

Assessment of beekeeping production and constraints in Jimma Horro District, Kellem Wollega Zone Oromia Ethiopia

Soresa Shuma Abdisa*, soriyeshuma@gmail.com

1. Dambi Dollo University, Ethiopia.

The study was conducted in Kellem Wollega Zone in Jimma Horro District, Oromia region; Ethiopia aims to assess beekeeping production systems and constraints from September 2018 to December 2019. Totally, 150 households were selected for the study. Semi structured questionnaire was prepared to collect primary data. The collected data were analyzed using descriptive statistics and the results were organized by tables and graphs. Based on the survey result, about 97% of the respondents indicated there are different forage types of honey bees' floras like shrubs, bushes, Nuge, Sunflower, cultivated crops herbs, weeds and some woody plants like Wanza, Koshem, Sesbania, Acacia and Tree Lucerne. The majority (90%) of the respondents obtained beekeeping by catching swarms. Honey was harvested twice a year from May to June and November to January. The survey result also indicated that beekeeping has a huge number of constraints that hinder honey bee production and profitability. The major constraints are pests and predators, Pesticides and herbicides application and swarming. The respondents indicated that, they have interest to improve beekeeping practices in the area. So the government and non-governmental organizations (NGOs) should support by training them on how to manage honey bee flora, and providing modern honey bee equipment to enhance the honey productivity is also very important to enhance the products of beekeeping in the study area.

Key words: Beekeeping production, Ethiopia.

INTRODUCTION

The beekeeping sub-sector has been an integral part of agriculture in Ethiopia. It has been contributing to household income and national economy through export, and also acts as poverty alleviation. The country has huge apicultural resources that made it the leading honey and beeswax producer in Africa (Fikru, 2015). According to central statistics agency of Ethiopia (CSA, 2015a), a total of about 5.89 million hives were estimated to be found in the rural sedentary areas of the country. From these total hives, the greater part (96.23%) is reported to be traditional which is poor in quality and low in quantity of hive products.

Honey and bees wax are the major hive products which are widely utilized for different purpose throughout the country. The products may be used either for household consumption and/or sold to finance the purchase of basic household commodities such as coffee, salt, cooking oil, sugar, etc. The products are sometimes used as payments and gifts to others. The survey conducted by CSA (2015b) indicated that of the total honey production, about 41.22% was

used for household consumption, 54.68% was sold, and less than 1% of the honey production was used as payment (wage) in the Ethiopia. On the other hand, 44.13% of the wax produced in the country was used as household consumption while 25.22% was used for sale.

According to the previous research conducted by Abera et al. (2016) in Damot Gale District, Wolaita Zone, Southern Ethiopia, most of the respondents (70%) practiced traditional beekeeping whereas 22 and 8% of the respondents practiced transitional and modern bee keeping system respectively. In a similar way, with regard to management of beekeeping, 62% of respondents (bee keepers) visit their bees' everyday while 18% of bee keepers visit and inspect their bees every three days in the study area.

Beekeeping provides different role in Ethiopia in general and in Jimma Horro District , Kellem Wollega zone , Oromia Region, Ethiopia in particular. Since honey and hive products are important source of food and income, it creates job opportunity and keeps the environment in balance through pollination. Nevertheless of the huge potential of beekeeping and honey bee flora, beekeeping has not been fully exploited and promoted in the district. Although bee keeping practices are widely undertaken and have great economic value particularly in Jimma Horro District, Kellem Wollega zone , Oromia Region, Ethiopia , its potential and constraints is not well identified and researched out so far. There are no documents in regard to bee keeping practice and challenges in Jimma Horro District, Kellem Wollega Zone, Oromia Region, Ethiopia. As a result, this study was aimed to assess the general points concerning the potential and constraints of bee keeping practice in Jimma Horro District, Kellem Wollega Zone, Oromia Region, Ethiopia.

Since assessing the existing practice of beekeeping enable one to identify the potential and constraints for beekeeping, and availing pertinent information is believed to help development experts and researchers who use the information generated for intervention purpose or make informed decisions.

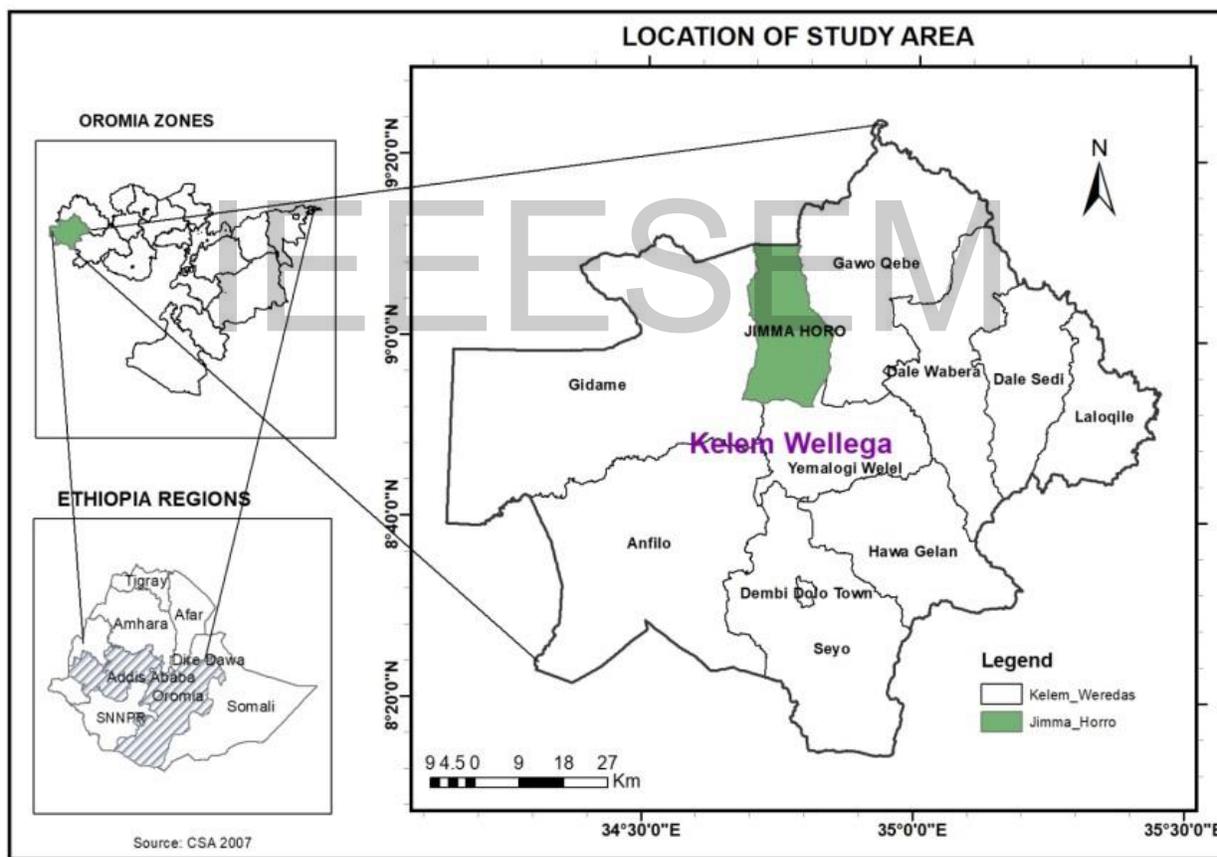
Therefore, the overall objective of the study was to assess the production and constraints of bee keeping practices and its management in Jimma Horro District , Kellem Wollega Zone, Oromia Region, Ethiopia.

MATERIALS AND METHODS

Description of the study area

The study was conducted from September 2018 to December 2019 in three selected peasant associations (Tonfi Cari, Ilu Kitaye and Abono) of Jimma Horro district, Kellem Wollega Zone

in Western Ethiopia. This district is bounded by Begi district in North, Gawo Kebe district in East, Yamalogi Wolel district in South and Gidami district in West. The area is located at about 665km west of Addis Ababa. The area is located at an elevation of 1400-1830m above sea level. The Topography of this district is characterized by Forest of Wolel Mountain and Dati Wolel Park. The main river in this district is Supe, Burar and Kumbabe. The climatic condition alternates with long summer rain fall (June to September), short rainy season (March to May) and winter dry season (December to February). The minimum and maximum annual rain fall and daily temperature range from 800 to 1200mm and 15 to 25 o c, respectively. Jimma Horro district is characterized by Dega (19.7%), Woyna dega (48.5%) and Kola (31.8%). Livestock population in area is estimated to be about 91671 heads of cattle, 300 mules, 12500 donkeys, 7225 Horses 26650 sheep, 20166 goats and 98271 species of poultry. The farmers in the area practice mixed farming.



Map of Study Area

Sampling techniques and sample size

The district has a total of 22 Kebeles (the smallest administrative unit) from which Dega (19.7%), Woyna dega (48.5%) and Kola (31.8%, respectively). Based on the potential from highland (*Tonfi Cari*), midland (*Ilu Kitaye*) and lowland (*Abono*). Then 50 respondents were

selected from each Kebeles purposively based on the experience and potentials of beekeeping activities. Thus, the total household selected for the study was 150 (3kebeles x 50 respondents).

Data collection method

In this study, both primary and secondary data were used to generate qualitative and quantitative information about beekeeping practices. The primary data were collected by using semi structured and pretested questionnaires. In addition to this personal observation, discussion with key informants and focus group discussion was made. The secondary data were obtained from published and unpublished documents.

Data analysis

The collected data of both quantitative and qualitative were analyzed and summarized by using descriptive statistics such as mean frequency and percentage, and the results were organized by tables and graphs.

RESULTS AND DISCUSSION

Sex, family size and age group respondents the socio- economic status of the interviewed households is presented in Table 1. Most of the interviewed respondents (88.7%) were male headed while the rest 11.3% were female headed. From the present study, it can be concluded that beekeeping was mainly practiced by males however; it can also be performed by females. The males' participation in the present study is similar with that of Malede et al. (2015) who stated that 87.5% of the respondents were male in and around Gondar in Ethiopia. However, the present study indicated that the participation of women in beekeeping is similar with the previous finding by Malede et al. (2015). According to Table 2, the majority of respondents (50.7%) in the study area were protestant religion followers whereas 27.1 and 22.2% were orthodox and Muslim religion followers respectively. The present finding showed that orthodox religion followers were lower than that of Taye and Marco (2014) where all (100%) respondents were orthodox followers even if, there was no impact of religion of respondents on beekeeping activity.

Table 1. Sex and Religion of the respondents

Variable	Number (N=150)	Percentage
Sex of household		
Male	133	88.7
Female	17	11.3
Religious		
Protestant		50.7
Orthodox		27.1
Muslim		22.2

Table 2. Age group of households (years) and Family Size of the Respondents

Variable	N	Minimum	maximum	Mean	STD
Age	150	25	52	37.1	7
Family Size	150	2	9	4.99	1.97

Educational back ground of respondents

Education is an important tool that determines the level of transformation of knowledge to improve beekeeping practice. As indicated in Table 3, the higher proportion of the respondents was illiterate (38.9%) while 35.4% was able to read and write. The proportion of illiterate of the present study was slightly higher than the previous research conducted by Malede et al. (2015) who indicated that of the sample beekeepers, 15.6% of the respondents have not attended any education while 62.5 and 21.9% attended primary and secondary school, respectively in and around Gonder town of northern Ethiopia. As indicated in Table 3 in the study area, the majority (94%) of the respondents that participated in beekeeping production was married and (6%) were single.

Table3. Educational back ground and marital type.

Variables	N	%
Educational Status		
Illiterate	56	38.9
Read and Write	51	35.4
Elementary	24	16.7
High School	13	9
Marital type		
Married	141	94
Single	9	6

Source of honey bee colonies

The respondents in the study area own bee colonies from different sources. As it is indicated in Figure 1, the Majority (about 90%) of the respondents obtained bee colonies by catching swarms whereas 2 and 8% obtained their colony by buying them and from parents as gift, respectively. This finding is lower than the previous finding of Tilahun et al. (2016) who argued that 17.6% of the respondents obtained it from parents as a gift in Tigray, Northern Ethiopia.

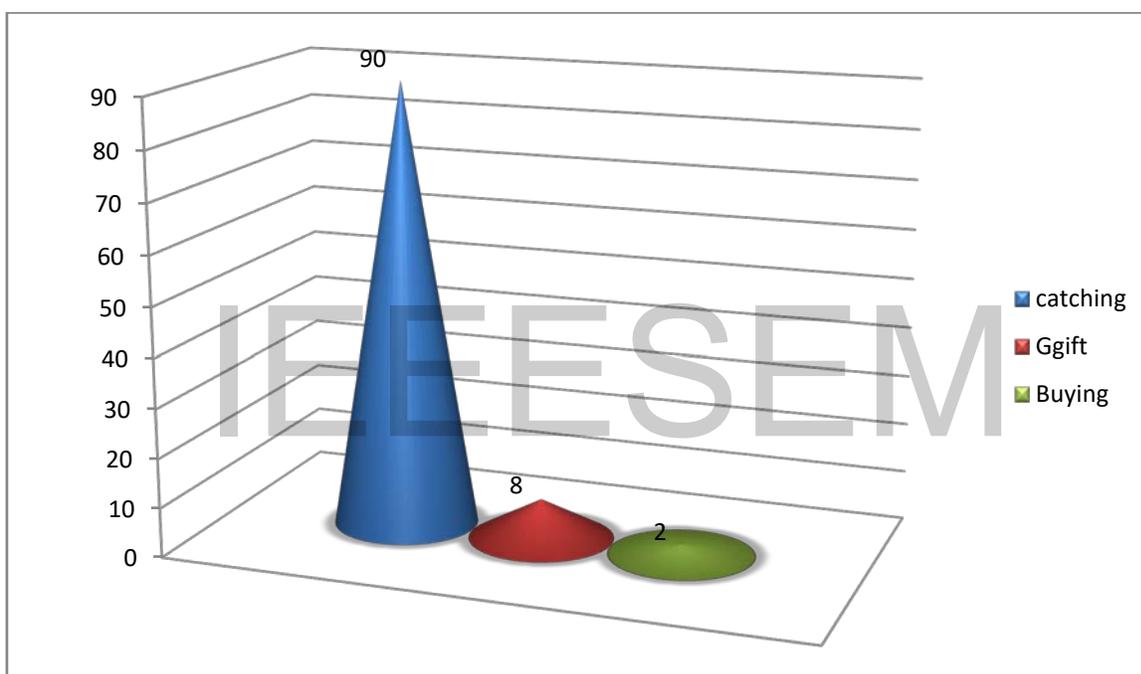


Figure 1 Source of honeybee colony in the study area.

Honey bee flora

The respondents grow different forage types of bees' floras which serve as pollen, nectar or both pollen, and nectar sources, such as shrubs, bushes, cultivated crops herbs, weeds and some woody plants. Accordingly, all of the respondents indicated that they were growing different bee flora like *Nuge*, *Sunflower*, acacia, wanza, koshem, sesbania, and treeleucerne. In the same manner, eucalyptus tree (Bahirzaf), vernom (girawa), bedenspp (addeyabeba) and guizotascabra (mech) are the major honey bee flora used by bees in the study area. The information collected from the respondents also indicated that even though, there are different types of bee floras in the area during wet seasons, there is shortage of bee flora during the dry

seasons. They also indicated that bee forage was found to be declining as compared with the past period due to deforestation and expansion of cultivated lands in the area.



Figure 2: Honey bee flora in Jimma Horro district

Honey bee management practices

According to the information collected from the respondents, honey was harvested twice a year. This result contradicts the previous finding by Yetimwork et al. (2014) who indicated that only 1.90% of the respondents harvest up to three times a year whereas about 61.5 and 36.5% harvest once and twice a year, respectively in Tigray region, northern Ethiopia. According to Table 4, the average honey production was 17, 28 and 41 kg/hive/year from traditional, transitional and modern hives. This result is slightly in not agreement with Gidey et al. (2012) who indicated that the potential productivity (the maximum yield) of the modern and traditional beehive was 45 to 50 kg/hive and 20 to 25 kg/hive, respectively. The respondents were also asked about the way they used to control absconding. According to the information collected, they control absconding by using different management system such as providing proper shelter, by protecting their colony from rodents, pest, and predators by using proper honey harvesting time and equipment.

Table 4. Types of hives

Types of hives	Honey yield per year (kg)	Price per kg (in birr)*
Traditional	17	65
Transitional	28	74.3
Modern	41	96.3

Honey marketing

According to the information collected from the respondents, the price of honey in the area varies from 65 to 100 Ethiopian birr/kg based on the type of hive from which the honey was harvested (Table 4). In the same manner, the price of honey fluctuates with highest price in the dry season especially during the period of wedding ceremonies (January to April), and also during wet season (June to August) in the period when there was no honey production and

lowest price during honey harvesting time (November and May). The general marketing of honey in the area was promising. They use honey as food, drinks, medicine, and for cultural ceremony. Almost all interviewed beekeepers did not harvest bee wax because of lack of awareness about the product.

Major constraints of honey bee production

The prevailing honey production constraints in the beekeeping development are important issues to bring solution for the challenge. The interviewed respondents were able to lists the major beekeeping constraints in the district. According to Table 5, the major constraints are:

1. Honey bee pest's disease and predators.
2. Pesticides and herbicides application, death of colony, absconding, swarming, marketing, bad weather and shortage of water.

According to the result of this survey, Honey bee pest's disease and predators is the main problems. This finding is not agreement with Taye and Marco (2014) who indicated that shortage of bee flora ranks the second major constraints of beekeeping in Wonchi District South West Shewa Zone of Oromia, Ethiopia. According to the information collected from the respondents, the existence of pests and predators is seen as a challenge to the honeybees and beekeepers. Pests and predators cause devastating damage on honeybee colonies (Table 5).

Table 5. Major constraints of beekeeping in the study area.

Challenges	Rank	What measures will be taken
Shortage of bee forage	7	Increasing bee forage by cultivating different crops
Honey pests disease and predators	1	Honey pests Clean hives
Pesticides and herbicides application	2	During cold season or morning and afternoon
Death of colony	6	Find out poisoning plant and cut
Drought (lack of rainfall)	5	By fetching water
Absconding	3	Overall management practice
Swarming	4	Prevent unnecessary swarming by providing water, additional hives
Marketing	8	Harvest and keep
Bad weather	9	Make suitable condition for bees
Shortage of water	10	Prepare pond

CONCLUSION AND RECOMMENDATIONS

The study was conducted in Kellem Wollega Zone Jimma Horro District, Oromia region; Ethiopia aims to assess beekeeping production and constraints. For the present study, 3 kebeles from highland (Tonfi Cari), midland (*Ilu Kitaye*) and lowland (Abono) respectively, were selected purposively based on their beekeeping potential. The data were collected using both primary and secondary sources.

The primary data were collected by using semi structured questionnaire. Most of the interviewed respondents (88.7%) were male headed while 11.3% were female headed. About 90% of respondents obtained bee colonies by catching swarms whereas 2 and 8% obtain their colony by buying and from parents as gift respectively. The interviewed respondents indicated that, there is shortage of beekeeping forage during dry season.

The price of honey in the area varies from 65 to 100 Ethiopian birr/kg based on the type of hive from which the honey was harvested. In the study area, the price of honey fluctuates with highest price in the dry season especially during the time of wedding ceremonies (January to April), and also during wet season (June to August) in the period when there was no honey production and lowest price during honey harvesting time (November and May). The major constraints are pests and predators, Pesticides and herbicides application, swarming.

Therefore based on the present study, the following recommendations were made: Beekeeping extension research and extension activity on management, developing technology from locally available materials and organizing apiary demonstration site; inadequate honey bee flora resources due to drought and deforestation is seen as a limiting factor to honey bee production in Jimma Horro District particularly during the long dry season. Therefore, selection of honey flora suitable for integrate agriculture program should be undertaken.

REFERENCES

- Abera A, Yakob H, Yasin G (2016). Assessment of Production System and Constraints of Bee Keeping Practices in Damot Gale District, Wolaita Zone, Southern Ethiopia. *J. Biol. Agric. Healthcare* 6(11).
- Central Statistics Authority (CSA) (2015a). The Federal Republic of Ethiopia Agricultural Sample Survey. Report on Livestock and Livestock Characteristics. *Statist. Bull.* 578(II):23.
- Central Statistics Authority (CSA) (2015b). The Federal Republic of Ethiopia Agricultural Sample Survey. Report on Crop and Livestock Product Utilization. *Statist. Bull.* 578(VII):91.

- Ethiopian Disaster Prevention and Preparedness Agency (2006). EDPPA: The northern part of Tena woreda, connected to the southern part by a narrow corridor, as a separate woreda named Diksis.
- Fikru S (2015). Review of Honey Bee and Honey Production in Ethiopia. *J. Anim. Sci. Adv.* 10:1413-1421.
- Gebiso T (2015). Adoption of Modern Bee Hive in Arsi Zone of Oromia Region: Determinants and Financial Benefits. *Agric. Sci.* 6:382-396.
- Gidey Y, Bethelhem K, Dawit K, Alem M (2012). Assessment of beekeeping practices in Asgede Tsimbla district, Northern Ethiopia: Absconding, bee forage and bee pests. *Afr. J. Agric. Res.* 7(1).
- Malede B, Selomon S, Zebene G (2015). Assessment of Challenges and Opportunities of Bee Keeping in and Around Gondar. *Acad. J. Entomol.* 8(3):127-131.
- Socio-economic profile of Arsi Zone (2006). Government of Oromia Region: Socio-economic profile of Arsi Zone (last accessed 1 August 2006).
- Taye B, Marco V (2014). Assessment of The Performance Of Wonchi Beekeepers' Association: A Case Of Wonchi District, South West Shoa Zone Of Oromia, Ethiopia. *European J. Phys. Agric. Sci.* 2(2):15.
- Tilahun M, Abraha Z, Gebre A, Drumond P (2016). Beekeepers' honeybee colony selection practice in Tigray, Northern Ethiopia. *Livest. Res. Rural Dev.* 28(83).
- Yetimwork G, Berhan T, Desalegn B (2014). Characterization of bee-keeping systems and honey marketing in Eastern zone Tigray, Ethiopia. *Livest. Res. Rural Dev.* 26(175).