

Assessment of beekeeping production system and constraints in basketo special woreda, Southern Ethiopia

Abstract

The study was conducted in *Basketo Special Woreda, Southern Ethiopia*¹ to identify beekeeping production system and major constraints. Totally, 7 kebeles were used for the study. From each kebele 15 households purposively selected based on experience and involvement of beekeeping practices. Thus, the total number of sampled respondents for the present study was 105. A pre-tested semi structured questionnaire was employed for the study to collect primary data. According to result of the study the majority (60%) of the respondents practice beekeeping activity using traditional hive whereas about 15% and 25% used transitional and modern bee hives respectively. The majority (73.3%) of the farmers use source of colony from swarm catching whereas only 26.7% buy the colonies from market. The majority of the respondents (61%) keep their bees in backyard. Majorities (85%) of the sampled respondents not practice feeding but only 15% of the respondents practice feeding for their bees. The major constraints to beekeeping activities in the study area were poisoning of bee colonies, shortage of bee forage, pest and predators, high cost of modern hives with its accessories and disease. Despite of constraints encountered this sub sector, there also future opportunity for beekeeping development in the Woreda. To improve the existing production system of beekeeping training should be provided for the farmers to operate internal inspection and manage bee colonies.

Keywords: bees, backyard, constraints, feeding, beekeeping

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Introduction

The diverse agro ecology and natural resources of Ethiopia is suitable for beekeeping operation. According to CSA² the country has a potential to produce about 50,790,578 kilogram of honey per year. However, the majority of honey (47,352,624kilogram) that accounts about 93.2% was harvested from traditional beehive type. The honey produced from the traditional hive is generally poor both in quantity and quality. The prevailing production constraints in the beekeeping subsector in Ethiopia are lack of knowledge, shortage of skilled man power, shortage of bee equipments, pests and predators, agro-chemicals, shortage of bee forage and lack of research extension.³ Bernard⁴ argued that livelihoods of the farmers engaged in beekeeping activity rely on natural capital where bees, flowering plants and water. Bees feed on the nectar and pollen from flowers, the nectar is eventually converted into honey. Gums and resins are collected from plants, which again act as habitat for nesting places. Bees are a natural asset accessible in the wild. Honey bees collect honey ingredients from different sources like wild; wastelands and even land-mined areas all have value for beekeeping. Beekeeping is therefore, possible in arid areas as a livelihood resilient strategy. It provides an excellent bonus crop in addition to, but not a substitute to other crops. In addition to this, Beekeeping is an important agricultural sector that utilizes natural nectar and pollen for production of honey, wax and other hive products that have a great contribution for the income of smallholder farmers.⁵

Most of local beehives are hanged over high trees. Honey production from honeybees are very low with an average of 5-6kg per hive per year, while from the improved one average of 15-20 kg even more is possible. Honey and beeswax are collected after rainy season; starting from October to December. In the South and Eastern parts, in addition to the main, there is minor harvesting period during May-June. According to CSA, the major honey and beeswax producing regions in Ethiopia are Oromia (41%), SNNPR (22%), Amhara (21%) and Tigray (5%).⁶ However, the country is suffering from the ecological degradation of its natural resources and this means the basis for any honey production is threatened and affected. In many regions of the country, beekeeping is considered as one of the income-generating activities for resource-poor farmers including women, youth and the unemployed sectors of the community.⁷ Even though Basketo Special Woreda¹ is potential for beekeeping activity, the farmers did not get adequate benefit from beekeeping subsector because of the traditional method of beekeeping system. This system is mainly characterized by low quality and yield of honey. Even though, the agro ecology condition of the area is appropriate for beekeeping operation, there is no research conducted so far to determine the honey production system and constraints. Moreover, identifying the existing beekeeping production system and challenges in the study area provide base line information for different stack holders to conduct further study. Thus, this research was conducted to exploit the main beekeeping production system existing and constraints in Basketo Special Woreda, Southern Ethiopia.¹ Therefore, the objective of the study was to investigate

production, management and constraints of beekeeping system in Basketo Special Woreda.¹

Materials and methods

Description of the study area

The study was conducted in Basketo special Woreda, Southern Ethiopia.¹ It is located at 578 km south of Addis Ababa and at 350km from Hawassa the regional capital city. The special Woreda is located at altitude of 1600 m a.s.l. The geographical information of total area is 41108.925 ha with a total population of 73950.¹ The average of annual rain fall ranges 900mm-1400mm and the mean annual temperature ranges 15°C -27°C. The major agricultural practice in the study area is mixed farming system. The main crops cultivated are maize, teff, sorghum, coffee, and fruits like mango, avocado and banana. The Woreda is known by huge number of livestock which comprising cattle, sheep, goat, poultry and equine 69465, 32163, 24405, 82738 and 16520 respectively. According to basket special Woreda animal and fishery resource office, there are about 5565 traditional hives, 60 transitional hives, 125 frame hive in the Woreda with the potential of 310 tons of honey and 31 tons of wax per year.

Methods of data collection

Before conducting field survey research, discussion was conducted with the head of Woreda Livestock and Fishery resource office and bee expert to select the Kebele which are potential for beekeeping production. The interview was conducted by using structured questionnaires survey and visual observation was also part of data collection. Two types of data namely primary and secondary were used during the study. Primary data was collected from beekeepers through formal interviews by administrating semi structured questionnaires. Secondary data was sourced from previous published research reports, nongovernmental organizations, and relevant government departments, woreda office of agriculture and rural development. Information was collected on beekeeper household characteristics, honey bee production system, opportunities and constraints of beekeeping activity in the study area.

Sampling data

According to the information collected from the Basketo special Agricultural and Natural Resource office,¹ the woreda has 33 kebeles which are categorized into three different agro ecologies namely “*Woynadega*”(mid altitude), “*Kola*” (lowland),and “*Dega*” (highland). Accordingly, 17, 15 and 1kebeles are “*Woynadega*”(mid altitude), “*Kola*” (lowland),and “*Dega*” (highland) respectively. For the study to make representative based on proportion of agro-ecology, 1 kebeles from *Dega* and 3kebeles each from *Woynadega* and *Kola* were taken purposively based on the potential of beekeeping. Totally, 7kebeles were used for the study. From each kebeles 15 households purposively selected based on experience and involvement of beekeeping practices. Thus, 105 households were used for the study (i.e. 7Kebeles*15 households).

Methods of data analysis

The collected data were coded and tabulated for analysis. The collected data was analyzed by using simple descriptive statistics. Finally, the result was organized by in the form of table and percentage.

Results and discussion

Socio-economic characteristics

As it is indicated in Table 1, the majority (89.5%) of the interviewed were male where as only 10.5% were female. The survey result of the present study indicates that beekeeping activity in the study area is dominated by male however females are also participated in the operation of beekeeping at a minimum rate. This finding slightly agrees with the findings of Gebretsadik & Dinku⁸ who indicated that out of the total respondents, about 84% of the interviewed small scale beekeepers involved in honey production was male, whereas 16% involved in honey production are female. The beekeepers that have different age group were involved in honey production. The minimum and maximum age of the respondents was 20 and 70 years respectively. According to Table 1, majority (45%) of the respondents were found in the age between 20 and 40 years old age. The survey result showed that the majority beekeepers age is found in the most productive age which is actively engaged in beekeeping activities to practice the new technology introduced to improve productivity.

Table 1 Characteristic of the respondents

Characteristics	Frequency	Percentage	
Sex	Male	94	89.5
	Female	11	10.5
Age	20-40	37	35
	41-60	47	45
	61-70	21	20

Family size and Educational status of the respondents

The beekeepers that are involved in the present study have different family size. According to the data collected from the respondents the higher about (35%) of the respondents had a family size of four up to six. However, about 22% of the respondents had a family size of six up to eight (Table 2). The higher number of family size in the study area would be as a means of opportunity to handle beekeeping activity at household level. As it is indicated in Table 3, about 69% and 16% of the beekeepers have attended primary and secondary school respectively. Whereas about 15% respondents are illiterate or who cannot read and write. It is quite understood that educated farmers have better understanding to accept new ideas that improve the existing production system.

Table 2 Family size of the respondents

Characteristics	Frequency	Percentage	
Family size	2-Jan	21	20
	4-Feb	24	23
	6-Apr	37	35
	8-Jun	23	22

Table 3 Educational status of the respondents

Educational status	Frequency	Percentage
Illiterates	16	15
1-4 grades	51	49
5-8 grades	21	20
8-10 grades	17	16

Beekeeping production system

The Beekeeper respondents were asked about the beekeeping practices like honeybee production system, sources of bee colonies and honey bee management. Accordingly, based on the information gathered from the respondents, there are three types of bee hives used for honey production in the study area namely traditional, transitional and modern hives (Table 4). The majority (60%) of the respondents practice beekeeping activity using traditional hive whereas about 15% and 25% used transitional and modern bee hives respectively. The predominance use of traditional hive in the study area is in line with other findings conducted in different parts of Ethiopia. For instance, Abera et al.,⁹ in the study of beekeeping in Damot Gale woreda, southern Ethiopia indicated that most of the respondents (70%) in the study area practiced traditional beekeeping whereas only about 22 and 8 percent practiced transitional and modern bee keeping system respectively. Moreover, Ejigu et al.,³ argued that even if, beekeeping has significant economic contribution for sustainable development for the region, the attention given to the sector until recently was not satisfactory and beekeeping has been left for nature with little attempts to support it with technological packages to improve its production and productivity.

Table 4 Honey bee production system

Bee hive type	Number of bee keepers	percentage
Traditional	63	60
Transitional	16	15
Modern	26	25

Source of bee colonies

As it is indicated in Table 5, the major sources of bee colony for the farmers are both swarm catching and buying colonies in the study area. Accordingly, the majority (73.3%) of the farmers use source of colony from swarm catching whereas only 26.7% buy the colonies from market. This idea is in agreement with,⁸ who indicated that majority of the respondents obtained their honey from swarm catching in selected districts of Gedeo zone, southern nation, nationalities and peoples regional state, Ethiopia. From this finding it can be concluded that beekeepers in the study area spent much time on catching swarm to establish beekeeping activity. Therefore, it has its own impact the productivity so other options should be needed to own the respondents bee colonies.

Table 5 Source of bee colony

Source of colony	Numbers of farmers	Percent of beekeepers
Swarm catching	77	73.3
Buying colonies	28	26.7

Honey bee management practices and colony inspection

According to the information collected from the sampled respondents the majority of the respondents (61%) keep their bees in backyard (Table 6). In the same manner about 28 and 11% of the farmers also place their hive under the eaves of the house and hanging on trees near homestead respectively. According to Okwee Acai¹⁰ the management practices of honeybee is the regular inspection of colonies to assess the status of brood condition, giving additional hive super for expansion of colony during flowering, distinguishing and

harvesting of ripe honey, space reduction, feeding and maintaining colonies during dearth periods and detection and control of bee pests which enhances colony performance such as reduced absconding, improved colony strength and higher hive yields. In the study area a common practice of hive inspection in traditional beekeeping is external inspection. As it is indicated in Table 7, the majorities (74%) of beekeepers respondents perform external inspection and also clean their apiary to prevent ant and other insect pests from getting access to hive. Internal hive inspection is under taking only by 26 % of beekeepers during honey harvesting, swarming and when colonies attacked by pests and predators. From this finding it can be concluded that the majority of the respondents undertake external colony inspection which may lack detail techniques to know the condition of the colony. Therefore, training should be given for the farmers to practice internal colony inspection.

Table 6 Bee hive placement

Placement of hives	Number of Respondents	Percentage
Backyard	64	61
Under the eaves/shades of house	29	28
Hanging of the trees near homestead	12	11

Table 7 Hive inspection (%)

Types of inspection	Respondents	percentage
Internal inspection	27	26
External inspection	78	74

Feeding honey bees

Honey bee colonies naturally sustain themselves and produce honey by foraging from natural and cultivated crops in all possible radiuses from their nest. During the survey period in the study area it was observed that majority of the respondents (85%) did not practice feeding however, only 15% of the respondents practice feeding for their bees (Table 8). As it is indicated in table 9, the type of supplementary feed provided was honey, sugar syrup, flour/pulses flour/ and water by 42.3, 16.7, 15.6 and 25.4% of the respondents respectively. From this finding the majority of respondents (42.3%) provide mainly honey for their bee colony as supplementary feed.

Table 8 Feeding of bee colony

Practice/not practice feeding	Respondents	percentages
Practice feeding	16	15
Not practice feeding	89	85

Table 9 Supplementary Feeding of bee colony (%)

Feed types	Respondents	percentages
Honey	45	42.3
Sugar syrup	17	16.7
Flour/pulse flour	16	15.6
Water	27	25.4

Constraints of beekeeping

According to the information gathered from the respondents there are different constraints that affect beekeeping activity in the study

area. These constraints are pest and predators, poisoning chemical (insecticides) of bee colonies, shortage of bee forage, pests and predator, high cost of modern hives with its accessories, and low quality of honey products. As it is indicated in table 9, the higher (35%) constraints of beekeeping are pest and predators. Similarly, about 23, 18, 16 and 8% of the respondents indicated that Poisoning chemicals of bee colonies (insecticides), disease, shortage of bee forage and high cost of modern hive and its accessories respectively were the main constraints responsible for low productivity of hive products in the study area.

Table 10 Constraints (%)

Constraints	Respondents (N=105)	Percentage
Poisoning chemicals of bee colonies(insecticides)	24	23
Pests and predators	37	35
Shortage of bee forage	17	16
High cost of modern hive and its accessories	8	8
Disease	19	18

Conclusion and recommendation

The majority of the interviewed beekeepers were male. In the study area about 69% and 16% of the beekeepers have attended primary and secondary school respectively while about 15% respondents are illiterate. The majority (60%) of the respondents' practices beekeeping activity using traditional hive whereas 15% and 25% used transitional and modern hives respectively. The majority (73.3%) of the farmers use source of colony from swarm catching whereas only 26.7% buy the colonies from market. The majorities (74%) of beekeepers respondents perform external inspection and also clean their apiary to prevent ant and other insect pests from getting access to hive. Internal hive inspection is under taking only by 26 %. According to the data collected from the beekeepers only 15% practices feeding of their bee colonies while 85% do not practice supplementary feeding. The main beekeeping constraints in the study area were poisoning chemical (insecticides) of bee colonies, shortage of bee forage, pests and predator, high cost of modern hives with its accessories, and low quality of honey products. Based on this research result the

management practices such as feeding, disease and predators control should be improved and training should be provided for farmers how to inspect and manage internal inspection of bee colonies.

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Conflict of interest

Author declares that there is no conflict of interest.

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