

Production Challenges: A focus on Honey Sub-Sector: The Case of Shebedino District, Sidama National Regional State, Ethiopia

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Abstract: - Apiculture is considered as one of the income-generating activities for resource-poor farmers including women, youth and the unemployed sectors of the community. It also provides attractive options for rural employment and income generation in harsh agro-ecosystems where crop production is marginal and the risk of crop failure is high. Even though, various constraints were hindering production and marketing of honey in Shebedino district of Sidama region, SNNPR, Ethiopia which is the second highest producer of honey in Sidama region. Therefore, this study was conducted with the objective of investigating opportunities and constraints hindering honey production and marketing in Shebedino district. To achieve this objective, both primary and secondary data have been collected from 156 farm households, 31 traders, 7 processors and 30 consumers and various literatures. The data collected were analyzed using descriptive statistics with the help of SPSS statistical package. The result of the study indicated that farmers' indigenous knowledge of beekeeping; agro-ecological condition of the District; support of governmental organizations and some other NGOs; availability of strong domestic market for honey, high production, and ease of licensing were identified as the main opportunities in honey production and marketing. Changes in weather condition, pests and predators, some pesticides used in crops, absconding, absence of some modern beekeeping equipment, lack of scientific knowledge on beekeeping, low participation of women in the sector, seasonality of honey and price fluctuation were identified as constraints in honey production and marketing in the study district.

Index Terms: Apiculture, honey production, challenges, Shebedino

I. INTRODUCTION

Honey production and marketing have various socio-economic benefits that significantly favor producers and traders who participate in its production and marketing. In many regions of the country, apiculture is considered as one of the income-generating activities for resource-poor farmers including women, youth and the unemployed sectors of the community. It also provides attractive options for rural employment and income generation in harsh agro-ecosystems where crop production is marginal and the risk of crop failure is high (Melaku *et al.*, 2008). It is also believed that honey production and marketing is an important economic activity that has great significance in terms of employment to Ethiopian rural community. According to USAID (2012) & Yetimwork *et al.* (2015), about 1.4 to 1.7 million households are estimated to be

engaged in honey production in Ethiopia. As per Miklyaev *et al.* (2014), Ethiopia's honey-production potential and its likely contribution to poverty reduction have been recognized and incorporated into the working agenda of the government of Ethiopia. Apiculture is a promising agricultural enterprise, which directly and indirectly contributes to smallholder's income in particular and nation's economy in general. It has significant role in generating and diversifying the income of subsistence Ethiopian smallholder farmers mainly the small land holders and landless (Fikru, 2015). Ethiopia has the largest bee population in Africa with over 10 million bee colonies, out of which about 5 to 7.5 million are estimated to be hived while the remaining exist in the wild. This makes Ethiopia a leading in Africa and ninth in the world in honey production, respectively (Gemechis 2015; Maledet *et al.*, 2015). As per USAID (2012) report, about 24% of Africa's and of 2% of the world's honey comes from Ethiopia. Shebedino is one of the 19 Districts of Sidama regional state, Ethiopia.

Various factors contributed for Shebedino District to be the largest producer of honey. There are also various constraints hindering production and marketing of honey. Therefore, this study focuses on those opportunities that contributed to and constraints hindered honey production and marketing in Shebedino district.

II. STATE OF THE ART

A. Opportunities of Honey Production and Marketing

Various opportunities have been identified as opportunities for honey production and marketing in Ethiopia that enhanced the supply of honey being marketed in the domestic market and abroad. For instance Maledet *et al.*, (2015) on their work entitled 'Assessment of Challenges and Opportunities of Bee Keeping in and Around Gondar' stated that the existence of flowering plants and ample source of water, availability of honey bee colonies and materials being among the major opportunities. According to Gemechis (2015), the tremendous variation of agro-climatic conditions and biodiversity which favored the existence of diversified honeybee flora and huge number of honeybee colonies (10 million bee colonies) being among the major opportunities of honey production and marketing. Seid and Solomon (2015) also argue that major opportunities being existence and abundance of honeybee, availability of potential flowering plants, ample source of water for bees except in

Production Challenges: A focus on Honey Sub-Sector: The Case of Shebedino District, Sidama National Regional State, Ethiopia

drought prone areas, traditional knowledge and experience of beekeepers', and the socio-economic value of honey. Ethiopia's wide climatic and edaphic variability have endowed this country with diverse and unique flowering plants, thus making it highly suitable for sustaining a large number of bee colonies and the long established practice of beekeeping (Assefa, 2009). As per MoA and ILRI (2013), the strong domestic honey market is another opportunity for honey marketing in Ethiopia. In Ethiopia, only about 10% of the honey produced whole over the country is consumed by the beekeeping households. The remaining 90% is sold for income generation and of this amount, it is estimated that 80% is used for *Tej* brewing.

B. Constraints of honey production and marketing in Ethiopia

In contrast to opportunities that favor honey production and marketing, various studies also pointed out the major challenges of honey production and marketing in Ethiopia. According to Maledet *et al.* (2015), and Seid and Solomon (2015), the major challenges are drought, pests and predators, pesticide poisoning, absconding, lack of modern bee keeping equipment and materials, honey bee diseases, lack of honey storage facilities, poor extension services, non-existence or poor involvement of women in beekeeping development and lack of knowledge of appropriate method of beekeeping. Gemechis (2015) mentioned as a constraint that the large majority of beekeepers in Ethiopia are still producing honey using traditional hives. The colonies in traditional beehives account for about 97% of the total hived honeybee population. The productivity of traditional hives is extremely low and the average yield is only about 5 to 8 kg/per colony/per annum. Whereas, Modern beehive yields around 20 kg of higher quality honey as compared to 5 to 8 kg of yields from traditional beehives and also poor quality of honey harvested from traditional hive when compared to the potential honey yields and quality gains associated with modern beehives (Miklyaevet *et al.*, 2014; Gemechis, 2015). In many parts of Ethiopia, the cooperatives lack proper collection, storage and transportation facilities and hence compromise the quality of the honey. They also have low business concept (market information gathering and analysis, pricing, promotion) to be competitive (Gemechis, 2015). The whole domestic honey market lacks proper structure and legality. It is of lengthy chain of actors that widens gap for the access of producers to bigger and better paying markets. As per USAID (2012), the major constraints identified are, backward technology for honey production, which includes traditional beehives and results in low quantity and poor quality of honey produced, lack of financial resources (such as access to loan) for beekeepers to obtain modern beehives and other tools necessary to increase honey production, supply-related barriers to properly managing modern beehives, and lack of proper training regarding efficient management of a modern-style apiary. So, the beekeepers complain the business as not rewarding and even lacking the market for their product, while the consumers see the ever increasing price of honey as unfair. Moreover, the market faces challenges like smuggling that pushes the legal actors out of market. In many cases, adulteration of honey has been a frustrating factor for both the producers and legal buyers and sellers as

the traceability and accountability is hardly possible (Gemechis, 2015).

III. METHODOLOGY

A. Description of the study area

Shebedino District is one of the 19 Districts of Sidama region which is located at the North-central part of Sidama region at a distance of 27 km from the capital city of SNNPR, Hawassa. Astronomically it is situated in the coordinates of 60 46' to 70 45' North latitude and 390 34' to 390 53' East longitudes. The total area of the District was 276.9 sq.km and it was bordered on the south by Dale District, on the west by Boricha District, on the north by Hawassa Zuria District, on the east by Gorche District, and on the southeast by Wensho District (SNNPR BoFED, 2018). There were around 294179 people in the District who live being clustered in 35 Kebeles, out of which 49.2% (145728) were females and the rest 50.8% (148451) were males, as per the 2018 statistics of the District Bureau of Finance and Economic Development (BoFED, 2018). The total household size was 55007. Around 93% (51413) of the total households are living in rural areas depending on crop production and livestock rising and the rest 7% (3594) are dwellers in the urban part of the District. Regarding honey production, the District was ranked the second high producer of honey in Sidama region next to Aroresa District. The total annual production for the year 2018 was 124.32 tons of honey according to the reports of Sidama region agriculture office (SZAO, 2018). The figure below shows map of Shebedino District and location of the study Kebeles.

B. Data Types, Data Sources, Method of Data Collection and Analysis

Both primary and secondary data were collected for this study. Primary data sources were honey producer farmers, honey traders, experts of beekeeping in the study District and experts working in District Trade and Industry Office. The sample size of was determined using the formula of Yamane (1967) cited in Israel (2012). Two stage sampling method was used to select these 156 sample farm households. In the first stage, Peasant associations (PAs) have been grouped as producer and non-producer PAs, and 3 PAs have been selected in random basis from producer PAs in the district (1 from high producer PAs, 1 from medium producers and 1 from low producer PAs). The PAs were Sedeka (from high producers), Teremesa (from medium producers) and Howolso (from low producers). In the second stage, 156 farm households have been selected in arandom basis from the above 3 PAs. Individual interview and focus group discussion were employed to collect primary data and secondary data were collected from different published and unpublished sources. The data collected were analyzed using descriptive statistics such as means, standard deviations, percent and frequency tables. SPSS statistical package has been employed to assist the analysis.

IV. RESULTS AND DISCUSSION

A. Socio-Economic and Demographic characteristics of Respondents

i. Sex and marital status of producer households

Out of the total sampled households in the study area, 88.5% were male-headed and the rest 11.5% were female headed households. Regarding marital status of the sampled households, most of the household heads (95.5%) were married, 3.2 percent were widowed and the rest 1.3 percent were single (Table 1).

Table 1. Distribution of sampled households by sex and marital status

Variables		N	%
Sex	Male	138	88.5
	Female	18	11.5
Marital status	Single	2	1.3
	Married	149	95.5
	Widowed	5	3.2

Source: Survey result, 2019

ii. Age, family size and educational level of household heads

Age of the respondents in the study District ranged from 20 to 80 and the mean age of the respondents was 44.34 years with standard deviation of 10.44. This shows that most of honey producers in the study District were adults. The family size of sampled respondents also ranged from 4 to 12 and the average family size was around 7 persons with standard deviation of 1.59 (Table 2). Regarding education, the mean grade level achieved by respondents was about grade 6. The minimum grade achieved was grade 0 (illiterate) and the maximum was grade 10 with standard deviation of 2.93.

Table 2. Distribution of respondents by age, family size and education level

Variables	Mean	Sd. Deviation	Min	Max
Age	44.34	10.44	20	80
Family size	6.91	1.59	4	12
Education level	5.78	2.93	0	10

Source: Survey result, 2019

iii. Beekeeping experience, landholding and livestock holding of households

The mean honey production experience of honey producers in Shebedino District was 10.11 years with the standard deviation, minimum and maximum of 5.99, 3 and 30 years respectively (Table 3). The result indicated that there were recent entrants to honey production.

Regarding the landholding, the average land holding size of the sampled honey producing households was 0.923 ha with minimum, maximum and standard deviation of 0.13 ha, 5 ha and 1.15 respectively. The mean colony holding of the

respondents was around 13 with minimum, maximum and standard deviation of 3, 91 and 15.4 respectively (Table 3). Total number of livestock holding of the households was measured in Tropical Livestock Unit (TLU). As indicated in Table 8 below, the average livestock holding was 2.32 TLU. The minimum and maximum TLU were 0.01 and 10.42 respectively with standard deviation of 1.68 (Table 3).

Table 3. Distribution of respondents by experience, landholding, colony holding, and livestock holding

Variables	Mean	Sd. Deviation	Min	Max
Beekeeping Experience (years)	10.11	5.99	3	30
Landholding (ha)	0.923	1.15	0.13	5
Colony holding	12.83	15.4	3	91
Livestock holding (TLU)	2.32	1.68	0.01	10.42

Source: Survey result, 2019

iv. Total amount of honey produced, amount supplied to the market and amount consumed

The total amount of honey produced by sampled 156 households in 2018/2019 was 26951 kg, out of which 96.7% (26060 kg) was supplied to the market and the rest 3.3% (891 kg) was consumed. The minimum and maximum of total honey produced were 17 kg and 380 kg respectively. The mean total production was 165.6 kg with a standard deviation of 84.12 (Table 4). The mean amount of marketed surplus was 160.1 kg with minimum, maximum and standard deviation of 15 KG, 370 kg and 83 respectively. The mean, maximum and minimum of the consumed honey were 5.7 kg, 20 kg and 1 kg respectively with a standard deviation of 2.92.

Table 4. Amount of honey produced, supplied and consumed in 2018/2019 (kg)

Variables	Mean	Sd. Deviation	Min	Maxi
Amount produced	165.6	84.1	17	380
Amount supplied to the marker	160.1	83	15	370
Amount consumed	5.7	2.9	1	20

Source: Survey result, 2019

v. Production and marketing costs of honey producers

According to data collected from producer farmers participated in focus groups discussion and sampled farmers, their total production cost includes cost of hives, cost of wax, cost of feed and labor cost. Cost of both modern and traditional hives for the year 2018/2019 has been separately identified using straight line method of calculating depreciation that assumes equal depreciation throughout the project life. Producers responded that on average modern hives serve 10 years and traditional hives serve 5 years. These service years of hives were used to compute depreciation. The scrape value of hives is assumed to be zero since producers responded that the hive will have

Production Challenges: A focus on Honey Sub-Sector: The Case of Shebedino District, Sidama National Regional State, Ethiopia

no value at the end of its life. Labor cost of producers was calculated by multiplying number of days spent in bee farm by the local wage value in the study area. Feed cost is a cost producers incurred to feed bees. It includes cost of pea/bean flour and cost of sugar that were used to feed honeybees in the study district as per the survey data. According to producer farmers, the marketing cost is associated to transportation cost from farm gate to the selling market and cost of honey container (collecting material).

A total cost of birr 451537 was incurred to produce 26951 kg of honey for the year 2018/2019 as per the survey data. The mean production cost of 1 kg of honey was birr 16.75 with minimum and maximum unit costs of birr 10.11 and birr 21.93 respectively. The standard deviation was 3.643 (Table 5). The total marketing cost incurred by producer farmers to supply 26060 kg of honey was birr 181899. The minimum and maximum marketing costs to supply 1 kg of honey were birr 5.33 and birr 12.00. The mean marketing cost of 1 kg of honey was birr 6.98 with a standard deviation of 1.10 (Table 5).

Table 5. Distribution of respondents by production and marketing costs of 1KG of honey

Variables	Mean (birr)	Sd. Deviation	Min (birr)	Max (birr)
Production cost	16.75	3.64	10.11	21.93
Marketing cost	6.98	1.10	5.33	12.00
Total cost	23.73	4.25	15.44	33.93

Source: Survey result, 2019

vi. Total cash income and honey income of producer households

Total cash income here refers to cash income from crop production, livestock rising, off farm sources, non-farm sources and other sources if any, other than honey source. Income from honey source is a cash income obtained from sale of marketed honey.

Regarding total cash income, the minimum cash income was 1000 birr and the maximum cash income was 57000. The mean total cash income was birr 11613. The minimum gross income producers got from honey supply was birr 750 and the maximum was birr 29600. The mean gross income was birr 9993.2 (Table 6).

Table 6. Distribution of respondents by total cash income and honey income

Variables	Mean	Sd. Deviation	Min	Max
Total cash income	11613	12292.8	1000	57000
Honey income	9993.2	5882.56	750	29600

Source: Survey result, 2019

vii. Demographic Characteristics of Traders

The demographic characteristics of traders (rural assemblers, wholesalers and retailers) were summarized in

terms of their age, sex, marital status, education level, experience in honey trading and marketing costs incurred. The survey result indicated that all of sampled honey traders were males. Regarding marriage, 87.1% of them were married and the rest 12.9% were single (Table 7).

Table 7. Distribution of traders by sex and marital status

Variables	N	%	
Sex	Male	31	100
	Female	0	0
Marital status	Single	4	12.9
	Married	27	87.1

Source: Survey result, 2019

The age of sampled traders ranged from 28 to 50 years with an average age of 37.25 years. With regard to education, the education level of sampled traders in Shebedino District ranged from grade 4 up to grade 12 complete with mean and standard deviation of about 7 and 2.53 respectively (Table 8). Honey trading experience of traders ranged from 2 years up to 15 years with mean experience of 7.32 years (Table 8). This entailed that there were new entrants in to the honey trading business in the study District.

Table 8. Distribution of traders by age, family size, education and experience

Variables	Min	Max	Mean	Std. Deviation
Age	28	50	37.2	15.7
Family size	3	13	7.7	3.6
Education level (grade)	4	12	6.6	2.5
Experience (years)	2	15	7.3	3.9

Regarding marketing costs of traders, traders participated in focus group discussion and sampled traders responded that marketing costs include cost of transportation, cost of container, cost of packaging, costs of storage/shop rent, and tax paid from the business. A total of birr 62200, birr 87500 and birr 135780 were incurred by rural assemblers, wholesalers and retailers respectively to trade 86.52% of the total honey supplied to the market by producer farmers. The rest 13.48% was sold to consumers directly by producers themselves. The minimum and maximum costs incurred by rural assemblers to trade 1 kg of honey were birr 2.63 and birr 4.65 respectively. The mean cost was birr 3.53 with standard deviation of 0.8 (Table 9). The mean marketing cost of 1 kg of honey for wholesalers was birr 17.41 with minimum and maximum costs of birr 17 and birr 17.83 respectively. The mean, minimum and maximum costs of 1 kg of honey for retailers were birr 13.54, birr 11.2 and birr 17.75 respectively with a standard deviation of 2.034 (Table 9).

Table 9. Distribution of traders by marketing costs of 1 kg of honey Traders

Traders	Cost of 1 kg of honey (birr)			
	Mean	Std. Deviation	Min	Max
Rural assemblers	3.5	0.8	2.63	4.65
Wholesalers	17.4	0.6	17	17.8

Retailers 13.5 2 11.2 17.7

Source: Survey result, 2019

B. Opportunities and Constraints in Honey Production and Marketing in Shebedino District.

Opportunities which favored production and marketing of honey in Shebedino District as well as constraints which hindered production and marketing of honey to the extent it should be, are discussed under this topic. Both producers and traders opportunities as well as producers and traders constraints are discussed respectively and separately.

i. Producers Opportunities

Lots of opportunities have been identified as favorable conditions to participate in honey production and marketing as per the data collected from sampled producers. As per the survey result, the major opportunities for producer farmers include farmers' endogenous knowledge on beekeeping; agro-ecological condition of the District; support of governmental organizations and some other NGOs; and availability of strong domestic market for honey.

A. Farmers' indigenous knowledge on beekeeping

Honey producer farmers in Shebedino District argue that they have inherited the culture of beekeeping from their ancestors. As per the survey data, all of them were traditionally equipped with how to manage bee farm prior to the current trainings being provided by district LFDCU and NGOs about modern beekeeping practices. Around 55% of producer farmers are acquainted with traditional hive preparation, 68.6% of them are knowledgeable on traditional bee pest management techniques (Table 10). The mean experience in year of farmers in honey production and marketing was more than 10 years (Table 3). These long time experience and endogenous knowledge of farmers were good opportunities in honey production and marketing in the study District.

B. Agro-ecological condition of the District

According to Shebedino District Finance and Economic Development Work Unit, (2015), agro-ecologically, the District exhibits 14.6% of Dega and 85.4% of Weynadega (Table 10) and receives mean annual rainfall ranging 800-1600 mm. All the three study Kebeles fall under Weynadega agro-ecology. Due to this, lots of flowering plants which serve as feed for bee flora grow in the study area. This has been one of the good opportunities in honey production and marketing in the study District.

C. Support of governmental organizations and NGOs

As per the replies of producers and honeybee experts in the study District, in addition to District Livestock and Fish Development Coordination Unit, governmental organizations such as Hawassa Agricultural Research Center and Hawassa University are supporting farmers in the District regarding beekeeping. The District LFDCU is the

main supporter of honey producer farmers in different regards such as giving trainings, disseminating new technologies including modern hives, follow-up of the day to day activities of farmers regarding beekeeping and giving technical advices through its development agents who were employed for this purpose. This government unit was mainly organized to support farmers regarding livestock and livestock products production. Its major goal is to improve the lives of smallholder farmers by supporting them in production of different livestock and livestock products.

Hawassa Agricultural Research Center was one of the six Research Centers found under South Agricultural Research Institute and have big apiary site in Remeda Kebele of Shebedino District. It trains honey producer farmers different skills on beekeeping and rarely supplies modern beekeeping materials such as modern hives as per the District Livestock and Fish Development Coordination Unit.

NGOs such as CARE Ethiopia, SOS Sahel Ethiopia and Plan Ethiopia are supporting farmers in different regards in relation to beekeeping. They are providing trainings, and are giving some materials such as modern hives. Even though honey producer farmers and development agents in the District argued that these supports being made by different governmental and nongovernmental sectors were not adequate (Table 10), they argued that these supports had been great opportunities for the current status of the District in honey production and marketing.

D. Strong domestic market for honey:

Farmers reported that all their honey supplied to local market in 2018/2019 was sold and most of them (68.6%) reported that the market demand for their honey being high (Table 10).

Table 10. Distribution of Producers in opportunities of honey production and marketing

Opportunities	Producers status	%
Hive preparation	Able	55
	Unable	45
Pest management	Able	68.8
	Unable	31.2
Agro-ecology	Dega	14.6
	Weynadega	85.4
Gov. organizations supporting	District Agriculture bureau	50
	Zonal Agriculture bureau	10
	Hawassa Agricultural Research Center	30
	Hawassa University	10
NGOs supporting	CARE Ethiopia	20
	SOS Sahel Ethiopia	70
	Plan Ethiopia	10
Adequacy of extension services	Adequate	64.7
	Not adequate	35.3
Market demand	High	68.6
	Medium	25.6

Source: Survey result, 2019

ii. Traders', Processors and Consumers' Opportunities

Production Challenges: A focus on Honey Sub-Sector: The Case of Shebedino District, Sidama National Regional State, Ethiopia

As per the survey data, out of 19 *Districts* of the zone, in 2018/2019 Shebedino *District* was the second highest producer of honey (124.32 tones) in Sidama region next to Aroresa *District* (Sidama region LFDCU, 2015) (Appendix III). According to the sampled traders and focus group discussion participant traders, this higher supply was a good opportunity. Some traders were also provided with credits (Table 11) and the licensing procedure to enter the business was not as such bureaucratic as attested by these traders.

Some of *Tejmakers* (57.1%) replied that they were supplied with inputs such as sugar by *District* Trade and Industry Development Coordination Unit (TIDCU) in time of scarcity.

Consumers also replied that the high production of honey was one of the good opportunities in the *District* in relation to honey consumption. Those consumers who purchased honey directly from producer farmers, from rural assemblers and those who purchased table honey from retailers in the study *District* reported that they were getting pure (quality) honey with no adulteration.

iii. Producers Constraints

A number of constraints were reported as constraints in honey production and marketing and prioritized by honey producers in Shebedino *District*. These constraints include changes in weather condition, lack of credit, pests and predators, pesticides (chemicals) used in crops, absconding, absence of some modern beekeeping equipments, lack of scientific knowledge on beekeeping, and low participation of women in the sector.

Change in weather condition: According to *District* Finance and Economic Development Unit (FEDCU, 2015), in august and March, the *District* received unexpectedly high rainfall in 2018/2019. In contrast in December and January, the *District* exhibited high radiation and shortage of rainfall in 2018/2019. Some farmers (25%) also reported that they were not receiving regular rainfall all the year in 2018/2019 (Table 11). According to producer farmers and honey bee experts working in *District* LEDCU, high rainfall prevented movement of honey bees in search of food, and have washed down flowers in 2018/2019. High radiation dried flowers and hit hives. In both cases honey bees were dying in the *District*. Farmers were cupping such a problem by preparing feed for bees from flour of pea/bean and sugar, and putting shelter above hives to prevent high radiation.

Lack of credit: Most of the producers (67.9%) needed money in terms of credit but most of them (67.3%) did not receive credit (Table 11). They argued that they would have expanded their beekeeping activity if they could get credits in 2018/2019. Therefore, lack of credit has been one of the constraints in honey production and marketing in the study district.

Pests and predators: Out of the sampled 156 producers, 135 (86.54%) reported that pests and predators were out of constraints in honey production and marketing in the *District*. According to the responses of these producers, the major Pests and predators which were attacking honeybees in the *District* include ants, bee martin, lizard, butterflies, and bee beetle. These pests and predators were one of the

main constraints in honey production and marketing. Farmers were using traditional methods to combat these pests and predators such as blowing chimney and putting hives on the top of iron sheet and also covering the top with the iron sheet to prevent entrance of ants to the hives; cleaning hives daily and checking entrance of pests.

Pesticides and Insecticides: Pesticides and insecticides (chemicals) which were mostly used in crops such as, Wag chemicals and DDT, were also another obstacles in honey production which were killing honeybees in the *District* as per the responses of producer farmers. As cupping mechanisms, farmers in the study *District* were placing beehives far from areas of application of these chemicals and also were closing hives for an hour to prevent bees' movement until the chemicals blowout.

Absconding: Absconding was one of production constraints in the study *District*. It is a situation where honeybees completely leave hives irreversibly. Around 82% of the farmers encountered absconding in the *District* (Table 11). According to producer farmers and *District* experts, the main reasons for absconding in the *District* were pests and predators, compaction and hitting of hives, and shortage of food for honeybees.

Absence of modern beekeeping equipment: Most of the farmers were using traditional materials in the study *District* as per the survey result. About 71.8% of the total respondent farmers do not own modern hives (Table 11); most of them do not have dresses to approach bees (89%), no modern chimney blowing material during honey harvest and pest management, only few iron roofed modern shelter for hives, and no wax printing machine as per the observation made during the survey period.

Lack of scientific knowledge on beekeeping: Many of honey producer farmers replied that they have gaps on scientific knowledge on beekeeping such as colony multiplication, hive preparation, pest management, transforming honey bees from one hive to the other and feed preparation for bees. Around 45% of the farmers were not even able of preparing traditional hives. They responded that they purchased traditional hives from those farmers who were able of preparing them. More that 30% of them were not able of managing pests (Table 11). Most of them (51.9%) even argued that they did not participate in any trainings regarding beekeeping. Lack of these basic knowledge regarding beekeeping were one of the constraints reported in honey production in the study *District*.

Low participation of women in the sector: According to the survey data, only 23% out of wives found in the total sample households were participating in beekeeping practices in the study *District* in the survey year. Only 2.56% of female children from the total sampled households participated in beekeeping in 2018/2019. As discussed above from the survey data, participation of women in beekeeping within households is around 26% in cumulative terms. This implied that participation of women in beekeeping was low relative to participation of male members of the households. This low participation of women in beekeeping practice reduced households' labor for the sector and was another constraint in the study area in

2018/2019. According to the survey data, the major reason for women low participation in beekeeping was the biting nature of bees for which women in the study *District* were so scary relative to men. So there may be a need to develop technologies which help to prevent biting.

Table 11. Distribution of farmers in honey production Constraints

Activities	Status of producers	No	%
Absconding	Encountered	128	82.1
	Not encountered	28	17.9
Credit need	Needed	106	67.9
	Not needed	50	32.1
Credit use	Used	51	32.7
	Not used	105	67.3
Trainings participation	Participated	75	48.1
	Not participated	81	51.9
Pests and predators as constraints	Reported	135	86.54
	Not reported	21	13.46
Whether producers have modern hives	Yes	44	28.2
	No	112	71.8
Dresses to approach bees	Yes	17	11%
	No	139	89
Labor used in beekeeping	Hired	0	-
	Family	156	100
Participation in beekeeping of household members	Husband	111	71.2
	Wives	36	23.1
	Male children	5	3.2
	Female children	4	2.6
Rainfall	Regular	117	75%
	Irregular	39	25%

iv. Traders, Processors and Consumers Constraints

According to Shebedino *District* Trade and Industry Development Coordination Unit (TIDCU, 2015), and as per the report of sampled traders, there were informal traders who have no license to trade honey and were influencing the work of formal ones by purchasing honey from farmers at a bit higher prices and selling it to processors and consumers in a slightly lower prices since they were not charged with taxes. From the total sample processors, 71.43% responded that there were traders who bring honey from other areas. They replied that the honey that comes from other places was not pure and adulterated with sugar. According to the survey data, all of the table honey and crude honey consumers (66.67%) in the *District* consumed honey produced within the *District* in 2018/2019 and those consumers who consumed honey in terms of *Tej* (33.33%) responded that the *Tej* they consumed from some processors was not pure and was mixed with other materials. Some consumers (42%) replied that the price of honey is somewhat expensive and increasing year to year. These adulteration and yearly price fluctuation of honey in the study *district* were the other constraints related to honey marketing.

Honey processors to table honey did not have modern honey processing machine and packing machines as per the observation made during the survey period. They were using traditional mechanisms of making table honey and also replied that purchasing honey processing machine and getting packing materials (plastic bags and glasses) being challenging. Some traders also wanted to process honey

rather than selling it in its crude form and wanted skills on honey processing technique in 2018/2019. No trader was processing honey in 2018/2019 due to lack of processing knowledge and materials. The seasonality of honey was another scenario raised by traders. Some traders argued that they didn't get honey in all seasons in 2018/2019.

V. CONCLUSION

Lots of opportunities have been identified as favorable conditions to participate in honey production and marketing. As per the survey result, these opportunities include farmers' indigenous knowledge of beekeeping; agro-ecological condition of the *District*; support of governmental organizations and some other NGOs; availability of strong domestic market for honey, high production, and ease of licensing. Ample constraints also have been listed out as constraints in honey production and marketing in Shebedino *District*. These constraints include change in weather conditions, pests and predators, some pesticides used in crops, absconding, absence of some modern beekeeping equipment, lack of scientific knowledge on beekeeping, low participation of women in the sector, seasonality of honey and price fluctuation. Therefore, the study recommended that any concerned organ should work to scale-up the good opportunities and solve the aforementioned constraints in order to further improve honey production and productivity at one hand and improve the income of smallholder honey bee keepers in the other hand.

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Production Challenges: A focus on Honey Sub-Sector: The Case of Shebedino District, Sidama National Regional State, Ethiopia

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