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Research Article

Assessment on Constraints and Opportunities of Beekeeping Dale Wabera District of Kelem Walaga Zone, West Ethiopia

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Abstract

It has been estimated that more than 90% agricultural practice major portion resources in Ethiopia is beekeeping. To serve these objectives household survey, interview was used to collect primary data. Accordingly, 3 sample kebeles were selected purposively and 60 sample beekeepers were selected using simple random sampling technique. Households' survey data was presented in form of percentages, graphics, and charts. It was found that ants, birds and wild animal, previously unknown and recently emerged red or flower, farmers' inclination to traditional beekeeping method, lack of extension services With respect to beekeeping, lack of trainings by the concerned bodies how to process and produce beeswax, lack of initiation and trainings for farmers with respect to beekeeping by the concerned bodies, expensiveness of improved hives and accessories and lack of credit facilities are the major factors that hindered the development of beekeeping in the study area.

Keywords: Beekeeping, Challenge, Opportunity and Management.

1. Introduction

Ethiopia is one of the countries on the continent with the highest number of bees and great potential for honey production. Due to its diverse ecological and climatic conditions, Ethiopia is home to the most diverse flora, providing honey bees with an abundance of nectar and pollen. Additionally, beekeeping is a well-adapted agricultural practice that is suitable for many ecosystems in this country. There are over 10 million honey bee colonies in this country, including non-domesticated honey bee colonies and honey bee colonies [1]. Ethiopia is Africa's largest honey producer and her 10th largest honey producer in the world. Additionally, the country produces a significant amount of beeswax. Globally, Ethiopia is the fourth largest country in beeswax production [2]. Home to the largest number of bee colonies and a plethora of honey sources in its flora, this country is Africa's leading honey and beeswax producer.

The country's total honey production is estimated at more than 43,000 tons per year (C.S.A. 1995). However, only a small portion of the total honey produced in the country is distributed on the market [3]. Recent studies have shown that the number of honey bee colonies in the country is decreasing (C SA. 1995), resulting in a decrease in honey and beeswax production and export revenues [4]. Tewodros (2010) evaluates beekeeping practices in the Wag-Himra region of the Amhara region of Ethiopia. However, beekeeping is practiced in Sago Adami, Dogano Bille and Forge Kombolcha. Dale Wabela Woreda and Kerem Walaga of the zone are yet to be rated. This call calls for evaluating beekeeping practices with a view to improvement strategies. Such research can help take advantage of available honey products, reduce beekeeping challenges, and increase local beekeeping opportunities

1.1. Statement of the Problem

Kelem-Walaga zone is one of the honey-producing regions of Ethiopia. Although there are many bee colonies in this region, the production of bees and the colony's per capita consumption is influenced by several factors. These factors include drought and deforestation of natural vegetation, use of pesticides, lack of skilled labor and training facilities, low level of technology used, bee diseases, pests and predators, adequate marketing systems, these include a lack of collaboration between researchers, extension workers, and farmers.

1.2. Objective

General objective

- To assess the challenges and opportunities of beekeeping in Dale Wabera district of Kelem Walaga zone, west Ethiopia.

Specific objectives

- To assess the challenges of beekeeping in study area
- To assess the opportunities of beekeeping in the area.

Basic research Question

To study on this title are many basic questions to assess the challenge and opportunities in beekeeping but the major and basic question are followed.

- What are the constraints that hindered for beekeeping in the study area?
- What are the opportunities for beekeeping in the study area?

Significance of the Study

This study was help in understanding the work of different researcher and preparing another paper in short and precise way.

- The information generated was help beekeepers to take their own measurement on beekeeping.
- The information generated was help to identify the constraints of beekeeping and generate final recommendation.
- This study was help or can serve as input for researcher and policy maker.

Scope and Limitation of the Study

This study was focus on assessing the challenge and opportunities of beekeeping in the study area. Due to the possible short age of time, resource and finance (money) the study was limited on small number of households owing bee colony.

1.3. Literature Review

Importance of Beekeeping: Beekeeping has many benefits that help increase the happiness of beekeepers. Additionally, some of the relative benefits and importance of beekeeping are: Bees are cosmopolitan: Honeybees adapt to a variety of environments (MOARD, 2003). Where cattle production may be severely limited due to tsetse, livestock disease or other reasons, crops can be obtained through beekeeping. Even small farmers and landless people can practice beekeeping. Beekeeping does not compete with other agricultural enterprises for resources and can be combined with other agricultural activities. Beekeeping does not disturb the ecological balance as many crops and livestock are cultivated. Beekeeping is possible even for people with few resources. Bees provide pollination services all over the world, and bees produce honey, beeswax, propolis, and other bee products. In most cases, men, women, and children can also work from home, so the whole family can participate. This means that the family's labor force can be used efficiently, and other local businesses can profit from the production of hives and equipment, as well as the use and sale of value-added products. Honey, beeswax, pollen, and propolis can be used in a variety of foods, cosmetics, ointments, and other products [5 4].

Beekeeping in Ethiopia: Beekeeping has been practiced traditionally in Ethiopia long before other agricultural systems were practiced. Therefore, it is believed that beekeeping in baskets began about 5000 years ago in the northern regions with the earliest settlements. Perhaps no other country in the world has practiced beekeeping as long ago as Ethiopia [5, 4]. There are currently an estimated 10 million bee colonies in the country, of which approximately 7.5 million are confined in hives and the rest live wild in forests. In western Ethiopia, there are beekeepers who own colonies of up to 1,000 bees. They do not count the number of nests, only the number of trees in which the nests hang [6].

Beekeeping System in Ethiopia: Ethiopia is endowed with adequate water resources and various honeybee floras, which create fertile ground for the development of beekeeping. Currently, beekeeping in the country is being exercised in different production systems.

Traditional Beekeeping Practices in Ethiopia: Traditional beekeeping is the oldest and the richest practices, which have been carried out by the people for thousands of years. More than 99 percent of bees are still kept in traditional hives with its various limitations [4]. Traditional bee keeping is widely practiced throughout the country 99 % honey and almost 100% bee wax come from traditional bee keeping [7].

Transitional (Movable Top-Bar) System of Beekeeping: It is a type of intermediate beekeeping between traditional and movable-frame beekeeping. Transitional beekeeping is one of the improved methods of keeping bees using top bar hive. Top bar hive is a bee hive of any size or design in which bees build their comb from top bars instead of attaching comb to the ceiling of the hive. Transitional beekeeping started in Ethiopia since 1976 and the types of hives used are: KTBH, Tanzania top-bar hive and Mud- block hives [8].

Modern (Movable- Frame) System of Beekeeping: Modern beekeeping systems aim at obtaining the maximum honey crop, season after season, without harming bees [9]. The number of boxes is varied seasonally according to the population size of a colony. It is a modern system of bee keeping, the amounts of honey from this type of beekeeping are high, it is possible to add extra home or supper and also possible to reduce. It uses queen excluder not to transfer the queen to chamber or supper. It can be easily inspected and manipulate and also easy to manage honey bee colony and harvest honey year-round. In modern beekeeping different types of frame hive are used, some of these frame hives being used in our country are Zander and langestroth hive [7].

1.4. Opportunities (Potential) for Beekeeping in Ethiopia

Ethiopia has enormous untapped potential for the development of beekeeping. The prevailing production constraints in the beekeeping sub sector of the country depending on the agro ecology of the area where the activities are carried out [10]. Based on survey conducted on current status of bee keeping in Ethiopia the potential of apiculture development were enormous & because of the following factors (MOARD, 2003).

Availability of Natural Vegetation, Field Crops and Water:

The presence of natural plant habitat and cultivated crops near and around apiary is a basic for the establishment of apiary. The natural vegetation composed of forest trees, shrub herbs and climbers provide adequate nectar and pollen for the foraging bees. Besides this the natural vegetation, the availability of cultivated crops such as oil crops (Naug and sunflower etc), cereals (Maize and sorghum) and legumes (Bean and pea – etc) that supply nectar and pollen for foraging bees has also paramount importance. There are also enough water sources from lakes, rivers, dams and streams used for individual consumption, brood rearing and hive ventilation [11].

Availability of Honey Bee Colonies: Recent study on morph cultures geographical races of Ethiopia by Amsalu et al., indicated that there are five (5) geographical races of honey bees [12]. The strong bee colonies indicate that the area is very suitable for bee business development.

Availability of Market

Beekeeping has been and still plays a significant role in the national economy of the country as well as for the subsistence smallholder farmers. The Contribution of bees and hive products, though difficult to assess, is probably one of the most important small-scale income generating activities for hundred thousand of farmer beekeepers. In fact, honey produced in the country is sold mainly at village level and the rest is sold on the road side of the market. The average price of honey in the village level is ETB 27.50/kg and town is ETB 45/kg. Marketing has retrogressively promoted.

1.5. Major Constraints of Beekeeping in Ethiopia

Ethiopia has untapped potential to promote beekeeping for both domestic use and export purposes. A study found that number of honey bee colonies in the country is declining (CSA, 1995). Therefore, efforts are needed to address some of beekeeping's biggest problems and maintain beekeeping productivity in a sustainable manner. However, the country may have vast untapped nectar and pollen resources, making beekeeping a potentially lucrative activity. The general production constraints for beekeeping development in this country are complex and vary widely between agro ecological zones and production systems [13]. Variations in production constraints extend to socio-economic conditions, cultural practices, and climate and bee behavior. According to HBRC, Ayalew and Edessa, the main limitations in the beekeeping subsector are: lack of qualified workers and training facilities; The level of technology used is low [14, 1, 15]. The price of improved beekeeping technology is high. Drought and deforestation of natural vegetation. Inadequate post-harvest management and marketing restrictions of honeycomb products. Indiscriminate use of pesticides. Bee diseases, pests and predators. Inadequate advisory services. Lack of coordination between research, extension and farmers [16-18].

2. Materials and Methods

2.1. Description of the Study Area

The study was conducted in Kerem Waraga area of Dale Wabela district. Kake is a town in the Kerem Walaga zone of the Oromia region, located at 7°51'N 36°35'E/7.85°N 36. 583°E. Coordinates: 7°51'N °35'E / 7. 85°N 36.583° E, altitude is 1560 meters above sea level. Deir Wabala district is located 96 kilometers east of the zonal capital Kerem Walaga, 579 kilometers from Addis Ababa Wabala and west of Der Wabala Wabala. The topography of the study area ranges from gently sloping to hilly with intermediate ridges and valleys. Belum – Chanka Ecologically, the Dale Wabela area is classified as 96% humid Wina Dega (humid midland) and 4% Kola (lowland). The total area of the district is 196.4 km2 (IPMS, 2007). Demographic Characteristics of Dale Wabela District The 2007 census revealed that Dale Wabela had a total population of 25,000 people, of whom 10,600 were male and 14,400 females. The total number of households in the district is 12087, with 11316 male households and 771 female households. The total number of nest boxes in the district is 95,286, of which 4,444 are 70,936 traditional, 777 transitional, and 586 moderns.

2.2. Sampling Techniques and Sample Size

A formal study was conducted to collect primary data using a structured questionnaire designed to survey farmers. Beekeepers were randomly selected to collect the necessary data about the challenges and opportunities of beekeeping in the region. Sixty households involved in beekeeping were selected using purposive sampling method. There are three Kebeles farmers' associations and one municipality in the study area. From his three farmers' associations in the kebele, he received 2 Two Kebele farmers' associations were specially selected. Particularly selected kebele farmers unions were Sago Adami, Dogano Bille and Foge Kombolcha. The total sample size for this study was 60 beekeepers. The total sample size (60 beekeepers) was divided proportionally per purposively selected kebele according to the number of beekeepers in each purposively selected kebele. Based on the financial resources and time to conduct this study, the sample size of kebeles and beekeepers was set at 3 and 60, respectively.

Table 1: Number of hives in the Sample Kebeles and Number of beekeepers in each Kebeles

Name of sample Keble	Number of hives in kebeles				Number of beekeepers sample Keble			
	Tradition-al Bee-keepers	Transitional Beekeepers	Modern beekeep-ers	Total	Traditional Beekeepers	transition-al Bee-keepers	Modern beekeep-ers	Total
Sago Adami	699	83	457	1239	127	36	110	273
Dogano Bille	891	110	587	1582	197	88	167	452
F/kombol-cha	910	150	210	1270	120	370	111	601
Total	2500	343	1254	4091	444	494	388	1326

Source:-Dale Wabera District Agriculture office and from collected data.

Table 2: Number of hives in the Sample Kebeles and Number of respondents beekeepers in each Kebeles

Name of sample Keble	Number of sample beekeepers			
	traditional	transitional	modern	Total
Sago Adami	1	3	16	20
Dogano Bille	4	1	15	20
F/kombolcha	3	2	10	20
Total	8	6	41	60

2.3. Methods of Data Collection

Both qualitative and quantitative data were generated using conventional survey method, the data collected includes: Potential, constraints and opportunities of beekeeping in the area: potential honeybee plants and flowering time, poisonous plants, water resources availability, honeybee pests and predators, insecticides and other chemicals application.

2.4. Methods of Data Analysis

All the data collected throughout the study period was analyzed by using simple statistical methods. The result was presented in the form of percentage, graphics, charts which were used to show the different magnitudes.

4. Result and Discussion

4.1. Respondents' General Information

The study showed that the indigenous knowledge of beekeeping differs from farmer to farmer and from area to area, based on their experiences and exposure in beekeeping activities. When beekeepers were asked to explain how they started beekeeping.

Table 3: Respondents' general information in the study area

kebeles		Total house hold			Total number of respondent					Respon-dents
		M	F	Total	M	%	F	%	Total	
1	Sago Adami	508	24	532	16	80	4	20	20	39(30-47)
2	Dogano Bille	307	22	329	14	70	6	30	20	42(38-53)
3	F/kombolcha	417	13	430	16	80	4	20	20	38(32-42)

Whereas, F: female, M: male.

Few women are participated in the beekeeping job in the area. Similarly, Hartmann (2004) reported that in Ethiopia traditionally beekeeping is men's job figure 1 male and female respondents in study area.

4.2. Honeybee Management Practices

10% farmers (model beekeepers) use a protective plastic under the hive stand in order to avoid the entrance of some pest and predator and most beekeepers use ash rear to hive stand and about 90% did not use. About 65% of the respondents said that the presence of water to their honey bees from this as they described 12.5% of water get from the stream and 52.5 % get water from the rivers. 35% of interviewed beekeepers gave additional food like besso, shiro, and sugar syrup and honey residues and water for their bees in order not to lose them and hence to harvest honey in the second honey fallow season.

Table 4: shows result of the response of farmers with respect to management practice.

SN	Kebeles	besso	shiro	sugar syrup	stream water	River water
1	sago adami	6	2	2	1	14
2	dogano bille	12	3	5	4	8
3	F/Kombolcha	14	6	10	3	10
	total	32	11	17	8	32
percentage	53.3	18.40	28.3	13.3	100%	

4.3. Management Problems Observed

The hive did not have hive stand rather it has been kept on an appropriate stone and woods where as others kept on the ground without any stands. Some of the hives did not have lid, but they covered it with plastic materials. Others were in a position to loge down due to unsuitability of stands. Most of the modern hives were not bounded (fenced) and placed on bare land without shade. If the bees disturbed, they can affect livestock and human being available in the surrounding areas.

Table 5: Result of honey bee management problems in dallo manna district.

SN	Kebeles	no hive stand	absence of hive lid	no fence
1	sago adami	8	10	0
2	dogano bille	16	3	0
3	F/Kombolcha	20	1	2
	total	44	14	2
percentage		73.3%	23.3%	3%

From the above table we observed that 73.3% of the hives have no stands. Especially f/kombucha kebele bee keepers (33.3%) did not provided the hive stand. in other way bee keepers rarely forgot to provide fence for their hive (3% of the found only in F/kombolcha kebele).

4.4. Major Beekeeping Activities

A. Sources of Honeybee Colonies to Start Beekeeping

The study showed that the indigenous knowledge of beekeeping differs from farmer to farmer and from area to area, based on their experiences and exposure in beekeeping activities. When beekeepers were asked to explain how they started beekeeping, 65% replied that they have started beekeeping by catching swarms and 35% by transferring from this result, it can be concluded that catching swarm is the main sources of honeybee colonies in the study areas. The price of one established colony in Dale wabera ranges from 50 to 60 ETB (the average being 54.5 ETB), but there is no as much extended bee colony marketing in the study area.

Table 6: Sources of honeybee colonies in the study areas

Sources of colony	Bee keepers (%)
From parents (as gift)	10
Catching swarms	65
Buying colonies	25
Total	100

B. Placement of Honeybee Colonies

In all study areas the majority of beekeepers (38.2 %) keep their traditional bee colonies in the hanging on trees near homestead, the majority of both the transitional (100 %) and moveable frame hives (100%) keep their bee colonies in the back yard

Table 7: Placement of different beehives after colony capturing(%)

No	Placement of hives	placement	Traditional	Intermediate	Movable frame
1	Backyard	65	35.29	100	100
2	Under the roof of the house	2.5	2.99	-	-
3	Hanging on trees near homestead	22.5	38.2	-	-
4	Hanging on trees in forest areas	10	23.52	-	-
Total		100	100	100	100

C. Respondent Beekeeping Practices in Percentage

In the study area from the interviewed beekeepers 12% beekeepers are practicing traditional beekeeping 10% beekeepers are transitional and 78% are practicing improved beekeeping. Both intermediate and modern beekeepers are 88%, and intermediate and traditional are 22% both traditional and modern 90%. This showed most farmers keep both traditional and moveable frame hives and very little of transitional ones.

4.5. Opportunities and Challenges in Beekeeping Development of Dale Wabera District.

According to the respondents, the major opportunities for bee keeping in Dale Wabera district include existence and abundance of honeybee, availability of potential flowering plants, ample sources of water for bees, beekeepers' experience and practices, socio economic value (value accorded to bee products by the people of that area), marketing situation of bee products, will give a good opportunity to create increasing demand for honey and competitive market in the region and to promote export of hive products, which will in turn result in endogenous technological change and overall development in the sub-sector for the district.

Honeybee Plants

- Many plants grown in this region serve as sources of pollen and nectar, or as both sources of pollen and nectar. Primarily shrubs, cultivated plants, herbs, wildflowers, weeds, and some woody plants are the main food source for the honey harvested in October, and most woody plants are the main food source for the honey harvested in May. It is the main source of pollen and nectar. Beekeepers say there are a variety of plants used as flora for bees. Respondents said that during the rainy season there are various types of bee plants in the area, but during the dry season there is a shortage of food for bees. He also pointed out that due to deforestation and expansion of cultivated land in the region, there is less food for bees than in the previous season. The vegetation characteristics of the study area are considered important indicators of the beekeeping potential of the area.
- According to the results of this study, bee plants in the study area are trees, shrubs, herbs, and cultivated plants that are a source of nectar and pollen. Some important honey plants in the study area were recorded with colloquial (common) and scientific names along with flowering time. Beekeeping is more dependent than other animal production on the ecological suitability of an area, and bee populations and their productivity are generally influenced primarily by the nature of the local bee flora. Resources provided by plants are important sources of nectar, pollen, and propolis. Some are important in building bee hives, while others are used in local practices to scent new hives and attract swarms.
- The composition of the bee flora in Dale Wabela Woreda consists of perennials (especially coffee), annual herbs, and some native trees, which contribute significantly to beekeeping. Changes in vegetation characteristics in this region may be suitable for effectively distributing honey production at different times of the year. Annual honey production in the study area is due to 'Bisana' (Croton Macrostachys), which usually blooms in May–June, and 'Gurawa/Ebicha' (Vernonia sp.), which usually blooms in February–March. Some farmers say that if a beehive is set up in close proximity to a coffee plantation, all the honey from that hive could come from coffee flowers.

Table 8: List of some major honeybee floras in the study areas

Botanical Name	Vernacular or Common Name	Flowering Period	Plant type
Trees			
Croton macrostachys	Besana / Bakanissa	Dec. – Feb.	Tree
Acacia sp.	Grar / Lafto	March - September	Tree
Schefflera abyssinica	Geteme	Oct. – Dec.	Tree
Cordia africana	Wanza / Wadessa	Jan. - July	Tree
Eucalyptus sp.	Eucalyptus / beharzaf	March - April	Tree
Ficus vasta	Warka / kiltu	May. - June	Tree
Shrubs and herbs			
Rhamnus prinoide	Gesho	March - April	Shrub
Vernonia amygadalina	Grawa / Ebicha	All year round	Shrub
Trifolium sp.	Clover / sidissa	Feb-March	Shrub
Bidens species	Meskel /Ababo meskela	July – Oct.	Shrub
Horticultural Crops			
Mangifra indica	Mango	Sept. – Dec	H.crops
Persea americana	Avocado	August – Oct	H.crops
Carica papaya	Papaya	Sept – Dec.	H.crops
Field crops			
Coffea Arabica	Coffee	Feb-March	F.crops
Zea mays	Maize	Sept. – Oct	F.crops

Challenges to beekeeping in the study areas

Based on the result of this study, beekeepers have encountered with a number of difficulties and challenges that are antagonistic with the success desired in honey production. Major problems in beekeeping arise from bee characteristics or environmental factors that are beyond the control of the beekeepers, while others have to do with poor marketing infrastructure and storage facilities. After having identified the major problems facing the beekeeping activities, farmers were requested to list their priority in order of importance. Because of lack of knowledge on application of chemicals against ants, some farmers complained their bee hives are being affected.

Table 9: Major Constraints Identified by Respondent Beekeepers in the Study Districts.

lists of Constraints	Constraints (%)	Rank
Absconding	11.32	1
Beekeeping equipments materials	10.6	2
Pests and predators	9.30	3
Swarming	8.73	4
Bee hives	8.41	5
Pesticides and herbicides application	8.01	6
Shortage of bee forage	7.71	7
Diseases	7.11	8
Drought (lack of rainfall	6.46	9
Shortage of water	6.14	10
Honeybee colony	4.53	11
Storage facilities	2.91	12
High temperature	2.91	13
Marketing	2.58	14
Death of colony	2.58	15
Migrations	0.32	16
High wind	0.32	17
Total	100	

Source: self (from collected information).

Some Details of the Selected Constraints are Discussed Below:

A. Bee Disease

Based on the assessment which undertaken in the dale wabera district, 67.5% of sample respondents had observed honeybee diseases in their hive. From these some beekeepers also responded as they observed chalk brood disease (29.62%), which results in bad smell of the hive and others, responded (40.76%) the presence of wax moth (Galleria mellonella ('tel') in their hives. The perception of the beekeepers in the formation of worms due to disease has had probably happen due to lack of knowledge of differentiating the damage caused by honeybee diseases and larvae of wax moth. The latter is known to affect the bee's comb through its larvae with which the beekeepers get confused worms formed due to disease. The honey bee hives in which the colony more likely affected by disease according to respondents, traditional, transitional and modern are:

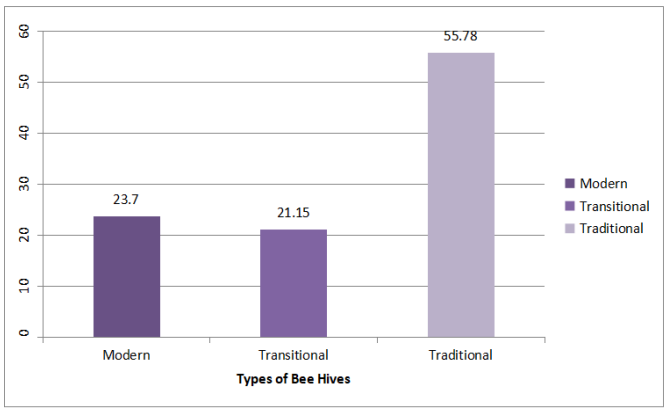

Figure 1: Shows Beehives Likely Affected by Disease in Percent.

B. Honeybee Pests, Predators

Respondents were asked to identify honeybee pests and predators. Based on the result of this study, the existence of pests was a major challenge to the honeybees and beekeepers. After having identified the major pests facing the beekeeping activities, farmers were requested to rank them

and the result indicated that ants, spider, birds, lizard and honey badger (Mellivora capensis), were the most harmful pests in order of decreasing importance. Beekeepers were interviewed on the prevalence of bee pests and predators. They mentioned the following bee enemies: like ant, insects, birds, spiders, monkey or apes.

Based on the collected data, 18% of sample respondents had observed ants in their hive. The beekeepers recognized that their bees could suffer from ants which result in death of adult honeybees in the hive and absconding of bee colony. The next most serious one is honeybee wax moth (17.53%). The beekeepers recognized that their bees could suffer from pests like wax moth (Galleria mellonella) which results in distraction of honey comb in the hive. However, the beekeepers did not know the real causes.

Table 10: Percent and ranks of major pests and predators

Major pest and predator	percentage	Rank
Ants	40	1
Wax moth	1.66	10
Spiders	1.6	9
Birds	25	2
Lizard	20	3
Hamagot /shelemetmat/	0.06	10
Wasps	10	4
Snake	0.32	9
Bee lice	1.0	9
Beetles	0.32	8
Monkey	0.05	7
Total	100	11

Besides to identifications, beekeepers of the Dale Wabera district have serious concern and have rich Experience and various practices in controlling some of the honeybee pests.

Table 11: Status of honey bee pests and predators in the study kebeles (response of the respondents if they exist).

SN	Kebeles	birds	lizard	wasps	ants	spiders	wax moth
1	sago adami	4	6	5	6	0	1
2	dogano bille	7	2	0	8	0	0
3	F/Kombolcha	4	4	3	10	1	0
	total	15	12	8	24	1	1
percentage	25%	20%	13.3%	40%	1.66%	1.66%	

The result of the above table indicates that ant is the most common problem for honey bee colonies in the study area followed by birds and lizard. Accordingly, F/kombolcha kebele was mostly affected by ants while the populations of birds affecting bees are higher in dogano bbile kebele of dale wabera district.

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Table 12: Major enemies of bees in Dale Wabera district as ranked by respondents and preventive measure

Pest and Predator	Preventive measures
Ants	Clean apiary, Place fresh ash around the base of Hive stand, Plastering Hives stands with plastic, and hot water, burning the ants with fir Destroying ant's nests keeping. Weeds well away from the base Of the hive stand
Wax moth	clean apiary, remove old comb, and strengthen the colony
Bee lice	clean apiary, Make the colony strong
Beetles	Clean apiary, narrowing the hive entrance
Spiders	Clean apiary, removal of spider's web and killing
Wasp's	Clean Apiary
Prey mantis	Cleaning apiary
Lizard	Clean apiary, and kills
Snake	Clean apiary, smoking with plant material and kill
Birds	Putting something (cloth, festal…) and, Killing Using 'wonchif
Hamagot	killing, fencing and chasing with dogs

C. Poisonous Nectar and Pollen Sources

Nim red flower

During this survey, beekeepers were interviewed if they know poisonous plants in their localities. Only experienced beekeepers listed few poisonous plants. These can be plants whose nectar or pollen is toxic to the bees themselves.

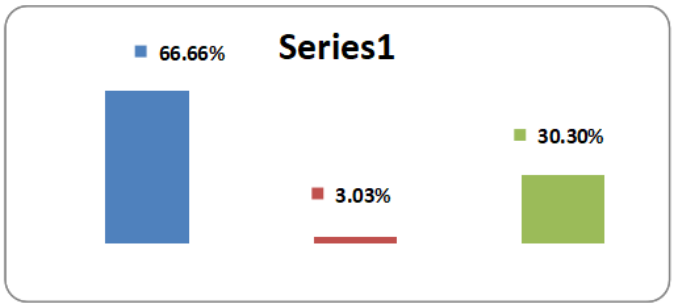

Figure 2: Percentage of Respondents Experienced in Toxic Plants.

Plants that are generally considered to be toxic to bees and humans or suspected in the study areas by the respondents are: ''Nimi tree'' (Azadirachta indica), and "Dima (red flower)' (Cotinus coggygrla). The knowledge of beekeeper regarding the damage caused by poisonous bee plants on honeybees was comparatively very limited. Only deaths of field bees were reported under or around the 'plants' however, we identified some plants poisonous.

D. Honey Marketing Problems

Minority of (2.5%) of respondent only sell their honey while the rest (40%) produce honey only for home consumption. But both sale and consume are (57.5%) sold their honey to (80%, and 20%) to traders and consumers respectively. The price of honey in the area varies from 27 to 37 ETB per kg. It has been observed that in the district the marketing system of honey has many problems. Most of the local markets are far away from the beekeepers and are inaccessible. Beekeepers travel on foot for several hours to sell their honey.

Honey Marketing Channel

- Producer/ (Farmer) – only sale (2.5%)
- Producers (farmers) – home consumption (40%)
- Producers both consumption and sale (57.5%)
- Producer (Farmers) – Consumer (20 %)
- Producers (farmer) – traders (80%)

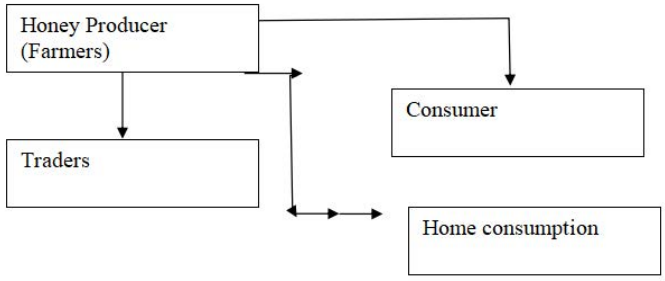

Figure 3: Marketing System in Area

E. Effect of Pesticide on Bees

Based on the data obtained the respondent those are using agrochemicals are 52.5% and those that do not use are 47.5%. Almost all respondents use these chemicals for the purpose of crop pest control especially for coffee. They use these agrochemicals from June to October months. According to respondents that uses chemicals know using this chemical would affect the honey bees.

5. Conclusion and Recommendations

Conclusion

Dale Wabera area is one of the areas with high potential for beekeeping. The area is covered with natural vegetation, shrubs, planted forests, and annual and perennial crops. It also has sufficient water resources and large bee colonies, making it an ideal environment for beekeeping. The main objective of this research project was to assess the challenges and opportunities of beekeeping in the district. The specific objectives were to assess beekeeping challenges, assess the potential for beekeeping in the area, and evaluate the effects of pesticides on honey bees and their bee products in the

study area. Based on the results of this study, people of the most productive age are actively participating in beekeeping and have moderate experience with beekeeping. For most beekeepers, colony formation occurred by swarm caching (65%) and 35% by propagation. This indicates that honey bee colonies were present in the study area. Based on the results of this study, three types of honeybee production systems were identified: (1) traditional beekeeping systems, (2) transitional beekeeping systems, and (3) mobile frame beekeeping systems. The majority of beekeepers are engaged in modern beekeeping. In the study area of the surveyed beekeepers, 12 beekeepers practice traditional beekeeping, 10 beekeepers are interim beekeepers, and 78% practice improved beekeeping.

Beekeeping in the study area was primarily a male activity, with only a minority of female beekeepers participating. However, women play an important role in applying control measures such as ash, mobile, and hot water against pests and predators near hives in apiaries. The study area has sufficient natural resources and a long tradition and culture of beekeeping. Predatory ants, birds, and silver moths have been found to affect beekeeping operations by ingesting beekeeping products and killing bees. Among predators, ants are a serious problem. For beekeepers, keeping ants away from hives is a tedious task. A previously unknown red flower, locally called 'above dimmer' or 'nim', also kills bees and plays an important role in reducing bee colonies, ultimately impacting beekeeping. It has been found. The main obstacles to exploiting the untapped potential of beekeeping in the area are the high cost of beekeeping equipment (accessories) and modern hives, avoidance from swarms, and the emergence of predatory pests and diseases. Market constraints include lack of producer organization, lack of involvement of traders who collect bee products and provide inputs to beekeepers, and lack of roads and transport services faced by beekeepers in the study area. is the main market constraint.

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Appendix

Appendix 1: Feed and water supplements in the survey area

Appendix 2: modern beehives without proper stands in the study area

Hababo dima Red flower Nimi

Appendix 3: Toxic plants in study areas

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