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## Forest-Based Enterprises

Opportunities for current and future expansion in Bugoma Landscape amidst developments for the benefit of Indigenous Peoples and Local Communities.

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## Executive Summary

Forest-based enterprises are characterized by the generation of products and services that satisfy society's needs using forest resources. They are particularly important in the rural economy, not only in the Bugoma landscape but the entire of Uganda. They help vulnerable rural communities obtain a source of income and improve their quality of life and well-being (Abigaba, 2016). However, little attention has been paid to the characteristics of these enterprises and their role in supporting local economies. Forest-based enterprises are at risk of getting depleted by developments in the oil and gas sector in the Albertine graben that are reclaiming land previously occupied by forests, agro-commodities (sugarcane, tobacco, tea) that require large expanses of land, inappropriate behavior in terms of exploitation of forest resources beyond acceptable thresholds, and the general population increase including refugees (Kyangwali Refugee Settlement) and migrants seeking better employment opportunities.

A study to understand the current status of forest-based enterprises in the Bugoma landscape, in comparison with developments and the benefits they offer to the Indigenous Peoples and Local Communities (IPLCs), was commissioned by Ecological Trends Alliance. The objectives of this study were to 1) identify the best and most feasible and sustainable Forest-based Enterprises (FBEs) that can support and sustain women, youth, and community livelihoods, 2) explore FBEs that can support IPLCs' quest for livelihood improvement, 3) explore existing nature-based business opportunities in the area (particularly the market for the products, the interests of the IPLCs and the likelihood of success in the existing business opportunities).

The study was carried out in the Bugoma-Budongo landscape in mid-2022. Literature review, Focused Group Discussion, and Key Informant Interviews were the methods used. The findings reveal that overall FBEs in the Bugoma landscape are dominated by males and that their businesses have been in existence for more than 10 years. The products and services include foods and beverages (juices, jam, edible leaves, mushrooms, and jellies), bee-keeping products (honey, wax, and propolis), handcrafts (baskets, drums, fiddles), gums/resins, flavors/fragrances (spice and essential oil), furniture (mainly timber), wood (for firewood and charcoal) and cosmetics (oil used for making soap and toothpaste). The IPLCs are interested in engaging in business enterprises but the success and likelihood of FBEs progressing are low given that the IPLC lacks financial resources, technologies, and necessary skills to exploit the resources adequately. They have experienced price decline, they are unable to make profits, they lack the equipment to improve the quality of products, some FBEs lack market, and lack skills to organize and expand their enterprises. If these are improved, then FBEs can continue to be implemented to increase their incomes and improve livelihoods. Above all, FBEs need to undertake a market analysis for their different products to identify the market size, growth, trends, customer segmentation, competitor analysis as well as the business environment. That way, they will interest IPLCs in the likelihood of success despite the peculiarity of FBEs in the Bugoma. The study concluded that FBEs have the potential to contribute to rural economic development by increasing income and reducing rural poverty.

# Introduction

## Background

Uganda has experienced a rapid decline in forest cover from 24% in 1990 to 9% in 2015, with a slight increment of about 2% in 2018-2019 (MWE, 2019). According to the Global Forest Watch, Uganda from 2001 to 2021, lost 3.9% of tree cover due to deforestation. This deforestation and degradation have been partly attributed to illegal logging, agriculture and settlement, unsustainable harvesting, and illegal trade in forest products (WWF, 2014) which are part of forest-based enterprises (Auren et al, 2004). In part, it is due to development in the oil and gas sector that has re-claimed formerly forested land to establish infrastructure like Hoima Airport, Kabaale Industrial Park, oil wells as well as roads in the Bugoma landscape. The establishment of infrastructure has led to an increase in access to and use of forest products and services. The other developments include sugarcane growing, tea growing, and tobacco growing that claim land formerly forested. Settlements and urbanization in the Bugoma landscape are also growing (Ministry of Lands, Housing & Urban Development, 2015) to the detriment of forests and FBEs.

The growing population due to the migration of the labor force in search of employment in the oil and gas industry has led to increased demand for firewood and charcoal, which are common sources of energy, despite their perpetual trade ban. Yet, IPLCs have a big interest because of the ready market that is an expanding business and attracting fairly good revenue, has a likelihood to succeed, and has a bad impact on forests. Production of charcoal is one of the main causes of deforestation, it remains one of the few income options for households and a source for cooking.

Forests and FBEs are treasured natural assets contributing about 8.7% to the national economy based on conservative estimates (NEMA, 2011). For example, Uganda's COVID-19 recovery packages (based on extracts from *Wabugia ugandensis*) worked closely with natural capital, particularly forest products, to develop a medical therapy for COVID-19. Therefore, the demand and pressure exerted on forest resources call for a concerted effort to invest in the raising of stock to support forest-based enterprise development.

## Objectives of the study

The study was to document the impact of business investments and the governance system on the status of the Bugoma forest landscape and local communities amidst the current and future expansion of the businesses and the specific objectives were;

- Identify the best and most feasible Forest-Based Enterprises (FBEs) that can support

and sustain women, youth, and community livelihoods

- Explore Forest-Based Enterprises (FBEs) that can support IPLC's quest for livelihood improvement
- Explore existing nature-based business opportunities in the area, (the market for the products, the interests of the IPLCs, and the likelihood of success among others).

## Scope of the study

The study documented the impact of business investments and the governance system on the status of the Bugoma forest landscape and local communities amidst the current and future expansion of the businesses. It was based on the Bugoma forest landscape which is composed of the districts of Hoima, Kikube, Buliisa, and Masindi. The four districts are endowed with natural forests (particularly Bugoma Central Forest Reserve, Murchison Falls Conservation Areas, and Budongo Central Forest Reserve) with a wide range of FBEs. The districts are located within the oil-rich Albertine Graben, as well as agro-commodities (tea, sugar cane, and tobacco), and have a combined population estimate of 1,092,900 according to the Uganda Bureau of

Statistics, 2017. The study was carried out in 2022 and looked at the FBE sector emphasizing markets of forest products, the growing demand and interest of IPLCs (women and youth) in FBEs, and the likelihood of success in the trade of FBEs.

This study considered district officials (Natural Resources Officers, Environment Officers, and Forestry Officers) who are knowledgeable about the subject matter. It also considered respondents from forest-based enterprises (timber dealers, and market vendors) who were also sampled. The study was limited in terms of time to cover all four districts therefore most of the data was by literature search, in which case, extra care about the age of the data was taken.

## Methods

The methods deployed for this study included a literature review, to establish familiarity with and understanding of current research on FBE, what has been done, and the unknown in the study area. The review was utilized to describe, summarize, objectively evaluate, and clarify the topic of forest-based enterprises. Key Informant Interviews of officials in various government

agencies, local governments of Kikuube, Hoima, and Masindi, private actors, and practitioners of FBEs were conducted. Focus group discussions were mainly employed at the community level and helped to gather information about local-level activities, challenges, and aspirations of FBEs. They were particularly conducted in Hoima, Kikuube, and Masindi.

# Findings

## Definition of FBEs

For this study, FBEs are enterprises that generate profits for reinvestment, and use wood and/or non-wood forest products and services (Auren et al, 2004), including trees outside the gazetted forest. This definition applies to the Bugoma forest landscape. Mayers (2006) defines them as “business operations aimed at making a profit from forest-linked activity, employing 10–100 full-time employees, or with an annual turnover of US \$ 10,000–US\$30 million. In this definition, he attempts to consider employment turnover, revenues, and ownership. FBEs differ from Income-generating activities whose primary purpose is to generate income for supporting basic livelihood needs.

FBEs are a major vehicle for fighting poverty in Uganda (Ministry of Finance, (2000), IMF (2005), FAO (2006)) and are a major investment in forest conservation and restoration, according to a report in 2021 by World Economic Forum, on investing in forests. The Uganda Timber Growers Association (UTGA) acknowledges that FBEs are an important source of employment as well as a source of raw material for wood-based value chains. The role of forest-based in employment, marketing of wood products, and forest value chains is overemphasized (MWE (2021) when looking at investing in forests and protected areas for climate-smart development. The World-Wide Fund Report in 2020, on forest stocks, product technologies, and market value chains in the Greater Virunga and Semliki-Albertine Landscapes emphasizes the role of forest value chains in industrializing the forest sector in Uganda.

Uganda Natural Capital Accounting (2020) considers the formal sector (sawn timber, poles, charcoal, tourism, and non-timber forest products) and estimates the forest sector to contribute 4 percent of

Uganda’s Gross Domestic Product (UBOS 2018), while the National Environment Management Authority suggests that this contribution may be as high as 8 percent (NEMA 2011).

There is a vast range of forest-based products from which the IPLCs derive income including fuelwood, rattan, bamboo, fibers, medicines, gums, and wild/forest foods among others. They provide the raw materials for many small-scale rural processing and manufacturing enterprises such as wood for furniture, vines for basket, mat, and handicraft production, wood for charcoal production, seeds for oil processing, and bark for tannin processing. In addition, fuelwood provides the main energy source for many other small-scale processing enterprises such as fish smoking, beer brewing, and brickmaking (Abigaba et al, 2016).

FBEs are wider in scope, there are different FBE businesses and ownership structures, both formal (registered and recognized by the government) and informal (unregistered) businesses, producing a wide range of forest-based goods and services. In the Bugoma landscape, FBEs can be seen as enterprises that can facilitate local people to meet basic needs and accrue wealth locally as individuals, communities, and associations without jeopardizing local creativity and environmental accountability.

## II. Threats to FBEs in Bugoma landscape

FBEs face problems, and those specific to the Bugoma landscape are discussed here.

### a) Lack of respect for policies

There is competing land use between forestry and agriculture, exemplified by the growing of sugar cane (Vulli, 2021) in the Hoima and Kikuube districts. That is why the National Environment Authority recently annulled the certificate for using forest land. The National Environment Authority in September 2022, issued a notice to cancel the use of forests in the Bugoma landscape.

“Immediately stop any further deforestation of the natural reserved forest area, eco-tourism area, cultural sites, and land reserved for the urban center. No sugar cane should be planted in the naturally reserved forest area, ecotourism area, cultural sites area, and land reserved for the urban center. The sugar cane MUST be restricted to areas permitted in the certificate.” National Environment Authority, in September 2022, ordered Hoima Sugar to restore degraded parts of Bugoma Forest. F BEs are enterprises that generate profits for reinvestment and use wood and/or non-wood forest products and services (Auren et al, 2004)

In addition, land set aside for oil and gas developments such as the Hoima International Airport, Kabaale Oil Refinery, and Kabaale Industrial Park, the road infrastructure as well as land set aside for oil wells was acquired fraudulently (Muriisa, 2018). The land grabbing in

Bugoma Forest Reserve, and the forceful acquisition of land for oil developments are done by people who have power linked to the government, who can bend the laws and jeopardize the IPLCs' interest in dealing in FBEs. Numerous efforts by civil society, rights-based organizations, and the media have not yielded results.

Uganda has a policy that guides refugee settlement in Uganda (MWE, 2019) in general and Kyangwaali Refugee settlement in particular, and has progressive policies to support the integration of refugees and asylum seekers. However, this is flawed because the environment, forests, and F BEs, in general, are encroached on in Bugoma forest reserve as extended rampant use by refugees from Kyangwaali refugee settlement who cut down trees for firewood, and construction materials.

The policy guiding the widespread cultivation of tea and tobacco across the landscape presents overwhelming environmental abuse, characterized by agricultural encroachment, charcoal burning, and production by migrants (Owiunji, 2013), hence jeopardizing IPLCs' quest for livelihoods as well as investments in FBEs. Raw material shortages are additionally compounded by wasteful processing and restrictive regulations.

### b) Lack of financial resources

FBEs lack financing options in the form of loans from banks and Savings and Credit Cooperative Organizations. Financial loans would help improve investment to purchase equipment to improve the quality and quantity of FBE products. The interest for borrowing money is high, requiring financial security. Most FBE practitioners are not in a position to provide the necessary security for meaningful loans. They are left with digital forms

like mobile money platforms offered by MTN and Airtel which are expensive to repay. They often borrow money from money lenders, who in turn, have exploited the space with high interest rates over a short grace period. There are untapped resources like the Uganda Development Bank that offer green financing, but not accessible due to a lack of information by people in the landscape.

### c) Lack of equipment and tools

FBEs in the Bugoma landscape, lack tools and equipment (machinery) for producing quality merchant-able forest products (WWF, 2020), to meet market demands, increase the export value of forest products, attract better pay, and attract sales. They produce products of low value, do not

have the specifications for design, are undersized, underage, and characterized by splits and warping due to open storage and poor stacking. Consequently, they fetch low returns, yet they are produced in an unsustainable manner.

### d) Lack of organized markets

Within the Bugoma forest landscape, FBEs have small, insecure markets that are not organized. FBE practitioners sell products individually, due to the small nature of their business and often dealing in artisanal products. They are not organized in groups and therefore cannot attract big markets.

They fear registration and are therefore not recognized by local and central governments usually serve as marketing agents for the products. Operating illegally puts them in a compromising situation since they are fined by the government whenever caught.

### e) Lack of organized groups

There are no organized and vibrant groups, networks, and associations of FBEs, and that serves to worsen all the other problems like lack of capacity to analyze situations and chat ways to minimize adverse impacts of problems. For example, the registration question and lack of recognition from players are largely due to the

absence of managerial capacity within the FBEs. Therefore, the lack of organization of FBEs in a manner that enables them to make effective use of available support services affects their operations such as the lack of an umbrella organization to run a saving and Credit Cooperative for the FBE.



#### f) Climate impacts

One of the threats to FBEs in the landscape is the impact of climate change vulnerabilities to ecotourism, loss of biodiversity (flora and fauna) that is a major attraction to ecotourism FBE, how it affects the growth and survival of non-timber forest products like bees for honey, mushrooms and

other forest foods that are on the market, how impacts the revenues of forest-based enterprises in general. It also impacts forest-based enterprises through the loss and damage of various tourist attractions like extremes of floods and famine.

#### g) Gender concerns

As part of the IPLCs, women and the girl child have not participated in the production of FBEs and they have not benefited from the revenue, as this is a male-dominated enterprise. Gender participation in FBEs is low and gender equality and social inclusion are yet to take root (Banana

et al, 2012), as seen in taking up leadership roles in the FBE village structure. Gender roles and rights are only beginning to take root as they are currently centered around the collection of firewood, forest food for family use, and operations relating to tree nurseries.

### III. FBEs that can support and sustain women, youth, and community livelihoods

The categorization of FBEs into small-scale rural producers, large-scale producers, primary wood processors, secondary wood processors, and forest-based tourism was done much earlier by

Auren et al, 2004. However, what has been done is to have a critical look at how they support women, youth, and the IPLCs in sustaining their quality of life.

#### a) Small-scale rural producers

This category includes small-scale tree farmers, non-timber forest products producers and processors (including products such as shea butter, herbal medicines, honey, gums, resins, oils, spices, and foods/fruits), commercial nursery operators,

brick makers, and fish smokers and pastoralists, as seen in Table 1. In this table, the participation, and how they draw income and community livelihood, are provided, only for FBEs that we were able to interview.

Table 1: Participation of women, youth, and general IPLCs

Category		Participation in F BE	Income/livelihoods
Small-scale rural producers			
small-scale tree farmers	Women	Those with land and financial resources establish woodlots as F BEs. Other women participate as workers.	Prunings are sold as firewood, Mushrooms are picked and packed for sale, and intercrop with trees are sold.
	Youth	They are willing to establish woodlots but lack land and financial resources to procure inputs. They end up working in enterprises that are established by either women or male IPLCs.	They are willing to participate in income generation associated with woodlots.
	General to IPLCs	Those with land and financial resources establish woodlots as FBEs.	Prunings are sold as firewood, Mushrooms are picked and packed for sale, large stamps are used for charcoal making, and intercrop with trees are sold.
non-timber forest products producers and processors (including products such as shea butter, herbal medicines, honey, gums, resins, oils, spices, and foods/fruits)	Women	Participate at a very small scale (like bee-keeping) due to a lack of funds and technologies. They collect mushrooms for subsistence and sale.	They end up selling most of the collection of different products to earn income, used to pay school fees and scholastic materials for the children.
	Youth	Rarely participate in non-timber forest-based enterprises	But, they collect and sell products to earn income.
	General to IPLCs	Participate in high revenue earning non-forest based enterprises like bee-keeping, herbal medicines, and spices.	They sell unprocessed or poorly processed products like spices and honey to earn income. They use herbal medicine for personal use.
commercial nursery operators	Women	They work in nurseries such as Albertine Tree Nursery, WND Forestry Services Nursery, and Core Woods Limited	Often women go to work in nurseries to earn daily income. The activities include potting, sowing, and nursery hygiene maintenance. They mainly serve medium to large-scale planters that pay a lot of money
	Youth	They operate street nurseries in Hoima, Masindi, and part of the Kikuube district because these are strategic and earn money quickly.	The youth work in nurseries to earn daily income. The activities include potting, sowing, nursery hygiene, and daily watering. They also do landscaping of compounds for extra income.

Brickmakers	Women	Women are less interested in brickmaking because it is masculine. However, when hard-pressed by needs, they participate.	Women often collect firewood sold to brickmakers. They often sell logs, and earn income, from Eucalyptus woodlots that are part of their F BE.
	Youth	The interest is high but limited in equipment and tools, technologies, and funds. They however participate with constraints.	They get involved in buying and selling wood used in brickmaking, in addition to selling the bricks.
	General to IPLCs	They own and are proprietors of the brick marking enterprises.	They employ youth in the production of bricks. They procure logs cut by the youth and some women.
Pastoralists	Women	A few women attend to animals during grazing	May not receive income since they are always part of the family.
	Youth	Youth participate in grazing cows.	May not receive income since they are always part of the family.
	General to IPLCs	They own the animals, usually run as household income	They engage women and the youth in grazing the animals, oftentimes, as family labor.

**b) Large-scale producers**

This category includes tea (such as Bugamba Tea Estate in Kikuube district), sugarcane (such as Victoria Sugar, Hoima Sugar, Cresten Sugar, and Atiak Sugar), and tobacco (such as Africa One International and remedial tobacco gardens belonging to former British American Tobacco). These present an opportunity for IPLCs and local communities (men and women) to work on the farms and gardens but they require a skill to do it better. Whereas sugarcane, tea, and tobacco aim at deforestation for their enterprise to flourish, they offer an opportunity to local communities and the IPLCs to generate income through the sale of products, and livelihoods and earn a living. The alternative is to encourage the companies to establish out growers schemes to benefit better. In

addition, companies should encourage IPLCs to grow trees and practice agroforestry to salvage the bad image created through deforestation.

There are private timber producers on forest reserve land (MZ timber traders, Hoima Timber Dealers Association, and Kiryatete Timber Dealer Association), private natural forest owners (Keith Bitamazire and Robert Rukahemura), and those sequestering carbon (ECO-Trust and Wildlife Conservation Society that present an opportunity for other F BEs to thrive. Women, youth, and general IPLCs can tap into herbal medicines, honey, mushrooms, gums, spices, and foods/fruits of private timber producers.

a) **Primary wood processors.**

This category includes producers of charcoal, firewood, sawmillers, tea processing, pitsawyers, and timber traders. They are organized under associations such as the Hoima Charcoal Producers and Traders Association, the Bugoma Pitsawyers Association, the Hoima Sawmillers Association, and the Hoima Timber Dealers Association. There is a wide range of opportunities for F BEs in the category mainly in natural forests. Women are mainly involved in charcoal production and trade, and firewood collection in the natural forests of Bugoma, Bujawe, Kyahaiguru, Budongo, and others. The youth get involved in pitsawying, tea processing, and timber

production because these require energy. The male category of IPLCs work as proprietors of the businesses and employ women and the youth as workers on various value chains. They market the products in rural growth centers, trading centers, established towns, municipalities, and cities like Kikuube, Hoima, Masindi, and Buliisa where there is demand, but middlemen sell the products elsewhere including Kampala. Profits generated by the F BEs are reinvested, school fees for children, and some meet the cost of livelihoods. Table 2 shows the participation of women, youth, and general IPLCs in this category of F BEs.

Table 2: Participation of women, youth, and general IPLCs

Category		Participation in F BEs	Income and livelihoods
Charcoal	Women	Women participate in the production and selling of charcoal. They are the owners of the enterprise most of the time.	Women generate income by cutting logs, carrying logs, making the kiln, and monitoring/supervising the kiln
	Youth	Participate production and selling of charcoal as owners of the enterprise. Also, work as laborers at times.	In most cases, he is the sole beneficiary, or else he/she pays for the people he/she sub-contracts.
	General to IPLCs	He is a sole proprietor and women and the youth work for pay.	Women and the youth cut logs, carry logs, make the kiln, and monitor/supervise the kiln and are paid.
Firewood	Women	Women collect, sometimes buy, and sell firewood in trading centers. They also collect firewood for home use.	Revenue from sales is used to pay fees, buy food and household items,
	Youth	The youth collect and sell firewood. Capital is a limiting factor in buying stock.	Revenue from sales is used to pay fees, buy food and household items,
	General to IPLCs	These operate the kiln and often hire women and the youth for oversite.	Revenue from sales is used to pay fees, buy food and household items,
Timber	Women	Limited participation due to capital, equipment, and technologies	Limited participation because of the masculinity of the tasks
	Youth	Limited participation due to capital	Fully participate in income-generating activities
	General to IPLCs	Full participation but limited due to equipment and technologies to produce better products	Engages women and youth in incoming generation activities related to FBE

a) **Secondary wood processors** - This category includes carpenters and artisans who produce furniture, make drums, woodcarvings, and crafts made out of wood. In this category, women and the youth are less willing to participate because of the level of investment to purchase the equipment and tools required. Male IPLCs dominate these F BEs but are still challenged with the cost of the equipment and tools as well as the necessary skills to produce quality products. Because of that, their products are of lower quality and not able to fetch the desired income.

b) **Forest-Based Tourism** - This category includes community-managed campgrounds, guides and porters' associations, trails, picnic sites, guided walks, and specialist viewing (birds, chimpanzees, baboons, etc). These offer a unique opportunity for community tourism, and agro-tourism, because of their diversity of ecosystems, wildlife, agro-forestry practices, and diversity of birds. It is an opportunity where all the IPLC categories can be involved in building and harnessing the diverse. The major attractions include the falls of River Wambabya, River Waki, and River Hoimo, the Kibiro salt pan and hot springs in Kigoroby, and of course artifacts of the Kingdom of Bunyoro. Kikondo Lodge overseeing Lake Edward is rich with bird watching, safari, and sport hunting. Kigagyu Forest which is 20 hectares habituates chimpanzees despite having problems with the community. This is an opportunity where all IPLC categories can be involved if they are availed the necessary training (hospitality), and investment (trails establishment, accommodation, etc).

### A classic opportunity for forest-based eco-tourism in the Bugoma landscape.

Community tourism is one of the forest-based enterprises in the Bugoma forest landscape. It is mainly practiced in forest patches of natural forest areas and established tourist circuits like Kabwoya Community Wildlife Reserve, and Bugoma Ecological Lodge (with chimps crossing) which generate revenue that is shared with IPLCs. Cross Cultural Foundation of Uganda is now engaged in sensitization of private forest owners (Keith Bitamazire, Robert Rukahemura) to allow chimpanzees space in their forests so they can be salvaged from extinction, hence continue attracting tourists. However, agro-commodities like sugarcane, tobacco, and tea are affecting community tourism by way of changing land use. Being optimistic, community tourism stands a chance to take off with oil and gas developments that will attract tourists for chimp tracking among other things. Local CSOs/NGOs can support and train IPLCs in community tourism. Local communities will provide accommodation, food, cultural entertainment, guided tours, transport, and art and craft businesses run either privately or through CBOs or some form of association. Eco-tourism and handicraft enterprises run by communities have the potential to alleviate poverty and help conserve the natural environment.



#### IV. FBEs that can support IPLC's quest for livelihood improvement

In this section, we ask ourselves which forest-based enterprises can support IPLC's careful search for livelihood improvement. We look into the contributions of each of the forest-based enterprises to livelihood improvement ranging from timber from natural forests, non-timber forest products (beekeeping, fruit growing) forest ecosystem services, commercial tree growing, and tree nurseries. These types of forest-based enterprises have been observed in the Bugoma forest landscape and offer options for livelihood improvement.

- a) **Timber from natural forests** – This is common in the landscape and is used in roofing, shutters, doors, and various categories of furniture. Whereas it is over-exploited, there is timber left in the tropical forests of Bugoma after all illegalities rocked the forests and there is a need for sustainable use if it is to meet future use. It is used as raw material for several FBEs in the Bugoma landscape, for construction purposes (roofing material for all houses in the Bugoma landscape), carpentry (making different products of wood using carpentry skill), and joinery parts (wooden chairs, office, kitchen, doors, or bedroom items, etc). Kiratete Timber Dealers Association is one of the FBEs that deals in such timber from natural forests and has a wide-spread market, including parts of Northern Uganda like Gulu and Lira. It fetches a high revenue compared to timber from forest plantations but is faced with competition from metal works, plastics, and wood from forest plantations. Added to that, is the lack of technologies for drying, and seasoning timber, and therefore moisture content of timber is high leading to poorly processed products. With technological advancement, the acquisition of the required skill, and the observance of the Annual Allowable Cut, this FBE is capable of supporting IPLC's quest for livelihood improvement.
- b) **Non-Timber forest products** – There are many FBEs in this category like bee-keeping, basketry, wood carving fruit tree growing, medicinal herbs, and many more. Women, youth, and the general IPLCs have been involved and can take an opportunity to develop these FBEs. Beekeeping, basketry, fruit tree growing, and herbal medicine have been looked at closely.
  - i. Beekeeping has been a part of the FBEs in the Bugoma landscape for generations; mostly through the use of traditional basket or hollowed-log hives. Recently farmers gained access to and learned to build and manage Kenya Top Bar hives. Beekeeping is practiced by the local community in Bugoma, Masindi, and Murchison Falls National Park, in organized groups (beekeepers, processors, packers, service providers), and around the park to target critical issues for the survival of the forest and the support of the local population. From the hives, farmers can harvest honey, wax, venom, jelly, make wine, and propolis and process/package them for sale. The market for such products is enormous within the landscape, among the tourists, among the oil and gas explorers, and even in the neighboring communities, though the quality of the products is relatively low and not guaranteed, and requires technological advancement. Some of the challenges include mass production of honey, seasonality, skills, and tools for harvesting, knowledge, and skills for packaging for eventual marketing. If improved, IPLCs would meet their desires to improve livelihoods through apiculture.

- ii. Basketry is the craft of basket-making for domestic and traditional use, as well as a tourist attraction. The other products include mats and hats. In the Bugoma landscape, baskets are made from forest products, sisal, and wetland products. This FBE is dominated by women, who extract the fibers, hand-dye, and weave them. They market their products to the local population as well as tour companies such as Bugoma Forest Tours and Travels and Bugoma Forest Lodge. Basket weaving is practiced across the landscape but challenged by sales/purchases, which in turn is controlled by the quality. If IPLCs and other categories are to benefit, they have to improve the quality of the product, maintain the standards, and be innovative in terms of the varieties put to sale.
- iii. Fruit tree growing is a common FBE that is practiced in the Bugoma landscape. Tangerines, mangoes, oranges, and passion fruits are widely cultivated, on a one-acre plot. Some exceed the one-acre plot to cover areas as large as 3 acres. IPLCs stand an opportunity to benefit from this FBE if it is well embraced and investments are done properly. Currently, there is a growing market demand from the oil and gas industry and the fact that Hoima has grown into a city status. In the central market in Hoima, there is a range of fruits sold within the landscape, and the demand meets the supply.
- iv. Herbal medicine – is widely collected and processed by women, youth, and the general IPLCs in the Bugoma landscape. They are, however, not organized in groups, each seeking to work independently. The post-COVID-19 era saw *Wabugia ugandensis* emerge as a therapy in the management of COVID-19 patients. *Prunus Africana* has been developed into a treatment for enlarged inflamed prostate glands. A lot of medicinal extracts are in use by IPLCs in the landscape, especially from Budongo and Bugoma forests. *“We get medicines from plants such as Erythrina abyssinica (to treat syphilis) Spathodea campanulata and Dracina fragrans (for sexual enhancement) from. Others we buy from friends who are capable of moving deeper into the forests because some plants have become rare. We need to know their real medicinal values, what they cure, and what doses we should be taking.”*, Hellen Oleru, Chairperson, Ongo Community Forests.

Whereas medicinal herbs are contested by medical practitioners, they bring relief and satisfaction to the population and serve as alternatives when the medicine is not accessible. For IPLCs to benefit, there must be a mechanism to educate users and guarantee that this herbal medicine works, improve the technology for the extraction of the medicine, and branding of the herbal medicine.

- c) Ecosystems services – This category includes eco-tourism and carbon trade but eco-tourism is chosen in the discussion for reasons that carbon trading is yet to be appreciated as a forest-based enterprise. For eco-tourism, the Kigagyu Forest (20 hectares) habituates chimpanzees despite problems with the community and the owners are on the verge of converting to goat rearing. The eco-tourism industry in Kabwoya Wildlife Reserves offers a variety of tourist activities that include birding and nature walks and generates income for communities to share. Bugoma Forest Lodge with chimps crossing has the potential to generate income from tourists. There is growing agrotourism that involves any agriculturally based activity that brings visitors to a farm or ranch like sugar cane at Hoima Sugar Works or tea at Bugambe Tea Estate in the Kikuube district. Ecotourism raises appreciation for biological resources and leads to better conservation practices. There are tourist attractions in the landscape, though some require skills like canopy walking. IPLCs stand a chance to benefit from ecotourism should they improve the standards of their services, and construct structures for accommodation, hospitality, and develop tour guide skills, and later learn how to market such attractions.
- d) Commercial tree growing/Community tree growers - Trees are already generating cash for the communities in the region as timber dealers directly buy timber from the tree growers. Uganda Timber Growers Association is increasing acceptance of tree growing as a forest-based enterprise and giving rural people skills and means to diversify their livelihoods, secure a sustained supply of timber to the wood industries' and ultimately accumulate wealth. Mr. Onzima, Dr. Byaruhanga, Ms. Margaret Athieno, Umar Yakavalha, Vincent Mugisha, and Byabashaija Jackson are examples identified during the case study, dealing with planted tree species. However, the species planted ought to be indigenous as opposed to exotic species like Eucalyptus and Pine. Indigenous species can also be planted on the farm (for poles, timber, and firewood) since natural forests are getting depleted. The enterprises will also be seen as a restoration program, seeking to re-establish indigenous trees, fight climate change vulnerabilities, and offer a wide range of opportunities for flora and fauna to thrive. Apart from the attainment of livelihood opportunities, IPLCs stand a chance to take pride in restoration activities. Isingoma says,
- e) " planting, growing, and protecting trees is a forest-based enterprise that earns income through eco-tourism when trees grow, protects our livelihoods through the formation of rains to support crops, and earns us pensions in the future when trees grow and we harvest them. " Vaitah Isingoma, Executive Director, Kitara Development Initiative.

- f) Enterprises based on commercial tree nurseries – There are tree nurseries in the region like the Albertine Tree Nursery, WND Forestry Services Nursery, and Core Woods Limited among others which are operated by individuals. There are nursery operations under NGOs/CSOs like EcoTrust, Jane Goodall Institute, Tree Talk Plus, Chimpanzee Sanctuary, Wildlife Conservation Trust, and Critical Mass Growth. These produce seedlings of various types that are used for tree planting, street planting, ornamental trees, and trees found in the agricultural landscape. The NGOs/CBOs also offer training to women, youth, and IPLCs in nursery operations, which increases their understanding of tree nursery management. In addition, there are tree nurseries owned and managed by Operation Wealth Creation, an arm of the National Agricultural Advisory Services. Nurseries are emerging in the sub-counties under the Development Response to Displacement Impact Project in the districts of Kikube and Hoima. There are also tree nurseries to support refugees in the settlement at Kyangwali. There have been tree restoration programs of oil and gas developments for resettlement action plans to cater to forests and trees. Together, they support tree-planting initiatives that propel the F BEs in the region. One challenge they face is the lack of water which is mitigated by locating such nurseries on the peripheries of wetlands. This is an enterprise that can be managed by IPLCs once given the necessary training, working capital, market of the seedlings, and resources to procure nursery equipment.





## Nature-based business opportunities in the area (the market for the products from priority F BEs, the interests of the IPLCs, and the likelihood of success).

### a. Nature-based business opportunity.

Growing trees for carbon trade is a nature-based opportunity and a cooperative community carbon offset scheme that seeks an emissions reduction capacity of over 100,000 tCO<sub>2</sub> per annum. Carbon trading is a market-based system aimed at reducing greenhouse gases that contribute to global warming, particularly carbon dioxide emitted by burning fossil fuels. The likelihood that it will occur in Hoima, Masindi, and Kikuube districts is high because it has been tried by Eco-Trust and Trees for Global Benefits. IPLCs stand an opportunity to sign up and get recruited into the F BE if they follow the guidelines for recruitment and if an opportunity is presented to them. Under this kind of nature-based business, also code-named the Payment for Ecosystem Services Scheme, a farmer who plants one hectare of Mahogany, *Prunus africana* or *Maesopsis eminii*, or any local tree species (including agroforestry species and fruit trees) receives average earn over US\$ 700 a year. This money serves as a small incentive for him to plant the trees. The farmer also gains through many benefits from the trees such as nutrient recycling, control of soil erosion, and shielding crops from the impacts of the changing climate.





Green charcoal is another FBE that seeks to produce energy-efficient briquettes with high-quality caloric values from charcoal and firewood. This is through the use of agricultural wastes such as coffee husks, maize (corn) cob, and rice husks that are crushed and molded into briquettes. This has been tried at Nyabyeya Forestry College producing non-carbonized briquettes to meet domestic use, and light industries in the Bugoma landscape. Producing briquettes would be the desire of IPLCs but would require training, funds, and technology to produce the quality desired. If trained and provided the necessary requisites, they would be able to fight the charcoal problem, which is a challenge in the region. Charcoal briquettes are still locked up by the private sector, to unlock the market potential, improve the technology, and carry out the necessary research on efficiency in terms of calorific value. Nsiita, the district environment officer notes, *"If we have and can use briquettes for our cooking, we spend fewer hours, spend less money on buying charcoal, and there is less smoke in the kitchen."*, Gertrude Nsiita, District Environment Officer, Kikuube District.

In 2015, there was training conducted by the Mushroom Training Resource Center in the Hoima district, where various organized groups from the communities were trained in the disciplines of mushroom production and marketing. Eco-Agric Uganda also offers similar training and is meant to equip farmers to start mushroom cultivation enterprises. Mushrooms are a source of income among critically vulnerable women and youth in the landscape. If such training is upscaled, and women and youth among other IPLCs are provided with the necessary capital, mushroom growing can change the lives of the people of the landscape.

#### b. Market analysis for the different products.

Market analysis is the activity of gathering information about conditions that affect a marketplace (TUNADO, 2015). It considers the market size, growth, trends, customer segmentation, competitor analysis, business environment, as well as strategies for going forward. A detailed market analysis for honey and bee products is attempted. An alternative look at FBEs like green charcoal briquettes and community tree planting is provided as alternatives to this study.

## i. Honey and other bee products

There is a lot of untapped potential in this F BE which is characterized by low productivity, use of local hives, poor practices, and poor post-harvesting practices among others. The sector is growing, with NGOs like TUNADO creating awareness and encouraging farmers to join the enterprise. Operation Wealth Creation and the Parish Development Model have earmarked the trade for future investment.

This F BE is characterized by commercial farmers (using KTB hives) who earn a higher gross margin compared to the subsistence farmer (using local hives) despite incurring more costs of production, especially input costs. Commercial farmers (using KTB hives) often are compensated by better honey prices as a result of proper harvesting and handling practices.

Among the products is beeswax. The price per kg is between UGX25,000. Propolis goes for UGX15,000. There is no known wine processing in the landscape except in other places like Kampala. This leaves honey as the most tradable product in the Bugoma landscape.

In terms of supply, most of the honey ends up in the market, restaurants, and shops in Hoima, Kikuube, and Masindi but also within communities for local consumption. The quality of honey is generally low yet most users are sensitive to the products they consume. Farmers, therefore, get low prices for honey which is a disincentive to production. The money from the honey sales complements the farmer's income from crops.

In terms of honey demand, some local buyers/ traders include market vendors, restaurants, shops, and visitors within Kikuube, Buliisa, Masindi, and Hoima. The local vendors bring the honey in bottles and jerrycans (of various sizes and shapes) and their price varies. The 400 grams is UGX7,000, 1.2 kilograms go for UGX25,000, two kilograms go for UGX50,000 and a four-liter jerrycan goes for UGX100,000. from UGX10,000 to 15,000 per kg. Haggling over prices is common. Some of the honey finds its way to supermarkets in Kampala, though respondents claimed regional buyers across borders like the Democratic Republic of Congo and Kenya. If the farmers invest a little more, they would earn better, as Stuart Tusabege, notes.

*Farmers harvest a few kilograms of honey because they have few bee hives. If they can be able to harvest more honey and other bee products like beeswax, royal jelly, venom, propolis and even make wine, then, this will make a suitable forest-based enterprise, to enhance their income,"* Stuart Tusabege, District Forest Officer, Hoima District.

What farmers, processors, and packers lack are marketing associations, to facilitate bulking, collective marketing, market linkage, and market information and intelligence. This helps to enhance their capacity. Most of them sell their honey individually with challenges like low prices, low production due to poor technologies, lack of knowledge of modern practices, and the quality of honey produced is not good (usually mixed with molasses and sugar).

The pricing for combed quality honey ranges from UGX 8,000 to 12,000 per kg. Processing and packaging raise the price to UGX25,000 per kg. The price of UGX8,000 to 12,000 of combed honey is considered to be fair since it saves the cost of processing. Processed honey can thereafter be taken to supermarkets, shops, and restaurants in the rural growth centers, towns, and Hoima City. Branding helps to attract honey consumers, especially tourists and, consumers of organic products. However, there is limited market information generally in the landscape.

Government policy to enforce quality assurance and control has not been honored by many processors and only a few follow the standards

## ii. Green charcoal briquettes

There is a growing market for briquettes considering that charcoal is becoming scarce and expensive. Currently, a bag of charcoal costs UGX 40,000 – 50,000 each. The current population of Buliisa, Kikuube, Hoima, and Masindi is approximately one million people, currently using charcoal, but those buying and using briquettes are going to increase in number. Whereas the population will continue to grow, trends are bound to grow toward the use of briquettes rather than traditional charcoal. Charcoal use is currently

agricultural waste to dispose of.

## iii. Community tree planting

The future for growing trees is going to be an income-earning forest enterprise, especially when planting and growing indigenous trees. First, it will earn income for trade in carbon credits traded as Internationally Transferred Mitigation Outcomes (ITMOs) using a carbon dioxide equivalent [CO<sub>2</sub>e] metric for a new set of market provisions defined under Article 6 of the Paris Agreement. Small-scale tree planters will be able to form a cooperative arrangement or a SACCO through which they sequester and sell carbon. Carbon

which include the Uganda National Bureau of Standards Act 1983, the Uganda National Bureau of Standards (Certification) regulations 1995, the Food and Drugs Act 1964, Public Health Act 1964, Water Statute 1995 and Agricultural Chemicals (Registration and Control) Statute 1993

Women, youth, and the general IPLCs need to take this opportunity seriously if the capacity of beekeepers to increase production is taken. If there is market intelligence within the landscape to establish if there still exists a high demand for honey and other bee products. This will help in planning on investment and inform decisions.

facing stiff abuse and is seen to be responsible for deforestation and forest degradation. In the future, buyers and users of charcoal are going to decimate, while the use of briquettes, made from agricultural waste, will increase. At this time, users will be innovative to look for renewable energy sources, which will work as a substitute. Therefore, the future lies with the use of briquettes, and women, youth, and IPLCs have to acquire the necessary skills and techniques for making since every family in the Bugoma landscape has

payments will be through this cooperative arrangement. As the trees grow, the farmer may decide to turn the tree establishment into an eco-tourism destination, which is another source of income. This will require another investment. Lastly, the farmer may choose to harvest his trees, to be used for construction and furniture, holding onto the carbon stored in the wood, thus abiding by the sale agreement for carbon.

#### iv. Fruit tree growing

The primary enterprise would be to grow trees and provide fruits from them. Since they are of various shapes and sizes, you sell them at different prices in each category. When the fruits are ready, you may choose to sell some, and leave others for a

different production chain. You may choose to process juice which has a high demand in the region. You may choose to process it into wine which is another product.

#### c. Interests in IPLCs and the likelihood of success

The interests of IPLCs in forest-based enterprises depend on several factors. The selection of an enterprise is important because it influences the success and growth of enterprises (it determines the decision of profits, legal formalities, flexibilities, and the risk associated with the enterprises). These vary in case the ownership is sole proprietor or group/association/partnership. The partnership is suitable in all cases of forest-based enterprises where sole proprietorship is suitable, provided the enterprise is to be carried on a slightly bigger scale. Most IPLCs in the region, however, prefer to work individually and are not used (or rather trained) to work as groups/associations/partnerships. In partnerships, IPLCs would be able to raise capital and share risks to investment which an individual cannot.

The scale of the forest-based enterprise is usually small-scale and therefore suitable for individuals or sole proprietors. If the enterprise grows bigger, becoming modest, then it qualifies for a partnership. IPLCs would take on carbon trading as they would qualify for partnerships through SACCO to fulfill their interest which includes accumulating carbon credits for sale as a group. The scale of the enterprise depends upon the size

of the market area served. If the market area is small and local, such as tree nursery operations or firewood collections, an individual or sole proprietorship is opted for.

Capital is one of the factors for the likelihood of success. It is raised through borrowing, credit, investing, and loans. The requirement of capital is closely related to the type of business and scale of operations. Forest-based enterprises that require heavy investment (like eco-tourism, timber harvesting, and trade) should be organized as a partnership, while those requiring small investments (such as mushroom growing) are often run by individuals. Future capital requirements for modernization and expansion also affect the choice of form of ownership organization.

The likelihood of success of F BEs will depend on several factors like the brand name of the F BE (of the honey, the ecotourism, fruits), business relationship (between sources of products, the marketplaces, and buyers), the technological capacity (the equipment, tools, and technical expertise), and the funds (to procure equipment and improve the quality and quantity of products) to improve the F BE products that can compete favorably on the market to fetch revenue.

#### d. Potential for export of F BE products

The opportunity to export F BEs will depend on the IPLCs' ability to have products that meet standards for export. In the region, we see Kenya requiring products for construction, green building, energy, furniture, arts and crafts, packaging, and printing. Tanzania has taken on the transformation program that is supported by the forest sector through the

supply of forest products. Rwanda is one of the fastest-growing economies in Africa and forestry businesses have an opportunity to be part of the development through the supply of the needed forest products for construction, energy, furniture, and other industries.

#### e. The peculiarity of F BEs in the Bugoma landscape

There are peculiarities with F BE exploitation in the region. For example, the booming petroleum development favors some F BEs to thrive, such as eco-tourism and hotel services, but it leads to a reduction of F BEs like those depending on harvesting wood and timber products because of the impact it has on deforestation and forest degradation. As we know forests and trees have to be cut down to pave the way for oil and gas infrastructure.

Some F BEs such as sugar cane growing are developed on land with disputed tenure and resource rights yet they have long-term forest production periods and they depend on the tenure security. Bugoma Central Forest Reserve is compromised by Hoima Sugar Company leading to deforestation and clearance of land for sugarcane growing. They can do this with patronage by politicians and those with military muscle neglecting the rights of the IPLCs over land and forest resources.

Bugoma Forest EcoLodge is an ecotourism FBE that depends on the existence of chimpanzees,

among others, that reside in the Bugoma forest. Decimating the forests to allow the cultivation of sugarcane, destroys the habitat that allows chimpanzees, baboons, elephants, and others to co-exist which is key in promoting tourism in the area.

A forest resource inventory was done 10 years ago in Budongo Forest and 5 years ago in Bugoma Central Forest Reserve while it was not done at all in most of the reserves in the landscape. This means the timber-related F BEs are harvested without establishing the Annual Allowable Cut, based on which timber is removed from the forest; jeopardizing the health of forests in the region.

Whereas carbon trading is factual and some IPLCs have been able to receive carbon money from other sources, it still eludes many actors in the sector. Even those that have received it, question whether it is enough to propel the understating of carbon sequestration and whether it will address the dangers of deforestation and forest degradation.



## Conclusion

### i. The Forest-based Enterprises that can support and sustain women, youth, and community livelihoods

Small-scale rural producers are many, predominantly rural. For the F BE on small-scale tree farmers, it is feasible that women who own land and financial resources participate in woodlots but the youth lack the resources to do so. For non-timber forest products, women participate at a very small scale (like bee-keeping) due to a lack of finances and the youth rarely participate. For Commercial nursery operators, women have demonstrated owning and participating in tree nursery enterprises, and the youth operate/run street nurseries because of the ease with which they are established. The brickmakers, the youth's interest is high but limited in equipment, technologies, and finances.

For the large-scale producers (tea, tobacco, sugarcane), whereas they are detrimental in terms of deforestation and forest degradation, IPLCs of

all types can be engaged in agroforestry and tree growing in ecologically fragile ecosystems so that they reap income from carbon credits. The most desired F BE by all IPLCs is the primary wood processors, who are willing to participate in charcoal, timber, and firewood because of the demand and market for these products. Because of the technological skills required by carpenters and artisans who produce furniture, make drums, woodcarvings, and crafts made out of wood, secondary wood processors, are fancied by male IPLCs because of the investment involved.

Forest-based tourism presents the only opportunity where all the IPLC categories can be involved in building and harnessing the diverse Bugoma landscape, exploring opportunities for ecotourism: the diversity of ecosystems, wildlife, agro-forestry practices, and reputable diversity of birds.

### ii. Support IPLC's quest for livelihood improvement

In terms of timber from natural forests, whereas they provide inputs for construction (roofing material for all houses) carpentry, and joinery parts (wooden chairs, doors, or bedroom items), timber from natural forests is now scarce and requires wise use. There are several F BEs on non-timber forest products like bee-keeping, mushrooms, and medicinal herbs among others, what makes meaningful benefits is bee-keeping because of the scale, sales, profitability, and the less impact the FBEs have on the environment. In terms of ecosystem services, eco-tourism has been considered conducive to the environment for it habituates chimpanzees as a tourist attraction, birding and nature walks, leads to an appreciation

of biological resources, and generates income for communities to share. Commercial tree growing generates cash for the communities as they sell carbon accumulated by tree growers as well as the sale of poles, timber, and firewood as the trees grow. It is also considered a restoration program, seeking to re-establish indigenous trees, fight climate change vulnerabilities, and offer a wide range of opportunities for flora and fauna to thrive. Coupled with that, are commercial tree nurseries, that produce seedlings of various types that are used for tree planting, street planting, ornamental trees, and trees found in the agricultural landscape, from which they earn income.

iii. Nature-based business opportunities in the area (the market for the products, the interests of the IPLCs, and the likelihood of success among others)

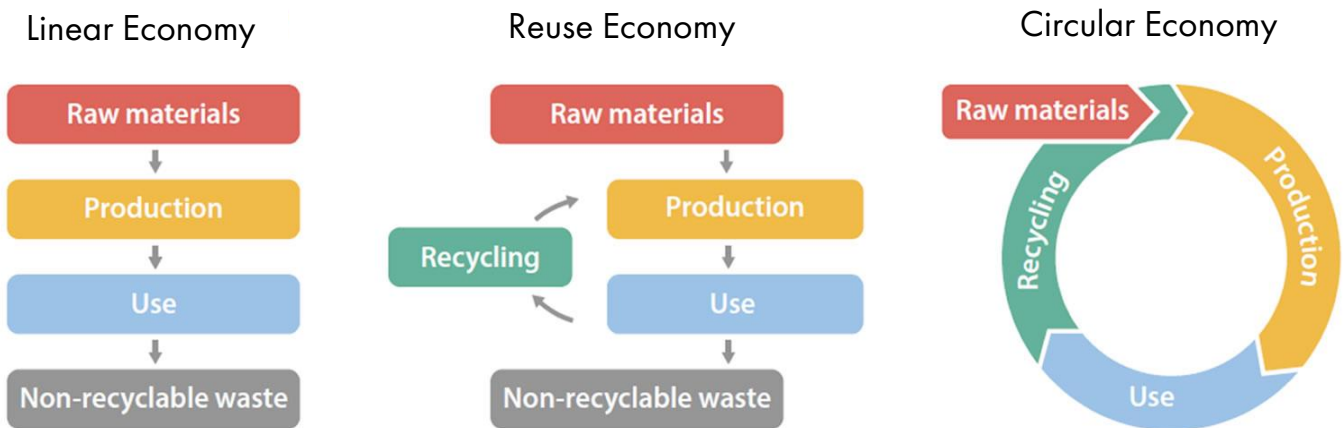
Growing trees for carbon trade is a nature-based opportunity and a cooperative community carbon offset scheme, that seeks an emissions reduction capacity of over 100,000 tCO<sub>2</sub> per annum fights climate change vulnerabilities, and offers a wide range of opportunities for flora and fauna to thrive.

Green charcoal is another F BE that seeks to produce energy-efficient briquettes with high-quality caloric values from charcoal and firewood. This is through the use of agricultural wastes such as coffee husks, maize (corn) cob, and rice husks, that are crushed and molded into briquettes.

There is an opportunity to conduct training at a Mushroom Training Resource Center in the Hoima

district, where various organized groups from the communities can be trained in disciplines of mushroom production and marketing.

Whereas F BEs in the Bugoma landscape take a linear as well as reuse economy approach, they should apply a circular economy approach (Figure 1), developed by UNECE/FAO. Where raw material input is becoming scarce because of deforestation, degradation, and environmental abuse, it is argued that materials should be produced, used, and recycled without generating waste for disposal. That way, FBEs will continue to exist, and innovation of reuse and recycling will advance in a green economy dispensation.



Source: UNECE/FAO, adapted from <https://www.government.nl/topics/circular-economy>.

# Recommendations

## a. Policy recommendations

1. There is a need for enabling policy guidelines to guide the development and implementation of F BE (including F BEs from NTF P) in the country.
2. Concerning the ESIA/EIA for the Bugoma Central Forest Reserve giveaway, F BEs studies should be a requirement for the issuance of the Environment and Social Impact Assessment/Environmental Impact

Assessment (ESIA/EIA) certificate and should aim to deter forest exploitation in areas of intensive F BE activity.

3. Buy-Uganda Build-Uganda policy should be applied when procuring products, especially those perceived to be F BEs, to promote the consumption of F BE products that are locally made in the landscape, and to address the issue of market.

## b. Social recommendations

1. Forestry Extension Services should be enhanced to provide business development, financial management, marketing, and processing skills to associations and networks of FBEs members.

2. Forest and land tenure rights of IPLCs and people living around forests, community forests, and user groups should be ensured to guarantee ownership of land and the cultivation of tree crops as an enterprise.

## c. Environmental recommendations

1. There is a need to minimize and control deforestation and degradation of the environment as it destroys resources that are input into FBEs.

2. Ensure the understanding of the nexus between FBEs and climate change to ensure their availability at all times.

## d. Economic recommendations

1. The government and the private sector should enhance investment into and unlock the utilization of F BEs to stimulate economic growth.
2. The reuse and recycling of F BEs should be promoted as an innovation for the circularity approach to F BEs.
3. F BEs should endeavor to certify their products, promote branding/labeling to

ascertain the traceability of FBEs, and guarantee the market.

4. Appropriate and advanced technologies appropriate for FBE products should be promoted for the production of goods that meet market requirements.
5. Explore incentives for establishing FBEs, like ecotourism, tree planting, and carbon trade among others.

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