Honey value chain analysis and Gender role in Dehana Woreda Waghimra Zone of Amhara, Ethiopia

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Journal of Livestock Science (ISSN online 2277-6214) 15: 208-217
Received on 19/3/24; Accepted on 5/5/24; Published on 20/5/24
doi. 10.33259/JLivestSci.2024.208-217

Abstract

Ethiopia has the most bee colonies and surplus honey sources of flora; it is Africa's top honey producer. Ethiopia produces approximately 24000 tons of crude honey per year, accounting for 24% of Africa's and 2% of the world's production. The objectives of this study were to identify actors in the value chain, assess their linkages and roles, estimate marketing margins for each actor, and identify factors influencing farmers' market channel choice for selling honey. Both primary and secondary data were utilized. The primary data were collected from 160 randomly selected producers, while the secondary data were gathered from various published and unpublished sources. Data were analyzed using descriptive statistics such as frequency, mean, minimum, maximum; percentage, t-test; ranking index; and gross market margin analysis. Honey producers, wholesalers, retailers, collectors, processors, and consumers were identified as the major honey value chain actors in the studied districts. Beekeepers use six different marketing channels to sell their honey until it reaches the end consumer. Market margin analysis was performed to estimate the marketing and profit margin differences between each actor and channel. A multinomial logit model was used to identify factors influencing honey producers' channel choice for marketing. MNL findings revealed that age, family size, education level, access to credit, distance to the nearest market, experience in beekeeping production, and membership in cooperative of the household heads were the most significant factors influencing beekeepers' decision to sell their honey directly to various marketing outlets. The distractive statistics results showed that honey production in study areas was limited due to a lack of bee flora, pesticide application, and herbicide use. Despite the fact that there are other beekeeping opportunities such as land availability, ease of management, government support, and the availability of forest and water in the study districts. Beekeepers should be kept up to date on current market trends so that they can choose the best market channel to maximize profits and improve their livelihoods. This can be accomplished through the use of agricultural and rural development offices, farmer training centers, and other voluntary NGOs; however, mass media and mobile messaging are more effective for updating marketing formation.

Keywords: Constraint: Gender: Honey: Market Outlet: Opportunities and Value Chain.

Introduction

Background and Justification

Ethiopia is the leading honey producer in Africa, one of the ten largest producers worldwide, and one of the four largest bee wax producing countries (Belete, 2015). Ethiopia has the most diverse flora and fauna in Africa, owing to its varied ecological and climatic conditions. Its forests and woodlands contain diverse plant species that provide surplus nectar and pollen for foraging bees (Biruk, 2020)**.** Ethiopia produces approximately 24000 tons of crude honey each year, accounting for 24% of Africa's and 2% of global honey production. This ranks the country first in Africa and tenth in the world. Currently, the country is estimated to have over 7000 species of flowering plants, the majority of which are honeybee plants (Nega & Demto Mamo, 2021)**.** Ethiopia, which has the potential to produce 500,000 tons of honey and 50,000 tons of beeswax per annum, has only exported 10,058.8 tons of honey and wax and earned 26.7 million USD over the past five years (Getahun Tekle, 2016).

Although the long tradition of beekeeping in Ethiopia, having the highest bee density and being the leading honey producer as well as one of the largest beeswax exporting countries in Africa, the share of the sub-sector in the GDP has never been proportionate with the huge numbers of honeybee colonies and the country's potentiality for beekeeping. Productivity is still low, leading to low utilization of hive products domestically and relatively low export earnings. Thus, the beekeepers in particular and the country in general is not benefiting from beekeeping production (Biruk, 2020; Tarekegn et al., 2018)**.**

In Ethiopia beekeeping can play significant roles in poverty reduction, achieving sustainable development and conservation of natural resources. Beekeeping is important for the society as food, income generation for both domestic market, export markets, as employment opportunity and other cultural aspects. Around two million farm households of the country are involved in beekeeping business using the traditional, intermediate and improved beehives Biruk, 2020; Tarekegn et al., 2018; Wodajo & Puskur, 2014; Yadeta, 2016)**.** It is also observed that a large number of people (collectors and retailers) participate in honey collection and retailing (at village, district and zonal levels) and thousands of households are engaged in *tej*-making (Adebabay Kebede & JenbeRie, 2008).

Beekeeping is a very long-standing practice in the farming communities of the Amhara region and it plays a significant role as source of additional cash income and nutrition for many subsistence farmers. It is an integral part of the smallholder farming system. In the region, the apicultural resources are immense, particularly in the western parts of the region. The natural vegetation coverage is relatively high, as a result in this area the honeybee population is dense and production is relatively high. In the eastern parts of the region, in spite of scarcity of natural vegetation's, large areas of inaccessible lands for cultivation and livestock grazing are covered with various types of bushes and make this part of the region still to remain potential for beekeeping. Besides, the beekeeping potentiality of the region is partly attributed to the various cultivated oil crops, pulse and field flowers, which are very important, source of forage (Wodajo & Puskur, 2014).

Dehana Woreda is located in the eastern part of the Amhara region and was identified as a potential beekeeping area with a long history of honey production practices. The district accounts for 10.26% of honey production in the Amhara region and is one of the potential sites within the Wag Himra administrative zone, with an annual honey production potential of 722.2 kuntal (Bihonegn, 2017; Biruk, 2020).

The Dehana Woreda people livelihood is strongly dependence with honey production and marketing next to crop and livestock production. Honey production and marketing in the district is the major economic activity that generate income and creates job opportunities for the majorities in both rural and urban areas and significant number of people are currently engaging in honey and beeswax collection. In the district organizing jobless urban and landless rural youths to involve to them in honey production activities, and processing and marketing.

There is no study on honey value chain in Amhara region especially in the study area. There is no complete and reliable information on honey value chain. The tendency to address to value chain actors and service providers in a holistic manner is poorly understood. The factors that determine the honey value chain are not well identified and the socio-economic benefit of honey and beeswax value chain is not identified. For this reason, it has remained difficult to design and implement integrated honey value chain development in the study areas. Therefore, this study will have paramount importance in analyzing the value chains and setting baseline information regarding honey value chains and socio-economic important to value chain players in the study area.

The objective of this study was to analyze honey value chain and gender role in case of Dehana woreda; in Waghimra zone Amhara regional state Ethiopia. The specific objectives were, to identify major honey value chain actors, functions and their linkages in the study area, determine marketing margins distribution among actors in the

value chain, identify factors affecting market channel choice of farmers to selling their honey, identify major constraints and opportunities in the honeybee production and to assess the role of gender in honey value adding activities.

Research methodology

Description of the study area

Dehana Woreda is located in Amhara National Regional State Waghimra Zone about 801 km north of Addis Ababa. It is also about 536 and 80 km far from Bahir Dar and Sekota respectively. It has 31 Peasant Associations and it shares border with North Gondar to the west, Sekota woreda to the east, Ziquala woreda to the north and North Wollo zone to the south. Regarding the infrastructure of the woreda, there is all weather gravel road to the woreda town. There are about 7 peasant associations with only dry weather road, yet about 15 peasant associations are not accessible/hard to reach. The woreda town has only 1 V-sat (satellite) telephone service. Besides, it has 6 hours daily electric power service originated from diesel generator.

The total population of the woreda is 197,930 (102,635 male 95,295 female) Out of the total population, 98.7 % is living in the rural areas and only 1.3% is urban dwellers. There are 31 PAs with a total of 38544 households of which 9383 are female headed households. 99 percent of the population of the woreda is Amhara ethnic group whereas only 1 percent is Agew. Almost all population of the woreda is follower of the Ethiopian Orthodox Christianity. From the total coverage of the Woreda (97,672 ha), 40,296 ha is allocated for farming, 10,364 ha for grazing land and 14,645ha covered with different types of forest. With regard to the natural resource conservation, the woreda has 14,406 ha of plantation forests which are planted by farmers.

The woreda has 13,199 ha of natural forests some of which are protected by the government. The major crops grown in the woreda are barley, wheat, chickpea and pea grown in the Weyna dega agro climatic zones. Teff, wheat, maize, sorghum and bean are major crops grown in Weyna dega agro climatic zones of the woreda. The only crop that dominantly cultivated in the Weyna dega agro climatic zone of the woreda is sorghum.

Sampling method

A two-stage sampling technique was used in this study to select a representative sample of honey producers and beekeepers. In the first stage, four kebelles from Dehana Woreda were purposefully selected based on their level of honey production potential and distance from the woreda market, after consulting with agricultural experts and development agents. Shimamdan, Gakiw, Gubara, and Guranba Kebelles are specifically selected from Dehana Woreda. In the **second stage** using (Yemane, 1967) the sample size determination formula 160 sample respondents for honey producing farmers was determined.

$$n = \frac{\mathrm{N}}{1 + \mathrm{N(e)2}}$$

Where

- n is the sample size,
- N is the population size
- e is the level of precision

And proportional sampling technique was utilized to determine the sample size of honey producing household's form each study kebelles, using the household list of the sampled kebelles, and total of 160 sample bee keeper farmers were selected randomly from the selected rural Kebelles. Moreover, 30 honey value chain actors were also included as part of this study. These includes: 10 honey retailers, 5honey wholesalers 5 consumers, 5 processers, 5 respondents from cafe, and hotels including collectors/assemblers, cooperatives and brokers. Both formal and informal methods of data collection methods were used through structured questionnaire and focus group discussion methods.

Methods of data collection

A semi-structured questionnaire was used to gather primary data from beekeeper farmers. Individual respondents provided information on household demographics, traders, honey production activities, service access, market-related issues, and honey production and marketing constraints and opportunities. Secondary data were obtained from published and unpublished sources, such as reports from Woreda Office of Agricultural and Rural Development (WOARD), Agricultural Marketing Promotion Agency (AMPA), Amhara Agricultural research institution (AARI), Journals and websites were also reviewed.

Interviews with key informants were also used as primary data collection methods, using a checklist: From the offices of agriculture and rural development of the study districts, DA's and experts, kebelle administration, trade industry and transportation, traders, which include wholesalers, retailers, processors, and cooperatives Information to be collected included production and marketing methods, production support services (input supply, extension, and credit), market environment (market places, access to market information, transportation, buying and selling strategies, source, marketing costs, market information), honey trade problems, and other related data. Focus group discussion was implemented at all the study areas which are six to ten randomly sampled farmers from each kebelles of the study areas.

Methods of data analysis

Different statistical analysis methods were employed for this study depending on the nature of the data, since descriptive and econometric model analysis were used to analyze the data collected from producers, processors, and traders. The statistical analysis was done using STATA (version 14) and SPSS (version 20) statistical software.

Descriptive statistics

Descriptive statistics refers to the use of percentages, means, and standard deviations. This were implemented to analyze the facilities, services, household characteristics, value chain performance and SWOT analysis method will be used to major constraints and opportunities of honey value chain.

Econometric Analysis

Econometric analysis was used to analyze the marketing channel choice of the producers. Hence the modeling channel choice decision is important to explain the effects of the independent variables which are the producer's household, marketing characteristics on the probability of choosing between different market channels in the honey value chain. To estimate the effect of explanatory variables on dependent variable involving multiple choices with unordered response categories, Multinomial logit (MNL) model is required as a function of the explanatory variables. Channel selection is multivariate in nature. Channel choice will either involve producers in selling to roadside traders engaged in honey marketing, to wholesalers, retailers, and consumers or in other marketing system (Gujarati 2003).

Marketing margin analysis

In the agricultural industry marketing margins can take on slightly different meaning production is grown rather built or bought wholesale, the marketing margin lies between the price that a small traditional farmer would get selling their stock directly to wholesaler at harvest versus the cost of packaging ,shipping and finding retail space to sell the crop can be significant even if the sale price that a small is much higher than wholesaler .understanding the marketing margin for produce helps small farm businesses learn whether direct to market will work for them.

It is also the price variation at different segments with the comparison of the final price to the consumer percentage of final weighted average selling price taken by each stage of marketing chain. Total marketing margin is the difference between what a consumer pays and what a producer/farmer receives for the product. A wide margin usually means high prices to consumers and low prices to producers. A major problem limiting the impact of market reforms is that many farmers do not have market access since the domestic marketing infrastructure is poorly developed (Muhammad, 2013).

$\text{TGMM} = \frac{Pc - Pp}{\text{Pc}} \times 100$ where

TGMM= Total gross margin

Pc = Consumer price

Pp= producer price

It is also necessary to determine portion of the price paid by the consumer that goes to the producer and the producer's margin which is called 'producer's gross margin' (PGMM). It is calculated as:

$\text{GMMP} = \frac{Pc - TGMM}{\text{Pc}} \times 100$

Net marketing margin (NMM)

The Net Marketing Margin is the percentage of revenue remaining after all operating expenses, interest, taxes and preferred stock dividends have been deducted from company's total revenue. So the final price earned by

the marketing middleman as his net income once his marketing and transaction costs are deducted. This is calculated as:

$$\text{NMM} = \frac{TGMMc - Marketingcost}{\text{Price paid by the consumer}} \times 100$$

Where: TGMM = Total Gross Marketing Margin, NMM = Net Marketing Margin

Result and discussion

Major honey value chain actors and their functions

Beekeepers

Individual beekeepers that primarily produce honey sort and filter it according to quality. The major value chain functions that honey producers perform in the study area include sorting, filtering, handling (packaging), transporting, and building traditional hives for honey production. The WARD usually supplies improved hives and their accessories. The majority of the honey producers in the study area sold their honey at the Amdwork, Kewuzba, and Chilla markets.

Value adding activity by beekeepers

Packaging and sorting: Sorting honey by quality and packaging or handling instrument is an essential step in preventing spoilage and preserving its quality. This study discovered that the producers who supply honey to the market package their product in a plastic box. The majority of the sampled households packs their honey in plastic boxes and sorts it by color and quality (Table 1). This result is consistent with (Tarekegn et al., 2017).

Filtering: With the provision of agricultural and rural development offices and the presence of cooperatives, honey filtering material is available in the study area, and beekeepers had the opportunity to filter their honey, which enabled the producers to get a higher price for their product. Out of the total sampled households that filtered their product either manually or by machine before they supplied their honey to the market, 20% of beekeepers used filtering and better handling of their honey, and additionally, 10% of the respondents also sorted their honey by its quality and used filtering. This result is consistent with (Ababor & Tekle, 2018)

Table 1: value adding activity

Value adding	Freq.	Percent
Handling only	18	11.25
Sorting only	16	10
Filtering only	20	12.75
packaging, sorting by its quality	46	28.5
Handling and filtering	20	12.5
Handling and sorting by its quality	26	16.25
Sorting by its quality and use filtering	14	8.75
Total	160	100.00

Source: Source: Own survey data, 2022

Retailers

These include rural, town, and supermarket markets, and they are key actors in the honey value chain in the districts. They connect wholesalers and urban consumers by offering according to the requirements and purchasing power of the buyers. Some of the retailers undertake semi-processing manually, using different honey filtering materials, and pack it with locally sold plastic materials that have a size range of 1 to 5 kilograms.

Wholesalers

The wholesalers were collected the honey from different towns of dehana woreda mainly from Amdework, chilla, Azila, Kewuzba and Amusit markets and they buy large quantities of honey either direct purchase from large farmer producer's collectors at a large quantity average of 8.20 quintal per year and resell to other traders and consumers especially to bahrdar, woldia and dessie.

Cooperatives

These are the primary actors who directly participate in honey marketing and assist honey producers in training and providing inputs in their districts. These actors organize farmers to supply them with filtered and crude honey on a regular basis, which they then sell to consumers. In the Dehana district union, we are collaborating with kebelle cooperative member households to provide filtering machines to honey-producing households. They also

provide training on how to use the honey filtering material, such as how to handle and supply quality honey to cooperatives.

Collectors

The collectors add value to honey by making spatial and temporal differences and collecting from distant location to make easily available to user and storing for future use. Unlike the beekeepers, the collectors sell the largest proportion of crude honey to tej-makers.

Processors

Processing activity in the honey value chain of the study area which is undertaken by brewers locally known as *tej* makers and this activity is common at Dehana district and other local towns. In this case the actors use the crude honey to make *tej (alcohol)* and birth (non-alcohol) and supply to the consumers this result is consistent with (Biruk, 2020).

Consumers

Consumers are the final actors of the honey value chain who buy the product for their own consumption purpose. They may afford it either as liquid processed *(tej and birth)* form or as packaged non processed form.

Honey marketing channels

The channel that farmers normally target for their honey is the local market. The flow of honey from the production centers to the consumer end depends on the distance and market closeness, means of transport, availability and quality of infrastructures, the nature of the product, the need and purchasing power of consumers. Most farmers sell honey in markets within their district. Beekeepers of the study area have six main alternative channels identified for honey marketing. Few producers sell their product at farm gate especially for the farmer traders/collectors, cooperatives and processors. But the majority of the respondents supply their honey to Consumers retailers, wholesalers and Tej breeders of the districts (Dehana district) markets. The main marketing channels identified from the point of production until the product reaches the final consumer through different channels were indicated below:

Chanel 1: Producer → consumer = 16.7%
Channel 2: Producer → Amdework and Sekota retailer → consumers = 38.2
Channel 3: Producer → Cooperatives → processor → consumers = 18.1%
Channel 4: Producer → Collectors → Retailers → consumers = 13.26
Channel 5: Producer → processors → consumers = 5.44%
Channel 6: Producer → wholesalers' → Retailers → foreign consumers =8.3%

Source: Own survey data, 2022

Channel 1 was chosen because it was the shortest route from producers to consumers, and the majority of the consumers purchased small amounts of honey at local markets. Market channel two refers to beekeepers who sell their honey to retailers, who then sell their purchases to consumers. Channel three beekeepers sell their honey directly to cooperatives, which sell it to processors, who then sell it to consumers. Channel four is the channel through which beekeepers sell their honey to collectors, who then sell to retailers, who sell to consumers the result is consistent with (Biruk, 2020; Tarekegn et al., 2017)**.** From the household survey result, it was found that majority (28.2, 21.1and 20.13 %) of the sampled bee keepers preferred to sell their honey directly to retailers, cooperatives and local honey collectors.

Marketing margin distribution among honey value chain actors for different market channels

Marketing margin refers the price variation at different segments with the comparison of the final price to the consumer percentage of final weighted average selling price taken by each stage of marketing chain. Total marketing margin is the difference between what a consumer pays and what a producer/farmer receives for the product. A wide margin usually means high prices to consumers and low prices to producers (Ababor & Tekle, 2018; Staal†, 2015; Tefera, 2014). The result of marketing margin analysis indicates that the highest and the lowest percentage of producers total gross marketing margin (TGMM) were found at channel V (processor) and I(consumer) which is 73.06%% and 55.46 %, respectively. The gross marketing margin result indicates that the producers share is highest at channel III (cooperative) and I (consumer) which is 79.58%% and 67.98 %, respectively it agree with (Sarka, 2017; Yadeta, 2016)**.**

Factors affecting market channel choice of farmers to selling honey

The multinomial result is shown in Table 3, and the channel "producer to consumer" was used as a base category (reference channel), so coefficient estimates are the logarithm of the odds of selling to collectors, retailers,

whole sellers, or cooperatives over the base category. The sign of the coefficient indicates the direction in which the variable influences the logit. As a result, a positive value indicates that a household is more likely to switch to the alternative option from the base category, whereas a negative value indicates that a household is less likely to choose the alternative option for marketing channels.

The results showed that the age of the HH head affected the Teji Maker outlet choice positively and significantly at 5%. As the age of the household head increases, they tend to produce and sell more unprocessed (crude honey) to the teji makers. The result agrees with (Biruk, 2020; Hailu et al., 2015; Nega & Demto Mamo, 2021; Sarka, 2017). Family size affects the cooperative outlet choice positively and is significant at 5%. Producers have a large family size; they have access to market information and knowledge about the use of cooperatives through training and different social networks than others, and the results agree with (Tarekegn et al., 2017). The education level result indicates that, literate household‘s sale their honey to traders and retailers outlets and significant at 5% because literate HHs can get market information easily than illiterate HH and they can understand the market outlets needs regarding the type of their honey(processed or crude honey) the result agree with (Nega & Demto Mamo, 2021).

Credit access has a positive effect on the cooperative outlet and is statistically significant at 5%. Farmers who are cooperative members can obtain credit from the cooperative and sell their honey to the cooperative for a dividend and a price premium. It agree with (Mekonnen, 2016)**.** The findings show that distance to market has a negative and significant impact (at a 5% level) on beekeepers' decision to sell directly to cooperatives as a market channel choice. Beekeepers that travel from distant districts to the market are unfamiliar to customers, and as a result, consumers do not trust the quality of their honey It agree with (Kizilaslan, 2020).

Beekeeping experience improves efficiency in honey production and product handling. The result indicates positively and significantly affected at (10%) that choosing cooperative market channel and retailers at 5% than other market channel. So this variable is important to beekeepers and it is only positive significant to cooperative market channel comparing the other variables (wholesaler, retailer and collector) market channels the result does not agree with (Tarekegn et al., 2017). Cooperative membership has a negative and significant influence (1%) on farm household decisions to sell their honey directly to consumers rather than cooperatives' market channels. This finding suggests that the major honey marketing cooperatives in the study area were ineffective because farmers were not encouraged to sell their honey to the cooperatives. Therefore, beekeepers are required to choose a wholesaler, retailer, or collector market channel to sell their honey consistent with (Tarekegn et al., 2018)**.**

Table 2: Honey marketing margin of actors

Margin Actors		**Marketing Channels**					
		Consumer	**Retailer**	**cooperative**	**Collector**	**processor**	**Teji maker**
Producers	Production cost in birr	69.50	69.50	69.50	69.50	69.50	69.50
	Marketing cost in birr	16.26	11.75	14.37	20.14	18.75	12.05
	Selling price in birr	280	305	314	307	338	296
	Market Margin in birr	194.38	215.25	230.12	217.36	249.75	214.45
	Profit margin	178.12	203.5	**215.75**	197.2	**231.00**	202.4
	Profit margin (%)	13.08	21.09	18.24	14.04	27.54	16.32
	GMM (%)	41.00	49.58	62.00	57.18	68.95	48.85
	NMM (%)	14	17.64	23.01	15.00	26.85	16
	TGMM (%)	55.14	65.89	69.48	61.82	73.06	63.03
Retailers	Marketing cost in birr		45.59				
	Purchase price in birr		305				
	Selling price in birr		384				
	Market Margin in birr		33.41				
	GMM (%)		67.39				
	NMM (%)		12.88				
	TGMM (%)		70.42				
Teji maker	Marketing cost in birr						29.71
	Purchase price in birr						315
	Selling price in birr						382
	Market Margin in birr						37.29
	GMM (%)						71.02
	NMM (%)						13.43

	TGMM (%)						74.39

Where: GMM= Gross Marketing Margin, NMM= Net Marketing Margin and TGMM=Total ; Source: Own survey data, 2022

Market information assists beekeepers in determining the price difference between their locality and the nearby main market. Access to current market information increases producer selling prices. The results show that it has a positive and significant influence (5%) on beekeepers' decisions to sell their honey directly to retailers. This suggests that consumers in the study area may be unable to afford to buy more honey than retailers in the districts, and farmers prefer to sell their honey to retailers. This Result agree with (Biruk, 2020).

Gender division of labor at the farm level

Gender division of labor is socially determined ideas and practices, which define what roles and activities, are deemed appropriate for women and men. Women are invisible and underserved suppliers, buyers in many agricultural value chains. Women are generally expected to fulfill the reproductive role of bearing, and raising children, caring for other family members, and household management tasks, as well as home based production. Men tend to be more associated with productive roles, particularly paid work, and market production. As indicated in table 5 both man and women participate in different activities in the beekeeping sector (Nega & Demto Mamo, 2021; Negeri, 2017; Sarka, 2017). The participation of women in productive activities was less when we compare with men and the women participation was higher than men in reproductive activities were. Also as indicated in table 4 the decision-making level of women were less as compared with men.

Constraints and Opportunities of honey production

Constraints honey production

According to the findings of this study, beekeepers face a number of difficulties and challenges that hinder their ability to produce honey successfully. Major problems in beekeeping arise from bee characteristics or external factors beyond the beekeepers' control, while others come from inadequate marketing infrastructure and storage facilities. According to the respondent, the major challenges that affect the production and productivity of honey in the study area are: shortage of bee flora due to drought, pest and herbicide application, disease, insects, and rodents; honey filtering material and bee wax shortage; and the high cost of modern bee hives (Askale Abrhaley, Malede Birhan, 2017; Getahun Tekle, 2016; Nega & Demto Mamo, 2021; Wodajo & Puskur, 2014).

The respondents indicated shortage of bee forage as the other major constraint which is resulted from increasing problem of deforestation and over-gazing and lack of attention to introduce potential bee forage plants. The disappearance of woody vegetation (forests and woodlands) and overgrazing has nearly depleted the bee forage supply. The supply of natural bee forage is disappearing and as consequence bee colonies are suffering, ultimately resulting in low yield. According the sampled beekeepers the first and major constraints of beekeeping were reported

Table 31: Result of multinomial logit model and marginal effect

Independent variables	Collector				Retailers		Teji Makers		cooperative			
	Coef.	Dy/dx	P>|Z|	Coef.	Dy/dx	P>|Z|	Coef	Dy/dx	P>|Z|	Coef	Dy/dx	P>|Z|
AgeHH	0.18	-.01	0.05**	-.019	.041	0.92	-1.8	-.03	1.24	-.44	-.002	0.46
DNM	0.067	.027	1.30	-.029	-.032	0.82	.204	.004	1.23	.409	-.002	0.057 **
EducHH	.206	-.01	0.69	-.194	-.012	0.031**	-.194	-0003	0.767	-.86	-.004	0.202
FamsHH	-.202	-.023	0.31	.004	.0293	0.97	-.358	.0059	0.15	-645	-.0043	0.01***
FarmExp	.0128	.0031	0.77	-.0159	-.004	0.66	.012	.053	.47	-.07	.0047	0.259
BKExp	.033	.0005	0.62	.0422	.0037	0.041**	.037	-06	0.713	.237	.0014	0.050*
ACS	-.449	-.100	0.56	.470	.1570	0.44	-1.34	-.029	0.15	.89	.004	0.002**
Ex.Con.	-2.52	-.248	0.65	-.546	.1850	0.47	-2.12	-.024	0.148	-2.87	-.014	0.136
COSHH	-.220	.037	0.81	-.501	-.050	0.47	-1.17	-.012	0.29	-5.31	-.03	0.000***
MIF	.612	-.076	0.47	1.484	.241	0.034**	1.003	-.002	0.34	-1.33	-.01	0.290

Source: Own survey data, 2022 difference at p<0.01= ***, p<0.05= **and p<0.1=*.

Table 4: Gender role in honey value adding activities

Value Adding Activities	Men (%)	Women (%)	Both (%)	X^2
Hive preparation and hanging	32.17	41.52	26.32	0.38
Harvesting	63.47	16.09	20.44	21.64***

Processing	26.81	47.19	26	2.06**
Packaging	54.69	28.03	17.28	7.47***
Selling	65.91	13.49	20.6	28.76***

shortage of flora following pest and herbicide application, and insect and rodents as second and third major challenges of the study districts.

Moreover according the focus group discussant there was additional problems in the honey marketing activities, which are poor functionality of farmers' cooperatives, lack of honey quality assurance mechanisms, honey adulteration, lack of practicable legislation on adulteration, lack of honey collection center and poor market linkage are the major problems (Askale Abrhaley, Malede Birhan, 2017; Getahun Tekle, 2016; Guyo & Legesse, 2015)**.** Therefore, establishing honey collection centers in potential production areas and equipping them with the necessary facilities including quality control mechanism will encourage honey producers and enable them to sell their product at better price and reduces the level of honey adulteration. Furthermore, these collection centers will have a potential to build the vertical linkage of honey value chain actors.

As a result, the regional government must act quickly to develop policy and legislation governing the use of agricultural chemicals. Furthermore, emphasis should be placed on chemicals that are not harmful to honeybees, and applications should not coincide with flowering seasons to reduce the poisoning effect on honeybees. In short, these issues are technical, management, and policy in nature, and they can have an impact on the region's beekeeping production and productivity.

Opportunities of honey production in the study area

Despite the problems and constraints discussed above, there are still numerous opportunities to profit from this subsector in the future. The study districts are endowed with botanically diverse honey source plant species, which give the honey desirable and distinct flavors, colors, and viscosities that are highly demanded by marketers. Availability of closure forest and water, land suitability, government support favorable investment policy and incentives from which honey production, processing and marketing is one of the important investment areas similar with (Beyene & Verschuur, 2014)**.**

Conclusion

This study was intended at analyzing honey value chain and gender role in case of Dehana woreda, in Amhara Regional State, Ethiopia. Honey value chain analysis of the study area discovered that, the main actors in the chain being honey producers, collector, retailers, wholesaler's cooperatives and processors. Collectors are engaged in purchasing of honey from kebelle in the district especially at Amdework, chilla, Azila and Amusit village market and sell to processor. Retailers and some wholesalers buy from producers and they done semi processing, sort, grading and transport it to central markets of the districts. Processors done value adding activities like sorting, packaging and filtering the honey and consumers obtain as packaged or Tej form.

The multinomial logit model result indicated that the probability to choose the consumer outlet was significantly affected by Age of households, distance to nearest market, Education level of households, family size, beekeeping experience, market information, cooperative member ship of household was affected the choice of market channels to sell their honey. Therefore, these variables require special attention if effectiveness of honey value chain and producers margin from honey production is important to be improved. Increase honey harvesting frequencies through promoting indigenous flora with varied flowering seasons as well as close assessment of local vegetation converge. Introduce regulation of honey quality standard through the promotion of quality declare certification of honey production system, and enforcement of the resection of quality standards. The study result indicates adverse effect of agro-chemicals on honey production. Therefore, actors working on honey production should introduce proper management practices.

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M.G. Phogella, W.S. Anbaw 2024. Honey value chain analysis and Gender role in Dehana Woreda Waghimra Zone of Amhara, Ethiopia. Journal of Livestock Science 15: 208-217, doi. 10.33259/JLivestSci.2024.208-217