Greener Journal of Business and Management Studies
ISSN: 2276-7827 Impact Factor 2012 (UJRI): 0.6670 ICV 2012: 6.03

Assessment of Honey Production and Marketing System in Gomma District, South Western Ethiopia

By

Chala Kinati
Taye Tolemariam
Kebede Debele

Research Article

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Chala Kinati, Taye Tolemariam and *Kebede Debele

College of Agriculture & Veterinary Medicine, Jimma University, P.O. Box, 307,Jimma, Ethiopia.

*Corresponding Author's Email: hawi_kd@yahoo.com

Abstract

The study was conducted in Gomma district of Jimma Zone, south western Ethiopia to assess honey production and marketing systems. For this study, six peasant associations (PAs) were selected using purposive sampling techniques. From each PA, 30 beekeepers (a total of 180) were randomly selected and interviewed using pre-tested, structured questionnaires. Data were collected and analyzed using descriptive statistics. Results of the study showed that the mean age of the respondents was 40.47 years, indicating an active and productive age. The beekeepers had an average experience of 5.66 years where male respondents (92.8 %) take the largest share to be engaged in beekeeping activities. The average honey yield per year/colony was 7.20 ±0.23, 14.70 ±0.62 and 23.38±0.73kg for traditional, transitional and moveable frame hives, respectively. Honey marketing participants were producers, collectors, retailers and consumers. There was no difference in price of crude honey between study locations (P>0.05), while significance difference (P<0.05) was observed for table honey. From results of the study honey yield per hive/year was found to be low from traditional and transitional hives as compared to moveable frame hive. Thus, strong extension and technical intervention is important for farmers to use the moveable frame hives to increase honey production and income of beekeepers in the study area.

Key words: Beekeepers, honey production, marketing system, price.

INTRODUCTION

The wide climatic and edaphic variability have endowed Ethiopia with diverse and unique flowering plant that is highly suitable for sustaining a large number of bee colonies and the long established practice of beekeeping. Nevertheless, the bees and the plants like all renewable natural resources are constantly under threat from lack of knowledge and appreciation of these endowments (Girma, 1998). Honey is almost exclusively used for local consumption, mainly for the brewing of mead, also called *T*ej *(*Hartmann, 2004). Even though the national honey production satisfies the local demand, it is so crude that it could not compete in the international market.

Though Ethiopia has diverse and unique flowering plants suitable for beekeeping, the bees and the plants like all renewable natural resources are constantly under threat from lack of knowledge and appreciation of these endowments. The principal resource base for beekeeping has become seriously devastated in the course of time. The potential of the Ethiopian landscape for honey production does now, undoubtedly, only constitute a small fraction of its former wealth. Moreover, the destruction of the remaining resource-base can be observed as, going on at a steadily accelerating pace (Girma, 1998).

The major constraints that affect apiculture in Ethiopia are lack of beekeeping knowledge, shortage of trained manpower, shortage of beekeeping equipment, pests and predators, fires, pesticide threat and inadequate research works to support development programs. The cultural beehives are not comfortable for sanitation and high level of production. Farmers are only selling honey and do not consider wax as means of income in their business. Based on these facts, even though Gomma district is believed to have a diversified type of vegetation and cultivated crops as potential for beekeeping activities, so far there is no research information on honey production system in the area. Moreover, little information is known about marketing system of honey in Ethiopian in general and Gomma district in particular. Therefore, this study was conducted to collect information on honey production and marketing systems of Gomma district in south west of Ethiopia.

MATERIALS AND METHODS

The study was conducted at Gomma District, located in mid-altitude sub-humid zone of the south western part of Ethiopia. It is one of the administrative regions under Jimma zone of Oromia regional national State. Gomma District

is located at 390 km from Addis Ababa. The topography of the study area ranges from gently sloping to hilly lands with ridges and valleys in between. The total surface area of the district is 96.4 km^2 (IPMS, 2007). The rainy season extends from May to September with highest rainfall usually recorded in August. The mean annual rainfall varies between 1400 and 1650 millimeters with average maximum and minimum temperatures of 29.9 ^{O}C and 13.4 ^{O}C, respectively and the altitude is 1400 to 2270 m.a.s.l. The soil type is dark reddish brown and there is a wide area covered with vegetation in the region, including the study area (Elias, 2003).

Sampling Procedure

The survey was conducted in Jimma zone, Gomma District of Oromia Regional State. A single- visit- multiple formal surveys (ILCA, 1992) was used to collect data. Based on the information obtained from district Agricultural Office, Gomma District was categorized in to high, medium and low in terms of its potential for beekeeping. Two Peasant associations (PAs) from each production category (high, medium and low), having thirty beekeepers each (a total of 180 beekeepers (Table 1) were selected using stratified random sampling techniques (Patton, 1990).

Table1: Peasant Association (PAs) in Gomma district selected based on honey production potential

No	Production category	Name of PAs	No. of bee hive	No. of house hold beekeeper
1	High	Kota	4146	458
		Omo Beko	3014	789
2	Medium	Omo Guride	2014	267
		Koye Seja	1338	265
3	Low	Kilole Kirkir	1064	119
		Bulbulo	719	150

No = Number PAs = peasant associations

Sources of data and analytical techniques

Primary data were used for this study. These data were obtained by using pre-tested, structured questionnaire to collect data on: Socio-economic characteristics of households (sex, age, family size, land holding, years of experience in beekeeping, educational level, major activities of beekeeping, Honey extraction, processing and storage method and Market structure/marketing channel. Questionnaire interviews and visual assessments of each beekeeper were conducted in the study area. The data was analyzed using the Statistical Packages for Social Sciences (SPSS) version 16.0. Descriptive statistics was used for the qualitative data; while analysis of variance was employed for quantitative data. Means were separated using least square significant difference whenever they were statistically significant at $P<0.05$.

RESULTS AND DISCUSSION

Socio-economic characteristics of households

The mean age of the beekeepers at Gomma District was 40.47 years (Table 2). This survey result showed that people in the most productive age are actively engaged in beekeeping activities with an average experience of 5.66 years. Based on this exposure, young people gradually move on to become independent beekeepers as soon as they can obtain their own hives (Gichora, 2003). They continue accumulating experience by seeking technical advice from fellow beekeepers and development agents (DAs) whenever necessary. The mean land holding per beekeeper household was estimated to be 1.73 ha. Generally, the average land holding in the district showed insignificant difference but is slightly higher than the national average household land holding of 1.0-1.5 ha (ASE AIFSP, 2002).

Table 2: Socio-economic indicators of the sample respondents (n=180) in the study

Socio-economic indicators	Minimum	Maximum	Average	SD
Age of households	20	70	40.47	10.4
Experience (years)	1	27	5.66	3.54
Family size (person)	1	16	5.6	2.77
Land holding (hectare)	0.25	10	1.73	1.34

n = number of respondent SD = Standard deviation

Regarding the level of education, 34.4 percent of those interviewed beekeepers did not receive any formal or informal education. The rest were at different stages of literacy ranging from reading and writing skills to completion of secondary school (Fig. 1).

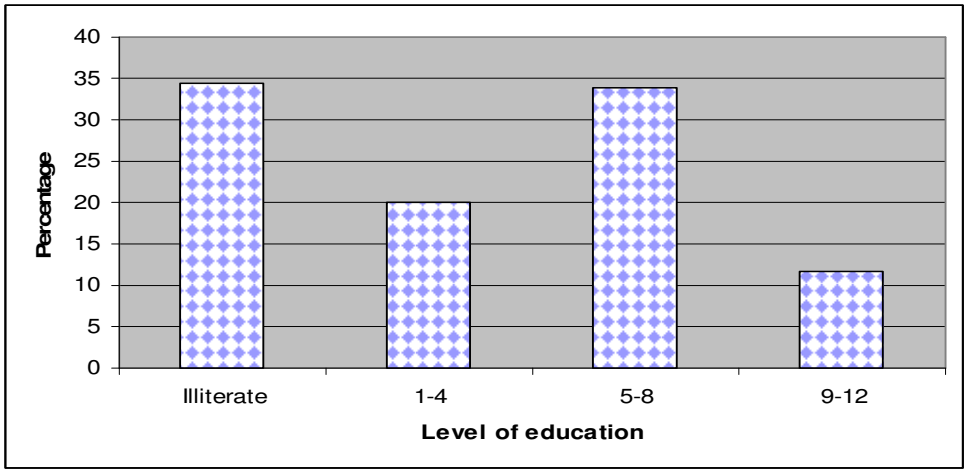

Fig. 1: Educational level (grade levels) of the beekeeper in the study area

Educational level of the farming households may have significant importance in identifying and determining the type of development and extension service approaches.

This shows that traditional beekeeping practices are based on informal opportunities and an individual's level of formal education does not matter as most of the beekeepers in this study are uneducated people. This is in line with Gichora (2003) who noted the insignificant role of level of education in the traditional beekeeping.

Honey production

a) Honey harvesting techniques and seasons

Most traditional beekeepers identify honey harvesting season by the experiences they developed in their respective area. The different indicators that the beekeepers use for identifying honey season are: smelling of honey, accumulation of bees around the entrance of hives, end of flowering season and weighing of the hive. Some beekeepers identify honey season by inserting a thin sized stick in to the hive. If there is honey, the stick comes back with the honey strips. This method of indicators could not be efficient in identification of honey from brood by weighing and it is also impossible to identify externally whether the honey has ripened or not. But in the case of movable comb and frame hive the maturity of honey and pure honey can be easily observed.

Honey is harvested in the study area from October to December and May (peak periods) and also sometimes January to March in each year. The majority of respondents (78 %) harvested honey twice within this period of the

year, whereas 16 % of the sample farmers harvested once in a year and 6 % of the sample farmers respond that they harvest three times in the same period, which indicates the presence of high potentiality of the area. It was

reported that any production obtained in the remaining periods of the year would be left as food for the colony to strengthen it for the next harvest. This research result was similar with Tessega Belie (2009) in Burie district where honey was harvested once or twice, and in some cases even three times.

b) Honey extraction, processing and storage method

According to the results of this study, about 65 percent of the beekeepers in Gomma District dealt with crude honey, which is obtained by breaking honey combs into smaller pieces by hand or stirring with a stick.

About 69.2 % of the interviewed beekeepers in study area said that they are straining their honey using clothe, sieve and hands; while 30 % of respondents sold crude (with wax) and 0.8 % of the interviewed beekeepers strained their honey after boiling due to lack of know- how and lack of processing materials. Where the beekeeper is not in urgently need of cash, honey was stored both in strained and without strained form. They didn't want to sell at lower price when markets are flooded with honey, usually at harvesting time. According to the respondent's beekeepers, 75 % of them sold their honey within 1 to 6 month after harvesting and only 1.7 % stored for more than two years (Table 3).

Table 3: Storage period of honey in the study area

No.	Storage period	Percent of respondents	
		Number	**Percent**
1	Less than one month*	26	14.4
2	One to six months	135	75.0
3	Seven to twelve months	12	6.7
4	One year to two years	4	2.2
5	More than two years	3	1.7
	Total	**180**	**100**

***** The honey will be consumed or sold after harvesting.

This indicates less likely deterioration of the honey during storage given the less dependable storage material because of its short storage time. Similar study showed that nearly all sample (n=120) farmers from Dangla (west Amara Region) and 52 % from Bore (Borena zone of Oromiya Regional State) sold over 85 % of their honey immediately after harvest. The remaining 48 % of the Bore sample farmers wait for price rise (on average for 3 to 5 months). 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 obligations (Beyene and David, 2007).

The commonly used traditional storage containers by beekeepers are clay pot, and container made of cucumber ('*kil*'). The containers are fitted with lids made of locally available materials and sealed with mud and ash mixture. Such traditional containers will absorb moistures or may change the flavor of honey and deteriorate the quality of the honey. In addition, these containers can breakdown easily so they need careful handling and nowadays they are gradually replaced by tin and plastic containers with fitted lids.

c) Honey yield from different types of beehive

Based on beekeepers estimate, the number of kilograms taken per hive per harvesting ranged from 3 kg up to 15 kg and 10 kg up to 35 kg of crude honey for traditional and transitional bee hive respectively and 6.25 to 50 kg table honey for movable frame hive (Table 4). This survey result was above the national average of 5 kg (Gezahegne, 2001 and EARO, 2000) 12-15 kg and 15-20kg (MOA, 2003) for traditional intermediate and movable frame hives, respectively. Moreover, according to the survey conducted in West Showa Zone, average honey yield of traditional hive is 6.1 kg per hive per annum (Edessa, 2002). These results are indicators of the existence of room for increasing performance of these beehives through good management practices coupled with favorable beekeeping environment. Generally, there were highly significant difference ($p<0.05$) between the three types of hives in terms of yield per hive per year.

Table 4: Least square means and standard error for honey yield (kg) obtained from different type of beehives per annum of the study area,

No.	Types of hive	Mean
1	Traditional hive	7.20 ± 0.23^{a}
2	Transitional hive	14.70 ± 0.62^{b}
3	Movable hive	23.37 ± 0.73^{c}

Means in a column having different superscript are statistically different at $P<0.05$

Based on the information from the respondents, honey bee colony number is increasing from the year 2005 to 2009 by 1532 to 2718 (Fig.2).

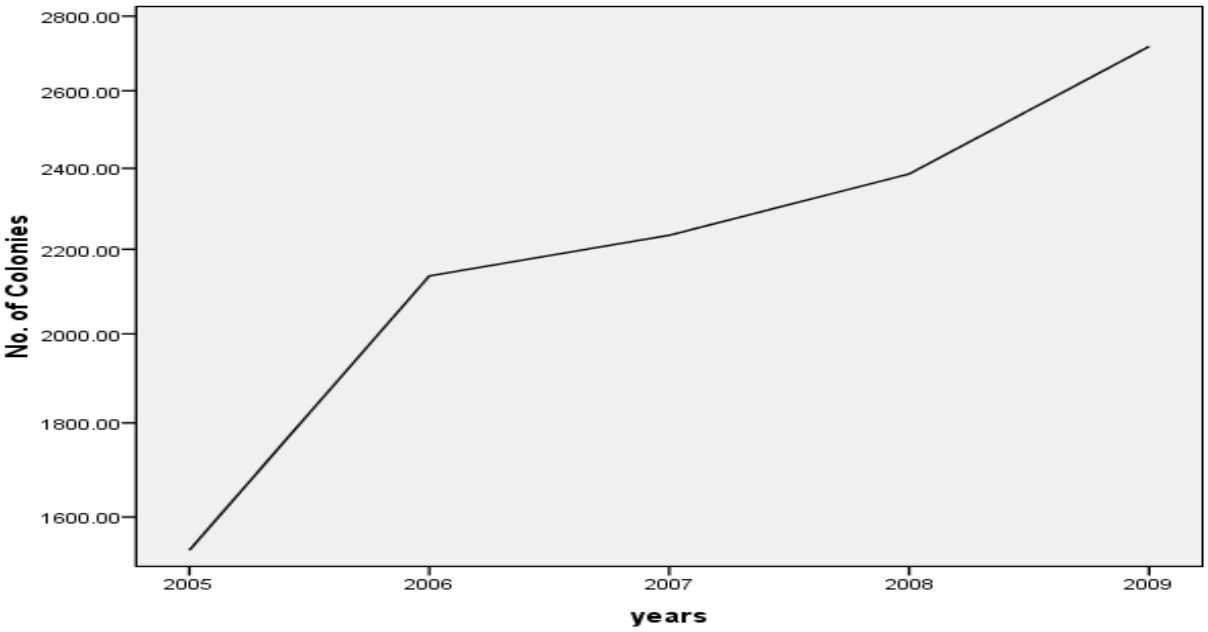

Fig.2. Number of honeybee colonies over the five years in the study area

This might be due to favorable weather condition, increment of beekeeping participant, and introduction of modern bee hives, a slight improvement of extension serves and a little increment in honey price. However, it is yet not satisfactory in relation to its potentiality. This result realizing the information obtained from District Agriculture and Rural Development Office which indicated disseminations of improved beehives, mainly movable frame beehives, has increased since 2003/2004 production year, which had a significant impact on honeybee colony increment.

According to the respondent beekeepers, the trends of honey yield of the past five years (2005 to 2009) were increasing from 13,002 to 31,650.25kg (Fig. 3).

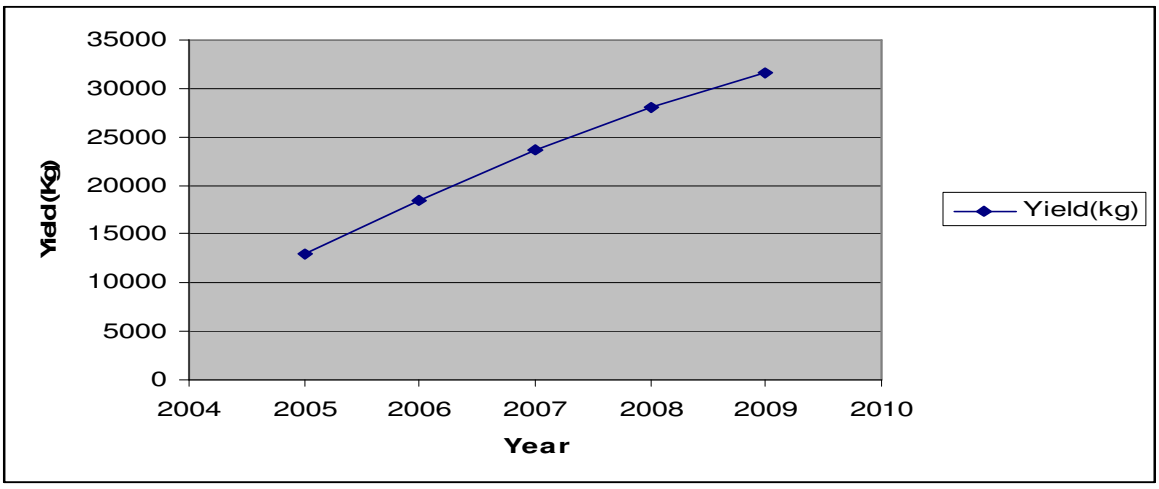

Fig. 3: Trends of honey production from 2005 to 2009 in the study areas

This is also might be the same case with the reason for trends of honeybee colony increment that is due to favorable weather condition, increase of beekeeping participants, and introduction of modern bee hives, a slight improvement of extension serves and a little increment in honey price.

The result of this study showed *PAs* which were grouped as medium production category were higher than the high and low production category in all types of beehive yield (Table 5). Moreover, the low production category come second in both transitional and movable beehive yield, while the high production category is higher in traditional beehives yield than low production category. Based on this research result, there was significant difference ($P<0.01$) between the three production categories in terms of honey production per hive in traditional bee hives. However, there was no significant difference($P>0.05$) between the three production category in both transitional and movable beehives.

Table 5: Least square means and standard error for honey yield from different type of beehives based on production category

Production. category	Type of hives		
	Traditional(yield/hive)	Transitional (yield/hive)	Movable frame (yield/hive)
High	7.3 ±0.43[a]	14.23 ±0.41	21.64 ±0.92
Medium	8.03 ±0.36[b]	15.03 ±0.51	24.39 ±1.39
Low	6.25 ±0.27[c]	14.85 ±0.39	23.37 ±1.21
Total	7.20±0.21	14.70±0.25	23.37±0.69

Means in a column having different superscript are statistically different at $P<0.05$

This shows that in traditional beehives, the yield per hive varied from one hive to another because of differences in size of beehives. Another contributing factor among the production categories for traditional hives could be the level of supervision or management employed by different farmers since traditional hives are hanged in the forest far from the home of the farmers. But in Transitional and movable frame beehive there was a standard size for construction of the hives and more accessible for the follow up as the hives are placed at the backyard.

Market structure/marketing channel

In this study, different honey marketing participants were identified. Honey marketing participants in the study area includes producers/farmers, honey collectors/assemblers, retailers and final consumers of the product.

Producers: Producers/farmers sell their honey to different buyers at the village or district market center. The market place that is the closest to the residence of the farmers is the first choice with regard to minimization of transportation

costs and less bargaining power by farmers due to individual marketing because of little amount of honey product and lack of information on honey marketing at other sites.

Honey collector: The honey collectors found in the study area purchased the honey produce directly from farmers in a small village markets for resell to other collectors, retailers, and consumers who come from different areas of the region at the district market center.

Retailers: There are shops and other retailers who divide large amounts of the product and sell it to consumers in small units. These are the final link in the channel that delivers honey to end users, since there were no processors in the study district. The majority of honey retailers found at the woreda centers have their own small stores and retail shops.

Consumers: From the consumers' point of view, the shorter the marketing chain, the more likely is the retail price going to be affordable. Consumers for this particular study mean those households who bought and consumed honey. They are individual households who bought the commodity for their own consumption also for making "*Tej*".

According to Mendoza (1995), marketing channel is the sequence through which the whole of honey passes from farmers to consumers. The analysis of marketing channel is intended to provide a systematic knowledge of the flow of the goods and services from their origin (produce) to the final destination (consumer).Therefore, during the survey, the following honey marketing channels were observed (Fig.4).

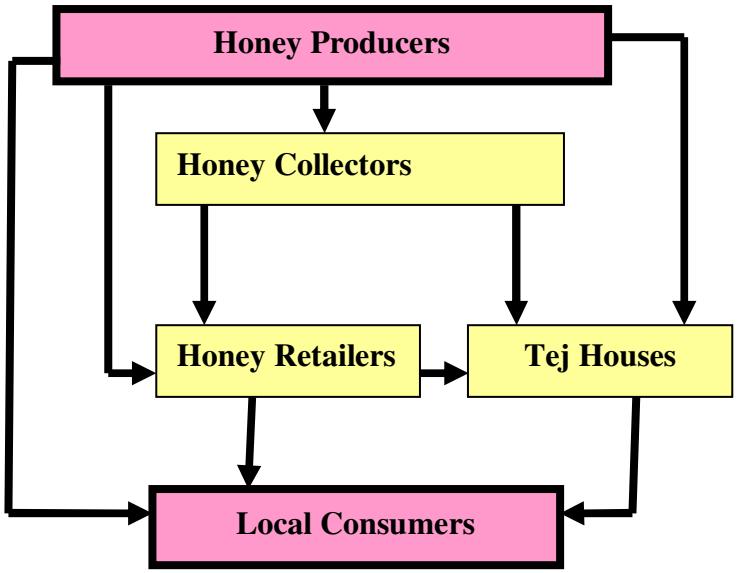

Fig.4. Honey Market Channel of the study area

I. Producer (Farmers) - consumers (39.6%)
II. Producer (Farmers) - honey collectors'- consumers (10.4%)
III. Producer (Farmers) - retailers'- consumers (50%)

In the area, the price of honey is subjected to fluctuation with the highest price in the dry seasons especially during wedding time, holiday, cultural ceremonies and also during wet seasons (June to August) the period when there was no honey production. The lowest price was reported during honey harvesting time (September to November, January to March and May). Almost all farmers have at least one market center where to buy or sale their honey or they sold at their vicinity for consumers and beverage (*Tej*) makers with low price. This is because of high transportation costs and less bargaining power by farmers due to individual marketing. Based on this, the average price of one kg crude and table honey varied from village to village (15.71 and 20.00 ETB) respectively (Table 6). In this survey result, a lower price was observed than the survey result of Melaku et al. (2008) at east shewa Ada'a Liban District where retailers come to their homes and collect the honey with the price of ETB 20–25/kg. When different localities were compared in terms of honey price per kilogram for crude honey there was no significant difference ($P>0.05$), while for table honey there was a slight significance difference ($P<0.05$).This difference might be due to the quality of the

product in relation to the way they stained the honey and the physical appearance was also unattractive due to impurities.

Table 6: Least square means and standard errors for honey price of different localities in the study area

Name of PAs	Price of crude Honey	Price of table honey
Kota	16.90±0.57	20.40±0.52^{bc}
Omo Beko	16.70±0.76	20.70±0.63 ^{bc}
Omo Guride	14.30±1.05	19.30±0.70^{c}
Bulbulo	14.70±1.27	21.30±0.82 ^{bc}
Koye Seja	13.70±1.11	22.50±0.87^{ab}
Kilole kikir	16.40±0.37	22.50±0.87^{ab}
Total	15.45±0.42	20.82±0.30

Means in a column having different superscript are statistically different at P<0.05

When asked to evaluate the local market price, the beekeepers replied that it is intrinsically connected to supply, as demand appears to remain relatively constant throughout the year. It is lowest soon after harvesting season (15ETB). Periodically, the price rises in the months following the harvesting season (30 ETB) and finally the product disappears from the local market. The price had no connection to much of the standard quality test though the quality standard of honey obtained in the area was found to be very good except the water insoluble materials (Chala et al. 2011).

CONCLUSIONS

Based on the result of this survey, people in the most productive age are actively engaged in beekeeping activities with having a moderate experience of beekeeping. The number of bee colonies and honey yield were increasing during the past five years. When different localities were compared in terms of honey price per kilogram for crude honey there was no significant difference observed (P>0.05), while significance difference (P<0.05) was observed for table honey. Likewise, the mean annul gross income per household during the survey time was about Birr 2,634.70. This showed a need for various strategies remaining to utilize the production potential of the area.

According to this survey, movable comb top-bar and movable frame hives resulted in higher honey production per colony (14.70±0.62 and 23.37±0.73 kg/hive respectively) compared with local hives (7.20±0.23). Generally the study area had good potential of honey production with increasing trend of expansion.

ACKNOWLDEGEMENTS

The authors gratefully acknowledged the financial support from Jimma University, College of Agriculture and Veterinary Medicine to conduct this study. We would also like to thank the beekeepers of the study area who had shared their knowledge and invaluable cooperation throughout the study period

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