

# Feasibility Assessment and Situation Analysis of Beekeeping in Mutunda Sub County, Kiryandongo District

## A Case of Diima and Nyamahasa Parishes

### SUMMARY REPORT



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## INTRODUCTION

Honeybees play an exceedingly significant role in sustaining forests and forest dependent livelihoods. Their service to humanity is unmatched as bees pollinate various crop plants without which the development of fruits and seeds would not happen particularly among pollinated crops. Moreover, in the process, they produce some of the most vital products that have been used for several purposes throughout the history of mankind.

Although honey is the product that most people associate with beekeeping, much more is generated from this farming. Besides providing other valuable services ranging from maintaining biodiversity to pollinating crops, honeybees provide other valuable products such as beeswax, pollen, propolis, royal jelly and bee venom. Hive products serve as a source of food and nutritional value, raw materials for various industries and medicine for a range of diseases. Beekeeping yields increased government revenue in form of levies and taxes, improved biodiversity conservation and enhanced environmental resilience. Once properly utilized, bees also play a vital role as a buffer in protecting communities from crop raiding by wild animals, particularly elephants.

This assessment evaluates the opportunities and challenges associated with beekeeping and development among communities residing in Diima and Nyamasa parishes in Kiryandongo District. These communities live adjacent to Karuma Wildlife Reserve (KWR) in Murchison Falls Conservation Area (MFCA) and are associated with cases of elephant raids on crop gardens. The presence of varying flora in this conservation area creates a conducive environment for beekeeping, enabling harvesting of honey to be done thrice compared to other places elsewhere in the country where it is done twice a year.

Communities residing near and around KWR have the opportunity to utilize an area in the reserve within a distance of 400 meters from the park boundary (called the resource use zone) for activities such as beekeeping. Currently, Diima parish has 18 beekeeping groups and Nyamahasa has 10, an indicator of the high interest in beekeeping in the area. Some of the groups are registered at both sub county and district levels and have leadership structure in place. Despite this, the groups continue to grapple with various challenges that range from limited skills, inadequate harvesting equipment and limited access to markets for bee products; lack of processing equipment, pests and limited access to modern hives. These gaps continue to hamper the development of beekeeping in the area according to the group leadership visited in Diima and Nyamahasa parishes.

Though other products such as propolis, wax, and bee venom are known to be generated more revenue, in this area, beekeepers mainly focus on honey because lack of knowledge about other bee products or their value. An example is the high value of bee venom that fetches between Shs. 50,000 -80,000 (\$14-22) per gram on the local market. A gram can be obtained from 10 hives every two weeks and the proceeds generated over a month are sufficient to boost household income immensely thus the need to diversify to maximize profit.

### *Purpose and objectives*

This feasibility and needs assessment was aimed at developing a better understanding of the requisite conditions, challenges, opportunities and risks that could affect positively or negatively the beekeeping enterprise in Nyamahasa and Diima parishes in Kiyandongo districts. The major objectives were:

1. To inform WCS on the strategic direction and actions to take with respect to supporting park adjacent communities.

2. To generate baseline information to enable effective monitoring and measuring changes in the welfare and behaviour toward wildlife conservation among participating and non-participating households.

## METHODOLOGY

The study was conducted in Diima and Nyamahasa parishes in Mutunda Subcounty, Kiryandongon District, majorly focusing on villages that are adjacent to Karuma Wildlife Reserve which is part of Murchison Falls Conservation Area. Several tools and techniques were used to generate triangulated data to facilitate robust analysis and inference. These included literature review, field visits, focus group discussions and analysis of strengths, weaknesses, opportunities and threats associated with beekeeping in the area.

## FINDINGS

### *Status of Beekeeping in Diima and Nyamahasa*

#### **Institutional arrangements**

The above data collected is a clear indicator of the various beekeeping groups in Diima and Nyamahasa parishes. There are a total of 17 and 10 beekeeping groups in Diima and Nyamahasa parishes respectively. Many of these have established leadership structures and group constitutions and some are registered with the lower local government. Each of the parishes has a parish beekeeping executive committee registered at with the District Local Government though there link between the parish committees and village based groups is not clearly defined

#### **Beehive status**

This assessment found out that communities in this area had received over 1000 hives in donation mostly from UWA. However, majority of bee hives were not colonized, an indicator of either poor management or a lack of skills by beekeeping groups. As a result, many of the hives lay abandoned in the wildlife reserve while some were burned by wildfire. During the field visit, it was noted that some bee hives had been unattended and some apiaries poorly managed which caused bees to abandon the hives. The most affected hives are local and very few modern ones.



*Abandoned hives in Karuma Wildlife Reserve*

## Type of bee hives

The majority of the beekeepers had local bee hives that have no standard measurements. Some were too big and others are too small which affects length of time required for bees to fill the hives, hence affecting the harvest. Local hives are also easily affected by pests due to their rough structures and the entrances are quite wide. Despite their challenges, local hives produce more propolis than the modern hives.



*A traditional hive*



*Kenya Top Bar hives*

## Products and Productivity

Based on historic harvest data obtained, modern hives were found to yield more honey compared to local hives. Majority of beekeepers in this areas are unaware of the value of other bee products that fetch hefty sums on the market compared to honey. As such, the farmers mostly concentrated on honey production and sold little or none of the other products.

Due to the conducive environment created by the presence of varying and unique flora in the wildlife reserve, beekeepers in this area are able to harvest honey three (3) times a year compared to other parts of the country where harvesting is done two times a year. According to the beekeepers in the two parishes, a hive produces between 8-15kgs of honey per harvest. Productivity can also be increased by diversify to other bee like wax, propolis and bee venom.

## Profile of beekeepers

**Household size:** The average number of household members in the families of the beekeepers was seven (7) people, which is a substantial number to feed. This requires heads of households to work harder to meet their responsibilities. To potentially support such a family, a farmer would require at least 10 beehives to produce 100kgs of honey per harvest in order to earn 2,100,000 to 2,400,000 Uganda Shillings a year. Once diversification is incorporated, households can potentially sustain themselves on beekeeping all through the year.

### ***Women and youth that are members of the groups***

**Education:** The majority of beekeepers in the two parishes are primary school dropouts and a few are secondary school drop outs. This is responsible for the lack of adequate leadership skills required by beekeeping groups which calls for training in group dynamics and leadership skills.

**Level of poverty:** The level of poverty in Diima and Nyamahasa parishes is demonstrated by the type of houses that beekeepers inhabit. Majority of the beekeepers in the area live in mud housed that are grass-thatched, an

indicator that they cannot afford bricks or iron sheets despite the prices being reduced over the years. To improve their livelihood, beekeepers will have to be sensitized about the importance of taking on beekeeping as a business.



*One of the beekeeping association members during a focus group discussion*

### Gender dimensions

The number of women engaged in beekeeping in these parishes is almost equal to the men according to the statistics obtained from the area. Women play a vital role of cleaning the apiaries, carrying the products after harvest and harvesting. Youth in the area have also formed beekeeping groups that are quite active.



*Beekeepers during a consultative meeting*

## *Challenges to beekeeping in the area*

### **Bee pests**

The majority of bee hives used are local ones with that have no standard measurements as earlier mentioned and as such, they are the most affected by pests compared to their modern counterparts due to their rough exterior and wide entrances. Due to the poverty levels in the two parishes, most beekeepers opt for the local beehives rather than the modern's ones that require more investment. The pests found in the area include:

- **Wax Moth:** These lay eggs in hives and the larvae which look like worms or maggots. Adult moths feed on honey combs and in so doing destroy the wax.
- **Hive beetles:** The large black beetles feed on the brood during the rainy season. Others with distinct markings feed on small amounts of honey and pollen. The smaller hive beetles lay eggs in pollen 40 cells, which is turned into a stinky mess by the maggots in a few days.
- **Black and red ants:** These are a major problem to bees once they infiltrate the bee hives. They create nests and close the entrances of the beehives. They eat or destroy the eggs of bees and the combs which leads to the migration of bees. These ants are responsible for the abandonment of hives by bees in many apiaries that were visited in Diima and Nyamahasa parishes.



*A beehive abandoned by bees due the black and red ants*

### **Absconding**

Bees abandon or desert a beehive due several factors including to lack of water, exhaustion of food stores, overheating, fire, thwarted swarming, deterioration of the nesting site and continuous pest attack. The many uncanonised hives found in Diima and Nyamahasa parishes are partly a result of hive abandonment.

### **Poor harvesting methods**

Farmers used rudimentary harvesting methods, for example, the use of too much smoke or burning of the hives, which lead to the destruction of the bee colonies and contamination of the honey harvested. The majority of

beekeepers harvest honey by cutting combs indiscriminately hence destroying the brood and killing bees in the process. These poor harvesting methods are compounded by irregular visits to the hives yet it is recommended that beekeepers visit hive once per honey flow season. These two challenges are the main causes of the aggressive behaviour and abandonment of hives by African honeybees.

### **Poor quality control**

Limited access to harvesting equipment and information to properly use them, makes honey susceptible to contamination and adulteration. Consequently, the quality of the honey harvested is does not meet the international standards required to enter the formal market chain and therefore ends up in the informal markets.



### **Lack of skills**

Many beekeepers in the area were not equipped with the knowledge or skills to carry out modern beekeeping and therefore opted for the traditional methods. Though some few members were trained by a beekeeping expert from Netherlands (PUM), the district entomologist, also from TUNADO (The Uganda National Apiculture Development Organisation) and the Gulu Natural Honey Company, the duration for the trained was insufficient according to the trained beekeepers.

### **Lack of access to Bee keeping Inputs**

80% of the beekeeping groups in the parishes do not have access to beekeeping inputs like the harvesting gear, beehives and processing equipment. However, some equipment were distributed to some groups supported by PUM from Netherlands and some bee hives distributed by Uganda Wildlife Authority to other group members.

### **Lack of Market for the Bee Products**

The availability and accessibility to markets was a major challenge to beekeepers. Many groups had no organized market or place where to sell their products and when consumers visit the area, they haggle with beekeepers to a price that is not favourable because of lack of options. The ideal would be for groups to obtain a collection centre or bulking centre for their bee products that would provide ready market and favourable prices. The price can be determined by the group and the can easily maintained since storage is considerably better due to the airtight buckets.

## *Beekeepers needs*

Results of the participatory needs assessment involving beekeepers in the two parishes, modern hives, ranked highest followed by braining and harvesting gear. The results of the needs assessment are summarised by parish in in tables 1 and 2 below.

The beekeepers ranked modern hives as the top priority need due to the many local hives in their possession that are not productive in the area. Over 90% of the bee hives owned are local hives (Psalm tree hives) and they have no standard measurements, are easily affected by the pests and are associated with low productivity. The beekeeping groups on the other hand prioritized particular modern hives such as the Kenya Top Bar and Langstroth hives. Their production is higher, inspection easily and movable for colony division and transfer.



*A Kenya Top Bar (KTB) hive*



*A Langstroth hive*



*A local hive in Karuma Wildlife reserve*

Further Beekeepers attribute their failure to cleaning apiaries, inspecting hives and harvesting in time to lack of harvesting gear. As mentioned earlier, these range from bee-suits (veil and overall), a pair of gloves, smokers, hive-tools, bee-brushes, harvesting torches and a pair of gumboots. The harvesting gear eases the work of harvesting, inspecting bee hives and cleaning apiaries because beekeepers are protected from stings.

**Table 1: Priority needs for according to Nyamahasa beekeepers**

No.	Needs	Reason	Total Score	Rank
2	Modern Hives	<ul style="list-style-type: none"> <li>Local hives production is low</li> <li>Local hives it's difficult to know if the honey is ready</li> <li>Harvesting is not easy in local hives as the hand may not reach the honey</li> <li>Modern hives are colonized</li> <li>Easy to do colony division</li> </ul>	28	1
1	Harvesting Gear	<ul style="list-style-type: none"> <li>For harvesting</li> <li>Can be used in inspection of hives</li> <li>Cleaning apiary</li> </ul>	20	2
3	Metallic Stands	<ul style="list-style-type: none"> <li>Easily help in pest control</li> <li>The hives are firmly placed</li> </ul>	9	3
4	Training	<ul style="list-style-type: none"> <li>Many beekeepers are lacking skills in beekeeping</li> </ul>	9	3
5	Venom Extractors	<ul style="list-style-type: none"> <li>Earn more income on a weekly basis</li> </ul>	8	5
7	Office	<ul style="list-style-type: none"> <li>Need for an office as well as collection centre</li> </ul>	3	6
6	Honey Processing machines	<ul style="list-style-type: none"> <li>Want to add value to the honey and other bee products</li> </ul>	1	7

**Table 2: Priority needs according to Diima beekeepers**

No.	Needs	Reason	Total Score	Rank
4	Modern Hives	Increase production	30	1
3	Trainings	Modern beekeeping skills Increase production Quality control	19	2
2	Harvesting Gear	<ul style="list-style-type: none"> <li>For harvesting</li> <li>Can be used in inspection of hives</li> <li>Cleaning apiary</li> </ul>	16	3
8	Venom machines	Earn extra income on weekly basis	4	4
1	Honey processing machines	Add value and earn more	3	5
6	Exchange visits	Again more practical skills	1	6
7	Market	Sale of bee products	1	6
5	Colonized hives	Increase the number of colonized bee hives	0	7

Metallic stands were prioritised by leaders and members of Nyamahasa beekeepers Association and were ranked third (3<sup>rd</sup>) among the needs of beekeepers to control pest attacks. The stands are known to keep the hives from the the ground where all kinds of insects and pests loom. Beehive with mettalic stands are easier to inspect and harvest.



*Picture showing metallic stands used in supporting the langstroth hives*

Capacity building in modern beekeeping was prioritized and ranked second (2<sup>nd</sup>) need by Diima members and third (3<sup>rd</sup>) by Nyamahasa members of the association. The majority of beekeepers still use of indigenous knowledge and beehives; only a few have been equipped with basic skills in modern beekeeping from experts like PUM Netherlands, TUNADO and the District entomologist. **Cam Nono Ber Kiwinyo, Diima beekeeping association and Nyamahasa beekeepers' groups** were trained in baiting and colonization, colony division and apiary siting. UWA also trained beekeepers along the park in site management and pest management. However, there is still need to equip the beekeepers with skills using practical training sessions for all the bee keeping groups along the park to improve the production. Very many apiaries visited are poorly managed because of lack of knowledge and skills which often causes bees to abandon hives thus affects production. The training is expected to improve colonization, apiary sites, pest control and management. The other form of training will focus on diversification to other bee products such as venom, propolis and wax to boost the beekeepers' income at a weekly basis, given that the market is readily available for such products.

The venom machines were ranked 4<sup>th</sup> among the list of priorities by both Diima and Nyamahasa beekeepers Association members because beekeepers are looking to increase their earning from bee products. Though Venom is a highly valued product at 50,000 to 80,000 Uganda Shillings (approximately £10 to £17) per gram, little or nothing is known by the beekeepers about this. 1 gram can be harvested from 10 beehives every two weeks and does not require a waiting 6 months as it is for honey. This is the reason it was ranked 4<sup>th</sup>. Although a handful of members were trained in venom collection, majority remain unknowledgeable about this product, how to harvest and handle it and its benefits.

Both the beekeepers in the Associations of Diima and Nyamahasa parishes mentioned the need to process the bee products particularly honey to add value and to fetch a better price rather than selling honey combs. The honey processing machines include the honey press, honey settling tanks of various sizes, honey extractors, refractometers, strainers and wax melters. This implies that a place will be required where to process the bee products for both associations. The honey processing machines were ranked as 4<sup>th</sup> and 5<sup>th</sup> respectively. In Nyamahasa it was ranked 6<sup>th</sup> while Diima Beekeepers association ranked it 5<sup>th</sup>. This way, beekeepers will be able to process, pack and sell bee products and consequently improve their livelihood.

Members of Nyamahasa Beekeepers Association raised the need for an office space that will be used as a meeting place for all the beekeepers, training sessions, bulking honey and storage. This was placed 5<sup>th</sup> among the list of priorities unlike beekeepers in Diima who did not see for office premises.

## *SWOT Analysis*

### **Strengths**

#### **Indigenous knowledge**

Beekeeping has been practiced in this area for communities have been present in this area and as such there is indigenous knowledge and skills that beekeepers in Nyamahasa and Diima parishes have employed over the years. These can be easily developed through trainings and boosted with further research. One of the leaders in the group (Akim) was cited as saying that he got the knowledge from Mt. Elgon National park where beekeeping was practiced and then he introduced it in Murchison Fall game park where they were allowed by UWA to use indigenous knowledge for beekeeping.

#### **The potential of hive products**

Honey is the most known hive product from honeybees. However, other bee products of economic value such as pollen (a good source of proteins), propolis (medicinal value), royal jelly, bee wax, swarms, and currently the most valued product is bee venom are potential income earners for beekeepers. But the challenge to this potential is the lack of knowledge about these products and their financial value and skills required to harvest and process them. This limited knowledge as seen beekeepers dispose of honey combs and propolis. The opportunity therein though is the nearness of the forest which boosts the quality of honey from this area. The honey in this area is often known to be free from pollutants and contamination due to the different natural bee forages. Since it's from the park its purely organic and can fetch a hefty price both on the local and international market.

#### **Social resources**

The beekeeping sector in Murchison Falls conservation area is supported by different development actors including the international organizations such as War Child, national institutions such as Uganda Wildlife Authority, Kiryandongo Local Government and The Uganda National Apiculture Development Organization

#### **The potential of large swathe of bee forage**

Murchison Falls conservation area has great climate, diverse flowering plants and is therefore ideal for the production of pure organic honey for export to niche market and fair trade markets. The landscape therefore is ripe for the potential of beekeeping development because of its mix of natural vegetation that would provide bee forage all year round which gives beekeepers the opportunity to harvest three times in a year, a rare occurrence in any part of the country.

### **Weaknesses**

#### **Poor quality control**

Most beekeepers do not have proper harvesting gear and consequently they compromise the quality of honey particularly when they use regimentally methods such as the use of fire. They also don't have proper storage containers to store the honey and therefore opt for unsanitary buckets or jericans which affects the quality of honey and indirectly the earns it would have fetched on the international market.

### **Limited knowledge and low inputs by the government**

Generally, Uganda lacks qualified professionals in the apiculture sector and this is a major challenge to beekeeping development. The government invests very little or no inputs into beekeeping compared to her other agricultural programs. There is no proper research and development as regards beekeeping in Uganda. In addition, beekeepers in the area possess limited knowledge in beekeeping and rather mostly indigenous knowledge and therefore lack basic techniques of modern beekeeping such as queen rearing and colony multiplication.

### **Other weaknesses in the beekeeping sector**

The beekeeping industry is fragmented. Worse still, the African honey bees are aggressive behaviour and have a habit of abandoning hives. There are no programs to rear honeybees of less aggressive and abandonment behaviour. There is also limited access to financing for beekeepers.

## **Opportunities**

### **Favourable government policy regarding entrepreneurship and beekeeping development**

The government of Uganda has various projects geared towards promoting beekeeping in Uganda FEFOC (Farm Enhancement Programme), NUSAF and the District Entomologists, Uganda Wildlife Authority that is using beekeeping to reduce on human-wildlife conflict in these communities. This has been successful in other areas such as Queen Elizabeth National Park and Bwindi Impenetrable Forest National Park where Bee House Products (where I was a team leader) where a bee fence was created to stop the elephants from raiding community crops.



*A Bee fence erected in Bwindi*

### **Viable market**

There are plenty of opportunities for hive products. Apart from honey that is consumed at all levels in the Ugandan society, exploring the production of other bee hive products such as propolis, beeswax, royal jelly, pollen and bee venom and live bees is an untapped opportunity for the local, regional and international market. This is boosted by the fact that European Union has certified Ugandan honey for export to the Euro zone; the government of Uganda pays to maintain that market for the export of honey.

## **Threats**

### **Pests and Diseases**

Pests and disease pose a major threat to beekeeping. They are known to attack and destroy the colonies in the hives and pests such as black and red ants, wax moth, beetles, birds, honey badger and rats can cause the bees to

abandon the hives. The threat is worsened by the lack of knowledge among stakeholders about the pests and diseases associated with bees. Recent reports indicate that Varroa mite was detected in Northern Uganda and Varroa destructor occurred in neighbouring countries of Tanzania and Kenya. These pose a threat to the beekeeping activities if they were to occur.

### **Wild fires**

Murchison falls conservation area is renowned for its wildfires particularly during certain seasonal periods. These fires are normally started by UWA and local communities living along the boundaries of the park to reduce dead vegetation, stimulate new growth, and improve habitat for wildlife. They are known to break down nutrients and minerals in burning plants and their debris such as old logs, leaves and dense undergrowth and restore them to the soil thus making a more fertile area. However, these wildfire fires are known to kill bees, destroy the hives and bee forage.

### **Theft**

Beekeeping is susceptible to theft. In some cases, thieves steal honey or metallic stands and in rare case the hive itself for reasons only known to themselves. In other cases, they completely destroy the beehive which negatively impacts the productivity of the beekeeper that year. This could negatively impact the project and discourage the beekeepers if measures are not put into place to safeguard the hives.

## **CONCLUSION**

Diima and Nyamahasa parishes in Murchison Falls Conservation area have the potentials for beekeeping development. This activity has the potential to positively impact the livelihood of community inhabiting the landscape, reduce conflict human-wildlife conflict and boost the overall economy and motivate locals to be more conscious of and active in biodiversity conservation. The opportunities for beekeeping development in the region are boosted by the presence vast swathes of natural resources (bees and forage), the current attention by the government and development partners to develop apiculture as a strategy for reducing poverty in rural areas and the high demand for beehive products. By upgrading the available resources such as modern technologies in beekeeping (using modern hives, metallic stands, proper harvesting and processing Equipment) will increase economic growth and increase per capita income. Nevertheless, to realize the potential of beekeeping in these two parishes, challenges ranging from the shortage of bee forage during dearth periods, honeybee pests and diseases, lack of skilled manpower and suitable trainings to handle transitional and modern beehives, outdated technologies in honey processing and the absence of policies in the apiculture sector have to be adequately addressed.

## **RECOMMENDATIONS**

- The two parishes should get at least 2 venom collection centres each to earn more money on a weekly and monthly basis and to improve their livelihood. This will greatly improve the perception of the communities towards beekeeping and the effort put into the management of hives.
- Modern hives (Kenya Top Bar Hives and Langstroth hives) that are renowned for higher productivity should be distributed to communities in the two parishes. As earlier mentioned, 90% of the hives in the area are local and due to their rough exterior, they are more susceptible to pest invasion and thus synonymous with low productivity.

- Bulk centres should be set up to enable beekeepers can deliver their products to these centres where the storage mechanisms preserve the best quality of the products, beekeepers can access competitive prices and market.
- Capacity building beekeepers at each stage of the whole value chain should be prioritized. Priority should be put on production (apiary management), harvesting bee products (harvesting honey, propolis and bee venom) and processing bee products (value addition).
- Bee fences should be created to deter elephants from crossing into the community gardens instead of scattering them in the park.
- Protective gear should be provided to the beekeepers to enable them effectively manage their apiaries, harvest in time and control the quality of the bee products.