



Short-term consultancy for strengthening honey value chain by improving colonization, marketing and strengthening links to VLFRs

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Executive Summary

An investigation was undertaken in five districts in Ruvuma region in February 2024 to understand and address perceived challenges experienced by the FORVAC beekeeping programme. These challenges include low colonisation of and low yields from donated hives, a disconnect between beekeeping and conservation of Village Land Forest Reserves, lack of success in building new market links and concerns about the future of nascent beekeeping associations. Direct observation of apiaries, their locations, and the premises of honey businesses, augmented rich discussions provided by wide range of stakeholders who provided information, views and insights.

The Terms of Reference alluded to reasons for low colonisation and low yields which “were not yet identified”. This phrase implied that there was possibly an unusual or obscure problem in the area. In fact, this is not the case. The challenges being faced by the beekeeping initiative are nothing out of the ordinary and are driven by multiple, intersecting factors which include; inexperienced beekeepers, lack of application of local ecological knowledge, lack of motivation for adequate follow-up, lack of large bulk honey buyers and beekeeping being carried out on too small a scale. These factors intersect. The lack of a large bulk buyer is both a cause and an effect. Without such a buyer, beekeepers lack motivation to produce more honey, and the lack of more honey, fails to attract such a buyer. Swahili Honey said that the price of honey in Ruvuma is too high, and the volumes too low.

These conclusions should not however give rise to undue concern. There are many positives. The colonisation rate as reported by the beekeepers who were interviewed was about 67% which is fair, and comparable with other locations in Tanzania. Beekeepers said that beekeeping is a good business and no beekeeper was failing to sell their honey. The price, although high from the point of view of bulk buyers, is favourable from the beekeepers’ point of view. The environment is generally conducive for beekeeping, although the forage availability in maize-dominated farmland is likely inadequate. Ants are a problem in the farming season, so at the time when beekeepers need to pay attention to this problem, they are busy in their fields. Honey bees are migratory – probably following the strong altitude gradient in the region. This migratory behaviour cannot be changed, and beekeepers must adapt to the bees, not the other way around. This can be difficult for inexperienced beekeepers. Beekeepers recognise that forest must be protected and are willing to act to conserve the forest patches they are using for beekeeping. At present beekeeping is happening on too small a scale to incentivise beekeepers to use (and so conserve) 1000s of ha of VLFR forests. Some beekeepers are investing own capital to expand, but others say the cost of hives is too expensive.

FORVAC have rightly taken a value chain approach. Yet some elements in the value chain have not been given due regard. Notably there is no economic analysis of beekeeping as a business, taking into account all costs, time, labour, economies of scale, risks and capital requirement. The focus has been heavily skewed towards monitoring colonisation rates, yet this is only part of beekeeping. On the market side, there is an assumption that if hives are donated, buyers will come. This is too big an assumption and needs more scrutiny. It takes bold action for development partners to invest directly in ‘big buyers’, e.g. subsidizing part of their business costs, but this needs a re-think. With the right arrangement money invested in big buyers directly reaches the pockets of beekeepers and motivates them more strongly than beehive donations or training seminars.

Finally, natural tree capital, held within the VLFRs could be used to make beehives. Within a management plan and within the Annual Allowable Cut, such a use of trees is entirely rational if it directly leads to motivation and actions to support forest conservation. The logic of ‘**Use trees and save forests**’, underpins the theory of change of the FORVAC project. This can just as well be applied to using trees to make beehives, as selling timber.

Recommendations are presented in Table 2 at the end of the report.

1. INTRODUCTION

The Forestry and Value Chains Development Programme (FORVAC) is a 6-year (7/2018-7/2024) Programme funded by the Governments of Tanzania and Finland. The programme covers three clusters in Tanga, Ruvuma and Lindi and is implemented by the Forest and Beekeeping Division (FBD) of the Ministry for Natural Resources and Tourism (MNRT), in close cooperation with Tanzania Forest Service (TFS) Agency and the President's Office Regional Administration and Local Government (PO-RALG),

FORVAC aims to contribute to increasing economic, social and environmental benefits from forests and woodlands while reducing deforestation. The expected outcome of FORVAC is *“Sustainably managed forests and forest-based enterprises generating income for community members and revenue for community social services”*.

Although in the intervention areas most income comes from sustainable timber harvesting, it was expected that forest honey could also play a significant role in generating income. Domestic demand for honey is high, and there is a potential to significantly increase production. The government strategy on the honey value chain support is to replace traditional beehives - bark and log beehives with modern beehives, this is designed to reduce tree cutting and increase yields.

FORVAC therefore supported this strategy by providing 2,867 modern beehives (1,863 beehives in Ruvuma cluster, 364 beehives in Lindi cluster and 727 beehives in Tanga cluster) for 135 beekeeping businesses, which received micro-business support in phases I or II.

However, there have been numerous challenges identified which include –

- Placement of beehives outside the VLFRs thus having a very weak link with the Community Forests which is not in line with the approach of FORVAC.
- Failed attempts to encourage community members to put the beehives in the Community Forests, partly because of the long distance from the village.
- Low colonization rates of modern beehives with the reasons and solutions not fully identified.
- Production volumes although variable are often low for example; supported businesses reported harvesting 3,543 kg of honey within July-December 2022 with an estimated monetary value of TZS 31.1 million (around EUR 12,500), which is fairly low.
- Although attempts to link producers to buyers have been tried, they have sometimes failed, partly because of the lack of sufficient economies of scale, low organization between producers and prices sometimes not being attractive.
- Though associations have been set up in Ruvuma, a challenge is to ensure the associations are driven by the producers themselves and are self-sustaining.

With FORVAC ending in July 2024, the programme has commissioned **Danstan Kabialo** of Tanzania Apiculture Development Support Organization (Api-Support) of Dar es Salaam and **Janet Lowore** of Bees for Development – UK in a short assignment to investigate and analyze factors leading to these challenges and come up with recommendations which will provide a fresh push to help overcome them and build a successful and sustainable outcome related to the honey value chain support that contributes to the dual outcome of FORVAC of incentivizing VLFR forest maintenance whilst generating significant income generation from VLFR forest products.

2. AIMS OF ASSIGNMENT

Focusing in Ruvuma only the assignment was designed to engage private sector buyers of honey in Tanzania as well as relevant government and other NGO actors in the sector. The assignment's broad

objective is to support the honey value chain strategy of FORVAC to ensure VLFR communities significantly improve their livelihoods through income generation from VLFR forest honey, building up viable honey-based enterprises that significantly contribute to livelihoods and incentivizing VLFR forest maintenance.

Specifically the assignment aims to;

- Conduct a study on factors that lead to low colonization especially with modern hives and recommend practical solutions.
- Advise on ways to maximize beekeepers honey volume and income/value.
- Identify ways to improve links between the honey value chains and VLFRs where possible.
- Ensure more deals done with buyers and beekeepers in Ruvuma and Lindi cluster.
- Strengthen beekeeping association in Ruvuma to increase its viability and economy of scale.
- Advise on and support strategies for post – programme sustainability.

3. METHODOLOGY AND DATA COLLECTION

The assignment was undertaken in the following five districts in Ruvuma region; Nyasa, Mbinga, Songea, Namtumbo and Tunduru. FORVAC head office in Dodoma and Ruvuma cluster provided transport logistics. In addition, the Ruvuma Cluster Coordinator designed and organized meetings with various stakeholders in Ruvuma for information and data collection. At the regional level, together with courtesy visit to the regional administration, the team discussed with Regional Natural Resource Advisor who provided overviews and expectations of the forest sector contributions to the regional economy as well as the beekeeping status in Ruvuma as compared to the requirement of the National Standards.

Several and similar tasks were done in each district, starting with a courtesy visit to the District Administration for familiarization and granting provisions to work with District Natural Resources experts. Tasks which contributed greatly in collecting information and data were; (i) conducting a half-day workshops with representatives of the District Beekeeping Association, District Beekeeping Officers (DBO), District Forest Officers (DFO) as well as TFS Manager & Beekeeping officers (ii) conducting meetings in a selected village with Village Natural Resource Committee (VNRC) together with village leaders (Chairperson & Executive Officer) (iii) Visiting honey processors who received FORVAC support of training and some processing equipment (iv) Visit some beekeepers' apiaries for continued discussion, viewing the beekeeping environment and the practices on the ground. The visits were also intended for ascertaining the information and data provided during the workshop including colonization of beehives (Refer **Annex 2**) (v) Visiting private trader and beekeepers in Songea district. An arrangement was made to meet with Swahili honey and to visit their premises in Dodoma.

Information and data in workshops/meetings, as well as other encounters, was collected by asking planned, as well as emerging, questions followed by responses and discussion. Short descriptive videos were taken with a selected individuals wherever attention to specific evidence was necessary. Wherever an individual was important for providing information and was not met, phone calls were arranged after field work. Furthermore, video conferencing was also arranged with SEDIT management and experts (SEdit organization was a service provider for FORVAC). Other information and data were obtained by reviewing reports provided by regional and district Natural Resource "sections" as well as other relevant literatures.

4. FINDINGS

This section documents the main observations noted during the field work and other communications during information and data collection. The findings form the basis for recommendation. For ease of description, they have been categorized in six themes.

4.1. Beekeeper's skills and knowledge

Beekeeping is not a well-established livelihood activity in the districts visited and many beekeepers are starting from the beginning. However, some few experienced beekeepers are within, in most communities, and they produce a lot of honey and can explain how they achieve it. For example, Mr Bonaventura Mbogolo in Namtumbo, said that he has learned that he must harvest honey in early June and if he delays for any reason, the bees will consume the honey in the hive and a good harvest will be impossible. He said this feature was particular to Namtumbo and differed from where he used to live. Many new beekeepers are lacking this kind of specific knowledge. DBO and TFS experts are available for continued coaching, but they are under-resourced with working budget. The DBO in Tunduru, for example, said that he been unable to access any working budget for fieldwork from the District Council for several years; he relied on donor funds only. TFS, are more strongly engaged with their own apiaries, rather than with community outreach. In addition to formal training provided by project support, new beekeepers need access to locally – specific experience and expertise, so they can adapt formal training to their local area. Whilst many stakeholders mentioned that individual working is better than group work, some beekeepers preferred to work in groups, fearing their inexperience. Many expressed the need for more exposure and experience sharing. Inexperience and undeveloped skills accounts, in part, for low yields and colonisation rates.

4.2. Yields and colonisation rates

Compared to data initially compiled by FORVAC, field meetings with beekeepers showed an improvement in colonization rates. SEDIT reports (2022) that, “last data collected involved all beehives (phase I & II of their engagement), and that when data was being collected, beehives distributed during phase II were recently taken into the forest and most of them were yet to be colonized”. According to the data provided by FORVAC (2023) the most recent average was 43% occupancy, whereas data collected during the assignment (see Annex 2) reported a 67% average occupancy. In Nyasa, the TFS apiary produces more honey per harvested hive that surrounding beekeepers. The average yield of liquid honey per harvested hive, as reported by beekeepers, was 4.6 litres, whilst TFS reported 10 litres. Former TFS officer in Nyasa, Mr. Gift Kawiche, commented that “the TFS apiary is not placed in a better environment than that of other beekeepers, but TFS has put more effort in good colony management”. Experienced beekeepers, Mr. Alfonse Ngailo of Mbinga and Mr. Bonaventura Mbogolo in Namtumbo said availability of bee colonies is not a problem and that swarms have specific routes [*nyuki wana njia*] and once these are observed and known, then catching colonies becomes easy. Field visits showed that forest patches where apiaries are, are very small and surrounded by farms with non-nectar producing crops, mostly maize. Visited beehives of a private beekeeper in Songea were found to have all colonies absconded recently due to invasion by ants. Based on these findings it can be inferred that;-

Low yields per colony by beekeepers likely caused by

- (i) Inexperience and lack of ‘follow-up’ by beekeeper (e.g. late harvesting)
- (ii) In some places insufficient nectar where hives are located (e.g. near maize fields)

Low colonisation rates likely due to

- (iii) Absconding caused by ants.
- (iv) Beekeepers’ lack of experience in attracting colonies (sometimes requires placing hives in specific places, then bringing them to the apiary once occupied)
- (v) Natural migration behaviour of bees in search of forage.

All of the above challenges can be addressed directly except point (v) which can be *managed* by adapting the beekeeping system. See **Annex 4** for some information about honey bee migration.

4.3. Enterprise at scale

Development projects deliver support in a particular way e.g. supporting groups, formal training, giving hives, but the 'project approach' is only the start. Real success is evident when individuals take beekeeping seriously as an enterprise and put a lot of their own effort into it, such as making or buying their own hives, and using and developing local expertise. This is beginning to happen in Ruvuma. For example, one beekeeper in Namtumbo, who is a member of a beekeeping group, reported to have made 100 beehives of his own. A school in Litowa village and Mr. Mapenzi Makame of Songea have made 10 and 100 beehives respectively as a result of FORVAC inspiration. A female beekeeper in Mbinga said she learned beekeeping in the group then decided to invest her own capital to buy 10 more hives of her own. However, other people said they lacked capital to buy more hives or – perhaps it would be more accurate to say – they felt safer and more confident to invest what little capital they had in other ventures.

Beekeeping as a group can be a good way to start, as people can rely on one another. But taking beekeeping to scale is best done by individuals. When asked, the majority of serious and experience beekeepers said beehive ownership and management is best done by individuals, not groups. Mr. Eberhard Haule of Namtumbo said, he sees that “when a beekeeper works individually, he/she has a plan of work, is committed and takes responsibility in managing colonies, which is not seen in many groups”.

4.4. Markets and trade

At present there is no surplus honey produced in Ruvuma, beyond that which cannot be absorbed within the region. Low supply of honey from beekeepers automatically pushes the farm gate price high as they demand more money for the small amount produced. Local people are willing to buy small volumes at a relatively high price because they purchase honey as a medicine, therefore regard it as an essential, not a luxury item. Other beekeepers mentioned that they sell honey to people (including expatriates) associated with the mining industry i.e. people with high disposable income, who are also willing to pay relatively high prices for local honey. When asked, none of the beekeepers said he/she had any difficulty in selling his/her honey, although some did express a wish for a central large-scale buyer, with known price and reliability. There was no evidence of trade in beeswax reported by beekeepers. Beekeepers are processing and selling more honey to consumers in the neighbourhood and less to small-scale traders. The farm gate price demanded by beekeepers ranges between TSH 7,000 - 15,000 per litre (TSH 140,000 TO 300,000 per 20 l bucket depending on a particular place see **Annex 3**). Therefore, local traders and packers in Ruvuma are finding it difficult to buy this honey, process and pack it for the same market in the same area. In this case they are sourcing honey from outside the region where prices are much lower. Farm gate prices differ from place to place across Tanzania due to factors like scale of production at the particular area and season, honey demand and quality. Typical farm gate prices experienced in other productive regions range from TSH 3,000 per litre (some parts of Shinyanga) to TSH 4,500 per litre (Katavi, Tabora, Geita regions). These prices translate to TSH 60,000 - 90,000 per 20 litre buckets of honey.

Example 1: Juliana Bruno:

Juliana Bruno, the owner of Dofam Natural Honey in Songea town, buys honey from Inyonga in Katavi region at the price of **TSH 70,000-80,000 per 20 litre bucket of liquid honey**. She then pays TSH 20,000 to transport such a bucket of honey from Katavi to Ruvuma so that the final price at Songea is TSH 90,000-100,000. This is far less than TSH 160,000 per similar bucket of honey offered by beekeepers in and around Songea.

Example 2: Other packers:

Mr. Ebernard Haule a processor in Namtumbo districts and TFS Officer in Songea – Vumilia B. Sanga - reported the same scenario of honey being sourced out of the region because of high local price and unavailability. Likewise Mr. Dimtran Mzuuyu, a so-called processor in Mbinga, at the time of visit had no honey to sell and confessed that he only processes his own honey.

This farm gate price is comparable to retail prices in other markets in the country. Therefore, the small volume and high price which discourage local traders and packers of honey around Ruvuma, also keeps external bulk buyers away.

Example 3: Swahili Honey

A conversation with a bulk buyer – Central Park Bees Limited (Swahili Honey), based in Dodoma, but active in Njombe, revealed that the price and volumes of honey in Ruvuma are not attractive for him. Swahili Honey is a bulk buyer, processor and exporter sourcing honey from different parts of Tanzania. The company buys comb honey at TSH 3200/Kg in Njombe and other places. Being a private company which should make profit to exist, Swahili Honey required that a minimum of 20 tons of comb honey be obtained in Ruvuma at an easy pick-up point having the right quality and price, in this case TSH 3200/Kg of comb honey equivalent to TSH 4000/Lt less about TSH 480 - the value of beeswax in the comb honey.

Despite the fact that beekeepers are enjoying premium price for their honey, they too express a wish for a central large-scale bulk buyer, with known price and reliability. This relays a signal that, similar to other places in Tanzania, they prefer to get paid immediately and at once for their honey versus selling at retail for extended time. The large-scale bulk buyer would also provide the confidence that should beekeepers wish to double, triple or quadruple their honey yields, they will still be able to sell it easily for cash. Honey is scalable in volume. It can therefore be observed that, presence of a bulk buyer will please them and act as a stimuli or having a pulling effect for the need to invest and produce more honey by beekeepers.

4.5. Link to forest protection

Currently beekeeping is done in patches of forests close to homesteads, most of them owned individually at family level. Some of them are communally provided to beekeepers by the village, for example those in Litowa (Songea) and Chengena (Namtumbo) villages. Beekeepers protect the forest areas where they locate their hives by making frequent patrol visits, making firebreaks, deterring cutting and preventing livestock entrance. They are not using VLFRs because they are too far away, and this distance makes it hard for them to protect and manage their bees. Scale is a factor here. If a beekeeper has hundreds of hives they will need to look for places further away from the village to place them, such as the VLFR, but with less than 50 – that is not necessary. Walking a long distance to tend to hundreds of hives makes more economic sense also. Protecting VLFR is the function of VNRC members, however, some beekeepers who are not VNRC members are helping with VNRC responsibilities, because they said they need that forest “in the future”.

At Chengena village beekeepers were asked, if beekeeping fails what will happen to that forest where they are keeping bees. They simply answered; “it will be turned to farmland”.

It is important to emphasize that the link to forest protection and beekeeping is strong, but it centres upon the **place where the hives are located**. If hives are located in a particular forest, then that forest will be better protected because of the hives, due to a number of mechanisms (1) the beekeepers have a vested interest to maintain the forest, instead of using the land for farming (2) the beekeepers have a vested interest to stop other people from damaging the forest (3) other people are more likely to respect an area of forest that is apparently being used by someone for their livelihood, compared to ‘the bush’ (4) some people fear bees and just stay away. Other links between beekeeping and forest conservation are weaker. Beekeeping can only relieve forest from unsustainable exploitation

e.g. charcoal making, *if most people are beekeepers* – and this is just not the case. Beekeepers protect the place where the hives *are located* and not – as a rule – where the bees might forage or where other bee populations live. These links are much weaker.

4.6. Beekeeping associations

All associations are currently dormant, awaiting registration certificates and further initiation support. When asked if, after receiving certificate, the association is able to convene members with their own resources, the associations in Tunduru and Nyasa said no, they are not able. Instead, they are looking for an initial push from a donor (e.g. FORVAC). After receiving registration certificates they plan to raise contributions towards running costs, give beekeepers a voice, support beekeepers and new-beekeepers with advice, information and mentoring, and help with marketing of members produce. The chairman of Mbinga Beekeeping Association said he is putting together a ‘team’ of experienced beekeepers able to help novice beekeepers. This sounds like an excellent idea.

5. ANALYSIS AND DISCUSSION

Compared to other areas of Tanzania, beekeeping is less-well established in the five districts visited. The beekeeping value chain, as with other livelihood activities, depends on a wide range of factors and supporting processes to be successful. It can be difficult to disentangle causes from consequences, which in turn can make it hard to identify the most optimum project interventions at any particular phase, or stage in the development of a local beekeeping economy.

For example, consider colonisation rates, one of the key questions in the Terms of Reference. It is well known that a leading cause of absconding is ant infestation and that colonies can be protected from ants by beekeepers taking certain preventative measures. In the project area not every beekeeper is taking these necessary preventative measures. Whilst it might seem prudent to recommend more training and follow-up to train beekeepers on the importance of protecting their bees from ants, the real problem is likely to be motivation. Once beekeepers have experienced the economic benefits of taking necessary preventative measures at the right time, they will do so. In seeking to achieve higher colonisation rates, it is necessary that beekeepers are motivated to apply what they have learned in the training seminars.

Further, consider the disconnect between the VLFRs and the beekeeping activity. It is known from other parts of Tanzania and other countries that beekeepers are very willing and able to travel long distances, deep into forests, to do their beekeeping, provided they are working on a large scale. Beekeeping on a large scale needs more forage (often found away from the village) and it is ‘*worth it*’ to walk a long distance if the rewards are greater. In this project area the disconnect between beekeeping and use of VLFRs is about scale. Beekeeping is not yet happening on a large enough scale for beekeepers to need to use the VLFR forests for beekeeping. Beekeeping is not happening at scale for two inter-related reasons (1) Beekeepers are not confident of the market if the honey harvests were to increase by ten-fold (for example) (2) Beekeepers lack the capital to buy more hives.

This analysis and discussion section is based around a generalised honey value chain diagram – see Figure 1.

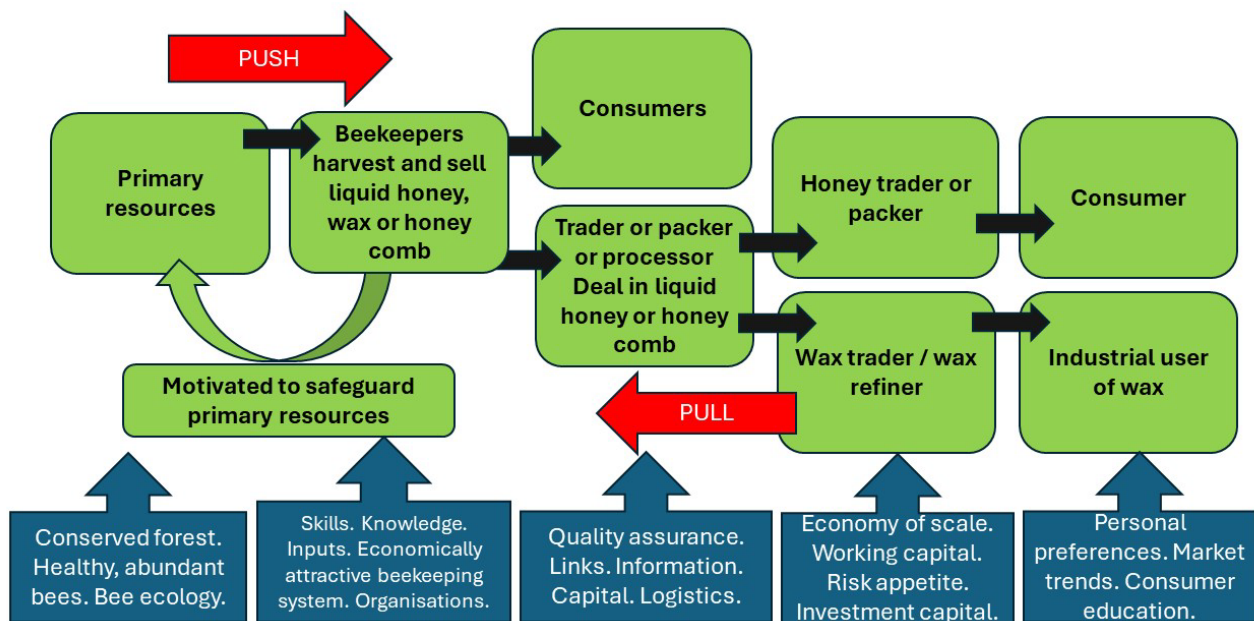


Figure 1. Generalised honey and beeswax value chain, applicable to Tanzania

An analysis of the honey and beeswax value chain in the project area reveals a number of distinct 'positives' which indicate that the value chain is growing and becoming stronger and has potential to develop further. These 'positives' can be summarised as follows:

- No beekeeper is failing to sell their honey and the price is generally considered to be fair, from the beekeepers' perspective
- Beekeepers recognise that beekeeping is a good business, because once they have started there are few repeat costs
- There are some very experienced beekeepers in the districts, and there must be more that were not encountered during the assignment. These people hold local knowledge and are a resource for less-experienced beekeepers
- Colonisation rates appear to be improving. In the FORVAC beekeeping database the average colonisation rate was 43%, whilst the rapid assessment done by the consultants suggested an average of about 67%. 67% is comparable with other miombo locations (Mmassey *et. al.* 2023)
- There is a strong link between forest protection and beekeeping – as evidenced by what beekeepers said and what they showed – but at present the forest that is being protected is patches near villages. The challenge now is to scale up so that this link extends to more forest area, and the large, distant VLFRs
- There is a general consensus that beekeeping is best done by individuals, although groups are useful when people get started, because it is easy to offer training to groups and people can help each other
- There is a clear appetite and felt-need for beekeeping associations, although it is hard to see – at present – how these associations will sustain themselves.

Whilst these positives are encouraging, in truth beekeeping is still in relative infancy in the project area. It is being done on too small a scale and by beekeepers who lack experience and motivation. These factors cumulatively work together to inhibit natural, rapid growth. This can be perhaps explained in a diagram as follows:

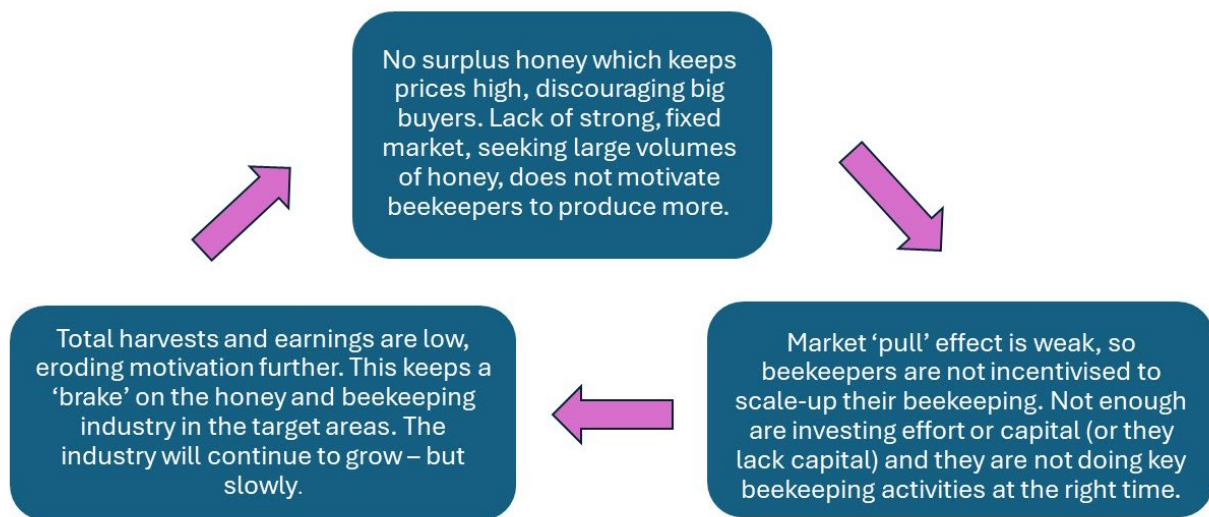


Figure 2. Diagram depicting factors which are inhibiting rapid growth in the beekeeping economy in Ruvuma.

The terms of reference for the assignment asked for solutions to the following challenges:

- Beekeeping not being done in VLFRs
- Low colonization rates of donated hives
- Production volumes low
- Unsuccessful attempts to link producers to buyers
- Establishing the associations on a sustainable footing.

By making reference to Figure 2 it is possible to see that these challenges are connected. Beekeeping is not being done in the VLFRs because the scale of beekeeping, as currently practised, is low – so it is not **'worth it'** to walk a long distance to remote forests to attend to a few hives and to harvest little honey. There needs to be more beekeepers, keeping more colonies to make it economically viable – and by that we mean thousands of beehives. 1863 beehives were donated by FORVAC in Ruvuma. More hives are needed¹ to really say that there is substantial beekeeping activity in the area. The disconnect between the beekeeping activity and the VLFR is largely about **scale**.

Low colonisation rates and low production volumes are largely caused by the same set of factors ... most of which are relatively predictable i.e. inexperience, lack of follow-up and lack of motivation. More specifically it was often mentioned that if inexperienced beekeepers miss the correct harvest time, then the harvest is lost as the bees consume the honey. If beekeepers don't pay attention to protecting their hives from ants, the bees will abscond. These are really sub-headings under a bigger heading of **Beekeeping not yet being taken as a serious business**. This has to change for total yields and yields per beekeeper to increase. And the fourth point about failing to attract big buyers is a direct consequence of this same 'heading'. Beekeeping is not yet being taken as a serious business by enough people, so there is no surplus honey available to be bought by big buyers. Indeed, the strongest manifestation of this is the fact that some of the district-based honey packers are sourcing honey from outside the region.

The final point, how to set-up the associations on a sustainable footing, is a hard one. It is well known that member-led beekeeping associations always struggle to sustain themselves. Exceptions do occur, for example, when beekeeping associations are led by very strong and charismatic leaders who run the associations more like their own businesses. There are many examples where beekeeping

¹ This is not to imply that more hives must be donated, beekeepers should take some of this responsibility

associations fail to raise contributions from members because members don't really see any tangible benefits and without contributions the associations can't function. It is very normal in the sector to encounter beekeeping associations which 'exist in name only'. To succeed they must have reason to exist, and this reason usually emerges when a group of serious beekeepers, decide to work together to overcome a challenge or problem which they cannot address on their own. Again, this goes back to beekeeping being taken as a serious business. Strong associations of primary producers and farmers usually **emerge** out of a felt need by serious actors, and are rarely able to **drive the growth** of primary production. They are, however, useful as conduits and communication channels for development programmes and other interested stakeholders.

This analysis is beginning to explain the challenge and we now turn to the solutions. Interventions are needed to encourage **Beekeeping to be taken as a serious business**. It is not unusual in reports of this kind to write out long lists of what needs to be done – more training, more hives, access to credit, etc. etc. To write out such a list would be stating the obvious and repetitive. Let's look at things a bit differently. There are really only two main things which need to occur for **Beekeeping to be taken as a serious business**.

1. An economically viable² and accessible beekeeping system and business model which allows many people to adopt beekeeping at scale.
2. Large-scale buyers with enough capital to establish a supply chain and enough capital to buy all the honey (that meets their quality demands) that beekeepers can bring them, for cash.

If either one of these are absent, beekeeping will still happen, and honey will be bought and sold. But the scale of the activity will remain small or moderate. But let's say, for the sake of discussion, that there was a large-scale buying facility in the area, that was buying honey for cash³, and bought all the honey that any beekeeper could bring them – 10, 20 or 30 buckets. The consequence of this would be that the volume of honey would begin to increase locally as beekeepers' motivation would increase, they would pay attention to their bees, seek advice from more experienced beekeepers about how to get bees into any empty hives, they would buy more hives (those that could afford) and more honey would get harvested. Eventually, after a number of years, the honey buying facility would buy more and more honey. The difficulty is that there is no private-sector entrepreneur who will set up a high-capacity honey buying facility **before** being confident that there is enough honey to buy.

On markets and trade it is useful to consider all the options. These are presented in Table 1.

Table 1. Honey market modalities in Ruvuma Region

	Market modalities		Comment
1	Beekeeper (or groups) process at home, sell liquid honey to customers – well packed, with good label, kiosk	Not done by beekeepers	Advise beekeepers who live close to road/town that this is a good option.
2	Beekeeper (or groups) process at home, sells liquid honey to customers – re-used bottles, to neighbours, from home	Done by many	No need to take action. Beekeepers will continue to do this. Suggest upgrade to option 1.
3	Group or association <i>buys</i> honey comb from individuals processes in group premises, sells liquid honey to	Not done	Not advisable. Associations struggle to do good business and struggle to

² Not only that – but more lucrative than alternative activities

³ At a lower price than the current Mbinga market-price – because if they paid the local market price they would not be able to sell at a profit

	customers – well packed, with good label, kiosk		raise the working capital to buy honey for cash.
4	Association <i>arranges</i> a business deal and coordinates on behalf of members with bulk buyer who pays them individually.	Not done	This can be considered and worth exploring.
5	Beekeepers process at home, sells liquid honey to small-scale honey packer	Done by some	This is a good option. The current high farmgate price makes it hard for the small-scale honey packers – but they have much to offer and it is worth investing in their growth.
6	Beekeeper sells honey comb to bulk buyer.	Not done	This would be a game-changer. Would need investment – hard to see it happening without an intervention.

Modality 6 is the game-changer that equates to the scenario described above. It needs investment and intervention. As clearly stated by Swahili honey, at present the prices and volumes in Ruvuma are not attractive for bulk buyers.

Tanzania Forest Services Agency (TFS) is an important stakeholder. They have their own apiaries and sell their own honey. It was reported that TFS are planning, in the future, to establish a trading company and will start trading in honey generally, buying honey from others and selling. Generally, governments tend to have poor track-records in the business sphere, yet such a development could open-up some new market opportunities for beekeepers. The small-scale honey packers (modality 5) don't have the resources and capacity to invest in supply chains e.g. give direct support to beekeepers, they are micro-businesses. At present they are buying honey from outside the region where it is cheaper. They are nevertheless important market stakeholders and some – e.g. Erica Mathayo in Nyasa and Michael Muhehi in Tunduru, are clearly offering an important route to market for local beekeepers and it is worth considering investing in them further.

The first point (1) towards **Beekeeping being taken as a serious business** refers to an economically viable and accessible beekeeping system and business model which allows many people to adopt beekeeping at scale. It is possible to say what *it doesn't look like*. It is not a group of 15 people sharing 42⁴ hives between them. As many of the stakeholders mentioned, group working can be challenging for a number of reasons and 2-3 hives per person does not really merit being called serious beekeeping. An economically attractive beekeeping system is one which delivers good returns in total, good returns in relation to time and cash invested, is accessible to a lot of people and with no great barrier in terms of getting started in the first place. In the target districts timber top-bar hives cost about TSH 60,000 and a litre of liquid honey sells (farm gate price) sells at about TSH 8,000 – a calculation reveals that it would take 7.5 litres of liquid honey to pay for the cost of the hive. In theory it should be possible to recoup the cost of a hive in the first year – but this is not happening. Many people can't afford to spent TSH 60,000 on a hive, they have too many pressing demands for their available cash. Even if they can afford it, inexperienced beekeepers are not confident that they can harvest enough honey to make the investment worthwhile. There are too many risks. They might not get bees in all their hives, the bees might abscond, they might miss the correct time to harvest honey, the colony might be too small, the honey might be stolen – or they might not get honey for a reason they don't understand. For example, honey bees don't only abscond to escape a disturbance, they also migrate in search of better forage elsewhere. Experienced beekeepers know this and adapt, less experienced beekeepers are disappointed, and loose motivation. The experience of the group beekeeping enterprises are fair and improving, but not so overwhelmingly successful that many

⁴ Average number of hives per group according to the respondents met

individuals are making individual decisions to invest capital to set up on their own. Some are ... and these 'early-adopters' are proof that beekeeping has potential. Nevertheless, most people either lack the capital or lack the confidence to invest at scale.

Development projects can 'bridge this gap' by donating hives (removes the need for capital), but hive donation projects are always poor substitutes for a thriving beekeeping activity driven by motivated beekeepers with the confidence and capital to scale-up on their own.

Taking a closer look at beekeeping as an economic activity we see that focussing on colonisation rates and yield per hive presents only a partial picture of beekeeping as an economic activity. It is also necessary to consider economics of the enterprise as a whole i.e. total output v total input (all capital, time, effort, labour, scalability and risk management). One risk that beekeepers and experts mentioned was the tendency for bees to migrate during the dearth period. It is almost impossible to change the bees' ecology, instead it is necessary to craft an economically viable beekeeping system that 'fits' to the bees' ecology and that means accepting that some hives will be empty some of the time. The overall economics of the system must be able to bear this. In Tanzania and in many other miombo forest countries the most economically viable and accessible beekeeping systems, which are able to 'bear' some hives being empty, some of the time, are those systems which use log, bark and woven hives. The reason for this is because the low-cost of hives means beekeepers can rapidly scale up, hang many hives and still harvest a good volume of honey, in total, even if some are temporarily empty.

It seems thought-provoking that in a forestry project that is advocating rational use of forest resources, beekeepers who have a vested interest to maintain forests, are constrained from scaling up their beekeeping activities – for lack of forestry resources. Use a tree and save a forest. It would be perfectly rational in a VLFR of 6000ha in size, for one tree per ha, to be used to make a hive⁵. This would fall within the Annual Allowable Cut and would, at a stroke, yield 6000 hives. Suddenly we have enterprise at scale. "Use trees and save forests".

6. CONCLUSION AND RECOMMENDATIONS

In light of the findings and the analysis we conclude that the Ruvuma region has the resources and climate to support a successful beekeeping economy. This section presents key recommendations under the same headings as used in Section 4. The recommendations are summarised and detailed in Table 2.

6.1. Beekeepers' skills and knowledge

The relatively low yields of honey reported to date suggest that Ruvuma is not an 'easy' place to do beekeeping and beekeepers must learn how to develop their techniques, adapt to the behaviour of the honey bees and learn about their local seasonal calendar. For inexperienced beekeepers to succeed they need to observe, pay timely attention to their colonies and seek advice from more experienced beekeepers and beekeeping officers. There are no easy short-cuts to learning beekeeping in these districts and beekeepers must persevere.

Recommendation: Identify experienced beekeepers and encourage the new beekeeping association to empower them to share their local knowledge and skills with new beekeepers.

Recommendation: Arrange a study tour for leaders of beekeeping associations and aspirational beekeepers, for learning and inspiration, and to show what serious beekeeping looks like.

Recommendation: Lobby District Councils to allocate budget for District Beekeeping Officers to do fieldwork, to support inexperienced beekeepers.

⁵ In a managed and planned way – with other support in place

6.2. Yields and colonisation rates

This is closely connected to the previous section. Low yields and colonisation rates are largely a consequence of inexperience on the part of beekeepers. It is particularly important that beekeepers pay close attention to the correct harvest time, protect their colonies from ants and learn that getting bees into hives sometimes involves locating empty hives in places where bee swarms habitually pass.

Recommendation: Ensure every beekeeper has access to good information about their beekeeping calendar – note there are marked differences within districts. We learned that beekeeping calendars have been prepared. These must be widely shared.

Recommendation: Promote individual ownership of beehives. Some groups have already divided donated hives amongst themselves. Beekeeping officers should suggest (not oblige) other groups to do the same, asking them to decide amongst themselves how to handle any person who neglects their hives in future e.g. should they relinquish them to others?

Recommendation: Study the honey yield capacity of the area (in different locations) in order to establish realistic targets.

Recommendations in section 6.1 apply here also.

6.3. Enterprise at scale

Taking beekeeping as a serious business means investing more, scaling-up and taking responsibility for one's own enterprise. Some people have the capital, motivation and will to buy more hives and do just that. But there are others who have the motivation and will, but lack the financial capital. When asked, one seemingly keen beekeeper said he planned to buy two more hives next year. Not enough!

Recommendation: Identify beekeepers who are willing to take beekeeping as a serious business and invest – provide them with support, based on business planning.

Recommendation: Study and model the full economic cost/benefit of beekeeping in the project area - using range of different assumptions and profile in comparison with other livelihood activities

Recommendation: Explore options for using the natural tree capital available in VLFRs, in a managed way and within the annual allowable cut, to make more beehives, allowing beekeepers to scale-up and earn more. Instead of asking the beekeepers to pay for these trees upfront, ask them to pay an annual sum to the VNRMC or do work in-kind, **in direct support of VLFR conservation**. If they locate their hives in the VLFR it makes more sense for them to multi-task, visit their hives and patrol at the same time.

6.4. Markets and trade

As shown in Table 1. there are several different marketing options for beekeepers. Some of these modalities are already happening well, but they are not creating a strong 'pull' effect and they are failing to send a very strong signal to beekeepers that the market is easy-to-access and demands large volumes of honey. The game-changer in this regard would be a bulk buyer of honey comb. The lack of a honey surplus in the target districts is deterring bulk buyers – for now. It is justifiable for development projects to intervene in this regard (although not popular) if new money reaches beekeeper's pockets and incentivises forest protection at the same time, and if the long-term outcome was a self-sustaining, privately run business.

Recommendation. Identify within-district honey buying businesses who are willing to invest and expand and provide them with support, based on business planning.

Recommendation. District Councils seek funds and build processing facilities (appropriate scale) and offer to rent it out to private entrepreneur/ bulk buyer. Seek a development partner to provide soft

loan or grant to an entrepreneur as working capital, to cover costs until businesses becomes profitable. The beekeeping associations can help by handling some of the collection logistics to make the business viable.

6.5. Link to forest protection

Beekeepers are reluctant to place their hives in the VLFR because their scale of operations do not yet demand the space or make it worthwhile to travel the distance. As more people take beekeeping seriously this is likely to change and cannot be forced. It is earlier advised that beekeeping is taken as an individual enterprise in which case beekeepers should be asked to support the VNRMCS in some way, either through an annual fee or by donating their time/labour towards VLFR protection.

Recommendation. Individual beekeepers using VLFR should be obliged to commit actions or money to support the VNRMCS.

Recommendation. Encourage overlap between VNRMCS and beekeeping activity – so for example beekeepers who wish to use the VLFR can take on some of the responsibilities of the VNRMCS, and VNRMCS members can help beekeepers by checking on safety of hives when doing patrolling.

6.6. Beekeeping associations

It is worth supporting beekeeping associations because they can create momentum for the sector, can serve as a 'go-to' group of people for anyone wishing to start beekeeping and can coordinate support and development. However, it would be ambitious to expect the associations to become vibrant, self-sustaining community-based organizations in the short term.

Recommendation: Proceed to convene establishment meetings for each district beekeeping association (when certifications are ready) and support them to create mechanisms for information and expertise sharing⁶ – for their own beekeeping community.

Recommendation: Invite a bulk honey buyer to speak to members and tell them their business model – for information and looking forward, not necessarily to forge immediate market link.

⁶ Also see recommendation 1

Table 2. Recommendations towards growing the honey industry in Ruvuma Region

no.	Recommendation	Impact on Value Chain	Time-frame	Stakeholders	How this could be achieved
1	Lobby District Councils to allocate budget for District Beekeeping Officers to do fieldwork, to support inexperienced beekeepers.	Enhances knowledge and skills, towards achieving greater yield	Immediate	FORVAC. District Councils. MNRT.	End of project presents opportunity to lobby DCs to invest in beekeeping as the donor has invested a lot - now DCs should shoulder more responsibility. Donated motorbikes are for beekeeping support and need to be fuelled - otherwise waste of donor resources.
2	Promote individual ownership of beehives. Some groups have already divided hives amongst themselves. DBOs should suggest (not oblige) other groups do the same, asking them to decide amongst themselves how to handle any person who neglects their hives in future e.g. should they relinquish them?	Enhances motivation, towards achieving greater beekeeper investment	Immediate	District Beekeeping Officers.	End of project presents opportunity to emphasise that donated hives now belong to the beekeepers (they are not FORVAC hives) - and they need to be treated as valuable assets. Opportunity for DBO to discuss ownership arrangements with groups and make changes in some cases. During these discussions the question should be asked, "what happens if a person neglects donated hives ... should they relinquish them after a warning?".
3	Ensure every beekeeper has access to good information about their beekeeping calendar – note there are marked differences within districts. We learned that beekeeping calendars have been prepared. These must be widely shared.	Enhances knowledge and skills, towards achieving greater yield	Immediate	District Beekeeping Officers.	End of project presents opportunity to check that resources created with project support, i.e. beekeeping calendars, are within reach of the beekeepers.

4	Convene establishment meetings for each district beekeeping association (when certifications are ready) and support them to create mechanisms for information and expertise sharing – for their own beekeeping community.	Strengthens knowledge and skills, motivation and empowers beekeepers	Immediate	FORVAC. District Beekeeping Officers. Beekeeping associations.	One meeting in each district. Associations should be helped to establish their objectives and mode of operating. Avoid being too ambitious in terms of aims - they need to start with moderate aims they can achieve, not ambitious goals they cannot reach.
5	Invite a bulk honey buyer to speak to beekeeping associations and tell them their business model – for information and looking forward, not necessarily to forge immediate market link.	Creates pull-effect of bulk market for large volumes	Immediate	FORVAC. District Beekeeping Officers. Beekeeping associations. Bulk buyer e.g. Swahili Honey or another.	The bulk buyer is invited to the meeting (above) so they can share their business model and explain the scale of volume of honey they are seeking. If there are five beekeeping associations, that suggests 5 meetings which is quite a big undertaking. An alternative lower cost approach might be to interview a bulk buyer, make a video and show the video at the meetings.
6	Identify experienced beekeepers and encourage the new beekeeping associations to empower them to share their local knowledge and skills with new beekeepers.	Enhances knowledge and skills, towards achieving greater yield	Medium-term	District Beekeeping Officers and TFS beekeepers. Beekeeping associations.	Identify a cohort of community-based experienced beekeepers and ask them to help others - this could form a key role of beekeeping associations. They may need an incentive - this could be arranged locally. For example, if a new beekeeper needs help to harvest honey, they could share some of the honey with the helper.

7	Arrange a study tour for leaders of beekeeping associations and aspirational beekeepers, for learning and inspiration, and to show what serious beekeeping looks like.	Enhances motivation, towards achieving greater beekeeper investment	Medium-term	District Beekeeping Officers and TFS beekeepers. Beekeeping associations. Development partner.	It is understood that study tours had previously been arranged by FORVAC. The reports from these study tours should be reviewed and some previous participants interviewed - perhaps to gauge if they have a strong impact. Otherwise this activity is expensive and would need donor support.
8	Oblige individual beekeepers using VLFR to commit actions or money to support the VNRMC.	Strengthens feedback loop towards beekeeping incentivising forest protection	Medium-term	VNRMC and beekeepers.	Obliging beekeepers to pay to use VLFRs may back-fire and discourage beekeepers from using them. The alternative is to ask them to commit actions to safeguard the forest e.g. patrolling, fire mitigation - as this helps the beekeepers as well. They are likely to be more willing to do activities, than contribute money.
9	Encourage overlap between VNRMC and beekeeping activity – so for example beekeepers who wish to use the VLFR can take on some of the responsibilities of the VNRMC, and VNRMC members can help beekeepers by checking on safety of hives when doing patrolling.	Strengthens feedback loop towards beekeeping incentivising forest protection	Medium-term	VNRMC and beekeepers. District Beekeeping Officers. Development partners.	VNRMC members could be supported / trained to become individual beekeepers. Then when they do their community work (VNRMC management) - they can do their individual work (beekeeping in the VLFR) at the same time.
10	Support individual aspirational beekeepers who show potential, to scale up their business	Enhances motivation, towards achieving greater beekeeper investment and greater volumes.	Medium-term	District Councils. Development Partner. Serious beekeepers.	This recommendation would need to be back-up by scoping exercise - to identify the beekeepers and craft a fully costed business plan of what a scaled-up beekeeping business would cost to grow, run and what it would yield.

11	Support local buyers to grow into bulk buyers	Creates market pull-effect in the value chain.	Medium-term	District Councils. Development Partner. District-based honey buying / packing companies.	This recommendation would need to be back-up by scoping exercise - to identify the honey businesses and craft a fully costed business plan of what a scaled-up honey business would cost to grow, run and what it would yield.
12	Study the honey yield capacity of the area (in different locations) in order to establish realistic targets.	Helps set realistic targets, enriches the enabling environment for the sector	Long-term	Researchers / students / experts. Development partners.	It is important that targets are rooted in evidence. This type of investigation could be undertaken by a research institution.
13	Explore options for using the natural tree capital available in VLFRs, in a managed way and within the annual allowable cut, to make more hives, allowing beekeepers to scale-up and earn more. Instead of asking the beekeepers to pay for trees upfront, ask them to pay an annual sum to the VNRMC or do work in-kind, in direct support of VLFR conservation. If they locate their hives in the VLFR it makes more sense for them to multi-task, visit their hives and patrol at the same time.	Supports scale-up, towards achieving greater yield	Long-term	Researchers / students / experts / MNRT officials. Development partners.	This recommendation would need to be backed-up by a feasibility study to explore what would be possible and acceptable within the management guidelines governing the VLFRs.

14	Study and model the full economic cost/benefit of beekeeping in the project area - using range of different assumptions and profile in comparison with other livelihood activities	Helps to identify support needed to make beekeeping more profitable and attractive, to incentivise more beekeeper investment	Long-term	Researchers / students / experts. Development partners.	A study of this kind would be suitable for a university student. The economic analysis should consider time spent beekeeping compared to other activities and situate beekeeping within the wider livelihood portfolio of people in the project area. One stakeholder said that people were less committed in beekeeping in one village, because they had too many other profitable options, making beekeeping 'not worth their time'. This needs to be understood.
15	District Councils seek funds and build processing facilities (appropriate scale) and offer to rent it out to private entrepreneur/ bulk honey buyer. Seek a development partner to provide soft loan or grant to an entrepreneur as working capital, to cover costs until businesses becomes profitable. The beekeeping associations can help by handling some of the collection logistics to make the business viable.	Creates pull-effect of bulk market for large volumes	Long-term	District Councils. Development Partner. Private sector buyer.	This recommendation would need to be backed-up by a feasibility study to explore what would be possible, what would it cost, roles and responsibilities. Whilst development partners are 'traditionally' willing to spend USD50,000 on buying and donating beehives to beekeepers, they are less willing to providing working capital to a new honey trade entrepreneur. The reasons for this are known and understood. Nevertheless, it could be strongly argued that investing in the market-pull is more impactful and sustainable. What is need is bold vision and well-crafted partnerships.

Annex 1. List of people and groups consulted

SN	Group/ Individual's name	Position/Category	Organization/ Location
1.	Joseph Kadendula	Managing Director	Central Park Bees Ltd (CPB) (Swahili Honey)
2.	Andrew P. Mhwagila	CPB representative - Njombe	Central Park Bees Ltd (Swahili Honey)
3.	Vinten Mlowe	Individual Beekeeper	Njombe
4.	Petro Masolwa	Ruvuma cluster coordinator	FORVAC
5.	Charles Africanus	Natural Resources Advisor	Ruvuma Regional Administration
6.	Michael D. Komba	Trained Carpenter	Songea district
7.	Olaf Ferdinand Hindi	Group Chairman	Kanyagatwende beekeeping goru
8.	David Mkasi	District Beekeeping Officer	Songea District Council
9.	Zakayo Y. Kaunda	District Forest Officer	Songea District Council
10.	Vumilia B. Sanga	TFS Beekeeping Officer	Songea
11.	Juliana Bruno	Honey Processor and packer	Dofa Natural Honey – Songea town
12.	Anthony V. Mwamuhuru	Individual beekeeper	Songea District Council (DC)
13.	Desderius Ndakize	DFC- TFS	Namtumbo DC
14.	Gravas Mwalyombo	District Forest Officer	Namtumbo DC
15.	Vedastus E. Buzinza	DFC - TFS	Namtumbo DC
16.	Maulid A. Fussy	FO-MNT- DED	Namtumbo DC
17.	Stanley B Chetesa	FA- NMT- DED	Namtumbo DC
18.	Azizi Kibwana	BO- TFS	Namtumbo DC
19.	Bonaventura I. Mbogolo	Private beekeeper	Namtumbo DC
20.	Eberhard Haule	Honey Processor and packer	Namtumbo town
21.	Salum Said	District Beekeeping Officer	Mbinga DC
22.	Halefa R. Singano	District Forest Officer	Mbinga DC
23.	Izrael Kick Adam	FA (TFS)	Mbinga DC
24.	Emanuel P. Samweli	BA (TFS)	Mbinga DC
25.	Ditramu Mzuyu	Beekeeper and Processor/ packer	Mbinga town
26.	Alfonse Ngailo	Beekeeper and honey processor/packer	Gembambili Amani Makoro village (Mbinga DC)
27.	Emanuel M. Masaga	District Beekeeping Officer	Nyasa DC
28.	Mussa E. Mbondo	Ag. DFO	Nyasa DC
29.	Rahma R. Muhiri	TFS Beekeeping Officer	Nyasa TFS office
30.	John Elisha Hhari	TFS Officer	Nyasa TFS office
31.	Limbega H. Ally	DNRECLI NY DC	Nyasa DC
32.	Erica Mathayo	Honey Processor and packer	Mbambabay town
33.	Michael W. Muhehi	District Beekeeping Officer and Honey processor/parker	Tunduru DC
34.	Denis Mwangama	DFC Tunduru (TFS)	Tunduru DC

SN	Group/ Individual's name	Position/Category	Organization/ Location
35.	Remna Rombola	TFS Beekeeping Officer	Tunduru DC
36.	District Beekeeping Associations for each district	Representatives (12 for each district)	Songea, Namtumbo, Mbinga, Nyasa and Tunduru districts
37.	Village Natural Resource Committee (VNRC) for each village	Members (15 for each village)	Litowa village (Songea DC), Chengena & Kumbara (Namtumbo DC), Amani Makoro (Mbinga DC), Liuli (Nyasa DC) and Liwangula (Tunduru DC)
38.	Village leaders	Village Chairman & Village Executive Officer (for each village)	Litowa village (Songea DC), Chengena & Kumbara (Namtumbo DC), Amani Makoro (Mbinga DC), Liuli (Nyasa DC) and Liwangula (Tunduru DC)
39.	Filbert Sambanyi	Director	SEDIT
40.	Jackson Sweveta	Business mentor - Nyasa	SEDIT
41.	Hamza Kiwanga	Business mentor – Tunduru & Namtumbo	SEDIT
42.	Mohamed Mtulia	M&E officer	SEDIT
43.	Gift Godlisten Kawiche	Former TFS Beekeeping Officer - Nyasa	TFS

Annex 2. Data – honey yields (collected from beekeepers met)

Some quantitative data was collected during the meetings and interviews. This data – although not complete - is presented here and is interesting.

Metric	Who provided the information	Average
Colonisation rates	41 groups or individuals provided data about colonisation rates.	67% occupancy (at time of asking)
Average total yield per enterprise (regardless of number of colonies)	38 individuals or family enterprises	103 litres of liquid honey
	21 group enterprises	50.6 litres of liquid honey
Average number of hives per enterprise	38 individuals or family enterprises	45
	21 group enterprises	42

The data was not collected completely – so some beekeepers provided information about number of hives and colonisation rate and yield, but did not mention how many colonies were actually harvested. When purposefully asked this question, most said that they did not harvest from all their colonies.

For a beekeeper the **total yield** is the most interesting result! Because it is this which leads to their take-home income. The way they decide whether the income was worth the effort is probably more strongly related to time spent and repeat cash, and they may be less concerned about yield per colony. It is the total effort invested compared to income earned which they care about, and this is distorted by hive donations (because it was not their money!).

The occupancy rate of 67% is fair and is greater than the 48% occupancy rate which was the most recent data in the information provided by FORVAC.

It is interesting to note that whilst average hive ownership is not very different between individuals/families and groups, total yield for individuals/families is **more than twice that of groups**. Whilst this was not a piece of scientific research this supports the point, made by many respondents, that individual hive ownership is better than group ownership.

Annex 3. Data – honey prices (as collected from beekeeper and retailers)

District Council	Honey form	Farm gate price (TSH.)	Retail price (TSH.)
Njombe	Comb honey	3,200/kg	–
Songea	Liquid honey	8,000 – 12,000/litre	12,000 – 15,000/litre
Namtumbo	Liquid honey	9,000 – 10,000/litre	10,000/870gm
	Comb honey	5,000/kg	-
Mbinga	Liquid honey	10,000/litre	10,000/kg
Nyasa	Liquid honey	7,000 – 8,000/litre	10,000/kg
Tunduru	Liquid honey	7,000 – 8,000/litre	10,000/kg

It is important to pay attention to units when considering honey yield. One person may give an answer in kilos of honey comb, whilst another might give an answer in litres of liquid honey.

Given that the conversion rate of honey comb to liquid honey is about 75% and one litre of liquid honey weighs 1.44 kg – one kilo of honey comb is very different to one litre of liquid honey.

1 kilo of honey comb gives about 700g of liquid honey.

700g of liquid honey is about 483 ml of honey.

So 1 kilo of honey comb yields about 0.5 litres of liquid honey i.e. about half.

So if someone sets a yield target of 7 per hive – it makes a big difference depending on whether they mean 7kilos of honey comb or 7 litres of liquid honey.

Formal retail outlets usually trade in grams or kilograms and exporters in tonnes. The reason why litres are used in less formal / local trade is because customers can ‘see’ the quantity by the size of the container – and where beekeepers / customers have no weighing scales, this provides a easy-to-use standard measure.

Annex 4. Tropical bees migrate in search of forage.

Tropical bees migrate in search of forage. It is a common strategy employed by tropical bees to help them to survive the dearth period or to move away from adverse weather conditions. For temperate bees the migration strategy is almost never used as it is likely to be fatal to the colony. Tropical bees, African and Africanised bees and all Asian species of *Apis* may utilise either the hoarding or the migrating strategy to survive dearth periods and may show high levels of seasonal migration. It is not clear why colonies migrate in some years and not in others.

Migration should not be confused with absconding. Migration is planned and is largely driven by varying patterns in resource scarcity and abundance. The term absconding is used when referring to an unplanned move in response to a shock e.g. pest attack.

Migration appears to occur due to scarcity of nectar, pollen or water and occurs primarily during the dearth periods found in tropical conditions. Migration tends to be seasonal and differs from disturbance-induced absconding in that colonies start preparing to move up to one month in advance of actually leaving. Firstly, the queen will reduce her egg laying rate so that very few larvae will be reared during this period. Those few eggs that are laid will be eaten by the workers. Most of the stored pollen and honey is also consumed by the bees. As soon as the last young brood has emerged the colony will leave. By doing this they ensure they have a good number of relatively young bees and the consumption of pollen ensures their fat bodies will be full of stored protein, ready to start rearing new workers in the new place.

Apis dorsata and *Apis laboriosa* (Asian spp.) are the bees that have the best recorded migration behaviour although a great deal is still unknown about it. In this instance there is a planned movement of all the colonies in a given area to a predetermined alternative migration site. According to Oldroyd and Wongsiri (2006) Asian honey bees do not usually store great amounts of honey. Their survival strategy is to put their effort into developing reproductive swarms rather than storing surplus food stuff that may be taken at any time by predators. This leaves the bees vulnerable to starvation if there is a prolonged shortage of nectar or pollen. Consequently, the response to diminishing resources is to move to an area where food is more abundant. In most cases open nesting bee species will migrate twice each year.

In Africa, *Apis mellifera*'s migration patterns are largely determined by altitude and rainfall patterns.

Broadly, a common seasonal pattern is for colonies to arrive at the end of the wet season. Then combs are built, there is a period of rapid colony growth and the strongest colonies produce reproductive swarms. By the end of the dry season, pollen availability is reduced, brood rearing diminishes and the adult population declines. Combs may be attacked by wax moths and predators while parasitic mite populations will be at the maximum. At this point colonies will move from the site and start a long migration to a new locality.

It is not clear how far migrating colonies can travel but it has been shown to be over 100km. As it travels the colony will settle in trees for rest periods. During this time the workers will forage for stores although a quiescent colony will have minimal energy needs. The colony will only move again once it has gathered sufficient stores for the next part of the journey. The movement is preceded by waggle dances on the surface of the colony that indicate the direction of movement. However, it is not known whether parts of the dance refer to the whole journey or just the part to be undertaken on that day. Under the right circumstance, a colony can move up 20kms each day. Nor is it understood how the bees find their intended new nest site since none of the workers who are travelling will have done the journey before and it is unlikely that the queen passes on this information. The probability is that the bees follow an environmentally beneficial trajectory determined by sufficient forage and optimum temperatures.

Once they near the new nesting site it is possible that the remains of last years combs offer some scent indication that the migration is complete. Despite this, *Apis dorsata* colonies are always started from scratch even if they are quite close the last season comb although *Apis florea* may take wax from another comb and reuse it in a new site. *Apis florea* migrations track abundant forage and other suitable physical conditions such as shade in summer and warmth in winter. *Apis mellifera* move away from some locations to avoid a heavy rainy season or to avoid a long dry season.

[Migration of bees - BfD Resource Centre \(beesfordevelopment.org\)](http://beesfordevelopment.org)

Annex 5. Nature-based beekeeping

There are many different beekeeping systems employed around the world and their applicability and success depends on the prevailing context and constraints. In miombo forest dominated landscapes the primary resources which underpin the success of beekeeping are the woodlands themselves and the bees, the nectar, the water and the hive-making materials therein. These landscapes provide plentiful nectar. Where these forests are large and distant from homesteads beekeepers must travel far to place hives and harvest honey. Or to put it another way, they don't have to travel far to place hives, but they **choose to**, because if they don't then the nectar resources of distant forests **goes uncollected by beekeepers**, and they lose money. Beekeepers choose to place hives in distant forests because they are able to hang many hundreds of hives and harvest a lot of honey. Such a working environment is however risky, calls for many hundreds of hives and beekeepers need to manage their time. Beekeepers have learned through experience that making and hanging many hives "**pays better**" than closely tending and managing fewer individual colonies. The forest beekeeping system devised by beekeepers in this context is well known. It relies on the use of log hives and bark hives which beekeepers either make themselves or purchase at a low cost – and disperse at low density over many hectares of forest. The Tanzania National Beekeeping Strategy is moving towards the replacement of these low-cost hives, to more financially expensive timber top-bar hives. Timber top-bar hives work very well and are suitable in many contexts. But not all. For many, many ordinary farmers they are too expensive and are not suited forest beekeeping systems. It is often said that the use of log and bark hives **causes deforestation** and this is the reason why their use should be replaced with timber top-bar hives. This thinking needs to be carefully examined, and perhaps re-considered.

- The definition of deforestation is the total removal of forest. The main cause of total removal of forest in Tanzania is conversion of forest to farmland. Forest beekeepers are extremely selective in their use of trees to make log and bark hives [only a few trees in each hectare are suitable], and their rate of tree use is balanced by natural regeneration of trees.
- The FORVAC project management plans have calculated Annual Allowable Cut (AAC) for a range of miombo species. This is useful. It should be possible to apply the same AAC to use of trees to make beehives, whilst keeping within sustainable limits.
- Using miombo species to make beehives (regardless of the method of making or type of hive) is a rational use of natural tree capital. For example see the case below.

Using indigenous trees to make hives is rational

One beekeeper told us that he used one large *Syzigium cordatum* to make 3 hives

Based on the information he provided we can estimate that it should be possible to harvest 8 litres of liquid honey a year for 20 years x 3 hives at TSH 10,000 = TSH 4,800,000.

If, as is sometimes the case, the hives are empty half the time – then we need to divide this total by 2. Divided by 2 (if hives empty half the time) = TSH 2,400,000

Provided the harvest of the *Syzigium cordatum* is within the Annual Allowable Cut – and this can be checked and counted – then using this tree in this way is economically rational.

Nature-based beekeeping

Forest beekeeping systems rely more heavily on the use of natural capital, compared to financial/cash capital. People are using their natural resources – nectar, bees and hive-making materials – in a rational way, for economic activity. Tanzanian beekeepers have developed in-depth indigenous skills and knowledge to achieve this. If we look at log and bark hive beekeeping through a new lens, we

see that it is the ultimate nature-based system. It is an economically viable system for harvesting nectar from large, distant forests. The system employs many, low-cost hives and comprises risk mitigation strategies (unpredictable nectar flows, migrating bees, pests, fire, theft). There is an acceptable trade-off between no. of hives, colonisation rate and yield. The time spent hanging hives and harvesting honey is '**worth it**'. Nature-based beekeeping fits with bees' natural behaviour, and uses natural capital (hive-making, nectar, bees). This 'intangible' has a value globally – it is special. It is possible to say that the honey harvested is "The most natural honey in the world". This feature might not be immediately of interest to the beekeepers, but it can drive marketing messages and api-tourism – especially with international consumers who are attracted to ideas about nature and natural produce.

The biggest draw back to nature-based beekeeping is that it is an extensive system, not an intensive system, and you need a lot of forest. If you don't have a lot of forest, it is not a workable system. This however, can be seen as a plus if the aim is to protect forests. Nature-based beekeepers have a vested interest to maintain forests and can become active, hard-working advocates in the endeavour to save forests. Nature-based beekeepers are not only beekeepers, they are forest-keepers.

Wider policy implications

- Nature-based beekeeping has much to offer the beekeeping sector in Tanzania
- Nature-based beekeeping needs to be given due attention by policy-makers, researchers, educators and marketeers.

Annex 6: Links to some useful beekeeping documents

Links

1. Beekeeping Policy Implementation Strategy (2021 – 2031)

[https://www.maliasili.go.tz/assets/pdfs/BeekeepingPolicyImplementationStrategy\(2021_2031\)final.pdf](https://www.maliasili.go.tz/assets/pdfs/BeekeepingPolicyImplementationStrategy(2021_2031)final.pdf)

2. National Beekeeping Training and Extension Manual

https://www.tfs.go.tz/uploads/National_Beekeeping_Training_and_Extension_Manual.pdf

3. Beekeeping General Regulations 2005

<https://faolex.fao.org/docs/pdf/tan205038.pdf>

https://www.tfs.go.tz/uploads/GN_454-

[THE_BEEKEEPING_\(GENERAL\)\(AMENDMENT\)_REGULATIONS_2019.pdf](https://www.tfs.go.tz/uploads/GN_454-THE_BEEKEEPING_(GENERAL)(AMENDMENT)_REGULATIONS_2019.pdf)

4. Guidelines for Quality Assurance of Bee Products in Tanzania

<https://trade.tanzania.go.tz/media/inspection%20guideline.pdf>

5. Guidelines for Management and Use of Honeybees Colonies for Pollination Services in Tanzania

https://www.tfs.go.tz/uploads/Guideline_for_Use_of_Honeybee_Colonies.pdf

6. Description and resources about Nature-based Beekeeping

[Nature Based Beekeeping - BfD Resource Centre \(beesfordevelopment.org\)](https://beesfordevelopment.org/nature-based-beekeeping)

7. Getting bees into hives – video

[Practical Beekeeping - BfD Resource Centre \(beesfordevelopment.org\)](https://beesfordevelopment.org/getting-bees-into-hives)

8. Practical beekeeping information

[Practical Beekeeping - BfD Resource Centre \(beesfordevelopment.org\)](https://beesfordevelopment.org/practical-beekeeping)

9. Beekeeping economics

[Beekeeping economics in Uganda - BfD Resource Centre \(beesfordevelopment.org\)](https://beesfordevelopment.org/beekeeping-economics-uganda)

[Beekeeping economics - woodland beekeeping in Zambia - BfD Resource Centre \(beesfordevelopment.org\)](https://beesfordevelopment.org/beekeeping-economics-woodland-beekeeping-zambia)

[Making a profit as a community based producer organisation - Can you sell to a packer? - BfD Resource Centre \(beesfordevelopment.org\)](https://beesfordevelopment.org/making-a-profit-as-a-community-based-producer-organisation)

10. Extensive beekeeping

[Extensive beekeeping - Issuu](https://beesfordevelopment.org/extensive-beekeeping)

Annex 7. Gallery of images

Image gallery



Image 1 Stakeholder meeting in Mbinga



Image 2 Hive in protected forest patch near Liwuli village, Nyasa



Image 3 Planks of miombo species, sawn by a beekeeper near Songea for making top-bar hives



Image 4 Plenty of timber in Njombe for hive-making; beneficial for Njombe beekeepers



Image 6 Top-bar hives placed in trees cannot be 'managed' as movable comb hives.



Image 5 Michael Muhehi selling stingless bee honey in Tunduru



Image 7 The Komba family near Litowa village keep a forest for their beekeeping and for the future



Image 8 The TFS apiary in Nyasa produces a lot of honey – but not more than can be absorbed in the district



Image 9 This forest patch is maintained for beekeeping near Kumbara village



Image 10 This forest patch is regenerating after having previously been used for farming; now used for beekeeping in Chengena



Image 11 Abel Fabian Ngongono in Kumbara explains that he will stop any fires from damaging this forest and the beehives he keeps there



Image 12 Notice beside the bee forest in Chengena



Image 14 Erica in Nyasa wants to sell a lot of honey; her business model is low margins and high volumes



Image 13 The bees absconded due to ant infestation



Image 16 Alfonso Ngailo prefers log hives because they are easier to open and check compared to top-bar hives which suffer from cross-combing



Image 15 The main cause of forest loss is conversion of forest to farm, not use of trees for hive-making

Annex 8: Responses to feedback on version 1 of the report

1. The document needs to be refined, there are some missing information and a bit of storytelling and question asking. Perhaps a more concentration on situation reporting could be good.

Changes made.

2. It is reported in some part of the document that the colonization rate was inferred from beekeepers' knowledge. Where there an attempt to assess it in the field to selected apiaries? At least to confirm the information from the beekeepers.

We asked individual beekeepers about their colonisation rates and they told us (41 beekeepers). See summary of information in Annex 2. In addition, we assessed selected apiaries – and the colonization rates that we saw were in line with what beekeepers said. This preoccupation (no pun intended) rate with colonization rates **does not** reflect the whole picture. Colonisation rates change (they are not static) and they are only **one part** of the economics of beekeeping as an enterprise.

3. If the farm gate price is considered currently to be expensive by the buyers, was there an assessment of what is supposed to be a rational farm gate price to a kilo of liquid honey? Is it so that buyers tend to offer low prices to the producers so that they can enjoy the super profit? At least in Tanzania buyers have a tendency of determine the prices of commodities from the farmers, how is it so in the study area.

There must be a 'bottom' price – below which it is not worth it for the beekeeper. But after that there is a range of prices which are determined by supply and demand – locally, regionally, nationally, internationally. There is really no such thing as a standard, rational price for honey.

No, bulk buyers are not offering low prices so they can enjoy 'super profits' ... big buyers are probably exporters, and they have to compete with international prices. The truth is that there is some very cheap mass-produced honey 'out there' and Tanzanian exporters have to be lean operators to compete. They are profit-orientated, smart business people – but they are not exploitative. Not companies like Swahili Honey, because they need beekeepers on their side to do their business. They have invested in the sector – they are not trying to abuse beekeepers. There are examples, perhaps, of informal merchants who lend money to beekeepers on the strength of forthcoming harvests – and offer low prices when people are desperate. This type of practice verges on exploitation, but was not seen in the project area.



Stamford Street Co. Clear Honey 340g



[Read reviews \(77\)](#) [Write a review](#)

ALDI PRICE MATCH*

Clear honey

75p 22p / 100g

Add

This honey, on sale in UK is £2.22 for 1 kilo or 0.7 litres, or TSH 10,000 for one litre. This example is deliberately provided as at the cheaper end of the scale, it illustrates what honey exporters have to compete with.

4. The draft well describes the challenges and gives good recommendations for development of honey production as well as includes thoughtful discussion. As there is no time for implement the recommendation during FORVAC, the report create basis for development of honey production activities for the next project. Keeping this in the mind, I think the report could benefit from some links or list of guidelines or other publications, training materials, good practices, etc. (from donors, institutions, etc.) that would give concrete advice how the recommendations could be implemented in practice. I understood that the consultants are very experienced in the sector so they should be able to recommend useful material. In addition, there must be hundreds of donor supported beekeeping project in Tanzania, any lesson learnt from them?

Links provided in Annex 6.

5. TFS is producing a lot of honey, where or how do they sell it? Would there be any role of TFS being 'middle man' or trainer for small producers? Would this be realistic in any condition and what kind of incentive for them would be needed.

Perhaps we gave the wrong impression. TFS are producing good amounts of honey, but not a surplus beyond local demand. There is no surplus beyond what the districts can consume. TFS do have a role to play in the honey sector. They are already playing a role of trainers – to some extent. They have a plan to establish a company and buy honey from others, but governments tend to have a poor track-record of doing business. But yes, this would be an interesting development to watch for in the future and could help beekeepers. It could however harm private sector operators, as TFS will be competing with them and they may not be operating on a level-playing field.

6. 4.4. Markets and trade – I do not understand prices: 8-15000/litre, but Juliana buys with 70-90 000 and 100 000 vs. 160 000??

Units! Litres v buckets. We have corrected this part.

7. The buyer and processor do not get enough honey from the district. Have they done something to develop a value chain, e.g. "contract farmers"?

No – this would cost them a lot of money. The local district-based buyers and processors are micro-businesses. They don't have the money or the capacity to establish outgrower systems. They are just small business people like anyone else – not big investors with long term investment plans.

8. There is lack of bulk buyers, do you have an idea how much honey would Swahili need to get in order return to the district and approximately how many colonies would it require. How this value chain could be developed demand-led?

He said he would need 20 tonnes at least to make a purchase (at the right price, right quality, collected in easy pick-up points) – but that would be for one purchase. We need to talk about something more sustainable and long term. This is the most interesting and important recommendation.

9. One recommendation is to arrange study tours for district officials. How about study tours for advanced beekeepers to other districts where the sector is more developed?

I think we said (or intended to say) that the study tours should be for the beekeepers, not the officials.

10. There was no any mention of quality of honey (expect liquid/comb), but how are sanitary and phytosanitary issues dealt in the value chain

The processors – variable. Some are following the TBS standards very well e.g. Erica in Nyasa. If beekeepers are processing at home and selling locally – people just go on trust – they see the beekeeper, the bees, the containers and make their judgement. Some honey on sale e.g. in the food market in Tunduru – was not well presented and unlikely to meet TBS standards. Issues of quality really come into play when you start accessing distant markets. Where the consumer does not see the premises or meet the beekeeper. See next point.

11. Why the traders are interested in buying combs instead of honey?

This goes to the previous point. Traders want more control over the processes that go into processing – to ensure cleanliness etc. If beekeepers sell comb they just take the comb out of the hive and put it in a bucket. It never touches any other equipment which might be dirty or exposed to any other possible contaminants / moisture / smells.

It works for the beekeepers too. Once you are operating at a larger scale (by that we mean are harvesting 100 kilos of honey or more) – then processing at home is time-consuming, tedious and difficult without proper premises and equipment.

Beeswax. At present beekeepers hardly process and sell beeswax at all – so this value is lost to the value chain. Bulk buyers can deal with it, accumulate large amounts and can sell it. The beeswax they get helps offset their costs. One could certainly argue that beekeepers are selling their beeswax (when they sell honey in the comb) at a very cheap price. But selling at a cheap price is better than not selling it at all! But yes – buyers want the beeswax. In short there are two reasons why traders are interested in buying combs:

1. They cut out processes (e.g. filtering using sub-standard equipment) which they cannot control and may impinge on quality
2. They obtain the beeswax at a relatively low price

References

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Mmassey et. al. 2023. Beekeeping in Tanzania: Enhancing hive occupancy and production of honeybee products for improved livelihoods in selected beekeeping potential areas. Technical report for Tabora and Geita Regions

