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HONEYBEE PRODUCTION SYSTEM, CHALLENGES AND OPPORTUNITIES IN SELECTED DISTRICTS OF GEDEO ZONE, SOUTHERN NATION, NATIONALITIES AND PEOPLES REGIONAL STATE, ETHIOPIA

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ABSTRACT

The study was carried out in selected districts of Gedeo zones of southern Nation nationality and people's regional state: such as Wonago, Kochere and Dilla Zuria/chichu/ districts. The objective of the study was to asses production systems, opportunities and constraints of apiculture farming in Gedeo zones of SNNPRs. Beekeeping is a long-standing practice in the study districts and appears as ancient history of the country as a whole. A cross sectional study, in which 90 households were purposively included and conducted in selected district to assess the current beekeeping practices, production potentials and production constraints. Most (72%) of the beekeepers in the study area have owned only traditional hives and produce honey for home consumption. The beekeeping practice was dominated by male.

Despite the area have production constraints, the area opportunities like existence of large sized natural forest and artificial forest, due attention provision from regional, federal and local government and nongovernmental organizations, yearly flowering and variety floral availability, some small scale farmers highly experienced in apiculture farming, market access and high demand of apicultural products at nationally and international level. Therefore, Designing effective honeybee pests and predators controlling methods, Introduction of full package improved beekeeping technologies with adequate practical skill training on all bee keeping trends and queen rearing practices promoting beekeepers important indigenous knowledge, Producing areal major honeybee plants in large scale, Avoiding discarding of bee colonies after honey harvest, Availing the strategies to support farmers with beekeeping business support services, Improving pre- and post-harvest handling of bee products and Improving the utilization of stingless bee's resources, without damaging the colony is important to make the honey production system in the area more economical, so as to enhance bee products for national and international need.

Keywords:
Honeybee production, Gedeo zone, constraints, opportunity, Ethiopia.

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1. INTRODUCTION

Ethiopia has a longer tradition of beekeeping than other country in the world during time of king Ezana, around the 3rd century AD; wax was needed for religious ceremonies and honey for nobility and the social elite for making traditional beverages. Despite its long history, beekeeping in Ethiopia is still an undeveloped sector of agriculture.

The knowledge and skill of honey production and honey and wax extraction of Ethiopian farmers is still very traditional. Of all the countries in the world, no country has such a long tradition of beekeeping than Ethiopia. Despite its long history, beekeeping in Ethiopian is still an undeveloped sector of agriculture. The knowledge and skill of honey and beeswax production of Ethiopian farmers is still very traditional and 95% of beekeepers follow traditional method of beekeeping practice with no improved techniques or technology (Oxfam, 2008). According to CSA, the major honey and beeswax producing regions in Ethiopia are Oromia (41%), SNNPR (22%), Amhara (21%) and Tigray (5%) 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 (CSA,2011).

Ethiopia is a leading honey producer in Africa and one of the ten largest honey producing countries in the world. Ethiopia has a share of around 23.58% and 2.13% of the total Africa and world honey production respectively (Ayalew, 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 Deffar, 1998). This assisted to exist more than 12 million honey bee colonies in the country (Gezahegn, 2001). Despite the favorable 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 remain low. One of the prominent factors for this low honey and productivity is traditional hives. Ethiopia has the potential to produce 500,000 tonnes of honey per year and 50,000 tonnes of beeswax per annual, but currently production is limited to 43,000 tonnes of honey and 3,000 tonnes of beeswax (MoARD, 2008).

Ethiopia has immense natural resources for beekeeping activity. However, like any other livestock sector, this sub sector has been seriously devastated by complicated constraints. the prevailing production constraints in the beekeeping sub sector of the country would vary depending on the agro ecology of the areas where the activities is carried out (Ayalew, 1994; Edessa, 2002).the major constraints that affect beekeeping sub-sector in Ethiopia are: lack of beekeeping knowledge, shortage of skills man power, shortage of bee equipments, pests and predators, pesticide threat, poor infrastructure development, shortage of bee forage and lack of research extension (Kerealem, 2009).

Low productivity and quality of bee products are the major economic impediments for beekeepers (Nuru, 1999). Depending on these realities, even though apiculture resource is immense in the district, there is no research information regarding to honey production potential, beekeeping constraints and the exits opportunities for future, in this districts which is very essential to identify the potential development constraints. Therefore, the intention of this survey was to investigate honey bee production, opportunities & constraints in the selected districts.

2. OBJECTIVES

- To assess the existing beekeeping practices in selected districts of Gedeo Zone.
- To identify the major constraints and available future remedial solutions in the study area

3. THE GLOBAL OVERVIEW OF HONEY PRODUCTION

The world total honey production is 1.3 million tons a year. Larger honey producing countries are Russia and others 19333,000 tones, China 161,000, USA 75 tones, Mexico 67,000 tons a year. Developing countries produce about 47% of the total world‘s honey production. Ethiopia is the leading honey producer in Africa and 10th in the world. (H .B .R. C, 2007)

Before 1970s Mexico was the world‘s honey exporter but now China leads. Although several African counters are the major producers of honey, almost nothing is exported because of quality problem. Developing countries are taken as a group accounted for 55.5% total experts. Ethiopia exports honey to traditional customers to the Arab counters (Saudi, Yemen) USA, Sweden etc. Developing counters in general and Africa in particular have many honey marketing constraints these are :- quality problem, absence of honey processing facility, absence of appropriate honey container for storage, retail selling and transportation, using honey for beverages, absence of honey producers and collectors cooperative, cultural problems and lack of knowledge about properties of honey and inaccessibility to markets. Price of honey is influenced by:-supply and demand condition distribution time transportation and storage nature of the product standardization and promotion, availability of competitive products and tariff and nontariff barriers and government support. Most of the rural beekeepers cannot afford to invest in modern beekeeping inputs, processing, packaging, and transport their products to market to maximize profit. they produce a low quality product that they are forced to sell locally to wholesale buyers at prices much lower than in domestic commercial markets (MoARD, 2003).

4. HONEY PRODUCTION IN ETHIOPIA

In the country about 30,200 tons of honey is estimated to be produced annually. This makes the country first in Africa and one of ten major honey producing countries in the world. However, most of honey goes for preparation of local beverage Tejj while small amount being used for other purposes. In many regions of country, apiculture is considered as one of the income generating activities for resource poor farmers including women, youth and unemployed sectors of the community. Apiculture also provides attractive options for rural employment and income generation in harsh agro-ecosystem where crop production is marginal and the risk of crop failure is high. There is a great potential in the country for working with communities by introducing minor and easily adaptable apiculture production system, leading to considerable

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gains in productivity beyond family consumption needs. The potential for improvement of the traditional honey and wax production has led to apiculture promotion as part of policy initiatives taken by government of Ethiopia although they have been, in the past, defeated by impact of major constraints and lack of appropriate research (working paper no. 8, Melaku G, and Shifa Ballo, 2008).

Currently Ethiopia is listed as a third country to export honey by European commission. To export to European Union a number of requirements must be met the primary and the secondary requirements. The primary requirements listed were: viable offer to the market, listed in the EU inventory of third countries eligible to export honey to EU and clean honey. The secondary requirements s comprised of: Business relation with the buyer, a traceability system for quality control and Hazard analysis and critical control points concept (P. Gall Mann and H. Thomas.2012).

5. MATERIALS AND METHODS

5.1.DESCRIPTION OF THE STUDY AREA

Gedeo Zone is located in 369 km from Addis Ababa to southern Addis Ababa-Moyale international road and 90 km from Hawassa (capital city of the region) in South Nation Nationality and People Regional State (SNNPRS). On the basis of the current border delineation, the land area of the region is estimated at 1347.04 square kilometers. Geographically, the Zone is located North of Equator from 50 53'N to 60 27'N Latitude and from 380 8' to 380 30' East, Longitude. The altitude ranges from 1500 to 3000m.

The zone has sub-humid tropical climate receives mean annual rainfall 1500 with range of 1200 and 1800 mm. The rainfall pattern is bimodal, with short rain season between March and May accounting for 30% of total rain fall and long rain season between July and October accounting for more than 60 % of total rainfall. The Zone experiences three distinct agro ecologic Zone Namely 'Dega' (30%), 'Woyina Dega' (67%) and 'Kefil-Kola' (3%). The mean monthly temperature is 21.5^{0C} with mean monthly maximum and minimum temperature of 25 ^{0}C and 18 ^{0}C, respectively.

5.2. METHODS OF DATA COLLECTION

Before conducting field survey research, discussion was conducted with the head of woreda livestock resource, development and health work process and bee expert to select sites and respondents. Based on the information of district livestock resource, development and health coordinators and bee expert, 80 beekeepers were purposively selected from two PAs per woreda to collect the required information. The interview was conducted with the selected respondents to generate the relevant data by using structured questionnaire survey and check list. Visual observation of the apiary management and Beekeeping trend was also part of data collection.

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5.3. METHOD OF DATA ANALYSIS

Primary data such as socio-demographic characteristic of respondents, numbers of bee colonies, honey production potential, beekeeping constraints were collected through structured questionnaire. Moreover, ranking of beekeeping constraints was used to identify and prioritize the major beekeeping challenges to beekeeping development in the study district. On the other hand, data collected through interview were analyzed through narration and interpretation. Information about the household characteristics of the sampled beekeepers, types and sources of hive used the swarming and absconding incidences, colony inspection, attractant materials used to baiting hives, constraints and opportunities and the like were collected through interviews using a semi-structured questionnaire. The generated information was entered into database and analyzed using descriptive statistics of SPSS (SPSS Version 20).

Household interview: to select the sample households for the study first discussion were made with woreda experts and cooperative members and model beekeepers. Accordingly 30 beekeeper households per woreda were used for the structured questioner interview. Therefore a stratified random sampling method was used to select the respondent households for the study. Accordingly 30 beekeeper respondents per study woreda have been randomly selected for the interview. Pre-test and recognizance survey were also conducted to see effectiveness of the questionnaire for the study; and then the sampled respondents were interviewed with the help of trained enumerators and house to house interview and visual observation.

Key informant interview: Key informant interview have been made with all study district beekeeping expert, development agents (DAs) of the study area, some individual beekeeper farmers. The qualitative information collected in interview is used to supplement and crosscheck the data obtained through the household survey.

Focus Group Discussions: Focus group discussions were conducted in the study area with purposively selected PA leaders, DAs and bee technicians, and some individuals, who are believed to be knowledgeable about bee keeping, were part of the discussion. Hence, purposive sampling method was used for selecting focus group discussion members.

Farmers research group meetings (FRG): Farmers research group annual meeting of Gedeo zone area were held at Dilla on the survey year and prioritized the bee keeping constraints and measures that will be available in the sector were incorporated and analyzed with the house hold survey data (table 6).

6. RESULTS AND DISCUSSION

6.1.DEMOGRAPHIC CHARACTERISTIC OF THE RESPONDENTS

Demographic characteristic of the respondents with structured questionnaire survey during household survey were presented in the following section.

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Sex of the respondents

Out of the total respondents, about 84% of the interviewed small scale beekeepers involved in honey production trend was male, whereas 16% involved in honey production are female. The survey result indicates that beekeeping activity in the study area is dominated by male. In the district beekeeping activity is mostly practiced with the traditional method of honey production by using local bee hives. The traditional hives are hanging on big tree branches in which some of trees are as long as 50 meters and above. Female cannot climb up such big trees to do beekeeping activity and as a result female are not encouraged to participate in beekeeping activity. Thus beekeeping is traditionally male dominated in the study area.

Age of the respondents

Beekeepers who involved in honey production had an average age of 30 years old. The survey result showed that farmers in the most productive age are actively engaged in beekeeping activities with the average experience of 4 years (table 1).

Family size of the respondents

The beekeepers that have different family size were engaged in beekeeping activity. The minimum and maximum family sizes of the respondents were 5and 7 respectively (table 1).

Educational background of the respondents

Out of the total interviewed about 49% and 39% of the respondent beekeepers have attended primary and secondary school respectively. The rest about 12% respondents were illiterate or who cannot read and write. Therefore in the study area, beekeeping is considered as a job creation activity on which the active labor force participate as Livelihood activity (table 1).

Table 1: Socio-demographic characteristics of the respondents.

		Woredas			
Variables		Wonago	Kochere	Dilla Zuria	Over all
N		30	28	30	88
sex	male	93%	78%	81%	84%
	female	7%	22%	19%	16%
age	mean	29.126	32.591	28.801	30.172
Education level	illiterate	10%	16%	9%	12
	1-6	58%	60%	30%	49
	7-12	32%	24%	61%	39
Family size	mean	7.2745	5.1101	5.0130	5.4658
Marital status	single	22%	25%	33%	27
	married	76%	73%	67%	72
	divorced	2%	2%	-	2

6.2. SOURCES OF HONEYBEE COLONY AND APIARY SITES

The study indicated existences of huge indigenous knowledge on practicing beekeeping which might differ from a beekeeper to beekeeper and also from one location to another location mostly depending on the beekeepers experience. The survey result indicated that 71% of the beekeepers started beekeeping by catching bee swarms, while the remaining by getting bee colonies through

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gift from parents and both catching swarm and gift from parents 14% , and 10%, respectively (Table 2).

This finding agree with Tessega (2009) and Chala (2010) reports that majority of beekeepers initiated beekeeping through swarm catching in Burie district of Amhara region and Gomma district of Oromia Region, respectively. But it also showed that bee colony selling is uncommon as there were no single respondent beekeepers that started beekeeping by buying bee colony.

Table 2: sources of honey bee colonies in study districts

Sources of honey bee colonies	*Percentage of Respondents*
Parents Gift	14
Catching swarms	71
Both as gift and catching swarms	10
Through inheritance	5
Total (N=90)	100

6.3. HONEY PRODUCTION TRENDS

Ethiopia produces about 98% of its bee product from traditional hives (CSA, 2007). For many farmers, beekeeping is one of their major activities in addition to livestock keeping and agriculture. Out of the total respondents, about 67% beekeepers were replied that honey yield in the district is increasing over the years as a result of government attention on the sector now a days, assigning of DA's in the nearby FTC's and kebeles, involvement of different NGO's in the sub-sector, The rest 33% respondents were replied that honey yield in the district is varies from time to time related to season. When rain fall season is good, there is ample pollen and nectar source of bee forage in the area. The amount of honey produced in such season is high but if the dry season prolonged, there is shortage of bee forage availability in the area. In this season, the amount of honey harvested is very low.

From the total interviewed farmers, about 31% were harvesting honey only once time per year. It was observed that most of these beekeepers were used traditional hives for honey production. The reaming 69% of the respondents were harvesting honey twice per year. These respondents were able to harvest honey twice per year because of they are practicing provision of supplementary feed for their bee colonies during the dry season and also follow seasonal colony management practice.

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 survey result revealed that, the average amount of honey harvested per hive per year in district from traditional, transitional and modern hive was 13.6kg, 19.807kg and 22.035kg respectively.

Table 3: Honey yields from different hive types

Variables	*Woreda*	*Mean +SE*	*Overall mean*	*p-value*
Honey yield/hive/year from	Wonago	13.234 ±0.78	13.6 ±0.99	0.009**

transitional	Kochere	10.330 ±0.23		
	Dilla Zuria	17.221 ±0.56		
Honey yield/hive/year from transitional	Wonago	26.256 ±0.89	19.807±1.980	0.491
	Kochere	11.990 ±1.34		
	Dilla Zuria	21.561 ±0.98		
Honey yield/hive/year from modern	Wonago	21.872 ±2.98	22.035	0.000
	Kochere	20.012 ±2.01	±33.90	
	Dilla Zuria	24.221 ±3.02		
Honey lose due to diseases/kg/year	Wonago	3.312 ±0.98	2.81 ±1.002	0.780**
	Kochere	1.209 ±0.99		
	Dilla Zuria	3.909 ± 0.80		
Honey lose due to diseases/ETB/year	Wonago	200.76 ±0.001	132 ±10.009	0.002
	Kochere	62.8 ±0.45		
	Dilla Zuria	134.3 +0.015		
Price of crude honey /kg	Wonago	90.02 ±49.023	87.24 ± 0.37	0.001
	Kochere	80.89 ±58.09		
	Dilla Zuria	92.80 ±56.98		

**- P< 0.01 across column

Honeybee colony Swarming

It is obvious that swarming is a means of reproduction in honeybee. From the total 90 respondents in this study, about 95% reacted occurrences of reproductive swarming in their apiary with the remaining about 5% had no knowhow about swarming. The respondents mentioned that frequency of swarming depends on the availability of honeybees flower and season of the swarming occurrences. About, 84.4% of the sample respondents had experience of catching the issued swarm and this result agrees with report of (Tessega, 2009) who recorded 85.80% experience in catching swarm for beekeepers in Burie District of Amhara Region. Also in this study about 72.8% of the sample respondents agree that issuing swarm had advantage to increase their number of colony and replace non-productive colony with only 27.2% responded swarm has no advantage.

Inspection of honeybee colonies

With regards to collecting information on the inspection of bee colonies by the beekeepers, about 72% of the respondents do not seasonally undertake inspection of their bee colonies. This indicates that most of beekeepers visit monthly and inspect their beehives externally but, they do not inspect internally at seasonally unless to check either the hive was filled with honey or not (Table 5).

However, internal hive inspection was limited to those honeybee colonies placed at backyard and under the eaves of the house. This result agrees with different previous researches (Kerealem, 2005; Tesfaye and Tesfaye, 2007; Chala, 2010) reported that farmers in Ethiopia do not commonly practice internal hive inspection due to the difficulty of the traditional hives for internal inspection i.e., fixed combs attached to the body of traditional beehive.

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Table 5: hive inspection trend of the study districts

	External		*Internal*	
	Frequency	Percentage	Frequency	Percentage
Every day	10	11	5	6
Every week	6	7	10	11.5
Every two weeks	30	33	12	13
Every month	34	**36**	15	16
Not at all except honey harvest	10	11	50	**55.5**
Total	**90**	**100**	**90**	**100**

6.4. INDIGENOUS KNOWLEDGE OF BEEKEEPING IN THE STUDY DISTRICTS

In the study area beekeepers have good indigenous knowledge of traditional beekeeping. According to the responses of the sample respondents, the indigenous knowledge used by the interviewed beekeepers were smoking baited hive by swarm attractant materials, honey harvesting time by smelling, observation at the beehive entrances for what resources the honeybees are collecting and insert stick to beehive to check for honey presence, controlling reproductive swarming by removing brood, strengthening of colony by feeding with honey as local medicine, control of honeybee enemies by different means like cleaning around apiary and using metals swarm catching, identification of adulterated honey by smelling, tasting and looking color of honey.

The result of this agrees with previous findings, (Solomon, 2009; Tessega, 2009) reported as beekeepers have deep indigenous knowledge of beekeeping. Moreover, it requires scientific support from research; indigenous knowledge of the beekeepers contributions to the beekeeping development of the area is important and has paramount importance to improve quantity and quality of honey as well as other hive products

Beekeeping Practice in the Study Area: Beekeeping in the study area has been practiced as sideways with other agricultural activities. Based on the study, there were no any respondents who base their livelihood only this sector. By depending on their level of economic status, three type of bee hives have used by the sample beekeeper farmers in the area. These were traditional (made from log and bamboo), top bar (transitional) and movable frame (modern) bee hives.

Traditional Beekeeping: The sample respondents have greater number of traditional hives because they have easily constructed from locally available materials such as tree logs, bamboo, woven grasses and others. The major apiary site selection criteria are not concord to that of improved ones. The existence of branched large trees to hang hives, wind and main rain direction are some of mostly used criteria in small scale farmers in study disticts.

Frame Hive and Top Bar Hive Beekeeping: Based on the study, the only problem for constructing top-bar hive (KTBH) by beekeepers were inabilities keeping the specific size of top-bars. Due to this problem the hive distribution was very low. In this beekeeping, the production of honey increased.

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Table 4: Distribution and composition of bee hive types of study districts

	Sample size N=90	
Type of Beehives used	Frequency	Percentages
Traditional hive	53	72
Transitional hive	2	2.2
Movable frame hive	17	19
Traditional and transitional	8	9
Transitional and movable frame hives	5	5.5
Traditional, transitional and movable frame hives	5	5.5

7. MAJOR CONSTRAINTS OF HONEY PRODUCTION IN THE DISTRICTS

The major problems of beekeeping in the area are honeybee enemies such as ants, honey badgers, birds and small hive beetles which may account for 20% of the total honey production loss annually. Similarly, many researchers found that ants attack is the most serious problem in beekeeping sector (Edessa, 2005; Desalegn, 2007). The result also supported by study of Gidey et al. (2012) which reported that bee pests, predators and absconding are major constraints affecting honey sub-sector in northern Ethiopia.

Table 6: Major bottlenecks of Honey bee production system in the study Districts

constraints	***Rank***	***Percentage***
Pest and predators	1	17
Shortage of bee colony	2	13
Lack of training/skill of beekeeper	3	12
High cost of bee hives	4	10
Shortage of bee forage	5	9
Lack of business support services	6	9
Marketing	7	7
beekeeping materials/equipments	8	6
Chemical application	9	4
Absconding	10	4
Swarming	11	4
Diseases	12	3
Storage facility/post harvest handling	13	2

8. EXISTING POTENTIAL OF BEEKEEPING IN STUDY DISTRICTS

Availability of eager beekeepers to accept new technology

The small scale farmers in the study area are so eager to access improved technologies. Almost all farmers in the area possess traditional hives with limited number of improved hives.

Scientific way of keeping honey bees, and access to improved way of beekeeping was not common in the specific Woreda. They haven't been updated training and promoted to keep honey bee, rather they had been more following the traditional system of beekeeping that learned from their passed families. Hence introduction of improved honey production technologies,

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management system and training could make to boost the apiculture production and productivity in the study locality.

Availability of natural forest with adequate apiculture flora and water resource

About 90 %, 68% and 86% of household interviewed own natural forest nearby to their dwelling residence from wonago, Kochere and Dilla Zuria Woreda peasant associations respectively as to existence of wide variety land size of natural resource of forest in Woreda, nothing is exploited concerning to apiculture production.

Existence of strong bee colonies and a number of colonies

The minimum honey bee colonies holding per household in wonago is three and maximum honey bee colonies holding for apiculture experience farmers was seventy five. While the minimum honey bee colonies holding was two and the maximum honey bee holding was hundred for Kochere. It is three to hundred for Dilla Zuria districts. These almost all of honey bee colonies in the specified Woreda kept on the natural forest. From the respondent farmers 64% households have 2-10 honey bee colonies ,25% of households possess 13-20 honey bee colonies and the rest 11% household have 25 -100 colonies.

Diversity and seasonal availability of bee forages

The major hone flow season in all study districts begins from January to February and June to August and it could be varied based on availability of rainfall and honey bee flora. More over these, bushes, trees, weeds and shrubs in the natural forest provide year round flora for apiary in the area. Most of these plants found in Natural forest of corresponding peasant association in Woreda and some found in their surrounding localities that developed artificially.

Market access and infrastructure

The small scale farmers in study Woreda supply their all agricultural product as to honey bee products to their village market, Woreda market, zonal market, nearby zonal market Even if the distance to others zone and Hawassa market is lengthy, there is possibility of marketing in all destination of apiary product marketing. Honey is almost exclusively used for income earning for small scale farmers. Local brewers mainly used as input for local beverage formulation specially tejj and local Biyrth.

Honey marketing system

Beekeepers of the study area sell their produced honey at different places and have different costumers. Sample respondents who produce and sell honey were asked their main customers. Accordingly, they mostly sell their honey to local honey traders 40%, beekeepers association 30%, local honey consumers 20%, and to tourists 10%. According to the survey result and secondary data obtained from the district Agricultural office, the price of honey is in the study area subjected to price fluctuation with the highest price in the dry seasons, especially during the wedding time from January to April and in wet seasons from June to August, the period when there is no honey production. The lowest price is during honey harvesting season from January to February and June to August. The result shows similarity with previous result in that, beekeepers sell the largest proportion of their honey during harvest at low price mainly to meet their demand for cash to pay taxes, debts and other social obligation (Beyene and David, 2007).

According to the interviewed farmers, the price of honey is also governed by different factors such as distance from market 25%, quality of honey 40%, consumers' preference 10%, color of honey 15%, , and test of honey 10%.

Honey is the only most common output that produced in apiculture farming small scale farmers in selected districts of Gedeo zone. The farmers in study area produce and provide honey for the market for their daily income gain. Mostly available hone colors produced and marketed in the study area were yellow/red, white and somewhat black. Among these colors of honey, mostly available colors were yellow/red and the second one was whites in the small scale farmer. As to most potential production seasons are two, the color of honey produced are also two. What makes the color of honey produced different was the available honey bee flora, season of harvesting and duration of storage in home of farmers. The white colored honey collected during crop and tree flowering seasons of haricot bean, fababean, pea, bissana and wanza and the red/yellow colored honey collected at flowering season of vast weeds and grasses such as Adey Abeba and the like. At this time the experience beekeeper farmers could collect honey per three week at least in the marketing process the preference of honey is different for various color of honey. For instance yellow/red colored honey preferred for its freshness, attractive color, and medicinal value and own high market value. in addition to these the local brewers prefer black in the first stage and red/yellow in the second stage for formulation of local beverage as its small extent sense for vast beverage.

Honeybee types in the districts

As the beekeepers replied, there are two types of honeybees and are identified as red and black types. The black is the dominant in the three districts. Farmers described their behavior as the red ones are more aggressive, productive and smaller in size and have less absconding and swarming behavior than the black ones, which is in line with Workneh (2011) report. However, body size and pigmentation of honeybees are reported to be changed with altitude (Amsalu et al., 2004).

Stingless bee honey /Apidae/ Meliponinae species

The area is very potential for the existence of different species of stingless bees and for the production of significant volumes of stingless bees honey annually. In the area two types of stingless bees (Meliponinae) are known, which are ground nesting and hollow tree nesting. Ground nesting comprises 30% of the total population of stingless bee in the area and is known for their better productivity. The major harvesting time is similar to that of honeybee's honey, which is February and, sometimes between Junes to August. At one harvest an average of 4 L of honey/per nest can be obtained. During harvesting the hunters dig in to the ground up to 10 to 15 cm below the nest. Moreover, stingless bee's honey hunters recognize the entrance diameter as wide and narrow and they believe in that the wider one is with more population and more productive. Around 20 % of the beekeepers of the respondents have a chance and tradition of harvesting sting less bee honey every year.

Stingless bees are useful in maintaining the ecosystem through pollinating different forest trees and cultivated plant species (Kwapong et al., 2010). In the present study, stingless bees honey is believed to have some medicinal value. Similarly, stingless bees' honey reported to have powerful antibacterial activities compared to honey from commercial honeybees (Temaru et al.,

2007). Further-more, it has higher market demand in India with 20 times costlier than normal honey (Kumar et al., 2012).

9. CONCLUSION AND RECOMMENDATIONS

Generally the area is very potential for beekeeping and the majority of the households keep bees. Beekeeping contributes for more than 15% of the total house hold incomes of the majority of the rural communities in the area. In the districts, despite the presence of different constraints and challenges, there are high potentials and opportunities to maximize the out put of the resource to improve the livelihoods of the communities in a sustainable ways. Different tribes have different well developed indigenous knowledge on how to harvest honey successively without discarding colonies, some also know how to protect their bees from ants attack using a biological control. Despite close proximity of the three districts, the better indigenous beekeeping practices are not disseminating to other areas due to limited support of the traditional indigenous knowledge's with research systems and improving them as needed. Therefore, it requires intervening to change the very old and unimportant traditional beekeeping practices through adopting improved technologies and management practices and practical skill trainings. Some of the major possible intervention areas are recommended here below:

1. Designing effective honeybee pests and predators controlling methods.
2. Introduction of full package improved beekeeping technologies with adequate practical skill training on all bee keeping trends and queen rearing practices on which farmers get and enhance a bunch of queens and new colonies without climbing trees to get colonies.
3. promoting beekeepers important indigenous knowledge and promoting the construction of non timber hives with low costs
4. Multiplying areal major honeybee plants in large scale and distributing to farmers of the area in a package form with a respective seasons.
5. Avoid discarding of bee colonies after honey harvest: beekeepers of the area should be aware on the possibilities of maintaining their colonies for successive harvesting
6. Availing the strategies to support farmers with beekeeping business through credit availability, cooperative formation, input supply and market facilitation should be put in place with value chain approach.
7. Improving pre- and post-harvest handling of bee products
8. Improve the utilization of stingless bee's resources: effort should be made how to identify, domesticate, document and utilize stingless bee resources without damaging the colony.

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