

## **Beekeeping for Rural Development: Its Potentiality and Constraints in Eastern Tigray, Northern Ethiopia**

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**Abstract:** Beekeeping in Ethiopia plays an important role in income generation for beekeepers. A household survey was conducted to assess the potential of beekeeping for rural development and identify the major constraints of beekeepers in a village called Hangodo in Saese Tseada Enba district Tigray, northern Ethiopia. Data were collected through the use of semi structure interview with randomly selected 85 beekeepers representing 87.6% of the total beekeepers in the village. Modern honey production accounted 91% of the potential annual income representing \$USD 27,623. The extent of adoption of modern bee hives was 75.3% which is much greater than the regional average of 31%. Majority (67%) of the respondents had modern beehive to enhance honey production and increase their income. The major beekeeping constraints were pests and predators, absconding, shortage of bee forage and drought. Despite all the constraints and challenges, there are enormous opportunities and potentials to boost the production and quality of honey products in the village. Enhancing bee forage plantation through introducing Multi-Purpose Trees (MPT) such as fruit crops is recommended.

**Key words:** Beekeeping, constraints, beehives, honey, Tigray, Ethiopia

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### **INTRODUCTION**

There is no well-documented evidence that indicates when and where beekeeping practice started in Ethiopia. However according to Ayalew (1978), beekeeping had started in the country between 3500-3000 B.C. The moderate climate of Ethiopia makes one of the most successful countries in the tropics in box hive utilization (Ruttner, 1988). Ethiopia has a share of around 23.58 and 2.13% of the total Africa and world honey production, respectively. The country is the leading honey producer in Africa and one of the 10 largest honey-producing countries in the world (Ayalew, 1990). The country is also one of the four largest bees-wax producing countries. In Ethiopia, beeswax is one of the 12 major exportable agricultural products (Mammo, 1976). About 1 million farmers are engaged in beekeeping in the country (Mammo, 1976). There are an estimated 10 million bee colonies out of which farmers keep about 7 million in traditional and modern hives that the remaining exists in forests and cervices (EMA, 1981) and this represents the highest bee density in Africa. Beekeeping is a long lasting practice in Ethiopia. Ethiopia produces about 28,500 tons of honey and 5000 tons of beeswax annually (HBRC, 2004). Beekeeping in Ethiopia plays an important role in income generation for beekeepers (farmers). In the country, an average of 420 million Eth. Birr or 35 million

\$USD is obtained annually from the sale of honey. Honey production of the country meets beverage requirements of the urban and rural population. It is also demanded for its nutritional and medicinal values. The others hive products such as beeswax; royal jelly, propolis and bee venom have high demand globally. Honeybees play a great role in pollinating plants. Particularly, self-sterile plants should get pollinating agents to maintain viable seed. The yield of plants pollinated by honeybees can be increased in quality and quantity. According to Crane (1990), honeybees can increase the yield of *Citrus sinensis* by 30%, watermelon by 100% and tomatoes by 25%. Adimasu *et al.* (2004) also reported that onion yields had increased by 94% due to honeybee's pollination. In addition, beekeeping sub-sector has a lot of relative advantages. The economy of Tigray is almost entirely agricultural with small holder cultivation of cereals and pulses mainly characterized by subsistence farming mixed with livestock rearing. The average size of land available to a four-person household is about 0.5 ha too small to support the family on agricultural production alone. Beekeeping is therefore one of the major areas of intervention for poverty alleviation in Ethiopia. For instance, it does not require fertile land as well as large area. Males and females of all working age groups can practice it. It also requires little initial capital. Despite the significance of beekeeping, there is little empirical

evidence on the potential of beekeeping for income generation and forest management in Tigray Region. There is limited information currently available on the constraints of beekeeping in the honeybee sub-sector. The theme of this investigation was to assess potential of beekeeping for rural development and identify the major constraints of beekeepers in the village.

**MATERIALS AND METHODS**

**Study area:** The study was conducted in a village called Hangodo in Saese Tseada Enba district located in the Eastern Tigray, Northern Ethiopia. The district was earlier covered in dense forest but deforestation over the last 30 years has left only sparse forestry, cactus and bush scrub. Temperatures reach maximum of 25-30 (°C) and minimum of 12-16°C while mean annual rainfall is 250-300 mm during the rainy months of June and August. The population is a thin spread at 30-40 people km<sup>2</sup>. The main economic activity is livestock production mixed with limited crop cultivation. The main livestock types are cattle and shoats (sheep and goats) (Livelihood Profile Tigray Region Ethiopia, 2007). Livestock are kept primarily as a store of wealth and sold when the need for income arises. Hangoda has 813 households with an area of approximately 1714 ha.

Data were collected through the use of semi structure interview with randomly selected 85 beekeepers representing 87.6% of the total beekeepers in the village. Generally, the instrument was designed to generate information in the following areas: annual income, number and type of beehive owned, constraints of beekeeping, honey yield/hive, year of adoption of modern beehives and beekeeping experience.

**RESULTS AND DISCUSSION**

Modern honey production accounted 91% of the potential annual income representing \$USD 27,623. The extent of adoption of modern bee hives was 75.3% which is much greater than the regional average of 31% (Table 1). There were 97 beekeepers, about 12% of the total households in the village. The exact number of people engaged in the honey sub-sector in Ethiopia is not well known. However, it is estimated that around 1 million farm households are involved in beekeeping business using the traditional, intermediate and modern hives (Beyene and Davide, 2007). On average 30 and 13 kg of honey per hive was harvested, respectively from modern and traditional hives. The total honey production of Ethiopia is estimated up to 24000 metric tons only a small amount of this is marketed. Besides poor marketing

Table 1: Number of beehives and estimated annual income in \$USD (n = 85) at Hangdog village Eastern Tigray, Ethiopia

Beehives	Total (%)	Annual income in \$USD
Modern	171 (75.3)	27,623
Traditional	56 (24.7)	2,800
Total	227 (100)	30,423

conditions the main reason is that about 80% of the total Ethiopian honey production goes in to the local Tej-preparation, a honey wine which consumed as national drink in large quantities (Hartmann, 2004). The price of 1 kg pure honey was on average 5.4 and 3.9 \$USD from modern and traditional beehive, respectively. It is estimated that a beekeeper could get about 161.5 \$USD gross benefit per hive/annum from modern beehive. Beekeeping contributes to the incomes of households and the economy of the nation. Honey production through beekeeping could be a useful avenue for improving rural economy (Baptist and Punchihewa, 1983).

The direct contribution of beekeeping includes the value of the outputs produced such as honey, bee wax, queen and bee colonies and other products such as pollen, royal jelly, bee venom and propolis in cosmetics and medicine (ARSD, 2000; Gezahegn, 2001). It also provides an employment opportunity in the sector. Majority (67%) of the respondents had modern beehive to enhance honey production and increase their income (Fig. 1). Although, beekeeping is an old age practice in the region, modern beehives have been introduced very recently. Improved box hives have been introduced and promoted in Ethiopia for the last 40 years (Kerealem, 2005). The Ethiopian government, realizing the potential of beekeeping sub-sector of the country in 1965, established beekeeping demonstration stations at different parts of the county (Workneh, 2007). The main objectives of the demonstration stations were to introduce improved beekeeping technologies (box hives, casting mold, honey extractor, honey presser, smoker, water sprayer, veil, glove, etc.) imported from abroad to the beekeepers and to offer beekeeping training for farmers and experts (Workneh, 2007).

Modern beehives allow honeybee colony management and use of a higher-level technology with larger colonies and can give higher yield and quality honey (Crane, 1990). Moreover, improved box hive has advantages over the others in that it gives high honey yield in quality and in quantity. High yield, quality honey, ease for inspection and harvesting of products are the major relative advantages of modern beehives compared to the traditional one. The probability of adoption of a new technology will depend on the difference in profitability between the new and old technologies and

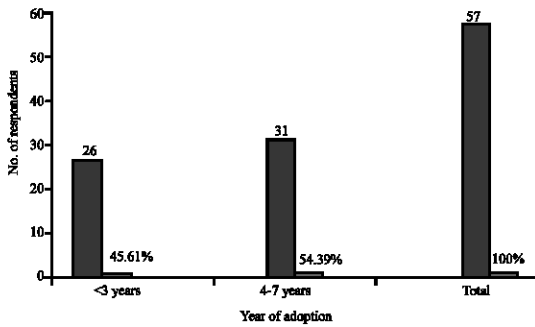


Fig. 1: Adoption of modern beehives in time span (n = 57)

the ability of the farmer to perceive the advantages and efficiently utilize the new technology (Schultz, 1995). According to the beekeepers, the major beekeeping constraints were pests and predators, absconding, shortage of bee forage and drought. The existence of honeybee's pests and predators affect the honeybees life which in turn also leads them to absconding (Workneh, 2007). Absconding (the total movement of honeybee colony by leaving the hive) can happen due to different reasons. Lack of feed, honeybee pests and drought are the main problems that may cause absconding (Workneh, 2007). Shortage of bee forage cause the honeybee colony to absconds to areas where resources are available for their survival. Based on the results of rural households socio-economic baseline survey, shortage of bee forage was the major constraint of beekeeping in the Amhara Region, Ethiopia (BFED, 2002, 2004).

### CONCLUSION

In this study, despite all the constraints and challenges, there are enormous opportunities and potentials to boost the production and quality of honey products in the village. Enhancing bee forage plantation through introducing Multi-Purpose Trees (MPT) such as fruit crops is recommended.

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