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RESEARCH ARTICLE

ASSESSMENT ON CHALLENGES AND OPPORTUNITIES OF BEEKEEPING IN ILU ABBA BORA ZONE, OROMIA REGIONAL STATE, SOUTH WESTERN ETHIOPIA

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ABSTRACT

The study was carried out to assess the constraint and opportunities of bee keeping in Ilu Abba Bora Zone, Oromia Regional State, South western Ethiopia. Eight districts were selected for the study following random sampling approach with the sample size of 544. Both primary and secondary data were used to generate qualitative and quantitative information. The data was analyzed using appropriate Microsoft excel and presented in table, bar graph and pie chart. The results of this study indicated that beekeeping in the study area has been practiced as sideways with other agricultural activities. The average amount of honey harvested per hive per year in the district from traditional, transitional and modern hive was 9.17kg, 19.81kg, and 29.05kg respectively. Majorities (33.26%) of beekeepers were used traditional bee keeping system, whereas few (15.69%) used modern bee keeping system. All respondents (100%) were used honey as the main hive product and service and 49.92% of the respondents were used honey and bee wax in combination while the least percentage of the respondents (1.43%) were used honey and bee brood in combination. The modern and transitional hives give more honey production annual as compared to traditional hive. The major constraints in the study area were pest and predator, pesticide application, high cost of modern hives, lack of hive equipments and lack of training. Highbeecolony, high coverage of honey flora, good climate condition, support from nongovernmental organization, increasing price of honey, support from extension worker and availability of local materials for hive making were the opportunities observed in the study for beekeeping development. Further studies are needed on the quality of the honey in the districts.

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INTRODUCTION

Ethiopia is blessed with adequate water resources and various honeybee floras, which create fertile ground for the development of beekeeping. Honey hunting and beekeeping have been practiced in the country for the exploitation of honey. In places where wild colonies of bees living in hollow trees and caves are found, honey hunting is still a common practice in Ethiopia (Tessga, 2009). Currently in Ethiopia beekeeping is practiced in three types of production systems namely; traditional, transitional and frame beehive beekeeping (Ayalew, 2008). Beekeeping is one of the most important farming activities in Ethiopia (Workneh *et al.,* 2008). Ethiopia is a leading honey producer in Africa and one of the ten largest honey producing countries in the world.

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Ethiopia has a share of around 23.58% and 2.13% of the total Africa and world honey production respectively (Ayelaw, 1990). Due to its wide climatic and edaphic variability, Ethiopia is a home to some of the most diverse flora and fauna in Africa that provide surplus nectar and pollen source to foraging bee colonies (Girma, 1998).This assisted to exist more than 12 million honey bee colonies in the country (Gezahegn, 2001). Ethiopia has the potential to produce 500,000 tons of honey per year and 50,000 tons of beeswax per annual, but currently production is limited to 43,000 tons of honey and 3,000 tons of beeswax .The quantity and quality of Ethiopian honey is generally poor, as 95% of beekeepers follow traditional method of beekeeping practice with no improved techniques or technology (Oxfam, 2008). Ethiopia has huge potential for encourage beekeeping activity; both for local use and for export purpose but there some constraints which hinder the production of the honey. The constrains which affect the beekeeping activity vary from one part to other part of the country depending on the agro ecology, socio-

economic conditions, cultural practices, climate (seasons of the year) and behaviors of the bees (Edessa, 2005). Despite the favourable agro-ecology for honey production and the number of bee colonies the country is endowed with, the level of honey production and productivity in the country is still low. The annual average honey production per hive is as low as six to seven kilos (Gebey *et al*., 2010). According to CSA (2007), Ethiopian honey production accounts for approximately 2.5 % of world production and 21.7 % of African honey production. Despite the country's immense potential for honey and beeswax production, the national annual honey and beeswax yield is very low as compared to the potential of the country. Composition and quality of honey are greatly influenced by geographical and environmental factors (Jones *et al.,* 2011). Even though apiculture resource is immense in the Ilu Abba Bor Zone, there is little evidence on the potentials and challenges of beekeeping in the zone. There is also limited information currently available on the constraints of bee keeping in the honey bee sub-sector. Thus, the present study was undertaken to assess the major beekeeping constraints and existing opportunities in Ilu Abba Bora zone

MATERIALS AND METHODS

Description of Study Area: The study was conducted in Ilu Abba Bor Zone is located in Oromia Regional National State, south western Ethiopia from April to June 2008 E.C (Figure 1). The zone is located at 600 km southwest of the capital Addis Ababa. Exorbitantly, Ilu Abba Bor is positioned between7027'40"to 902'10" latitude North and 34052'12" to 41034'55" east longitudes.

Ilu Abba Bora area is relatively under good vegetation cover of tropical montane evergreen rainforest on the highlands. The vegetation cover gradually changes to bush shrubs, open deciduous and savanna when one descended to the eastern and western lowlands. The vegetations in the valley bottom wetlands are dominantly sedge (*Cyperus latifolius*) (Dixon and Wood, 2003). Nearly 30% of the surface area of Ilu Abba Bora Zone is under forest cover (mainly natural forest). The forest cover significantly varies between Woreda. Sale Nono (68%), Yayu Hurumu (55.8%), Ale Didu (43.9%), Mettu (37%) and Alge Sachi (33%) are the five Woreda with large areas of forest cover whereas Bedele Dabo (3.7%) Darimu (10.7%) and Dhedhesa (14%) are Woreda with lower forest cover (Legesse, 2007).

Sampling Techniques and Sample Size

Eight districts (Bure, Salle Nono, Bedele, Didu, Alle, Yayyo, Alge and Bacho) were selected for the study following random sampling approach. The study populations were all beekeepers in the study districts (Availability sampling techniques). Thus, the sample size was 544 in 41 kebelefrom the proposed study district.

Methods of Data Collection

In this study, both secondary and primary data were used to generate qualitative and quantitative information. Primary data such as socio-economic characteristic of respondents, opportunities for beekeeping, honey production potential and beekeeping constraints were collected through questionnaires and personal observation.

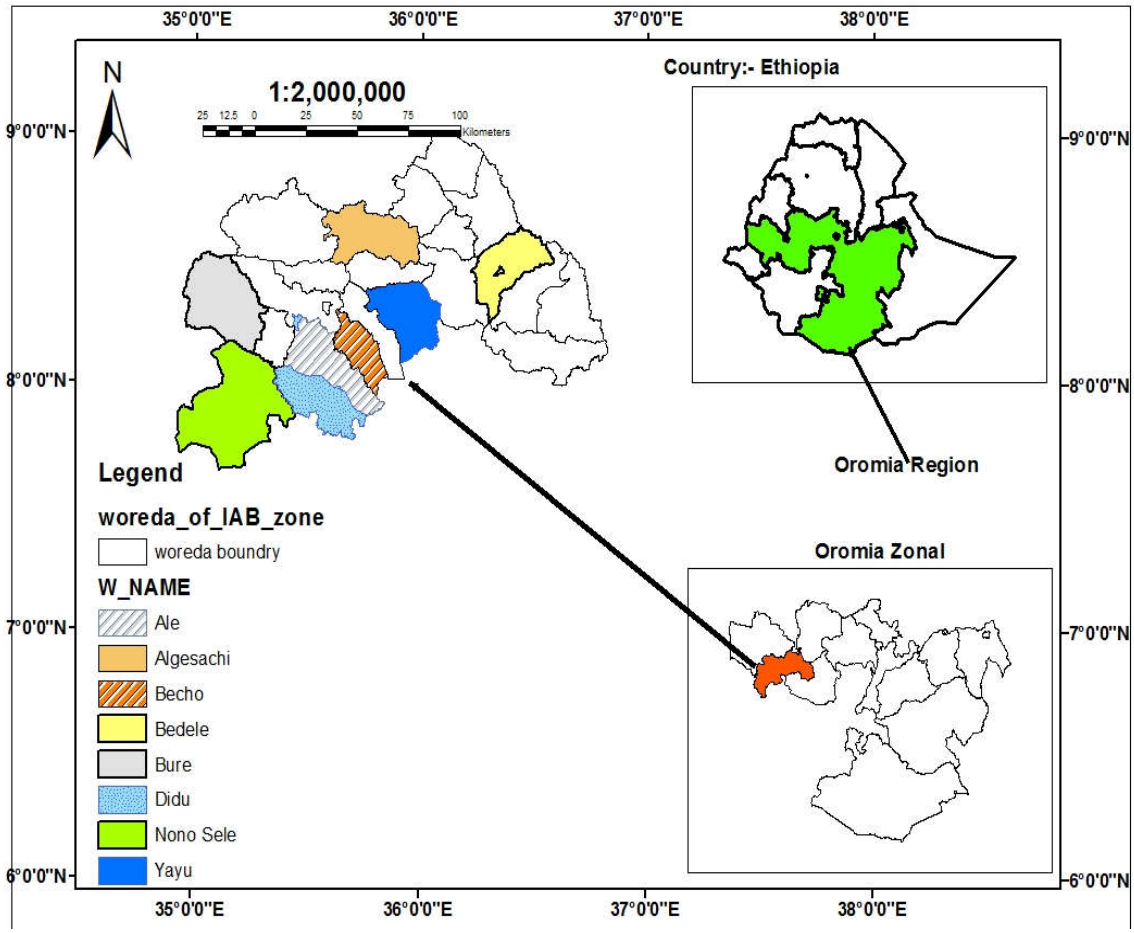

Figure 1. Map of the study districts

The secondary data relevant to this study was collected from published and unpublished sources.

Data Analysis: The collected data was analyzed using appropriate Microsoft excel. Moreover, ranking of beekeeping constraints were used to identify and prioritize the major beekeeping challenges to beekeeping development in the study area. Both qualitative and quantitative data were interpreted by using descriptive statistics and the analyzed data were presented using table, bar graph and pie chart.

RESULTS AND DISCUSSION

Average honey yield production of honey per hives per year

According to the interviewed beekeepers and the district bee expert, there are three types of bee hives beekeepers use for honey production in the district. The result of the study indicated that, the average amount of honey harvested per hive per year in district from traditional, transitional and modern hive was 9.17kg, 19.81kg, 29.05kg respectively (Table 1).

Number of hives owned by beekeepers

The study revealed that, traditional, transitional and modern types of bee hives were used by beekeepers for honey production in the studied districts. Majorities (81.97%) of beekeepers of were used traditional hives while 12.93% and 5.08% of beekeepers were used transitional and modern bee hives respectively **(**Figure 2).

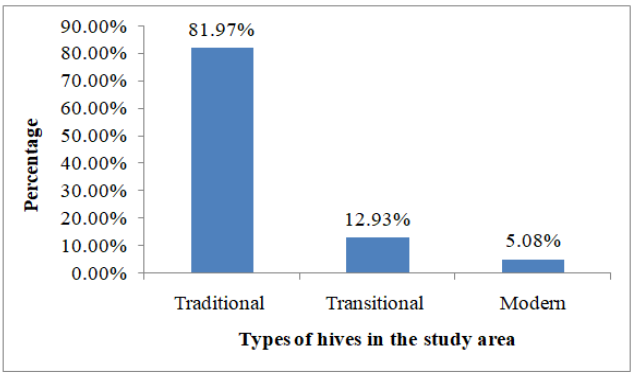

Figure 2. Hive owned by beekeepers in the study area

Table 1. The average honey yield production of honey per hives per year in Kg

No	Type of Hive	Districts								Av.
		Bacho	Didu	Sale nono	Yayo	Bure	Bedele	Alle	Alge sachi	
1	Traditional	11.013	8.709	7.35	9.67	4.18	17.31	6	9.13	9.17kg
2	Transitional	24.428	14.545	15.63	33.82	12	21.85	11.5	24.78	19.81kg
3	Modern	30.75	27.717	20.78	31.66	14.86	25.05	37.5	44.16	29.05kg

The average amount of honey harvested per hive per year increase from traditional to transitional to modern. The finding of the present study is in agreement with study done by Melaku *et al.* (2008) in which improvement in apiary management has been observed and the quantity and quality of honey produced has increased due to modern hives.

Beekeeping system

Majorities (33.26%) of beekeepers were used traditional bee keeping system, whereas few (15.69%) used modern bee keeping system (Figure2). This implies that the traditional bee keeping are highly used by bee keepers in the study area. Similar result was reported by Malede *et al*. (2015) in which the sample respondents have greater number of traditional hives because they have easily constructed from locally available materials such as clay pots, woven grasses.

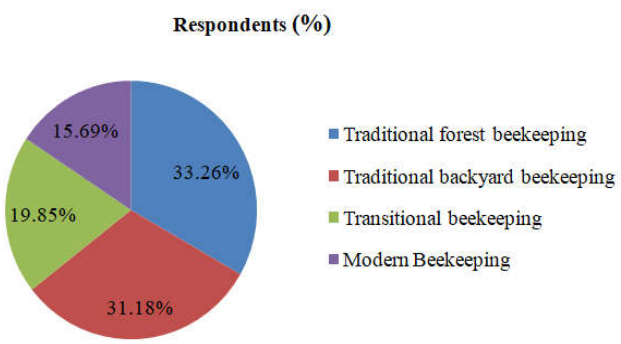

Figure 2. The different beekeeping system in the study area

Hive product and service

In the study area all respondents (100%) were used honey as the main hive product and service and 49.92% of the respondents were used honey and bee wax in combination while the least percentage of the respondents (1.43%) were used honey and bee brood in combination (Table 2). Comparable result was reported by Gallmann and Thomas (2012) in which different hive products such as beeswax, bee pollen, propolis, royal jelly and bee venom have a well documented and effective tradition in healthcare, especially in Asian and Eastern European cultures.

Major constraint's of beekeeping in Ilu Abba Bora zone

The major constraints of beekeeping in the study area were pest and predator (31.2%) and application of pesticide (26.4%) while poor extension service (8.3%) was the least observed beekeeping constraint (Table 3).

Table 2. Percentage of hive product and service used in the study area

No	Hive product	Respondents (%)
1	Honey	100
2	Wax	49.92
3	Propolis	7.74
4	Pollination service	2.29
5	Beebrood	1.43

Beyene and Verschuur (2014) were reported pests and predators, agrochemical, high cost of modern bee hivesand lack of hive equipments as major beekeeping constraints in South West Shewa Zone of Oromia regional state. Teklu and Negash (2016) also reported pests, predators, lack of training and pesticide application are major constraints affecting

beekeeping in Southern Nation, Nationalities and Peoples Region of Ethiopia.

Table 3. Major constraints identified by respondents in the study districts

Constraints	Number of respondents	Respondents (%)
Pest and predator	170	31.2
Pesticide application	144	26.4
High cost of modern hives	102	18.8
Lack of hive equipments	83	15.3
Lack of training	45	8.3
Total	544	100%

Major pests and predators of honey bee

The result of present study revealed the existence of pests was a major challenge to the honeybees and beekeepers. The respondent farmers indicated that bee-eater birds, termites, honey badger, ants, bee lice, small hive beetles, monkey and wax moth were the most harmful pests in decreasing order of importance (Table 4). This study also indicated that 20.5% of respondents had observed bee-eater birds in their beehives and resulted in reduction the number of adult honeybees in the hive (Table 8). 14.1% and 13.8% of the respondents reported termites and honey badger as the second and third most serious bee enemy in the area respectively (Table 8). Similar finding was reported by Desalegn (2001) and Kinati *et al.* (2012) in the central highlands of Ethiopia and Jimma zone southwestern Ethiopia respectively. A recent study by Haftu *et al.* (2015) conducted central zone of Tigray also revealed that ants, birds, honey badgers, lizards, and wax moth to be the most devastating challenges in the study area.

Table 4. Major pests and predators of honey bee

Major pest and predator	Percent (%)	Rank
Bee-eaters birds	20.5%	1
Termites	14.1%	2
Honey badger	13.8%	3
Ants	12.9%	4
Bee lice	10.9%	5
Beetles	10%	6
Monkey	9.9%	7
Wax Moths	7.7%	8

Methods used by bee keepers to protect pests and predators

Most of the beekeepers (28.73%) were used clearing the site daily and 21.3 % of beekeepers were keeping the site. While the remaining beekeepers were used frequent inspection (18.59%), using modified hives stand (14.96%) and using burned gas (12.11%) (Figure 3).

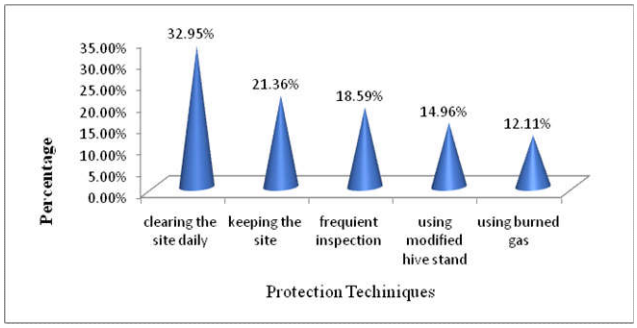

Figure 1. Methods used by the beekeepers to protect pest and predators

Similarly study by Gidey and Mekonen (2010) showed traditionally, farmers have their own control means including the application of ash, rope around entrance of hives (hanging the predator's neck), insect repellents (such as dirty engine oil), snap and light traps, mechanical killing of the pests etc.

Beekeeping Opportunities

Even though there are many beekeeping constraints in the study area, there are also opportunities for honey production. 32.77% and 30.81% of the beekeepers in the study area have no problem with access to bee flora coverage and bee colony respectively (Table 5). Huge number of bee colonies provides great opportunities for beekeepers to expand and produce more honey (Beyene and Verschuur, 2014).

Table 5. Opportunities identified by respondent beekeepers in the study district

Opportunity	Respondents (%)
Colony	30.81
High coverage of honey flora	32.77
Good climate condition	10.69
Support from non Governmental organization	10.34
Increasing price of honey	6
Support from extension worker	5.8
Availability of local materials for hive making	3.56

Table 61. List of some major honeybee floras in the study areas

Common name	Scientific name	Flowering period
Waddessa	*Cordia africana*	Oct. to Nov.
Baaggee	*Combretum pariculatum*	December
Kararo	*Pouteria adolfi-friederici*	February
Gatama	*Scheffleria abyssinica*	March- May
Hambabbessa	*Albizia gummifera*	February
Bakkannisa	*Croton macrostachus*	Feb.-April
Eebicha	*Vernonia amygdalina*	Dec.-Feb.
Boqqolloo	*Zea mays*	June-July
Baddeessa	*Syzygium guineense*	February
Somboo	*Ekbergia capensis*	Sept.-Nov.
Buna	*Coffee arabica*	April-May
Tufo	*Guzotia sp.*	Oct.- Dec.
Kelloo	*Bidens pachyloma*	September- Oct.

List of some major honeybee floras in the study areas

Some important honeybee plants in the studied areas were recorded in vernacular (common) and scientific names with their flowering periods (Table 6). The resources supplied by plants are important sources of nectar, pollen and propolis. Honeybee plants comprise of trees, shrubs, herbs and cultivated crops and are a source of nectar and pollen Chala *et al.* (2012).

Conclusion

Based on the present study pest and predator, pesticide application, high cost of modern hives, lack of hive equipments and lack of training were identified as the major beekeeping constraints. The opportunities for beekeeping development in the zone were include highbeecolony, high coverage of honey flora, good climate condition, support from nongovernmental organization, increasing price of honey, support from extension worker and availability of local materials for hive making. Traditional, transitional and modern hives were used by beekeepers in the studied area. The modern and transitional hives give more honey production annual when compared to traditional hive.

Clearing the site daily, keeping the site, frequent inspection, using modified hive stand and using burned gas were methods used to protect pest and predators by the beekeepers. Controlling honeybee pests and predators and pesticide application and studies on the quality of the honey are needed.

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