition, it is also noted that a smaller number of business visitors also engage in wildlife-watching tourism. The TEMS for 2019 identifies around 3% of business tourists engage in wildlife safaris (MTWA, 2020).

Policy simulations for the 2019 TEMS data show that if 100,000 additional leisure tourists had visited Uganda, this would have added nearly US$100 million to tourism exports (or 1.5% of total exports) and generated additional value-added to GDP of between 0.4% and 0.9%. Or, if each tourist in 2019 had spent one more night in Uganda, this would increase tourism exports by

US$67 million (or 1% per cent of total exports and) and generate additional value-added to GDP of between 0.3% and 0.7% (World Bank, 2020). Of course, exports are only part of the story. There remains considerable potential associated with developing the wildlife-watching tourism sub-sector for domestic tourism. This could be a key wildlife-watching tourism market to develop, as demand from international tourists recovers more slowly following the COVID-19 crisis.

Beyond the revenues the tourism sector generates in Uganda, it also employed around 6% of Uganda's labour force in the financial year 2016/17 (MTWA, 2017a). Whilst these figures consider all tourism in Uganda, this implies that increasing wildlife-watching tourism might be a pathway for addressing unemployment, as well as poverty reduction, in the country.

Whilst the wildlife-watching tourism sub-sector has the potential to attract more visitors and encourage them to stay longer in Uganda, it is very much dependent on maintaining natural ecosystems in good condition and healthy populations of species for tourists to visit. The Uganda Green Growth Development Strategy (UGGDS) acknowledges the risk that declines in biodiversity-related natural capital pose to tourism and other sectors. In response, it targets natural capital management as a catalytic investment area, identifying Environmental-Economic Accounts as the fundamental source of information to support policy interventions to achieve economic development targets and job creation.

In response to this policy need, this report presents a set of integrated environmental-economic accounts that provide information on the 'Stocks' of ecosystems and species and the 'Flows' of ecosystem services underpinning tourism-related economic activities in Uganda. The analysis of tourism services and biodiversity through a value chain aims to provide information for policymakers on the importance of biodiversity in the economy and human well-being to encourage its conservation and enhancement.

2.0 METHODOLOGY

2.1 Conceptual Approach

This report presents a set of biodiversity-related ecosystem accounts that can be used in decision-making to maintain and enhance a sustainable wildlife-watching tourism industry in Uganda. The purpose of the accounts is to organize information on 'Stock' ecosystems, the species that use them and the 'Flows' of ecosystem services (i.e., 'recreation related' ecosystem services concerning wildlife-watching tourism) they provide to users (consumers of visitors) and the associated transactions between key economic units (government and tourism businesses) in Uganda and wildlife-watching tourists.

The flow of ecosystem services, from an ecosystem to an economic unit, essentially represents a transaction. In this case between the ecosystem and the visitor receiving the 'recreation related' ecosystem service. Following the conventions of the SEEA EA, the use of these services is attributed to the people experiencing the ecosystem, i.e. the visitor. However, there is no transfer of funds between the ecosystem and the visitor. To recognize the value of the ecosystem service, economic units managing the ecosystem (e.g., Ministry of Tourism, Wildlife and Antiquities / Uganda Wildlife Authority) sells access to consumers (tourists). These and other economic units (e.g., businesses) may also provide accommodation and other goods and services (e.g., guiding services, tours, retail goods) to consumers (tourists). Figure 1 sets out these transactions and the associated economic agents.
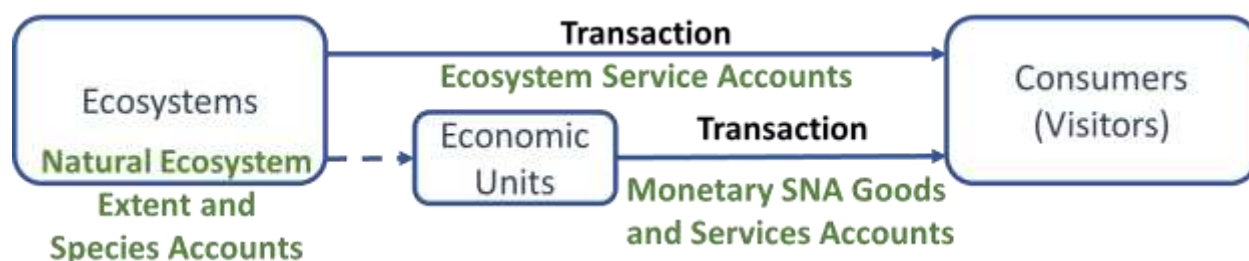
Figure 1: Transactions between ecosystems, economic units and consumers (i.e., tourists), adapted from Eigenraam and Obst, (2018)

As can be inferred from Figure 1, there is an incentive for the economic unit (government or business) to maintain the extent and condition of ecosystems and their associated species. Essentially, the better the health of the ecosystem and the more iconic species there are, then

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the more wildlife tourism services can be sold to tourists. This is because they are fundamental assets supporting the transaction in ecosystem services between the ecosystem and the consumer that results in the realization of economic benefits by economic units and, more generally, the economy of Uganda.

Reflecting Figure 1, the accounts presented in this report aim to integrate information on the stocks of these ecosystem assets, the ecosystem service flows they supply and the related monetary transactions between economic units (i.e., governments and businesses) and different consumers (i.e., tourist types) the *'recreation-related'* ecosystem services support. The application of this accounting logic will directly support the UGGDS by identifying where investments can be targeted towards the sustainable management and enhancement of biodiversity-related natural capital, development and marketing of tourism packages, and establishing sustainable livelihood opportunities. Further, by making this explicit link to the formal economy, a fuller understanding of the range of economic activities supported by these ecosystem service flows can be accounted for (restaurants around national parks, accommodation services and transportation services, etc.).

To inform on sustainable development options around the wildlife-watching tourism sub-sector, this report also presents a set of Integrated Analyses. These analyses compare key aggregates (i.e., indicators or totals) from biophysical ecosystem accounts (i.e., extent, condition, services), alongside economic (e.g., tourism expenditure) and additional social-economic data (e.g., poverty incidence). They are intended to support decision-makers in the pursuit of inclusive, sustainable development. The Integrated Analyses presented to respond to user needs identified via the Context Analysis (UNEP-WCMC *et al.,* 2019) and Inception Workshop (NEMA *et al.,* 2019) reports. These are summarized in Table 1.

Table 1: Policy uses and user needs (Biodiversity and Tourism Accounts)

Policy use / question	Information needs (data items)
What are the trends in biodiversity (Iconic Species and ecosystems) that support tourism activity?	Iconic species population census information Time series information on the extent of natural ecosystems and habitat
What is the value of tourism expenditure (tourism earnings) per site and per species?	Amounts of revenue generated by tourist at the different entry points

Policy use / question	Information needs (data items)
How should we design protection laws for biodiversity (e.g., with respect to gazettement and degazettement of protected areas) to support the tourism industry?	Areas frequently visited, their visit rates and duration of stays Location and extent of protected areas, iconic species distribution and natural ecosystems and habitat
How does biodiversity affect the economy? Is biodiversity a clear source of revenue? Can we show the return on investment in the tourism industry and support the case for further investment to unlock more opportunities for sustainable wildlife-based tourism?	Domestic and international expenditure Trends in tourist numbers and their nationalities (domestic, regional, international)
How should we decide to undertake non-conservation economic infrastructural activities within Protected Areas, including the wider exploitation of natural resources?	Trends in the number of species, their abundance and their distribution
How should we decide the budget allocation to the biodiversity and wildlife-watching tourism sub-sector?	Health of species and their habitat. Conservation / Threat status of species
At what level should we set national park access fees?	Management costs for wildlife-watching tourism sites
How can we better manage biodiversity to support job creation in the tourism industry? How can this be used in the context of poverty alleviation, boosting local incomes and creating markets for local goods (e.g., handicrafts)?	Ecosystem services Trends in tourist numbers and their nationalities (domestic, regional, international) Regional income and employment data
How can we make better use of wildlife resources to increase international tourism and foreign exchange earnings?	Type and value of local services provided by communities to tourists around tourist sites
Is there the potential to increase domestic tourism, for example via increased trips to forest reserves?	Information on the tourism value chain
Which 'wildlife tourism packages' should be developed (with the necessary infrastructure) to unlock the full potential of the Uganda wildlife watch tourism industry?	Information on the level of activity of private tour operators and the value of the packages they provide
How can relocation of species also support the tourism industry as well as satisfying objectives for conservation?	Information on the species and ecosystems in areas of high tourist visitation
Where are conservation activities lacking that threaten the resource base for wildlife-watching tourism in Uganda?	Information on the populations of iconic species, the condition of the Ecosystem they use and levels of investment in ecosystem maintenance and enhancement

2.2 Accounting Approach

The accounting approach is per the United Nations System of Environmental-Economic Accounting Ecosystem Accounting (SEEA EA) (UNSD, 2021). As the SEEA EA was only adopted as an international standard in March 2021, the accounts presented have been compiled using the SEEA Experimental Ecosystem Accounting (SEEA EEA) framework and associated Technical Recommendations (UN et al., 2017, 2014b). However, they are considered to be consistent with the approach set out in the recently adopted SEEA EA.

The SEEA EA provides a set of terms, concepts, accounting principles and an integrated accounting structure that allows the measurement of ecosystems in terms of their extent, condition and services in a manner consistent with each other and with standard measures of economic activity (UNSD, 2021). The SEEA EA is a multipurpose framework for understanding the interactions between ecosystems and the economy. The SEEA EA considers ecosystems as assets, which are measured in terms of their extent, condition and the services they provide to different beneficiaries. These core accounts are supported by a set of thematic accounts of particular policy relevance. This includes accounting for species-level biodiversity, both as a management theme and as an important element in the measurement of ecosystem condition (Remme et al., 2016). Also, a set of SNA Goods and Services Accounts have been compiled. These link supply and use of the *'recreation-related'* ecosystem service to associated transactions of products and services recorded in the System of National Accounts (UN et al, 2010).

UNEP-WCMC et al. (2019) provide a draft methodology to aid in implementing the SEEA EA in a way that best speaks to identified user needs with respect to and biodiversity and tourism in Uganda. This methodological note has guided the compilation of the sequence of accounts presented in this report.

2.3 Data collection

Data collection involved two main approaches. The first was a review of existing data collected by the Ministries Departments and Agencies (MDAs) and analysis of the collected data to identify the type of biodiversity data and information. The second comprised the formation of an Expert

Working Group (EWG), so that data gaps could be filled and the accounts could be developed in a way that best met user needs.

2.3.1 Review OF Existing Data

Ministries Departments and Agencies (MDAs) were requested through a letter to submit a copy of the biodiversity data that are generated based on the created thematic areas. The received datasets were then shared amongst the EWG members for their input and refinement on the suggested description of the generated data. The types of national biodiversity data and information available and their associated meta-data, their location, and accessibility were assessed for completeness and a metadata tool was developed based on the format obtained from UBOS. The detailed metadata for each of the data that were extracted from the different MDAs are captured in a metadata dictionary for the Darwin "Integrating Natural Capital into Sustainable Development Decision-Making in Uganda" as a whole.

2.3.2 Working Arrangements

A technical committee (Expert Working Group, EWG) was constituted to work with the consultants. The EWG was engaged in the development of the accounting approach and identification of key datasets required for the development of the fisheries accounts. Metadata on all datasets contributing to the compilation of the accounts were recorded in a metadatabase following UBOS Data Quality Assurance Framework. The structure of the metadatabase was agreed with UBOS in advance of the data collection process (following a common template). This was intended to establish the foundation for the institutional relationships between data providers and UBOS for the regular and long-term production of the accounts.

2.4 Compiling the Accounts

The SEEA EA (UNSD, 2021) sets out a stepwise approach for implementing the framework. The first step in this process is to delineate the ecosystem accounting area of interest (e.g., a country) and the configuration of different ecosystem types within this area. The SEEA EA requires this delineation of ecosystem types as mutually exclusive collectively exhaustive units (i.e., there are no gaps or overlaps of ecosystem types within the ecosystem accounting area). The framework is subsequently predicated on the integration of three types of areas: ecosystem assets (a

contiguous ecosystem area), ecosystem types (aggregations of the same type of ecosystem asset within the ecosystem accounting area) and the ecosystem accounting area itself (e.g., country, national park, watershed, administrative area).

Ecosystem Accounts will often be produced at the national scale, reflecting the scope of national accounting. However, more analytical value may be added when compiling accounts for Ecosystem Accounting Areas (EAAs) for subnational areas, particularly those of policy or land management interest. For Biodiversity and Tourism, these EAAs comprise the National Parks and other Protected Areas of Uganda. Consequently, the sequence of accounts presented in this report has been compiled for the following 12 protected areas (as shown in Figure 2). These EAAs have been identified as key biodiversity and wildlife-watching areas for tourism by the EWG:

Uganda's biodiversity and wildlife-watching areas	
1. Kidepo Valley National Park	7. Kibale National Park
2. Murchison Falls National Park	8. Katonga Wildlife Reserve[1]
3. Mount Elgon National Park	9. Queen Elizabeth National Park
4. Toro-Semiliki Wildlife Reserve	10. Lake Mburo National Park
5. Semuliki National Park	11. Bwindi Impenetrable National Park
6. Rwenzori Mountains National Park	12. Mgahinga Gorilla National Park

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[1] Due to limited data Ecosystem Extent Accounts only are presented in this report for Katonga Wildlife Reserve (see Appendix I).
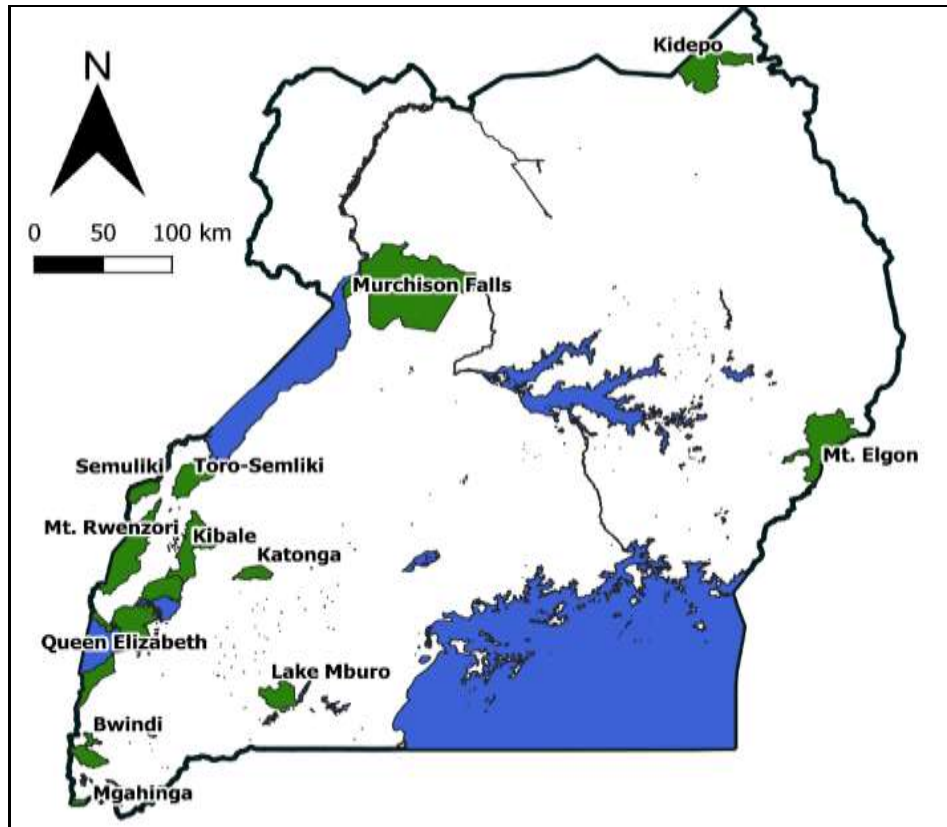
Figure 2: Ecosystem Accounting Areas for the Biodiversity and Tourism Accounts

In addition to the protected areas identified in Figure 2, it is acknowledged there are other protected and non-protected areas that will also be visited by wildlife-watching tourists. These include NFA Central Forest Reserves, such as Mabira Forest Reserve, where ecotourism activities are established. Whilst it has not been possible to compile an integrated set of ecosystem accounts for these areas, indicative information on visitors to two of these NFA managed forests is available (Kalinzu and Budongo Central Forest Reserves).

There are also further wildlife reserves operated by UWA (e.g., Plan-Ude and Bokora) that wildlife-watching tourists may visit. There are several important bird areas in Uganda, often associated with wetlands (e.g., the Mabamba Bay Wetland System, Ramsar site), that will be a big draw for bird-watching tourism. Outside protected areas, there may also be important wildlife areas for tourism. For example, relatively natural rural areas can support sustainable hunting-based tourism. It has not been possible to obtain sufficient data on these areas within this project. However, they should be included in future iterations of the accounts if sufficient information on the species they contain and the tourism activities they support becomes available.

For each of the Ecosystem Accounting Areas (EAAs) identified in Figure 2, the following set of accounts has been compiled: Natural Ecosystem Extent Accounts; Thematic Species Account; Physical Ecosystem Service Supply and Use Accounts (Physical Supply and Use Tables (PSUTs) for tourism); Monetary Ecosystem Service Supply and Use Accounts (Monetary Supply and Use Tables (MSUTs) for tourism); and SNA Goods and Services Accounts (for wider expenditure associated with wildlife-watching tourism, e.g., on hotels and catering). This sequence of accounts and the source data used to compile is summarized in Figure 3. The following sections provide more detailed information on the methodology and source data used to compile each of the accounts on the right-hand side of Figure 3.
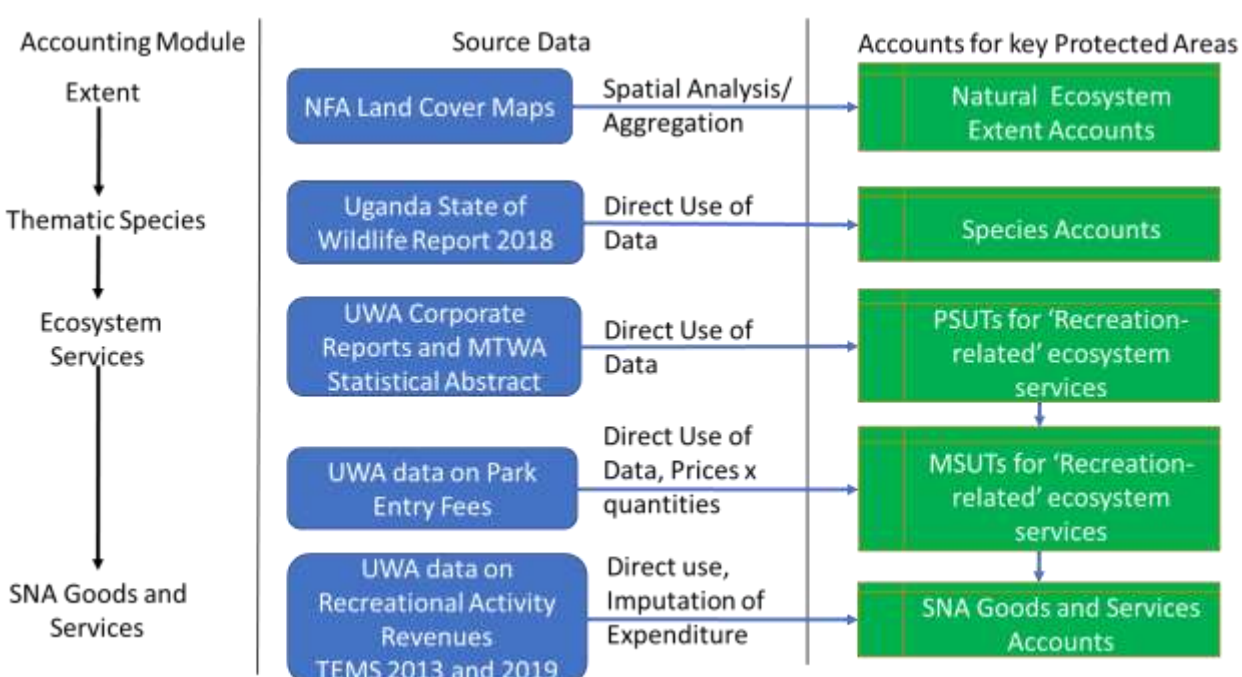
Figure 3: Sequence of accounts presented in this report

2.4.1 Natural Ecosystem Extent Accounts

The configuration of natural habitat in the landscape will be a key factor in encouraging wildlife-watching tourism activities in Uganda; the extent of these ecosystems is a key accounting concern for this report. Wildlife-watching tourism is driven by visits to protected areas in Africa (WTO, 2014). As such, understanding the stability of natural ecosystems in protected areas is highly relevant to maintaining the quality of these assets to continue to support wildlife-watching tourism opportunities in Uganda.

As proposed in para. 3.18 of the SEEA EEA technical recommendations (UN et al., 2017), land cover can be used as a proxy to delineate the extent of different ecosystem assets as a starting point. The National Biomass Study (Diisi, 2009) provides land cover maps for 1990, 2000, 2005, 2010, 2015 and 2017: a starting point for delineating ecosystem types in a fashion that will be recognizable to national decision-makers. These provide the fundamental data basis for calculating Uganda's National Land Physical Asset Accounts (indeed, aggregated Land Accounts for the Protected Areas Estate are presented in Uganda's Land Physical Asset Accounts, see Section 2.7, UBoS, 2019). Figure 4 presents the extent of the NBS classes in 2015. A key observation is that many of the tropical high forest areas in Figure 4, align with the EAAs (protected areas) for which ecosystem accounts are presented (although there are also important extents of this ecosystem type that lie outside of these areas).
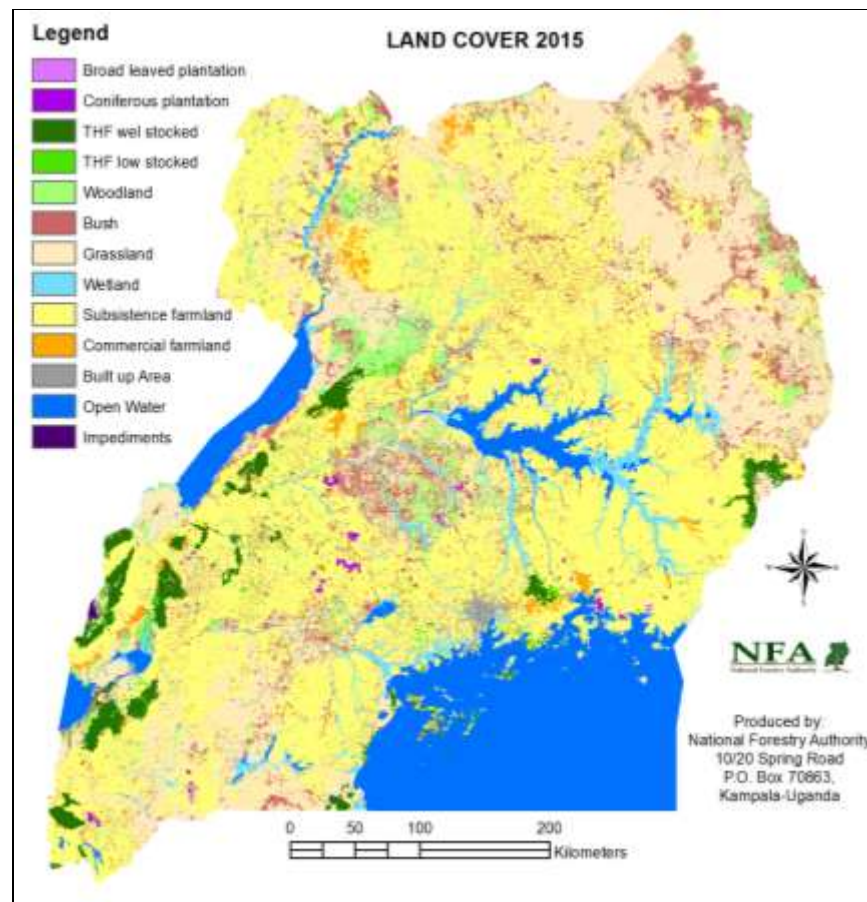
Figure 4: Extent of NBS Classes in Uganda 2015 (source NFA)

To support the analysis, accounts derived from these land cover data have been compiled to summarise changes in the extent of natural and non-natural (i.e., converted for production) land

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cover. This has been achieved by identifying the different NBS classes that are natural land cover types and aggregating the other non-natural land cover types. The identification of natural land cover types follows Pomeroy et al. (2002). This assignment of the NBS classes are summarised in Table 2. Diisi (2009) provides detailed descriptions of the NBS classes presented in Table 2.

Table 2: National Biomass Survey Classes Presented in the Natural Ecosystem Extent Accounts

NBS Class	Ecosystem Type
Tropical forest well stocked	Tropical forest well-stocked (Natural)
Tropical forest low stocked	Tropical forest low stocked (Natural but degraded with reduced species richness and secondary bush/shrub growth)
Woodland	Woodland (Natural)
Bush	Bush (Natural)
Grassland	Grassland (Natural)
Wetland	Wetland (Natural)
Open Water	Open Water (Natural)
Broad-leaved plantations	Non-natural
Coniferous plantation	The combined extent of these land cover classes is aggregated within the Natural Ecosystem Extent Accounts to ease presentation.
Small scale farmland	
Commercial farmland	
Built-up area	
Impediments (areas with no vegetation)	No data
No data (additional class for balancing small discrepancies in the spatial analysis for the accounts)	

The spatial analysis necessary for calculating the Natural Ecosystem Extent Accounts for the EEAs (protected areas) using the land cover maps for 2000 and 2017 provided by the NFA was achieved using the EnSym software package. For details on using this software for Ecosystem Accounting in Uganda, see Appendix A, UNEP-WCMC and IDEEA (2017). It is highlighted that similar information on land cover change are included in Uganda's State of Wildlife Report for some of the EAAs (protected areas) for which Ecosystem Accounts are presented in this report.

The period between 2000 and 2017 was chosen as the accounting period in order to provide a sufficient period to observe land cover change and its impacts on natural ecosystems from expansion of non-natural land covers. This period also aligned with the time series of observations

for the Species Accounts and 2017 is the most recent land cover mapping available to align with recent tourism activity statistics.

2.4.2 Thematic Species accounts

Observing iconic species will be a prime motivation of many tourists visiting Uganda. The extent of natural habitat provides useful (proxy) information on the suitability of ecosystems to support species. However, information on the abundance of iconic species provides tangible links to the condition of ecosystems that enable wildlife-watching tourism, and associated recreation opportunities.

The data used for the construction of the Species Accounts were obtained from the Uganda Wildlife Authority (UWA) published in the State of Wildlife Resources 2018 (UWA, 2018). The exception for this was for Mount Elgon National Park, where species data were collected directly from the management unit for the national park offices in Mbale.

The information on species abundance presented in the State of Wildlife Resources 2018 (UWA, 2018) is based on aerial and on-the-ground surveys from the 1960s to 2017. These include national estimates based on these surveys, as well as surveys within individual protected areas.

The State of Wildlife Resources will henceforth be produced every two years. The report is designed to provide a reference of the state of wildlife to guide planners and policymakers, in line with UWAs mandate. This includes informing tourism promotion, as well as conservation planning.

Five iconic species important for eco-tourism were identified by the members of the EWG in one of the consultative meetings for the project. These comprised: chimpanzees, gorilla, lions, elephant and buffalo. The Species Accounts for these five species were calculated for the National Scale using the information Uganda's State of Wildlife Resources report 2018 (UWA, 2018). In addition, more detailed Species Accounts are presented for the individual protected areas identified in Figure 2, where this information was available in the State of Wildlife Resources 2018 report or from Mbale UWA offices for Mount Elgon National Park.

2.4.3 Physical Ecosystem Services Supply and Use Accounts

The ecosystem services supply and use account records the flows of ecosystem services supplied by ecosystem types to economic units during an accounting period. Given the focus of this report, the ecosystem service of interest is labelled as the '*recreation-related*' service supplied by ecosystems and the species they contain (biodiversity-related natural capital). Within the SEEA EA, the concept of the supply of ecosystem services is equal to the use (or receipt) of ecosystem services. For the '*recreation-related*' ecosystem service, supply and use can be equated by using proxy data on visits to the EAAs (protected areas) Figure 2 to participate in wildlife-watching tourism.

The information on tourist visits to national parks and wildlife reserves to engage in wildlife-watching tourism has been obtained from data collected by UWA and the MTWA. The MTWA publish an annual tourism sector statistical abstract (e.g., MTWA, 2017b) and annual tourism sector performance reports (e.g., MTWA, 2019). The number of visitors to national parks is one of the key statistics presented in the abstract. The numbers are obtained via the gate registers as visitors enter the national parks and validated using gate receipts (MTWA, 2017b). As such these statistics are indicative of visitor days spent visiting the park. This data allows visitor statistics to be associated with the national park visited. For recent years (2018 and 2019), these data are supplemented with records obtained directly from UWA.

In addition to the data on tourist visits to the UWA managed National Parks and Wildlife Reserves, some information on visits to NFA Central Forest Reserves is also available from the ecotourism office at the NFA. Ecotourism activities are being developed within the NFA Central Forest Reserves. It is understood that the intention is to improve the monitoring of visitor numbers around the key Central Forest Reserves for ecotourism. These comprise Mabira, Budongo, Mpanga and Kalinzu Central Forest Reserves. Where a range of activities, such as chimpanzee tracking, monkey tracking, habituation, guided walks and birding, are currently enjoyed by visiting tourist. These sites are also provided with ecolodges under concession arrangements. Data on visitor numbers for Kalinzu and Budongo Central Forest Reserves only are included in the Physical Supply and Use Accounts only.

2.4.4 Monetary Ecosystem Services Supply and Use Accounts

The Monetary Ecosystem Service Supply and Use Accounts follow the same general format as the physical accounts. Again, visitor data is used as a proxy to value the 'recreation-related' ecosystem service. These monetary values are based on the prices paid by visitors on park entry. Park entrance expenditure was estimated using the information on physical visits by different tourist categories (Foreign Non-Residents; Foreign Residents, East African Community Residents, Student and others) and respective park entrance fees from the UWA tariffs published every two years. It is highlighted that this approach yields a small overestimation of the aggregate value of park entrance fees received, as children receive a discount but are not distinguished in the visitor statistics available. However, cross-referencing with aggregate revenue stream data provided by UWA reveals these overestimates are small (<10%).

It is highlighted that use of park entrance fees is very much a proxy for valuing the 'recreation-related' ecosystem service and overvalues the ecosystem contribution to the wildlife-watching tourism experience. Further work would be required to isolate the contribution of ecosystems to the value of experience the consumer enjoys. For example, following Remme et al., (2015) the resource rent approach can be used. Here the contribution of the ecosystem service to the overall value of the experience the consumer enjoys is estimated by subtracting all costs for capital and labour from the park visitor and guiding fees. However, this may not be wholly reasonable or straight forward, as there are multiple objectives for capital investment in national parks. The Monetary SNA Goods and Services Supply and Use Accounts described in the next session may also provide more useful monetary information for economic planning for the wildlife-watching tourism sector.

2.4.5 Physical SNA Goods and Services Supply and Use Accounts

The SNA Goods and Services Accounts inform on the related transactions between the economic units and the consumers of the 'recreation-related' ecosystem service (the right part of Figure 1). The SNA (System of National Accounts) means that the products and services recorded in the supply and use accounts lie within the production boundary of the SNA (i.e., they are produced by an economic unit, not an ecosystem). The statistics on the number of visitors recorded as supplied by producers in the SNA Goods and Services Supply and Use Accounts are entirely equivalent to those recorded in the Ecosystem Services Accounts (the total used by the

economic unit). However, the SNA Goods and Services Supply and Use Accounts present disaggregation of 'Use' by type of consumer. In this case by Foreign Non-Residents; Foreign Residents, East African Community Residents, Student and others.

The SNA Goods and Services Supply and Use Accounts are first presented in physical terms (to the degree possible) and then monetary terms. The Physical SNA Goods and Services Supply draw on the same data as used to compile the Physical Ecosystem Service Supply and Use Accounts. These provide data on the number of visits to national parks disaggregated by tourist type. This information is used to compile national-scale SNA Goods and Services accounts, representing visits to all of the EAAs / Protected Areas considered in this report. This is to provide a concise presentation. SNA Goods and Services Supply and Use Accounts could easily be produced for each protected area (key data in this regard is presented in the integrated analyses).

2.4.6 Monetary SNA Goods and Services Supply and Use Accounts

The Monetary SNA Goods and Services Accounts are structured to combine further information on transactions involving supporting goods and services associated with wildlife-watching tourism activities. For instance, on recreational activities in national parks, accommodation, meals consumed, transportation services and retail products that are consumed by wildlife-watching tourists. Information on these goods and services is difficult to obtain and combine in physical terms. However, monetary information on associated transactions is often more readily available (or easier to impute) and can be easily aggregated. These accounts have been compiled for the 2012 and 2019 calendar years.

Whilst the monetary values associated with the transactions of these goods and services may be recorded elsewhere in the SNA, it is not aligned or integrated with information on the 'Stock' of ecosystem assets that support their provision (e.g., Protected Areas and the natural ecosystems and iconic species they support). Addressing this disconnect is vital to informing the relationship between Uganda's environment and its economy, highlighting the importance of sustainably managing her ecosystem assets and identifying opportunities for development based on their sustainable exploitation.

The Monetary SNA Goods and Services Supply and Use Accounts have been compiled using the same data on park entrance fees as presented in the Monetary Ecosystem Services Supply and Use Accounts. To supplement this, UWA also provided information on revenue streams associated with vehicle park entrance, recreational activities, concessions and other internal income-generating activities. This information on recreational activities includes guiding fees, gorilla tracking fees, nature walks, bird hikes, accommodation, etc. The information is provided in aggregate (i.e., for all National Parks and wildlife reserves) and provides a broader understanding of the range of economic activities which tourists consume, beyond just park entrance fees. The revenues included in the accounts comprise vehicle entrance fees; gorilla tracking fees; and other recreational activities. In addition, the UWA revenue reported for accommodation is included in the accounts; this is subtracted from the total expenditure imputed for accommodation by international tourists from the Tourism Expenditure Motivation Surveys (discussed below).

The UWA revenue data are available for financial years, which run from July to June in Uganda. The PSUTs and MSUTs described above are based on calendar years. To integrate the accounts, the revenues achieved in the 2012/13 financial year are assigned to the 2012 calendar year. The revenues achieved in the 2018/19 year have been assigned to the 2019 calendar year. This is to mitigate the impact the COVID crisis had on tourism expenditure does in the 2019 / 2020 financial year (monthly tourism earnings dropped 70% in April 2020 from the previous year, World Bank, 2020). In the next iteration, it will be helpful to align the visitor and revenue data around common accounting years. It is highlighted that UWA revenues associated with concessions income and other internal income-generating activities are not included in the set of accounts presented.

The Monetary SNA Goods and Services Supply and Use Accounts also draw on the Tourism Expenditure and Motivation Surveys (TEMS), coordinated by the MTWA (World Bank 2013; 2020). The years the accounts are produced are deliberately selected to best align to the TEMS undertaken. The TEMS data has been used to integrate a more holistic picture of the full scope of economic activities associated with the wildlife-watching tourism sub-sector in the private, as well as public, sector.

The TEMS data provides an important opportunity to impute expenditure associated with wildlife-watching tourism in Uganda and address some of the gaps in the Physical SNA Goods and Services Supply and Use accounts, using monetary values. This is also, clearly, very helpful for informing economic planning and budgeting processes surrounding the sub-sector and the biodiversity-related natural capital assets supporting it.

Table 2.3 of World Bank (2013) of the World Bank (2020) provides information on tourism expenditure by tourist type (including leisure and recreational tourists, who participate in wildlife-watching tourism). To align information on leisure tourism expenditure from the TEMS 2019 with those of the TEMS 2012, several aggregations were made. These are summarized in Table 3.

Table 3: Aggregation of TEMS 2019 expenditure categories for leisure tourists to TEMS 2013 expenditure categories

TEMS 2012 (Table 2.3, World Bank, 2013)	TEMS 2019 (Table 4, World Bank, 2020)
Retail trade	Crafts & souvenirs + other shopping
Hotels, bars and restaurants	Accommodation + Food & beverages
Passenger road transport	Local transport + guide service
Air Transport	Domestic air transport
Other services	Other
Cultural and recreational services*	Park entry fees + tracking fees + sightseeing tours + adventure activities + entertainment

*Cultural and recreation services are not included in the Monetary SNA Goods and Services Accounts as this would imply double counting with UWA recreational activities in the account.

Average daily expenditure per category was estimated from the total expenditure for leisure tourists and the average duration of stay (assuming 15-day or less visit) presented in the TEMS for 2012 and 2019. These total and average daily expenditures are summarized in Table 4.

Table 4: Total and Average Daily Expenditures by Leisure Tourists for 2012 and 2019 (From TEMS)

	Total Expenditure (TEMS 2012, USD - Table 2.3, World Bank, 2013)	Average length of stay (<15-day trip, TEMS 2012 – Table 2.2 World Bank, 2013)	Daily Expenditure (USD)	Daily Expenditure (UgX)	Total Expenditure (TEMS 2018, USD)	Average length of stay (<15-day trip, TEMS 2019 - Table 15) (MTWA, 2020)	Daily Expenditure (USD, TEMS 2019 - Table 4) World Bank, 2020)	Daily Expenditure (UgX)
Retail trade	124	6.8	18.24	45,679	120	6.7	17.91	66,340
Hotels, bars and restaurants	591	6.8	86.91	217,714	488	6.7	72.84	269,784
Passenger road transport	133	6.8	19.56	48,995	159	6.7	23.73	87,901
Air transport	24	6.8	3.53	8,841	13	6.7	1.94	7,187
Other services	44	6.8	6.47	16,209	88	6.7	13.13	48,650
Cultural and recreational services*	295	6.8	43.38	108,673	223	6.7	33.28	123,282
Total	**1,211**	**6.8**	**178.09**	**446,111**	**1,091**	**6.7**	**162.84**	**603,144**

*Cultural and recreation services are not included in the Monetary SNA Goods and Services Accounts as this would imply double counting with the park entrance and guiding fees included in the account. In 2012, 1 USD = 2,505 UGX and in 2019, 1 USD = 3,704 UgX[2]

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[2] https://data.worldbank.org/indicator/PA.NUS.FCRF?locations=UG

As Table 4 shows, the average daily expenditure associated with leisure tourists has dipped slightly in US dollars between 2012 (USD 178 / day) and 2019 (163 USD / day). However, due to exchange rate movements, the average daily expenditure in Ugandan Shillings has increased over this period, from UGX 446,111 / day in 2012 to UGX 603,144 in 2019.

The Monetary Ecosystem Service Supply and Use Accounts include the expenditure categories for Retail, Hotels, bars and restaurants, Travel services (Passenger road transport and Air transport) and Other services in Table 4. The accounts are compiled in Ugandan Schillings and use the average daily expenditures of leisure tourists highlighted for 2012 and 2019 in the grey cells in Table 4. As indicated in the footnote to Table 4, expenditure on cultural and recreation services are not included in the Monetary SNA Goods and Services Accounts to avoid double counting with the revenues on park entrance and other recreational activities in the account.

In order to impute total expenditure associated with a visit to a protected area, the daily expenditure for each category is multiplied by the visits/gate receipts of international tourists (Foreign Non-Residents) to national parks. This is considered a conservative assumption, given the time tourists will spend time travelling to and from the park, as well as within it. The focus on international tourists reflects that the TEMS is a survey designed to be administered to non-resident tourists spending at least one night in Uganda (World Bank, 2020). The hotels, bars and restaurants expenditure imputed for international tourists were split between the government and businesses based on the revenues reported by UWA for accommodation services. It is highlighted that other tourist categories will also spend money on SNA Goods and Services during their visits, this is not recorded in the accounts as data (or reasonable estimates) are known to be available for these tourist categories at present.

2.5 Integrated analyses and additional socio-economic data

The SEEA is designed as an integrated information system that allows the harmonisation of different environmental data sets in a manner that is coherent across these data and with the System of National Accounts. A key advantage of organising information in this fashion is that different data are directly comparable with each other and multiple environmental data (e.g., on

ecosystem extent, species and ecosystem services) can be mainstreamed into sustainable economic development planning processes.

To support decision-makers, the integrated analyses presented in this report combine key information from the accounts described above with wider statistics relevant to green economic development planning. This is intended to provide integrated information on the relationship between biodiversity, tourism and associated economic activity and social welfare. In particular, by meeting the key requirements of the accounts to meet the User Needs in Uganda (as identified in Table 1). To this end, the integrated analyses also make use of additional socio-economic data on:

- Revenue sharing
- Poverty Incidence
- Unemployment

2.5.1 Revenue Sharing

The Wildlife Act 2019 mandates the Uganda Wildlife Authority (UWA) to pay twenty per cent of the park entry fees collected from a wildlife protected area to the local government of the area surrounding the wildlife protected area from which the fees were collected. These payments are distributed as conditional grants. For instance, grant payments for infrastructure, facilities and livelihood development for local communities. The amounts in Table 5 are the share of this 20% that local governments were entitled to for the financial year 2019/2020.[3] These are assumed to be based on the gate receipts from the previous financial year (i.e., 2018/2019).

The statistics presented in Table 5 provide an insight into the local community scale benefits that accrue due to tourism activity in nearby protected areas. They can be presented alongside the information in the other accounts to illustrate where tourism activity is delivering important economic support to local community development and where this could be improved based on the wildlife watching tourism potential of different protected areas.

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[3] As reported in the UWA (January, 2021) Status report on revenue sharing funds disbursement and implementation of projects for the 2019/2020 financial year

Table 5: Revenue Sharing by National Park (2019/2020, UWA 2021)

National Park or Wildlife Reserve	20% share of park entrance fees for the year (2019/2020, UgX.)
Murchison Falls NP	938,362,093
Queen Elizabeth NP	728,820,246
Kidepo Valley NP	164,636,625
Bwindi Impenetrable NP	793,364,027
Mgahinga Gorilla NP	92,279,012
Mt. Elgon NP	31,406,476
Lake Mburo NP	330,662,927
Kibale NP	358,519,250
Rwenzori Mountains NP	53,907,634
Semliki NP	19,305,519

2.5.2 Poverty Statistics

The approach to calculating the national poverty line for Uganda is described in UBoS (2019b). It reflects the estimated cost of meeting basic caloric requirements adjusted for age, gender, and daily activities. The incidence of Ugandans living below this poverty line has fallen sharply from 31.1% in 2006 to 19.7% in 2013 (UBoS, 2019b). However, factors such as the 2016/17 drought, have stalled the pace of poverty reduction, resulting in recent increases in poverty incidence. This has been particularly noticeable in the eastern region of the country (UBoS, 2019b).

Mapping poverty incidence offers government authorities and development partners a clear view of the evolving incidence of poverty across localities. They also provide crucial spatial information to inform the formulation, implementation and monitoring of poverty-reduction policies at different levels of government. An important caveat to mapping poverty incidence is that, whilst such maps illustrate how broad poverty incidence is, additional data are required to understand how deep it is in different areas (i.e., how far below the poverty line the poor may be in an area).

In Uganda, official poverty incidence rates are not produced below the sub-region level, where sampling errors in the Uganda National Household Survey data become non-negligible (UBoS, 2019b). However, UBoS has produced poverty maps for the sub-county level using Small Area

Estimation (SAE) methods as part of a project supported by the World Bank and UNICEF. The most recent set of poverty maps combines data from the 2016/2017 Uganda National Household Survey and the 2014 National Housing and Population Census to estimate poverty incidence at the sub-county scale (UBoS, 2019b). This is broadly related to the 2016/17 situation.

Given their spatial nature, information from poverty maps can also be broadly aligned to the information from the biodiversity and tourism accounts. This can support an integrated analysis on where tourism development and associated income possibilities would have the greatest potential impact on policy alleviation. To this end, Figure 5 presents the location of the 12 Ecosystem Accounting Areas considered in the Biodiversity and Tourism Accounts, with the information on poverty at district scale estimated by UBoS.
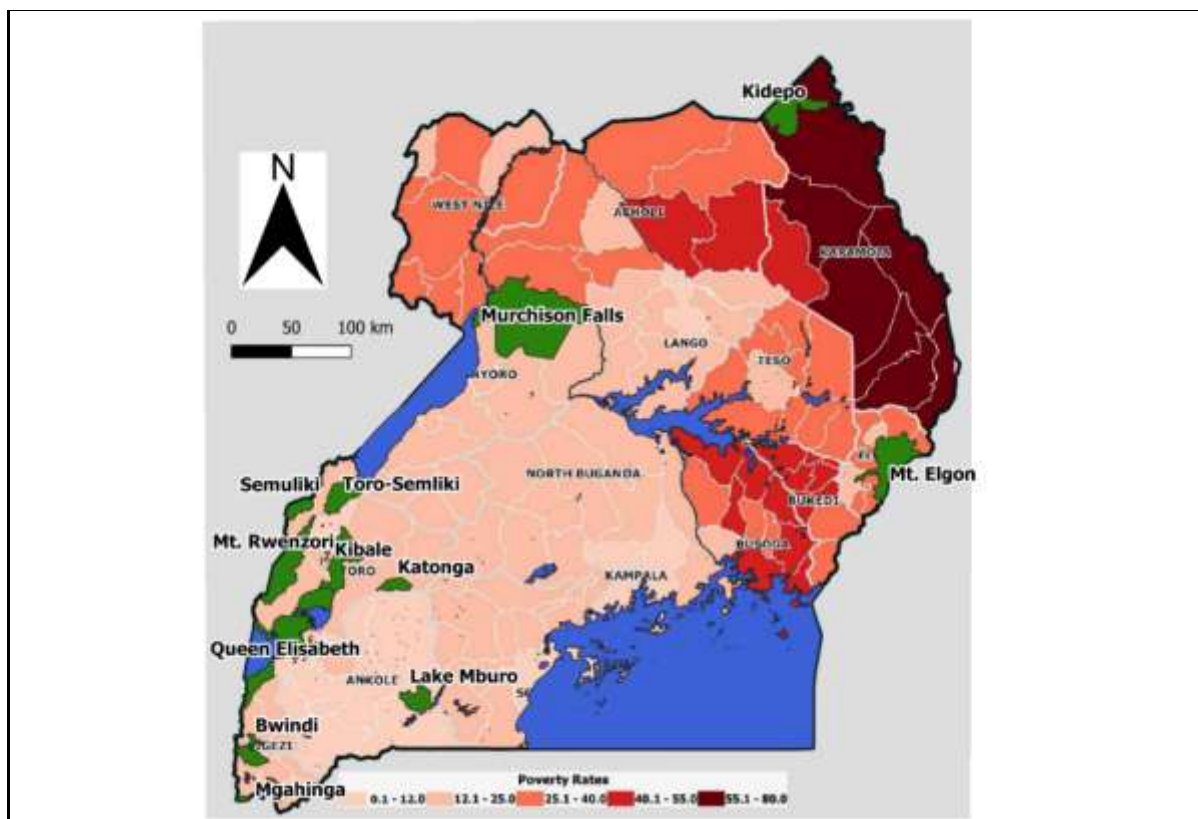
Figure 5: Poverty Incidence Rates by District, 2016/17 (UBoS[4])

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[4] From presentation by Stephen Baryahirwa, UBoS: https://www.ubos.org/wp content/uploads/publications/02_2020Presentation_-Uganda_Poverty_Maps_2016-20177.pdf

From the perspective of poverty alleviation, Figure 5 indicates that developing tourism in Kidepo Valley National Park would be a high priority. For Mount Elgon and Murchison Falls, this would be a medium to high priority and a medium priority for the remaining national parks and wildlife reserves.

2.5.3 Unemployment (Labour) Statistics

The most recent Uganda Labour Force Survey (NLFS) was carried out between November 2016 and July 2017 and is reported in UBoS (2018). The NLFS provides a comprehensive set of labour market indicators to support the monitoring and evaluation of national and international development programmes, such as NDPII, Africa Agenda 2063 and the SDGs (UBoS, 2018). The NLFS stratifies Uganda into seven statistical regions for reporting these indicators, comprising: Kampala; Peri-Urban Kampala; Central; Eastern; Northern; Karamoja; and, Western.

There are a large number of indicators derived for the working population of Uganda in the NLFS. The two indicators considered most relevant for identifying where investment in wildlife-watching tourism could be prioritized for job creation are:

- **Unemployment:** These are persons aged 14-64 years actively seeking employment and available to participate in employment. It captures those persons seeking pay for engaging in an activity to produce goods or services. It is a well-known headline indicator for conditions in the labour market.

- **The proportion of population Outside of Labour Force (Out of LF):** These are persons aged 14-64 years who were neither employed nor unemployed for the production of goods and services in the seven days prior to the survey. This indicator provides an insight into the economically inactive proportion of the population (i.e., those not employed or unemployed). These persons are split into two categories:
    - Those not seeking and being available for employment
    - Those not seeking and not being available for employment. Comprising those in school, subsistence agriculture, with family responsibilities or housework and those with illness or disability

The results of the 2016/17 NLFS for Unemployment and Outside of Labour force indicators are presented with the location of the 12 Ecosystem Accounting Areas considered in the Biodiversity and Tourism Accounts in Figure 6. As Figure 6 shows, unemployment is the highest in the Eastern (15.3%) and Northern (13.5%) regions. As such, wildlife watching-related job creation activities

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can be considered a high priority around Mount Elgon the northern perimeter of Murchison Falls National Parks. Unemployment is also higher in the Karamoja (6.8%), compared to the Western (5.6%) region. As such, from a job creation perspective, Kidepo Valley National Park can be considered as a medium to high priority for the development of wildlife-watching tourism activities.

As the right-hand panel in Figure 6 shows, prioritising the development of wildlife-watching tourism activities for job creation around Kidepo Valley, Mount Elgon and the Northern perimeter of Murchison Falls can also be justified based on the large proportions of the working-age population that is currently out of the labour force in the Karamoja (63.6%), Eastern (59.7%) and Northern (51.1%) regions. This is indicative of a high level of economic inactivity amongst the population for these reasons. Investing in stimulating this is important, as, in a majority of cases (i.e., >50%) in these regions, the main reason for such inactivity amongst respondents to the Uganda Household Survey was 'Discouragement'.
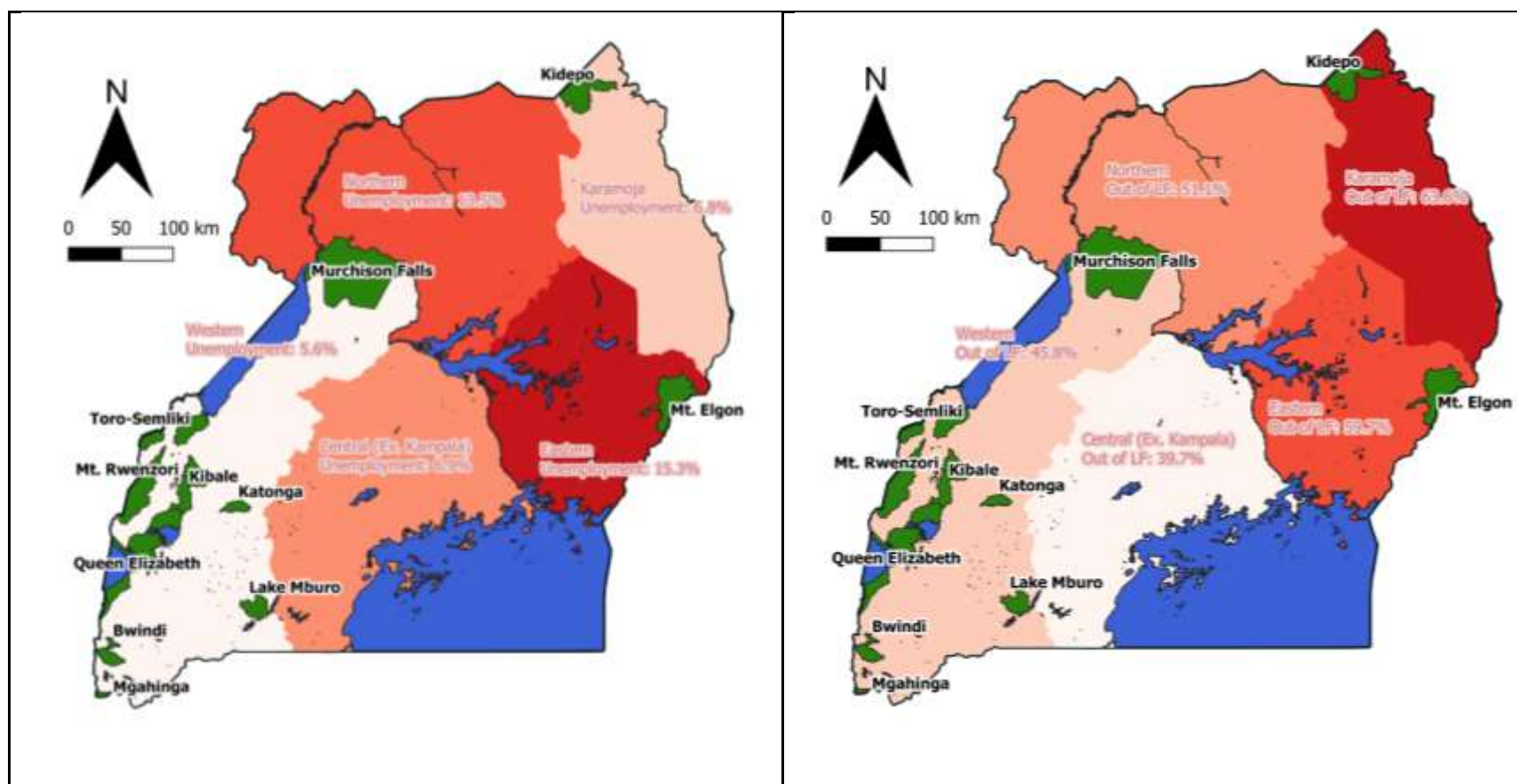
Figure 6: 2016/17 National Labour Force Survey results for 'Unemployment' and 'Out of Labour Force' by region, (Central Region Excludes Kampala and Peri-Urban Kampala). Darker colours represent higher unemployment or out of labour force statistics. The green areas represent the EAAs / protected areas for which accounts have been compiled.

3.0 ACCOUNTING RESULTS

The accounting tables presented in this section are intended to provide a coherent picture of the link between ecosystems (and species) and economic activity via an integrated presentation of the SEEA EA and SNA Supply and Use Tables for the wildlife-watching tourism sub-sector in Uganda (i.e., following the sequence of accounts provided in Figure 3). They directly provide important aggregates that can be directly obtained to support the sustainable development of this sector and mainstream associated biodiversity benefits into decision-making. They are supported additional Integrated Analyses (presented in Section 4), which integrate this key information from the accounts with additional socio-economic data (e.g., on poverty and employment). These integrated analyses are intended to provide information on the relationship between biodiversity, tourism and associated economic activity and social welfare and respond to the key user needs identified in **Table 1**.

It is highlighted that the accounts are not intended to be able to communicate all the subtleties of biodiversity and ecosystem interactions with livelihoods, social welfare and the economy. Further information than is presented in the accounts will be required for informing local scale management planning on the use of the environment and local conservation activities.

3.1 Natural Ecosystem Extent Accounts

The sequence of accounts provided in Figure 3 starts with the 'stocks' of biodiversity-related natural capital that are supporting the wildlife-watching tourism sub-sector in Uganda. As noted, the extent of natural ecosystems is one way of measuring the ecosystem component of these stocks. Table 6 provides an aggregated natural ecosystem extent account for all of the EEAs / protected areas for the period between 2000 and 2017.

The largest extent of natural ecosystems in the aggregated area of the protected areas in 2017 is Grassland (470,265 ha). Inspection of Table 6 also reveals substantial declines in 'Bush' extent, offset by substantial additions to 'Grassland' extent. This trend is also mirrored in the National Physical Land Asset Accounts for Uganda (UBoS, 2019a). The reasons driving this reversal between bush and grassland are unclear. One possibility discussed in UNEP-WCMC and IDEEA (2017), was the spread of *Lantana camara* (a shrub considered an alien invasive species in Uganda)

in the 1980s and 1990s. This may have led to the reclassification of grassland as bush around 2000 and, subsequently, reducing the extent of this species may have led to (apparent) recent gains in grassland extent. Table 6 reveals that the extents of Tropical Forest Well-Stocked (228,685 ha) and Woodland (219,810 ha) are broadly similar in 2017. Both also experience a similar, negative, net change in extent between 2000 and 2017 (-18,608 ha for Tropical High Forest Well Stocked, -31,233 for Woodland).

Table 6: Natural Ecosystem Extent Account for All EEAs / Protected Areas (in ha, 2000 and 2017)

Classifications >>	Tropical high forest well stocked	Tropical high forest low stocked	Woodland	Bush	Grassland	Wetland	Open-water	Non-natural	No data	TOTALS
Opening Stock (2000)	247,293	12,398	251,043	303,478	232,950	20,872	10,238	25,034	2,342	1,105,648
Additions to stock										
Total additions to stock	14,873	19,998	70,672	41,928	280,731	24,095	4,158	11,087	1,206	468,748
Reductions in stock	-	-	-	-	-	-	-	-	-	-
Total reductions in stock	(33,481)	(8,272)	(101,905)	(259,694)	(43,416)	(2,519)	(1,547)	(17,819)	(95)	(468,748)
Net change in stock	(18,608)	11,726	(31,233)	(217,766)	237,315	21,576	2,611	(6,732)	1,111	-
Closing Stock (2017)	228,685	24,124	219,810	85,712	470,265	42,448	12,849	18,302	3,453	1,105,648

* Non-natural = Broad leaved plantations, Coniferous plantation, Small scale farmland, Commercial farmland, Built-up area

No data = Impediments, No data

The second-largest net increase in extent revealed by Table 6 is for wetlands (+ 21,576 between 2000 and 2017). This reflects an increase from 20,872 ha in 2000 to 42,448 ha in 2017. Net increases in extent are also noted for Tropical Forest Low Stocked (+ 11,726 ha, possibly indicative of degradation of a well-stocked forest) and Open Waters (+2,611 ha) between 2000 and 2017.

As shown in Table 6, the extent of non-natural ecosystems remains relatively low between 2000 and 2017 across the aggregated area of all the EAAs / protected areas. The opening extent of these ecosystems (25,034 ha) only represents approximately 2% of the total aggregated area in Table 6. The extent of these ecosystems reduces over the accounting period, with a closing stock of 18,302 ha in 2017.

A full set of Natural Ecosystem Extent Accounts for each of the EAAs / protected areas identified in Figure 2 is provided in Appendix I. In the following sections, a subset of the Ecosystem Extent Accounts is presented and discussed to illustrate the insights they can provide for the wildlife-watching tourism sub-sector. An important caveat to the interpretation of these accounts is that

they are intended to provide an insight into trends in relatively broad land cover classes with respect to natural ecosystem extent. These classes will miss certain ecological details relevant to natural ecosystems and their condition and should be considered as providing very broad signals on the nature of natural ecosystems in protected areas.

3.1.1 Natural Ecosystem Extent Account for Murchison Falls National Park

Murchison Falls National Park is the largest EAA of all the protected areas. Together with Queen Elizabeth National Park, it is also the most visited (as shown in Table 24, these two parks interchange in terms of the most visited in different years). Table 7 presents the Natural Ecosystem Extent Account for Murchison Falls National Park. As Table 7 shows, the extent of non-natural ecosystems (or land conversion) remains relatively low and stable between 2000 and 2017 in Murchison Falls National Park. Only around 1% of the total extent (4,487 ha) is identified as non-natural in 2017.

Table 7: Natural Ecosystem Extent Account for Murchison Falls National Park (in ha, 2000 and 2017)

Classifications >>	Tropical high forest well stocked	Tropical high forest low stocked	Woodland	Bush	Grassland	Wetland	Open-water	Non-natural	No data	TOTALS
Opening Stock (2000)	-	185	170,964	148,031	55,732	5,296	3,433	3,101	-	386,742
Additions to stock	-	-	-	-	-	-	-	-	-	-
Total additions to stock	512	1,600	41,382	18,557	155,779	13,857	2,478	4,347	177	238,689
Reductions in stock	-	-	-	-	-	-	-	-	-	-
Total reductions in stock	-	(185)	(77,091)	(137,579)	(18,343)	(1,515)	(1,015)	(2,961)	-	(238,689)
Net change in stock	512	1,415	(35,709)	(119,022)	137,436	12,342	1,463	1,386	177	-
Closing Stock (2017)	512	1,600	135,255	29,009	193,168	17,638	4,896	4,487	177	386,742

* Non-natural = Broad leaved plantations, Coniferous plantation, Small scale farmland, Commercial farmland, Built-up area

No data = Impediments, No data

Relatively large increases in wetlands and open waters between 2000 and 2017 are observed in Table 7 (+ 12,342 ha and + 1,463 ha, respectively). As previously noted in Table 6, a large decrease in Bush and a large increase in grassland extent is also observed in Table 7 between 2000 and 2017. There is also a large decrease in the extent of woodland between 2000 and 2017 (-35,709 ha). This net change also associated with large gross additions (+ 41,382 ha) and reductions (-

77,091 ha). From being essentially absent in 2000, a small extent of Tropical High Forest is identified in Table 7 for 2017.

3.1.2 Natural Ecosystem Extent Account for Queen Elizabeth National Park

Table 8 presents the natural ecosystem extent account for Queen Elizabeth National Park, the second largest of the protected areas and a key destination for wildlife-watching tourism in Uganda. An important observation from Table 8 is that almost the extent of non-natural ecosystems within the national park has reduced to almost nothing between 2000 and 2017 (from 6,263 ha in 2010 to 503 ha in 2017).

Table 8: Natural Ecosystem Extent Account for Queen Elizabeth National Park (in ha, 2000 and 2017)

Classifications >>	Tropical high forest well stocked	Tropical high forest low stocked	Woodland	Bush	Grassland	Wetland	Open-water	Non-natural	No data	TOTALS
Opening Stock (2000)	3,987	1,680	32,754	31,989	84,223	9,448	4,718	6,263	258	175,320
Additions to stock										
Total additions to stock	3,353	4,411	6,220	6,256	19,222	7,056	1,076	403	51	48,048
Reductions in stock										
Total reductions in stock	(479)	(997)	(9,550)	(15,843)	(14,384)	(283)	(271)	(6,163)	(78)	(48,048)
Net change in stock	2,874	3,414	(3,330)	(9,587)	4,838	6,773	805	(5,760)	(27)	-
Closing Stock (2017)	6,861	5,094	29,424	22,402	89,061	16,221	5,523	503	231	175,320
* Non-natural = Broad leaved plantations, Coniferous plantation, Small scale farmland, Commercial farmland, Built-up area										
No data = Impediments, No data										

Table 8 also reveals increases in the extent of wetlands and open waters between 2000 and 2017 (net change +6,773 ha and +805 ha, respectively). Again, net increases in the extent of Grassland (+ 4,838 ha) and net decreases in the extent of Bush (- 9,587 ha) are observed between 2000 and 2017. Small net increases in the extent of Tropical High Forest and a slight net decreases in Woodland (- 3,330 ha) are also observed between 2000 and 2017 in Table 8.

3.1.3 Natural Ecosystem Extent Account for Lake Mburo National Park

After Murchison Falls and Queen Elizabeth National Parks, Lake Mburo is the most visited protected area in Uganda (as discussed with respect to **Table 24** and the physical ecosystem

service supply and use accounts). **Table 9** presents the natural ecosystem extent account for Lake Mburo. **Table 9** reveals the extent of non-natural ecosystems remains relatively low in Lake Mburo National Park (660 ha in 2017, or around 2% of total extent).

As would be expected, **Table 9** shows that a relatively large portion of the park is open water (1,933 ha) and wetlands (4,570 ha). Small net increases in the extent of these ecosystems are observed between 2000 and 2017 (+283 and +1,416 ha, respectively). The remainder of the Lake Mburo National Park is made up of woodland, which remains stable in extent between 2000 (8,393 ha) and 2017 (8,493 ha) overall but shows relatively large gross additions (2,199 ha) and reductions (2,099ha) over this period. Substantial net decreases in the extent of Bush (-12,970 ha), offset by net increases in Grassland (+11,006 ha) are also observed in Table 9.

Table 9: Natural Ecosystem Extent Account for Lake Mburo National Park (in ha, 2000 and 2017).

Natural Ecosystem Extent Account	Lake Mburo 2000 to 2017									
Classifications >>	Tropical high forest well stocked	Tropical high forest low stocked	Woodland	Bush	Grassland	Wetland	Open-water	Non-natural	No data	TOTALS
Opening Stock (2000)	-	-	8,393	15,308	8,090	4,570	1,710	495	-	38,566
Additions to stock	-	-	-	-	-	-	-	-	-	-
Total additions to stock	-	-	2,199	874	12,438	1,777	378	526	-	18,192
Reductions in stock	-	-	-	-	-	-	-	-	-	-
Total reductions in stock	-	-	(2,099)	(13,844)	(1,432)	(361)	(95)	(361)	-	(18,192)
Net change in stock	-	-	100	(12,970)	11,006	1,416	283	165	-	-
Closing Stock (2017)	-	-	8,493	2,338	19,096	5,986	1,993	660	-	38,566
* Non-natural = Broad leaved plantations, Coniferous plantation, Small scale farmland, Commercial farmland, Built-up area										
No data = Impediments, No data										

3.1.4 Natural Ecosystem Extent Account for Kidepo Valley Park

Table 10 presents the natural ecosystem extent account for Kidepo Valley National Park. Again, the extent of non-natural ecosystems identified in the national park is very small (in fact close to zero in 2017). Kidepo Valley National Park is associated with savannah-type ecosystems. Table 10 again reveals a large increase in the extent of grasslands (+58,235 ha), offset by a commensurate decrease in Bush extent (-58,522) between 2000 and 2017.

Table 10: Natural Ecosystem Extent Account for Kidepo Valley National Park (in ha, 2000 and 2017)

Classifications >>	Tropical high forest well stocked	Tropical high forest low stocked	Woodland	Bush	Grassland	Wetland	Open-water	Non-natural	No data	TOTALS
Opening Stock (2000)	-	-	2,039	69,292	16,520	-	-	-	135	87,986
Additions to stock	-	-	-	-	-	-	-	-	-	-
Total additions to stock	-	-	1,529	1,662	59,663	-	-	47	112	63,013
Reductions in stock	-	-	-	-	-	-	-	-	-	-
Total reductions in stock	-	-	(1,387)	(60,184)	(1,428)	-	-	-	(14)	(63,013)
Net change in stock	-	-	142	(58,522)	58,235	-	-	47	98	-
Closing Stock (2017)	-	-	2,181	10,770	74,755	-	-	47	233	87,986

* Non-natural = Broad leaved plantations, Coniferous plantation, Small scale farmland, Commercial farmland, Built-up area
No data = Impediments, No data

3.1.5 Natural Ecosystem Extent Account for Bwindi Impenetrable National Park

Uganda is well known for having the world's largest population of mountain gorillas (54% of the global population, World Bank, 2020). Bwindi Impenetrable National Park is an essential protected area for safeguarding the habitat of mountain gorillas in the country, as well as globally. Table 11 presents the Natural Ecosystem Extent Account for Bwindi Impenetrable National Park.

Table 11: Natural Ecosystem Extent Account for Bwindi Impenetrable National Park (in ha, 2000 and 2017)

Classifications >>	Tropical high forest well stocked	Tropical high forest low stocked	Woodland	Bush	Grassland	Wetland	Open-water	Non-natural	No data	TOTALS
Opening Stock (2000)	31,652	-	25	-	-	-	-	315	23	32,015
Additions to stock	-	-	-	-	-	-	-	-	-	-
Total additions to stock	116	20	73	56	-	45	-	157	-	467
Reductions in stock	-	-	-	-	-	-	-	-	-	-
Total reductions in stock	(278)	-	-	-	-	-	-	(189)	-	(467)
Net change in stock	(162)	20	73	56	-	45	-	(32)	-	-
Closing Stock (2017)	31,490	20	98	56	-	45	-	283	23	32,015

* Non-natural = Broad leaved plantations, Coniferous plantation, Small scale farmland, Commercial farmland, Built-up area
No data = Impediments, No data

As Table 11reveals, the extent of Tropical High Forest Well-Stocked very much dominates the entire extent of the national park in 2000 and 2017. Furthermore, the extent of this ecosystem remains very stable with low gross additions (+116 ha) and reductions (-278 ha) between 2000 and 2017 ha observed in Table 11.

3.1.6 Natural Ecosystem Extent Account for Mgahinga Gorilla National Park

Mgahinga Gorilla National Park is the only other national park tourists can visit to engage in gorilla tracking. Table 12 presents the Natural Ecosystem Extent Account for Bwindi Impenetrable National Park. As Table 12 shows, Mgahinga Gorilla National Park is considerably smaller than Bwindi National Park. Within the park, the extent of Tropical High Forest Well-Stocked remains steady between 2000 (2,148 ha) and 2017 (2,266 ha), showing a net increase (+ 118 ha) over this period. Non-natural ecosystems have increased in extent in the national park (+162 ha, net change), possibly associated with land-use change in bush areas.

Table 12: Natural Ecosystem Extent Account for Mgahniga Gorilla National Park (in ha, 2000 and 2017).

Classifications >>	Tropical high forest well stocked	Tropical high forest low stocked	Woodland	Bush	Grassland	Wetland	Open-water	Non-natural	No data	TOTALS
Opening Stock (2000)	2,148	207	370	823	265	35	-	76	26	3,950
Additions to stock	-	-	-	-	-	-	-	-	-	-
Total additions to stock	176	-	110	-	-	-	-	200	-	486
Reductions in stock	-	-	-	-	-	-	-	-	-	-
Total reductions in stock	(58)	-	(148)	(242)	-	-	-	(38)	-	(486)
Net change in stock	118	-	(38)	(242)	-	-	-	162	-	-
Closing Stock (2017)	2,266	207	332	581	265	35	-	238	26	3,950

* Non-natural = Broad leaved plantations, Coniferous plantation, Small scale farmland, Commercial farmland, Built-up area
No data = Impediments, No data

3.1.7 Natural Ecosystem Extent Account for Rwenzori Mountains National Park

Table 13 presents the natural ecosystem extent account for Rwenzori Mountains National Park. As with the other protected areas, the extent of non-natural ecosystems remains in 2000 and

2017 (492 ha and 499 ha respectively, or around 0.5% of the extent of the protected area in both years).

As Table 13 also reveals, quite large net decreases in the extent of Tropical High Forest Well-Stocked are observed between 2000 and 2017 (-15,110 ha). These are associated with transitions to Tropical High Forest low Stocked (which shows net increases in the extent of +2,157 ha), Woodland (+6,509 ha), Bush (+3,312 ha) and Grassland (+2,318 ha) over the same period.

Table 13: Natural Ecosystem Extent Account for Rwenzori Mountains National Park (in ha, 2000 and 2017)

Classifications >>	Tropical high forest well stocked	Tropical high forest low stocked	Woodland	Bush	Grassland	Wetland	Open-water	Non-natural	No data	TOTALS
Opening Stock (2000)	79,340	-	7,561	351	9,904	-	139	492	1,707	99,494
Additions to stock										
Total additions to stock	384	2,157	6,638	3,345	2,360	69	52	291	828	16,124
Reductions in stock										
Total reductions in stock	(15,494)	-	(132)	(33)	(42)	-	(139)	(284)	-	(16,124)
Net change in stock	(15,110)	2,157	6,506	3,312	2,318	69	(87)	7	828	-
Closing Stock (2017)	64,230	2,157	14,067	3,663	12,222	69	52	499	2,535	99,494
* Non-natural = Broad leaved plantations, Coniferous plantation, Small scale farmland, Commercial farmland, Built-up area										
No data = Impediments, No data										

3.1.8 Natural Ecosystem Extent Account for Kibale National Park

Table 14 presents the natural ecosystem extent account for Kibale National Park. Table 14 reveals the extent of non-natural ecosystems has declined substantially between 2000 and 2017 (from 3,917 ha in 2000 to 1,629 ha in 2017).

As also shown in Table 14, net increases in the extent of Tropical High Forest Well-Stocked (+4,436 ha) and Tropical High Forest Low Stocked (+2,720 ha) are observed between 2000 and 2017. Across the same period, net decreases in the extent of Woodland (- 2,049 ha), Bush (-1,629 ha) and Grassland (-1,843 ha) are also observed.

Table 14: Natural Ecosystem Extent Account for Kibale National Park (in ha, 2000 and 2017).

Classifications >>	Tropical high forest well stocked	Tropical high forest low stocked	Woodland	Bush	Grassland	Wetland	Open-water	Non-natural	No data	TOTALS
Opening Stock (2000)	47,473	3,241	5,388	4,118	9,643	445	154	3,917	-	74,379
Additions to stock	-	-	-	-	-	-	-	-	-	-
Total additions to stock	6,482	5,864	1,177	1,889	1,801	620	68	803	38	18,742
Reductions in stock	-	-	-	-	-	-	-	-	-	-
Total reductions in stock	(2,046)	(3,144)	(3,226)	(3,518)	(3,644)	(66)	(7)	(3,091)	-	(18,742)
Net change in stock	4,436	2,720	(2,049)	(1,629)	(1,843)	554	61	(2,288)	38	-
Closing Stock (2017)	51,909	5,961	3,339	2,489	7,800	999	215	1,629	38	74,379
* Non-natural = Broad leaved plantations, Coniferous plantation, Small scale farmland, Commercial farmland, Built-up area										
No data = Impediments, No data										

3.1.9 Natural Ecosystem Extent Account for Mount Elgon National Park

Table 15 presents the natural ecosystem extent account for Mount Elgon National Park. As shown in Table 15, the extent of non-natural ecosystems is around 10% of the total extent of the national park. Whilst the extent of non-natural ecosystems shows a net decline from 9,024 ha in 2000 to 8,270 ha in 2017, there are relatively large gross additions (+3,046 ha) and reductions (+3,800 ha) that suggest some turn over in land use within the National Park.

Table 15: Natural Ecosystem Extent Account for Mount Elgon National Park (in ha, 2000 and 2017).

Classifications >>	Tropical high forest well stocked	Tropical high forest low stocked	Woodland	Bush	Grassland	Wetland	Open-water	Non-natural	No data	TOTALS
Opening Stock (2000)	62,824	6,371	3,150	19,326	9,261	-	-	9,024	-	109,956
Additions to stock	-	-	-	-	-	-	-	-	-	-
Total additions to stock	3,465	5,062	6,127	6,631	17,917	-	-	3,046	-	42,248
Reductions in stock	-	-	-	-	-	-	-	-	-	-
Total reductions in stock	(14,112)	(3,330)	(1,722)	(17,552)	(1,732)	-	-	(3,800)	-	(42,248)
Net change in stock	(10,647)	1,732	4,405	(10,921)	16,185	-	-	(754)	-	-
Closing Stock (2017)	52,177	8,103	7,555	8,405	25,446	-	-	8,270	-	109,956
* Non-natural = Broad leaved plantations, Coniferous plantation, Small scale farmland, Commercial farmland, Built-up area										
No data = Impediments, No data										

As with Rwenzori Mountains National Park, net decreases in the extent of Tropical High Forest Well-Stocked are observed between 2000 and 2017 (-10,647 ha). These are associated with net

increases in the extent of Tropical High Forest Low Stocked (+1,732 ha) and Woodland (+4,405 ha). Whilst not presented here, the land-cover change matrix used to produce Table 15 indicates that conversion to small-scale farmland was associated with a reduction in the extent of Tropical High Forest Well-Stocked of approximately 1,500 ha. As with the previous natural ecosystem extent accounts, Table 15 also reveals reversals in the extent of Bush and Grassland between 2000 and 2017.

3.2 Thematic Species Accounts

A second key component of the 'stocks' of biodiversity-related natural capital supporting wildlife-watching tourism is the populations of iconic species in areas that tourists visit. As the populations of these species reduce, so does the capacity of Uganda to attract tourists to view her wildlife. Of course, there are clearly important conservation imperatives for also maintaining healthy populations of these species.

The National Stocks of the five iconic species identified via the EWG meeting are summarised in Table 16. This information has been directly extracted from Table 1 of the UWA (2018) State of Wildlife Resources report. The trends in these and other medium to large mammals in Uganda are discussed in that report.

Ideally Table 16 would follow the asset type structure for accounts used for the natural ecosystem extent accounts. However, given the survey information used to compile the Species Accounts comes from different years for different species, the only way to harmonise this information for common opening and closing years would be to impute values based on interpolation between surveys. As such, the presentation of Species Accounts in this section largely follows the format set out in UWA (2018).

An inspection of Table 16 reveals that populations of elephants and buffalo have been increasing in Uganda since the 1990s (albeit they are still well below numbers observed in the 1960s). Whilst the national mountain gorilla numbers presented in Table 16 are low in absolute terms, they represent a substantial proportion of the remaining global population (estimated at 1,063 by WWF, 2019). As Table 16 also shows, mountain gorilla numbers have increased since around the 2000s. Some caution is required when comparing numbers from population surveys, as sampling

efforts may vary. Nonetheless, the trend in mountain gorilla populations in Uganda is encouraging and will have been an important contributing factor for the recent relisting of the subspecies as Endangered (from Critically Endangered), on the IUCN Red List in 2018 (IUCN, 2018).

For lions, Table 16 also provides a positive trend over the last 15 years or so. For chimpanzees, there is very limited information captured in Table 16. As shown, the national estimated population is around 5,000 in 2000.

Table 16: National Iconic Species Account for Uganda

Species >>	Chimpanzee	Gorilla	Lions	Elephant	Buffalo
1960	N/D	N/D	N/D	30,000	60,000
1982/83	N/D	N/D	N/D	2,000	25,000
1995/96	N/D	N/D	N/D	1,900	18,000
1999/2003	4,950	320	N/D	2,400	17,800
2004-06	N/D	302	N/D	4,322	30,308
2007-10	N/D	N/D	408	4,393	21,565
2011-14	N/D	400	493	5,739	36,953
2015-17	N/D	400	493	5,808	37,054
N/ = No Data Available					

Following the format of the Natural Ecosystem Extent Accounts section, the following sections present a subset of Species Accounts to illustrate the insights they can provide for the wildlife-watching tourism sub-sector.

3.2.1 Species Account for Murchison Falls National Park

Table 17 provides the Species Account for Murchison Falls National Park, based on the populations reported in UWA (2018) State of Wildlife Resources report. As Table 17 identifies, data on some mammal counts are distinguished for dry and wet season observations (this does not apply to the lion and crocodile counts)). As Table 17 reveals, Murchison Falls has large populations of three iconic species (elephant, buffalo and lion). The population of elephants appears to increase to over 1,000 from around 2005 to 2014, the most recent observations also suggest that buffalo populations have been similar between 2005 and 2014 at over 10,000. Table

17 suggests a decrease in the size of the lion population in the national park between 2004 and 2013, although there is some observed volatility in these numbers.

Generally, a positive trend is observed in populations of antelope and giraffe between the 1990s and 2010 / 2014. These species will be of interest to wildlife tourists in savannah ecosystems. Furthermore, the population of crocodiles is shown to have increased quite substantially in 2013. These animals are also likely to be very interesting to visitors to the park.

Table 17: Species Account for Murchison Falls National Park

Murchison Falls NP Classifications >>	Elephant	Buffalo	Lion	Giraffe	Ugandan Kob	Waterbuck	Warthog	Hartebeest	Crocodile
1995 (Wet)	201	1,087		100	6,355	539	411	3,068	230
1996									316
1999 (Dry)	778	3,889		347	7,458	792	1,639	1,639	
2000			181-467*						
2002			181-467*						
2004			350						
2005 (Dry)	516	11,004	263	245	9,315	1,441	2,298	2,298	
2010 (Wet)	904	9,192	132	930	36,640	6,430	1,962	3,589	180
2012 (Dry)	1,617	7,506		757	37,208	6,648	2,508	2,508	
2013			215						659
2014 (Wet)	1,330	12,841		860	58,313	5,240	4,986	8,108	
'Dry' means population from dry season observations, 'Wet' means poulation from wet season observations									
Lion populations from Table 5 UWA (2018) (* is for 2000-2002)									
Crocodile populations from Table 6 UWA (2018)									

3.2.2 Species Account for Queen Elizabeth Protected Area

The species populations estimated for the Queen Elizabeth Protected area presented in UWA (2018) cover the Queen Elizabeth National Park and associated Kyambura and Kigezi Wildlife Reserves. These estimates are based on a series of reports and surveys produced between 1980 and 2014. They are supported by further populations for key animal species, including lions and hippopotamuses presented in Tables 5 and 7 of UWA (2018). This information on Species populations for Queen Elizabeth Protected Area is collectively summarised as a Species Account in Table 18. The species selected for inclusion in Table 18 is broader than those identified as the five iconic species in Table 16. This is in part to provide a more nuanced picture of the range of wildlife supported by these areas and also in acknowledgment that national parks characterised

by savannah landscapes will not contain iconic species associated with forest landscapes (e.g., mountain gorillas or chimpanzees), and vice versa.

Table 18: Species Account for Queen Elizabeth Protected Area

Queen Elizabeth PA Species >>	Elephant	Buffalo	Lions	Hippopotamus	Uganda Kob	Topi	Waterbuck	Warthog
1980	150	4,200		5,000	20,000	1,500	2,100	1,100
1988/89	400	5,000		2,200	18,000	400	1,500	1,600
1992	500							
1995	1,088	16,549		2,958	31,899	493	1,860	1,175
1999	1,353	7,250	185	2,811	20,588	325	2,227	1,931
2000	1,086	10,674	206*	3,400	32,245	94	4,666	2,423
2001						100		
2002	998	6,807				157		
2004	2,497	6,777	200	2,632	17,440	440	3,382	1,880
2006	2,959	14,858		4,789^	20,971	1,521	3,548	1,388
2008				4,856^				
2010	2,502	8,128	144	5,233^	8,483	482	2,483	1,466
2012	3,018	12,825		4,726^	19,855	1,097	2,767	1,465
2014	2,913	15,771		5,792^	12,987	2,049	2,981	1,456
2016				6,547^				
2018				6,654^				
Population data from Uganda Wildlife Authority (2018) State of Wildlife Resources in Uganda								
Population data from Table 2, except for: Lion populations from Table 5 UWA (2018) (* is for 2000-2002)								
^ = Selected Hippopotamus population numbers from Table 7 UWA (2018)								

As Table 18 shows, Queen Elizabeth National Park contains a reasonably high number of elephants (2,913 in 2014) and buffalo (15,771 in 2014). The numbers of these species appear to have improved and stabilised in recent years.

Table 18 also shows a population of lions at the park, also an iconic species for wildlife-watching tourism. However, populations of this iconic species appear to have reduced from around 200 in 2000 to 144 in 2010.

With respect to the other species in Table 18, the populations of hippopotamus appear to have steadily increased from around 3,000 in 2000 to over 6,500 in 2018. Whilst showing some

variability in trends, the abundance of topi and waterbuck antelopes are around 2,000 and 3,000 individuals in 2014. Whilst populations of Ugandan kob show declines from the 1990s, Table 18 indicates a population of around 13,000 in 2014. Collectively, these antelopes will be interesting to wildlife-watching tourists, not least because they are important prey for lions.

3.2.3 Species Account for Kidepo Valley National Park

Table 19 presents the Species Account for Kidepo Valley National Park. As shown in Table 19, Kidepo Valley contains a population of the iconic species of elephants (407 in 2014), buffalo (6,147 in 2014) and lions (132 in 2010, similar to Queen Elizabeth National Park). The numbers of elephants appear relatively stable since 2000 and have improved from the 1990s. Table 19 suggests increases in the populations of buffalo (from 1,500 to 6,147) between 2000 and 2014 and lions (from 35-60 to 132) between 2000 and 2010.

Table 19 also reveals that there are populations of other species that are likely to be interesting to wildlife-watching tourists visiting Uganda. These include giraffe, zebra, ostrich and antelopes (eland, hartebeest, oribi, waterbuck). Although the population numbers in Table 19 are low, the trend is encouraging between 2012 and 2014.

Table 19: Species Account for Kidepo Valley National Park

Kidepo Valley NP Species >>	Elephant	Buffalo	Lions	Eland	Giraffe	Hartebeest	Oribi	Ostrich	Warthog	Waterbuck	Zebra
1981	411	564		200	160	1,400					450
1991	212				5						
1992	215				8						
1998	250	700		50	8						400
2000	390	1,500	35-60*		8	130					300
2002	420	1,800		7	9	250					150
2004			25								
2005	454	2,750		13	14	338	39		42		94
2008	387	3,643				295	132		107	44	25
2010			132								
2012	440	3,912		17	17	524	19	58	25	178	75
2014	407	6,147		28	20	1,785		213			153
Population data from Uganda Wildlife Authority (2018) State of Wildlife Resources in Uganda, Table 3											
Lion populations from Table 5 UWA (2018) (* is for 2000-2002)											

3.2.4 Species Account for Bwindi Impenetrable Forest National Park

Bwindi Impenetrable National Park is a globally important area for the protection of mountain gorillas. Trekking activities to view these species is also a major draw for wildlife-watching tourists visiting Uganda. The Species Account Bwindi Impenetrable National Park is presented in Table 20 and solely focuses on this iconic species. This is because UWA's (2018) State of Wildlife Resources report only presents species data on this mammal for this protected area. Steady increases in the population of mountain gorillas are observed from the 1990s (250 gorillas counted in the park in 1994) to 2011 (400 counted) Table 20.

Table 20: Species Account for Bwindi Impenetrable National Park

Bwindi Impenetrable NP Species >>	Mountain Gorilla
1987	280
1994	250
1997	290
2002	310
2006	330
2011	400
Population data from Wildlife Authority (2018)	
State of Wildlife Resources in Uganda, Figure 22	

3.2.5 Species Account for Kibale National Park

Table 21 presents a Species Accounts for Kibale National Park. As Table 21 shows, Kibale National Park contains populations of three iconic species, elephant, buffalo and chimpanzees. The populations of elephants also appear to have improved quite substantially between 2001 and 2010. There is also a substantial population of chimpanzees, around a quarter of the national population in 2010.

In addition to the three iconic species, the UWA (2018) State of Wildlife Resources report also provides information on population numbers for other species, mainly primates. These are also included in Table 21 to give a broader insight into other wildlife-watching tourism activities the national park could support. Table 21 also shows quite substantial decreases in the populations of red-tailed monkeys between 2001 and 2010. Nonetheless, the population of this monkey, as

well as red colobus, grey-cheeked Mangabeys, black and white colobus and baboons all exceeded 10,000 in 2010. As such, Kibale National Park would be very interesting as a destination to wildlife-watching tourists particularly interested in seeing a variety of primates, as well as iconic species such as elephants and buffalo.

Table 21: Species Account for Kibale National Park

Kibale NP Species >>	Elephant	Buffalo	Chimpanzees	Red tailed monkey	Red colobus monkeys	Grey Cheeked Mangabeys	Black and White colobus monkeys	Baboons	Bush Pig
2001	262	124	1,298	33,460	32,980	16,210	7,970		400
2005	393	554	921	37,312	30,218	11,603	7,346	6,468	
2010	487	402	1,068	17,324	28,906	12,191	10,459	12,390	

Population data from Uganda Wildlife Authority (2018) State of Wildlife Resources in Uganda, Section 2.4.7

3.2.6 Species Account for Mount Elgon National Park

The Species Account for Mount Elgon National Park is presented in Table 22. As in Table 22, there are a number of different primate and antelope species identified in the park. However, the populations of species appear to have declined between the mid-2000s and 2012.

It is unclear how much this is an artefact of differences in survey effort and intensity or indicative of significant loss of species within the national park. Indeed, between 2011 and 2012 the population of Buffalos falls from 34 to 0, Black and White Colobus from 550 to 177 and Blue Monkey 723 to 67.

It is highlighted that the species population data in Table 22 has been obtained from the Mount Elgon National Park Management Unit Office, rather than from the UWA (2018) State of Wildlife Resources Report. Further work is required to validate the Species Account in Table 22. At the current time, using the information in Table 22 should be done with caution. For instance, for identifying the species that may be present in the national park.

Table 22: Species Account for Mount Elgon National Park

Mount Elgon NP Species >>	Buffalo	Baboon	White Colobus Monkey	Blue Monkey	Red Tailed Monkey	Duiker	Sitatuga	Hyaena	Bush buck	Bush pig	Waterbuck	Giant forest hog	Leopard
2004	2	97	4,004	1,691	8	16		0	6	52		2	
2005	14	308	1,931	1,256	7	48		0	16	50		2	2
2006	6	29	1232	539	41	62	1	15	60	71		0	
2007	2	121	1,724	1,270	8	23		1	15	9			1
2008	0	95	1,212	794	6	25	1	1	15	6			1
2009	4	61	44	203	1	22		1	2	7		2	
2010	18	69	385	190	0	12		5	1	13			
2011	34	35	550	723	1	7		0	1	12		2	
2012	0	11	177	67	31	0	14		0	1	4		
Population data from MENP Management Unit Offices, Mbale													

3.2.6 Species Account for Lake Mburo National Park

Table 23 provides the Species Account for Lake Mburo National Park. In 2014, the population of buffalo exceeded 1,000. Lions were also identified as an iconic species for wildlife-watching tourism in the park, although only 1 or 2 individuals are intermittently identified in Table 23. Based solely on this information, it remains unclear if these iconic species are currently present in the park.

Beyond the iconic tourism species, the population of hippopotamuses appears similar between 1999 and 2012, at around 300. The populations of zebra, waterbuck and impala have increased substantially between the mid-2000s and 2010 / 2014, although this may be an artefact of differences in surveying approaches.

Table 23: Species Account for Lake Mburo National Park

Lake Mburo NP Species >>	Buffalo	Lion	Eland	Hippopotamus	Impala	Topi	Warthog	Waterbuck	Zebra
1995	25		273	5	6,599	57	571	241	2,430
1996	105		88	76	7,442	111	480	287	1,574
1997			285		6,817	362	964	485	3,254
1998			1,442		4,124	81	559	427	3,748
1999	486		199	303	1,595	183	550	598	2,249
2002	132	2*	28	97	2,956	271	493	396	2,665
2004	946		606	213	3,300	162	560	548	4,280
2006	1,115		296	357	4,705	148	741	1,072	5,968
2010	591		1,323		33,565			3,495	11,778
2012	574		1,378	296	29,285			3,644	11,974
2013		1							
2014	1,077		859		20,408		805	2,166	11,849
Population data from Uganda Wildlife Authority (2018) State of Wildlife Resources in Uganda, Table 3									
Figures 14 & 15. Lion populations from Table 5 UWA (2018) (* is for 2000-2002)									

3.3 Physical Ecosystem Services Supply and Use Accounts

The Physical Ecosystem Service Supply and Use Table (PSUT) for the *'recreation-related'* ecosystem service supplied by the EAAs (Protected Areas) are presented in Table 24. These accounts cover the period from 2011 to 2019. It is highlighted that these statistics represent calendar years, not the financial year in Uganda (July to June).

The top right section of Table 24 presents statistics on wildlife-watching tourism visits disaggregated by protected areas (i.e., the supply side of the ecosystem service transaction). This information is disaggregated by year in the rows. As this part of the account shows, there has been a steady and substantial increase in visits to the protected areas considered from 2012 (202,855 visits) to 2018 (330,528 visits, including visits to NFA Central Forest Reserves). There is a slight drop in 2019, but this data does not include visits to NFA forest reserves.

Table 24 reveals the supply of the ecosystem services is dominated by visits to Murchison Falls National Park (103,665 visits in 2019) and Queen Elizabeth National Park (77,995 visits in 2019).

Elsewhere, Bwindi Impenetrable and Lake Mburo and National Parks contribute approximately 35,000 visits each to the national total in 2019 (36,341 and 33,188 visits, respectively). Table 24 reveals there were 19,251 visits to Kibale, 22,577 visits to Semiiki and 12,648 visits to Kidepo Valley National Parks in 2018. As Table 24 shows, visits to Mount Elgon (2,980 visits), Mgahinga (7,593 visits) and Rwenzori Mountains National Parks (6,043 visits) were less than 8,000 in 2019. Although it should be noted Mgahinga is a small national park. Less than 1,000 visits were recorded for Toro Semiliki Wildlife Reserve in 2019 (771 visits).

The upward trend in visitors is generally reflected across most of the Protected Areas in Table 24. Notable exceptions to this are the Toro Semiliki Wildlife Reserve, where visits were over 4,000 in 2013 and 2014 and have since fallen to below 1,000 from 2015. Bwindi Impenetrable and Kibale National Parks do show a decline in visitor numbers from 2014 levels to lower levels in 2015 and 2016, before recovering to around 2014 levels in 2017 and substantially exceeding these in 2018 and 2019. A decrease in visits to Mount Elgon National Park is noted between 2017 and 2019.

In addition to the visits to the UWA-managed National Parks and Wildlife Reserves, Table 24 also presents data on visits to the Kalinzu and Budongo Central Forest Reserves (CFRs) managed by the NFA. Table 24 shows that there is also an increase in visitors to the Kalinzu CFR between 2017 and 2018. It is highlighted that Table 24 does not capture all visitors to the NFA CFRs, visits to important sites for ecotourism such as Mabira and Mpanga CFRs, and the remaining CFRs NFA manage are not included. Visitor monitoring data for these CFRs is likely to be available in future years and would be a very useful addition for these accounts.

The bottom left part of Table 24 shows the physical use of the *'recreation-related'* ecosystem service disaggregated by economic unit. Following the conventions of the SEEA EA, the use of these services is attributed to the people experiencing the ecosystem (i.e. the visitor, with an aggregate proxy value of 323,861 visits in 2019). The use of the ecosystem service is treated as final consumption by households. As per the accounting conventions, physical ecosystem service supply matches use. As set out in Figure 1, it is the government manages the ecosystem and hence receives the money from the related transaction in which tourists pay for access to the parks.

These values in monetary terms are presented in the monetary ecosystem services and SNA Goods and Services accounts in the following sections.

3.4 Monetary Ecosystem Services Supply and Use Accounts

Table 25 presents the Monetary Supply and Use Tables (MSUT) for the *'recreation-related'* ecosystem service. These follow the same structure as the PSUT presented in Table 24. The MSUTs show the expenditure by tourists on park entrance rose from approximately UgX. 9 billion in 2011 to nearly UgX. 26 billion in 2019.

In recent years, Murchison Falls National Park has generated the highest entrance ticket revenues, approaching UgX. 8 billion in 2018 and 2019. Queen Elizabeth and Bwindi Impenetrable National Parks have also generated relatively high entrance fee revenues, exceeding UgX. 5 billion each in 2018 and 2019. Elsewhere, Lake Mburo and Kibale NPs generated over UgX. 2.5 billion each in 2018 and 2019. It is highlighted that these values are marginal overestimates, as entrance fee discounts have not been applied to child visitors. However, the overestimate is expected to be <10%.

Whilst the remaining National Parks generated less than UgX. 1 billion in entrance fee revenues in 2018 and 2019, these revenues generally increase substantially from 2011. In particular, the park entrance revenues for Kidepo Valley National Park increase from <100 million in 2011 to nearly 700 million in 2019. Similar increases are observed for Mgahinga Gorilla National Park.

Table 24: Physical Ecosystem Services Supply and Use tables for 'recreation-related' ecosystem services (2011 to 2019, Visitor Numbers)

	Users		Ecosystem Service Suppliers														
	Economic Unit		Protected Areas														
Classifications >>	Households (Visitors)*	TOTAL USED	Queen Elizabeth (QENP)	Murchison Falls (MFNP)	Lake Mburo (LMNP)	Bwindi Impenetrable (BINP)	Kibale (KNP)	Semiliki (SNP)	Kidepo Valley (KVNP)	Mount Elgon (MENP)	Mgahinga Gorilla (MGNP)	Rwenzori Mountains (RMNP)	Toro Semiliki SWR	Kalinzu NFA Forest Reserve	Budongo NFA Forest Reserve	TOTAL SUPPLIED (Protected areas)
Physical Supply *(Visitors)*																
2011			87,924	60,272	21,480	17,334	10,433	3,152	2,452	2,351	1,900	1,738	770	-	-	209,806
2012			58,172	60,803	22,927	18,259	10,372	3,591	2,300	1,565	2,497	1,663	-	-	-	182,149
2013			69,193	70,798	14,068	21,695	10,834	5,752	2,890	2,096	8,952	2,724	4,948	-	-	213,950
2014			58,769	66,844	20,611	26,980	12,097	3,033	2,758	564	4,824	2,314	4,091	-	-	202,885
2015			72,964	65,366	24,979	16,476	10,463	10,389	5,663	2,669	2,648	3,343	598	-	-	215,558
2016			85,905	75,360	26,012	19,522	11,760	8,214	7,824	3,335	3,840	3,192	761	-	-	245,725
2017			81,660	93,256	30,403	26,576	15,728	12,850	11,018	4,391	5,505	3,633	651	998	-	286,669
2018			86,875	102,305	35,206	37,514	18,843	16,628	12,056	3,405	6,781	5,146	586	1,278	3,905	330,528
2019			77,995	103,665	33,188	36,341	19,521	22,577	12,648	2,980	7,593	6,043	771	-	-	323,322
Physical Use *(Visitors)*																
2011	209,806	209,806														
2012	182,149	182,149														
2013	213,950	213,950														
2014	202,885	202,885														
2015	215,558	215,558														
2016	245,725	245,725														
2017	286,669	286,669														
2018	330,528	330,528														
2019	323,322	323,322														

Data for UWA parks for 2011 to 2017obtained from UWA and MTWA Tourism Sector Statistical Abstracts and Performance Reports

Data for 2018 and 2019 for UWA Parks obtained from UWA records. Data for NFA Forest Reserves obtained from NFA records

*Following the SEEA EA convention for the treatment of cultural ecosystem services, these are used by households in final consumption.

Table 25: Monetary Ecosystem Services Supply and Use Tables for *'recreation-related'* ecosystem services (2011 to 2019, Park Entrance Fees)

Classifications >>	Users Economic Unit		Ecosystem Service Suppliers — Protected Areas											
	Households (Visitors)*	TOTAL USED	Queen Elizabeth (QENP)	Murchison Falls (MFNP)	Lake Mburo (LMNP)	Bwindi Impenetrable (BINP)	Kibale (KNP)	Semliki (SNP)	Kidepo Valley (KVNP)	Mount Elgon (MENP)	Mgahinga Gorilla (MGNP)	Rwenzori Mountains (RMNP)	Toro Semiliki SWR	TOTAL SUPPLIED (Protected areas)
Monetary Supply *(Park Entrance, Ush. '000s)*														
2011			2,466,119	2,786,801	871,248	1,382,085	797,106	48,590	98,421	48,590	112,448	91,324	25,161	8,727,893
2012			2,008,883	2,919,518	971,499	1,548,464	788,968	54,711	104,022	37,840	160,190	98,959	-	8,693,054
2013			2,617,838	3,556,121	688,797	1,913,687	829,041	62,419	146,664	46,852	409,732	129,083	190,129	10,590,363
2014			2,283,920	3,792,037	2,062,358	1,385,844	1,102,508	199,680	106,450	24,981	84,432	59,089	169,935	11,271,232
2015			2,727,058	4,177,555	1,380,373	2,015,139	1,192,812	91,945	317,680	81,690	225,643	130,841	32,001	12,372,736
2016			3,806,279	5,282,544	1,526,935	2,522,634	1,512,555	72,664	417,071	94,168	364,943	150,405	30,461	15,780,659
2017			4,790,606	6,666,448	1,956,771	3,620,395	2,091,154	106,496	554,825	113,426	513,022	176,013	55,479	20,644,635
2018			5,360,168	7,941,381	2,551,496	5,410,650	2,653,233	182,938	717,339	102,571	750,152	256,509	44,037	25,970,474
2019			5,266,778	7,824,221	2,547,461	5,222,227	2,724,987	186,801	674,691	101,744	837,928	257,538	55,306	25,699,681
Monetary Supply *(Park Entrance, Ush. '000s)*														
2011	8,727,893	8,727,893												
2012	8,693,054	8,693,054												
2013	10,590,363	10,590,363												
2014	11,271,232	11,271,232												
2015	12,372,736	12,372,736												
2016	15,780,659	15,780,659												
2017	20,644,635	20,644,635												
2018	25,970,474	25,970,474												
2019	25,699,681	25,699,681												

Data for UWA parks for 2011 to 2017obtained from UWA and MTWA Tourism Sector Statistical Abstracts and Performance Reports

Data for 2018 and 2019 for UWA Parks obtained from UWA records. Monetary values based on published UWA tariffs for park entrance fees.

*Following the SEEA EA convention for the treatment of cultural ecosystem services, these are used by households in final consumption.

3.5 Physical SNA Goods and Services Supply and Use Accounts

The SNA Goods and Services Supply and Use Accounts describe the transactions between those economic units using the *'recreation-related'* ecosystem service and the ultimate consumer of this service and related goods and services. The physical SNA Goods and Service Account is presented in Table 26. Table 26 focuses purely on the disaggregation of consumption of the *'recreation-related'* ecosystem service by tourist type. It is highlighted that these accounts can be readily generated for individual protected areas. This information is also routinely reported in the MTWA Statistical Abstracts.

Table 26: Physical SNA Goods and Services Supply and Use Accounts

Classifications >>	Producers Economic Unit — Government (Run National Parks)	TOTAL USED	Consumers Households — Foreign Non Residents (International Visitors)	Foreign Residents (Domestic Visitors)	EAC Visitors	Students (Domestic Visitors)	Unallocated*	TOTAL CONSUMED
Physical Supply *(Visitors)*								
2011	209,806	209,806						
2012	182,149	182,149						
2013	213,950	213,950						
2014	202,885	202,885						
2015	215,558	215,558						
2016	245,725	245,725						
2017	286,669	286,669						
2018	330,528	330,528						
2019	323,322	323,322						
Physical Use *(Visitors)*								
2011			81,999	15,015	44,390	62,678	5,724	209,806
2012			81,470	17,101	43,683	37,812	2,083	182,149
2013			99,622	16,871	52,169	42,363	2,925	213,950
2014			89,402	15,354	49,480	45,774	2,875	202,885
2015			77,206	14,775	54,770	65,074	3,733	215,558
2016			95,949	15,778	62,142	70,299	1,557	245,725
2017			123,237	14,711	78,684	66,463	3,574	286,669
2018			150,931	14,038	90,914	68,281	6,364	330,528
2019			153,850	11,459	76,854	77,605	3,554	323,322

Data for UWA parks for 2011 to 2017obtained from UWA and MTWA Tourism Sector Statistical Abstracts and Performance Repo
Data for 2018 and 2019 for UWA Parks obtained from UWA records.
*Unallocated visitors are: Transit, VIP and UWA visitors to UWA managed parks / reserves and all visitors to NFA Forests

As Table 26 reveals, there has been a substantial and steady increase in the number of Foreign Non-Resident Visitors to the National Parks, increasing by approximately 90% between 2011 to

2019. In 2019 the number of these types of visitors was 153,850, or around 50% of all visits. These visitors are important as a source of foreign exchange (or export) revenue.

The rise in Foreign Non-Resident Visitors is also mirrored by similar relative increases in more local East African Community (EAC) visitors. The numbers of these visitors increased by approximately 75% between 2011 to 2019, although a slight drop in the numbers of these visitors is noted between 2018 and 2019.

3.6 Monetary SNA Goods and Services Supply and Use Accounts (2012 and 2019)

The Monetary SNA Goods and Service Accounts provide information on the values of the transactions between those economic units relying on the *'recreation-related'* ecosystem service to produce related goods and services and the tourists that consume them. Together with the ecosystem services accounts, they provide an extended articulation of supply and use between ecosystems and multiple economic actors in the wildlife-watching tourism sub-sector. The products and services in the accounts include the value of the park entrance and recreational activities that accrue to the government, as managers of the National Parks and other protected areas. They also include additional services, such as accommodation, meals and transport, revenue from which may accrue to other economic units. By using a common monetary metric, information on these different services and goods can be combined and aggregated.

Whilst monetary information on the transactions of these goods and services may be recorded elsewhere in the SNA, it is not aligned or integrated with information on the 'Stock' of ecosystem assets that support their provision (e.g., Protected Areas, the natural ecosystems they contain and the species they support). Understanding the full value of economic activity supported by these assets is key for efficient economic planning for wildlife-watching tourism, determining investment levels, and also identifying which wildlife-watching tourist markets to develop and what the likely returns may be. It also reveals the full magnitude of economic activity dependent on the sustainable management of protected areas, natural ecosystems and the species that use them and an incentive to conserve and enhance them.

The top left part of Table 27 presents the value of the SNA Goods and services associated with wildlife-watching tourism that accrue to different economic units in 2012. An important insight from Table 27 is that the total expenditure associated with the wildlife-watching tourism sub-sector around the national parks and wildlife reserves considered in this report exceeds UgX. 62 billion in 2012. This is an order of magnitude higher than the ecosystem service values associated with visitor park entrance fees reported in Table 25.

Further inspection of Table 27 highlights the importance of gorilla Tracking as a source of revenue for UWA, contributing in excess of UgX. 18 billion in 2012. Other recreation activities are also important, contributing approximately UgX. 6.5 billion in 2012. As Table 27 reveals, other business operators also benefit from the consumption of products and services by wildlife-watching tourists. In particular, Table 27 indicates businesses providing accommodation and catering services generated revenues of around UgX. 17.5 billion in 2012. These revenues are based on imputed expenditure from the TEMS 2012) for international tourists only. Businesses involved in providing travel, retail and other services also generated revenues approaching UgX. 9 billion in 2012. Collectively, these economic activities will support a number of jobs and livelihoods local (and on route) to wildlife-watching tourism destinations.

The bottom right section of Table 27 presents the value of the expenditure on these products and services by type of tourist (this is final consumption by household). This comprises information on whether the tourist is an international (foreign non-resident), a foreign resident, an East African Community (EAC), or a student visitor. This provides useful information on which consumers participate the most in transactions. For example, Table 27 reveals that well over half the economic activity associated with wildlife-watching tourism is derived from international tourists from outside the EAC, over 34 billion in 2012. Given international tourists are not economic residents of Uganda, these expenditures represent export revenues.

Two caveats to the above are highlighted. The international expenditure of over 34 billion in 2012 by international tourists is an underestimate. This is because it is not possible to assign recreation activities, such as gorilla tracking, to specific tourist categories at this time. It is also important to highlight that the absence of expenditure data for Foreign Resident, EAC and other domestic visitors in Table 27 implies no expenditure. It indicates that further work is required to

obtain data to impute these values for these visitor categories. This is because the TEMS is designed to survey non-residents visiting Uganda (World Bank, 2020).

The Monetary SNA Goods and Service Account for 2019 is presented in Table 28. As Table 28 reveals, the total expenditure associated with wildlife-watching tourism has increased to approximately UgX. 187.5 billion in 2019. By 2019 revenues generated by UWA from gorilla Tracking have risen to approximately UgX. 72 billion and for other recreational activities to over UgX. 15 billion. Table 28 also indicates businesses providing accommodation and catering services to international wildlife-watching tourists generated revenues of around UgX. 41.5 billion in 2019. Businesses providing travel retail and other services to these tourists also generated revenues over UgX. 32 billion in 2019. Table 28 indicates that the expenditure of international wildlife-watching tourists from outside the EAC during their visits was approximately 96.5 billion in 2019 (based on entrance fees and expenditures imputed from the TEMS).

Table 27: Monetary SNA Goods and Services Supply and Use Accounts (2012)

Classifications >>	Producers — Type of Economic Unit — Government (UWA run National Parks)	Businesses (Private operators)	TOTAL USED	Consumers — Type of Consumer — Foreign Non Residents (International Visitors)	Foreign Residents (Domestic Visitors)	EAC Visitors	Students (Domestic Visitors)	Unallocated*	TOTAL CONSUMED
SNA Supply Products & Services (2012, Ush. '000s)									
Park entrance	8,693,054	-	8,693,054						
Vehicle entrance	1,094,660	-	1,094,660						
Gorilla tracking	18,504,533	-	18,504,533						
Other recreational activities	6,411,628	-	6,411,628						
Hotels, bars and restaurants (International)	299,971	17,437,188	17,737,160						
Retail trade (International)	-	3,721,468	3,721,468						
Travel services (International)	-	4,711,899	4,711,899						
Other services (International)	-	1,320,547	1,320,547						
TOTAL	35,003,846	27,191,102	62,194,949						
SNA Use Products & Services (2012, Ush. '000s)									
Park entrance				7,111,362	1,060,491	428,690	92,511	-	8,693,054
Vehicle entrance				-	-	-	-	1,094,660	1,094,660
Gorilla tracking				-	-	-	-	18,504,533	18,504,533
Other recreational activities				-	-	-	-	6,411,628	6,411,628
Hotels, bars and restaurants (International)				17,737,160	-	-	-	-	17,737,160
Retail trade (International)				3,721,468	-	-	-	-	3,721,468
Travel services (International)				4,711,899	-	-	-	-	4,711,899
Other services (International)				1,320,547	-	-	-	-	1,320,547
TOTAL				34,602,436	1,060,491	428,690	92,511	26,010,821	62,194,949

"-" Means No data available; *Unallocated means the expenditure cannot be assigned to a tourist type

Table 28: Monetary SNA Goods and Services Supply and Use Accounts (2019)

Classifications >>	Producers — Type of Economic Unit: Government (UWA run National Parks)	Businesses (Private operators)	TOTAL USED	Consumers — Type of Consumer: Foreign Non Residents (International Visitors)	Foreign Residents (Domestic Visitors)	EAC Visitors	Students (Domestic Visitors)	Unallocated	TOTAL CONSUMED
SNA Supply Products & Services (2019, Ush. '000s)									
Park entrance	25,699,681	-	25,699,681						
Vehicle entrance	789,876	-	789,876						
Gorilla tracking	71,913,644	-	71,913,644						
Other recreational activities	15,366,212	-	15,366,212						
Hotels, bars and restaurants (International)	493,069	41,013,200	41,506,268						
Retail trade (International)	-	10,206,409	10,206,409						
Travel services (International)	-	14,629,289	14,629,289						
Other services (International)	-	7,484,803	7,484,803						
TOTAL	114,262,481	73,333,700	187,596,181						
SNA Use Products & Services (2019, Ush. '000s)									
Park entrance				22,738,452	1,258,780	1,501,950	200,499		25,699,681
Vehicle entrance				-	-	-	-	789,876	789,876
Gorilla tracking				-	-	-	-	71,913,644	71,913,644
Other recreational activities				-	-	-	-	15,366,212	15,366,212
Hotels, bars and restaurants (International)				41,506,268	-	-	-	-	41,506,268
Retail trade (International)				10,206,409	-	-	-	-	10,206,409
Travel services (International)				14,629,289	-	-	-	-	14,629,289
Other services (International)				7,484,803	-	-	-	-	7,484,803
TOTAL				96,565,221	1,258,780	1,501,950	200,499	88,069,731	187,596,181

"-" Means No data available; *Unallocated means the expenditure cannot be assigned to a tourist type

4.0 INTEGRATED ANALYSES

One of the most useful features of the SEEA is its ability to organize and present physical and monetary information coherently and consistently (UN et al., 2014a). Combined presentations of this information allow users to find relevant aggregates and indicators on the interactions between the economy and the environment in a single location. By design, these combined presentations include only a limited set of variables most relevant to the environmental or economic concern of interest.

The integrated analysis in this section provides a set of key aggregates from the biodiversity and tourism accounts in a combined presentation for different protected areas. This is presented as Table 29, which makes use of the most recent data obtained from the set of biodiversity and tourism accounts. In addition to key aggregates from biodiversity and tourism accounts, additional socio-economic data on revenue sharing, poverty incidence in neighboring districts and unemployment from neighboring regions is presented in Table 30 (as discussed in Section 2.5). Ideally, these would be presented in a combined data but the number of columns makes this difficult.

The combined presentation is intended to directly support decision-makers, by presenting key indicators from the biodiversity and tourism accounts to inform on policy goals and targets related to the wildlife-watching tourism sector. A key purpose for the integrated analysis these combined presentations support is to identify the potential role for wildlife-watching tourism in green growth, including poverty alleviation and income generation. In particular, informing on the Policy Uses and User Needs identified in **Table 1**. Below, key insights from the integrated analysis of the accounts and the combined presentation in Table 29 and Table 30 for these policy questions are presented:

- **What are the trends in biodiversity that support tourism activities?** For the 11 protected areas in Table 29, the ecosystem extent accounts reveal that a vast majority of these areas remain natural ecosystems (generally around 98% or more, although Mount Elgon this is 92.5%). Loss of Tropical High Forest Well-Stocked is noted for Mount Elgon and the Rwenzori Mountains National Parks, although these parks are associated with relatively low tourism activity. However, Table 29 reveals that a considerable portion of

these national parks remain Tropical High Forest Well-Stocked (47.5% for Mount Elgon and 64.6% for the Rwenzori Mountains National Parks). These stocks of important natural ecosystems could support more nature-based tourism, particularly given they are in mountainous areas. They may also support other species of interest to tourists, such as interesting birds.

The UWA (2018) State of Wildlife Resources Report provides a nuanced analysis of species trends, as do the Species Accounts presented in Section 3.2. However, with respect to the 5 iconic tourist species identified by the Expert Working Group, Table 29 reveals:

- o Bwindi Impenetrable and Mgahinga Gorilla National Parks maintain important populations of gorillas.

- o Murchison Falls, Queen Elizabeth and Kidepo Valley National Parks maintain important populations of lions. It is possible Lake Mburo also contains lions. Increasing the numbers of these species in the park could boost tourism activity

- o Kibale National Park maintains an important population of chimpanzees (and other primates) that could support more tourism activities focused on primates.

- o Murchison Falls, Queen Elizabeth, Kibale and Kidepo Valley National Parks maintain important populations of elephants and buffalo. Lake Mburo National Parks maintain important populations of buffalo.

- **What is the value of tourism expenditure (tourism earnings) per site and per species?** Table 29 reveals the value of park entrance fees across different protected areas in 2019 ranged from approximately UgX. 55 million (Toro Semiliki SWR) to more than UgX. 7.8 billion (Murchison Falls National Park) in 2019. Whilst it is not possible to impute the value of all tourism expenditure around visits to protected areas, the TEMS for 2019 suggests that local expenditure by international tourists on hotels, bars, catering, retail and other services in 2019 ranged from approximately UgX. 133 million (Toro Semiliki SWR) to in excess UgX. 16.5 billion in 2019 around Murchison Falls National Park.

Table 28 reveals the revenues associated with gorilla tracking in Bwindi Impenetrable and Mgahinga Gorilla National Parks approached UgX. 72 billion in 2019. Table 28 also reveals the revenues associated with other recreational activities across the protected areas in Table 29 exceeded UgX. 15 billion in 2019.

- **Can we show the return on investment in the tourism industry and support the case for further investment to unlock more opportunities for sustainable wildlife-based tourism?** The expenditures outlined above provide an insight into the full range of wildlife-watching tourism activities supported by different protected areas and their economic value. These should be accepted as lower bounds, as they do not consider all expenditure associated with the full length of wildlife-watching tourists in Uganda or EAC visitors. As Table 29 reveals, the number of international visitors and highest expenditures are associated with Murchison Falls and Queen Elizabeth National Parks, the two largest. However, Kidepo Valley, the Rwenzori Mountains and Mount Elgon are also large national parks, with the latter two having large areas of tropical high forest (well-stocked). Kidepo Valley also has similar species to the Murchison Falls and Queen Elizabeth National Parks. Table 29 provides an insight into the potential returns that could be realized for the government and local businesses from developing tourism activities in these areas. Particularly, for international tourists and increasing export revenues. For instance, this could include investment in marketing, access and hospitality infrastructure.

Table 29: Combined Presentation of Biodiversity and Tourism Accounts

Protected Area	Biodiversity-related natural capital											Tourism information				
	Total Extent (Ha)	Extent Natural Ecosystems (%, 2017)	Extent Tropical High Forest(%, 2017)	Extent Open Water (%, 2017)	Gorilla (2010 or latter)	Lions (2010 or latter)	Chimpanzees (2010 or latter)	Elephant (2010 or latter)	Buffalo (2010 or latter)	Other Primates (2010 or latter)	Antelope (2010 or latter)	International visitors, 2019	Foreign Resident and EAC visitors, 2019	UWA Entrance Fees, 2019,'000s Ush.	Foreign exchange revenue, 2019, '000s Ush.	International tourism expenditure, 2019, '000s Ush.
Queen Elizabeth (QENP)	175,320	99.7%	3.9%	3.2%		144		2,913	15,771		17,424	31,189	18,480	5,266,778	19,587,356	12,000,716
Murchison Falls (MFNP)	386,742	98.8%	0.1%	1.3%		215		1,330	12,841		76,647	43,197	42,915	7,824,221	27,128,636	16,621,082
Lake Mburo (LMNP)	38,566	98.3%	0.0%	5.2%		1			1,077		23,433	14,972	9,253	2,547,461	9,402,735	5,760,836
Bwindi Impenetrable (BINP)	32,015	99.1%	98.4%	0.0%	400							34,830	1,511	5,222,227	21,873,982	13,401,678
Kibale (KNP)	74,379	97.8%	69.8%	0.3%			1,068	487	402	81,270		18,153	713	2,724,987	11,400,471	6,984,802
Semliki (SNP)	21,952	99.7%	87.6%	0.3%								507	4,947	186,801	309,017	195,080
Kidepo Valley (KVNP)	87,986	99.9%	0.0%	0.0%		132		407	6,147		2,010	3,232	6,559	674,691	2,029,765	1,243,590
Mount Elgon (MENP)	109,956	92.5%	47.5%	0.0%					34	286	18	436	1,699	101,744	265,743	167,761
Mgahinga Gorilla (MGNP)	3,950	94.0%	57.4%	0.0%	✓							5,261	1,071	837,928	3,304,020	2,024,296
Rwenzori Mountains (RMNP)	99,494	99.5%	64.6%	0.1%								1,728	739	257,538	1,053,218	664,889
Toro Semiliki SWR	54,247	98.0%	0.0%	0.2%								345	426	55,306	210,278	132,747

Species populations base on most recent survey soce 2010. A tick implies species present but numbers are not public. Other primates is the sum of all baboons and monkeys, the figure excludes Gorilla and Chimpanzee populations. Antelope is the sum of Ugandan Kob, Topi, Waterbuck, Hartebeest, Oribi, Eland, Duiker, Sitatuga, Impala

Foreign exchange revenue is Foreign Non Resident Tourist Expenditure on Park Entrance + International Tourism Expenditure (below) + International tourism expenditure on deomestic travel

International tourism expenditure is the number of international tourist multiplied by the aggregate daily expenditure on Hotels, bars, catering, retail and other services (TEMS 2019 data).

Table 30: Additional Socio-Economic Data

Protected Area	Revenue sharing (2019/20, '000s Ush.)	Local poverty incidence (neighbouring districts)	Unemployment (neighbouring regions, 2016/17)	Out of Labour Force (neighbouring regions, 2016/17)
Additional socio-economic data				
Queen Elizabeth (QENP)	728,820	0 - 25%	5.6%	45.8%
Murchison Falls (MFNP)	938,362	12 - 40%	5.6 - 13.5%	45.8 - 51.1%
Lake Mburo (LMNP)	330,663	0 - 25%	5.6%	45.8%
Bwindi Impenetrable (BINP)	793,364	12-25%	5.6%	45.8%
Kibale (KNP)	358,519	12 - 25%	5.6%	45.8%
Semliki (SNP)	19,306	12 - 25%	5.6%	45.8%
Kidepo Valley (KVNP)	164,637	55 - 80%	6.8%	63.6%
Mount Elgon (MENP)	31,406	25 - 40%	15.3%	59.7%
Mgahinga Gorilla (MGNP)	92,279	12 - 25%	5.6%	45.8%
Rwenzori Mountains (RMNP)	53,908	12 - 25%	5.6%	45.8%
Toro Semiliki SWR	-	12 - 25%	5.6%	45.8%

- **How can we make better use of wildlife resources to increase international tourism and foreign exchange earnings?** The UGGDS targets the tourism and wildlife sector as one of four natural capital sectors for development, with an ambition to quadruple the value of foreign tourism by 2030. Table 29 presents information on foreign exchange revenues from the wildlife-watching tourism sub-sector by national park. These foreign exchange revenues are presented as aggregate expenditures by non-resident foreign tourists presented in SNA Goods and Services accounts in Table 27 and Table 28. These are estimated based on park entrance fees from Foreign Non-Resident Tourists, plus imputed expenditure from the TEMS (2019) associated with their visit. Across all National Parks and Wildlife Reserves, this is 96.5 billion in 2019. Increased from approximately UgX. 34.5 billion in 2012. This suggests a substantially better performance in the wildlife-watching tourism sub-sector, compared to the tourism sector as a whole.

The World Bank (2020) suggests tourism exports grew 15.2% overall, between 2012 and 2019.

Whilst it is highlighted that the COVID crisis has substantially impacted revenues from the wildlife-watching tourism sector, these trends are encouraging with respect to medium to long-term potential for the wildlife sector to achieve the UGDDS target. Achieving this target once the international tourism market recovers will require appropriate investment to further develop tourism activity across Uganda's Protected Areas.

Whilst a useful indicator, the revenues presented are a substantial underestimate of total foreign revenues associated with the sector. This is because it has not been possible to disaggregate revenues associated with recreational activities in protected areas with tourist types (which are substantial, especially for gorilla trekking), identify expenditure by EAC visitors from outside Uganda and consider other protected areas beyond those identified in Table 29.

- **How can we better manage biodiversity to support job creation and poverty alleviation via the tourism industry?** Table 30 suggests that the development of tourism activity around Kidepo Valley and Mount Elgon National Parks could be relatively more effective in terms of poverty reduction.   This is because poverty incidence, unemployment and out of labour force statistics appear to be higher around these national parks.   Both parks have species that would be of interest to wildlife-watching tourists, whose populations could be enhanced, complemented, and developed. Although the Species Accounts for Mount Elgon, in particular, should be interpreted with caution. Table 24 and Table 25 illustrate that demand for wildlife-watching tourism has been built between 2011 and 2019 for Kidepo Valley National Park. Visitor numbers have increased by a factor of 5 over this period and entrance fees by a factor of 7.

There is potential to offer joint packages to these parks, given the different configurations of ecosystems and species they contain. Increasing numbers of international tourists would increase local expenditures on retail items (including handicrafts), catering and other services, which would benefit local communities and businesses. Table 29 suggests

this level of expenditure was approaching UgX. 60 billion in 2019 and particularly high around Murchison Falls (UgX. >16 billion), Queen Elizabeth (UgX. >12 billion) and Bwindi Impenetrable National Parks (UgX. >13 billion).

Boosting tourism in protected areas will directly improve prospects for local communities via increased grants from revenue sharing. In this regard, it is noted that Kidepo Valley, Mount Elgon, the Rwenzori Mountains and Toro Semiliki are all large protected areas (>50,000 ha) but revenue sharing is relatively small (up to a maximum of UgX. 165 million in 2019 in Kidepo Valley National Park), given their size.

5.0 SUMMARY OF FINDINGS AND NEXT STEPS

A key objective of environmental accounting is the integration with wider statistics on economic activity and society. As shown in this report, whilst information on the goods and services associated with wildlife-watching tourism be recorded elsewhere in the SNA, it is not aligned or integrated with information on the 'Stock' of ecosystem assets that support their provision (e.g., Protected Areas and the natural ecosystems and species they support). Addressing this disconnect using the types of integrated environmental-economic accounting approach presented is vital to informing the relationship between Uganda's environment and its economy, highlighting the importance of sustainably managing its protected areas and the natural ecosystems and species they contain. This is also essential for identifying economic opportunities for development based on their sustainable exploitation.

The UGGDS acknowledges the risk declines in natural capital (including ecosystems and species in protected areas) pose to tourism and other sectors. In response, it targets natural capital management as a catalytic investment area. The Tourism and Wildlife Sector is one of four natural capital sectors targeted, with an ambition to quadruple the value of foreign tourism, create jobs and enhance natural capital protection by 2030. The set of integrated tourism and biodiversity accounts presented in this report can support the implementation of the UGGDS by:

- Revealing trends in the natural ecosystem and species loss by location and identifying where these are a risk to tourism revenues (informing the protection of biodiversity-related natural capital) and where tourism revenue generation opportunities are increasing.

- Revealing expenditure associated with the wildlife tourism sector (identifying highest multipliers for green growth)

- Identify opportunities for developing wildlife-watching packages for different tourists and their potentials returns (increase export revenue)

- Linking wildlife tourism development to job creation and poverty alleviation opportunities (via integration with local employment and poverty statistics)

- Informing macroeconomic analysis for Green Economy policy planning (by linking ecosystem services to standard economic units)

The accounts focus on the period before the COVID-19 crisis and associated impacts on the wildlife-watching tourism sector in Uganda. Whilst the COVID crisis has substantially impacted revenues from the wildlife-watching tourism sub-sector, trends visitor numbers and revenues were very encouraging before this. As such, the set of integrated biodiversity and tourism accounts are considered to provide useful information set for planning post-COVID recovery of the sector as the international tourism market also recovers. In this way, wildlife-watching tourism can play a key part in delivering the targets of the UGDDS over the medium and longer-term.

5.1 Accounting Results

This report presents a set of integrated ecosystem extent, species, physical and monetary ecosystem services and SNA Goods and Services accounts focused on selected protected areas in Uganda. These accounts are supplemented with a combined presentation of key aggregates from the accounts and additional socio-economic data to support integrated analyses and decision-making. This section summarizes the key accounting results identified.

5.1.1 Natural Ecosystem Extent Accounts

An aggregate Natural Ecosystem Extent Account for all 12 Protected Areas considered reveals that their total extent to be 1,105,648 ha. Of this only 18,302 ha are identified as non-natural land cover in 2017, down from 25,034 in 2000. In total, 228,685 Tropical High Forest Well-Stocked is included in these protected areas. However, 18,608 ha for Tropical High Forest Well-Stocked is lost between 2000 and 2018, likely driven by due to degradation to Tropical High Forest Low Stocked. Substantial increases in wetland extent are observed between 2000 and 2017 (from 20,872 ha to 42,448 ha).

With respect to individual protected areas, natural ecosystems comprise at least 98% of the total area of Queen Elizabeth, Murchison Falls, Lake Mburo, Bwindi Impenetrable, Semliki, Kidepo Valley and the Rwenzori Mountains National Parks and Toro Semiliki Wildlife reserve in 2017. This indicated the extent of natural ecosystems has remained very high and relatively stable in these National Parks. This figure is somewhat lower for 97.8% for Kibale, 94.0% for Mgahinga Gorilla and 92.5% for Mount Elgon National Parks.

Murchison Falls and Queen Elizabeth National Parks are the two largest (386,742 ha and 175,320 ha, respectively). Murchison Falls shows a slight increase in the extent of non-natural land cover (+1,386 ha) between 2000 and 2017, whereas in Queen Elizabeth National Park the extent of non-natural ecosystems has almost reduced to zero by 2017. Significant increases in the extent of wetlands and open water are observed in Murchison Falls National Park (+ 12,342 ha and + 1,463 ha, respectively) and Queen Elizabeth National Park (+6,773 ha and +805 ha, respectively) between 200 and 2017. It is unclear what has driven this. Queen Elizabeth National Park also shows an increase in the extent of Tropical High Forest Well-Stocked (+2,874 ha) between 2000 and 2017.

The Rwenzori Mountains (99,494 ha), Kidepo Valley (87,986 ha), Kibale (74,379 ha) and Toro Semiliki Wildlife Reserve (+54,247 ha) are the next largest national parks. Quite large net decreases in the extent of Tropical High Forest Well-Stocked are observed in Rwenzori Mountains National Park between 2000 and 2017 (-15,110 ha). Similarly, net decreases in Tropical High Forest Well-Stocked extent occur in Mount Elgon National Park (-10,647 ha) between 2000 and 2017 (-15,110 ha). However, net additions to the extent of Tropical High Forest Well-Stocked are observed in Kibale National Park between 2000 and 2017 (+4,436 ha). Kidepo Valley is almost entirely comprised of stable extents of savannah-type ecosystems of woodland, bush and grassland.

Bwindi Impenetrable (area 32,015 ha) is almost entirely Tropical Forest Well Stocked, with the extent of this ecosystem remaining approximately 31,500 ha between 2000 and 2017. Mgahinga Gorilla National Park (area 3,950 ha) is the second important protected area for gorilla habitat. The extent of Tropical Forest Well-Stocked increases from 2,148 ha to 2,266ha between 2000 and 2017.

An important caveat to the interpretation of the ecosystem extent accounts is that they are intended to provide an insight into trends in relatively broad land cover classes with respect to natural ecosystem extent. These classes will miss certain ecological details relevant to natural ecosystems and their condition. It would be possible to add additional ecological meaning to the extent of natural ecosystems accounted for by integrating information of vegetation types likely to be encountered in these areas of natural land cover and further validating land cover products.

UNEP-WCMC & IDEEA Group (2017) provides such an example using the information on vegetation classes mapped by Langdale-Brown et al. (1964). Work is also ongoing in these regards via the GEF Funded CONNECT project in Uganda.[5]

5.1.3 Thematic Species Accounts

Five iconic species for wildlife-watching tourism were identified by the Expert Working Group. These comprised: chimpanzees, gorillas, lions, elephants and buffalo. The National Account for these species suggests increases in the national populations of gorillas from around 320 individuals in around 2000 to 400 in 2015/17. Elephants and buffalo also show steady increases in population from the mid-1990s (1,900 and 18,000, respectively) to 2015/17 (5,808 and 37,054, respectively). The national population of lions also increases between 2007/10 (408) and 2015/17 (493). Information is not available at the national scale on chimpanzee trends, although the numbers estimated in 1999/2003 are 4,950.

For Murchison Falls, the trends in elephants, buffalo and lions are similar to the national trends, although some volatility is noted. In 2014 there were 1,330 elephants and 12,841 buffalo counted in the park. The number of lions in 2013 was 215, down from 350 in 2004. A similar pattern is observed for Queen Elizabeth National Park, where 2,913 elephants and 15,771 buffalo are counted in 2014. Again, Lions show a decrease between 2004 (from 200) to 2010 (to 144).

Kidepo Valley National Park contains similar species assemblages, to Murchison Falls and Queen Elizabeth, the most visited national parks. Here buffalo and lions show an increase in abundance. Buffalos increase from 1,500 in 2000 to 6,147 in 2014 and lions from 25 in 2004 to 132 in 2010. Elephant populations appear steady between 2000 and 2014 at approximately 400 individuals.

Lake Mburo National Park has a similar population of buffalo (1,077 in 2014), which is similar to the population recorded in 2006. Lions have been identified in the park but only 1 individual is recorded for 2013. Increasing the population of lions may be a catalyst for more tourism activity at this national park. Lake Mburo National Park a substantial population of antelope.

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[5] https://www.connectbiodiversity.com/

Between 2001 and 2010, Kibale National Park also shows increases in elephants (from 262 to 487) and buffalo populations (from 124 to 402). Chimpanzee populations decline slightly over this period, from 1,298 to 1,068, although, the 2010 population is higher than for 2005. Kibale National Park also has a substantial population of other primates. These species could, potentially, support greater wildlife-watching tourism activity in this national park.

The population of the mountain gorilla in Bwindi Impenetrable National Park shows steady and sustained increases from 280 in 1987 to 400 in 2011. An important population of mountain gorillas also exists in Mgahinga National Park. These are demonstrated as an important source of revenue for UWA.

It is important to highlight that absence of data does not imply the absence of species in national parks and other protected areas. Also, there will be a great many species of interest to wildlife-watching tourists in other protected areas including forest reserves and species from non-mammal taxa, for instance, birds like the Shoebill in wetlands.

5.1.4 Ecosystem Services Accounts

The physical supply and use accounts for the *'recreation-related'* ecosystem service reveals a steady and substantial increase in visits to the protected areas considered from 2011 (209,806 visitors) to 2018 (330,528 visitors). There is a slight drop in 2019 (to 323,322), but the 2019 data does not include visits to NFA Central Forest Reserves. Generally, visits to all National Parks increase between 2011 and 2019. However, recent declines in visitor numbers are noted for Mount Elgon National Park and Toro Semiliki Wildlife Reserve.

The monetary ecosystem service supply and use accounts show the expenditure by tourists on park entrance associated with increased visits rose from approximately UgX. 9 billion in 2011 to nearly UgX. 26 billion in 2019. In 2019, Murchison Falls NP has generated the highest entrance ticket revenues, approaching UgX. 8 billion. Queen Elizabeth and Bwindi Impenetrable NPs generated entrance fees above UgX. 5 billion each in 2019. Elsewhere, Lake Mburo and Kibale NPs each generated over UgX. 2.5 billion in 2019. Park entrance revenues for Kidepo Valley NP increase substantially from <100 million in 2011 to nearly 700 million in 2019.

It is highlighted that there are many other ecosystem services supplied by protected areas in Uganda that were not been considered in the accounts presented. These include a range of important regulating and provisioning ecosystem services, as well as cultural services related to recreation and tourism.

5.1.5 SNA Products and Services Accounts

The physical SNA Goods and Services Accounts describe the types of tourists who consume the *'recreation-related'* ecosystem service. They reveal a steady increase in the number of Foreign Non-Resident Visitors to the National Parks, increasing by approximately 90% between 2011 to 2019. In 2019 the number of these types of visitors was 153,850, around half of all visits to Uganda's National Parks. Increases in EAC visitors of around 75% are also observed over this period.

The Monetary SNA Goods and Services Accounts have been compiled for 2012 and 2019 only. They provide information on transactions of goods and services associated with wildlife-watching tourism activity, which are underpinned by the *'recreation-related'* ecosystem service. The Monetary SNA Goods and Services Accounts reveal total wildlife-watching tourism expenditure associated with visits to protected areas rose from UgX. 62 billion in 2012 to approximately UgX. 187.5 billion in 2019. Expenditure on recreational activities produced by UWA (excluding park entrance) increased from approximately UgX. 25 billion in 2012 to approximately UgX. 87 billion in 2019. Expenditure on gorilla tracking dominated this.

Imputed expenditure of international tourists on around their visits rose from around UgX. 27.5 billion in 2012 to around UgX. 74 billion in 2019. This expenditure can be an important source of income for businesses and livelihoods local to protected areas. Aggregating these values with park entrance fees paid by Foreign Non-Resident Tourists, as an indicator of rising export revenues associated with visits to protected areas, suggests an increase from around UgX. 34.5 billion in 2012 to around UgX. 96.5 billion in 2019.

It is highlighted that the total values presented in the Monetary SNA Goods and Services accounts underestimates of total expenditure by wildlife-watching tourists for several reasons. The information relates to tourists to a limited number of protected areas, expenditure associated

with visits to NFA Central Forest Reserves, Important Bird Areas and other UWA wildlife reserves is not included. Furthermore, it has not been possible to impute expenditure on accommodation and other services by EAC and other domestic tourists.

5.2 Key Insights from the Integrated Analyses

The various modules of the SEEA allows different environmental and economic data to reconcile and organize in combined presentations of key aggregates and indicators. The combined presentations allow an integrated analysis of environmental and economic information, alongside additional socio-economic data. To some of the key policy questions identified in **Table 1**, the combined presentation for the biodiversity and tourism accounts provides the following insights:

- Natural Ecosystem Extent has remained high across most National Parks in recent years in National Parks. This is particularly the case for National Parks with high levels of tourism activity, including Murchison Falls, Queen Elizabeth and Bwindi Impenetrable National Parks. Loss of Tropical High Forest Well-Stocked is noted for Mount Elgon and the Rwenzori Mountains National Parks, with relatively low tourism activity. Nonetheless, there remain considerable areas of Tropical High Forest in the Mount Elgon and the Rwenzori Mountains National Parks that could support more nature-based tourism around this ecosystem type and mountainous environments generally.

- Iconic Species populations of elephants and buffalo have been broadly stable or improved in Murchison Falls, Queen Elizabeth and Kidepo Valley National Parks. Lion populations show increases in Kidepo Valley National Park but decrease elsewhere. However, there remain populations of these iconic species across these three National Parks that support wildlife-watching tourism. Lions have been observed in Lake Mburo, but only one or two individuals. Boosting the numbers of these species could increase tourist activity in this national park.

- Mountain gorillas in Bwindi Impenetrable National Park show steady increases in recent years, and an important population of mountain gorillas also exists in Mgahinga National Park. These are demonstrated as an important source of revenue for UWA. In Kibale National Park, there are recent declines in chimpanzee populations. However, this park has a strong complement of primates that can support associated wildlife-watching tourism activities.

- The highest wildlife-watching tourism expenditures are associated with Uganda's two largest National Parks, Murchison Falls and Queen Elizabeth. However, Kidepo Valley, the Rwenzori Mountains and Mount Elgon are also large national parks, with the latter two

having large areas of tropical high forest (well-stocked). Kidepo Valley also has similar species to the Murchison Falls and Queen Elizabeth National Parks and shows strong growth in visitor numbers and park entrance fees between 2011 and 2019. Kibale National Park also benefits from relatively large populations of iconic species, including chimpanzees.

- Total expenditure by international tourists on park entrance and imputed expenditure on other products and services increased from approximately UgX. 34.5 billion in 2012 to UgX. 96.5 billion in 2019. This reveals strong performance of the wildlife-watching tourism sub-sector with respect to increased export revenue (a key UGGDS Goal). This expenditure also provides important revenues for supporting local employment and livelihoods around the protected areas visited. For 2019 imputed expenditure on Hotels, bars, restaurants, retail and other services associated with visits to the protected areas considered n this report approaching UgX. 60 billion in 2019.

- Data on poverty incidence and labour indicate that developing tourism activity around Kidepo Valley and Mount Elgon National Parks would have relatively higher impacts on poverty alleviation and unemployment or labour force participation. Kidepo Valley also has an assemblage of species that is similar to other national parks with savannah ecosystems and high visitor numbers. Whilst Tropical High Forest Well-stocked is reducing in extent in Mount Elgon, there is still a relatively large area of this ecosystem remaining that tourists could visit. Boosting local incomes, creating livelihoods and increasing revenue sharing via wildlife-watching tourism around these and other protected areas would directly contribute to achieving key goals of Uganda's National Development Plan (III).

Key to developing the wildlife-watching tourism sub-sector in Uganda will be investments in conserving and enhancing natural ecosystems and species and building climate change resilience in protected areas, combined with investments in innovative tourism packages, access and tourist facilities. Based on the growth in tourism expenditure over the last decade, there appears good potential for this sector to deliver on its promise of a catalytic investment area for the UGGDS. Particularly positive co-benefits for poverty alleviation may be achieved by stimulating tourism activities in the eastern and north-eastern parts of the country. As the World Bank (2020) identifies, encouraging tourists to spend an extra day or two in the country as part of their vacation could deliver very large economic benefits. As such encouraging an additional visit to less-visited national parks could be a fruitful strategy in achieving the UGGDS and National Development goals.

5.3 Extensions and Next Steps

The set of integrated biodiversity and tourism accounts presented in this report represent the first attempt to provide an articulation of biodiversity-related natural capital stocks, tourism activity and associated economic expenditure via a national accounting approach. Roadmaps are under development with relevant stakeholders to establish a set of concrete policy entry points and processes for institutionalizing the compilation of the accounts and integrating them into decision-making processes. Part of this includes the development of a green growth options paper, where information from the accounts will be used to steer investment in biodiversity and the wildlife watching tourism sub-sector.

It is highlighted that *'recreation-related'* ecosystem service is one of many important ecosystem services that are supplied by protected areas. Expanding the ecosystem service accounts to include these additional ecosystem services is important for revealing the overall contributions of Uganda's protected areas to the economy and society.

It is anticipated the biodiversity and tourism accounts will be improved in future iterations. The data basis appears well-assured for compiling the Ecosystem Services and SNA Goods and Services Accounts on an annual basis and the Species Accounts every two years. It may be possible to improve both the ecological and temporal resolution of the natural ecosystem extent accounts for protected areas, using the results of the Spatial Biodiversity Assessment undertaken for Uganda via the GEF-funded CONNECT Project. [6]

In future iterations, efforts should be made to expand the set of protected areas considered. This should include compiling accounts for other UWA managed sites (including wildlife reserves), NFA Central Forest Reserves, and important wetlands (e.g., Ramsar sites).

Invasive species are a known risk to the condition of Uganda's protected areas. Where invasive species are particularly prevalent in protected areas, their existence is also a potential factor in reducing wildlife-watching tourism activities in that area. It would be helpful to integrate data on

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[6] https://www.connectbiodiversity.com/

invasive species as a condition metric for different protected areas in the sequence of accounts presented.

It is also acknowledged that the Species Accounts generally providing information for mammals. It would be useful to include other taxa, particularly birds. Uganda's protected areas host the continent's largest variety of bird species (1,082 species). This attracts birders from around the globe to Bwindi Impenetrable, Queen Elizabeth, Kibale, Murchison Falls and Semliki National Park (SNP), and several forest reserves (World Bank, 2020).

As an additional analysis, it would also be useful to undertake climate change modeling to understand the effects of climate change on habitat suitability for iconic (and other) species in Uganda's protected areas. This would help plan for building the resilience of landscapes in protected areas and the wildlife-watching tourism industry.

It would be useful to disaggregate Ugandan visitors from non-Ugandan EAC visitors to better understand domestic and export revenues from the local region. Linked to this, it would be helpful to integrate information on domestic and EAC wildlife-watching tourism expenditure to inform the development of this part of the sector. The information for other protected areas could also be very relevant here, particularly for sites visited for a day or weekend trips.

Linking the accounts to tourism satellite accounts (UN, 2010) should also be explored. It is understood these are currently being developed for Uganda. This could deliver more integrated information set on employment data and the wider value chain related to wildlife-watching tourism. Work on linking the environment and the economy in the context of tourism is also occurring within the UN World Tourism Organization's project on Measuring the Sustainability of Tourism (MST).[7]

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[7] https://www.unwto.org/Measuring-Sustainability-Tourism

It will also be interesting to link information from the accounts with information on environmental expenditure associated with conservation activities and protected areas. This could include making the links to information organised via the BioFin initiative in Uganda.[8]

Other improvements that could be made to improve the usefulness of the accounts in future iterations comprise:

- Regular, systematic updates of the Species Accounts.

- Aligning calendar and financial year reporting for different visitor statistics and revenue streams.

- Disaggregate UWA wildlife-watching tourism expenditures on recreational activities by the park and tourist type.

- Impute expenditure on hotels, restaurants, bars; travel; retail and other services by Foreign Resident, EAC and other domestic tourists. This will help plan the development of the domestic and near domestic wildlife-watching tourism markets.

- Isolate the contribution of ecosystems to the value of experience the consumer enjoys (e.g., applying resource rent approaches to isolate the ecosystem service contribution to entrance fees in the monetary ecosystem service supply and use tables).

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[8] More general work on linking the SEEA and BioFin is ongoing, see: https://unstats.un.org/unsd/envaccounting/ceea/meetings/twelfth_meeting/Methodological%20alignment-biodiversity%20accounting%20Final.pdf

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APPENDIX I: NATURAL ECOSYSTEM EXTENT ACCOUNTS FOR ECOSYSTEM ACCOUNTING AREAS

Natural Ecosystem Extent Account   Bwindi   2000 to 2017

Classifications >>	Tropical high forest well stocked	Tropical high forest low stocked	Woodland	Bush	Grassland	Wetland	Open-water	Non-natural	No data	TOTALS
Opening Stock (ha)	31,652	-	25	-	-	-	-	315	23	32,015
Additions to stock (ha)	-	-	-	-	-	-	-	-	-	-
Total additions to stock	116	20	73	56	-	45	-	157	-	467
Reductions in stock (ha)	-	-	-	-	-	-	-	-	-	-
Total reductions in stock	(278)	-	-	-	-	-	-	(189)	-	(467)
Net change in stock (ha)	(162)	20	73	56	-	45	-	(32)	-	-
Closing Stock (ha)	31,490	20	98	56	-	45	-	283	23	32,015
* Non-natural = Broad leaved plantations, Coniferous plantation, Small scale farmland, Commercial farmland, Built-up area										
No data = Impediments, No data										

Natural Ecosystem Extent Account   Katonga   2000 to 2017

Classifications >>	Tropical high forest well stocked	Tropical high forest low stocked	Woodland	Bush	Grassland	Wetland	Open-water	Non-natural	No data	TOTALS
Opening Stock (ha)	-	-	13,381	5,031	1,634	520	-	475	-	21,041
Additions to stock (ha)	-	-	-	-	-	-	-	-	-	-
Total additions to stock	-	860	887	1,823	4,795	482	-	503	-	9,350
Reductions in stock (ha)	-	-	-	-	-	-	-	-	-	-
Total reductions in stock	-	-	(4,600)	(3,654)	(610)	(40)	-	(446)	-	(9,350)
Net change in stock (ha)	-	860	(3,713)	(1,831)	4,185	442	-	57	-	-
Closing Stock (ha)	-	860	9,668	3,200	5,819	962	-	532	-	21,041
* Non-natural = Broad leaved plantations, Coniferous plantation, Small scale farmland, Commercial farmland, Built-up area										
No data = Impediments, No data										

Natural Ecosystem Extent Account Kibale 2000 to 2017										
Classifications >>	Tropical high forest well stocked	Tropical high forest low stocked	Woodland	Bush	Grassland	Wetland	Open-water	Non-natural	No data	TOTALS
Opening Stock (ha)	47,473	3,241	5,388	4,118	9,643	445	154	3,917	-	74,379
Additions to stock (ha)	-	-	-	-	-	-	-	-	-	-
Total additions to stock	6,482	5,864	1,177	1,889	1,801	620	68	803	38	18,742
Reductions in stock (ha)	-	-	-	-	-	-	-	-	-	-
Total reductions in stock	(2,046)	(3,144)	(3,226)	(3,518)	(3,644)	(66)	(7)	(3,091)	-	(18,742)
Net change in stock (ha)	4,436	2,720	(2,049)	(1,629)	(1,843)	554	61	(2,288)	38	-
Closing Stock (ha)	51,909	5,961	3,339	2,489	7,800	999	215	1,629	38	74,379

* Non-natural = Broad leaved plantations, Coniferous plantation, Small scale farmland, Commercial farmland, Built-up area
No data = Impediments, No data

Natural Ecosystem Extent Account Kidepo 2000 to 2017										
Classifications >>	Tropical high forest well stocked	Tropical high forest low stocked	Woodland	Bush	Grassland	Wetland	Open-water	Non-natural	No data	TOTALS
Opening Stock (ha)	-	-	2,039	69,292	16,520	-	-	-	135	87,986
Additions to stock (ha)	-	-	-	-	-	-	-	-	-	-
Total additions to stock	-	-	1,529	1,662	59,663	-	-	47	112	63,013
Reductions in stock (ha)	-	-	-	-	-	-	-	-	-	-
Total reductions in stock	-	-	(1,387)	(60,184)	(1,428)	-	-	-	(14)	(63,013)
Net change in stock (ha)	-	-	142	(58,522)	58,235	-	-	47	98	-
Closing Stock (ha)	-	-	2,181	10,770	74,755	-	-	47	233	87,986

* Non-natural = Broad leaved plantations, Coniferous plantation, Small scale farmland, Commercial farmland, Built-up area
No data = Impediments, No data

Natural Ecosystem Extent Account Lake Mburo 2000 to 2017										
Classifications >>	Tropical high forest well stocked	Tropical high forest low stocked	Woodland	Bush	Grassland	Wetland	Open-water	Non-natural	No data	TOTALS
Opening Stock (ha)	-	-	8,393	15,308	8,090	4,570	1,710	495	-	38,566
Additions to stock (ha)	-	-	-	-	-	-	-	-	-	-
Total additions to stock	-	-	2,199	874	12,438	1,777	378	526	-	18,192
Reductions in stock (ha)	-	-	-	-	-	-	-	-	-	-
Total reductions in stock	-	-	(2,099)	(13,844)	(1,432)	(361)	(95)	(361)	-	(18,192)
Net change in stock (ha)	-	-	100	(12,970)	11,006	1,416	283	165	-	-
Closing Stock (ha)	-	-	8,493	2,338	19,096	5,986	1,993	660	-	38,566

* Non-natural = Broad leaved plantations, Coniferous plantation, Small scale farmland, Commercial farmland, Built-up area
No data = Impediments, No data

Natural Ecosystem Extent Account — Mgahinga — 2000 to 2017

Classifications >>	Tropical high forest well stocked	Tropical high forest low stocked	Woodland	Bush	Grassland	Wetland	Open-water	Non-natural	No data	TOTALS
Opening Stock (ha)	2,148	207	370	823	265	35	-	76	26	3,950
Additions to stock (ha)	-	-	-	-	-	-	-	-	-	-
Total additions to stock	176	-	110	-	-	-	-	200	-	486
Reductions in stock (ha)	-	-	-	-	-	-	-	-	-	-
Total reductions in stock	(58)	-	(148)	(242)	-	-	-	(38)	-	(486)
Net change in stock (ha)	118	-	(38)	(242)	-	-	-	162	-	-
Closing Stock (ha)	2,266	207	332	581	265	35	-	238	26	3,950

* Non-natural = Broad leaved plantations, Coniferous plantation, Small scale farmland, Commercial farmland, Built-up area
No data = Impediments, No data

Natural Ecosystem Extent Account — Mt. Elgon — 2000 to 2017

Classifications >>	Tropical high forest well stocked	Tropical high forest low stocked	Woodland	Bush	Grassland	Wetland	Open-water	Non-natural	No data	TOTALS
Opening Stock (ha)	62,824	6,371	3,150	19,326	9,261	-	-	9,024	-	109,956
Additions to stock (ha)	-	-	-	-	-	-	-	-	-	-
Total additions to stock	3,465	5,062	6,127	6,631	17,917	-	-	3,046	-	42,248
Reductions in stock (ha)	-	-	-	-	-	-	-	-	-	-
Total reductions in stock	(14,112)	(3,330)	(1,722)	(17,552)	(1,732)	-	-	(3,800)	-	(42,248)
Net change in stock (ha)	(10,647)	1,732	4,405	(10,921)	16,185	-	-	(754)	-	-
Closing Stock (ha)	52,177	8,103	7,555	8,405	25,446	-	-	8,270	-	109,956

* Non-natural = Broad leaved plantations, Coniferous plantation, Small scale farmland, Commercial farmland, Built-up area
No data = Impediments, No data

Natural Ecosystem Extent Account — Mt. Rwenzori — 2000 to 2017

Classifications >>	Tropical high forest well stocked	Tropical high forest low stocked	Woodland	Bush	Grassland	Wetland	Open-water	Non-natural	No data	TOTALS
Opening Stock (ha)	79,340	-	7,561	351	9,904	-	139	492	1,707	99,494
Additions to stock (ha)										
Total additions to stock	384	2,157	6,638	3,345	2,360	69	52	291	828	16,124
Reductions in stock (ha)										
Total reductions in stock	(15,494)	-	(132)	(33)	(42)	-	(139)	(284)	-	(16,124)
Net change in stock (ha)	(15,110)	2,157	6,506	3,312	2,318	69	(87)	7	828	-
Closing Stock (ha)	64,230	2,157	14,067	3,663	12,222	69	52	499	2,535	99,494

* Non-natural = Broad leaved plantations, Coniferous plantation, Small scale farmland, Commercial farmland, Built-up area
No data = Impediments, No data

Natural Ecosystem Extent Account Murchison Falls — 2000 to 2017

Classifications >>	Tropical high forest well stocked	Tropical high forest low stocked	Woodland	Bush	Grassland	Wetland	Open-water	Non-natural	No data	TOTALS
Opening Stock (ha)	-	185	170,964	148,031	55,732	5,296	3,433	3,101	-	386,742
Additions to stock (ha)	-	-	-	-	-	-	-	-	-	-
Total additions to stock	512	1,600	41,382	18,557	155,779	13,857	2,478	4,347	177	238,689
Reductions in stock (ha)	-	-	-	-	-	-	-	-	-	-
Total reductions in stock	-	(185)	(77,091)	(137,579)	(18,343)	(1,515)	(1,015)	(2,961)	-	(238,689)
Net change in stock (ha)	512	1,415	(35,709)	(119,022)	137,436	12,342	1,463	1,386	177	-
Closing Stock (ha)	512	1,600	135,255	29,009	193,168	17,638	4,896	4,487	177	386,742

* Non-natural = Broad leaved plantations, Coniferous plantation, Small scale farmland, Commercial farmland, Built-up area
No data = Impediments, No data

Natural Ecosystem Extent Account Queen Elizabeth — 2000 to 2017

Classifications >>	Tropical high forest well stocked	Tropical high forest low stocked	Woodland	Bush	Grassland	Wetland	Open-water	Non-natural	No data	TOTALS
Opening Stock (ha)	3,987	1,680	32,754	31,989	84,223	9,448	4,718	6,263	258	175,320
Additions to stock (ha)										
Total additions to stock	3,353	4,411	6,220	6,256	19,222	7,056	1,076	403	51	48,048
Reductions in stock (ha)										
Total reductions in stock	(479)	(997)	(9,550)	(15,843)	(14,384)	(283)	(271)	(6,163)	(78)	(48,048)
Net change in stock (ha)	2,874	3,414	(3,330)	(9,587)	4,838	6,773	805	(5,760)	(27)	-
Closing Stock (ha)	6,861	5,094	29,424	22,402	89,061	16,221	5,523	503	231	175,320

* Non-natural = Broad leaved plantations, Coniferous plantation, Small scale farmland, Commercial farmland, Built-up area
No data = Impediments, No data

Natural Ecosystem Extent Account — Semuliki — 2000 to 2017

Classifications >>	Tropical forest well stocked	Tropical forest low stocked	Woodland	Bush	Grassland	Wetland	Open-water	Non-natural	No data	TOTALS
Opening Stock (ha)	19,869	98	331	248	633	124	13	443	193	21,952
Additions to stock (ha)	-	-	-	-	-	-	-	-	-	-
Total additions to stock	385	12	613	820	196	-	71	20	-	2,117
Reductions in stock (ha)	-	-	-	-	-	-	-	-	-	-
Total reductions in stock	(1,014)	-	(39)	(213)	(316)	(124)	(11)	(397)	(3)	(2,117)
Net change in stock (ha)	(629)	12	574	607	(120)	(124)	60	(377)	(3)	-
Closing Stock (ha)	19,240	110	905	855	513	-	73	66	190	21,952

* Non-natural = Broad leaved plantations, Coniferous plantation, Small scale farmland, Commercial farmland, Built-up area
No data = Impediments, No data

Natural Ecosystem Extent Account Toro-Semliki 2000 to 2017	Tropical forest well stocked	Tropical forest low stocked	Woodland	Bush	Grassland	Wetland	Open-water	Non-natural	No data	TOTALS
Opening Stock (ha)	-	616	6,687	8,961	37,045	434	71	433	-	54,247
Additions to stock (ha)	-	-	-	-	-	-	-	-	-	-
Total additions to stock	-	12	3,717	15	6,560	189	35	744	-	11,272
Reductions in stock (ha)	-	-	-	-	-	-	-	-	-	-
Total reductions in stock	-	(616)	(1,911)	(7,032)	(1,485)	(130)	(9)	(89)	-	(11,272)
Net change in stock (ha)	-	(604)	1,806	(7,017)	5,075	59	26	655	-	-
Closing Stock (ha)	-	12	8,493	1,944	42,120	493	97	1,088	-	54,247

* Non-natural = Broad leaved plantations, Coniferous plantation, Small scale farmland, Commercial farmland, Built-up area

No data = Impediments, No data

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