

BEEKEEPING FOR INCOME GENERATION AND COASTAL FOREST CONSERVATION IN TANZANIA

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Background

Forest loss and fragmentation are widely recognised as the two most important factors responsible for the degradation of the environment in Lindi Region, Tanzania. Available information on the components of forest, especially in the natural-resource-dependent areas, indicates a gloomy trend. The continuing forest loss is a telling measure of the imbalance between human needs and wants and nature's capacity. Lindi Region has potential and abundant areas for the development of beekeeping (URT, 2005). Existence of high beekeeping potential is a function of the presence of virgin forests (mainly miombo woodlands), a low human population density that provides an environment conducive for the establishment of beekeeping activities, bee fodder plants (natural and cultivars), and knowledge of beekeeping. The development of beekeeping activities for income generation and forest management is

hindered by poor transport infrastructure and marketing systems for bee products (Kihwele *et al.*, 2001; Ngaga *et al.*, 2005).

Improved marketing of bee products will ensure increased income and food security at household and national levels thereby achieving the national and UN development millennium goals of poverty reduction and natural resource management (UN, 2005). Furthermore, the importance of beekeeping as an income-generating activity is due to the fact that many people use honey as food, medicine and for sale. Beekeeping offers a great potential for development and is comparatively less demanding in terms of investment, labour and time. Also, beekeeping is advocated to improve human welfare by alleviating poverty through increased household income: it is a source of food and nutritional security, raw materials for various industries, medicine, increased government revenue through levies and taxes, improved biodiversity conservation and enhancing environmental resilience (Kihwele *et al.*, 1999; MNRT, 2004).

Beekeeping gives local people and the Government economic incentive for the retention of natural habitats, and is an ideal activity in any forest conservation programme (Mwakatobe, 2001; Okoso-Amaa *et al.*, 2004). Despite the significance of beekeeping, there is little or no empirical evidence on the potential of beekeeping for income generation and forest management in Lindi Region. Most of the available research material is in the form of scientific documents with little information in the direction of rural development or forest conservation. Therefore there was a need for information for use by beneficiaries and policy makers.

The study area

Mangrove forests (along the seashore) and miombo woodlands (upland) are the two categories of coastal forests rich in biodiversity that are dominant in Lindi Region. Miombo woodlands are mainly in forest reserves. (See also Figure 1, left).

Data collection and analysis

120 households were interviewed, 30 in each village using the sampling techniques of Bailey (1994). Participatory Rural Appraisal (PRA) household questionnaires, a checklist of questions and participant observation were used for data collection. Socio-economic data were analysed by SPSS programme. Data collected through PRA were analysed with the help of the local community.

Income evaluation

Table 1. Income of smallholder beekeepers and non-beekeepers

Activity	Monthly income (TZS)		
	Mean	Minimum	Maximum
Beekeepers	67,405	15,000	427,000
Non-beekeepers	51,259	3,000	300,000

Source: Field data, 2005

€1 = TZS 1,840; US\$1 = TZS 1,170

Smallholder beekeepers have a higher income than non-beekeepers. This implies that beekeeping products (honey and beeswax) raise the income of beekeepers, contrary to non-beekeepers who depend mainly on commercial crops such as cashew nuts and simsim, whose prices have fallen in recent years due to poor marketing systems.

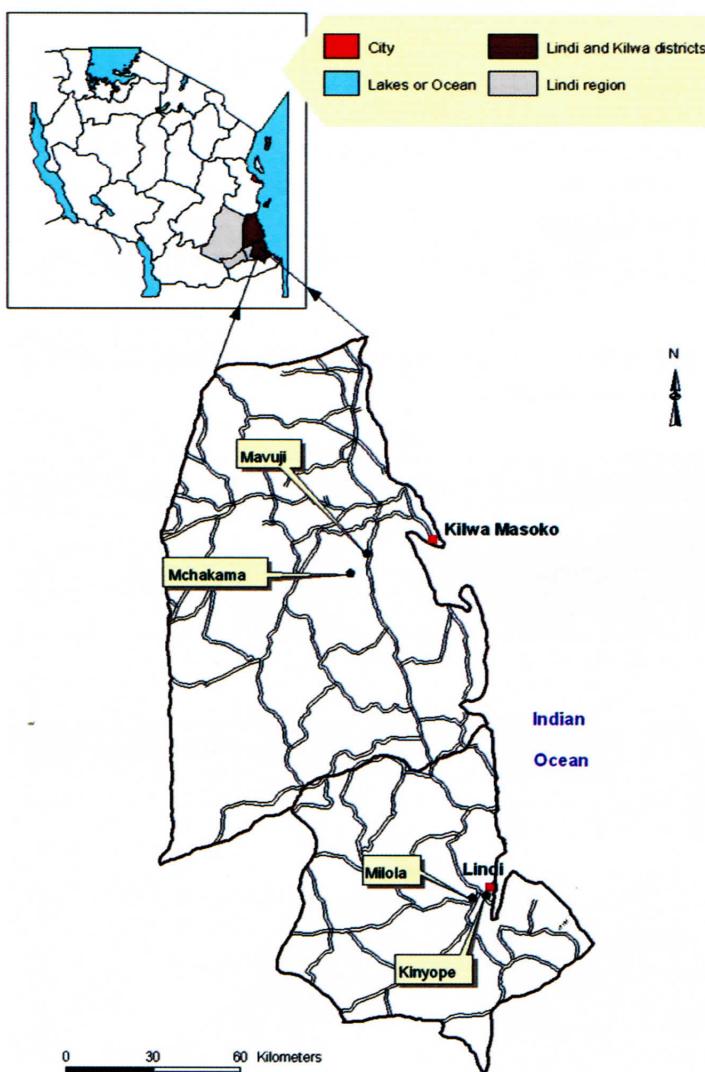


Figure 1. Kilwa and Lindi Rural Districts in Lindi Region (the brown line denotes District boundaries). Kilwa Masoko and Lindi house the District Headquarters (red dots). The study areas included Mavuji and Mchakama villages in Kilwa District and Kinyope and Milola villages in Lindi Rural District. Small double lines denote roads.

Participation in beekeeping activities

Table 2. Groups of people and their participation

Group	Participation in beekeeping activities (%)
Men only	33
Men with boys	33
Old men	29
Men with women	5

Beekeeping activities involved both genders at different stages of honey and beeswax processing and marketing. For example, 66% of respondents represented men only and men with boys' involvement in beekeeping activities. On the other hand 29% of respondents mentioned old men participating in beekeeping activities. Traditionally, men are responsible for honey harvesting which is normally carried out at night because they are scared of honey bees during the day. In Milola and Kinyope villages, division of labour was evident. While men specialise in the construction of hives and honey harvesting, women are involved in carrying unprocessed honey home from the forest. The dominance of men in beekeeping activities in the study villages seemed to have unplayed the role and contribution women have made with respect to managing bee reserves and habitats, harvesting of crude honey, and the processing of bee products.

Indigenous knowledge and equipment

Smallholder beekeepers in Tanzania have rich indigenous knowledge of beekeeping. They also have good knowledge of different types of hives, bee smokers and honey containers. In terms of hive types, it was found that most smallholder beekeepers use local style gourd hives as shown. The reason is that they are cheaper than other types of hive and are locally available. The gourd hive is one of the oldest items of indigenous equipment and has been adopted in areas of Tanzania where alternative materials for hive making are scarce. Split log and bark hives are also used by smallholder beekeepers in the study area: over 95% of hives used by smallholder beekeepers in Tanzania are of this type. In the study villages, split log and bark hives are made by tree debarking, thus several trees are destroyed. However, split log and bark hives are locally considered to be the most convenient because of the abundance of miombo woodlands, which provide easily obtainable and suitable longevity, low cost, and the indigenous knowledge of hive making.

Tree species preferred for hive making include *Acacia spp*, *Afzelia quanzensis*, *Brachystegia spiciformis*, *Jubernadia globiflora* and *Pterocarpus angolensis*. Durability and ample availability are two major reasons for these preferences.

This indigenous knowledge enables smallholders to carry out beekeeping activities at minimal cost, as it does not need heavy investment in terms of financial and human capital, for equipment and extensionists. Nevertheless, in terms of production, indigenous knowledge has an adverse impact on the quantity and quality of bee products.

The art of beekeeping

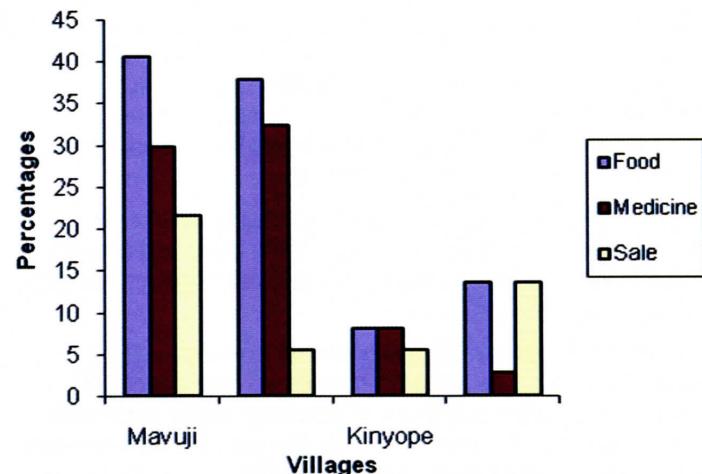
Smallholder beekeepers know how, and where, to establish an apiary in ecological areas for maximum production of bee products. For instance in Milola village, beekeepers established their apiaries by hanging hives from trees in areas with sources of water and adequate bee fodder plants, in miombo woodlands.

In the study villages, smallholder beekeepers use a mixture of wax and cassava leaves *mtondwa* as bait for attracting colonies when stocking hives. Smoke *mwenge* is used to subdue the bees during harvesting.

Uses of honey

Honey is used as food, medicine and for sale

Figure 2. Honey uses in the study villages, Lindi District



Honey is added to porridge or tea as a substitute for sugar. In Kinyope village, honey is used mainly as the raw material for brewing. As shown in Figure 2, less honey is sold compared with the other two uses of honey. This is probably due to poor market promotion and prices, and poor transport infrastructure. It was found that as medicine, honey is used in Milola and Mchakama villages to cure people suffering from stomach ulcers, burns, wounds from fire and for children suffering blood shortages.

While respondents were aware that some diseases were treated with honey, some of them did not know how much or how frequently one should use honey.

Table 3. Annual household income generated from honey and beeswax in the study villages

Village	Income from honey (TZS)/year	Income from wax (TZS)/year
Mavuji	Mean	26,380
	Min	1,200
	Max	142,000
Mchakama	Mean	152,714
	Min	8,000
	Max	600,000
Kinyope	Mean	61,000
	Min	18,000
	Max	140,000
Milola	Mean	66,400
	Min	24,000
	Max	180,000

Source: Field data, 2005

€1 = TZS 1,840; US\$1 = TZS 1,170

Income generation and forest management

The reason that the highest incomes generated from honey and beeswax occur in Mchakama village may be due to the awareness created by Mchakama Beekeeping Group.

According to the study, the income generated from beekeeping is invested in other economic undertakings including petty trading and fishing, and is used for paying for social services - education, health, transport and housing.

This study did not find any evidence of cash income generated from eco-tourism of bee reserves and apiaries. Bee reserves can be used to generate incomes for the local communities as is the case at Onana Bee Research and Extension Centre in Moshi District, and Njiro Beekeeping Research Centre, Arusha, where owners of bee reserves earn good incomes from study tours that are made by people from within and outside the country (MNRT, 2001).

Apart from income generation, beekeeping activities produce various tangible benefits and contribute to sustainable management of natural resources and increased biodiversity. Milola division beekeeping officer Mr Yusufu Juma Mponda said:

"Beekeeping is very useful and important for forest resource management. This is because where beekeepers have put their hives they protect and avoid bush fires, and discourage people from cutting timber, poles and other forest resources. After some time these areas become green because the vegetation is allowed to grow. In such areas you find also fresh air due to forest vegetation cover. Not many people pass near apiaries for fear of being stung by bees, consequently giving more room for grass and other plants. Therefore where there is an apiary, forest resources are conserved."

Some tree species that are conserved through beekeeping include *Brachystegia spiciformis*, *Dalbergia melanoxylon*, *Dalbergia nitidula*, *Jubernadia globiflora* and *Pterocarpus angolensis*.

In addition to their role in forest resource management, bees are important pollinators of wild and agricultural plants. Increased income of smallholder beekeepers in the study areas has increased awareness of the value of forest resource management and livelihoods. This agrees with Kihwele *et al* (2001), who contended that individuals, communities and organised groups can effectively respond to the shocks and stresses caused by impoverishing forces, by practising beekeeping activities.

Conclusions

The majority of respondents (83%) fall within the productive ages 18-60 years. It was realised that women are not fully involved in beekeeping activities. It is vital to make the beekeeping industry more vibrant, to contribute to the national goal of reducing poverty, improving community livelihoods and maintaining sustainable natural resources.

Beekeeping has a potential contribution to the incomes of smallholders in Kilwa and Lindi Rural Districts. This income is generated through selling honey and beeswax. Constraints on the efforts of beekeepers



A gourd hive used for beekeeping in Mchakama village, Kilwa Region

include the poor marketing system, and inefficient road and communication infrastructures. Marketing of bee products in the villages is poorly organised, such that honey is used within the villages as food and medicine.

Recommendations

- The Government should improve road and communication infrastructures to facilitate information dissemination and the smooth movement of bee products to potential markets.
- Development partners should facilitate the involvement of women in beekeeping activities in the study villages. This can be achieved through women's access to information, extension and training, and exchange visits to increase their participation in beekeeping activities, and consequently improve household incomes and livelihoods.
- Development partners should fund research to ascertain ways of improving harvesting and marketing of bee products to enhance their quality and quantity and hence improve the livelihoods of people in the study villages.

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EDITOR'S NOTE References cited are with the article on the BfD website Information Centre.

GERMANY SUSPENDS PESTICIDE APPROVALS AFTER MASS DEATH OF BEES

The German Office for Consumer Protection and Food Safety (BVL) has reportedly suspended the approval of eight pesticides after the mass death of bees in one State. The German Research Centre for Cultivated Plants reported that 29 out of 30 dead bees it examined in Germany's Baden-Wuerttemberg state had been killed by contact with clothianidin, a product found in one of the seed treatment products.

The suspended products are: Antarc (ingredient: imidacloprid; produced by Bayer), Chinook (imidacloprid; Bayer), Cruiser (thiamethoxam; Syngenta), Elado (clothianidin; Bayer), Faibel (imidacloprid; Bayer), Mesurol (methiocarb; Bayer) and Poncho (clothianidin; Bayer).

Beekeepers and agricultural officials in France, Italy, and the Netherlands all noticed similar phenomena in their fields when planting began a few weeks ago. The use of these pesticides has also affected the population of wild bees and other insects, prompting the 'Coalition against Bayer-dangers' to demand that the pesticide maker withdraw all neonicotinoids from the market worldwide. "We have been pointing out the risks of neonicotinoids such as imidacloprid and clothianidin for almost 10 years now," Philipp Mimkes, spokesman for the 'Coalition against Bayer-dangers' said in a press release. He added that since Bayer has an annual turn-over of nearly €0.8 billion (US\$1.25 billion), it makes imidacloprid and clothianidin its most important products. "This is the reason why Bayer, despite serious environmental damage, is fighting against any application prohibitions," Mimkes added.

According to the US Environmental Protection Agency's fact sheet, clothianidin, which is a non-selective poison, is highly toxic to honey bees. The chemical is often sprayed on corn fields during spring planting to create a protective film.

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