

ANALYSIS OF THE AGRICULTURE AND ENERGY SECTORS TOWARDS COMMITMENTS FOR BIODIVERSITY CONSERVATION IN UGANDA

In-depth Analysis of Opportunities, Challenges and Good Practices



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ACRONYMS

AFD	Agence Française de Développement – French Development Agency
BVC	Biodiversity Voluntary commitment
CBD	Convention on the Biological Diversity
CBF	Community Based Facilitators
CFR	Central Forest Reserve
CR	Critically endangered
CSA	Climate Smart Agriculture
CSOs	Civil Society Organizations
DFO	District Forest Officer
DRC	Democratic Republic of Congo
ECOTRUST	Environment Conservation Trust of Uganda
EN	Endangered
FAO	Food and Agriculture Organization of the United Nations
FSSD	Forest Sector Support Department
GDP	Gross Domestic Product
IUCN	International Union for Conservation of Nature
KBA	Key Biodiversity Area
KCCA	Kampala Capital City Authority
LC	Least Concerned
MWE	Ministry of Water and Environment
NBSAP	National Biodiversity Strategy and Action Plan
NEMA	National Environment Management Authority
NFA	National Forest Authority
NGOs	Non-Government Organizations
NP	National Park
NT	Near Threatened
PA	Protected Area
STAR	Species Threat Abatement and Restoration
SWOT	Strengths, Weaknesses, Opportunities, Threats
ToRs	Terms of References
ToTs	Training of Trainers
UNDP	United Nations Development Programme



UNFFE	Uganda National Farmers Federation
UNHCR	United Nations High Commission for Refugees
VU	Vulnerable
WCS	Wildlife Conservation Society
WWF	World Wildlife Fund for Nature



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EXECUTIVE SUMMARY

Introduction

The BIODDEV 2030 Project: *"Facilitation of commitments for biodiversity"* is implemented in 16 countries with financial support from AFD (French Development Agency) and coordinated by Expertise France. The overall goal of BIODDEV 2030 is to contribute towards stopping biodiversity loss by 2030 and achieving its restoration by 2050 through Biodiversity Voluntary Commitments (BVCs). As part of this project, the BVC is defined as *"an agreement whereby one or several stakeholders undertake in order to mobilise and set up a series of prospective and strategic actions, which are shared, and science based, and which will bring about a positive and measurable change in biodiversity health. Voluntary Commitment can be undertaken by an individual or a group of stakeholders. The commitment of these players will include a moral dimension and an action plan detailing how it will be implemented"*.

In Uganda, the project is implemented by WWF Uganda Country Office and it aims at mainstreaming biodiversity in Uganda's economy through sector-based commitments, particularly those sectors having a major impact on biodiversity.

As part of the first phase of the BIODDEV 2030 project, the first study aiming at *"Assessing the drivers of the biodiversity loss caused by economic sectors in Uganda"* was carried out by Oreadebreche in 2021. Based on its conclusions, this report presents the results of the study carried out as part of the second phase of this project. The study conducted an in-depth analysis of agriculture and energy sectors to establish the extent of their impacts on biodiversity and explore the options, opportunities and challenges for future commitments to reduce pressure on biodiversity in Uganda. Through an intensive consultation of key stakeholders belonging to the two sectors, a list of potential BVCs was identified.

Uganda is well endowed with a diversity of genetic, species and ecosystem resources that are of international significance. However, despite various conservation efforts, there has been a loss of biodiversity at an estimated rate of 10-11% per decade, mainly as a result of habitat modification and loss. Based on the first study, Agriculture and energy are the sectors having the greatest negative impact on biodiversity. The study that is now reported here, is an assessment of the contribution of the two sectors to biodiversity decline in Uganda, with the view of identifying opportunities and challenges for future voluntary commitments to reduce pressures on biodiversity. The study focused on:

- Analysing and characterizing of the stakeholders in each sector
- in-depth examination of sectors
- Identifying good practices, opportunities and challenges concerning reducing pressures on biodiversity including practices being implemented in the neighbouring countries
- Identifying obstacles and challenges likely to be faced by stakeholders towards implementation of commitments to biodiversity conservation
- Documentation of measures to mitigate challenges identified
- Proposing a strategy for further stakeholder consultations to confirm Biodiversity commitments
- Identifying sectoral voluntary biodiversity commitments to be undertaken by the various actors to halt and reverse biodiversity loss and achieve the objectives set for the post-2020 global biodiversity framework and 2050 vision ("Living in harmony with nature").

This report is structured in four chapters with the first chapter providing a background and introduction to the study. The second chapter describes the methods utilized for this assignment, namely the literature analysis, the field mission investigations, the national consultations and the



questionnaires. In the third chapter, the report provides the results of the study per sector (agriculture and energy). The fourth chapter provides the key conclusions and proposals for a way forward.

The main findings, conclusions and recommendations are provided as follows:

General observations

1. The stakeholders in the agriculture and energy sectors were categorized according to their interest-influence in the development of biodiversity voluntary commitments. In the agriculture sector, relevant Government agencies, non-government organizations and private sector farmers who are involved in commercial agriculture had high interest and high influence in the development of BVCs. Despite their impact on biodiversity, they have both interest and influence in biodiversity conservation. In the energy sector, District Local Governments have high influence (integrating biodiversity commitments in the district development plans) and high interest in reducing pressure off the natural resources. High interest-high influence stakeholders require in-depth engagement to develop their voluntary commitments.
2. Best practices that contribute to biodiversity conservation are already implemented in Uganda, such as afforestation, reforestation and agroforestry interventions. They serve to increase forest and tree cover, with multiple functions, including, among others stocking biomass energy, providing food security and mitigating climate change. Forest plantations provide alternative sources of forest products and reduce pressure on the natural resources and thus reduce negative impacts of deforestation, loss of biodiversity and climate change. A follow-up engagement with stakeholders will help to appreciate these good practices and to concretize commitments.
3. There is an enabling policy and regulatory environment to sufficiently support voluntary commitments for biodiversity conservation for both the agriculture and energy sectors. The government has put in place enabling policy, legal and planning frameworks to support agricultural expansion and commercialization, enhance land productivity, biodiversity conservation, climate smart agriculture and increase the contribution of the agriculture sector to GDP. However, the main challenges that impede stakeholder decisions to commit themselves include limited knowledge about and exposure to biodiversity conservation information, limited financial resources and inadequate technical capacities to implement best practices.
4. Certification of organic products and forest certification, payment for ecosystem services, and use of alternatives are among the innovative voluntary commitments being practiced by a few stakeholder categories. For instance, the forest certification scheme provides guidelines to conserve representative samples of species and hence improve biodiversity conservation under the plantation landscape. Similarly, certification of organic products requires compliance with conservation agriculture practices. These are important mitigation measures that should be promoted and adopted by stakeholders as useful voluntary commitments for the conservation of biodiversity.
5. Indigenous knowledge and practices exist that promote the conservation of biodiversity. However, there is limited capacity within the traditional communities to document and disseminate such knowledge. Scientists should therefore work with the traditional communities to catalogue/document the existing traditional conservation practices and knowledge and integrate them into formal biodiversity management systems, including the agricultural landscapes.

Specific issues

1. Smallholder agriculture is a major source of employment for many unskilled and semi-skilled workers in Uganda. Around 85 percent of households engage in crop production both for their consumption and income generation and only 14.4 percent cultivate crops exclusively for their consumption. The productivity and production under this category of farmers is low, on small



landholdings of about 1.3 hectares per household. Increasing population growth has driven the subsistence farmers to convert virgin ecosystems such as forests, grasslands and wetlands, thus contributing to the loss of important habitats for different biological resources. Most subsistence farmers are not aware of biodiversity conservation and are hardly involved in developing voluntary commitments, despite the high negative impacts they cause. To halt and reverse the loss of biodiversity by 2030 will require deliberate efforts to stimulate participation and incentivize small-scale farmers to develop and implement voluntary commitments for biodiversity conservation.

2. Promotion of commercial agriculture has focused on monoculture crops such as sugar cane, tea, oil palm and others largely for income generation, and households neglect other traditional crops that have been important for maintaining the genetic, species and ecosystem diversity and food and nutritional security. Expansion of commercial agriculture through conversion of other land covers such as natural forests, woodlands and grasslands increases the threat to biological diversity and needs to be handled through deliberate decisions that require stakeholders to undertake voluntary commitments to conserve biodiversity on agricultural landscapes.
3. Commercial tree plantations aim at increasing productivity and production through the use of chemicals and fertilizers and the application of climate-smart strategies. Most farmers do not appreciate the impact of chemicals and fertilizers on biological resources and the environment such as the increasing fragility of agri-food systems and have weak support to apply climate smart agriculture technologies. There is need to create awareness about the negative impacts of fertilizers and chemicals, their safe application and the application of CSM technologies to mitigate the impacts on biodiversity.
4. Over-dependence on fuelwood for energy exerts great pressure on wood resources in the country. According to UBOS (2018), biomass fuels is the main fuel for cooking. It accounts for 94% of the energy used by the households. There is increasing demand for firewood (3.2 % per year, in line with population growth rate according to the World Bank 2019) from institutions such as schools, the Army, prisons and hospitals as major consumers of firewood and charcoal. These institutions, and any other such institutions that have a dependency on biomass energy, should be a major target to be involved in developing voluntary commitments for biodiversity conservation.
5. Charcoal production in Uganda is dominated by inefficient practices and technologies, which waste wood and contribute to the increased cutting of trees and loss of biodiversity. According to the National Charcoal Survey for Uganda 2015 (MEMD, 2016), 48% of charcoal producers burn the wood when still wet, which is highly wasteful and inefficient, while commonly used traditional earth kilns have an efficiency of 10- 15%. The introduction of improved technologies (such as the Casamance and Adam retort kilns which efficiency are between 30% to 50% according to MEMD 2013) increases efficiency and should be considered one of the key biodiversity voluntary commitments in the energy sector.

1 BACKGROUND AND GOAL OF THE ASSIGNMENT

1.1 The State of Biodiversity in Uganda

Uganda ranks among the most bio-diverse countries in the world. According to the National Biodiversity and Action Plan II (October 2016), Uganda has over 18,783 species of flora and fauna which can be categorized as; mammals (380 species ranking 13th in the world), birds (1,016 species contributing 47% of bird's population in Africa), fishes (over 600 species), amphibians (98 species), reptiles (150 species), plants (over 5,000 species) and domestic animals. Uganda's rich biodiversity is distributed across diverse terrestrial landscapes and aquatic habitats. Most of the biodiversity is found in natural forests, but a considerable number is also found in other natural ecosystems such as mountains, savannahs, wetlands, lakes and rivers, among others. The Albertine Rift region, covering the western part of the country is particularly known for the occurrence of species of conservation concern, such as the mountain gorilla (*Gorilla beringei beringei*), chimpanzee (*Pan troglodytes*) and many species endemic to the northern Albertine Rift region. The Mt Elgon National Park and Moroto Forest Reserve (in the east – northeast) and the Sango Bay region (west of Lake Victoria) also harbour nationally threatened species. The northeast of the country, however, has the lowest number of threatened species apart from the Kidepo Valley National Park bordering South Sudan.

In this context, the country government is committed at the political level to support biodiversity conservation. This is reflected in Uganda's commitment to the CBD, Paris Agreement, NDCs, SDGs, Vision 2040, NDP III and the sectoral development plans.

The conservation of biodiversity in Uganda is through a system of Protected Areas (PAs) in form of Wildlife Conservation Areas (WCAs), Central Forest Reserves (CFRs) and Local Forest Reserves (LFRs). The WCAs (National Parks, Wildlife Reserves, Wildlife Sanctuaries and Community Wildlife Areas) form about 14% of the land surface while forests represent only 11.2% of the country¹. The PAs are however only partially representative of all the key ecosystems in Uganda. The country developed the Forest Nature Conservation Master Plan in 1999 (Forest Department, 2002), but this was unfortunately not implemented although it had provided for a minimum set of sites that would be representative of the country's ecosystems.

It is worthwhile to establish a PA system that represents all key ecosystems including montane ecosystems, Aquatic ecosystems and Wetlands to cater for the increasing human population pressures. This requires real commitment from key stakeholders to assure the effective conservation of Uganda's biodiversity. The progress in assessing gaps in the PA network has been gradual and the country has now identified a set of Key Biodiversity areas (KBAs), building on an earlier initiative that identified Important Bird Areas (IBAs). An assessment that was recently made (by Plumptre *et. al.* 2018²) using mammals, birds, reptiles, amphibians, and plants as surrogate taxa for all biodiversity identified 36 terrestrial sites that are of sufficient global importance to qualify as KBAs, using the Global Standard for the Identification of KBAs, which complement an additional nine freshwater sites. The KBAs are critical habitats of the highest biodiversity where development is very difficult to implement without causing significant biodiversity loss and consequently commitments by stakeholders are important to reduce the loss of biodiversity. The PAs provide an opportunity to maintain the biological resources of Uganda and the set of KBAs must all be

¹ <https://data.worldbank.org/indicator/AG.LND.FRST.ZS?locations=UG>

² Conservation of vertebrates and plants in Uganda: Identifying Key Biodiversity Areas and other sites of national importance; <https://onlinelibrary.wiley.com/doi/full/10.1002/csp2.7>



protected and development avoided at these sites but this requires commitments from key stakeholders. Although there has been limited data on biodiversity valuation in Uganda, past estimates put the gross economic output attributable to biological resource use in the fisheries, forestry, tourism, agriculture and energy sectors at US\$ 546.6 million a year and indirect value associated with ecosystem services and functions at over US\$ 200 million annually (NEMA, Emerton and Muramira, 1999). The valuation informed the need for greater conservation commitment by the Government of Uganda.

Despite various conservation efforts, there has been a decline in biodiversity, especially since 1990. The rate of biodiversity loss is estimated to be between 10-11% per decade (NEMA, 2009), mainly as a result of land use changes and habitat modifications. The population of Uganda is increasing at an average rate of 3.0 percent per annum³, which has increased the demand for arable land and the use of natural resources for development. The recent study by WWF on drivers of biodiversity loss showed that agriculture and energy sectors were the leading drivers of biodiversity loss. Therefore, addressing the root causes of biodiversity loss requires a critical analysis of the two leading sectors contributing to the loss.

1.2 The BIODEV2030 Project

WWF-Uganda is implementing the Project "*Facilitation of commitments for biodiversity*" (BIODEV 2030), with financial support from AFD (French Development Agency) and coordinated by Expertise France. The overall goal of BIODEV 2030 is to contribute to stopping biodiversity loss by 2030 and achieve its restoration by 2050. For this reason, the project aims at mainstreaming biodiversity conservation in Uganda's economy through sector-based commitments, particularly those sectors having a major impact on biodiversity. The commitments are expected to emerge from a multi-stakeholder dialogue. The BIODEV 2030 project defines biodiversity voluntary commitments (BVCs) as "*an agreement whereby one or several stakeholders undertake to mobilize and set up a series of prospective and strategic actions, which are science - based and shared to **bring about a positive and measurable change** in biodiversity health. A BVC can be undertaken by an individual or a group of stakeholders*".

This study builds on the previous study conducted in 2020⁴ that assessed the drivers of the biodiversity loss caused by economic sectors. The main conclusions from the analysis were as follows:

- Biodiversity in Uganda is declining at a high rate both in and outside PAs and the sectors that have the greatest negative impact are agriculture and energy.
- Within the agriculture sector, small-scale farming (or subsistence farmland), commercial farmlands, forest plantations and livestock are the key drivers of land use change and, therefore, the **main threat to the tropical high forest and the other natural habitats (bushland, woodland, grassland, and wetland)**. Within the energy sector, biomass energy was the main driver.

The present study is an in-depth analysis of agriculture and energy sectors concerning biodiversity conservation.

³ Uganda National Bureau of Statistics, 2020. Statistical Abstract 2020

⁴ WWF 2021, Assessing drivers of biodiversity loss caused by economic sectors in Uganda. WWF Kampala Uganda.



1.3 Objectives of the Study

The overall objective was to assess the contribution of the agriculture and energy sectors to biodiversity loss, with the view of identifying opportunities, challenges and good practices for future commitments to reduce pressures on biodiversity.

The specific objectives are to:

- a) Undertake an in-depth analysis of the characteristics of agriculture and energy sectors about their impact on biodiversity
- b) Conduct a stakeholder analysis through mapping their characteristics and nature of interests
- c) Identify pressures, challenges, good practices and opportunities for biodiversity conservation including practices being implemented in other countries
- d) Identify challenges likely to be faced by stakeholders towards implementation of commitments to biodiversity conservation
- e) Document measures to mitigate challenges identified
- f) Identify sectoral voluntary commitments to be undertaken by the various actors to reduce biodiversity loss and achieve the goals of the post-2020 global biodiversity framework and 2050 vision (“Living in harmony with nature”).

1.4 Scope

The study focused on two economic sectors which had the highest contribution to biodiversity loss, as identified in the first study, namely agriculture and energy. Within the agriculture sector, the following components were considered the most critical:

- (i) Small-scale/ subsistence farming
- (ii) Commercial farming
- (iii) Livestock.

For the energy sector, the most critical components were:

- (i) Charcoal, and
- (ii) Firewood.

In addition, plantation forestry is a cross cutting component as a driver for biodiversity loss both in the agriculture and energy sectors.

As part of this study, the key stakeholders from these components were identified. Interviews and workshops were held with them for developing Biodiversity Voluntary Commitments (BVCs) for reducing the pressure on biodiversity.

2 METHODOLOGY

2.1 Approach

This study employed systematic steps linked to each other for identifying Biodiversity Voluntary Commitments as illustrated in . These steps are further described in the subsections that follow.

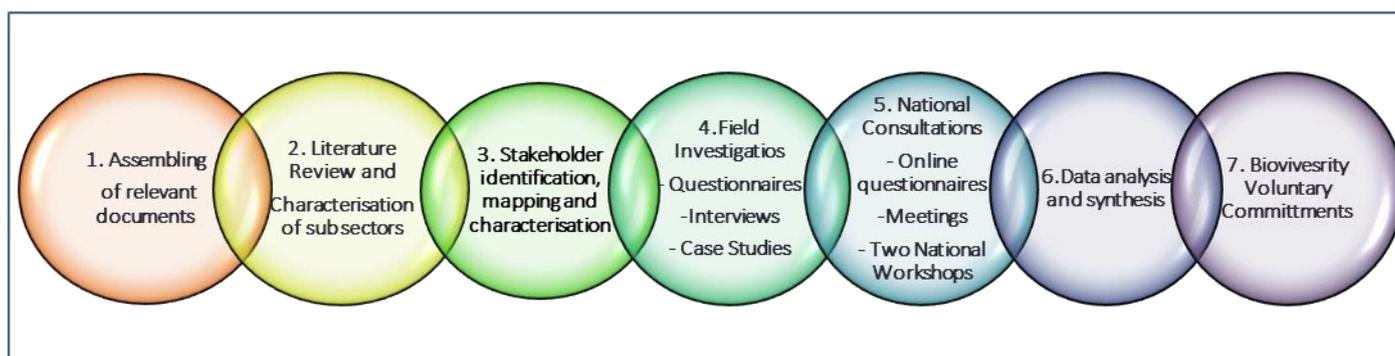


Figure 1: Key steps employed in the study

2.2 Data collection methods

2.2.1 Literature review

The literature review was aimed at collating an understanding of the biodiversity status in Uganda, the challenges, opportunities and good conservation practices and voluntary commitments within the agriculture and energy sectors as well as to identify good practices and lessons from other countries. The review also provided the political, economic, social, technical, legal and environmental contexts of biodiversity conservation as well as informed the development and proposed implementation of voluntary commitments. Relevant documents, reports and publications were retrieved from different sources, including national and sectoral policies, laws and strategic plans. Most of the documents were available and accessed from authentic scholarly websites, and some were obtained from Government Ministries, Departments and Agencies (MDAs), research and academia and non-government organizations involved in the study. The review focused on, biodiversity conservation in agriculture and energy and provided secondary data. The main keywords maintained during the internet search included “voluntary commitments”, “biodiversity conservation”, “agriculture” and “energy”. Appendix A is a list of documents reviewed and the key issues identified for the agriculture sector, and Appendix B is for the energy sector. The literature for other countries is provided in Appendix C.

2.2.2 Stakeholder Consultations

Stakeholder consultation was used to solicit input and feedback from various people within the agriculture and energy sectors. These sectors have many stakeholders; hence it was necessary to select representative samples for the study, based on elaborate stakeholder identification and

mapping for each sector; stakeholder analysis and categorization of the stakeholders to determine the target sample for the study.

The criteria for sampling were in a first step, directly related to the biodiversity impacting stakeholders in the agriculture and energy sectors, and in a second step, they targeted the stakeholders who have an interest in biodiversity conservation and with the potential to make voluntary commitments. The process entailed a detailed categorization of the stakeholders, determining the level of engagement required for each stakeholder category, as illustrated in Figure 2.

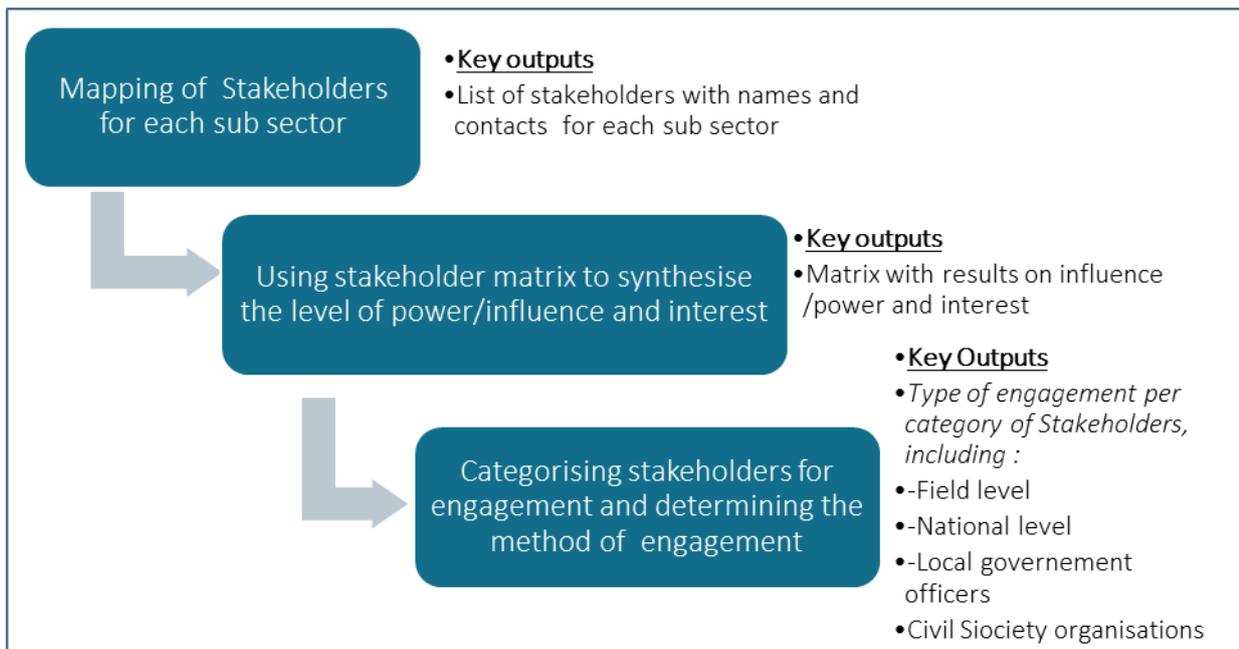


Figure 2: Stages in stakeholder characterisation for this study

The categorization of stakeholders was done through the interest-influence analysis matrix and based on this the method of engagement of the stakeholder category was determined as presented in Figure 3.

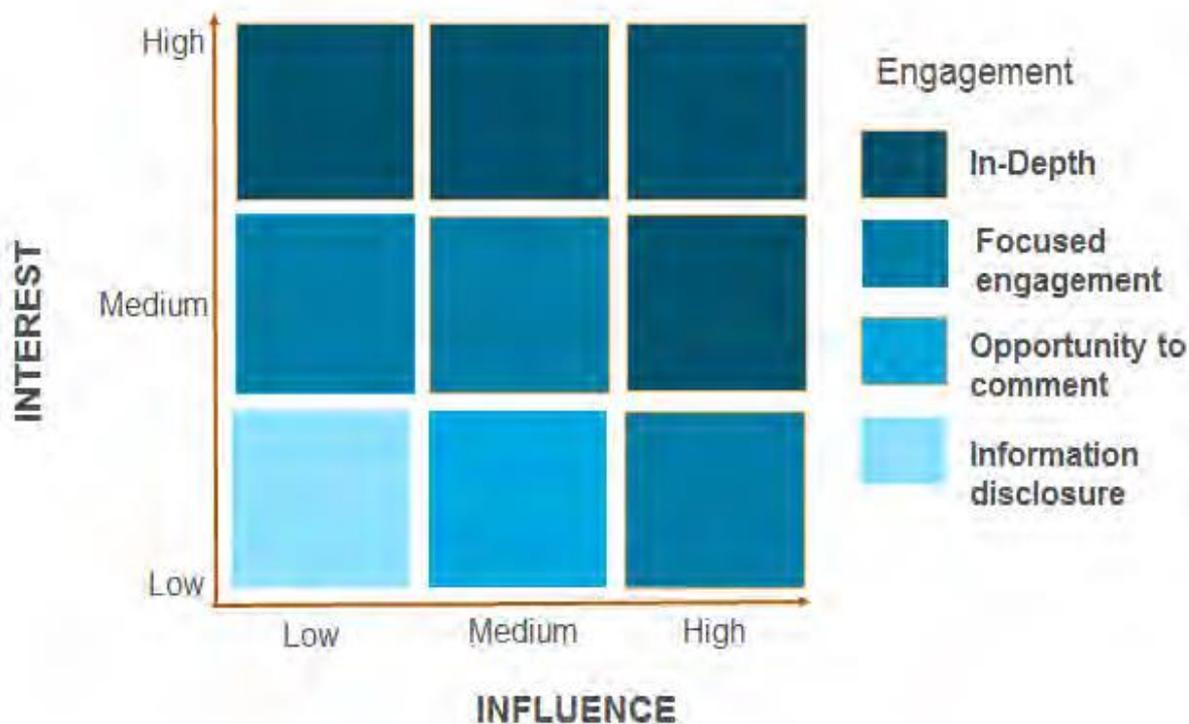


Figure 3: Conceptual stakeholders' analysis matrix.

Definition of the Stakeholders' interest

Stakeholder interest was defined as the extent to which a stakeholder is engaged in the agriculture or energy sector depending on or impacts biodiversity resources and has the potential to develop voluntary commitments. Stakeholder interest was assessed using the criteria shown in Table 1.

Table 1: Definition of the Stakeholders' Interests

High	Agriculture and Energy sector stakeholders have already developed biodiversity voluntary commitments, or plan to develop them, or they know that future voluntary commitments are a priority for the organization and they are willing to develop them as part of this assignment
Medium	Agriculture or Energy sector stakeholders have not developed any voluntary commitments. It is not a priority of the organization, but they are interested in taking part in upcoming workshops.
Low	Agriculture or Energy stakeholders have not developed any biodiversity voluntary commitments. Their priorities are in other aspects, and they do not show interest in developing voluntary commitments or in taking part in the planned workshops.

Definition of the Stakeholders' influence

Stakeholder influence refers to the power that a stakeholder has over biodiversity conservation outcomes. Influence can be direct or indirect. Indirect influence derives, for example, from a stakeholder's ability to influence others or their access to important information. Formal influence may derive from their ability to directly affect decision making through, for example, the issue of government approval and permitting decisions. The assessment was qualitative based on the criteria presented in **Erreur ! Source du renvoi introuvable..**

Table 2: Definition of stakeholder's influence

High	The stakeholder or stakeholder group is considered highly influential if they can stop
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	biodiversity loss and if they have the capacities to implement voluntary commitments having a significant impact on biodiversity loss and the other stakeholders. For example, powerful civil society organizations or private companies can affect the operation of the agriculture and energy sector.
Medium	The stakeholder or stakeholder group is considered to have moderate influence if they have moderate capacity to influence biodiversity conservation or the development of impacting biodiversity voluntary commitments. For example, lobby groups, NGOs and small associations.
Low	The stakeholder or stakeholder group is isolated and has limited capacity to exert influence over the biodiversity conservation. For example, stakeholders who lack institutional and social legitimacy, lack awareness of biodiversity or have weak capacity. They may be isolated communities that are geographically distant.

Determination of the engagement methods

The engagement methods for the stakeholders were based on their interest and influence and, as shown in Figure 3, they are defined under four categories:

- i) **In depth engagement:** applied to stakeholders with high-interest and high influence, and high interest and medium influence or medium interest and high influence, because of their interest in biodiversity conservation as regulators, resource managers, or provide oversight functions, and also for their influence in decision-making processes. Also considered under this category are stakeholders with high interest/low influence, who are dependent on biodiversity resources, but are voiceless. Essentially, these stakeholders together are important in planning and/or implementing activities related to the biodiversity voluntary commitments, and hence they are to be consulted as key informants.
- ii) **Focused engagement:** applied to stakeholders with medium interest and low influence; medium interest and medium influence and low interest and high influence because of their interest in biodiversity conservation or their high influence in decision making processes. They hold vital information, wield power to make supportive decisions or provide formal guidelines necessary for the process. A close engagement is a way of exploring their knowledge, and skills and taking and obtaining the necessary support related to the biodiversity voluntary commitments.
- iii) **Opportunity to comment:** The stakeholders were consulted and allowed to share their views. It applied to stakeholders with low interest and medium influence, who may need to be informed about the plans and progress during the implementation of the activities related to the biodiversity voluntary commitments.
- iv) **Information disclosure:** The stakeholders receive information regarding biodiversity voluntary commitments and may share their views. Their views may or may not be considered.

Target population, sampling and data collection tool

The target population for this study was categorised into seven sub-groups, based on thematic areas related to the main drivers of biodiversity loss and actors that influence management of the agriculture and energy sectors. These were:

- (i) Small-scale farmers;
- (ii) Commercial farmers;
- (iii) Livestock grazers;
- (iv) Commercial tree growers;
- (v) Biomass energy stakeholders;
- (vi) Government and local governments;
- (vii) Civil society organizations.

For these subgroups, case study areas were selected, discussed with, and approved by members of the Task Force and WWF through the inception meetings.

A set of comprehensive questionnaires was used as a tool for data collection, tailored for the different stakeholder categories in each of the sectors. The questionnaires mainly covered the following areas:

- (i) General background information,
- (ii) Stakeholder identification and characterization,
- (iii) The impacts of the stakeholder on biodiversity and the current commitments to biodiversity
- (iv) The future biodiversity voluntary commitments
- (v) The challenges and opportunities foreseen for developing biodiversity commitments
- (vi) The measures required to mitigate the challenges,
- (vii) The final recommendations.

Stakeholder consultation methods

- a) **Online consultations** – using a free online survey tool (Kobotoolbox) to collect and analyse the data. Questionnaires were sent to various stakeholders in the agriculture and energy sectors.
- b) **National workshops** - Two national workshops were organized for the agriculture and energy sectors respectively. The agriculture sector focused on small scale agriculture, commercial agriculture, livestock and forest plantations, while the energy sector focused on biomass energy, charcoal and firewood.
- c) **Field level consultations** - The field missions were organized, and the group discussions were guided by a predetermined set of questions. Field visits also involved interactions with key informants including staff of PAs, district officials and extension workers.
- d) Four case studies, here described, provided practical examples of the impacts of the different sub-sectors on biodiversity during the field missions.

(1) Communities around Kagombe Central Forest reserve: The central coordinates of Kagombe Forest Reserve are latitude: 0.81 and longitude: 30.82. The reserve covers 30,266 ha. This area provides a great case study on the impacts caused by subsistence farming on biodiversity. Between 1995 and 2015, the superficies of the land cover impacted was 28.7 km² representing 9.5% of the reserve⁵. The Kagombe CFR is a tropical rain forest, which covers parts of Kagadi, Kibaale, Kakumiro, Kabarole and Kyenjojo districts, and is under the mandate of the National Forestry Authority. The forest serves as part of the wildlife corridor forests connecting Budongo and Bugoma forest reserves in the north, to Semliki National Park to the west, via Muhangi, Kitechura, Ibambaro, Matiri and Itwara CFRs. Kagombe is also a major watershed for River Muzizi. Since the early 2000s, the forest has been heavily encroached by subsistence farmers, who have cleared the natural forest vegetation to plant crops like bananas, maize, beans, onions, tomatoes, coffee and eucalyptus trees. A scoping study conducted by Mupada *et. al.*, (2008)⁶ observed that the forest cover in the greater Hoima and Kibaale Districts had decreased seriously, resulting mainly from the influx of immigrants from other districts and from the DRC, who were mostly relegated to forested areas, often viewed as inhospitable by the local inhabitants, and that some of the immigrants were even settled in CFRs (e.g. Guramwa and Kagombe)

⁵ <https://dopa-explorer.jrc.ec.europa.eu/wdpa/39985>

⁶ Mupada, E.K., S. Nsita and S. Khaukha, 2008. Conservation of biodiversity in the Albertine Rift forests of Uganda Project: Scoping for Inception Report. Final Report submitted to WWF, Dec. 2008.



by unscrupulous local leaders. This area, therefore, presents as an appropriate case study site regarding the conversion of a tropical high forest to subsistence farms that has been going on over the last two decades. The clearance of the forest patches for crops progressively leads to the loss of the corridor function of the reserve that negatively impacts biodiversity resources. The main stakeholders are National Forestry Authority, Kibaale local government, local communities, collaborative forest management (CFM) groups and NGOs working in the area.

- (2) Forest Patches in Masindi district:** Masindi District is a district in Western Uganda. The central coordinates of the district are: 01 41N, 31 44E. Masindi district is bordered by Nwoya District to the north, Kiryandongo District to the east, Nakasongola District and Nakaseke District to the southeast, Kyankwanzi District to the south, Hoima District to the southwest and Bulisa District to the northwest. The District covers 2,584.6 km². It is well endowed with forest resources including 13 CFRs and several private forests on private land. From 2001 to 2021, Masindi lost 43.4kha of forest cover, which is equivalent to an 8.5% decrease since 2000. The forests, have been cleared for expanding commercial agricultural farming, mainly sugar cane growing and (formerly tobacco) by subsistence farmers. Kinyara Sugar Works was rehabilitated in the late 1990s and has since then expanded the sugarcane plantations, both on its core production land and on private land under the out-growers scheme. The surrounding forests were important biodiversity corridors allowing for the movement, protection and breeding/dispersal of plants and animal species within the landscape. The main stakeholders include private landowners, Kinyara Sugar Ltd, Masindi Sugarcane Out-growers Association, Budongo Conservation Field Station, ECOTRUST, WCS and Masindi District Local government among others.
- (3) Communities and private sector within and around Forest Reserves in Mubende District:** Mubende district is located in the central region of Uganda and lies within the cattle corridor, with mainly wooded savannah vegetation type. The dominant tree species in the north are *Acacia hockii*, *A. polyacantha*, *Albizia coriaria*, *A. zygia*, *Bridelia micratha*, *Blighia unijugata*, *Combretum molle*, *Markhamia lutea* and *Teclea nobilis*, occur together with *Maytenus senegalensis* and *Sapium ellipticum*. The district has 11 CFRs: Kasolo (31.93km²), Muinaima (10.48 km²), Lusiba (6.61 km²), Kisombwa (29.24 km²), Kyampisi (15.5 km²), Kasenyi (2 km²), Kaweri (12.39 km²), Mpinve (18.54 km²), Kanangolo (26.73 km²), Torono (4.35 km²) and Bamude – Nchwanga (3.20 km²). Most of these had been degraded through encroachment, mainly by the local communities, for timber, crop cultivation, cattle grazing and charcoal burning among other illegal activities. After undertaking a site-species matching study, NFA allocated these heavily degraded CFRs to the private sector for tree farming so that they could be restored. The main aim was to establish plantations of fast-growing and high-yielding species like pine and eucalyptus, for the production of sawlogs. These forest reserves therefore provide a case for plantation forestry and its impact on biodiversity conservation. Key stakeholders include district local governments (District Environment officer, DFO, District Production Coordinator), NFA, Private plantation owners (private companies, New Forests Company, Global woods Ltd), and civil society organizations operating in the region.
- (4) Land Degradation in and around Mt. Elgon National Park Environment –** Mount Elgon National Park is located in the eastern part of Uganda covering an area of 1,117 kms² east of Mbale Town one of Uganda's beautiful busy towns. The latitude of Mt. Elgon National Park is 1,1185, the longitude is 34.5265 with the GPS coordinates of 01° 07' 06.60" N and 34° 31' 35.39" E. Between 1995 and 2015, the superficies of the land cover impacted by human activities was 5.8 km² (0.5 % of the National Park)⁷. Mt. Elgon was gazetted as a National Park around 1983. However, nearly 80% of the residents around Mt. Elgon depend on the mountain land for direct use of resources as well as for agriculture-

⁷ <https://dopa-explorer.jrc.ec.europa.eu/wdpa/28175>



dominated activities, and consequently the protected area experiences a lot of pressure from the adjacent communities, (UNDP, 2013)⁸. According to the Uganda Bureau of Statistics, Mt. Elgon has the country's highest population density of 1,000 people per square kilometer with a population growth rate of 3.4 percent per annum⁹. The growing population is a pressure force on the NP, especially the northern slopes of Mt. Elgon. The affected communities include the Benet, the Indigenous Peoples (IPs) who have been living adjacent to the NP from time immemorial. The main drivers of the biodiversity loss and main stakeholders involved in this loss include pastoralists and small-scale farmers. Bush burning to have more fresh grass and conflict over resource use may affect the biodiversity and therefore productive engagement needs to be undertaken. Encroachment onto the protected area for grazing cattle and degazettement of part of the park are major concerns. Key stakeholders include Benet, other pastoralists, cultivators, UWA, district local governments of Kapchorwa, Kween, Bukwo and Sironko among others as well as CSOs operating in the area.

2.3 Data analysis and synthesis

2.3.1 PESTLE Analysis of the Sectors

The agriculture and energy sectors were analysed in terms of biodiversity mainstreaming and conservation using the PESTLE analysis tool, which considers the political, economic, social, technical, legal and environmental factors as elaborated below.

- **The political factors** include the sectoral policies and programs impacting (positively or negatively) the biodiversity. Political factors also include institutions, tax policy (tax rates and incentives), etc.
- **Economic factors** include the budget dedicated to the sub sectors, Growth Domestic Product indicator (or similar indicators that provide information on the wealth of the sub-sectors), import and export indicators, etc.
- **Social factors** include the main stakeholders (from the public and private sectors, as well as from the civil society), employees, social classes and minorities, attitudes toward the sub-sectors, income level, etc.
- **Technological factors** include application of scientific knowledge for practical purposes, machinery and equipment, innovations and other technologies that may affect the sub-sectors,
- **Legal factors** include international agreements/conventions, national laws, policies and regulations, including the level of implementation of the environmental and biodiversity laws and regulations.
- **Environmental factors** include the geographical location of the sub sectors, the potential impacts on biodiversity (e.g. habitat loss, species loss, pollution emissions, etc.), best practices and biodiversity commitments (if already taken).

2.3.2 Analysis of data

The data collected was mainly qualitative, obtained through key informant interviews, group discussions and observations, to document opinions of respondents. Qualitative methods were used to analyze the data collected from online respondents and stakeholder interviews and

⁸ UNDP, 2013. Ecosystem-based adaptation in Mt Elgon Ecosystem: Vulnerability Impact Assessment for the Mt. Elgon Ecosystem. Website: https://www.adaptation-undp.org/sites/default/files/downloads/undp_ugandaunepunep-wcmc_2013_uganda_via_report.pdf.

⁹ <https://reliefweb.int/report/uganda/overpopulation-uganda%E2%80%99s-mount-elgon-kills-hundreds>



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discussions during national and field consultations, using excel. The analysis involved coding responses from stakeholders based on the thematic areas by objectives of the study.

2.3.3 Development of biodiversity voluntary commitments

Consultations were utilised to collect voluntary commitments for biodiversity conservation from stakeholders. The consultations were conducted during field level focus group discussions and during the national level workshops. The interest of the stakeholders to participate in voluntary biodiversity commitments was evaluated through assessing the extent to which a stakeholder would be interested in developing voluntary commitments for biodiversity conservation. A series of responses guided discussions to further pursue a specific stakeholder were also conducted during the study. In summary developing BVCs involved three major steps as presented in **Figure 4**.

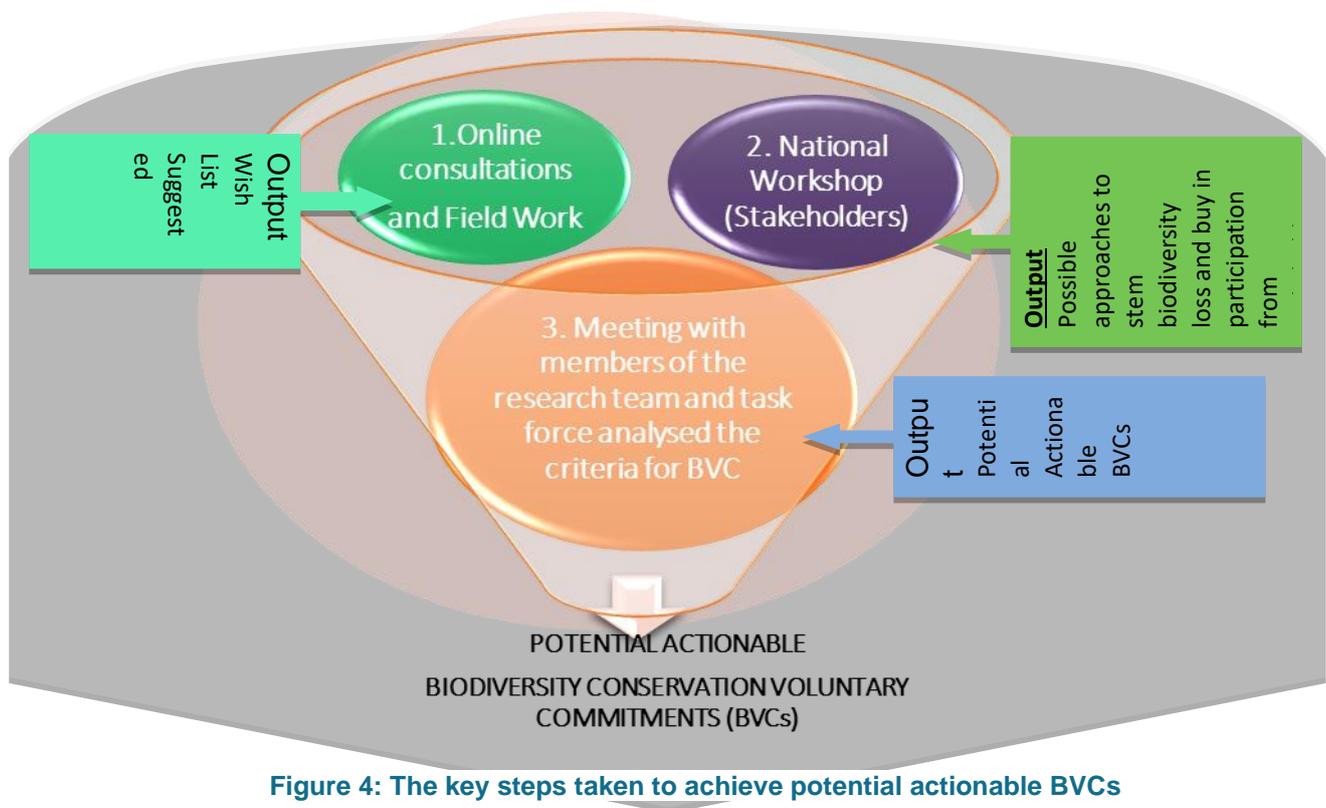


Figure 4: The key steps taken to achieve potential actionable BVCs

3 FINDINGS

3.1 Agriculture Sector

3.1.1 PESTLE sector analysis

The literature review for in-depth sector analysis was undertaken using the PESTLE analysis tool, and this section describes the main findings for the agriculture sector. Overall, a total of 53 key reports from the agriculture sector were reviewed. A list of documents reviewed and issues identified is provided in Appendix A. In addition, literature from other countries provided lessons learnt and best practices to inform the study (table 9).

a) General overview of the agriculture sector

The Agricultural sector accounted for about 23.7% of the GDP, and 31% of export earnings in 2021. 70% of Uganda's working population is currently employed in the agriculture sector (Thornton, 2022). In 2020, the contribution to the agricultural GDP by different sub-sectors includes crops (68%), livestock (16%), fisheries (12%) and forestry (4%).

In 2019, Agricultural land occupied the largest proportion of land cover area of Uganda (44.2%), followed by grassland (21.2%) and then water (15.5%) and forests (8%). In general, the total land under agriculture (for small-scale subsistence and large-scale) has been increasing since 1990, as shown in Erreur ! Source du renvoi introuvable. **Erreur ! Source du renvoi introuvable..**

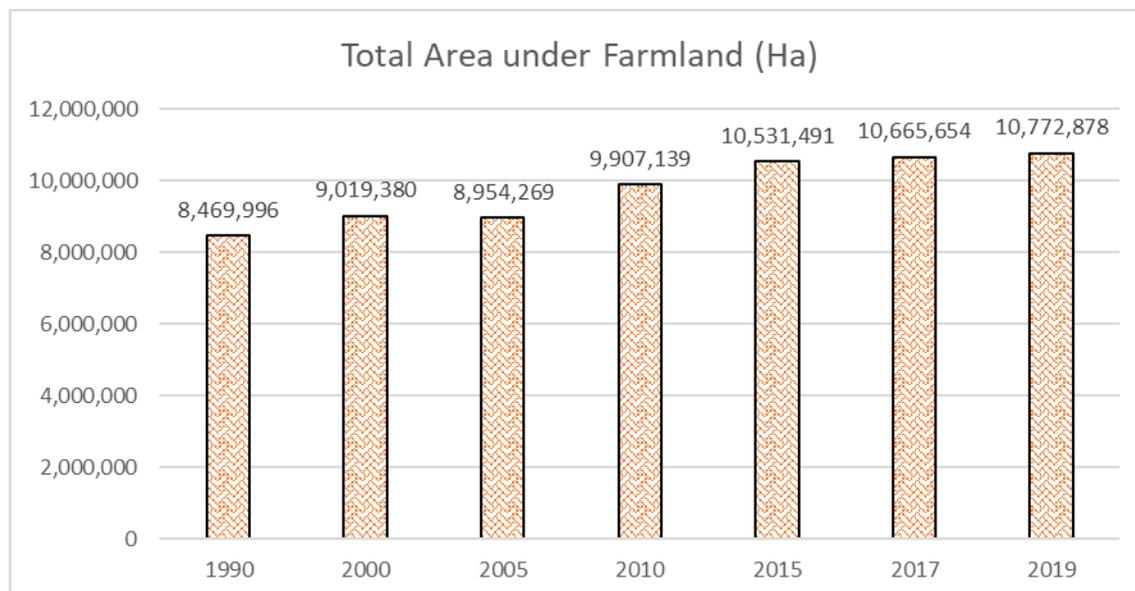


Figure 5: Total area under subsistence and large-scale farmland (NFA, 2019 Land use Land cover data)

The expansion of agricultural land over the years has been cited as one of the key drivers of biodiversity loss, through the clearance of habitats to allow for the cultivation of crops. Agricultural development has mainly been at the subsistence level, but there is increasing realization of growth of commercial plantations for tea, sugar cane, oil palm, cocoa and rice. Usually, the primary focus of a plantation is the production of cash crops through high standard management. Other traditional cash crops (cotton, cocoa), nut trees (cashew nut, shea nut, macadamia), cereals

(wheat, barley, rice), fibre crops (sisal, jute, kenaf), horticultural crops (garlic, citrus) and oil crops (castor oil) (Kagorora *et al.*, 2021) and usually plantation forestry and agroforestry. The other aspects of the agriculture sector include livestock and fisheries. However, although forestry is traditionally managed under the Ministry of Water and Environment and official reports on the GDP place it under agriculture, it is in practice a cross cutting component that affects biodiversity through habitat conversion by both agriculture and energy sector activities. The PESTLE analysis for the agriculture sector thus considers three components namely subsistence agriculture, commercial agriculture and livestock. Plantation Forestry is considered separately.

b) PESTLE analysis of the agriculture sector

Political context: Agriculture is the main sector supporting Uganda’s economy and it is given great priority at the political level. Uganda aspires to transform agriculture from subsistence farming to commercial agriculture and hence make it profitable, competitive and sustainable to provide food and income security to all the people of Uganda¹⁰. There is an enabling policy, legal and planning framework to support the agricultural expansion, growth and development, and a refocus towards commercialization. Subsistence agriculture is increasingly being replaced by commercial agriculture as Governments pushes to increase the contribution of the agriculture sector to the national Gross Domestic Product (GDP). The agriculture sector aims at creating employment opportunities along the entire commodity value chain of both crops and livestock. The government has also set up a detailed strategy of development for the livestock sector. Uganda’s current National Development Plan –NDP III considers agro-industrialization as one of the core programs will increase access to affordable mechanization application of fertilizers and could thus increase pressure on biodiversity resources.

Economic context: The majority of people in the country depend on small-scale production for food and income. Around 85 percent of households engage in crop production both for own consumption and income generation and only 15 percent cultivate crops exclusively for own consumption (UBOS, 2020)¹¹. **Erreur ! Source du renvoi introuvable.** shows the main crops grown for food. The main crops harvested are maize, beans, cassavas and sweet potatoes.

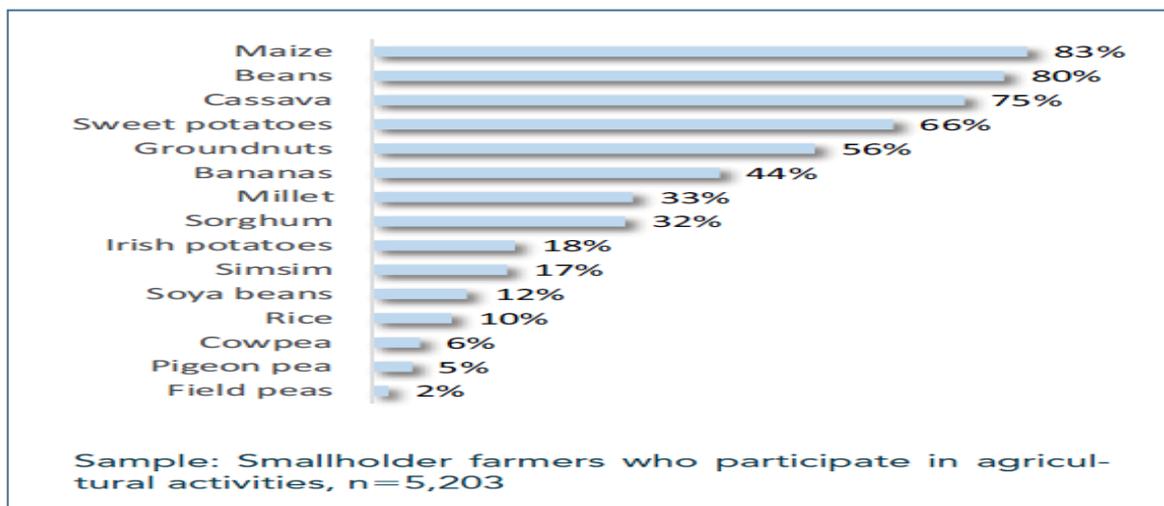


Figure 6: Crops grown for food and as staple crops

The productivity and production under this category of farmers is low, on small landholdings of an average of about 1.3 Hectares per household (**Erreur ! Source du renvoi introuvable.**).

¹⁰ Uganda Vision 2040, Government of Uganda, Kampala.

¹¹ Uganda Bureau of Statistics (UBOS), 2020. Uganda Annual Agricultural Survey 2018. Kampala, Uganda; UBOS.

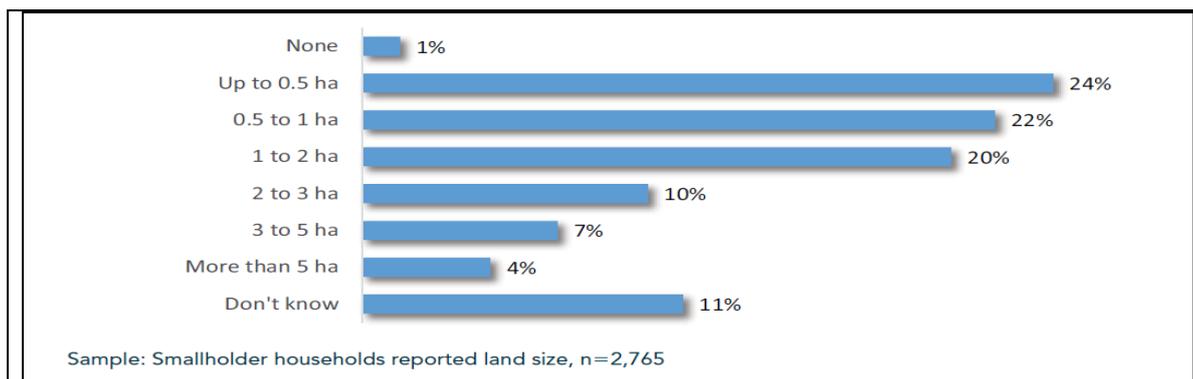


Figure 7: Number of hectares (ha) of agricultural land owned
Source: World bank, (2013).

Smallholder agriculture is a major source of employment for many unskilled and semi-skilled workers in Uganda. The average annual farm income is less than UGX 1 million (equivalent to around USD 300), compared to about UGX 2.6 million (equivalent to around USD 680) for the large-scale producers, (UBOS ibid). To this end, the level of poverty within the country is high (**Erreur ! Source du renvoi introuvable.**).

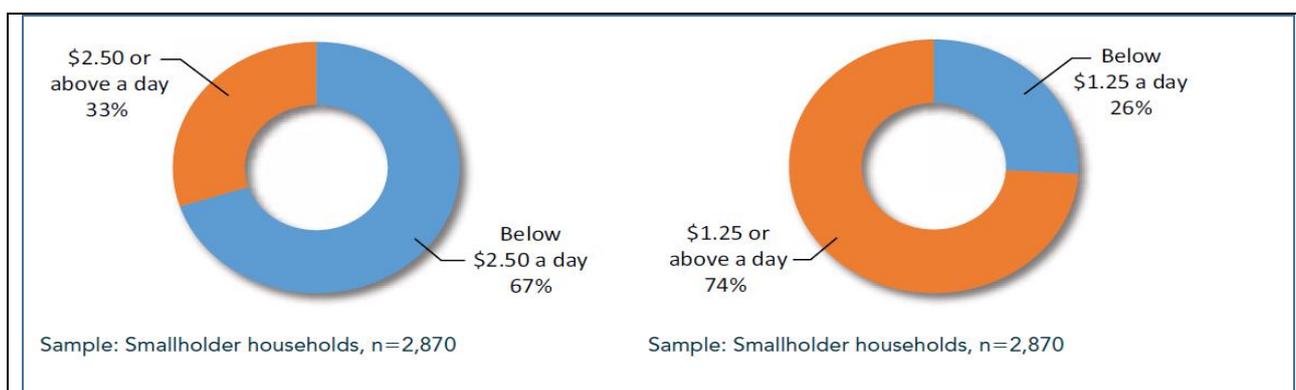


Figure 8: Poverty Status of Households (Source: The World Bank 2013)

Commercial agriculture is however developing with the cash crop sub-sector (coffee, cocoa, cotton, tea) averaged growth rates of 6.4%, while the food crops sub-sector (maize, cassava and bananas) growing at an average of 3.7%. The cash crops grown in Uganda include cotton, sugar cane, tea and coffee. Commercial agriculture also provides opportunities for economic benefits, including job creation, emergence of shops and other small businesses and other income-generating opportunities.

According to FAO (2019b), the livestock sector in Uganda represented about 17% of the agricultural value added and 4.3% of GDP. According to GOU (2020), the livestock sector is at 2.1% average growth rate over the period 2015-2019. Uganda currently has some 14.2 million cattle, 16 million goats, 4.5 million sheep, 47.6 million poultry and 4.1 million pigs, according to data from the agricultural ministry and the Uganda Bureau of Statistics. The country is currently a net exporter of livestock products and live animals, primarily dairy products and eggs. Meat and meat products play a minor role¹². UBOS (2020) confirms that there is increasing demand for livestock and livestock products, calling for increased investment in the sub sector. Table 3 shows the changes in the sub sector:

Table 3: Changes in the Livestock Sector over 10-years (2008 to 2018)

S/N	Animal type	Population in 2008 (millions)	Population in 2018
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¹² <https://allianceforscience.cornell.edu/blog/2020/07/uganda-moves-to-boost-incomes-of-smallholder-livestock-farmers/#:~:text=Uganda%20currently%20has%20some%2014.2,the%20Uganda%20Bureau%20of%20Statistics.>



		(millions)	
1	Cattle	11.4	15.6
2	Goats	12.5	15.6
3	Sheep	3.4	4.4
4	Pigs	3.18	4.5
5	Rabbits	0.373	0.628
6	Chicken	37.4	35.4

Social context: National statistics show the highest poverty levels in the northern region of Uganda (Anderson et al., 2016). The most common form of ownership of the land is individual ownership under the customary laws (World Bank, 2013), as illustrated in **Erreur ! Source du renvoi introuvable.**

Table 4: The form of land ownership by Communities involved in Agriculture

	Total	Central	Eastern	Northern	Western
Individual ownership with lease or certificate	31%	47%	28%	19%	37%
Individual ownership under customary law	40%	24%	41%	52%	37%
Communal (resources are shared)	8%	6%	5%	20%	4%
State ownership	0%	1%	0%	0%	1%
Other	10%	7%	11%	7%	11%
Don't know	10%	15%	14%	2%	11%

Sample: Smallholder farmers who participate in agricultural activities, n=5,203

Most of the small scale farmers have a weak level of education, as shown in **Erreur ! Source du renvoi introuvable.**

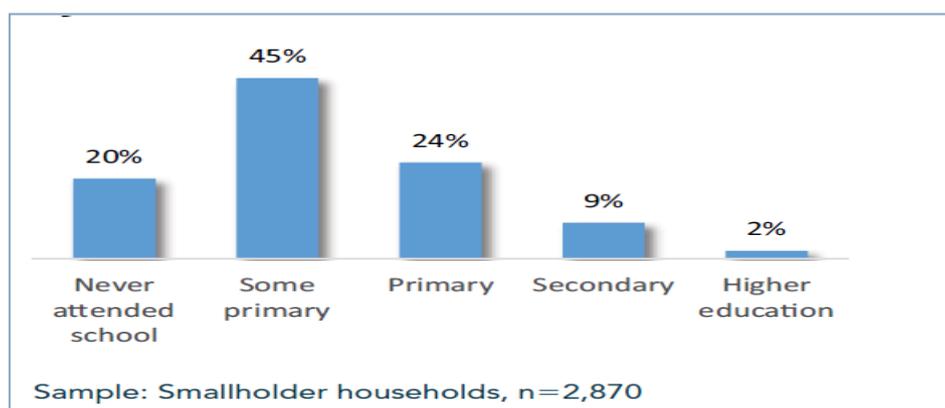


Figure 9: The highest education attained by the head of household

Large-scale commercial farming tends to focus more on the perennial monoculture crops such as sugarcane, tea, oil palm etc., and most farmers offer more land to these crops at the expense of food crops. The introduction of oil palm growing in Kalangala District by 2006 encouraged the communities either to sell their land to the oil palm company, or to utilize all available family land for oil palm growing under the out-growers scheme, leaving no provision for food production. As a result, there was severe negative effects on food security, and the district increasingly depended on food brought from other districts.¹³ In Busoga sub-region, the farmers involved in commercial

¹³ Ssemmanda R. and Opige M.O. (eds.). 2018. Oil palm plantations in forest landscapes: impacts, aspirations and ways forward in Uganda. Wageningen, the Netherlands: Tropenbos International

sugarcane growing are food insecure, as the majority of householders cultivated few crop varieties, lacked adequate and nutritious foods, and have inadequate income to purchase food to meet their needs. To cope with food insecurity, households offer labour in exchange for food, borrow food, ration food, and at times steal, (Mwavu, *et al*, (2018)¹⁴.

Expansion for commercial agriculture tends to increase pressure on land available for settlement and subsistence farming, with many smallholder farmers, especially women, becoming landless. In Kalangala District, many smallholder farmers were reported to have become landless and had to camp in fish landing sites, causing a shift to fishing and thereby increasing pressure on the aquatic biodiversity, (Semmanda and Opige, *ibid*). In the sugar-cane growing areas, landowners hire out their land on long-term basis (5-10 years or more) to commercial sugar cane growers. Such practices lock up land and denies access to family members. In addition, increasing populations from migrant workers is associated increase in crime prevalence.

The livestock production is however also largely by small scale farmers and scattered in different villages or even mobile (FAO, 2005) and is dominated by indigenous breeds¹⁵. The World bank (2013) mentions that there 16 times more workers from small holder farmers than workers from the commercialized agricultural. In terms of gender 86.7% of the females are engaged in agricultural activities while 74% are males¹⁶.

Technological context: Uganda's Agriculture Sector Strategic plan (MAAIF 2016)¹⁷ notes that agricultural mechanization is still minimal in the country and subsistence farming is characterized by traditional tools (hand or cattle driven tools, ploughs) and methods of cultivation, which incorporate family labour. Manual irrigation methods are mostly used. Although communication is poor as parts of Uganda have low mobile penetration rates and with poor networks which prevent reliable communication, there are efforts to modernize agriculture to ensure greater productivity. Water-for-production schemes are being developed, and feasibility studies carried out on community- based irrigation schemes and district-based demonstrations on small-scale irrigation technologies. Rainwater harvesting and management initiatives were established in 23 districts. GOU developed some community storage facilities, modern grain processing equipment and cold chain infrastructure for dairy in some parts of Uganda. However, there is still need for a lot more.

In terms of commercial agriculture, farms are highly mechanized and scientifically managed. They are characterized by machines, modern irrigation methods, modern inputs (such as fertilizers), intensive capital, cash crops and cereals harvested in large areas. Agricultural commercialization usually necessitates land use intensification and the increased use of pesticides, synthetic fertilizers, and herbicides, which can alter soil micro-biological organisms critical for nutrient cycling and the number of insect and bird species necessary for pollination and biological pest control. This increases the fragility of agri-food systems to pest and disease outbreaks and other climate-related shocks.

In terms of livestock, the technological aspects include access to services and automation technologies that continue to facilitate improved productivity. The ease of reaching out to stakeholders in the value chain of livestock production and husbandry practices ensure faster and more effective and efficient improvement and marketing.

Legal context: The Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) is the institution with the mandate to oversee the development of the agriculture sector. The implementation is

¹⁴ Mwavu, E.N., V. K. Kalema, F. Bateganya, P. Byakagaba, D.I Waiswa, T. Enuru and M.S. Mbogga, 2018. Expansion of Commercial Sugarcane Cultivation among Smallholder Farmers in Uganda: Implications for Household Food Security. Website: <https://www.mdpi.com>

¹⁵ <https://www.agriculture.go.ug/2019/10/02/livestock-sub-sector-developed-reinforced-with-more-support-for-innovation-breeding-and-enterprise-incubation/>

¹⁶ Uganda Bureau of Statistics, UBOS 2018 Uganda Annual Agriculture survey report, 2018.

¹⁷ Agriculture Sector Strategic Plan 2015/16-2019/20, MAAIF, Entebbe, Uganda.



through four Directorates, namely Crop Resources, Animal Resources, Fisheries Resources, and Agricultural Extension Services. There are also seven statutory bodies established to enhance efficiency of the delivery of the agricultural goods and services. These are: National Agricultural Research Organization (NARO); Uganda Coffee Development Authority (UCDA); Cotton Development Organization (CDO); National Animal Genetic Resources Centre and Databank (NAGRC&DB); Dairy Development Authority (DDA), Coordinating Office for Control of Trypanosomiasis in Uganda (COCTU) and National Agricultural Advisory Services (NAADS).

Objective XXII, sub sections (a) and (c) of the 1995 Constitution of the Republic of Uganda restate that the State shall – “take appropriate steps to encourage people to grow and store adequate food”; and “encourage and promote proper nutrition through mass education and other appropriate means in order to build a healthy State”. Uganda has thus over time instituted agricultural policy reforms as well as strategic frameworks aiming at transforming the smallholder farmers from subsistence to commercial production. These include; Liberalization and privatization policy 1987, Poverty Eradication Action Plan (PEAP) 1997 – 2007; Plan for Modernization of Agriculture (PMA) Strategy 2000 -2001; Rural Development Strategy (RDS) 2005 – 2007 ; Prosperity for All (PFA) 2006 (Adong et al., 2014). The National Agriculture Policy (2013) provides an enabling environment to achieve food and nutrition security; improve household incomes; enhancing sustainable agricultural productivity and value addition; providing employment opportunities and promoting domestic and international trade. This policy supports sustainable land management and conservation agriculture and climate smart technologies. The National Organic Agriculture Policy 2019 – promotes sustainable use of natural resources and conservation of indigenous knowledge.

The National Environment Act (GOU, 2019) recognizes a number of agricultural activities including biodiversity offsets, special conservation areas, industrial or commercial fish processing; fish caging for commercial production; processing of animal oils; and processing of dairy products.

In terms of livestock, the country has a range of policies and strategies to ensure a sustainable growth and transformation of the livestock sector guided by the Agriculture Sector Strategic Plan (ASSP) 2015/16 – 2019/20. The strategy prioritizes investments in beef, dairy cattle, poultry and goats as well as in other agricultural commodities. Uganda’s policy on the livestock sector and climate change has been strengthened by the recent National Agriculture Policy. Key overarching policies include the Uganda National Climate Change Policy 2015, National land-use policy and legal frameworks, National Agriculture Policy (NAP), Vision 2040, National Environmental Policy, 1995, Agriculture Sector Strategic Plan, National Development Plan III, Renewable energy policy, Forestry policy, Cattle Grazing Act (1945), National Climate Change Policy (NCCP) (2015), Comprehensive Africa Agriculture Development Programme (CAADP), Local Government Development Plans (LGDPs), and Annual Work Plans and Budgets, and Communication on "*The Paris Protocol - a blueprint for tackling global climate change beyond 2020.*"

Environmental context: Increasing population growth has driven the subsistence farmers to convert virgin ecosystems such as forests, woodlands, grasslands and wetlands, and thus contributing to loss of important habitats for different biological resources. According to NFA records (NFA, 2019) small-scale agriculture expanded from 84,052 km² to 106,078 km² between 1990 and 2019, contributing to the conversion of 22,026 km² within a period of 29 years (or an average increase of 759.5 km² per year). With this expansion comes the threat to loss of habitats such as forests, bushland, grassland and wetlands, which host different biological resources. Therefore, subsistence agriculture has major impacts on biodiversity, due to the extensions of agriculture into virgin lands. **Erreur ! Source du renvoi introuvable.** illustrates the increasing disappearance of the forest area and increasing area under subsistence agriculture.

Most subsistence farmers are not aware about the biodiversity conservation, and are hardly involved in developing voluntary commitments, despite the high negative impacts they cause. Halting and reversing the loss of biodiversity by 2030 will require deliberately efforts to stimulate



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participation and incentivize small-scale farmers to develop and implement voluntary commitments for biodiversity conservation.

Commercial agriculture expanded from 684 km² to 1650 km² between 1990 and 2019 contributing to the conversion of 966 km². This heavily contributed to biodiversity loss. There is still limited support to farmers to promote CSA initiatives and address land degradation.

The application of technologies that promote intensive land use and use of chemicals increases fragility of agri-food system and greatly impact biodiversity and constrains efforts to mitigate biodiversity impact. There is need to create awareness on the use of fertilizers and chemicals. Map locating the areas where annual and perennial non-timber crops have the biggest impact on species is shown in **Erreur ! Source du renvoi introuvable..**

Grassland areas decreased by 4% of its area from between 1990 and 2017, from 53 404 km² to 51 206 km² (.



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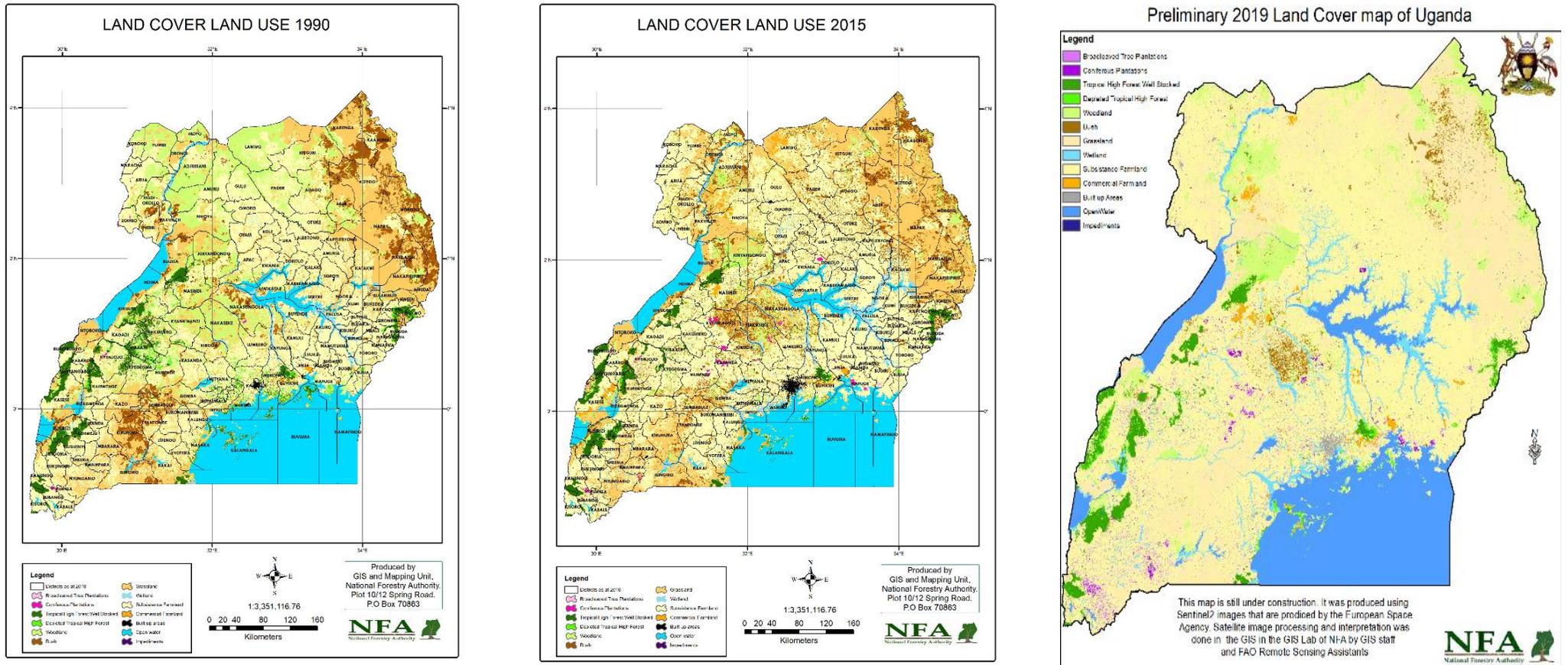


Figure 10: Land use map, showing increasing predominance of areas under agriculture, mainly subsistence farming (yellow) from 1990 to 2019.

Commercial agricultural plantations aim at increasing productivity and production through use of chemicals and fertilizers and application of climate-smart strategies. Most farmers do not appreciate the impact of chemicals and fertilizers to biological resources and the environment such as increasing fragility of agri-food systems and have weak support to apply climate smart agriculture technologies. There is need to create awareness about the negative impacts of fertilizers and chemicals, their safe application and application of CSM technologies to mitigate the impacts on biodiversity.

Promotion of commercial agriculture has focused on monoculture crops such as sugar cane, tea, oil palm and others largely for income generation, and households often neglect other traditional crops that have been important for maintaining the genetic, species and ecosystem diversity and food and nutritional security. Modernization of agriculture emphasizes the use of exotic species and improved varieties, which leads to genetic erosion of indigenous species. Populations of the once popular indigenous fruits and vegetables such as indigenous tomatoes are rarely available (NEMA, 2016)¹⁸.

Key message regarding agriculture towards commitment to biodiversity conservation

- Government has put in place enabling policy, legal and planning frameworks to support agricultural expansion and commercialization as well as enhance land productivity and this has implications for biodiversity conservation unless climate smart agriculture is employed in that focus of increasing the contribution of the agriculture sector to GDP. Commercial agriculture has focused on monoculture crops such as sugar cane, tea and oil palm and other income generation, and households tend to neglect other traditional crops that have been important for maintaining the genetic, species and ecosystem diversity and food and nutritional security. Expansion of agriculture land through conversion of other land cover such as natural forests, woodlands and grasslands increases the threat to biological diversity and need to be handled through deliberate decisions that require stakeholders to undertake voluntary commitments to conserve biodiversity on agricultural landscapes.
- Large scale agriculture plantations aim at increasing productivity and production through use of chemicals and fertilizers and application of climate-smart strategies. Most farmers do not understand the negative impact of chemicals and fertilizers on biological resources and the environment such as increasing fragility of agri-food systems and have weak support to apply climate smart agriculture technologies. There is need to create awareness about the negative impacts of fertilizers and chemicals, their safe application and application of CSM technologies to mitigate the impacts on biodiversity. Large scale farmers should therefore be targeted for commitments to biodiversity conservation. There is an enabling legal framework to support the development of the livestock sector in Uganda but needs to be integrated with opportunities to promote participation in biodiversity conservation as well as mitigation of the impacts to biodiversity.
- 74% of Uganda household are involved in livestock production (UBOS, 2022). The social structure has great impact on biodiversity considering that semi-intensive system mainly involves cross-breeding, in kraals, paddocks and cattle barns/stalls and feeding with high-quality feed.
- In 2020 there was increase in animal product export from UGX 672.9 billion (USD 0.17 billion) to UGX 729.7 billion (USD 0.19 billion). UBOS (2020) confirms that there is increasing demand for livestock and livestock products, calling for increased investment in the sub sector no clear effort in biodiversity conservation.

c) PESTLE Analysis of plantation forestry

In Uganda plantation forestry is a form of commercial farming where trees are grown as an investment for income and profit by individuals and groups. These are small (up to 100ha), medium (100-1000ha) and large-scale (above 1000ha) investments that have established tree plantations of mostly pines and broadleaved trees. Plantation forestry involves dedicated capital inflows and

¹⁸ National Environment Management Authority, 2016. National Biodiversity Strategy and Action Plan (NBSAP II).



tracts of land where trees are grown as long-term investments. In this study, the analysis focused on tree plantations, but it should be noted from the on-set that, plantations are not about trees only. Government continues to develop innovative financing mechanisms and commercial incentives such as through the Saw Log Production Grant Scheme (SPGS) and trade in carbon credits) in order to encourage private sector investment in forestry plantations. Government will also provide support to the private sector in the form of land in central forest reserves and work with partners to provide technical advice and training, access to market information, and standards of best practice for commercial forestry. Further investment into technological innovation and research will be done to increase wood yields and promote highly valuable indigenous species for use in plantation forests.

Political context: Plantation forestry development is the mandate of the Ministry of Water and Environment, through the management responsibility of National Forestry Authority, District Forestry Office, and the private sector. Prior to 1990, plantation forestry received little attention, with most of the timber and other forest products coming from natural forests and woodlands. Around 13,000 ha of plantations were established in late 1960s/early 70's, largely with *Pinus caribaea* and to a lesser extent *P. patula*, *P. oocarpa* and *Eucalyptus grandis*. These plantations were clear-felled since the mid 90's (and not replanted). In early 2000s the then Forestry Department started to promote the development of forest plantations as a strategy to address the increasing demand for forest products and reduce the dependence on the natural forests. This strategy aimed at contributing to the conservation of biodiversity by reducing pressure on the natural habitats. Government put in place a generally favourable environment for private sector investment in commercial forestry, through availability of land in the central forest reserves and the innovative Sawlog Production Grant Scheme (SPGS), which operated from 2004-2021 to provide performance-based grant subsidies and technical support to small, medium, and large investors. Since 2004, commercial plantation development in Uganda has grown considerably, with over \$50 million in private investment being channelled into the sector. It is estimated that 75,000 ha of plantations have been established under SPGS. The Timber Plantation Investment Program (2006) set a target of establishing at least 150,000 ha by 2025 for both public and private sectors, in order to meet the demand for timber.

Economic context: Plantation forestry has increasingly been recognized as an important source of forest products such as timber, firewood, building and transmission poles, for the growing construction and furniture industry. Studies indicated that there was a huge and increasing gap between demand and supply of these products. Commercial forest plantations therefore have great potential for generating incomes, creating employment and contributing to national development. NEMA (2016) reported that forestry contributed 6% to Uganda's Gross Domestic Product (GDP) and 11-27% of household cash incomes of communities around forest reserves.

Social Context: Forestry employs over 1 million people in the formal and informal sectors. About 100,000 people are employed in the formal sector while the biggest number of those employed is found in firewood collection & trade plus the charcoal value chain at household, commercial and industrial levels.

Legal Context: Plantation forestry development is the mandate of the Ministry of Water and Environment, through the management responsibility of National Forestry Authority, District Forestry Office, and the private sector. A number of national policies, laws and strategies have been put in place to provide guidance to forestry developments, including plantation forestry, and the conservation of biodiversity. Among the policies include the Uganda Forestry Policy (2001, now being revised), the Uganda Wildlife Policy (2014); the National Environment Management Policy (1994) and the National Policy for the Conservation and Management of Wetland Resources (1995). The Forestry Policy creates a favourable investment environment to promote the development of commercial forest plantations and private sector investment that could reduce pressure off the natural forests and thus enhance biodiversity conservation. The National Environment Act, 2019 provides for the environment and social impact assessments and so



provides safeguards to mitigate negative impacts of forest plantation development. The strategic plans like the National Forest Plan (2011), the National Biodiversity Strategy and Action Plan (NBSAP II), and the National REDD+ Strategy, among other, implement the provisions of forestry related policies, while the laws that provide enabling environment for policy implementation include: the National Forestry and Tree Planting Act 2003, The National Forestry and Tree Planting Regulations (2016), the National Environment Management Act (2019), and the Uganda Wildlife Act (2019). As a Focal Point for the UN Convention on Biological Diversity (CBD), NEMA has developed the second NABSAP (NABSAP II) to guide the conservation of biodiversity in the country. Also, the recently published National Biodiversity and Social Offsets Guidelines NEMA, (2022) provide for sustainable development that ensures conservation of biodiversity and recognizing key biodiversity areas with irreplaceable sites that should be given priority protection status. It also aims at maintaining a balance between development and conservation.

Environmental Context: Even if forest plantations generally have lower tree species richness and abundance per unit area compared to natural forests, they are an important mitigation intervention when considered in terms of an alternative source of forest products and thus reduce pressure on natural forests. To this end, commercial forestry has the potential to support Uganda's environmental and development goals, including reducing the impacts of deforestation on biodiversity and climate change. From the NFA land use land cover assessments, it turns out that plantations increased from 350 km² to 3,143 km² between 1990 and 2019, contributing to the conversion of 2,793 km² of land (**Erreur ! Source du renvoi introuvable.**). Large scale forest plantation investors such as Green Resources, New Forestry Company and Nile Fibre Board Company have certified their forests under the Forest Stewardship Council (FSC) Forest certification scheme, which provides guidelines to conserve representative samples of species and hence to improve biodiversity conservation under the plantation landscape. This approach is an important mitigation measure and serves as a useful a voluntary commitment for the conservation of biodiversity

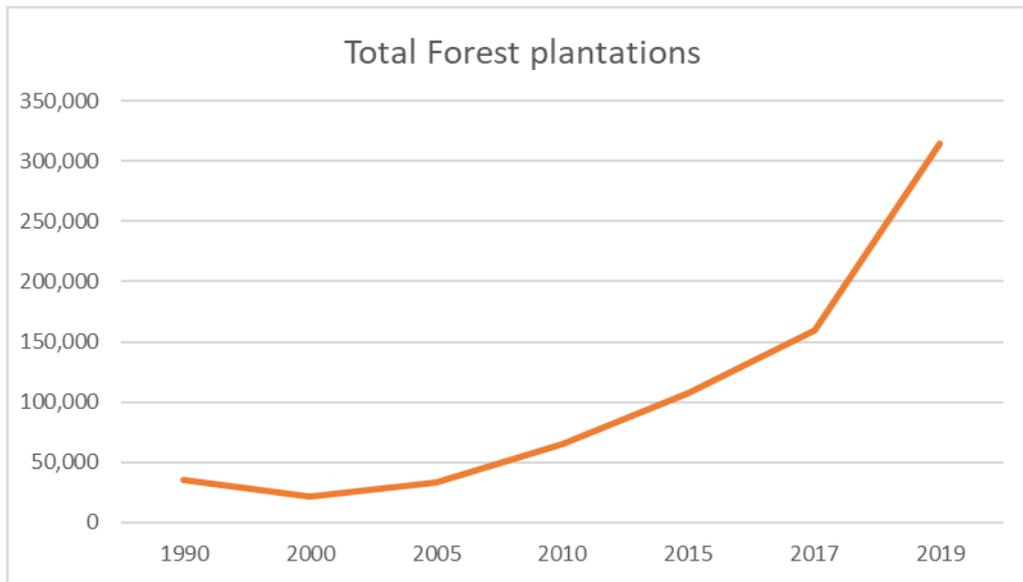


Figure 11: Trends in the area under forest plantations (NFA records, 2019)

Commercial forest plantations are important mitigation intervention, when considered in terms and alternative source of forestry products and reducing pressure on the natural forest. To this end, commercial forestry has the potential to support Uganda's environmental and development goals, including reducing the impacts of deforestation on biodiversity and climate change. A follow-up engagement with stakeholders will help to appreciate these good practices and to concretize commitments.

Key message regarding plantation forestry supporting biodiversity conservation

- There is an enabling policy framework and structure to support the contribution of plantation forestry to biodiversity conservation as well as mitigation of the impacts to biodiversity.
- The sector employs over 1 million people in the formal and informal sectors and therefore attracts people from dependence on natural forests and hence provides opportunity for biodiversity conservation.
- Plantations increased from 350 km² to 3145 km² between 1990 and 2019, contributing to the conversion of 2793 km² of land where plantations have the biggest impact on threatened species (IUCN, 2020), but this also provided a mitigation potential to biodiversity as an alternative source of wood products. Plantation forestry stakeholders therefore need to participate in development of BVCs.

3.1.2 Stakeholder characterization

Based on the stakeholder analysis framework in Figure 3, and the description in Tables 3 and 4, the stakeholders in the agriculture sector were identified, categorized and prioritized for engagement as shown in **Erreur ! Source du renvoi introuvable.** and depicted in **Erreur ! Source du renvoi introuvable.**

Table 5: Categorization of stakeholders in the Agriculture sector for engagement during consultations

Category	Stakeholders
1. Central Government Institutions	<ul style="list-style-type: none"> • Ministry Agriculture Animal Industry and Fisheries (MAAIF) • National Forestry Authority (NFA) • Uganda Wildlife Authority • NEMA)
2. Big forest Plantation owners such	<ul style="list-style-type: none"> • New Forests Company, Small Forest Plantations Owners (Isabella Investments Limited (Buyigi Forest Estate, Zziwa and off shore estates agronomist
3. Commercial agriculture includes Sugar Companies	<ul style="list-style-type: none"> • Kinyara Sugar Works LTD Sugar cane growing in Masindi district). Sugar Cane Out-growers (private commercial sugar cane Grower- and Masindi Sugarcane Out-growers Association).
4. Big forest Plantation owners	<ul style="list-style-type: none"> • New forests company
5. Small Forest Plantations Owners	<ul style="list-style-type: none"> • Isabella Investments Limited • Buyigi Forest Estate, Zziwa and off shore estates agronomist
6. Uganda Beef producer's cooperative union	
7. District Local Government Officers	<ul style="list-style-type: none"> • Kagadi, Masindi, Kibaale, Kween, Kapchorwa, Mbale, Mubende and Hoima
8. Lobby Group such as the Benet	<ul style="list-style-type: none"> • Benet - Mt Elgon
9. Non-Governmental Organizations (NGOs)	<ul style="list-style-type: none"> • International and National (WCS and WWF)
10. Civil Society Organization (CSOs)	<ul style="list-style-type: none"> • Kitara Civil Society Network
11. Cultural Institutions	<ul style="list-style-type: none"> • Buyoro kitara kingdom(BKK) Buganda, Toro and Busoga,
12. Faith Based Organizations	

Key message to pursue for BVCs: Regarding the private sector, the stakeholders who have high interest and influence in the development of BVCs are farmers involved in commercial agriculture, the sugar companies and the out growers. These include:

- Kinyara Sugar Works LTD



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- Sugar cane growing stakeholders in Masindi district
- Sugar Cane Out growers and
- Masindi Sugarcane Out-growers Association
- Cultural institutions



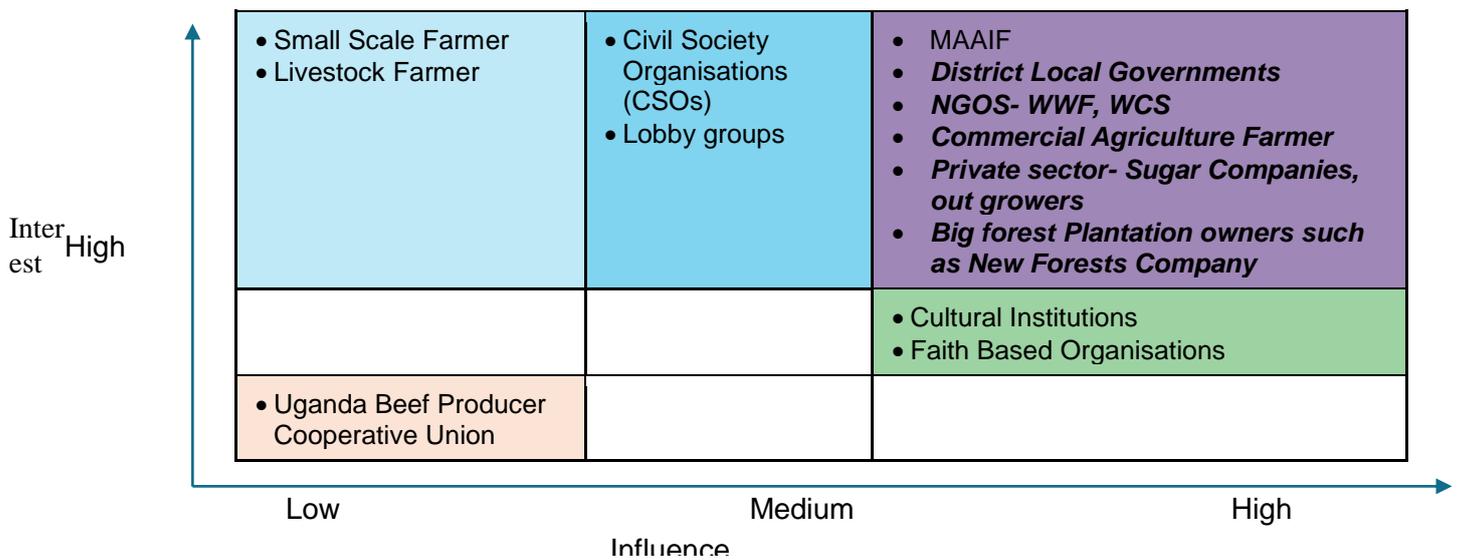


Figure 12: Categorization and prioritization of stakeholders in the Agriculture sector

Explanation	
<p>Influence- High</p> <ul style="list-style-type: none"> • Central Government Institutions- Remote sensing tools have enabled to identify and to quantify the main threats on habitats • Non-Governmental Organisations (NGOs) - Coordination and implementation of interventions • Big forest Plantation owners - Nine out of ten respondents were willing to decrease their environmental impact and develop biodiversity commitments • Livestock farmers - (Increasing demand for livestock products) • District Local Government Officers- district provides a catalyst for tree plantation development as pressure on competing land use affecting biodiversity resources <p>Interest -High</p> <ul style="list-style-type: none"> • Central Government Institutions- promote collaborative forest management, capacity building in nature based enterprises, restoring degraded landscapes as business. • Non-Governmental Organisations (NGOs) - Scalability and replicability • Commercial Agriculture - knowing more about biodiversity commitments • Big forest Plantation owners - knowing more about biodiversity commitments • District Local Government Officers- integrating biodiversity commitments in the district development plans <p>Level of Engagement to Secure Commitments - In-depth engagement</p>	<ul style="list-style-type: none"> • Civil Society Organisation- parish groups should be used as models of transformation, and participation at planning level a key tool to success <p>Level of Engagement to Secure Commitments - In-depth engagement</p>
<p>Influence- Medium</p> <ul style="list-style-type: none"> • Lobby Group- commitment such as tree planting • Civil Society Organisation- with knowledge and skills and serve as CBFs/TOTs in each parish) <p>Interest -High</p> <ul style="list-style-type: none"> • Lobby Group- they depend on the forests for livelihood 	<p>Influence - High</p> <ul style="list-style-type: none"> • Cultural Institutions -No of trees planted Number of trees that survived Distribution list • They have dedicated ministries for environment and they are able to effect commitments for biodiversity conservation Acreage planted • Faith Based Organisations - No of trees planted Number of trees that survived Distribution List Acreage planted <p>Interest - Medium</p> <p>Faith Based Organisations -Tree planting and awareness</p> <p>Level of Engagement to Secure Commitments - Focused engagement.</p>
	<p>Influence - Low</p> <ul style="list-style-type: none"> • Uganda Beef Producer cooperative union <p>Engagement - Information disclosure</p>
	<p>Influence- Low</p> <ul style="list-style-type: none"> • Small scale farmers - Small holder farmers do not follow best practices farmers were varied based on the activities of engagement by respondents • Livestock farmers – Need effort to engage <p>Interest -High</p> <ul style="list-style-type: none"> • Small scale farmers - voluntary commitments among the small-scale agricultural farmers were varied based on the activities of engagement by respondents • Livestock farmers - Increasing demand for livestock products <p>Level of Engagement to Secure Commitments – In-depth engagement</p>

3.1.3 Pressures and challenges to biodiversity conservation

The three components of the agriculture sector namely small-scale farming, commercial farming and livestock provide various pressures and challenges to biodiversity conservation. A huge range of answers were provided by the stakeholders. The most common type of pressures that have been noted by respondents from the field (Benet, Kagadi, kweeni and Mt Elgon National Park) were intensive cultivation of steep slopes and thus causing soil erosion as a result of degradation on the steep slopes, clearing land for agriculture expansion (growing potatoes, cabbage, barley, wheat), use of agrochemicals and outright encroachment with respect to impact by both small scale and commercial agriculture. The pressures arise from challenges such as limited finances to explore other sources of livelihoods apart from dependence on land, inadequate extension staff and poor governance. Lack of by-laws and poor enforcement of existing laws were mentioned as obstacles and challenges (100%) by the commercial agriculture stakeholders while 50% mentioned economic and technical challenges as obstacles to biodiversity conservation. With respect to tree plantations, 70% of stakeholders considered direct impacts such as tree harvesting for firewood and charcoal as major pressures as well as forest clearing which involves cutting trees and burning, and 40% considered harvesting of mature plantation trees as a pressure. These pressures may however be considered opportunities for action.

Commercial tree growers reported inadequate information on good methods to apply (90%) as a major challenge. Weak enforcement of laws for offenders and local political interference including corruption (50%), Bush fires (40%) and pressure for resource access by communities (20%) as well as unclear land tenure system (30%) as major challenges.

The pressures and challenges as provided from the consultations are real and can possibly be addressed through a multi stakeholder approach. The most significant current pressures are therefore clearing land for cultivation, poor farming practices land fragmentation and declining quality of habitats and over grazing. Governance is also contributing to the pressure on resources particularly political decisions that are made towards clearing natural resources for other land uses. Most of these exert a high to very high pressure on biodiversity and are worsening. As indicated by Isbell *et al.*, 2017, it is mostly human activities that are reshaping biological communities and impacting ecosystem functioning across the Earth¹⁹. Meeting the national and consequently the global challenge of biodiversity conservation and sustainable use of nature requires identifying the underlying causes of change and how these are related to threats. The identified pressures relate clearly with the globally identified threats.

Global maps of pressures such as the terrestrial human footprint (Venter *et al.*, 2016) characterize the geographic hotspots of anthropogenic threats to biodiversity. The maps have estimated that at least 75% of terrestrial land has been exposed to some sort of land-use change (Venter *et al.*, 2016) with only 23.2% classified as wilderness (Watson *et al.*, 2016). The intensity of the terrestrial human footprint has been linked with spatial variation in ecological processes (Tucker *et al.*, 2018) and thus this study that provides specific case studies and responses at national level contributes to the summed pressure of different drivers related to human activities and relationships among them. Areas identified as having high human pressure could be underlaid by different combinations of drivers with varying intensity, each of which may have contrasting impacts on biodiversity. Stakeholder voluntary commitments could contribute greatly to effectively conserving biodiversity.

Figure 13 provides an overview of the pressures, and challenges to biodiversity conservation from the four agriculture subsectors and how they are related to globally identified threats.

¹⁹ <https://besjournals.onlinelibrary.wiley.com/doi/10.1002/pan3.10071>





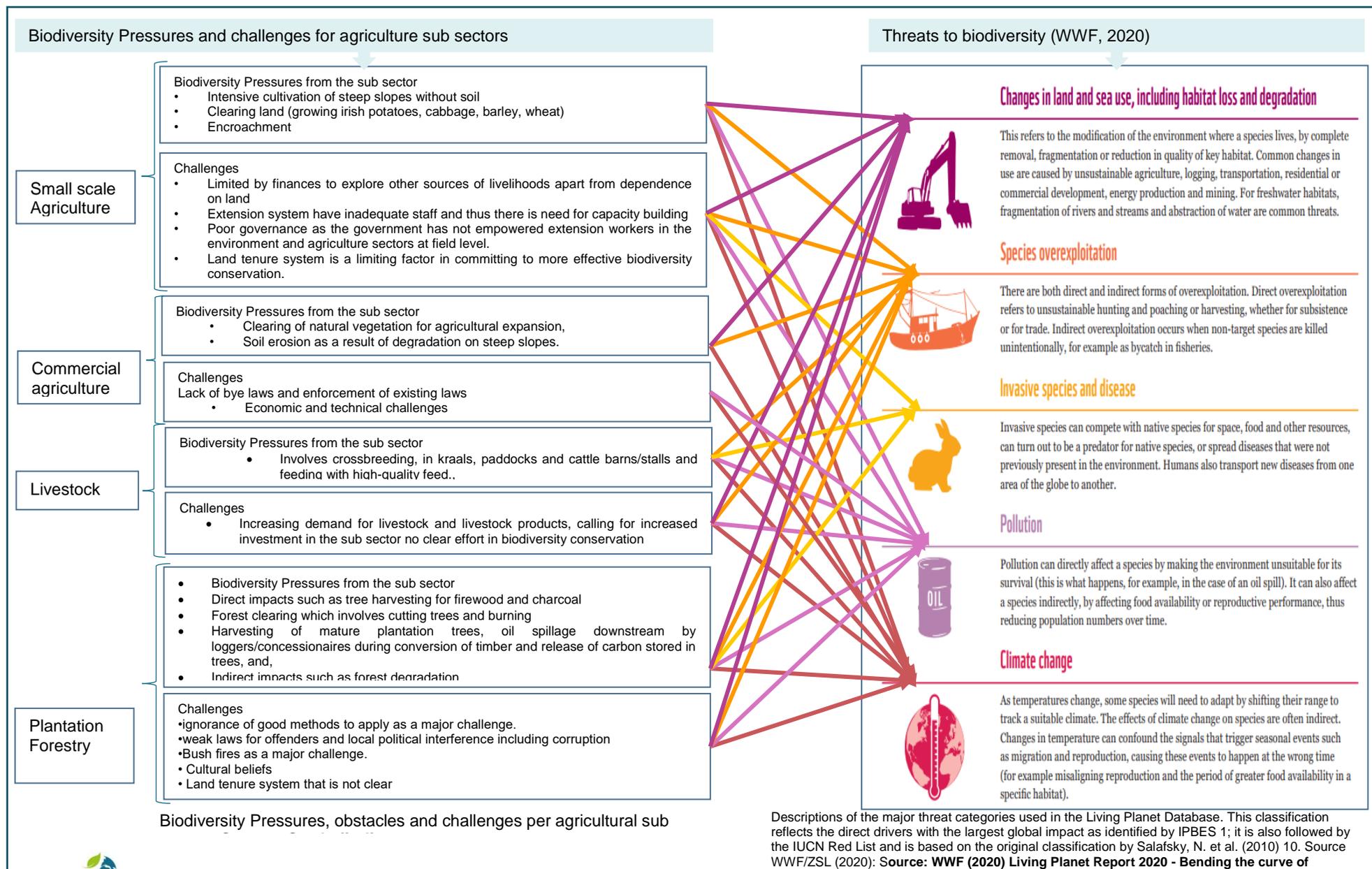


Figure 13: Mapping biodiversity pressures and challenges for agriculture sub sectors (Adopted from the Living Planet Report 2020 by WWF)

3.1.4 Measures to mitigate challenges

General measures to mitigate challenges to biodiversity conservation are focused on creating an enabling environment for stakeholders in the agriculture sector to incorporate biodiversity conservation into their day today activities.

The measures proposed from the field stakeholders were mostly area specific and include:

- (i) Improved agriculture practices that will enhance soil and water conservation as well as increasing productivity of land. It was noted that subsistence farmers focus on land expansion into forested areas to seek increased productivity.
- (ii) Promotion of organic farming, zero grazing, capacity building in nature-based enterprises and restoration of degraded landscapes among subsistence farmers.
- (iii) Provision by Local government of indigenous tree seedlings for planting on farm as reported by most stakeholders particularly subsistence farmers.
- (iv) Land use planning to ensure that a family caters for the various needs such as food and firewood reported by Mt Elgon National Park.
- (v) Community mobilization, sensitization, education and guidance aimed at changing their mindset for sustainable natural resource management and embracing tourism as a source of income to the communities was extensively discussed particularly in the Mt. Elgon areas.
- (vi) Enforcement of land use planning – at farm level as well as improved extension services to promote adherence to the land use plan was mentioned as an important aspect to ensure improved biodiversity conservation.

Other stakeholder specific measures included:

- Support local communities to restore degraded areas by providing tree seedlings especially with support from Local Governments and Civil society such as Kitara Civil Society organization (KICSON) and NFA and planting trees within the communities
- Advising communities to identify alternative livelihoods like fish farming in wetlands rather than clearing and draining them for agriculture
- Districts to have ordinances on restoration of degraded areas and implement them.
- Support by NFA to give indigenous tree species seedlings to local communities, as well as fast growing species, to address the increased demand for biomass energy.
- Government to generate and distribute clean and high-quality planting materials to farmers.
- Improve access to and use of organic and inorganic fertilizers and soil moisture conservation techniques.
- Strengthen extension services and training in good agricultural practices such as mechanized agricultural production through technology adoption
- Support increased value addition initiatives through Public-Private Partnership (PPPs).
- Train and equip farmers in post-harvest handling technologies including achievement and maintenance of quality standards
- Reward best biodiversity actions/improvements by farmers as an incentive for further commitments
- Sensitization of the local communities on the use of basic low-cost technologies such as water harvesting applicable in remote areas of districts
- Support the local community to promote commercial tree growing
- Control both population and animal numbers towards carrying capacity
- Provide improved technical support by extension workers targeting integrated land management
- Providing resources for implementation of programs targeting biodiversity conservation.
- Provision of forest resources outside PAs and Implement fire control measures

The measures reported during the national consultation include:

- a) Mass tree planting and reforestation of degraded areas including national tree planting campaigns



- b) Buying land for the landless to plant tree for firewood users
- c) Employ Forester's to implement and enforce the regulations
- d) Giving free or cheap biogas including providing support at household level by government and civil society to promote production and use of biogas and thus reduce land degradation.
- e) Government or any concerned NGO should start mass teaching people about biodiversity
- f) Set up conservation information centres.

3.1.5 Current good practices and opportunities to reduce pressures on biodiversity resources

A number of interventions were identified that are examples of good practice in the agriculture sector. These interventions either contribute to reducing pressure on biodiversity resources or provide opportunities for mitigating the challenges to biodiversity conservation, as described below. These good practices should be promoted and adopted by stakeholders as useful voluntary commitments for the conservation of biodiversity. They include:

At Field Level:

- Small scale farmers are promoting afforestation and agroforestry, plant both exotic and indigenous trees and undertake mixed farming systems with livestock and crops where residues supplement crops.
- Commercial Agriculture: Community sensitisation and forest restoration, increased tree planting to avert pressure on the PAs; incentives and disincentives by e.g. UWA and NFA.
- Plantations/Commercial tree growers: community sensitisation and forest restoration and training in alternative livelihood sources such as mushroom growing and involving private sector in tree growing
- Livestock: effort to sensitize, educate, guide, and provide incentives for the communities

At National Level:

- Small scale farmers are provided with capacity building as well as advisory and training services.
- Commercial Agriculture: CSA, tree planting, agroforestry practices and protecting water sources.
- Plantations/Commercial tree growers: Planting more trees on open land and harvested areas
- Livestock: Some have mixed farming systems with livestock and crops where residues supplement crops.

A brief description of identified good practices is provided as follows:

- a) **Afforestation and reforestation**: Afforestation, reforestation and agroforestry interventions are undertaken by both the agriculture and energy sector stakeholders. The interventions serve to increase forest and tree cover with multi-purpose functions including, among others, reducing soil erosion, stocking biomass energy, providing food security and mitigating climate change. Planting of both exotic and indigenous tree species is promoted. The exotic species are usually fast-growing and provide alternative sources for wood products and reduce the pressure off natural forest resources and hence reduce loss of habitats. On the other hand, planting indigenous species serves as a good practice for promoting *ex-situ* species conservation.
- b) **Certification of organic products**: Organic agriculture is a wholistic production management system, which promotes and enhances agro-ecosystem health, including biodiversity,



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biological cycles and soil biological activity²⁰. Certification of organic products requires compliance with conservation agriculture practices. Some stakeholders in the agriculture sector, particularly commercial farmers are progressing towards certification of their products based on the farming practices being undertaken.

- c) **Forest certification:** A forest certification scheme provides guidelines to conserve representative samples of species, considers high conservation value areas and hence improves biodiversity conservation under the plantation landscape. Some stakeholders such as the New Forest Company have gone through the process of forest certification. Such good practice could be undertaken as a voluntary commitment by other plantation forestry stakeholders. There are a few examples of Payment for Environment Services (PES) such as in the Ruwenzori mountain area as well as the activities being promoted by ECOTRUST in the Albertine rift and community tree planting in Elgon. Further biodiversity rich areas may be more effectively conserved if more stakeholders take up such activities as voluntary commitments.
- d) **Law enforcement:** Government has put in place enabling policy, legal and planning frameworks to support biodiversity conservation and climate smart agriculture. Impeccable implementation of biodiversity protection is needed through enforcement of laws by the relevant authorities such as NFA and UWA.
- e) **Attitude change from business as usual – Use of Alternatives:** During this study, all respondents at the national level reported being involved in planting both exotic and indigenous trees as alternative biomass energy sources rather than depend on natural forests. However, at field level, only half of the respondents said they have trees dedicate as energy sources. A major opportunity is that 66.7% of the respondents are willing to learn new ideas and there is a will by local leaders to provide support towards improved agriculture practices. Measures to mitigate challenges therefore include advocacy and lobbying (66.7%), capacity building and sensitization (66.7%) as well as providing incentives particularly giving prizes for best biodiversity actions/improvements from members (33.3%). Some stakeholders (50%) reported protecting water sources through climate smart agriculture as a best practice and as an opportunity for mitigating challenges.

Tree planting stakeholders also noted that there is planting of more trees on open land and harvested areas (30%) but only 10% reported existence of initiatives providing financial support to communities and biodiversity related issues to enhance biodiversity conservation.

Stakeholders (70%) reported that NGOs funding and interventions in sensitizing the communities is a great opportunity available to enhance biodiversity conservation while 50% noted that cheap labour and skilled manpower is available to enhance tree planting but only 20% noted that land availability for tree planting was an opportunity.

Forest plantation owners reported measures to mitigate challenges to include awareness and communication to the communities (80%); joining hands together to create enabling environment and build capacities (50%), providing resources for implementation of programs targeting biodiversity (40%), Government intervention and engagement (40%) and capacity building and sensitization (20%).

Further good practices that contribute to biodiversity conservation are from forest plantation owners and some practicing commercial agriculture who are willing to develop biodiversity voluntary commitments.

²⁰ MAAIF 2019: The National Organic Agriculture Policy, 2019. Government of Uganda. Kampala, Uganda.



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Erreur ! Source du renvoi introuvable. provides a summary of the suggested solutions by stakeholders and how they are linked to addressing the globally identified threats to biodiversity conservation. Each of the suggested measures may address more than one of the threats to biodiversity arising from the agriculture subsectors.





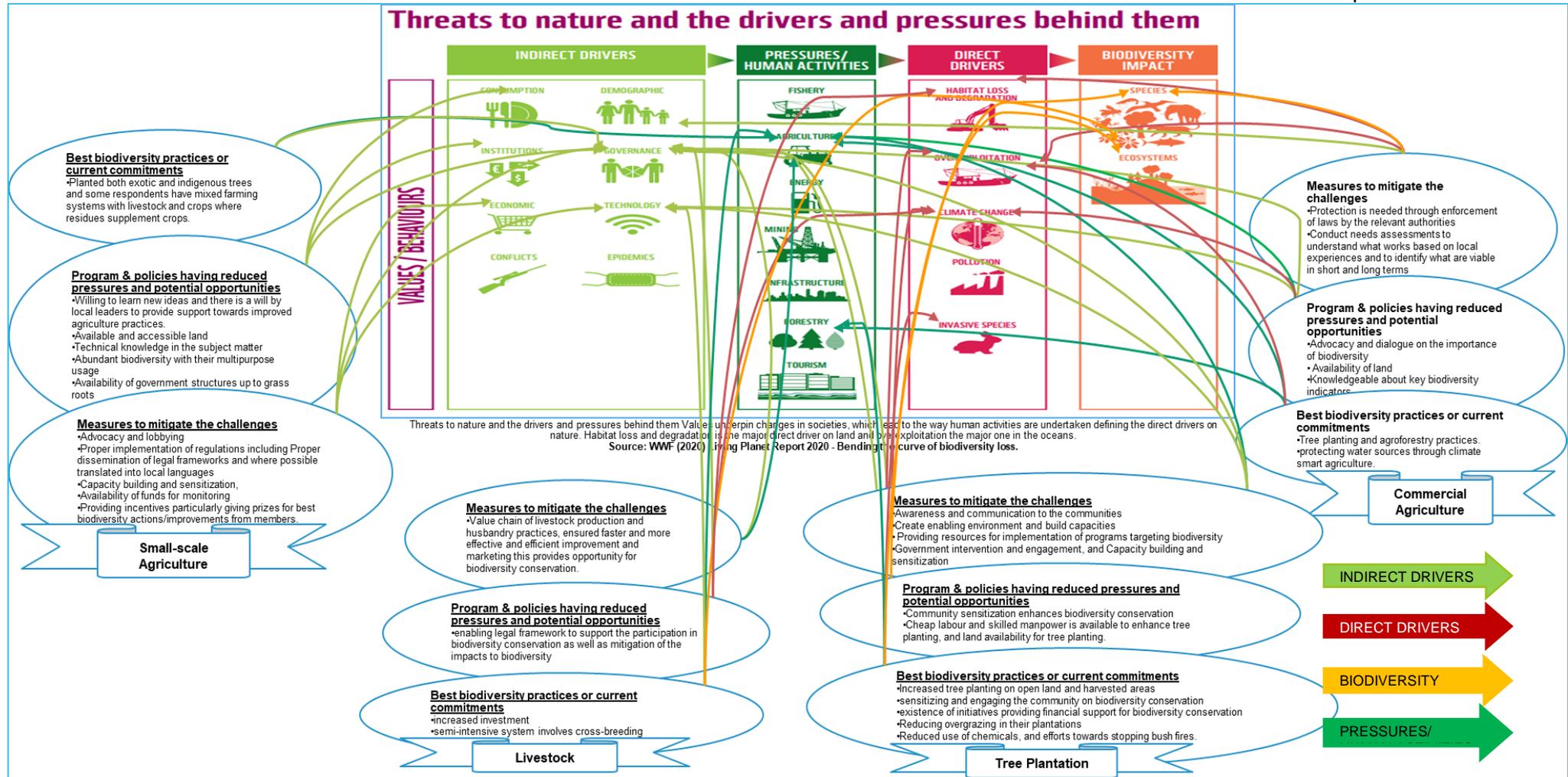


Figure 14: Mapping of study findings from the agriculture sector on best biodiversity practices, opportunities and measures to mitigate challenges against the global threats to nature and pressures behind as adopted from the Living Planet Report 2020 by WWF.

3.1.6 Proposed Biodiversity voluntary commitments to reduce biodiversity loss

- a) **Stakeholders' willingness and interest to develop voluntary biodiversity commitments for the agriculture sector** – The study sought the opinion of stakeholders about their interest/willingness to develop voluntary commitments for biodiversity conservation. Government officials and tree growers are willing to develop voluntary biodiversity commitments, while the interest of small-scale farmers was pretty weak despite the fact that according to the biodiversity threat analysis, they are the key stakeholders who can directly reverse the biodiversity erosion. Tree growers, District officials and commercial agriculture farmers are willing to participate in development and implementation of BVCs. The participation of small-scale holder farmers in committing to conservation was limited mainly because of the inadequate awareness of the implications of the BVCs.

The opportunity cost of foregoing the traditional practices in livestock management towards biodiversity conservation is high. The livestock farmers would require land scape restoration and pasture management support.

b) **Proposed Biodiversity Voluntary Commitments for the agriculture sector**

Key Biodiversity voluntary commitments were collected from the agriculture sector and **Erreur ! Source du renvoi introuvable.** provides a summary of the outcomes.

Table 6: Summary of the proposed Biodiversity Voluntary Commitments in the agriculture sector

Category of Stakeholder	Number Biodiversity commitments listed	List of Biodiversity commitments that might be developed with further engagement	Quantification	Name of enabling activities	Name of stakeholder committing
Small scale agriculture	2	Tree Plantations (Indigenous trees)	5 Million Trees Planted	Capacity building and Sensitizations	<ul style="list-style-type: none"> • UNFFE • Bunyoro Kitara Kingdom
		Restoration of wetlands	40km2	Capacity building and Sensitizations	<ul style="list-style-type: none"> • Kagadi district government(KDLG) • Masindi district local government, • Kibale district local government
Commercial agriculture	3	Restoration of Mount Elgon ecosystem	40 ha	Promoting Policies, programs and activities for integrated land management and conservation	<ul style="list-style-type: none"> • NEMA, • Commercial farmers, • District local governments around Elgon, • Benet
		Development of Land use plans	15 farmers commercial / subcounty	Capacity building and Sensitizations	<ul style="list-style-type: none"> • Tea growers and • Sugar cane growers working v Extension Officers) – • MAAIF and • DAOs
		Construction of Soil and Water Conservation Structures	30 acres (12 ha) as contours	Capacity building and Sensitizations	<ul style="list-style-type: none"> • Tea growers and • Sugar cane growers working v Extension Officers) – • MAAIF and • DAOs

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		Tree Plantations (Agroforestry and Hedge trees)	30,000 trees planted	Capacity building and Sensitizations	<ul style="list-style-type: none"> • Tea growers and • Sugar cane growers working v Extension Officers) – • MAAIF and • DAOs
Livestock	3	Restoration Rangelands (research, Bush clearing, enclosures) –in the cattle corridor areas such as Nakasongola and Nakaseke District.	100 km ²		<ul style="list-style-type: none"> • MAAIF livestock section, • MWE • DLGs
		Conservation of the local animal genetic conservation through breeding	2,000 animals		<ul style="list-style-type: none"> • MAAIF • MAAIF, • NAGRIC&DB, • NALIRRI
Plantation Forestry	3	Establish Forest plantations to Reduce Pressure on the Natural Forests	700,000 ha		<ul style="list-style-type: none"> • NFA
		Agriculture/Forestry certifications by UTZ, Rainforest Alliance	22,000ha		<ul style="list-style-type: none"> • NFC, • NFA, • NEMA • DLG
		Range land Resource planning	200,000ha		<ul style="list-style-type: none"> • Tea, • Coffee, • Sugarcane • Palm oil

3.1.7 Challenges likely to be faced by stakeholders towards the implementation of the commitments to biodiversity conservation

Most stakeholders have a partial understanding about the concept and practice of biodiversity conservation and have limited knowledge and so are not able to propose approaches to “biodiversity voluntary commitments” especially among small-scale farmers. It is therefore necessary to build a common understanding of the concept of “Biodiversity voluntary commitment” so that stakeholders can make informed decisions, so that their commitments can bring actual changes as expected under the Biodev 2030 project. This might be done through awareness meetings whose participants will be the members of biodiversity task force and key stakeholders.

Indigenous knowledge and practices exist that promote the conservation of biodiversity. However, there is limited capacity within the traditional communities to document and disseminate such knowledge. Scientists should therefore work with the traditional communities to catalogue / document the existing traditional conservation practices and knowledge and integrate them into formal biodiversity management systems, including the agricultural landscapes.

There is limited knowledge and understanding among the stakeholders about what exactly biodiversity means, and how it benefits the various stakeholders. Unless the people get clarity about the conservation values in their minds and change their attitude towards conservation, it will be difficult to conserve biodiversity and make decisions about BVCs. As a result, the ability to accept the opportunity cost of setting aside areas for conservation appear to be limited. This particularly as the communities do not appreciate the importance and practice of land use planning and sustainable natural resource management.

3.2 Energy Sector

3.2.1 PESTLE analysis

Overall, a total of 14 key reports for energy sector were reviewed as summarized in Appendix B. A list of documents reviewed, and the key issues identified are provided in Appendix A. In addition, literature from other countries provided lessons learnt and best practices to inform the study (Appendix C).

(a) PESTLE analysis of the Charcoal and Firewood sub-sectors

Political Context: The Energy Development Program of NDP III aims to increase access to and consumption of clean energy. Key expected results include increase in primary energy consumption; increase in the proportion of population accessing electricity; reduction in the share of biomass energy used for cooking; increase in transmission capacity; and enhanced grid reliability. This Program, in part contributes to reduction of the pressure on the forestry resources for fuelwood, which is one of the drivers of deforestation. This thread of thought is echoed in Vision 2040, which states that, “*Due to climate change, emphasis will be on other renewable forms of energy including wind, solar and biogas will be harnessed*”, and hence making it clear that the direction of Government is to reduce the dependence on biomass energy.

Economic Context: The Ministry of Energy and Mineral Development estimates that charcoal contributes to USD 26 million to Uganda’s GDP. Uganda’s national total primary energy is comprised of 88% biomass energy, 10% fossil fuels and 2% electricity (Draft Energy Policy, 2019). The biomass energy use is primarily for domestic 74%, industry 18% and institutions and SMEs 8% (Biomass Strategy, 2013). The annual value of traded wood fuel is estimated at USD 810 million, comprising 2.3 Mt of charcoal worth USD 580M (World Bank, 2019). The current charcoal consumption of wood biomass stands at 1, 118,336 metric tons of (FAOSTAT 2018) equivalent to 13, 979,580 m³ of raw wood (10% efficiency) giving total estimated consumption of 57,272,101 m³ of raw wood per year. This consumption is growing at 3.2 % in line with population growth rate (World Bank 2019).

Charcoal is the major source of energy used in urban settings: about 837 metric tons of charcoal are supplied to Kampala per day in dry season and 1,017 metric tons of charcoal in the rainy season. It is estimated that industrial and commercial firms use 0.3 million tons of charcoal annually. Charcoal demand is expected to more than double by 2040 which means more trees will be cut leading to a reduction in carbon sinks and habitats for biodiversity. About 4,961 metric tons of charcoal is used by households in Uganda per day.

Firewood contributes significantly to the energy consumed in institutions such as schools, hospitals, prisons and in industries. It is estimated that industrial and commercial firms use 5.3 million tonnes of firewood annually. Therefore, the industry in Uganda is heavily reliant on firewood as it is used extensively for:

- (i) process heating and to fuel artisanal brick burning (0.6 kg of wood/kg of product),
- (ii) tea drying (1.5 kg of wood/kg of product),
- (iii) small scale lime production (1.5 kg of wood/kg of product) and
- (iv) tobacco curing (8 kg of wood/k of product), and
- (v) ceramics, confectionery, and other rural based industries (Walter & Aubert, 2018).

The current consumption of wood biomass for energy stands at about 43,292,521m³ of firewood and 1,118,336 metric tons of charcoal (FAOSTAT 2018) equivalent to 13, 979,580 m³ of raw wood

(10% efficiency) giving total estimated consumption of 57,272,101 m³ of raw wood. Firewood is the cheapest source of energy available that most people use widely. Currently the country suffers a biodegradation loss of USD 2.3 billion, 25 percent of which is wood fuel (NDP III, 2020).

Social Context: Charcoal production is practiced in almost all the districts, following tree felling for construction or during land clearing for farming. There are no dedicated forest plantations for charcoal production.

Firewood is the source of energy of the poor majority who cannot afford electricity or liquid petroleum gas (LPG). Uganda is thought to have moved into a national wood fuel deficit in the year 2000. This decline already affects poor people.

It is estimated that around 870,000 people are employed in the charcoal sub sector of which up to 60% of employment and value is likely generated in rural areas (World Bank, 2019). The production of wood-based fuels is informal and thus there are no official statistics to guide policy makers. However, Uganda's charcoal business is well established, with a supply chain that stretches from rural forest charcoal producers to middlemen who move the product to retail sellers who operate in heavily populated urban districts. The business not only relies on small buyers who deal in sacks of charcoal but on large-scale buyers who move truckloads of charcoal from rural areas into Uganda's cities. The charcoal burning business is a lucrative trade in Uganda. The process begins from cutting down the trees into logs, burning, transportation and distribution, as well as wholesale and retail trading. This makes a livelihood for vast of Ugandan households with majority being single mothers or women who must feed their children and also send them to school (Namaalwa et al, 2009). Charcoal production in Uganda is from privately owned forests (43%), followed by central forest reserves (22%), on-farm trees (20%) and others (14%).

The overdependence on fuelwood for energy has exerted pressure on wood resources in the country. According to UBOS (2018)²¹, biomass fuels constitute the main fuel for cooking for 94% of the households. The other sources of energy for cooking (electricity, kerosene, gas, etc.) account for only 6%. There were variations by residence whereby 96 percent of households in rural areas used biomass fuels compared to 89 percent of households in urban areas. The majority of households in urban areas used charcoal for cooking (66%) compared to households in rural areas (16%). Overall, this illustrates the enduring importance of wood fuels for the country's energy security. There is increasing demand for firewood from institutions such as schools, the Army, the prisons and hospitals as major consumers of firewood and charcoal. These institutions, and any other such institutions that have dependency on biomass energy, should be a major target to be involved in developing voluntary commitments for biodiversity conservation.

Up to 98.8% of the households use fuelwood for cooking in rural areas. Firewood is the most significant source of energy in Uganda, and the majority of the people employ it for domestic use and small-scale industries such as brick and tile making, agro-processing (sugar, tea, tobacco), jaggeries, bakery and fish processing (Tabuti et al., 2003; Yikii et al., 2006). Of the total biomass consumed, firewood accounts for more than 80% (MEMD, 2013).

The firewood subsector provide employment to a large number of semi-skilled and unskilled laborers at different stages of production, transportation and distribution. A lot of stakeholders are involved in the firewood value chain, including producers, transporters, dealers (wholesalers and retailers), buyers and local authorities or other institutions (FAO, 2016a).

Technological context: The collection, processing and distribution of firewood are done almost exclusively by small, informal and unregulated actors using rudimentary technologies and practices (MEMD, 2016; Walter & Aubert, 2018). The chain starts with growing trees or woody biomass. There are a number of sources for the biomass needed to process fuelwood. These include natural and plantation forests, the growing stock of woody biomass, residues from forest harvesting,

²¹ UBOS, 2018. National Household Survey, 2016.

agroforestry and silvicultural thinning. The traditional tools and methods for firewood harvesting are axe, panga and recently power saws. In rural areas, households use firewood mainly on three stone stoves in poorly ventilated spaces and in food preparation by commercial vendors in urban areas. Most of firewood is not for sale and is collected directly by consumers. Biomass for firewood is gathered and carried to a point of sale, usually the roadside. It is packed in bundles and transported to market. The firewood is then sold to transporters or traders who carry it to markets in urban areas. In some instances, big buyers hire wood cutters who go into the forested areas directly to harvest firewood (UNEP, 2019).

Similarly, charcoal production in Uganda is dominated by inefficient practices and technologies, which waste wood and contribute to increased cutting of trees and loss of biodiversity. Many charcoal burners do not sort wood according to species prior to carbonization. Charcoal in Uganda is produced from slow-growing species that are vulnerable to overexploitation. According to the National Charcoal Survey for Uganda 2015 (MEMD, 2016), 48% of charcoal producers burn the wood when still wet, which is highly wasteful and inefficient, while commonly used traditional earth kilns have an efficiency of 10- 15%.

Traditional earth kilns dominate the production of charcoal in Uganda. These include the Kinyankole (“the bus”) and the Kasisira (“the banda”) earth kilns with an estimated wood to charcoal conversion efficiency between 10-15% maximum (Knöpfle, 2004). Charcoals are produced from over 100 tree species with mostly slow growing -dense dryland species presenting the best quality which makes them vulnerable to over exploitation. These include Combretum, Albizia, Terminalia and Acacia spp. (Knöpfle, 2004), as well as Maesopsis eminii, Milicia excelsa and Ficus spp, plus eucalyptus and mango (Kasimbazi, 2018). Charcoal production continues to raise concerns about its ability to sustain the growing demand and its negative impacts on the environment (Group 2010, Collins et al 2013). Introducing improved technologies such as the Casamance and Adam retort kilns may increase efficiency in charcoal production to achieve 3 to 4 kg of wood per kg of charcoal which is 30% to 50% efficiency respectively on an energy basis (MEMD 2013). The introduction of improved technologies increases efficiency and should be considered as one of the key biodiversity voluntary commitments in the energy sector. The Ministry of energy promotes the use of rocket and Lorena stoves for cooking in households and institutions respectively.

Legal context: Key dedicated institutions for governing biomass energy at the national and local level include the Ministry of Water and Environment, Ministry of Lands, Housing and Urban development, Ministry of Energy and Mineral Development, Ministry of Local Governments, NFA, the District Natural Resources Offices, District Environment Office and District Forestry Office. The Uganda National Development plan III and the climate change policy advocates for the promotion of inclusive climate-resilient and low carbon emission development at all levels. However, there are no clear guidelines on the control of firewood and charcoal use and thus continuously causing biodiversity loss. There have been few interventions to promote the sustainable production and utilization of biomass as an energy resource.

There are several existing policies and regulatory frameworks in Uganda that recognize the role of biomass in national development such as:

- National Environment Act, 2019
- National Forestry Policy (2002),
- National Forestry and Tree Planting Act (2003),
- National Forestry and tree planting regulations, 2016,
- Land Act (2001),
- Local Government Act (1997),
- National Environment Policy (1995),
- Renewable energy policy,
- Biomass Energy Strategy 2013 and Vision 2040.

All these regulatory frameworks support sustainable use of natural resources including forestry resources for charcoal production. The Renewable Energy Policy aims to increase the use of modern renewable energy, from the current 4% to 61% of the total energy consumption by the year 2017. Renewable sources of energy are defined as those sources that are replenished continuously by natural processes, e.g., solar energy, hydropower, biomass, wind and geothermal as well as organic wastes. One of the objectives of the Policy is to manage the biomass resource base (wood, charcoal and agricultural residue) in a sustainable manner.

The NFTP (2003) and regulations provide for regulation of forest produce, including firewood and charcoal through licenses and movement permits. However, the level of compliance to these policies and regulations is still very low leading to misuse and degradation of the environment (Vision, 2040). In particular, there is poor regulation on harvesting forest resources on private land. The government is currently reviewing the forestry policy, which provides the opportunity to address this gap (Tugumisirize Obed, Personal Communication).

Environmental context: Fuel wood requirements have contributed to the degradation of forests as wood reserves are depleted at a rapid rate in many regions of the country²². Charcoal consumption increases at a rate close to the urban growth rate of 6% per annum. Kampala is the biggest consumer of charcoal accounting for more than 51% of the total charcoal produced in Uganda (MEMD, 2015). The central region districts of Nakasongola, Nakaseke, Luwero and Kyakwanzi, Mubende and Kiboga are the main source of charcoal supplied to urban Kampala (63.4% of the city's total).

Firewood is sourced from forests, woodlands, shrub lands and in some cases from trees on farms (scattered trees, agroforestry, or energy woodlots) and consists mostly of fallen sticks or branches, prunings of living or dead branches removed from standing trees, and wood from cut or felled trees, (Duguma et al., 2020). **The over dependency on firewood results into unsustainable utilization of forest cover and vegetation.** The global forest resource assessment of 2005 indicates that between 2000 and 2005, the annual deforestation rate in Uganda was 2.2% being the highest in the world (Okello et al. 2013). It is also estimated that over 44 million tons of woody biomass are consumed annually against an estimated sustainable yield of 26 million tons, thus eating into the available wood stock (UNDP, 2013). Climate impacts from firewood use include CO₂ emissions from unsustainable wood harvesting and methane (CH₄) and black carbon emitted during incomplete combustion. Estimates of wood fuel's contribution to global anthropogenic emissions range from 2% (Bailis et al., 2015) to 7% (FAO, 2016b). The STAR analysis provided a map (**Erreur ! Source du renvoi introuvable.**) that highlight areas where threatened species are under pressures due to logging and wood harvesting (IUCN, 2020).

Charcoal demand continues to raise concerns about its ability to sustain production for the growing demand and its negative impacts on the environment (Group 2010, Collins et al 2013). Annually, Uganda loses 120,000 hectares of forest cover of which 60%percent (72,000 hectares) is due to charcoal and firewood. The poor regulation of charcoal and firewood exploitation has continually contributed to loss of tree cover and biological resources.

²² The Renewable Energy Policy

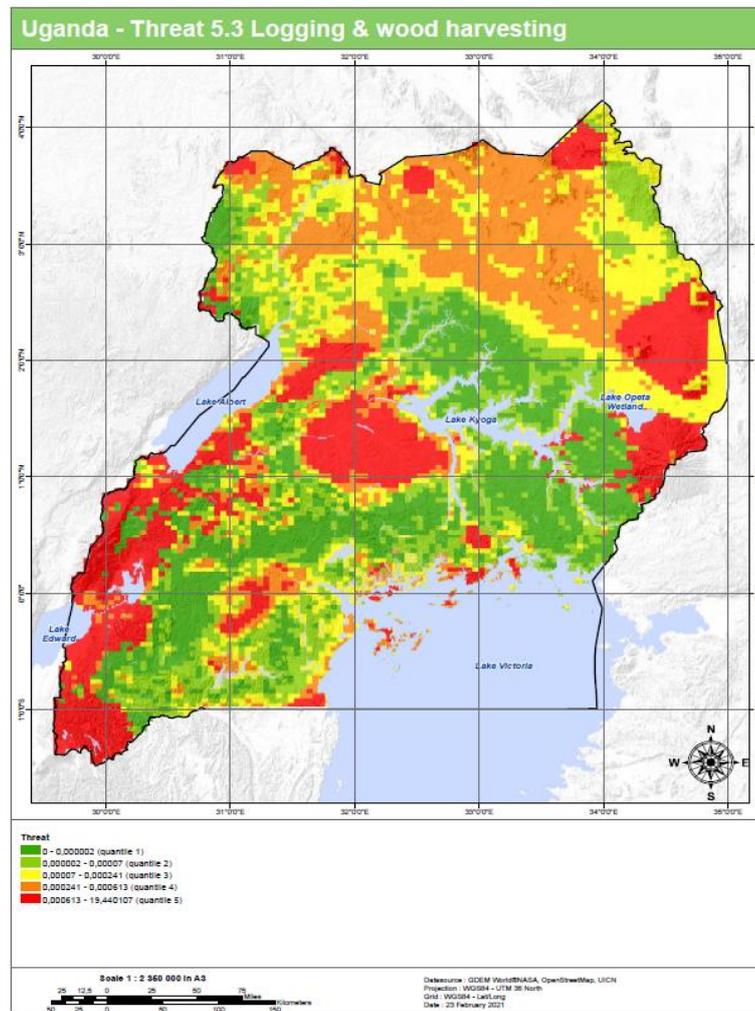


Figure 15: Map of logging and wood harvesting from STAR analysis, in 2020

Solid fuels for cooking such as charcoal, firewood, and other biomass fuels emit smoke and thereby exposing household members, particularly the girl child and women, to respiratory infections (UBOS, 2018)²³.

Key message about the charcoal and Firewood sub-sectors towards commitment to biodiversity conservation

a) Charcoal

- There are key dedicated institutions for governing biomass energy at the national and local level but there are no clear guidelines on the control of firewood and charcoal use which continue to cause biodiversity loss.
- Charcoal consumption is growing at 3.2 % in line with population growth rate (World Bank 2019). Charcoal demand is expected to more than double by 2040 thus a reduction in carbon sinks and habitats for biodiversity.
- Charcoal production in Uganda is from privately owned forests (43%), followed by central forest reserves (22%), on-farm trees (20%) and others (14%). This lucrative business begins from cutting down the trees into logs, burning, transportation and distribution, as well as wholesale and retail trading
- Charcoal production in Uganda is dominated by inefficient practices and technologies because many charcoal burners do not sort wood according to species prior to carbonization.
- Regulatory frameworks support sustainable use of natural resources including forestry resources for charcoal production. Lack of license among charcoal producers makes it difficult to mitigate impacts on biodiversity.
- Annually, Uganda loses 120,000 hectares of forest cover of which 60%percent (72,000 hectares) is due to charcoal. This has greatly contributed to environmental degradation and biodiversity loss

b) Firewood subsector

- There are key dedicated institutions for governing biomass energy at the national and local level. However, there are no clear guidelines and regulations on the control of firewood and charcoal use which continue to cause biodiversity loss.
- Apart from households, firewood is also consumed in institutions such as schools, hospitals, prisons and in industries. Currently the country suffers a biodegradation loss of USD 2.3 billion, 25 percent of which is wood fuel (NDP III, 2020). This results to tremendous pressure to wood resources. There is need for a focussed engagement with the high consumers of firewood to ensure they participate in committing to biodiversity conservation.
- 98.8% of the households use fuelwood for cooking in rural areas. A lot of stakeholders are involved in the firewood value chain, including producers, transporters, dealers (wholesalers and retailers), buyers and local authorities and this could be utilized to enhance commitments by promoting efficiency across the value chain.

²³ Uganda Bureau of statistics, Government of Uganda, Kampala.

3.2.2 Stakeholder Characterization

The stakeholders for the energy sector were identified, categorized and prioritized for engagement during the consultation process and shown in **Erreur ! Source du renvoi introuvable.** and **Erreur ! Source du renvoi introuvable.**

Table 7: Categorization and prioritization of stakeholders in the energy sector for engagement during consultations.

Category	Stakeholders
Biomass Energy Producers/Consumers	<ul style="list-style-type: none"> • Firewood user/consumer and charcoal user/consumer
Wood processing and briquette factory	<ul style="list-style-type: none"> • Carbonized briquette producers
Charcoal traders Firewood collection for sale	<ul style="list-style-type: none"> • Traders and sellers
District Local Government Officers	<ul style="list-style-type: none"> • Kagadi, Masindi, Kibaale, Kween, Kapchorwa, Mbale, Mubende and Hoima
Central Government Institutions	<ul style="list-style-type: none"> • Ministry of Energy and Mineral Development, • Ministry of water and Environment(MWE)-Forestry Sector Support Department-FSSD • Kampala capital city authority(KCCA) • National Forestry Authority (NFA) • Uganda Wildlife Authority(UWA) • National Environmental Management Authority(NEMA)
Non-Governmental Organisations (NGOs)	<ul style="list-style-type: none"> • International and National (WCS and WWF)
Cultural Institutions	<ul style="list-style-type: none"> • Bunyoro kitara kingdom(BKK) • Benet - Mt Elgon
Schools	
Factories	<ul style="list-style-type: none"> • including sugar factories, tea factories)
other Institutions	<ul style="list-style-type: none"> • Prisons, Army, Police, MULHUD, Hotels (MTWA) and MTIC • Uganda Association for Sauna operators
Faith Based Organisations	
Financial institutions	<ul style="list-style-type: none"> • Equity Bank

Key Message for development of BVCs: Regarding the energy sector, the stakeholders who have high interest and influence in the development of BVCs are Schools, Prisons, Army, Faith based organisations Uganda Local Government Association, Tea and Sugar Factories, Uganda Hotel Owners Association, Private Schools Association, NFA, MWE-FSSD and KCCA.

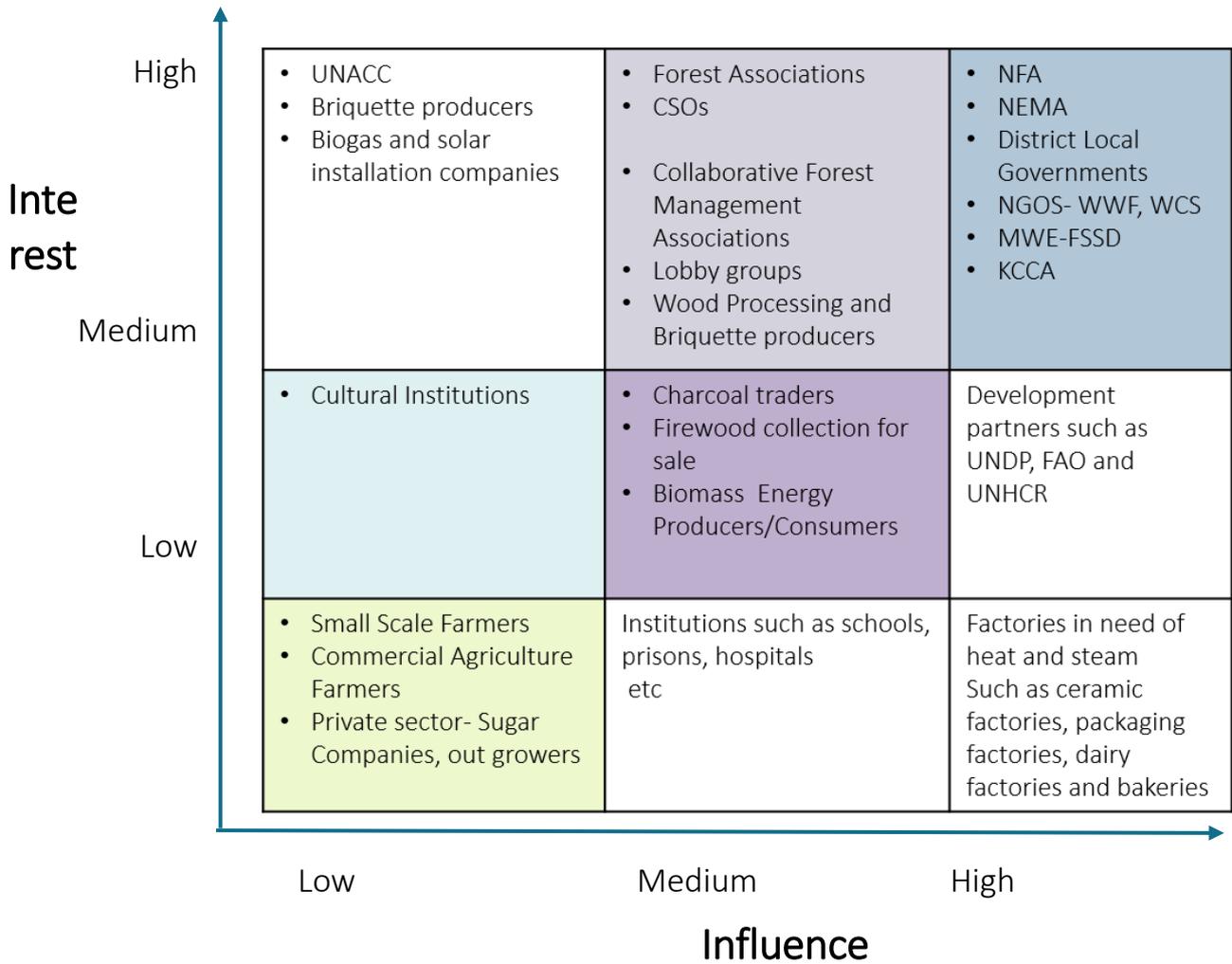


Figure 16: Categories of Stakeholder Analysis for Energy Sector

Explanation

Influence- High

- **Central Government Institutions-** Remote sensing tools have enabled to identify and to quantify the main threats on habitats
- **Non-Governmental Organisations (NGOs)** - Coordination and implementation of interventions
- **Schools** - rely on firewood and charcoal for cooking and heating
- **Factories** - rely on firewood and charcoal for cooking and heating
- **Other institutions (Prisons, Army)** - rely on firewood and charcoal for cooking and heating
- **District Local Government Officers-** integrating biodiversity commitments in the district development plans

Interest -High

- **Central Government Institutions-** promote collaborative forest management, capacity building in nature based enterprises, restoring degraded landscapes as business.
- **Non-Governmental Organisations (NGOs)** - Scalability and replicability
- **Schools** - dwindling fuel wood that is continuously increasing in price
- **Factories** - dwindling fuel wood that is continuously increasing in price
- **Other institutions (Prisons, Army)** - dwindling fuelwood that is continuously increasing in price
- **District Local Government Officers-** district provides a case for tree plantation development as pressure on competing land use affecting biodiversity resources)

Level of Engagement to Secure Commitments – In-depth engagement

Influence- Medium

- **Biomass Energy Producers/Consumers** - Addressing the increased demand for timber and biomass energy thereby mitigating further encroachment of the natural forest
- **Charcoal traders-** Formalize and regulate the market
- **Firewood collection for sale-** Formalize and regulate the market
- **Faith Based Organisations-** Tree planting and awareness
- **Financial institutions** - Tree planting and awareness

Interest -Medium

- **Biomass Energy Producers/Consumers**
- **Charcoal traders-** Formalize and regulate the market
- **Firewood collection for sale-** Formalize and regulate the market
- **Faith Based Organisations-** Tree planting and awareness
- **Financial institutions** - Tree planting and awareness

Level of Engagement to Secure Commitments - Opportunity to comment and suggest further commitments

Focused Engagement

Influence Medium

- **Wood processing and briquette factory** - Adoption of new and improved technologies like promoting of energy efficient stoves and use of briquettes, biogas and solar to reduce on the need for wood fuel
- **Faith Based Organisations** - No of trees planted Number of trees that survived Distribution List Acreage planted

Interest -High

- **Wood processing and briquette factory** - Introduction of alternative sources of energy like electricity at a lower cost, use of bio gas

Level of Engagement to Secure Commitments - Focused engagement

Influence- High

- **Cultural Institutions and Forest Associations** - No of trees planted Number of trees that survived Distribution List Acreage planted

Interest -Medium

- **Cultural Institutions and Forest Associations** - Tree planting and awareness

Level of Engagement to Secure Commitments – Focused Engagement

3.2.3 Pressures and challenges towards commitments to biodiversity conservation

Given that the vast majority of the stakeholders interviewed dealt with both firewood and charcoal, the answers related to Biodiversity pressures as well as obstacles and challenges are closely related.

The local government officials noted various obstacles and challenges to enhancing biodiversity conservation by the energy sector including 53% reporting inadequate finance to support strategies aimed at biodiversity conservation and thus there is low motivation for the implementers; 32% saying there are conflicting laws as well as that there are gaps in the laws and policies; 32% thought there was less manpower to implement some of the solutions e.g., some sectors have only district-based staff while 26% mentioned that high illiteracy levels among the stakeholders is a great obstacle. District based officials (21%) also believe that political interventions that negate conservation efforts as well as community members not welcoming the idea are a problem. Some 11% of the local government staff noted that land tenure system that is not clear is also an obstacle.

The civil society organizations (100%) noted a lack of an understanding / knowledge / capacities with respect to BVC as a potential obstacle while 33.3% reported financial constraints, especially lack of sustained long-term funding to fully commit to conservation. The funding is critical as 66.7% say there is need to train the farmers on the new trends of farming techniques and also have induction trainings to be carried out. A Lack of coordination and cooperation among institutions addressing biodiversity conservation was reported by 33.3% as was the inadequacy of technical staffs at lower local government levels and also 33.3% reported that there are only few regulatory bodies in the biodiversity implementation and so there is need for collaboration.

Overall, all stakeholders mentioned deforestation (mainly through cutting trees for charcoal), the increasing construction and the industrial needs for timber, poles, fuel wood as well as felling of indigenous tree species for charcoal and soil erosion as major pressures generated by the charcoal sub sector. These are similar to pressures from the fuelwood sub sector but with greater effect (most institutions such as army, police, prisons and schools use firewood to provide cooking energy and so there's higher pressure than charcoal). Deforestation (mainly through cutting trees for fuelwood) is thus great particularly from the increasing demand for firewood from institutions such as schools, prisons and hospitals. This is unfortunately uncontrolled harvesting of trees.

Challenges to biodiversity conservation from the energy sector arise from the dependence on the natural resources that has contributed to the increasing destruction of plants and animals, and this is exacerbated by the increasing construction and industrial needs for timber, poles, fuel wood. There was also mention of political interference leading to encroachment on PAs and limited logistical facilitation affecting law enforcement. A lack of advocacy on use of other alternative energy sources apart from using firewood and limited knowledge about biodiversity issues as well as delay of service delivery from the concerned parties who have promised to help exacerbates the problem. Un-employment and lack of enough funds and manpower to effect existing commitments as well as poor government policies that sometimes need byelaws and empowerment of enforcement officer were mentioned among others.

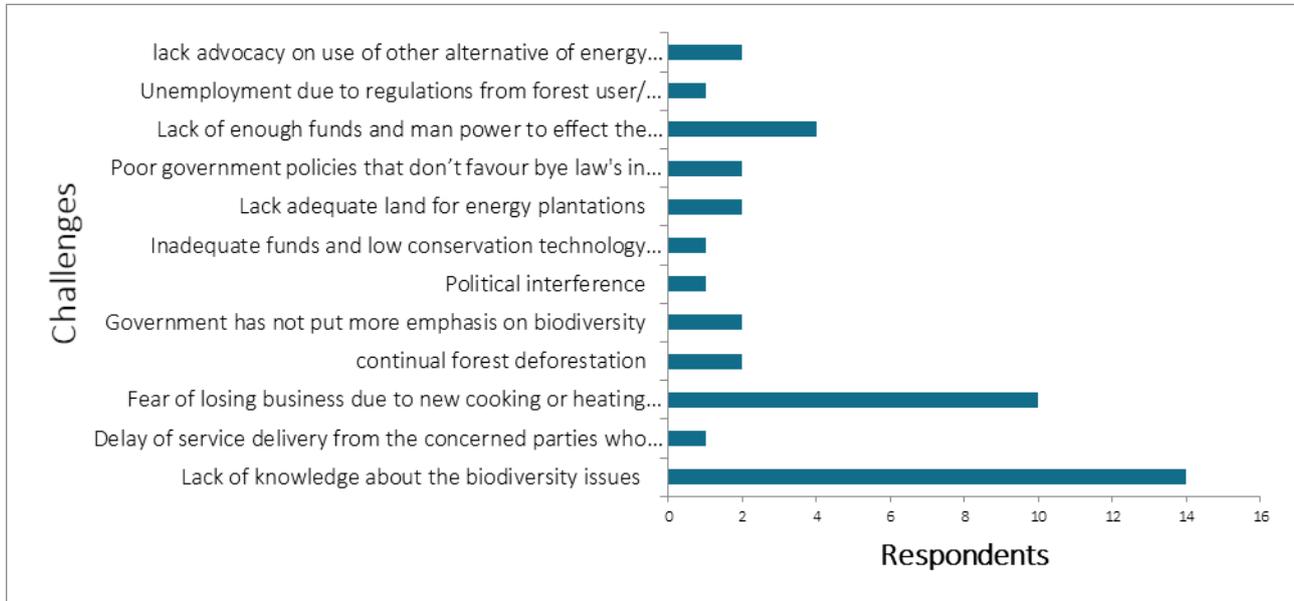
Over the field investigations, the respondents reported the following pressures:

- The deforestation, mainly through cutting trees for timber and fuelwood
- The increasing construction and the industrial needs for timber, poles, fuel wood
- Felling of indigenous tree species

At the national level, 66.7% of the stakeholders were aware of the pressures from their activities while 33.3% were not.

An underlying cause of pressure to natural resources is that human population is growing exponentially. The population largely depends on natural resources, including products such as

timber, food, fuelwood, fodder, medicine, etc., and services such as water, fertile soil and good weather. There are no industries to provide jobs for local communities. The dependence on the natural resources has contributed to the increasing destruction of plants and animals, and this is exacerbated by the increasing construction and industrial needs for timber, poles, fuel wood, etc. The challenges reported by the field stakeholders included political interference leading to encroachment on PAs and limited logistical facilitation affecting law enforcement reported by NFA Officers from Kibaale Kagadi and Kakumilo.



The information reported from the national consultation are described in **Erreur ! Source du**

Figure 17: Challenges reported by the respondents on firewood and charcoal, during the national workshop focused on energy.

renvoi introuvable..

Biomass is a renewable resource; however, demand has outstripped supply which has led to indiscriminate cutting of natural forests. It is clear that firewood will remain the cheapest source of energy for cooking for the foreseeable future compared to the available alternatives. It is also clear from the literature review that biomass demand is highest in urban areas particularly charcoal for household use and firewood for institutional and factory use. So, a strategy to mitigate the impact of firewood and charcoal on biodiversity loss needs to address the demand questions. Stakeholders that need to make voluntary commitments that would create some impact should therefore include institutional consumers of both charcoal and firewood.

Figure 18 provides an overview of the pressures and challenges to biodiversity conservation from the two Energy subsectors and how they are related to globally identified threats to biodiversity conservation.

Biodiversity Pressures and challenges for the Energy sub sectors

Threats to biodiversity (WWF, 2020)

Charcoal

Firewood

- Biodiversity Pressures from the sub sector**
- The deforestation, mainly through cutting trees for charcoal
 - The increasing construction and the industrial needs for timber, poles, fuel wood
 - Felling of indigenous tree species for charcoal
 - Soil Erosion

- Challenges**
- Dependence on the natural resources has contributed to the increasing destruction of plants and animals, and this is exacerbated by the increasing construction and industrial needs for timber, poles, fuel wood
 - political interference leading to encroachment on protected areas and limited logistical facilitation affecting law enforcement
 - Lack advocacy on use of other alternative energy sources apart from using firewood.
 - Un employment due to regulations from forest user/firewood.
 - Lack of enough funds and manpower to effect the existing commitments.
 - Poor government policies that do not favor byelaws in place and empowerment of enforcement officer
 - Lack of adequate land for energy plantations
 - Inadequate funds and low conservation technology adoption
 - Continued deforestation
 - Fear of losing business due to new cooking or heating systems being introduced to respondents
 - Delay of service delivery from the concerned parties who have promised to help

- Biodiversity Pressures** from the sub sector (Most institutions use firewood so there's higher pressure than charcoal)
- Deforestation, mainly through cutting trees for fuelwood
 - The increasing demand for firewood form institutions such as schools, prisons and hospitals
 - Un controlled harvesting of trees for fuelwood

- Challenges**
- Illegal /uncontrolled harvesting of trees for timber and fuelwood
 - Lack of knowledge about biodiversity issues
 - political interference leading to encroachment on protected areas
 - Inadequate knowledge
 - limited logistical facilitation affecting law enforcement reported by NFA Officers

Changes in land and sea use, including habitat loss and degradation



This refers to the modification of the environment where a species lives, by complete removal, fragmentation or reduction in quality of key habitat. Common changes in use are caused by unsustainable agriculture, logging, transportation, residential or commercial development, energy production and mining. For freshwater habitats, fragmentation of rivers and streams and abstraction of water are common threats.

Species overexploitation



There are both direct and indirect forms of overexploitation. Direct overexploitation refers to unsustainable hunting and poaching or harvesting, whether for subsistence or for trade. Indirect overexploitation occurs when non-target species are killed unintentionally, for example as bycatch in fisheries.

Invasive species and disease



Invasive species can compete with native species for space, food and other resources, can turn out to be a predator for native species, or spread diseases that were not previously present in the environment. Humans also transport new diseases from one area of the globe to another.

Pollution

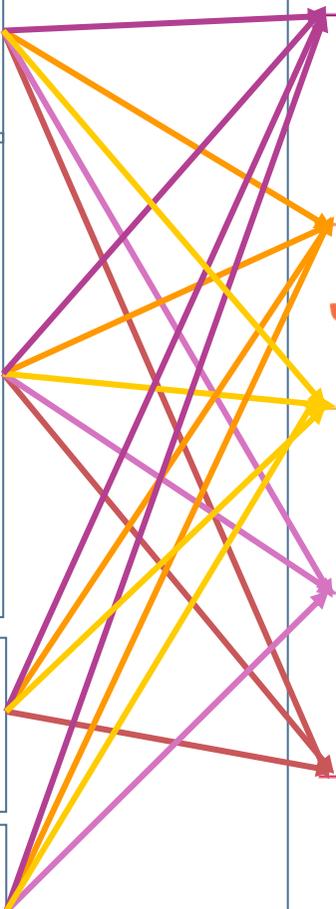


Pollution can directly affect a species by making the environment unsuitable for its survival (this is what happens, for example, in the case of an oil spill). It can also affect a species indirectly, by affecting food availability or reproductive performance, thus reducing population numbers over time.

Climate change



As temperatures change, some species will need to adapt by shifting their range to track a suitable climate. The effects of climate change on species are often indirect. Changes in temperature can confound the signals that trigger seasonal events such as migration and reproduction, causing these events to happen at the wrong time (for example misaligning reproduction and the period of greater food availability in a specific habitat).



Different threat types in living planet Database Descriptions of the major threat categories used in the Living Planet Database. This classification reflects the direct drivers with the largest global impact as identified by IPBES 1 ; it is also followed by the IUCN Red List and is based on the original classification by Salafsky, N. et al. (2010) 10. Source WWF/ZSL (2020):

Biodiversity Pressures, obstacles and challenges per energy sub sectors *Source: Study findings*

Figure 18: Mapping Biodiversity pressures and challenges for energy sub sectors (Adapted from the Living Planet Report 2020 by WWF).

3.2.4 Measures to mitigate challenges

The identified major challenge is deforestation – mainly through cutting trees for timber, charcoal and fuelwood. There is still a lot of cutting natural trees for various purposes and based on the understanding that tree planting initiatives in the past has progressively addressed the situation, it has been proposed as one of the main measures. Other measures proposed from the field stakeholders include:

- (i) Forest restoration using Indigenous trees such as proposed by a CFM group in Muzizi area near Kagombe that suggested that they planned to restore 513ha over a 2-3years period.
- (ii) Promotion of collaborative forest management, capacity building in nature-based enterprises, restoration of degraded landscapes among the CFM Groups around most forest reserves as suggested by NFA.
- (iii) Provision by Local government of indigenous tree seedlings for planting on farm as reported by North Budongo Forest Conservation Association (NOBUFOCA) CFM group
- (iv) Land use planning to ensure that a family caters for the various needs such as food and firewood reported by Mt Elgon National Park.
- (v) Planting energy – woodlots for fuelwood and timber production to avert pressure – especially the indigenous tree species
- (vi) Promoting energy saving stoves and other forms of energy such as briquettes.
- (vii) Promotion of tree growing on-farm, including indigenous tree species, fruit trees, Marketing and promoting tourism

The measures reported during the national consultation include:

- (i) Mass tree planting and reforestation of degraded areas.
- (ii) Buying land for the landless to plant tree for firewood users
- (iii) Employ Forester's to implement and enforce the regulations
- (iv) Giving free or cheap biogas to address energy needs at household level
- (v) Government or any concerned NGO should start mass teaching people about biodiversity
- (vi) Government should help low-income people to do other activities rather than selling charcoal and firewood.
- (vii) Introduction of alternative sources of energy like electricity at a lower cost, use of bio gas and briquettes.

Regulators and policy implementers need to provide incentives to increase uptake of alternatives such as biogas, briquettes, gas and electricity). This would reduce pressures/ decrease demand for firewood and charcoal. There is thus a clear need for creating awareness of alternatives and promote energy efficient gadgets and stoves that will make alternatives viable.

The strategy for addressing challenges needs to have a buy-in from policy makers to also make key commitments such as possibly a ban on use of firewood from natural forests particularly by factories and institutions in urban settings. This has been done in Kenya, Tanzania and Rwanda and it is achievable here in Uganda as there are some alternatives (wood from plantation forests which in turn increases the value of plantation wood and ultimately making planting trees profitable for the framers). Stakeholders would thus be encouraged to focus on energy crops –trees planted specifically for charcoal and firewood.

3.2.5 Current good practices and opportunities to reduce pressures on biodiversity resources

A number of interventions were identified that serve as examples of good practice in the energy sector. These interventions either contribute to reducing pressure on biodiversity resources or provide opportunities for mitigating the challenges to biodiversity conservation, as described below.

a) Supporting afforestation and reforestation interventions

Many actors, especially the CSOs, reported that they were promoting afforestation and agroforestry through training and skills development for the communities and providing them with the needed advisory services. The CSOs utilize the technical staff from their organizations to implement the capacity building and sensitization programs. Tree growing by local communities increases the availability of biomass energy on which the majority depend and mitigates the pressure on natural resources. The enabling environment (e.g., development partners willing to contribute, supportive community members, and favourable government policies etc.) provides opportunities to implement such initiatives and effectively contribute to biodiversity conservation.

b) Community-based facilitators as a nucleus of for community mobilization, training and uptake of biodiversity conservation technologies in energy sector

As part of measures to mitigate challenges to biodiversity conservation, Civil Society Organizations (CSOs) reported that government together with other partners should identify community members and engage them with knowledge and skills to serve as community-based facilitators (CBFs) and/or Training of Trainers (TOTs) in each parish. The government should initiate projects that enhance a revolving fund for biodiversity conservation. The CSOs also noted that parish groups should be used as models of transformation and participation at planning level and will be a key tool to success.

c) Adoption of improved technologies that promote biomass energy efficiency

Energy saving technologies such as efficient cook stoves; including the scale of production of improved cookstoves are being promoted as good practice that enhance biodiversity conservation. 53% of the respondents reported that there was some adoption of improved technologies like energy efficient stoves and use of briquettes.

d) Use of alternative sources of energy for heating and lighting

There are a number of alternative sources of energy that are being promoted to reduce the need for wood fuel. These include the use of biogas and solar energy. Another good practice is the promotion of the use of liquid petroleum gas (LPG) among communities. Communities are able to acquire gas cylinders at subsidized costs from MEMD, funded by Uganda Electricity Credit Capitalization Company that provides funds for promotion of renewable energy technologies through financial institutions. There are also efforts towards extending power to more markets in the rural areas by the Rural Electrification Agency.

e) Favourable policy and legal framework

With respect to the policy framework, local government officials mentioned some opportunities available to further biodiversity conservation and 63% of the respondents believed there is an enabling environment in place (e.g., governance systems exist, development partners are willing to contribute, there are supportive community members and favourable government policies are in place among others).

At Protected Area level, UWA has put in place park regulations and guidelines to enable local communities to have regulated access to protected area resources such as firewood. The communities are required to remove only dry wood only on days of the week agreed upon by both IWA and the communities for collecting firewood. and this currently enhances the protection of biodiversity while meeting demand by the local communities.

f) Other initiatives

Key initiatives being undertaken at the field level in response to charcoal production as a driver of biodiversity loss include:

- a) Support to research on charcoal by CSOs (WWF and WCS).
- b) Restoration of 600ha of Kagombe forest reserve that had been degraded by charcoal producers.
- c) Production of indigenous seed tree species.
- d) Promotion of afforestation of indigenous trees.

From the field investigations, the current opportunity for developing BVCs, which was reported by the Benet (Mt Elgon) was the promotion of non-timber forest products (40 Beehives by CFM groups and also in Muzizi).

At the national level, the stakeholders listed the following opportunities indicated in

Figure 19.

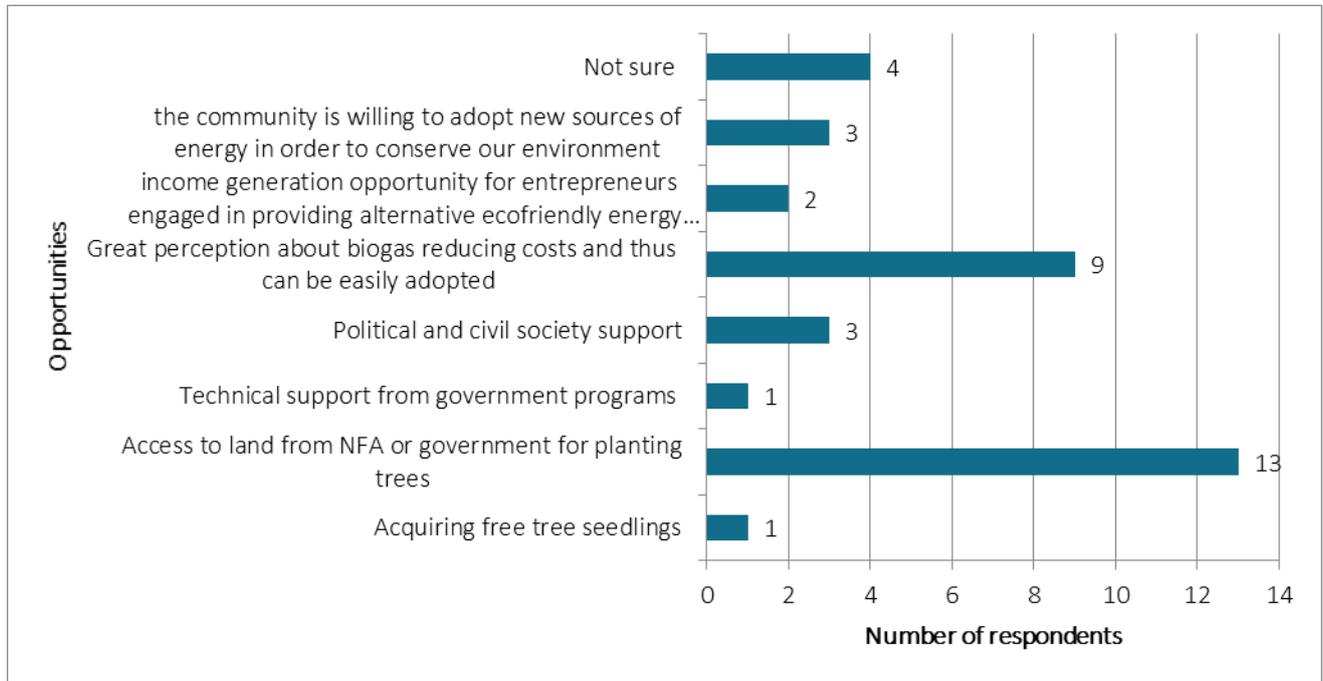
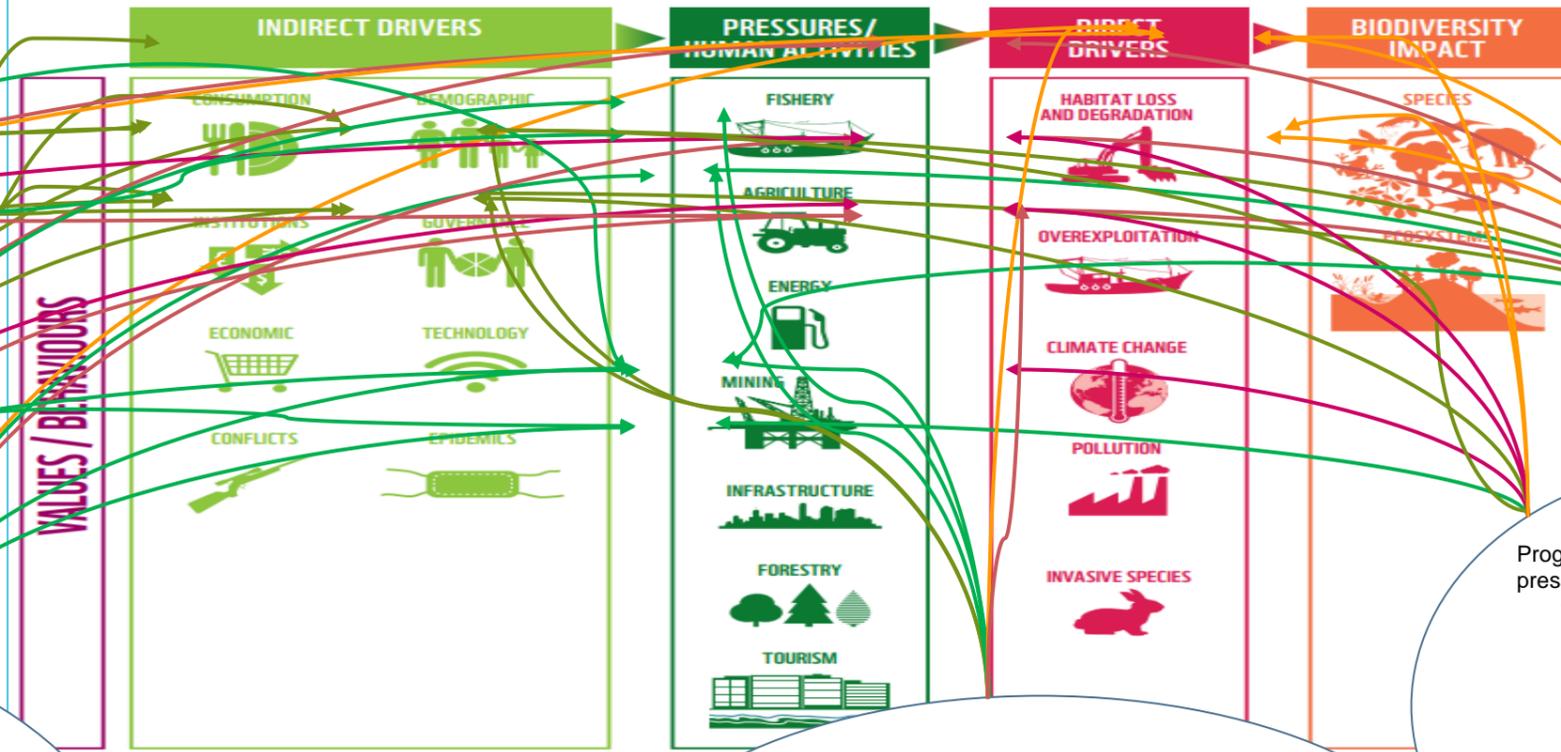


Figure 19: Current opportunities reported by respondents on firewood and charcoal during the national workshop, for developing BVCs.

Overall, stakeholders mentioned, promoting afforestation of indigenous tree species, private sector involvement in tree planning, increasing collaboration with private sector and none state actors as best practices and that district Ordinances on natural resources would enable implementing key commitments. Promotion of adoption of new and improved technologies such as energy efficient stoves and use of briquettes, biogas and solar to reduce on the need for wood fuel are other good practices that enhance biodiversity conservation.

Figure 20 provides a summary of the current best practices and some proposed measures by stakeholders to mitigate challenges to biodiversity conservation. The figure indicates how they are linked to addressing the globally identified threats to biodiversity conservation. Each of the suggested measures may address more than one of the threats to biodiversity arising from the energy subsectors.

Threats to nature and the drivers and pressures behind them



Best biodiversity practices or current commitments

- Promoting afforestation of indigenous tree species, private sector involvement in tree planning.
- Promoting mass tree planting including afforestation. Increase collaboration with private sector and none state actors.

Program & policies having reduced pressures and potential opportunities

- District Ordinances of on natural resources for enabling implementing key commitments
- Promoting afforestation and agroforestry plant both exotic and indigenous trees, mixed farming systems with livestock and crops where residues supplement crops.
- NFA should equip their staff to monitor the forest reserves more effectively.

Best biodiversity practices or current commitments

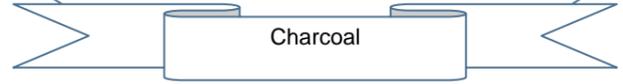
- Increasing the use of seedlings to the use of efficient tech
- Community restoration, alternative efficient tech

Program & policies having reduced pressures and potential opportunities

- Exploring the eco-tourism potential within and around protected areas such as Budongo CFR and others.
- Support nature-based enterprises such as beekeeping
- Train and equip community members to manage and benefit from boundary trees

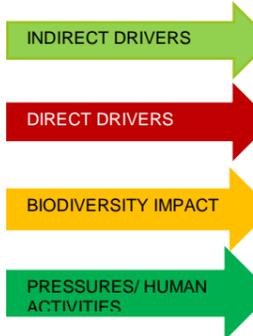
Measures to mitigate the challenges

- Promote adoption of new and improved technologies like promoting of energy efficient stoves and use of briquettes, biogas and solar to reduce on the need for wood fuel
- Continue with community awareness and education campaign to create attitude change. It will entail various approaches, including community mobilization and sensitization, community participation in biodiversity conservation activities and projects/programmes, exchange visits to sites of excellence or success stories (e.g. the Rwenzori region).



Measures to mitigate the challenges

- Intensification of planting trees to address firewood needs, fruit trees for food and nutritional needs and the indigenous tree species to conserve specific species
- Support nursery beds for planting trees along the edges of sugar cane plantations
- Exploring the eco-tourism potential within and around protected areas



Threats to nature and the drivers and pressures behind them Values underpin changes in societies, which lead to the way human activities are undertaken defining the direct drivers on nature. Habitat loss and degradation is the major direct driver on land and overexploitation the major one in the oceans.
 Source: WWF (2020) Living Planet Report 2020 - Bending the curve of biodiversity loss.

Figure 20: Mapping best biodiversity practices, opportunities and measures in the energy sector to mitigate global threats (Adopted from the Living Planet Report 2020 by WWF)



3.2.6 Proposed Biodiversity voluntary commitments to reduce biodiversity loss

- a) **Stakeholders' willingness and interest to develop voluntary biodiversity commitments for the energy sector** – the study sought the opinion of stakeholders about their interest/willingness to develop voluntary commitments for biodiversity. The results in **Erreur ! Source du renvoi introuvable.** show that 58.3% of the respondents indicated that they had other major concerns and did not plan to spend time on biodiversity commitments; 22.9 % were interested in knowing more about biodiversity commitments, while 12.5% were interested in developing biodiversity voluntary commitments. It was only 6.3% of the respondents who expressed willingness to develop biodiversity voluntary commitments to reduce their impacts. Therefore, few stakeholders are actually willing to take voluntary biodiversity commitments, mainly the private sector such as Kinyara Sugar Works and New Forests Company, who are aware about environmental safeguards including biodiversity conservation, and they have current commitments.

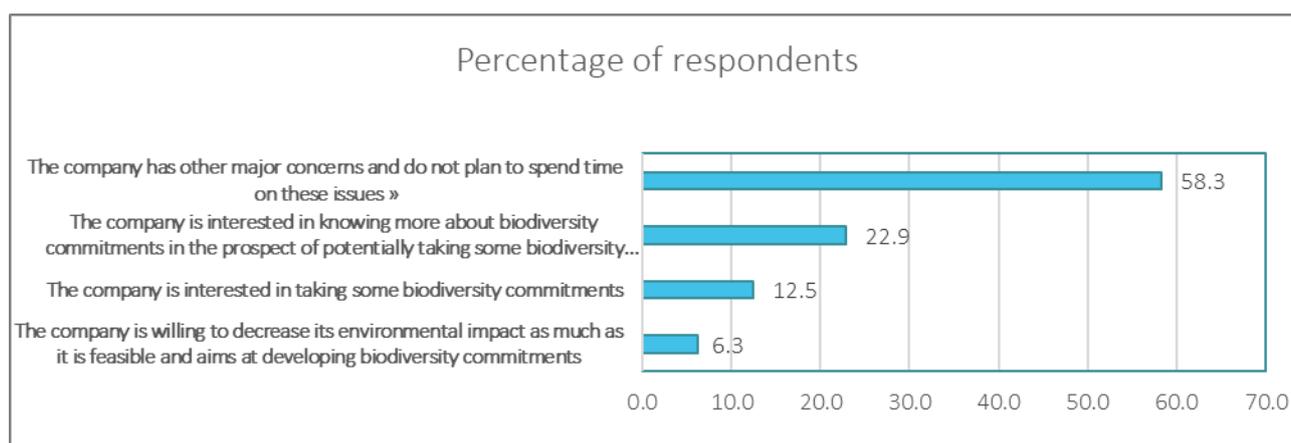


Figure 21: Willingness of stakeholders in the energy sector to develop voluntary commitments

- b) **Proposed Biodiversity Voluntary Commitments for the energy sector.**

The following biodiversity voluntary commitments were suggested by the stakeholders:

- (i) Tree planting on-farm/under agro-forestry system
- (ii) Establishing dedicated energy plantations or woodlots
- (iii) Use of improved stoves/clean cookers
- (iv) Promote use of LPG through a deliberate subsidy by the Government

Table 8 is a summary of voluntary commitments by the different stakeholders.

Table 8: Proposed voluntary commitments to be developed in the energy sector by different stakeholders

Category Stakeholder	of	Number Biodiversity commitments listed	List of Biodiversity commitments that might be developed with further engagement	Quantification	Name of Enabling activities	Name of Stakeholder Committing	Period for Implementation
Firewood	4		Increasing sources of fuelwood(woodlots, on farm, energy plantations and multipurpose fast-growing trees)	640,000ha	Capacity building and awareness -FMNR	Community, MWE, NFA District local government, MAAIF, Institutions such as schools, Ministry of energy and mineral development and industries such as TEA processors	Per year
			Popularize fuel wood energy regulations	400, 000copies	Capacity building and awareness -FMNR	MWE, users of fuelwood	1 Year
			Formalize and regulate the market	64,000ha	GIS and ground truthing Enforceable permits issued	Forest/tree owners Fuelwood transporters Users and traders at all levels	Per year
			Technology improvement on fuel wood uses	1.66M units (353,000 households) of clean cookers/stoves	Capacity building and awareness -FMNR	Institutions Community Research organizations CSO'S MEMD MWE (World Bank); Subsidy of LPG by the MEMD?	Per year
Charcoal	3		Planting trees	444,000 40 Ha		Youth Groups in Luwero District	1 Year
			Offer of land for tree planting in Busoga, West Nile and Karamoja	20 Acres (8 ha)		FIDA	1 Year
			Households using improved cooking methods	100,000 Households	Sensitize and coordinate clean cooking technology between the producers and users	Renewable energy business incubator Ltd UNACC	3 years

3.2.7 Challenges likely to be faced by stakeholders towards the implementation of the commitments to biodiversity conservation

There is an enabling policy and regulatory environment to sufficiently support voluntary commitments to biodiversity conservation in both the agriculture and energy sectors. However, the main challenges that impede stakeholder decisions to commit themselves include limited knowledge about and exposure to environmental safeguards, limited financial resources and inadequate technical capacities to implement best practices. Access to planting materials may be limited in some cases.

Area specific challenges include limited funds among some stakeholders such as the private sector and local communities to implement planned activities, e.g. Tree planting. In other instances, advice and technical guidance needed on the appropriate indigenous tree species for planting (including e.g. *Podocarpus spp.*, *Olea welwitschii* and *Erythrina abyssinica*) and how to establish and manage community nurseries or collect wildlings may not be readily available.

Additionally, limited availability of land, which forces people to cultivate at water-banks, as well as lack of knowledge about where to get the right type of grass for planting as grass bands along the terraces or along the rivers and streams was a noticeable challenge among the rural communities. Planting trees along the boundaries is also likely to spark off conflicts among neighbours.

A specific challenge applicable to the Mt. Elgon area is that the communities that were temporarily allowed to reside on the 2,500 acres (1,112 ha) of the National Park land are not certain about the land and tree tenure, and this discourages them from planting trees on such land.

3.3 Good practices and Lessons from other countries

The lessons outlined in this section are benchmarked on biodiversity voluntary commitments by key stakeholders in different countries under the Convention on Biological Diversity (CBD), which were mainly pledged during COP-15 to help advance biodiversity goals and objectives by the UN Environment Programme²⁴.

Identifying lessons from other countries and from specific stakeholders that have committed to biodiversity conservation provides inspiring examples of potential voluntary commitments that might be undertaken by the Uganda national stakeholders. The summary of lessons learnt from BVCs from other countries are presented in Table 9.

²⁴ [issue 3 \(cbd.int\)](https://www.cbd.int/issue3)

Table 9: Summary of lessons learnt from other countries concerning BVCs

Organization/ Country	Commitment	Lessons towards to Biodiversity Conservation Commitments
<p>Institute Ecofuturo</p> <p>Brazil</p>	<ul style="list-style-type: none"> • The commitment is to maintain 7000 hectares of Atlantic Forest and protect over 1000 species of fauna and flora in the area to promote conservation of biodiversity. • Actions to fulfil the commitment: <ul style="list-style-type: none"> ○ The institute develops environmental education, scientific research, ecotourism, forest management and restoration and community participation, with the collaboration of the Taiaçupeda community (district of Mogi das Cruzes where the entrance to the area is located) and the local government. 	<p>In relation BVCs this institute in Brazil informs the approach by different stakeholders in Uganda with respect their commitment to:</p> <ul style="list-style-type: none"> • Establish Tree Plantations (Indigenous trees) – <u>Small scale agriculture</u> • Tree Plantations (Agroforestry and Hedge trees)- <u>commercial agriculture</u> • Establish Forest plantations to Reduce Pressure on the Natural Forests –<u>Plantation forestry</u> • Increasing sources of fuelwood (woodlots, on farm, energy plantations and multipurpose fast-growing trees)- <u>firewood</u> • Planting trees – to address Charcoal and firewood pressures • Offer of land for tree planting in Busoga, west Nile, Karamoja – <u>Charcoal</u> <p>Lessons: Specific locations need to be made clear for all the commitments. The commitments should consider specific actions that can be complemented in fulfilling the commitments such as forest management, awareness creation and a strategy to allow participation of other stakeholders including local communities.</p>
<p>Heidelberg Cement</p> <p>North America and in Asia</p>	<ul style="list-style-type: none"> • Commitments include Restoration, promotion and protection of biodiversity during and after excavation activities. Some of the actions include: <ul style="list-style-type: none"> ○ 1) undertaking a net impact assessment of all active sites by 2025; ○ 2) Prepare a proximity study every 3 years, with sites within 1 km of high biodiversity value areas implementing a biodiversity management plan; ○ 3) increase the awareness of its employees and empower them to identify, assess and sustainably manage any occurring species on their extraction sites; ○ 4) engage communities in the importance of 	<p>BVCs by this factory in North America inform different organizations in Uganda that are committed to:</p> <ul style="list-style-type: none"> • Restoration of wetlands- impacted mostly by <u>small-scale holder agriculture</u> • Restoration of Mount Elgon ecosystem- impacted by both <u>Commercial and small-scale agriculture</u> • Restoration of Rangelands (research, Bush clearing, enclosures) –in the cattle corridor areas such as Nakasongola and Nakaseke District. – <u>addressing livestock pressures</u> <p>Lessons: Impacting institutions, particularly the private sector may consider proposing specific actions that can support fulfilment of their BVCs in collaboration with local communities. Developing frameworks that promote protection of biodiversity such as land use planning, implementation of biodiversity management plans and increasing awareness and engaging</p>

	biodiversity and habitat restoration.	communities are good aspects of BVCs.
Brazilian Business Council for Sustainable Development (CEBDS)	<ul style="list-style-type: none"> The Brazilian Business Commitment to Biodiversity, proposes to align the strategies of the business sector in Brazil (e.g. Shell, Siemens, Bayer, Equinor) with international and national strategic plans to contribute to nine biodiversity conservation targets by 2030. Some of the targets include: <ol style="list-style-type: none"> 1) applying mitigation hierarchy throughout the lifecycle of projects; 2) promoting and strengthening the best practices that favour the rational use of biodiversity resources; 3) fostering and developing studies to promote conservation; 4) fostering research projects, technology and innovation that contribute to the conservation of biodiversity and ecosystem services; and 5) Making information publicly available in order to facilitate management of biodiversity and ensure transparency. 	<p>In relation to Uganda, BVCs by CEBDS organisations in Brazil informs that there is an opportunity to engage different organisations in Uganda commit to biodiversity conservation.</p> <p>Lessons: Petroleum companies and Organisations can commit to promote strengthening of best practices, promoting and fostering research projects and innovation. The organisations can also support already proposed commitments in Uganda by implementing actions that make the information publicly available for biodiversity conservation such as.</p> <ul style="list-style-type: none"> Establish Tree Plantations (Indigenous trees) – addressing impacts by <u>small-scale agriculture</u> Tree Plantations (Agroforestry and Hedge trees)- <u>commercial agriculture</u> Establish Forest plantations to Reduce Pressure on the Natural Forests –<u>Plantation forestry</u> Increasing sources of fuelwood (woodlots, on farm, energy plantations and multipurpose fast-growing trees)-<u>firewood</u> Planting trees - <u>Charcoal</u> Offer of land for tree planting as well as indigenous tree seedlings in Busoga, west Nile, Karamoja – addressing <u>Charcoal pressures</u>
Global		
County Governor of Troms and Finn mark	<ul style="list-style-type: none"> Country Governor of Troms and Finn mark commits: <ul style="list-style-type: none"> to maintain and improve the environmental conditions in the catchment areas of Pasvik and Grense, Jakobselv-Vuorema rivers, through a joint multi-use plan, including a programme of measures (PoM) developed for 2021 to 2030. Joint measures are expected to reduce the environmental impact of human activity (e.g. atmospheric deposition directly onto surface waters, hydropower and other physical alterations of watercourses, alien and 	<p>In relation to BVCs by the County Governor of Troms and Finn mark in Northern Europe there is an opportunity to engage different organisations to implement actions to fulfil the commitments, since Uganda has committed to:</p> <ul style="list-style-type: none"> Conservation of local animal genetic conservation through breeding - <u>Livestock</u> Range land Resource planning- <u>Plantation Forestry</u> Popularize fuel wood energy regulations-<u>fire wood</u> Formalize and regulate the market - <u>Firewood</u> Technology improvement on fuel wood uses – addressing <u>Firewood pressures</u> <p>Lessons: Some commitments can be made jointly to promote regional</p>
Northern Europe		

	<p>invasive species, and nutrient loading and discharge of pollutants)</p> <ul style="list-style-type: none"> ○ to sustain and improve the environmental status of the border river catchments between Norway, Russia, and Finland. ● Some actions of the commitment include: <ol style="list-style-type: none"> 1) reducing emissions from industry to a level that minimizes impacts in air, aquatic and terrestrial ecosystem, 2) reducing ecological effects of household wastewater discharges on water ecosystems in Pasvik-Inari catchment; and 4) promoting mass awareness of environmental consequences from human activities. 	<p>biodiversity conservation. This is important for migratory species or impacts on biodiversity that are not limited by geographical boundaries.</p> <p>The use of charcoal and firewood is transboundary and in most cases the value chain shows that consumption does not happen at the source.</p> <p>Uganda can support activities of mass awareness as some of the actions to promote biodiversity conservation.</p>
<p>International Union of Conservation of Nature (IUCN) Netherlands (European Union, Netherlands)</p>	<ul style="list-style-type: none"> ● International Union of Conservation of Nature (IUCN) Netherlands, an international organization working mainly on nature conservation, with Deltaplan Biodiversity recovery and MVO Nederland, is mobilizing Dutch organizations – businesses, local governments, NGOs and citizen initiatives to join the Dutch action agenda for biodiversity. By end of 2021, 151 organizations (e.g. local governments, private sector, civil society) had submitted a pledge related to <ul style="list-style-type: none"> ○ industries working on agricultural, ○ forest, ○ fisheries, ○ financial services, ○ catering industry. <p>The aim is to expand pledges over the coming years from 250 organizations.</p>	<p>In relation IUCN Commitments there is an opportunity to engage different organisations in Uganda commit to:</p> <ul style="list-style-type: none"> ● Conservation of local animal genetic conservation through breeding - <u>Livestock</u> ● Range land Resource planning- <u>Plantation Forestry</u> ● Popularize fuel wood energy regulations- <u>fire wood</u> ● Formalize and regulate the market - <u>Firewood</u> ● Technology improvement on fuel wood uses - <u>Firewood</u> <p>Lesson: There are so many local NGOS involved in activities that promote degradation of biodiversity and therefore a plat form can help to bring them together to commit to BVC that relate to agriculture and energy sectors. The organisation can submit pledges with timelines on when they can commit.</p>
<p>WildBound From COP15</p>	<ul style="list-style-type: none"> ● Wild Bound, a non-governmental organization, has committed to <ul style="list-style-type: none"> ○ Create educational content and activities that is expected to reach 60 schools, 180 teachers, 30,000 students, and 3 million viewers on 	<p>The WildBound BVCs approach to actions to fulfil commitments is a very good opportunity for all the commitments for stakeholders in Uganda. Some commitments in Uganda require this kind of approach to meet its targets to:</p> <ul style="list-style-type: none"> ● Conservation of local animal genetic conservation through breeding - Livestock

<p>NGO Forum Commitment</p> <p>China</p>	<p>social media by 2023. It will work with partners such as World Wildlife Fund and Peking University High School Dalton Academy to:</p> <ul style="list-style-type: none"> • 1) raise public awareness in schools, communities, and the general public in China and internationally around the intrinsic value of biodiversity protection, forest protection, and sustainable palm oil; • 2) Create collective action that is initiated by empowered youth to educate their own community, addressing sustainable palm oil, in order to promote responsible businesses and better policymaking to steward global biodiversity. 	<ul style="list-style-type: none"> • Range land Resource planning- Plantation Forestry • Popularize fuel wood energy regulations- fire wood • Formalize and regulate the market – Firewood • Technology improvement on fuel wood uses –Firewood <p>Lessons: promoting collective actions such as those that can increase adoption of improved cooking methods can eventually improve businesses and thus lead conservation of biodiversity</p> <p>Uganda should consider plat forms such as schools, universities and social media to crease awareness</p>
<p>Forest City Studio</p> <p>National (China) (From COP15 NGO Forum Commitment)</p> <p>China</p>	<ul style="list-style-type: none"> • Forest City Studio, commits to the development of Nature-Based Solution (NbS) to provide biological diversity, ecological restoration solutions. Some of the targets include <ul style="list-style-type: none"> ○ 1) By 2025, complete more than 10 urban biodiversity research projects, including conservation or restoration of specific species in urbanized areas, construction of urban microhabitat; ○ 2) By 2030, complete the ecological restoration demonstration cases of seven types of urban habitats (urban green space, country park, farmland, forest, wetland, mountain and roof greening), including no less than 1 square kilometre; ○ 3) By 2040, build ecological corridors with a total length of no less than 100 kilometres and as well as a partial urban ecological network; and ○ 4) By 2050, introduce ecological demonstration zones in megacities, with a total area of no less than 1 square kilometre in areas with a high density of population, including residence communities, commercial complexes, streets 	<p>The BVCs by City Studio in China provides a good innovation plat form for conservation of biodiversity in any kind of environment including cities. Since the consumers of products from commercial, small scale and energy products are in urban centres.</p> <p>Uganda should consider specific commitments targeting actions that will be implemented by urban dwellers.</p> <p>The already stated commitments provide such opportunities</p> <ul style="list-style-type: none"> • Conservation of local animal genetic conservation through breeding - <u>Livestock</u> • Range land Resource planning- <u>Plantation Forestry</u> • Popularize fuel wood energy regulations- <u>fire wood</u> • Formalize and regulate the market - <u>Firewood</u> • Technology improvement on fuel wood uses -<u>Firewood</u> <p>Lesson: The newly created cities in Uganda could consider actions to promote alternative energy sources to replace fuel wood and use of charcoal. Building city ecological corridors and demonstrating restoration cases of urban habitats and promoting research.</p>

	and surrounding	
<p>Village Farmers Initiative</p> <p>Nigeria</p>	<p>Village Farmers Initiative (VFI), an indigenous peoples and local community organisation with a network of over 2000 women and youth farmers and fisher folk, from the Anam riverine communities in Nigeria.</p> <ul style="list-style-type: none"> • We are committed by, at least 2026, to activities related to biosafety, biodiversity and ecosystem restoration, climate change mitigation and adaptation, and preservation and protection of indigenous food heritages and sustainable use of natural resources with traditional ecological knowledge. VFI will, among others: <ul style="list-style-type: none"> ○ 1) Advocate and raise awareness of the Convention on Biological Diversity and its Protocols to a network of indigenous people and local communities; ○ 2) adopt innovations on nature-positive production, plant-rich diet and menu to drastically reduce carbon emissions in our environment; and ○ 3) promote climate justice; people, economic and community resilience of women and youth in our socially and economically disadvantaged communities. 	<p>The BVCs by VFI in Nigeria presents unique BVCs although the actions to fulfil the commitments are not so clear. The commitments relate with what Ugandan stakeholders committed such as:</p> <ul style="list-style-type: none"> • Tree Plantations (Agroforestry and Hedge trees)- <u>commercial agriculture</u> • Establish Forest plantations to Reduce Pressure on the Natural Forests –<u>Plantation forestry</u> • Increasing sources of fuelwood (woodlots, on farm, energy plantations and multipurpose fast-growing trees)- <u>firewood</u> • Planting trees – to address Charcoal and firewood pressures • local animal genetic conservation through breeding - <u>Livestock</u> • Range land Resource planning- <u>Plantation Forestry</u> • Popularize fuel wood energy regulations- <u>fire wood</u> • Formalize and regulate the market - <u>Firewood</u> • Technology improvement on fuel wood uses –<u>Firewood</u> <p>Lessons: The organisation presents a commitment on innovation to adopt a nature positive production, which is a big gap in Uganda. Agriculture and Energy initiatives for conservation are very difficult to adopt since they require a “not business as usual”.</p> <p>Awareness creation to promote good biodiversity practices and achieve attitude change through women and the youth.</p>
<p>Cultural Intellectual Property Rights Initiative</p> <p>Global Europe, South-East Asia, India, Latin America and East</p>	<p>The Cultural Intellectual Property Rights Initiative, commits to</p> <ul style="list-style-type: none"> • Eliminate culturally appropriative behaviour in the fashion industry with a vision to create a system that nurtures, sustains and protects Traditional Knowledge (TK) and Traditional Cultural Expressions (TKE). • The initiative develops frameworks and tools to promote the value of TK and TCEs. By 2030, the goal of the initiative is to <ul style="list-style-type: none"> ○ Facilitate the implementation of the 3Cs’ Rule (Consent, Credit, Compensation Framework) in the benefit of over 100 communities or 	<p>The BVCs by Cultural Intellectual Property Right Initiative do not have specific actions.</p> <p>The opportunity for Uganda stakeholders who have committed to BVCs to consider how culture and traditions can conserve biodiversity. Commitments present an opportunity for developing tools to promote</p> <ul style="list-style-type: none"> • Range land Resource planning- <u>Plantation Forestry</u> • Popularize fuel wood energy regulations- <u>fire wood</u> • Formalize and regulate the market - <u>Firewood</u> • Technology improvement on fuel wood uses –<u>Firewood</u>

<p>Africa</p>	<p>indigenous people-led initiatives in Europe, South-East Asia, India, Latin America and East Africa, and to translate the 3Cs - Get Weaving! campaign into over 60 languages.</p> <ul style="list-style-type: none"> ○ The Cultural Sustainability Academy, a 6-week-executive program for decision-makers and members of Indigenous peoples and local communities and leaders in the fashion industry will by 2030, ○ Enable 120 alumni to become agents of change for bio-cultural diversity to support commercial practices that are culturally sustainable with environmental and culture sustainability through traditional knowledge. 	<p>Lessons: Working with cultural and traditional institutions can easily promote biodiversity conservation and community engagement and ownership for sustainability.</p> <p>Promote actions to support commercial practices that are culturally sustainable with environmental and culture sustainability through traditional knowledge</p>
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4 CONCLUSIONS AND RECOMMENDATIONS

4.1 Conclusions

4.1.1 Overview of the agriculture and energy sectors

Government of Uganda has put in place enabling policy, legal and planning frameworks to support the agricultural expansion and commercialization, enhanced land productivity, biodiversity conservation, climate smart agriculture and increasing the contribution of the agriculture sector to GDP. Similarly, the energy sector is a priority and there is an enabling environment to support development of the sector.

There are some good practices and efforts towards biodiversity conservation for both agriculture and energy sectors. Certification of organic products and forest certification and payment for ecosystem services as well as use of alternatives are among the innovative voluntary commitments being practiced by a few stakeholder categories. A forest certification scheme, which provides guidelines to conserve representative samples of species and hence improve biodiversity conservation under the plantation landscape is a great example. Similarly, certification of organic products follows compliance to conservation agriculture practices.

4.1.2 Stakeholder characteristics

Most stakeholders in the agriculture sector had high interest and influence in the development of BVCs. They included government, non-government organisations and private sector farmers who are involved in commercial agriculture, sugar companies and the out growers (e.g. Kinyara Sugar Works LTD a sugar cane growing stakeholder in Masindi district including Sugar Cane Out growers and Masindi Sugarcane Out-growers Association as well Tea growers' impact biodiversity resources). Fortunately, they have both interest and the influence in developing biodiversity conservation actions.

The stakeholders in the energy sector that showed commitment to biodiversity conservation include District Local Governments (e.g. Kagadi, Masindi, Kibaale, Kween, Kapchorwa, Mbale, Mubende and Hoima) who have high influence on (integrating biodiversity commitments in the district development plans) and high interest in reducing pressure off the natural resources through, for example, promoting tree plantation development, as pressure on competing land use affects biodiversity resources). Such stakeholders therefore will need in depth engagement. National Forestry Authority (NFA) notably has high interest in providing remote sensing tools that have enabled to identify and to quantify the main threats on habitats.

There is a need to develop a common understanding of the concept of "Biodiversity voluntary commitment" so that stakeholders can make informed decisions, so that their commitments can bring actual changes as expected under the BIODEV 2030 project.

4.1.3 Pressures, challenges, good practices and opportunities for biodiversity conservation

The three agricultural subsectors (small-scale/ subsistence farming, commercial farming and livestock) provide various pressures and challenges to biodiversity conservation. The most common type of pressures noted by respondents from the field (Benet, Kagadi, Kween and Mt Elgon National Park) were intensive cultivation of steep slopes (resulting in soil erosion), clearing

land for agriculture expansion (growing Irish potatoes, cabbage, barley, wheat), use of agrochemicals and outright encroachment.

In the energy sector Biodiversity pressures and challenges are closely related and arise from the overdependence on wood resources for energy. Overall, all stakeholders mentioned deforestation (mainly through cutting trees for charcoal and firewood) and for the industrial needs for timber, poles as well as felling of indigenous tree species for charcoal and soil erosion as major pressures.

The increasing demand for firewood from institutions such as schools, the Army, prisons and hospitals as major consumers of firewood and charcoal is a challenge unless alternative energy sources are made available.

Good practices that contribute to biodiversity conservation include improved agriculture practices, tree planting efforts and an increasing use of alternative energy to wood. Some stakeholders including Government officials, commercial tree growers and some practicing commercial agriculture are willing to develop biodiversity voluntary commitments, while others are already practicing some of the good practices. Afforestation, reforestation and agroforestry interventions tend to cut across the agriculture and energy sectors as good practices by most stakeholders and Indigenous Knowledge and practices exist that promote conservation of biodiversity.

4.1.4 Challenges likely to be faced by stakeholders towards implementation of BVCs commitments

Stakeholders do not share the same understanding of what biodiversity and voluntary biodiversity commitments mean. The limited knowledge and understanding among the stakeholders about the concepts of biodiversity and biodiversity voluntary commitments, and how these benefit the different stakeholders will affect acceptability and adaptation of the conservation measures and decisions on voluntary commitments Unless the people get clarity about the conservation values and change their attitude towards conservation, it will be difficult to conserve biodiversity.

Most of the stakeholders have inadequate financial and technical capacities for investing in biodiversity conservation. Therefore, the ability to accept the opportunity cost of setting aside areas for conservation appear to be limited, which will likely impact decisions on BVCs.

Lack of bye-laws, poor enforcement of existing laws and poor governance are major factors that will most likely impede the successful implementation of BVCs.

Tracking voluntary biodiversity commitments requires time for stakeholders to assess their environmental impacts, identify alternative methods or activities, assess the financial costs of the alternative methods / activities, ahead of being able to bring changes.

4.1.5 Measures to mitigate challenges

The strategy for addressing challenges needs to have a buy-in from policy makers to also make key commitments such as possibly a ban on use of firewood from natural forests particularly by factories and institutions in urban settings. This has been done in Kenya, Tanzania and Rwanda and it is achievable here in Uganda as there are some alternatives (wood from plantation forests which in turn increases the value of plantation wood and ultimately making planting trees profitable for the framers). Stakeholders would thus be encouraged to focus on energy crops –trees planted specifically for charcoal and firewood.

4.2 Recommendations in developing BVCs

Some stakeholders in the agriculture and energy sectors have good practices in place that contribute to Biodiversity conservation and show willingness to develop biodiversity voluntary commitments. The good practices should be developed further into viable voluntary commitments. Biodiversity voluntary commitments that could be undertaken by the agriculture sector stakeholders include:

- 1) Improved agriculture practices - Voluntary certification with a sustainable agriculture label for small holder farmers, coffee, tea sectors, etc. (output: Number of hectares of land under certification-200,000ha).
- 2) Voluntary certification with a sustainable forestry management label (output: Number of hectares of land under certification-100,000ha).
- 3) Restoration of degraded habitats (output: 50square kms per year restored)
- 4) Promotion of planting threatened species of agricultural crops, e.g., Bambara nuts.
- 5) Planting of indigenous trees (10 million trees per year).

Biodiversity voluntary commitment that could be undertaken by Energy Sector stakeholders:

- 1) Voluntary certification with a sustainable energy label (output: number of organizations with the label)
- 2) Establishing wood energy plantations (output: number of hectares planted purposely for energy production)
- 3) Promoting and incentivize use of alternative energy sources such as Ethanol, LPG, Biogas and briquettes for increased adoption (Number of organizations using alternative cooking and heating fuel)
- 4) Promoting and install energy efficient cook stoves and equipment such as pressure cookers (output: Number of stoves or efficient equipment) installed and organizations using energy efficient stoves and equipment
- 5) Introducing a more regulated use of firewood from natural forests particularly the use of indigenous trees by institutions and factories in the Uganda's major cities. Efforts to be directed on use of only deadwood (output: a moratorium imposed and implemented).

4.2.1 Strategy for further stakeholder consultations to confirm Biodiversity commitments

Voluntary biodiversity commitments are a relatively new approach to biodiversity conservation in Uganda, and probably globally. There is limited understanding of the concept and practice among most stakeholders, and more prominently for the small-scale farmers. Among those stakeholders with high interest in biodiversity conservation, they exhibit aspects of good practices that contribute to biodiversity conservation, but still many of them have not yet grasped the spirit and intent of voluntary commitments. It is therefore necessary to build a common understanding of the concept of "Biodiversity voluntary commitment" so that stakeholders can make informed decisions, in such a way that their commitments can bring actual changes as expected under the Biodev 2030 project.

A workshop is proposed for each sector in which BVCs as indicated in Table 10 will be discussed after a template (Appendix G) has been sent to select key stakeholders to be populated. At the end of the workshop, the BVCs collected over the national workshops will be assessed against the criteria of a BVC into actionable ones with key stakeholders discussing their implementation. At the end of the meetings, it is expected that BVCs are clear with stakeholders having collated the relevant information (regarding the accurate quantification of the BVC, funding sources, implementing timeline, enabling activities, etc.). Table 10 summarizes the current results with respect to biodiversity commitments which will further be discussed with further engagement of stakeholders indicated in the last column of the table.

Table 10: Proposed specific voluntary commitments to be reviewed

(i) Agriculture Sector

Problem to be addressed	Drivers of the problems	Possible voluntary commitments – to address the problem	Key stakeholders to implement commitments
Land degradation in Mt. Elgon.	Poor subsistence farming practices	40 ha of land / year where Policies, programs and activities promote integrated land management for conservation of Mount Elgon ecosystem	DLG: Kween, Bukwo, Mbale & Bududa. CSOs: IUCN, UNFFE, Benet Lobby Group. Government agencies: UWA, MWE (FSSD) & MAAIF.
		Land use planning to ensure that a family caters for the various needs such as food and firewood reportedly taken from Mt Elgon National Park.	DLG: Kween, Bukwo, Mbale & Bududa. CSOs: Benet Lobby Group. Government agencies: MAAIF
	Unregulated grazing	Regulated grazing in the Mt. Elgon National Park	DLG: Kween CSOs: IUCN, Benet Lobby Group. Government agencies: UWA
Ecosystem degradation in Kagombe CFR and land degradation around adjacent areas	Encroachment of CFR by subsistence farmers	Restoration planting of Kagombe CFR - xxx ha of land / year	DLGs: of Kagadi, Kibale, Kakumiro, Kabarole and Kyenjo Government agencies: NFA, NEMA CSOs: WWF, WCS, ECOTRUST
		Planting of indigenous trees by a CFM group in Muzizi area near Kagombe - 513ha over a 2-3years period.	CFM Group

		Promotion of collaborative forest management, capacity building in nature-based enterprises, restoration of degraded landscapes among the CFM Groups around most forest reserves as suggested by NFA.	NFA CFM Groups
	Poor farming practices by subsistence farmers	Integrated land management and Improved farming practices around Kagombe CFR	DLGs: of Kagadi, Kibale, Kakumiro, Kabarole and Kyenjo Government agencies: MAAIF CSOs: WWF, WCS, ECOTRUST, UFF
Ecosystem degradation in the protected area of Budongo and Bugoma CFRs	Encroachment of CFR by subsistence farmers	Restoration planting of Budongo and Bugoma CFRS -	Government agencies: NFA CSOs: CFM Groups
	Inadequate law enforcement and poor governance	Improved surveillance and professionalism	NFA
Land and forest degradation outside Bugoma and Budongo Forest Reserves in Bunyoro.	Clearance of forested areas for sugar cane growing	5 million trees planted	DLGs: Government agencies: Cultural institutions: Bunyoro Kitara Kingdom CSOs: UNFFE, Eco trust and WCS Private sector: Sugarcane Out growers in Masindi, Hoima, Kagadi and Kyenjojo
	Need for increased sugarcane production	Reduce use of chemical fertilizers to 30% through use of biofertilizer The company has also earmarked 500 hectares to be maintained as indigenous forest including for enrichment Restoration planting / Enrichment planting: xxx ha per year for xx years Roadside planting of indigenous tree species: xxx	Private sector: Kinyara Sugar Ltd, and Sugarcane Out growers in Masindi, Hoima, Kagadi and Kyenjojo

		Km of roads per year	
	Lack of land use planning	Land use plans for 15 farmers per subcounty per year	DLGs: Masindi and Hoima. Government agencies: MAAIF, CSOs: WWF, Eco trust and WCS
Land degradation in the cattle corridor	Over stocking of livestock Nomadic pastoralist practices Limited pasture improvement practices	100 Km ² of rangeland habitat restored (through research and bush-clearing enclosures) over 10 years	Government agencies: MAAIF (Animal production) & NALIRI. DLGs: Nakasongola, Mbarara, Nakapirpirit. CSOs: SVI (Italian NGO).
Land and ecosystem degradation in South Western Uganda.	Need for increased tea production	Land use planning in tea growing areas	DLGs: Bushenyi, Rubirizi, Kanungu & Kabarole Government agencies: NFA, MAAIF, MWE (FSSD), NAADS secretariat. Private sector: Uganda Tea Association.
Clearing forests outside PAs in central and western Uganda	Increased production of oil palm, coffee and food resources	Land use planning; Agroforestry	DLGs: Kalangala, Mukono, Buikwe Government agencies: NFA, MAAIF, MWE (FSSD), NAADS secretariat. Private sector: Coffee growers, Oil Palm growers

(ii) Energy sector

Problem to be addressed	Drivers of the problem	Possible voluntary commitments – to address the problem	Key stakeholders – with capacity (to implement commitments)
Land degradation in Mt Elgon	Increased demand for biomass energy by communities	Agroforestry practices on private land	CSOs: Benet Lobby Group, DLGs: Kween, Government agencies: MAAIF, UWA, MWE (FSSD) & Ministry of Energy and Mineral Development.
		Regulated community access to the National Park for firewood collection	UWA
		Planting trees along community land boundaries	CSO: Benet Lobby Group; ECOTRUST; Indigenous peoples and local communities
Ecosystem degradation in Kagombe Forest Reserve	Increased demand for biomass energy ()	Restoration planting: 5 million trees planted	Government agencies: MEMD, MWE (FSSD), NFA, CSOs: WWF, WCS, Eco trust, DLGs: Kagadi, Kibale and Kakumiro. Private sector:
Land degradation	Increased demand for fuelwood as energy for institutions and industrial processes	Energy plantations and woodlots: 1,800 Ha dedicated to charcoal energy plantations	Government agencies: MEMD, MWE (FSSD), NFA, Uganda National energy Efficiency Alliance (UNREEEA)
		Energy woodlots: 640,000 Ha of woodlots dedicated for firewood products	Government agencies: MEMD, MWE (FSSD), NFA, Schools, Uganda Prisons Force; Uganda Police Force; Uganda Peoples Defence Force CSOs: DLGs: ALL Private sector: Private schools; Manufacturing Industries; UTGA
		2,300 Ha of lands planted with woodlots dedicated for energy production	MEMD, MWE, NFA, MoLG, EU, NAFORRI, UNBS, Nyabyeya Forestry college
		1.66M units (353,000 households) of clean cookers/stoves	MEMD with funding from the World Bank

	Wasteful methods of biomass energy production and utilization	Improved cookstoves and tree planting for fuel wood and certification as well as switching to alternatives	Institutions such as schools, and industries such as TEA processors
Land degradation in the cattle corridor	Charcoal burning and over cutting of trees for fuel wood.	Land use plan for 15 farmers / subcounty / year	Government agencies: MAAIF (Animal production), NARO, Uganda Prisons, Uganda Police DLGs: Mubende and Nakasongola CSOs: UNACC, Luwero Youth Group (Vanessa), Cultural institutions: Buganda Kingdom. Religious institutions: Church of Uganda, Catholic church. Institutions: Ministry of Education and Sports & Private schools association (UNAPSI – 0772632211/0704762575), Uganda Saunas Association, Church of Uganda,
Land degradation in Luwero District	Increased demand for biomass energy (charcoal)	Planting 444,000 trees (400 Ha) in Luwero District	Uganda Youth for Biodiversity Network (UYBN) - Youth Network by Vanessa
Rangeland degradation in the cattle corridor	Overgrazing, bush clearing for farms and charcoal burning.	100 km ² over 10 years (Area of habitats restored-Rangeland restoration- (research, Bush clearing, enclosures)	MAAIF livestock section, MWE and DLGs in the cattle corridor areas such as Nakasongola and Nakaseke Districts.

(iii) Plantation forestry

Problem to be addressed	Drivers of the problem	Possible voluntary commitments – to address the problem	Key stakeholders to implement commitments
Forest degradation	Increased demand for wood resources for timber, poles and firewood	700,000 ha of forest planted	NFA
Land degradation in the rangelands as a result of.	Alternative land uses, e.g.: plantation forests	Natural resource restoration	CSOs: DLGs: Mubende (DNRO), Luwero, Lyatonde and Nakasongola. Government agencies: NFA, NARO, MWE (DESS) Private sector: New Forests Company & UTGA

4.2.2 Identification of key stakeholders for developing actionable BVC

Most of the stakeholders in the two sectors (agriculture and energy) have not developed actionable voluntary commitments but have made good general suggestions and these will be discussed further to ensure a refinement to actionable BVCs. To achieve actionable commitments in both the agriculture and energy sectors, the more appropriate approach is to further engage key players in the sectors (farmers, private sector investors, regulators, consumers and donors / financiers). The Key stakeholders for further engagement in the two sectors are provided in Appendix D and E.

5 APPENDICES

5.1 Appendix A: Documentation Reviewed for the Agriculture Sector

(I) Documents for the commercial farming sub-sector

References of studies	Salient issues
GOU (2020)	<ul style="list-style-type: none"> The agricultural sector recorded improved growth rates over the period 2015-2019 averaging 3.4 percent per annum. It is indicated that Uganda's gigantic biodiversity is a major backer of the agricultural sector 48% of the generated improved agricultural technologies was adopted in FY 17/18 relative to 30% in baseline year 2014.
NEMA (2016)	The agricultural sector in Uganda contributed 50% to export earnings, employed 70% of working population (78% of total population from rural), Agro-processing accounted for approx.60% manufacturing output, food processing 40%.
Fowler & Rauschendorfer (2019)	<ul style="list-style-type: none"> Employment is dominated by agriculture in Uganda, investment in this sector will deliver high poverty reduction and substantial gains in living standards. Agricultural productivity, continued to contribute to economic growth and improvement of livelihoods especially through organic farming deriving benefits such as low-cost agricultural systems that rely on biological and ecological processes
GOU (2016)	Poverty levels in Uganda have gone down according to World Bank (2016), much of the progress is attributed to agricultural income growth, peace and stability, education, urbanization, and sustained economic growth averaging 7% annually
GOU (2018a)	The Agricultural sector exports have grown progressively over the years, from US\$868.1m in 2010 peaking at US\$1.32b in 2013 before reducing to US\$1.29b in 2014.
GOU (2015b)	Talks of the tea industry as having made tremendous progress in terms of increased production and productivity through attracting inflow of foreign direct investment.

(II) Documents for the tree plantation sub-sector

References of studies	Salient issues
NEMA (2016)	<ul style="list-style-type: none"> Forestry as a form of plantation contributed 6% to Uganda's Gross Domestic Product (GDP) and 11-27% of household cash incomes of communities around forest reserves.

GOU (2020)	<ul style="list-style-type: none"> Between 2016 and 2019 the forestry sub-sector contributed 3.5% of GDP per annum. Uganda's forests contribute 61% to Uganda's tourism income and jobs for about 1 million people. About 3,500 ha of degraded natural forests have been restored and 60,000 ha allocated to private developers for commercial.
Kaboggoza (2011)	Reiterates how forest plantations contribute to ecological functions, and support to the economy through forestry related. Forests contribute to soil and water management, carbon sequestration, and future uses for Uganda's biodiversity was valued at over US\$ 130.7 million annually.
NEMA (2016)	<ul style="list-style-type: none"> Increased encroachment on PAs mainly by people who came from other locations. For example, by 2008 there were over 300,000 illegal settlements in Central Forest Reserves country wide. Agricultural encroachment is also reported in some National Parks and wetlands. One of the indicators of land degradation is soil erosion. It was estimated that by 2003, the annual cost of soil nutrient loss due to soil erosion in Uganda was about \$625 million per year. The problem of soil erosion was steadily increasing with the ever-increasing human population. Poor agricultural practices, such as over-stocking of rangelands and cultivation on steep slopes contribute to erosion and siltation of water bodies, thereby altering ecosystems and species composition.

(III) Documents for small scale/subsistence farming sub-sector

References of studies	Salient issues
UBOS (2020)	The agricultural sector in Uganda is highly fragmented and dominated by small-scale farmers most of whom combine subsistence farming with cash crop and livestock farming. The majority of the farmers own land individually except in parts of northern Uganda where pastoral land holding is predominantly communal. Farming is progressively becoming mechanised although cultivation is still majorly by hand or cattle driven ox ploughs. About 7.4 million households manage agricultural land and rear livestock and of these, 81.2% of the adults are engaged in agricultural activities. About 80% of the agricultural households produce for both own consumption and sale, and 9% produce only for own consumption. Approximately 39.6% of adults from agricultural households own the land they cultivate, being 48.7% for men and 31.1 % women. The primary food crops are maize, banana, cassava, and beans as of 2018.
Nabwire (2015)	Smallholder agriculture is a major source of employment for many unskilled and semi-skilled workers in Uganda as it is more labour intensive hence the best channel for poverty reduction if well improved.
GOU (2020)	The agricultural sector in Uganda registered improved growth rates over the period 2015-2020 averaging 3.4% per year. Prominent improvements were observed in the food crops sub-sector (maize, cassava and bananas) that grew at an average of 3.7 %. The cash crop sub-sector (coffee, cocoa, cotton, tea) averaged at 6.4%. The livestock sector was the least performer and grew at 2.1%.

GOU (2015a)	<ul style="list-style-type: none"> • More than 75% of the farmers in the Uganda grow bananas, accounting for 54% of the total tonnage of fresh food produced. However, it still held a relatively small share of crop income in the country. • Under the program of Agricultural Modernization, 8 water for production schemes were developed, and 17 feasibility studies carried out on community-based irrigation schemes and district-based demonstrations on small-scale irrigation technologies and rainwater harvesting and management established in 23 districts. • Technologies for labour saving were increased including tractor donations by GoU to identified model farmer groups and for neighbourhood contracting. • There is generally limited use of inputs such as fertilizers under small scale agriculture.
GOU (2019b)	<p>Government of Uganda in 2018 revamped the agriculture extension system through recruitment of sub-county agriculture extension officers in most of the districts across the country. This helped integrate Community-Supported Agriculture (CSA) into the extension system and provide advisory services on the climate resilient technologies to farmers.</p>
GOU (2018a)	<p>Most Local Governments have built the capacity to offer extension services to farmers engaged in agriculture up to 70% of all the required support. The services mostly focus on seed multiplication and use. Generally speaking, seed production, importation and sale for a variety of crops including vegetables, grains, cereals and cash crops is by seed companies and not government.</p>

(IV) Documents for the livestock sub-sector

References of studies	Salient issues
GOU (2020)	<p>Over the period 2015-2020, the livestock sector was the least performer and grew at 2.1%.</p> <p>The livestock sector represented about 17% of the agricultural value added and 4.3% of GDP in 2018. Approximately 58% of households depending on livestock for their livelihoods and 92% of those being subsistence smallholder farmers.</p>
FAO (2019a)	<ul style="list-style-type: none"> • The average landholding size for livestock rearing households was 2.2 hectares and per region • Fish farming in Uganda, is dominated by small-scale trading. • Total fish production in 2014 amounted to 461,726 MT, of which 17,597 MT accounting for 3.8% export and earned Uganda US\$ 134,791million. The fisheries sector contributed approximately 12% to the agricultural GDP and 2.5% to the national GDP in 2015.
FAO (2019b)	<p>The total fish production was at about 560,000 metric tonnes annually with about 82% (460,000 MT) contribution from the five main water bodies and several small lakes and only 18% (100,000 MT) from culture fisheries. There was continued decline in the stocks of large commercial fish species especially Nile perch from Ugandan water resulting mainly from un-sustained law enforcement.</p>
MAAIF (2016)	<p>Constraints to production of beef and dairy, are the quality of breeds and the livestock numbers as well as water shortages and scarcity of feeds during drought.</p>
GOU (2020)	<p>The agricultural sector in Uganda registered improved growth rates over the period 2015-2020 averaging 3.4% per year. The livestock sector was the least performer and grew at 2.1%.</p>
GOU (2015a)	<p>With respect to aquaculture, three new commercial aquaculture sites were established; 17 fishponds were established; two aquaculture parks were established; eight landing sites were constructed/ developed; and, four regional fish hatcheries were constructed (GOU 2015a).</p>

(V) Cross-cutting documents about the challenges in agriculture

References of studies	Salient issues
UBOS (2020)	<ul style="list-style-type: none"> • Generally, majority of the households engaged in agriculture reported a shock in their production. Overall, 82% of the agricultural farmers reported facing drought as one of the major challenges while 17% reported floods. There was however an improvement at 47% of the farmers that experienced a food shortage in 2018 as compared to the 57% in 2008. • Uganda's soil fertility has reduced and needs enrichment though most farmers are not applying fertilizers. Loss of soil nutrients in Uganda is reportedly one of the highest in Africa, however, only 24% of agricultural households used fertilizers. About 40% of the non-fertilizer users believe fertilizers are expensive and 25% believe the soil has enough fertility. Amongst the fertilizer users, only 32% used organic fertilizers, the rest of the users used inorganic fertilizers.

GOU (2015a)	<ul style="list-style-type: none"> Poor agronomic practices that affect agricultural production and other challenges like poor post-harvest handling and processing, and a weak monitoring and evaluation system have hampered the agricultural sector.
GOU (2015d)	<ul style="list-style-type: none"> Poor agricultural practices especially by small scale famers has resulted into increased land degradation due to soil erosion and soil nutrition depletion, deforestation, over grazing and water pollution. Also, over population in some areas has resulted in land fragmentation and over use, affecting land quality, agricultural production and economic development.
Kamanyire (2000)	<ul style="list-style-type: none"> Land degradation due to unsustainable methods of land use and demographic pressures leading to encroachment in gazetted areas has also reduced land productivity. Also mentions the poor Post-Harvest-Handling that results in product losses and loss in quality thus reducing viability of crops, both at farm level as well as during marketing. Lack of appropriate methods for harvesting, drying, cooling, pest control and other operations, as well as lack of appropriate storage facilities, and improper packaging also present challenges.
GOU (2015c)	Points at wasteful means of production and unsuitable land use management practices as leading to much soil degradation, pollution of land and water resources.
GOU (2000)	<ul style="list-style-type: none"> On-farm and off-farm poor post-harvest handling results into losses for both food and cash crops. Issues of timely harvesting, proper drying, protection from infestation with diseases and pests and proper storage are not yet up to the desired standards. The unavailability to the farmers of technological packages to do with high-yields, efficient and cost-effective cultivation. Low rates of adoption of appropriate technology, extension and farmer linkages, and absence of effective delivery of extension services to farmers. Financial constraints for both investment and working capital for smallholder agricultural producers. This impedes creation and sustenance of a dynamic and productive modern agricultural sector that is more productive and high-yielding.
GOU (2020)	<ul style="list-style-type: none"> Mentions of a shortage of standard and modern storage facilities leading to a decline in quality of the products. Uganda's post-harvest losses range from 30 to 40% for grains and other staples, and 30 to 80% for fresh-fruits and vegetables.
MAAIF (2016)	<ul style="list-style-type: none"> The bad practices like harvesting of immature coffee by farmers, processing of wet coffee by unlicensed mobile rural hullers and roasting of inferior coffee, are responsible for low pricing of Uganda's coffee. The coffee regulations not covering farm level activities constrain enforcement plus the slow adoption of value addition technologies along the coffee value chain.

GOU (2018a)	<ul style="list-style-type: none"> • It is indicated that 68% of farming households were engaged in subsistence rain-fed agriculture and relying largely on home-saved seed of low quality resulting in low productivity and production. Reliance on home-saved seed is caused by inadequate availability of affordable high-quality seed but also lack of trust in the certified seed available on the market. Certified seed contributes only about 15% of the requirement and an estimated 30-40% of seed traded in the market is counterfeit. • There is also insufficient infrastructure for seed production, multiplication, conditioning, storage, marketing and distribution including appropriate means of transportation. The seed production system currently depends on low input characterized by low use of improved seed, and the farm level crop yields are far below potential. For example, yields of beans as a major food crop ranges between 300-500kg per acre per season compared to a potential of up to 900kg per acre per season. Maize yields are below 2,000kg per hectare compared to 7,000kg per hectare per season for hybrid maize. Rice is currently on average at a yield level of less than 1,000kg per hectare compared to an expected potential of 3,000-4,000kg per hectare per season.
World Bank (2016)	<ul style="list-style-type: none"> • Reports a low use of agricultural inputs, for example in 2012, only 25% farmers were using fertilizer for their crops, while only 10% used pesticides and less than 12% of farmers received extension services. Low use of quality input could be attributed to the low quality of inputs available on local markets, for “on average, 30% of nutrients are missing in fertilizers available to farmers in local markets”.
EPRC (2014)	<ul style="list-style-type: none"> • Raises the issue of majority of small farmers in Uganda not using improved crop varieties, leading to low yields.
GOU (2015b)	<ul style="list-style-type: none"> • Slow adoption of technology particularly amongst the women farmers despite being the majority labour force, also leads to low productivity. It also reports that the sector is characterized by limited value addition which is attributed to poor post-harvest handling techniques.
GOU (2019)	<ul style="list-style-type: none"> • Points to limited access to and utilization of climate information by farmers to improve agricultural management and livelihoods. This may be coupled with limited capacity to access and utilize ICT to benefit from a wide range of climate information sources. Also, inadequate climate advisory services to support farmers to respond appropriately to the changing climate conditions. Generally, there is lack of enough information and tools by the extension workers and farmers on the modern agricultural technologies, practices and approaches.
GOU (2019b)	<ul style="list-style-type: none"> • The high cost of inputs, technology equipment and services combined with the weak economic base of the majority of the smallholder farmers plus the increasing climate risk require financial services to scale up adoption of modern agriculture. Financial institutions providing agricultural credit services have a low coverage especially in rural agricultural areas and offer credit at higher interest rate. There is literally no coverage of Agricultural Insurance Services to mitigate risks and uncertainties in agriculture. • There is limited marketing infrastructure especially for rural areas, they receive low prices for produce due to lack of access to markets and marketing information. Most small holder farmers store and market produce individually through middlemen due to limited or lack of organized groups or cooperative with bulking and transportation facilities to access good markets.
Nabwire (2015)	<ul style="list-style-type: none"> • Poverty especially among the rural smallholder subsistence farmers hinders them from undertaking some of the recommended agricultural practices.

BANK, W. (2018)	<ul style="list-style-type: none"> • Pollution: Increased urbanization and industrial development has created more waste; the discharge of industrial waste pollutes water systems. Fertilizers, pesticides, herbicides, polythene bags and plastics
GOU (2016)	<ul style="list-style-type: none"> • Limited infrastructure: Limited supporting infrastructure such as dry ports, industrial parks, storage facilities and additional services. Irregular electricity supply with high charges and high fuel costs which greatly affects efficiency and profitability. The poor road conditions
NEMA (2016)	<p>Invasive species: The introduction of exotic species into the natural systems e.g., <i>Senna spectabilis</i> that has invaded over 1,000 ha of the Budongo Forest Reserve, <i>Broussonetia papyrifera</i> in Mabira Forest Reserve. Also, the Water hyacinth (<i>Ecihornia crassipes</i>) on Lakes Victoria, Kyoga and R. Nile banks and the introduction of the Nile Perch resulting into about 40% of the <i>haplochromine</i> species disappearing in L. Victoria.</p>
FOWLER & RAUSCHENDORFER (2019)	<ul style="list-style-type: none"> • Limited capacity of the primary producers to meet the set standards in the export market. • Lack of a comprehensive National Agriculture Policy, meaning that land productivity potential, land capability and land sustainability for agriculture is not well known. • The East African Community common tariff schedule has not been successful and undermines the functioning of the customs union. Ugandan agriculture-based exporters face stringent health and safety requirements. 35% exporters from the manufacturing sector were affected. • A number of Non-Tariff Measures (NTMs) that hinder improved export performance <p>Climate change</p> <ul style="list-style-type: none"> • Unreliable weather affects many crops productivity through loss of soil fertility, pollution of water ecosystems, deforestation through clearing virgin lands and agricultural gas emissions. • Over dependency on rain-fed agriculture continues to pose a challenge in the agriculture sector. • Increased cases of drought, unreliable rain patterns, and soil erosion are leading to biodiversity loss.
KAMANYIRE, M. (2000)	<p>Pests and diseases: Pests and diseases significantly reduce agricultural yields, the common ones are banana weevil, coffee berry borer, sugar cane stem borer and cassava mosaic. Others are banana xanthomonas wilt disease, cassava brown streak virus disease, fruit flies and citrus canker. About 40% of the farmers reported pests and diseases as big challenge.</p>
FOWLER & RAUSCHENDORFER (2019)	<p>Agricultural Modernization: Ministry of Public Service (MoPS) approved the positions of district agricultural engineers in the local governments. The government committed to increasing spending to 10% from around 3% of the national budget to achieve the Comprehensive Africa Agriculture Development Program (CAADP), and the National Irrigation Master Plan to increase to around 250,000 hectares by 2035.</p>

(VI) Cross-cutting documents about the biodiversity conservation commitments in Uganda

References of studies	Salient issues
NEMA (2016)	A number of national policies have been put in place to protect the Ugandan environment, key among them are: the National Environment Policy (1994); the Uganda Wildlife Policy (2014); The Forestry Policy (2001) The Land Policy (2000); The Tourism Policy (2003); The Fisheries Policy (2003; The National Agriculture Policy (2009); The Decentralization Policy (1993); The National Gender Policy (2007); The National Culture Policy (2006); The Education Policy (1992); The National Community Development Policy (2015);
UNDESA (2009)	A couple of measures to ensuring sustainable development, as: <ul style="list-style-type: none"> • Inter-agency cooperation and collaboration enacting freedom of information legislation and the right to petition governments • Outline the structures, roles, and responsibilities of the different stakeholders involved in a project • Decentralize powers and functions in government and encourage excluded groups to participate in governance • Establish a monitoring process to track outcomes. • Promote a multi-sectoral vision for conflict-sensitive sustainable development and a common understanding between a government and its development partners
WORLD BANK (2005)	<ul style="list-style-type: none"> ▪ Private sector strengthening as well as establishment of an inclusive and representative body ▪ Structured coordination of all stakeholders in designing and implementation of national sustainable development strategies. ▪ Policy-making, coordination and accountability systems should be emphasized to support increased development work within conflict areas to avoid occurrence of other challenges like high crime rates, land encroachment and unplanned land use.
BRONDIZIO, E. S. J; SETTELE, S. DIAZ, and NGO H. T. editors (2019)	Some of the ways through which biodiversity loss can be minimised include: <ul style="list-style-type: none"> • passing appropriate government legislation • preserving relevant nature preserves • reduction of invasive species • habitat restoration • promotion of captive breeding and seed banks

Further References:

Grant Thornton 2022, Uganda Budget 2022, Grant Thornton International Limited. www.gtuganda.co.ug

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5.2 Appendix B: Documents reviewed for the Energy Sector

(I) Documents for the charcoal sub-sector

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(II) Documents for the firewood sub-sector

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5.3 Appendix C: Documents reviewed for the neighbouring Countries

Literature reviewed per country

Country	National Biodiversity Strategy and Action Plan (NBSAP)	National Report to the CBD (Last report: Sixth national report)	The state of national biodiversity for food and agriculture	National biodiversity finance policy and institutional review
Democratic Republic of the Congo	Democratic Republic of the Congo, UNEP, FEM and MEFDD, August 2015	Democratic Republic of the Congo and Ministry of Environment and Sustainable Development, October 2019	-	-
Kenya	Republic of Kenya, 2019	Republic of Kenya, March 2021	FAO, 2013	-
Rwanda	Republic of Rwanda, UNEP and GEF, December 2016	Republic of Rwanda, UNEP and GEF, September 2020	-	BIOFIN, REMA and UNDP, November 2017
South Sudan	Republic of South Sudan, Ministry of Environment and Forestry, UNEP and GEF, 2018	Republic of South Sudan, Ministry of Environment and Forestry, UNEP and GEF, November 2019	-	-
United Republic of Tanzania	Vice President's Office, Division of Environment, The United Republic of Tanzania, October 2015	The United Republic of Tanzania, May 2019	FAO, 2016	-
Democratic Republic of Ethiopia	Government of the Federal Democratic Republic of Ethiopia and Ethiopian Biodiversity Institute, 2015	Government of the Federal Democratic Republic of Ethiopia and Ethiopian Biodiversity Institute, May 2014	FAO, 2013	-

5.4 Appendix D: Agriculture sector - Key stakeholders engaged further for achieving actionable BVCs

N°	Name	Title	District	Contact
1	Uganda Tea growers		Countrywide	Association secretariat to provide member contacts
2	Ssentongo Daudi, Bunyoro Kitara Kingdom	Coordinator	Hoima	0776419546
3	Ndibwami Yosia	District Secretary to production	Kagadi	0775024250 0782866023 dibwayosia@gmail.com
4	Mpeeka Mathew	Agricultural Engineer	Hoima	0773867981
4	Job Byaruhanga	District - Agricultural officer	Masindi	0777211365
5	Dr Ramesh B	Agriculture Manager	Kinyara Ltd Sugar	0757 777279
6	Jane Asimwe	V/chairperson	Sugarcane Out-Grower's Association	0772553948
7	Paul Sanya	SCDO-Luwunga Forest Plantation	New Forests Company	0776 774455
9	Francis Tumuhimbise	Manager	Small scale plantation	0772 893942
10	Fred Onyai	NEMA	NEMA	fred.onyai@nema.go.ug
11	Dennis Mahoro	Principle Ecologist	Range MAAIF	0772685937
12	Anna Nakayenze and other DEOs around Mt. Eldon	To coordinate	District local government around Mt. Elgon	0772555387
13	Ssentongo Daudi	Manager training and crop resources	Uganda National Farmers Federation (UNFFE)	0776419546
14	Chebet Mungech	Benet	Benet	0779233078; mungech@gmail.com 0772335915
15	Francis Kikonyogo Gerald Kitaka	District Production officer at Nakaseke and Nakasongola	On rangeland restoration	franciskikos@yahoo.co.uk ; 0782820071 kitakamuwanga@gmail.com
16	Lucy Iyango	Commissioner Wetlands Department	MWE	0772886422 iyango2010@gmail.com
17	Andrew Byamugisha	Commissioner Crop Protection	MAAIF	0772514981 ambkyeba@gmail.com
18	Mugabi Stephen David	Commissioner – MWE Environment Support Department	MWE	0782059294; mugabisd@gmail.com

5.5 Appendix E: Energy sector key stakeholders engaged further to achieve actionable BVCs

Name	Organization/position	Contact
1. John Tumuhimbise	Ministry of Energy and Mineral Development- Asst: Commissioner - Renewable Energy	johntumuhimbise@gmail.com
2. Caroline Aguti	Ministry of Energy and Mineral Development- Head of Environment	Caguti1977@gmail.com
3. Justine Akumu	Ministry of Energy and Mineral Development- Energy officer	akumujustyn@gmail.com
4. Virginia Semakula	General Secretary - UNACC	
5. Sarah Babirye	UNACC	sarinbabirye@yahoo.com 0704828804/0787282919
6. Virginia Semakula	UNREEEA	0772427494
7. Bob Kazungu	Forest Sector Support Department	Bob.kazungu@gmail.com ; bob.kazungu@mwe.go.ug
8. Tom Obong Okello	National Forestry Authority Executive Director	tomokello@yahoo.uk
9. Obed Tugumisirize	National Forestry Authority Coordinator Plantation forestry	obetug@yahoo.com
10. UYBN (Youth groups by Vannessa Nakate)	UYBN (Youth groups by Vannessa Nakate) - operating in Luweero	0774257596
11. Kabi Maxwell	National Forestry Authority- Forestry Utilization Specialist	kabimaxwell@yahoo.com
12. Akankwasah Barirega	NEMA-Executive Director	akankwasah@gmail.com
13. Francis Ogwal	NEMA- CBD Focal Person	sabinofrancis@gmail.com
14. Edison Masereka	Kampala Capital City Authority	emasereka@kcca.go.ug
15. Denis Kavuma	Uganda Timber Growers Association- General Manager	denniskavuma@utga.ug
16. Mpologoma Betty	Uganda Tea Growers Association- Acting Executive Secretary	0772418917
17. Kisutu Ahmeo	Charcoal Burning Association- representative	0760242064

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18.	Denis Mugaga	Ministry of Finance, Planning and Economic Development-Economist	mugaggad@gmail.com
19.	Henry Tumwesigye	Church of Uganda- Director Community Transformation	bekamut@gmail.com
20.	Joseph Katswera	Kasese District Local Government- Natural Resources Officer	katswera@gmail.com
21.	Edwin Muhumuza	Youth Go Green Uganda- team leader	edwin@youthgreen.org
22.	Clare Kaga	Renewable Energy business Incubator Ltd	+256782358522/0704942320 info@energyincubator.org
23.	Robert Mucokhisa	Range Supervisor Nyabyeya Forestry college	Robert.mucokhisa@gmail.com 0779522969/0702260729
24.	Maureen Uwimbabazi	NAFORRI	Biodiversity Task Force
25.	Kiza Simon	Busoga Forest Company-ESG Manager	bfc@greenresources.no

5.6 Appendix F: Members of the Biodiversity Task Force

N°	Name	Organization	Title	Tel (Mobile)	Email
1	Francis Ogwal	National Environmental Management Authority	CBD Focal Person	0772517045	sabinofrancis@gmail.com
2	Obed Tugumisirize	National Forestry Authority	Coordinator Biodiversity	0776211013	obetug@yahoo.com
3	Richard Kapere	Uganda Wildlife Authority	Manager planning	0772688875.	Rufurich1968@gmail.com
4	Boaz Tumusiime	Ministry of Tourism, Wildlife & Antiquities	Wildlife Officer	0706103722	boaztumusiime@gmail.com
5	Andrew Byamugisha	Ministry of Agriculture, Animal and Fisheries Industry	Senior Agriculture Inspector	0772514981	ambkyeba@gmail.com
6	Caroline Aguti	Ministry of Energy and Mineral Development	Head of Environment	0772619300	Caguti1977@gmail.com
7	Denis Mugaga	Ministry of Finance, Planning and Economic Development	Economist	0702440655	mugaggad@gmail.com
8	Joseph Ongol	Ministry of Water and Environment	Assistant Commissioner	0777777934	oriobuto@yahoo.com
9	Moreen Uwimbabazi	National Forestry Resources Research Institute (NaFFORI)	Forest Ecologist	0782250112	muwimbabazi@gmail.com
10	Gerald Eilu	Makerere University	Professor/Lecturer	0772642640	gerald.eilu@gmail.com
11	James Omoding	IUCN	Senior Program Officer	0772437169	James.Omoding@iucn.org
12	Henry Tumwesigye	Church of Uganda	Director Community Transformation	0775704894	bekamut@gmail.com
13	Denis Kavuma	Uganda Timber Growers Association	General Manager	0773135240	denniskavuma@utga.ug
14	Joseph Katswera	Kasese District Local Government	Natural Resources Officer	0772997158	katswera@gmail.com
15	Alex Kyabawampi	New Forest Company	Manager	0772654643	Alex.kybawampi@newforests.net
16	Derrick Mugisha	Uganda Youth Biodiversity Network	Executive Director	0776009464	mugishaderrickmanuel@gmail.com
17	Mungech Chebet	Indigenous Communities of Uganda	Member of the national task force	0779233078	mungech@gmail.com
18	Martin Asiimwe	WWF UCO	Coordinator FBC	0702193999	masiimwe@wwfuganda.org
19	Francis Alinyo	WWF UCO	PM BIODEV2030	0783000111	falinyo@wwfuganda.org
20	Edwin Muhumuza	Youth Go Green	Team Leader	0392963353	edwin@youthgreen.org

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5.7 Appendix G: Template for development of actionable BVCs

Problem to be addressed: E.g. Land degradation in Mt. Elgon

Drivers: (i) Subsistence farming on the steep slopes of Mt. Elgon causes soil erosion and loss of productivity.

(ii) Grazing in the protected area causes loss of vegetation cover

Objective to be achieved by BVCs: Restoration of vegetation cover and land productivity

Stakeholder: The Benet

Brief description of Stakeholder:

Biodiversity Conservation Commitments (BCCs)/or Biodiversity Voluntary Commitments (BVCs)				
	BCC/ BVC 1 (Example)	BCC/ BVC 2	BCC/ BVC3	BCC/ BVC 4
Brief Description of Commitment to assure BCC /BVC is actionable	Interventions promote integrated land management for the conservation of the Mount Elgon ecosystem			
Quantification	40 ha of land where Policies, programs and activities promote integrated land management			
Actions to be undertaken to achieve the quantified BCC/BVC	(i) Soil and water conservation terraces by each member (ii) Reduced cattle herds by each member (iii) Grass planting in the compounds (iv) Boundary planting with trees			
Monitoring Measuring and Reporting	Annually: number of ha restored			
Implementation Timeline (in a year) or per year	During the rainy for field activities (March- May and Sept-Nov) but throughout the year on supervision			
Responsibility (Focal person)	Mr. XXXX			
Financial resources Committed (UGX)	UGX 10M per year for five years			
Source of funding (optional)	Internal savings from crop sales by members and some from a partner			
Partners	WWF			