

ORIGINAL ARTICLE

Assessment of bee keeping practice in gurage and siltie zone, Ethiopia

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The study was carried out in cheha woreda from Gurage zone, Misrak Azerenet woreda from Silte zone in Ethiopian. The objective of the study was to assessment of bee keeping practice. Multi-stage sampling technic were used first the zones and woreda was selected purposively based on honeybee production potentials, second two kebele from each woreda was selected using random sampling and finally honeybee producing farmers were selected simple randomly sampling and 118 sample size is determine by using yamen formula. Both primary and secondary sources were used for data collection by using semi-structured questionnaires, direct observation, focus group discussions and key informant interviews. SPSS software was used to analysis the data by using descriptive statistics. The study results indicate farmers in study area were engaged for beekeeping practice using either by traditional, transitional or by modern beehive. From the three kinds of beehive type 98.3% of the respondents owned traditional hives. And most respondents were the type of beehive for honey product only. Even most respondents practice traditional beehive 55.1% were main purpose of honey production for both home consumption and for sale and the average honey yield from local, transitional and modern beehive were 4.1 kg, 5.59 kg and 6.63 kg per year/hive respectively. But Poor extension services, Attack by recurrent drought, Pest, predators, and diseases attacking, Lack of improved processing materials, Deforestation of forest, Increase in the Chemical application on crops, Shortage of improved bee flora, Lack of enough modern beehive supply, Lack of credit, Honeybee migration to other area, Presence of different kinds of honeybee enemies like ants, spider hive beetles were found to be the main constraints of beekeeping in the study area. Even availability of many numbers of local bee hives, suitable agro-ecology for honey production, farmers' willingness to improve beekeeping practices were the main opportunity to produce honeybee in the study area. So Concerning body must to create the opportunity of supplying enough modern beehive to the farmers, in order to increase honey production potentials, must to find the solution in best way of protecting ants other honeybee enemy and it needs to study a research on the effect of chemical application on honeybee production and give the solution.

Keywords: Bee keeping, Constraints, Honey production, Opportunity.

Introduction

Ethiopia is one of the countries which has the largest bee population and owns big potential of honey bee production. Owing to its varied ecological and climatic conditions, Ethiopia is home to the diverse flora that provides surplus nectar and pollen to bees. Moreover, bee keeping is an appropriate and well adapted farming practice to extensive range of ecosystem of the country. Today, over ten million of bee colonies are found in the country, which includes both undomesticated and hived ones (Ayalew Kassaye, 2001).

In bee keeping, Ethiopia has a huge potential. There are various conducive ecological zones which, owns over 7000 species of flowering plants, such zones have supported the existence of large number of bee in the country (Beyene, et al., 2007). It has also the largest bee population in Africa with over 10 million bee colonies, out of which about 5 to 7.5 million are estimated to be hived while the remaining exists in the wild (CSA, 2009)

The importance of beekeeping in providing extra income is one option that is available for developing countries as a means to meet the local needs of their people, yet this area has not been exploited. In spite of the importance of honey and its by products from beekeeping, their contributions to rural livelihood in many developing countries are yet to be acknowledged (Shackleton, C., Shena, S., 2004). Beekeeping allows for a degree of risk avoidance by providing a reliable, high-value product that enables rural farmers to survive in times of economic crisis (Pete, et al., 1998; Bradbear, 2006). In almost all part of the country, beekeeping is a well-established household activity. Besides other agricultural activities bee keeping is one of the most important income generating activities.

In Gurage and silte zone endowed with diverse flowering plants that provide surplus nectar and pollen to bees and big potential for honey production. Besides that in general it is known that bee keeping requires low investment venture that can be undertaken by most people by women, youths, disabled and the elderly. But, this sub sector has not satisfactorily benefited much to the nation as well as to the beekeepers, traders, exporter and processors due to existence of many constrains, the honey sub sector fabrication, productivity and its contribution to country economy is much lower than it's prospective. Even if the intervention of the government to minimize the sub sector constrains is taken as a good practice, the beekeeper's are not still producing the amount what they are supposed to produce and most of the farmers who present in those zones who participating in apiculture were few. Even those who participate were existence of small number of beehives. So aassessment evaluation was a pre-requisite for the actual implementation of beekeeping production in the study area. And the objective of this study was to assess beekeeping practice, constraint and opportunity of bee keeping practice in Siltie and Gurage zone, Ethiopia.

Methods

Description of the study area

The study was conducted in Gurage and Silte zone in southern nations and nationalities of people's regional state of Ethiopia. Specifically in cheha woreda and Misrak Azerenet woreda from Gurage and Siltie zone respectively.

Gurage Zone was bordered on south east by Hadiya and Yem Special Woreda, west, north and east by Oromia Region and south east by Siltie zone. This Zone has 16 woredas and 5 urban administrations. The Zonal center town wolkite found on distance of 155 km and 259 km from the capital city of the county Addis Ababa and Regional capital city of Hawassa respectively. Topographically lies within the elevation ranging from 1000 to 3,600 meters above sea level. Its four traditional agro-ecological has Wurchi 4.1%, Dega 27.5%, weyina Dega 65.3%, kola 3%. From this zone select Cheha woreda to study honeybee practice this woreda has bordered on south by Enemorina Eaner, on west by the Oromia Region, on the north by Wabe River, on east by Ezha, and on the southeast by Gumer and Geta. The administrative center for Cheha is Emdibir. An elevation of in this woreda has range from 1900 to 3000 meters. And all-weather road was built in 1963 which connects Emdibir north to Addis Ababa, and south to Hosaena by way of Welkite. The subsistence agriculture in Cheha is primarily based on enset, together with maize, sorghum and chickpea, as well as some annual root crops like yams and taro. Important cash crops include teff and Niger seed and practice honeybee production from this woreda Ferezye and yeweze kebele were potential to honey production from ferzeze start honey production around 1996. And in this kebele 71 modern hives and practice by 65 farmers, 3 transitional hive and 240 traditional beehive types exist to produce honeybee.

Siltie is a Zone Southern Nations, Nationalities and Peoples' Region in the Ethiopian. This zone is bordered on the south by Alaba zone, on the southwest by Hadiya, on the north by Gurage, and on the east by the Oromia Region. Geographically it lies between 38°3'25.812"E 7°45'10.864"N. From this zone select Misraq Azernet Berbere woreda to study honeybee practice. In this woreda totally 18 kebele were exist and all this kebele more or less practice honeybee production and totally 750 numbers of farmers practice honeybee production from those 687 male and 63 were female from those farmers 659 farmers practice traditional beehive and totally 9900 traditional beehive with bee and 7740 traditional beehive without bee totally 17,640 traditional beehive type is present recently in this woreda and started long period of time. In this woreda also practice modern beehive technology it started 2002 E.C recently 176 number of modern beehive present and practice by 91 farmers in this woreda. And also practice transitional beehive technology it started 2002 E.C but it is few recently 6 beehive with bee and 17 without bee totally 23 transitional beehive type present and practice by 4 farmers in this woreda. And this woreda is bordered on the south by the Hadiya Zone, on the west by Mirab Azernet Berbere, on the northwest by the Gurage Zone, on the northeast by Alichio Werero, and on the east by Wulbareg.

In this woreda the major livelihood is run by crop production and rearing of animals including beekeeping practice. And from this woreda Emezar and Derawut kebele were potential to honey production from Emezar start honey production around 2005. And in this kebele 80 modern hive practice by 25 farmers, 8 transitional hive and 167 traditional beehive types exist to produce honeybee.

Sampling size and procedure

The sampling technique used multi-stage sampling. First zones and woreda was selected purposively based on production potentials of honeybee production. Second two kebele from each woreda was selected using random sampling. Finally from each kebele honeybee producing farmers were selected simple randomly sampling.

The sample size was determined by According to Yamane (1967) formula.

$$n = \frac{N}{1 + N(e)^2}$$

$$n = \frac{2558}{1 + 2558(0.09)^2} = 118$$

(N) is number of total population who practice beekeeping activity in the study area which is equal to 2558 and (n) is sample size that getting from population which is equal to 118 and (e) is error term which is equal to 0.09.

Data collection

Both primary and secondary sources were used for data collection. Structured and semi-structured questionnaires were employed. The questionnaires were pre-tested before the actual data collection implementing so as to evaluate the clarity of the questions and interpretation of the questions by the farmers and time required for an interview. Results from the pre-test were used to re-frame the final questions. Moreover, direct observation, focus group discussions and key informant interviews were also conducted with beekeepers, extension workers and bee experts. Secondary data were collected from different sources such as books, research publications; journals and office reports/unpublished data.

Methods of data analysis

SPSS version 20 programs were used to process the data. Descriptive analyses like mean, maximum, minimum frequency and percentage was used for analyzing the collected data.

Results and Discussion

The general Socio-demographic characteristics associated with beekeeping

Socio-demographic characteristics of respondents associated with beekeeping households were show in Table 1. From the result the total households interviewed, 78.8% were male. It indicates few women are participated in the beekeeping job in the study area this implies women are not economically empowered through beekeeping activity. Similarly Hartmann (2004) reported that in Ethiopia traditionally beekeeping is men's job and major livelihood of the household were which rearing of livestock and crop production this implies mixed farming practice in the study area and some of respondents were off/non-activity type of off/non-farm activity the area were carpenter. Petty traders, drivers, daily labour, guard, café and restaurant owners, baking enjera, government employ, hand craft and wood workers and 19.5% crop production only and the major crops grown in the area were avocado, coffee, enset, maize, potato, wheat, teff, barley, cabbage and from those some of the crops used as bee forage. Major livestock of the area were cow 99.2% bull, goat, calves, heifer, ox, poultry sheep, and Honeybee.

The mean ages of the beekeepers in the study area were 42 years. This implies people in the study area found in productive age group and actively engaged in beekeeping activities. This result agrees in line with Chala, et al., (2013) who report that mean age of the respondents was 40-47 years. As concerning with level of education mean level education were, 6 this implies the farmers ability to manage honeybee production system. Gichora, 2003 noted that for more advanced beekeeping, one should have a good grasp of bee biology and behaviour of bees for better colony management.

Table 1. The general Scio-demographic characteristics associated with beekeeping.

Category	Variable	Frequency n=118	Percent
Marital status	Married	104	87.3
	Single	14	11.9
	Widower/d	1	0.8
Sex	Female	25	21.2
	Male	93	78.8
Major livelihood of the houshold	Crop production	23	19.5
	Livestock rearing	1	0.8
	Mixed	78	66.1
	Off/non-farm	16	13.6
	Maximum	Minimum	Mean
Age	80	20	42
Educational level	12 ⁺ 3	0	6
Total family size	10	2	6
Total land in hectar	6	0.0625	1.1
Land used for honey production in hectar	0.25	0	0.0575
farming experience in year	2	50	20

Source: Field survey, 2022.

Beekeeping practices in the study area

From the results of Table 2 indicate all respondents were engaged for beekeeping practice using either by traditional, transitional or by modern beehive. Most beekeepers in the study area owned traditional hives, but 69.5% of the respondents were not practice of modern beehive this indicates the adoption rate of modern bee hive technology is very low. This is due to different reason like the cost of purchasing of modern hives, lack of harvesting, processing equipment's, lack of access of improved hives and lack of skilled man power. But remain 30.5% of the respondents were use of modern beehive and it getting from different source like from research center, none governmental organization agricultural office 16.9%, market, others and private enterprise. Similarly, Mahari (2007) in eastern Tigray reported that modern beekeeping productions require more expensive establishment cost, accessories and skill training although yield better quality and quantity honey. Moreover, (Tesfaye, k., Tesfaye, L., 2007) reported almost all beekeeping practices are traditional and only little intervention was made with improved beekeeping practices due to lack of appropriate honey processing materials, Lack of bee equipment's (like modern hives, casting mold, frame wires) and lack of skilled manpower. And the practice of transitional beehive was very low in the study area.

Table 2. Bee keeping practices in the study area.

Variable	Category	Frequency	Person
Owner of beehive	Yes	118	100
Owner of local beehive	Yes	116	98.3
	No	2	1.7
Owner of transitional beehive	Yes	11	9.3
	No	107	90.7
Owner of modern beehive	Yes	38	30.5
	No	80	69.5
The source of modern beehive	Research Centre	2	1.7
	Agricultural office	20	16.9
	NGO	10	8.5
	Market	2	1.7

The reason not practice modern beehive	Other	2	1.7
	None	82	69.5
	Lack of harvesting materials	26	22
	Due to cost of purchasing	30	25.4
	lack of skilled man power	24	20.3
	others	2	1.7

Source: Field survey in 2022.

Honey harvesting, feeding and managements practice and type of hive products

The result shows there are different types of practice were present which related to beekeeping. In the study area mostly management practice of honeybee production within the study were continuous cleaning of the area around beehive and follow-up by farmers itself but 44.9% of the respondents follow-up for honeybee sometimes and few were follow frequently and continuously. Major honey harvesting practice and accruing high yield of honey production were two interval season the first and the most honey yield season starting from September to February and the second and less honey yield season from May up to august the reason behind this season were favourable to high honey yield period in this period was presence of high flora and forage this was provide feed for honeybee and give high yield of honey.

There are different kinds of products were acquired from honeybee like honey, bee waxes, bee colony. The study show 83.1% were the type of beehive product were honey only but very few were produce for join together honey with beeswax and produce colony. There was different reason not produce potential amount of those products like lack of knowledge 64.4%, lack of processing skill and lack of market and respondents that said lack of market said first initially start to processing beeswax but finally stop processing due to market problem. Others like lack of training, awareness, less availability of beehive, lack of processing material like alcohol, lack of skilled man power support. And the major feed source of honeybee was local flowering tree 56.78%, like cultivated crops and other local flowering plants and another feed source were maize powder, sugar mix with water and others 20.27% like locally preparing feed called shiro which is powder of grits this kinds of feeding system decrease the movement honeybee.

Table 3. Honey harvesting, feeding and managements practice and type of hive products.

Category	Variable	Frequency	Present
Follow-up by farmers itself	Frequently	39	33.1
	Sometimes	53	44.9
	Rarely	23	19.5
	Not at all	3	2.5
Management practices	Continuous cleaning	53	44.9
	Follow-up	20	16.9
	others	6	5.1
	Continuous cleaning of the area around the beehives and follow-up	39	33.1
The peak season of honey production	September up to February	98	83.05
	May up to august	14	11.9
The reason	Flowering season	74	62.7
	forage availability	38	32.2
Type of hive products	Honey	98	83.1
	Honey and beeswax	15	12.7
	Honey and colony	5	4.2
Collection of bee waxes	Yes	15	12.7
	No	103	87.3
Reason for not collection wax	Lack of knowledge	76	64.4

	Lack of processing skill	13	11
	Lack of market	4	3.4
	Other	10	8.4
Major feed practices of honey bee	Sugar mixed with water	7	6
	Local flowering tree	67	56.78
	Maize powder	20	16.95
	Other	24	20.27

The trends of honey production

According to the results show half of the respondents were the trends of honeybee production were decreasing and 6.78% were no change the reason behind was decrease of flowering plants, feed shortage, climate change effects, due to application of chemicals, due to the presence of different kinds of honey enemy, low follow-up from government body like development agents this body more focus on other thing rather bee production and the presence of electric poll means you know honeybee move from one area to others at this time the honeybee by itself made a home around poll area at this time increase the number of empty beehive decrease honey and honeybee production level from time to time in the study area. But less than half of the respondents were increase the trend of honeybee production the reason behind is the presence of water, opportunity to getting training, self-motivation, good management practice like giving feeding system during shortage of flower it provide to maize powder and grits, due to use of modern beehive, increase the demand of honey, to increase income level and the presence of different kinds of crops as provide for feed for honeybee.

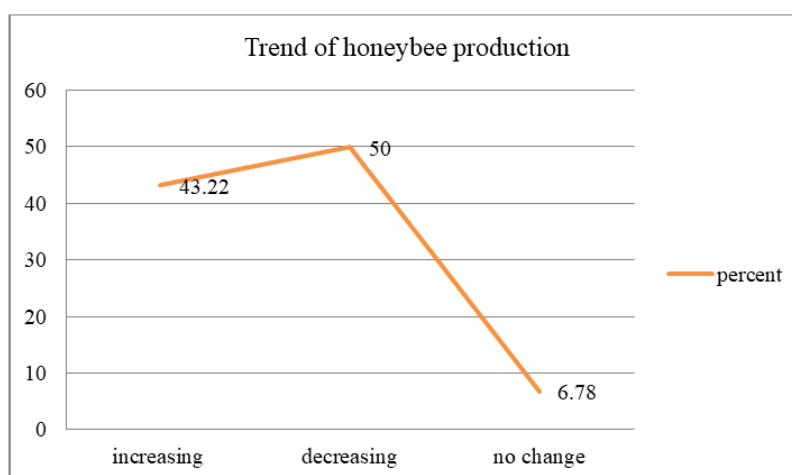


Fig. 1. Trends of honeybee production. Source: Picture from the field, 2022.

The apiary placement of beehive

In different research show that to produce honeybee the beehive put in different place it may at backyard, it may at hanging near homestead, under the roof and eaves and in the forest. But in the study area most of the beekeepers kept their hives hanging near to homestead it show below Fig. 2 and this result were more related the farmers were more practice with traditional beehive practice however, the present result disagree with (Tesfaye, K., Tesfaye, L., 2007) who reported that about 97.6% of the respondents in Adami Tulu put their hives on a branch of tree and the rest at back yard this different may be due to more forest occur in that area.

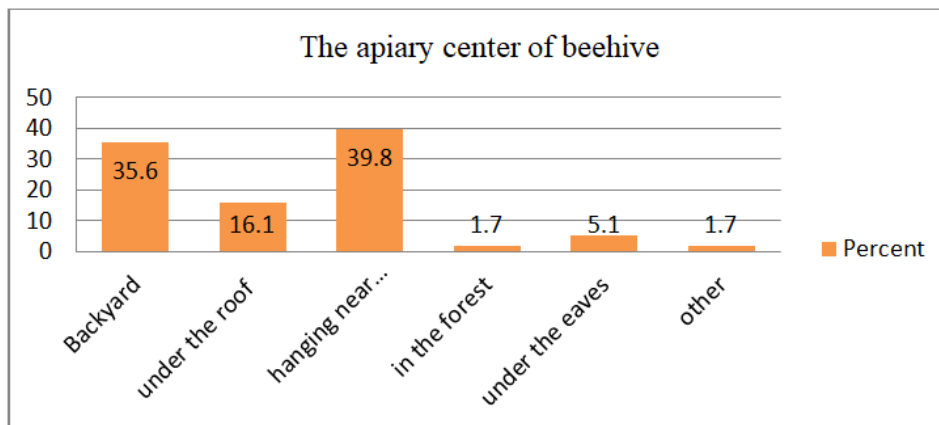


Fig. 2. Apiary centre or placement of hive. Source: Field survey, 2022.

Storage system of honey and source of bee colonies

There different systems were present to store honey after harvest from beehive in the study area reported by most sample respondents of the sample beekeepers used plastic containers to store honey (Fig. 3). Other beekeepers still use traditional containers such as earthen pot and tin to store honey. Farmers use traditional containers which are technically not appropriate storage facilities as they result in quick crystallization, fermentation of honey, changing of general appearance and taste of honey (Tesfaye and Tesfaye, 2007). Most of the respondents replied that they have got their colonies by catching swarms this was due high movement honeybee from one area to others and these movement due to finding of feed to exist mostly move from less feed or forage existing area to more forge or feed existing area and the rest of respondents said bee obtained from their parents and buying form other place. This is more or less similar with Addis and Malede (2014), who noted that 49.2% of the beekeeper started by catch swarms. Moreover, Tesfaye and Tesfaye (2007) reported that about 70% of respondents have got their bee colonies by trap swarms. From this result catching swarm is the main sources of honeybee colonies in the study areas.

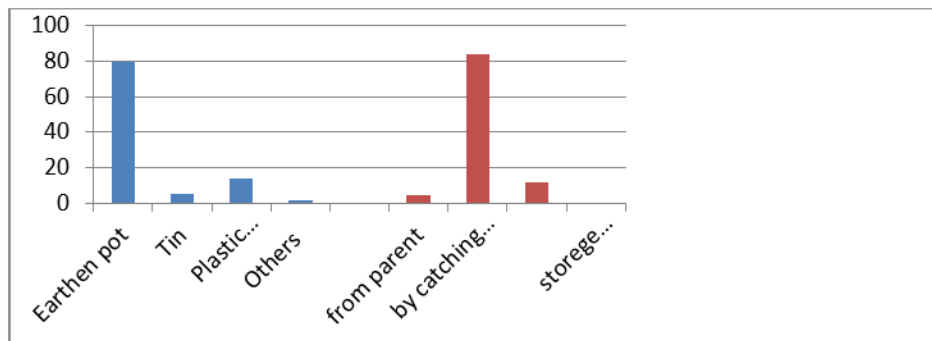


Fig. 3. Storage system of honey and source of bee colony. Source: Field survey, 2022.

Purpose of honey production and occurrence of empty beehive

According to the study show that there was existence of empty traditional, transitional and modern beehive this was due to different reason among them was absconding which is account for 39%, 1.7%, 16.9% and others reason account 42%, 3.4% and 3.4% in traditional, transitional and modern beehive respectively. The major reason for absconding of honeybee was due to break the home of the queen during honey harvest 85%. And from result indicate even most respondents practice traditional beehive the main purpose of honey production in study area for both home consumption and for sale 55.1%.

Average production yield per year/hive of honey

As a results show that the average honey yield from local, transitional and modern beehive were 4.1 kg, 5.59 kg and 6.63 kg per year/hive respectively this indicate that modern beehive give more honey product than the others beehive type so using modern beehive type is better to increase the production level of honey. And also more frequently to harvest honey from modern beehive the study indicate in average 3 time harvest honey from modern beehive but less frequent harvesting in transitional and local

beehive type even if more average honey yield and more frequent harvesting from modern beehive the farmers in study area use more number of local beehive type and use less number of modern beehive type this was due less awareness, training and lack of enough supply of modern type of beehive.

Table 4. Purpose of honey production and cause of occurrence of empty beehive.

Category	Variable	Frequency	Percent
Traditional beehive without bee	Yes	80	67.8
	No	38	32.2
Reason of traditional beehive without bee	Absconding	46	39
	Others	28	42
Transitional beehive without bee	Yes	6	5.1
	No	112	94.9
Reason of transitional beehive without bee	Absconding	2	1.7
	Others	4	3.4
Modern beehive without bee	Yes	24	20.3
	No	94	79.7
Reason of modern beehive without bee	Absconding	20	16.9
	Others	4	3.4
Purpose of honey production	Home consumption	48	40.7
	For sale	5	4.2
	Both	65	55.1

Source: Field survey, 2022.

Table 5. The average yield per year/hive of honey.

Variable	Minimum	Maximum	Mean
honey yield from local (kg)	0.75	10	4.1
honey yield from transitional (kg)	0.75	11	5.59
honey yield from modern (kg)	1.5	12	6.63
Frequency harvest honey from local beehive	1	5	2.3
Harvesting frequency from transitional beehive	1	4	1.8
Frequency harvest honey from modern beehive	1	8	2.74
Amount of traditional hive with bee	0	102	5.3
Number of transitional hive with bee	0	3	0.13
Number of modern hive with bee	0	20	1.11

Source: Field survey, 2022.

Commonly honey harvesting material and institutional service to honeybee practice

Separating the bee from honey quickly and easily using honey harvesting materials. There are different kinds of tools to harvest honey product from honeybee like brush, gloves, smoker and escape board. As the result of the study commonly used for honey harvesting material were first brush which mostly used for brush the bee out of the hive when harvesting honey, second smoker it may be traditional or modern type of smokers but in the study area most respondents used traditional type of smokers. In general smoker is the most valuable type of tools during harvesting honey. Third sickle this were tools used for cutting honey with wax during separating from hive. But from those important tools in study area 38.1% of the respondents used sickle and tradition smokers. From the study indicate most of the respondents used traditional harvesting equipment's were used rather than modern one. There are different kinds of institutional service and information's are need to stable and continues honey production. In the study area indicate most respondents 63.6% were not access to extension contact which related to beekeeping production. But

some respondents get the access to this service even respondents that contact with extension were most of them 19.5% getting the chance in twice per year this very far contact. And 83.1%, 91.5%, 66.1% were not getting the access to field demonstration; credit service and training this indicate not attention to beekeeping production in the study area.

Table 6. Institutional service and source of information for honeybee production.

Category	Variable	Frequency	Percent
Extension contact	No	75	63.6
	Yes	43	36.4
Average frequency extension contact	Once per month	12	10.2
	Twice per year	23	19.5
	Once per week	5	4.2
	Others	3	2.5
Source of information	Others farmers	40	33.9
	Personal observation	63	53.4
	Others	15	12.7
Attended field demonstration	Yes	20	16.9
	No	98	83.1
Getting credit service	Yes	10	8.5
	No	108	91.5
Getting formal training	Yes	40	33.9
	No	78	66.1

Source: Field survey, 2022.

The major beekeeping constraints in the study

Each beekeeper involved in the study was requested to prioritize the challenges of beekeeping.

And the other main constraints of beekeeping in the study areas were poor extension service 82.2% this implies during beekeeping most extension supporter do not attention to honeybee production, 68.6% were lack of knowledge means the farmers were less awareness about management of honey production in the study area, 89.8% lack of improved beekeeping processing materials like improved smokers, modern beehive technology, improved glove this implies most of the farmers use traditional processing equipment, 68.8% were said increasing chemical application on crops, we know one of the source of feed for beekeeping was locally flowering plants and cultivated crops so during chemical application it affect honeybee during pollen and nectars, so as concern to feeding challenge 84.7% of the respondents said shortage of improved bee flora, 79.7% lack of enough modern beehive technology supply, 67.8% honey bee migration by different reason means bee was move to other place were found to be the top challenges for beekeeping in the study area. This result agrees with Yirga, et al., (2012) reported that bee pests and predators, absconding and shortage of bee forage were the major constraints affecting the honey sub sector in asgede tsimbla district, Northern Ethiopia.

There was different kind of enemy that cause the problem of honeybee production and absconding from hive that cause empty to the hive and reduce honey production in the study area and from the result indicate major problem among the enemy was ants 85.6% respondents said ants was the main problem to produce honeybee products, second spider which attack honeybee and also the other enemy like hive beetles, birds, termite, and cat. But there were different kinds of mechanism used to protect those enemies. So more than half of the respondents said those enemy were protected though clean the area and the other 29.7% said protected through the way of scattering ash, create gap between constrictive materials and ground, used bespread the canopy, movability of the hive to other area means changing the position of beehive to other place and smoking. So those study implies there are different mechanism to protect honeybee enemy through traditional way but it need to improve the way of protection to remove those enemy totally from the area.

Table 7. Constraints and major beehive enemies of honeybee production.

Variable	Category	Frequency	Percent
Poor extension services	Yes	97	82.2
	No	21	17.8
Lack of knowledge	Yes	81	68
	No	37	31.4
Attack by recurrent drought	Yes	38	32.2
	No	80	67.8
Deforestation of forest	Yes	51	43.2
	No	67	56.8
Lack of improved processing materials	Yes	106	89.8
	No	12	10.2
Pest, predators, and diseases attacking	Yes	105	89
	No	13	11
Increase in the Chemical application on crops	Yes	81	68.6
	No	37	31.4
Shortage of improved bee flora	Yes	100	84.7
	No	18	15.3
Lack of enough modern beehive supply	Yes	94	79.7
	No	24	20.3
Lack of credit	Yes	68	57.6
	No	50	42.4
Market inaccessibility	Yes	5	4.2
	No	113	95.8
Death of colony	Yes	45	38.1
	No	73	61.9
Honey bee migration to other area	Yes	80	67.8
	No	38	32.2
Attack by ants	Yes	101	85.6
	No	17	14.4
Attack by spider	Yes	83	70.33
	No	35	29.77
Attack by hive beetles	Yes	17	14.4
	No	101	85.6
Others	Yes	57	48.3
	No	61	51.7

Source: Field survey, 2022.

The opportunities to engage in beekeeping practice

Even different kinds of constraints exist there were opportunity to increase honey production level. According to the study it was include availability of suitable agro-ecology 95.8%, farmers' willingness to improve beekeeping practices in the area 92.4%, although there is shortage of bee food during dry season, there are many varieties of flowering plants during wet seasons which used as bee food 54.2%, the current high market demand for honeybee products 90.7%. And others opportunity was availability of apiculture cooperatives, forest, it requires few labor and it use low input source. Some study show 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.(Gezahegne, T., 2001) Plentiful forage availability coupled with favourable and diversified agro-climatic conditions of Ethiopia create environmental conditions conducive for the growth of over 7000 species of flowering plants which has supported the existence of large number of local bee colonies in Ethiopia. According to secondary data collection another opportunity of honeybee production practice was youth organized through union and those bodies' supports by extension body, and supply modern beehive to model farmers, supply bee wax to the farmers freely.

Table 8. The opportunities to engage in beekeeping activity in the study area.

Variable	Category	Frequency	Percent
Local beehives owned	Yes	43	36.4
Suitable agro-ecology for honey production	Yes	113	95.8
	No	5	4.2
Currently the government is promoting modern hives with low cost	Yes	12	10.2
	No	106	89.8
Farmers' willingness to improve beekeeping practices	Yes	109	92.4
	No	9	7.6
The existence of different varieties of flowering plants	Yes	64	54.2
	No	54	45.8
Existence of high market demand for honeybee products	Yes	107	90.7
	No	11	9.3
Other opportunities	Yes	69	58.5

Source: Field survey, 2022.

Conclusion

In general bee keeping is an appropriate and well adapted farming practice to extensive range of ecosystem of the country. And in Gurage and silte zone endowed diverse flowering plant that provides surplus nectar and pollen to bees and big potential for honey production. All the respondents engage beekeeping practice in the study area and most widely used type of beekeeping in the study area was traditional beehive type and the use of modern and transitional beehive type was low. The trend of honeybee production potentials were mostly decreasing through different reason. And potential for collection of honeybee product like bee waxes and bee colony was very low and mostly the type of hive products for honey only. Major feed source for honeybee in the study area were local flowering tree, and catching swarm is the main sources of honeybee colonies in the study areas. Hanging near to homestead was the main apiary center for the study area. Through different reason like absconding that causes existences of empty beehive and migration of honeybee in the study area. From the three kinds of beehive average yield of honey from modern beehive was high and more frequently harvest honey from it. Among different kinds of instructional service extension contact, field demonstration, credit service and giving training were very low in the study area. The major constraints of beekeeping in the study area were found enemy like ants, spider and Pesticides and herbicides application, shortage of improve bee forage, lack of enough modern beehive supply, lack of credit service and honeybee migration are the main constraint. In the area despite the presence of different constraints and challenges, there are high potentials and opportunities to maximize the honey outputs like suitable agro-ecology, willingness of farmers, and existence of different local variety of flowering plants during wet season and market demand of honey.

Recommendation

Concerning body must be found the solution to best way of protecting ants and other honeybee enemy like spider, termite and hive beetles.

The governmental and other concerning body should create the opportunity of supplying modern beehive and honeybee flora to the farmers in order to increase honey production.

The extension body must give attention to honeybee production like other livestock and crop.

The governmental and other concerned body should give training to the farmers in order to increase knowledge and processing skill about the way of collection of bee waxes and the way of producing bee colonies from parents.

Any concerned body should be done a research on the effect of chemical herbicide application on honey bee production and give the solution.

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