Hope Forest of

WCS

A QUICK NEEDS ASSESSMENT IN MODERN BEEKEEPING AROUND GISHWATI-MUKURA NATIONAL PARK, RWANDA

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ABSTRACT

This assessment was conducted in 12 sectors of Rutsiro and Ngororero districts around Gishwati-Mukura National Park with the aim of empowering local communities to get alternative honey in order to reduce the fire incidents in the park and improve local livelihoods. Also this assessment provides useful information for expansion of beekeeping in order to meet the demand of the Modern Honey Processing Center that the government constructed in the area in 2017. The findings of this assessment reveal that modern beekeeping is still in its early stages around Gishwati-Mukura National Park. Few apiaries and beehives are in place and the already limited beekeepers practice it in a traditional way. While it is widely recognized that modern beekeeping increases honey production and quality and reduces the incidents of forest fires, 87.1% of the observed beehives in Gishwati-Mukura area are traditional. Also, traditional beehives were reported to be sometimes destroyed by termites, small mammals and primates. This never happens to modern beehives because they are made in stronger materials. Moreover, some of respondents mentioned that although it is not yet a big threat, sometimes bees in areas around Gishwati-Mukura National Park die from pesticides that are used in agriculture. Furthermore, this assessment reveals that the current annual production of 16 tons of honey is very low considering the amount of 180 tons needed annually to get the Honey Processing Center fully functional. During this assessment, local beekeepers showed that they know that modern beekeeping can give them more income, but they do not adopt it because it is expensive and requires the knowledge that they do not have. All respondents proposed financial and technical supports to expand beekeeping in the area and to improve their beekeeping practices in order to increase the revenue from beekeeping and produce enough honey for the Processing Center. This assessment also revealed that in Gishwati-Mukura area, beekeeping is dominated by old men. This calls for strategies to involve youth and women to ensure that this business is inclusive and sustainable.

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ACRONYMS

FHA: Forest of Hope Association

GMNP: Gishwati-Mukura National Park

MINAGRI: The Ministry of Agriculture and Animal Husbandry

SNV : Netherlands Development Organisation

UNICOAPIGI: Union des Coopératives Apicoles de Gishwati

WCS: Wildlife Conservation Society

1. INTRODUCTION

1.1 Background

This assessment is part of the project implemented by Forest of Hope Association (FHA) under a sub-award of Wildlife conservation Society (WCS) to prevent encroachment of human activity by surrounding communities in Gishwati-Mukura National Park (GMNP) by promoting conservation programs and focusing on livelihood activities such as beekeeping. Gishwati and Mukura natural forests are mostly known for having experienced the highest rate of deforestation in Rwanda. This was caused by development of large-scale cattle ranching schemes, establishment of plantations of non-native trees, resettlement of refugees after the genocide, mining and free-grazing of cattle. This highly affected the forest biodiversity and local livelihoods. In 2002, the Rwandan government and NGOs started restoring parts of these two forests. Currently, forest restoration is significant, have seen biodiversity increase and gained important institutional recognition with the gazetted law establishing Gishwati- Mukura National Park in February 2016.

Despite the efforts in restoration of Gishwati-Mukura National Park, high population density and related heavy dependence on forest resources pose a major challenge to the conservation of this park. The communities around GMNP rely on subsistence agriculture practiced on plots of around 0.3 hectares per household (National Institute of Statistics Rwanda, 2012). This land holding is not enough to satisfy the basic household needs, thus illegal use of the GMNP resources. Modern beekeeping is identified as a potential activity that can supplement what local people get from agriculture. This will improve their livelihoods and reduce illegal use of the park resources including harvesting wild honey that is the major cause of the GMNP fires that outbreak during dry seasons.

Traditional beekeeping around GMNP, like in many parts of Rwanda, has been practiced for many years, where honey is used as a food product, medicine and for brewing traditional beer (MINAGRI, 2012). Around 2000, some beekeepers in GMNP area started practicing beekeeping as a business and grouped themselves in cooperatives that further formed a union in order to start processing their honey in 2008. This union is called UNICOAPIGI (Union des Cooperatives Apicoles de Gishwati). It collects, processes and sells honey and handcrafts made in bee wax. In 2016, UNICOAPIGI collected 16 tons from 4 local beekeeping cooperatives that it processed and packaged for sale at national market. In 2017, attracted by the work of UNICOAPIGI and increase in pollen due to successes in forests restoration, the government of Rwanda constructed a modern Honey Processing Center in the GMNP area and gave it to UNICOAPIGI for management. This Center will need 180 tons of honey per year as it has the capacity to process 500kg/day. For the Center to be fully functional, raw honey production has to be increased by 91%. The puzzle is how to meet this demand while ensuring that local people benefit from this business opportunity and reduce their pressure on park? This study was therefore conducted with the below objectives.

1.2 Study objectives

The main objective of this study was to assess the needs in modern beekeeping around the Gishwati-Mukura National Park. The specific objectives were to identify key issues and opportunities to promote modern beekeeping around Gishwati-Mukura National Park and to map where modern beekeeping should be expanded to increase honey production in the area.

2. METHODOLOGY

2.1 Study area

This assessment was conducted in the 2 Districts surrounding GMNP: Rutsiro and Ngororero located in Western Province, specifically in 12 sectors adjacent to the park. These are Nyabirasi, Kigeyo, Mushonyi, Ruhango, Musasa and Boneza around Gishwati forest and Mukura, Rusebeya, Bwira, Ndaro, Sovu and Mushubati around Mukura forest. GMNP is the youngest park in Rwanda, gazetted on 1 February 2016. It consists of Gishwati Forest (the northern part of this park), with an area of 1,570 hectares, and the Mukura Forest (the southern part) with an area of 1,988 hectares. The total area is 3,558 hectares (RDB, 2017).

As the map below shows, GMNP is located in 8 of the sectors mentioned above. Other 4 neighboring sectors were added as potential sectors where the beekeeping business can be expanded to increase the honey production.
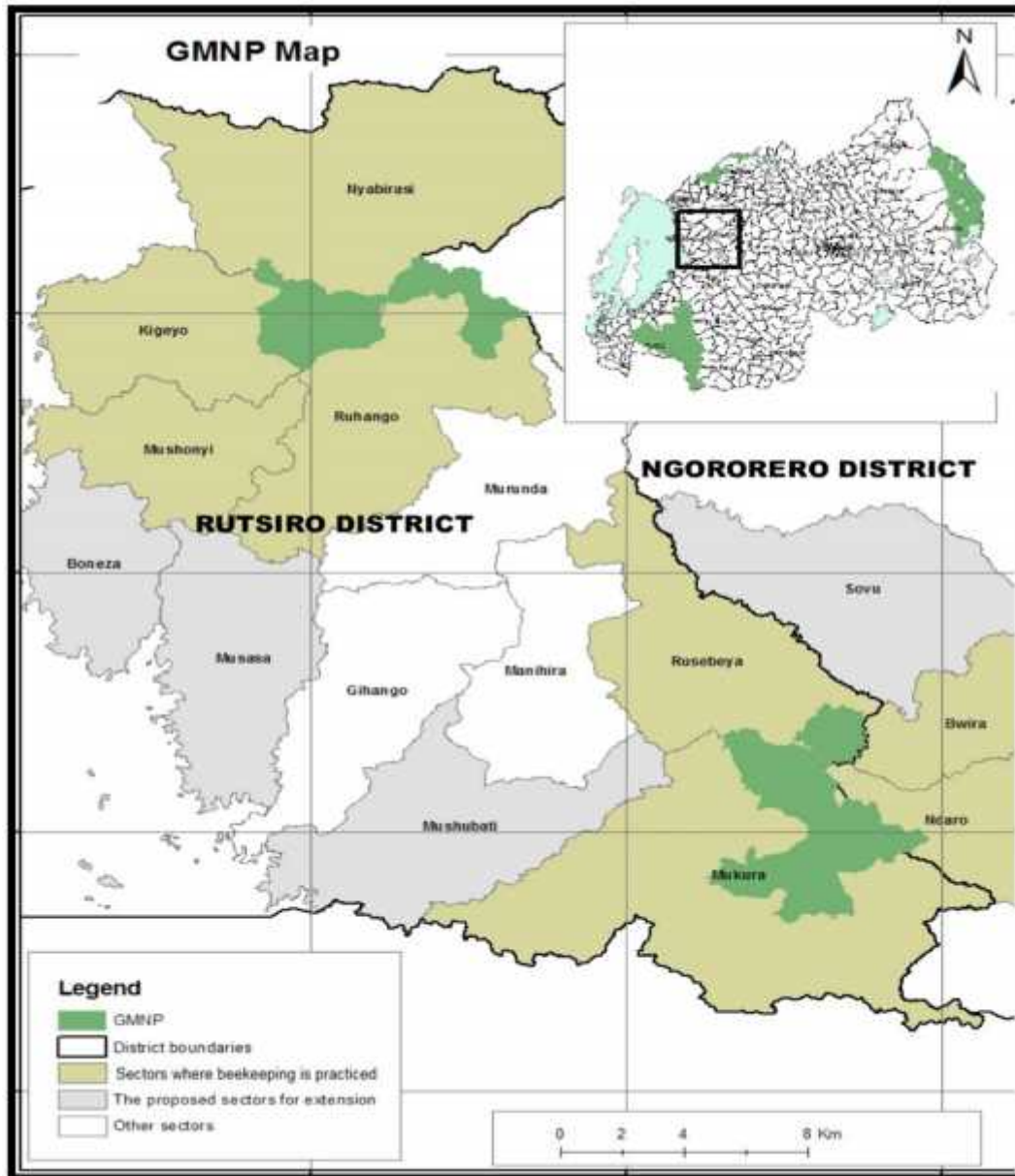
Figure 1: Map of the study area and the proposed sectors for expansion

2.2 Sampling techniques, data collection and analysis

In this assessment, a semi-structured questionnaire was designed in a way that helped to acquire information related to current status of the beekeeping business, both traditional and modern. This includes current honey production; impact of beekeeping practices on the GMNP; challenges; opportunities; capacity and skills of beekeepers; techniques used and; other gaps and needs to increase honey production. Data were collected using interviews to key informants and focus group discussions and direct observation. In total, 60 beekeepers were visited and interviewed.

The criterion for respondents' selection was to be a beekeeper and doing beekeeping around the GMNP. Respondents were found in their villages and their beekeeping sites were visited. In Gishwati area, the Manager of UNICOAPIGI provided the list of members of the four cooperatives that make up the union (JYAMBERE, COAPIRU, COVED and CODASE) and from there 20 respondents were randomly selected (5 per cooperative) for interview. In Mukura area, most of beekeepers are not in cooperatives, local leaders and residents in each of the sectors adjacent to the park (Mukura, Rusebeya, Bwira and Ndaro) provided names and locations of beekeepers they know. 20 of them were selected as key informants and the selection was based on the knowledge and the ability to share information on beekeeping situation and practices.

To get data about the needs to expand beekeeping beyond sectors adjacent to the park, UNICOAPIGI and agronomists of Ngororero and Rutsiro Districts were contacted. 9 sectors in the vicinity of the sectors bordering with the park were visited. After talking with agronomist of each of those sectors, it was decided to visit 4 sectors among them that showed the potential for beekeeping development. Those area: Musasa, Boneza and Mushubati in Rutsiro and Sovu in Ngororero). The Manager of UNICOAPIGI also said that some individuals from these Sectors sell honey to the union. Then, 20 individual beekeepers in these sectors were randomly selected for interview.

Also field observation was used mainly when different beekeeping sites were visited to assess activities and observe the status of beehives and apiaries.

Excel software was used to enter and analyze data.

3. RESULTS AND DISCUSSION

The results of this assessment show that beekeeping activities are mainly done by old people, involving more men than women. Most of respondents in this assessment were between 18 to 60 years old. About 90% of 60 respondents were above 35 years old and only 12 respondents were women (Table 1). This situation is also found in other areas across the country (SNV Rwanda, 2009). Having only old people in beekeeping is a risk for its sustainability if nothing is done to engage more youth in beekeeping business. It is recognized that the involvement of young people who are flexible, energetic and more likely to input personal resources is needed to enhance the beekeeping production. Also Rwandan culture did not favor the involvement of women in beekeeping because traditional beehives are usually placed very high in branches of big trees where only men can reach by climbing. In Rwandan culture, women do not climb trees. These findings indicate that there is a need to mobilize youth and women for them to join beekeeping cooperatives in order to not only bring in new energy, skills and ideas but also to ensure that this business is inclusive. It is fortunate that modern beehives are placed in apiaries rather than trees. Women can easily participate in every single activity.

Table 1: Age and sex distribution of respondents

		Number of respondents /60	Percentage (%)
Age	< 35years	6 respondents	10
	> 35years	54 respondents	90
Sex	Women	12 respondents	20
	Men	48 respondents	80

3.1 Status of beekeeping around Gishwati-Mukura National Park

From the direct observation at the beekeeping sites visited during this assessment and the information received from respondents, it was realized that most of beekeeping is traditional as indicates the table below.

Table 2: Distribution of beekeeping activities in twelve sectors of study area

No	Sectors	Beekeepers cooperatives/ groups/ individuals	No of beekeepers (Individuals/cooperative members)			No of apiaries	No of beehives recorded	
			Female	Male	Total		Traditional	modern
	SECTORS ADJACENT TO GISHWATI FOREST							

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#	Sector	Name						
1	Kigeyo	JYAMBERE	6	33	39	2	70	44
		CODASE (Coopérative de Développement Apicole et la Sauvegarde de l'Environnement)	9	15	24	3	96	52
2	Nyabirasi	ABISHYIZEHAMWE COOPERATIVE	2	31	33	1	54	0
3	Mushonyi	COVED (Coopératives des Volontaires pour l'Environnement et le Développement)	30	15	45	3	53	37
4	Ruhango	COAPIRU (Coopérative des Apiculteurs de Ruhango)	5	55	60	3	65	66
	SECTORS ADJACENT TO MUKURA FOREST							
5	Mukura	ABAKUNDA INZUKI/ MWENDO	30	70	100	4	243	50
		TUBEHAFI	71	38	119	1	190	0
		ABISHYIZEHAMWE	0	26	26	1	74	0
6	Rusebeya	COARABERU (Rusebeya beekeeping Cooperative)	38	146	184	3	354	0
7	Bwira	Beekeepers groups	0	19	19	1	68	0
8	Ndaro	TUZAMURANE	0	21	21	1	71	0
	THE PROPOSED SECTORS FOR EXPANSION							
9	Musasa	Individuals	0	5	5	1	129	10
10	Mushubati	Individuals	0	5	5	2	113	9
11	Boneza	beekeepers groups	0	48	48	2	145	0
12	Sovu	Individuals	0	5	5	1	127	0
Total			**191**	**542**	**733**	**28**	**1,798**	**268**

Only 12.9% of observed beehives were modern (268 modern beehives out of 2066 beehives recorded). This proportion is not far from the one from the information provided by the agronomist of Rutsiro district that shows that across the whole district, only 484 (15.9%) are modern beehives while 7,271 (84.1%) are traditional. This justifies the low production and quality of honey in this area that is mainly associated with the characteristics of the traditional beehives, practices, and colony exposed conditions. For instance, beekeepers cannot see inside them during the day so that they can do some cleaning or remove insects that attack bees and honey. This means that they only clean the traditional beehives during honey harvesting which takes place during the night. For beekeepers to see inside the hive, they use fire for light if they do not have flashlights. They also use a lot of smoke to chase bees away so that they can access honey and bee wax. This smoke changes the smell and composition of honey, negatively affecting the honey quality.
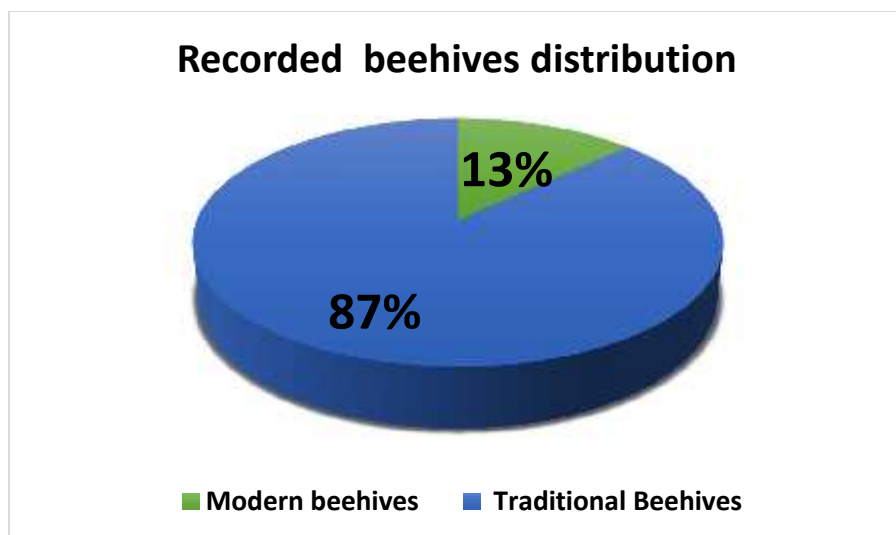
Figure 2: The proportion of modern and traditional beehives in surveyed sectors

Asked whether they are satisfied with honey production, all respondents including the ones who have more than 20 years in beekeeping indicated that they are not satisfied with the production they get. They explained that honey harvested from traditional beehives varies between 2 kg to 10 kg per hive. This production is very low compared to the one respondents reported that they get from modern beehives that varies from 10 to 50 kg as indicates the table below. The recent studies undertaken on the beekeeping sector in Rwanda also confirm the low productivity of traditional beehives where the average production per season was 5 kg per hive 2012 (MINAGRI, 2012).

Table 3: Comparison of honey production from traditional and modern beehives

	Honey production (Kg/hive/year)	Respondents	Percentage
Traditional beehives	(2-5)	41	68.3%
	(5-10)	19	31.7%
	TOTAL	60	
Modern beehives	(10-20)	4	30%
	(20-50)	9	70%
	TOTAL	13	

3.2 Modern beekeeping is a real need to improve livelihoods around Gishwati-Mukura National park

Most of respondents in this assessment affirmed that modern beekeeping is highly needed in the area around GMNP. Respondents totaling 85% stressed that beekeeping is part of their daily

business; the challenge is the production that remains low because they mainly practice traditional beekeeping. About 86.7% of respondents suggested that adopting modern beekeeping can significantly improve their honey productivity if they can get financial and technical supports to improve their beekeeping equipment and practices. The main reason they mentioned they fail to adopt modern beekeeping is that it requires high investment and numerous trainings on techniques used that they cannot afford.

Respondents confirmed that beekeeping generates income to local people. They said that they use the money from beekeeping to pay school fees for children, pay for health insurance (Mutuelle de santé) and buy food to supplement the agricultural production. They all confirm that once they are supported to do modern beekeeping they can even do it as their only one business.

3.3 Modern beekeeping as potential to increase the park protection and reduce fire incidents

Considering the report of eco-guards, the poor honey harvesting techniques caused 3 fire incidents that spread inside the park in last 3 years. About 76.7% of respondents stressed that they mostly use traditional tools that not only cause fire incidents, but also affect quality of honey. This confirms the existing information that the use of traditional honey harvesting techniques including the excessive use of smoke, leads to poor quality and low production of honey (MINAGRI, 2012). Some beekeepers around GMNP who have modern beehives mentioned that modern techniques for honey harvesting do not cause fire outbreak, suggesting that shifting from traditional to modern beekeeping can be a sustainable solution to fire incidents. Respondents also mentioned that expanding many modern beehives near the park boundary can strengthen the partnership with the community to fight against illegal wild honey harvesting and other illegal use of the park resources. The reason is that in Gishwati area, FHA uses Community Conservation Agreements encouraging beneficiaries to help educate their neighbors about the importance of the park and also report illegal users of the park resources. This is a win-win situation where beneficiaries help conserve the park and at the same time get incentives that improve their livelihoods.

3.4 Challenges that are beyond beekeepers control

During this assessment, local beekeepers showed that the main issues that beekeeping is facing are the use of pesticides that kill bees and the destruction of traditional beehives by small mammals, termites and primates specifically chimpanzee. Respondents suggested solutions that include replacing traditional beehives by modern ones that resist to those problem animals and engaging other partners and government institutions to ensure that farmers use chemicals that are not harmful to honey bees. Also they proposed that pesticides can be sprayed during periods when plants do not have flowers to minimize the contamination of bees while harvesting the pollen as also Malede et al. (2015) recommended

3.5 Needs to adopt modern beekeeping to meet raw honey demand

29.7% of respondents provided information that they have received some training in apiary management and bees caring techniques. However 76.8% of respondents said that they are still using traditional methods when harvesting honey. This includes smoke and other inappropriate materials such as small traditional machetes and knives that they already know affect the honey quality. There is therefore a need to effectively train beekeepers in business skills mainly focusing: on management of apiaries, caring for bees, bee-colony management and quality control improvement at honey harvesting level. Traditional beehives produce less than 50% of the modern beehives. As mentioned above, there is a need to produce as much as honey as possible to make the new Honey Processing Center built in this area functional. UNICOAPIGI collects around 16 tons of honey per year from four local beekeeping cooperatives. This production is from 250 modern beehives and more than 2000 traditional beehives that UNICOAPIGI is nowadays using. The Processing Center will need 180 tons of honey per year as it has the capacity to process 500kg/day. In case climate conditions are good, beekeepers harvest two times a year and the average production in this area is 45kg/year/modern beehive. To meet the demand of Processing Center for raw honey, 3,508 modern beehives are needed (considering that there are already 484 beehives in Rutsiro district). This will need a large expansion around GMNP and neighbouring area. These figures show that each sector needs 292 modern beehives that can be distributed in 6 apiaries. This estimation is based on the information received from UNICOAPIGI, local beekeepers and local leaders but the production is relative to the availability of pollen and water, and climatic conditions. This indicates that the beekeeping expansion should focus on areas located near the GMNP boundaries and the proposed expansion sectors because of the availability of pollen, water and high altitude. Also, the distribution of apiaries should consider the humidity as most of respondents mentioned that bees die in very humid areas.

When discussing with local beekeepers and the manager of UNICOAPIGI, they said that beekeeping activities have been practiced for many years in GMNP area mainly for household consumption as food supplement, medicine and additive in traditional beer. Honey processing for commercial purpose started in 2008 by UNICOAPIGI and the annual production from this area that time was 500kg. Since then, the production started to increase as a result of this market opportunity and engagement of beekeepers. UNICOAPIGI records show that the production increased to 5tons in 2012. They mentioned that in 2009, some beekeepers started adopting modern beekeeping beside traditional and this has considerably increased honey production in the area. In this regard, 4 cooperatives grouped in UNICOAPIGI produced 16 tons of honey in 2017. This is evidence that modern beekeeping can boost honey production in this area if promoted and therefore keep the honey Processing Center fully functional. To achieve this, there is an urgent need for beekeepers in the GMNP area to build more apiaries, equip them with good quality modern beehives, acquire modern honey harvesting equipment and materials, and get adequate trainings

in modern beekeeping such as beehives setup and maintenance, caring for bees and management, honey harvesting techniques, tools handling and cleaning, etc.

3.6 Potential to expand beekeeping around Gishwati-Mukura National Park

In addition to increasing honey production in sectors adjacent to the park, the assessment revealed that there is potential to expand beekeeping in Musasa, Boneza and Mushubati in Rutsiro and Sovu in Ngororero. This will help meet the demand of raw honey to run the Honey Processing Center on daily basis. As mentioned above, these sectors were chosen because they produced more honey in the previous years compared to others remaining. The estimated production of last 5 years was 1 ton per sector per year. Other reasons of selection were that those sectors have many individual beekeepers and more native vegetation compared to others especially Mushubati sector. Those are favored by low population densities and high altitudes. For sectors such as Musasa and Boneza, the good production is due to the vicinity to the Lake Kivu and availability of pollen from a big woodlot called Magaba in that area. Bees easily find water and fly over the lake to different islands located in this area to look for pollen.

4. CONCLUSION AND RECOMMENDATION

This assessment reveals that beekeeping in GMNP area is still more traditional with low productivity although it has potential to improve local livelihoods and contribute to the conservation of the GMNP. Yet there is an urgent need to increase honey production to more than 9 times the current production for the Honey Processing Center that the government constructed in this area to become fully functional. To meet this demand, modern beekeeping has to be boosted in the area and expanded in its environs. However, local beekeepers showed inability to do this by their own due to limited financial and technical capacity. They need support to get more modern beehives and related equipment and materials, and knowledge and skills necessary to improve honey quality and caring for the bees and hives. Also expanding beekeeping in Musasa, Boneza, Mushubati and Sovu sectors is a potential to meet the honey demand of the Processing Center and increase support to local human wellbeing. Indeed, there is a need to involve more young people and women for efficiency and sustainability of this business.

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