Honey value chain analysis in Legehida district

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Abstract

This study aims at analyzing the value chain of honey in Legehida Woreda of the South Wollo Zone, Amhara Region, Ethiopia. The data were collected from both primary and secondary sources. The primary data were generated by a household survey using a pre-tested, semi- structured questionnaire, a key informant interview, and focus group discussions using checklists. The primary data for this study were collected from 205 beekeepers, 18 traders (6 local collectors and 8 retailers), and 29 consumers using pre-tested questionnaires and analyzed using SPSS and STATA software. Secondary data from many published source was used to complement this. The primary participants (actors) in the Woreda, according to value chain analysis, are input suppliers, beekeepers, local collectors, retailers, and consumers. Four market channels were identified, and the greatest and lowest producers' total gross marketing margins (TGMM) were 19.1% and 0% in channels III and I, respectively. Without taking into account channel I (producers selling directly to consumers), the producers' share was highest in channel II and lowest in channel III, at 86.3 and 67.1 %, respectively. The result of the ranking index analysis indicated that honey production was constrained by the prevalence of pests and predators, the death of colonies, and absconding. Despite this, opportunities exist, such as the availability of area closures, simple access to modern beekeeping supplies, bee fodder availability, stimulating government policy, and a strong demand for quality and quantity of honey. Therefore, policies aiming at gender consideration, capacity development, establishing honey collection centers, developing and improving infrastructure, market information, and an adequate supply of beekeeping tools and equipment are recommended to accelerate the honey value chain's development.

Key words: Honey; Value Chain; Market Channel; Constraints; Opportunities.

Introduction

One of Ethiopia's oldest farming systems is beekeeping. Diverse plant species in the natural resource base, such as forests and woodlands, offer foraging bees an abundance of nectar and pollen (Workneh, 2011; (Phogella & Anbaw, 2025)). The country has a competitive advantage in beekeeping due to its good natural resource endowment for the production of honey and wax (MoA and ILRI, 2013). Due to its unique ecological and climatic conditions, Ethiopia possesses some of the most diverse flora and fauna, as well as being the largest honey producer in Africa (Nuru, 2007). Ethiopia is a major producer of honey in both Africa and the rest of the world. For example, in 2013, the country produced over 45 thousand tons of honey, accounting for approximately 27% and 3% of African and worldwide honey output, respectively, making it Africa's largest producer and the world's tenth (FAOSTAT, 2015).

Apiculture is a promising off-farm enterprise that contributes directly and indirectly to smallholder income in particular, accounting for 1.3 percent of the country's agricultural GDP (Demisew, 2016). Ethiopia's entire honey production, according to the CSA (2023), was roughly 50 thousand tons. Apiculture is a promising off-farm enterprise that directly and indirectly adds to smallholder income, accounting for 1.3 percent of the country's agricultural GDP (Demisew, 2016). According to reports, the sale of honey generates an average of 420 million Ethiopian Birr per year (MoA and ILRI, 2013). The subsector also creates jobs in both rural and urban areas by organizing jobless urban and landless rural youth and women to participate in the manufacture of bee equipment and beekeeping activities (Chagwiza, 2014). Despite the fact that honey production is high in the research area, market supply is low in comparison to its potential. Low productivity is triggered by a number of socioeconomic, production, market, and institutional issues. Honey farmers, according to Kassa et al. (2017), suffer marketing challenges due to market inaccessibility, poor farm-gate prices, and a long marketing chain, all of which result in unlimited market participation.

Furthermore, honey producers in the Legehida district were widely characterized by limited marketing linkage, which stems from physical barriers (such as using technologies, making visits, communicating specific information, favorable environmental conditions, and resources and materials) to market access, low bargaining power, and a lack of ability to force local collectors and traders' price setting and exploitation at the farm gate. The area's market was dominated by the traditional system, and honey producers were forced to sell directly to traditional transaction roots such as collectors and unlicensed dealers, for whom they did not, received a premium price. Producers might planned their output more in accordance with market demand, schedule their harvest during the most profitable period, pick which market to sell their commodities to, and negotiate on a more equitable footing with traders thanks to improved information and marketing facilities (CIAT, 2004).

According to MoA and ILRI (2013), improving beekeepers' ability to reach and actively engaged markets was one of the most critical development issues. The potential increase in output and rural incomes that could result from the introduction of improved production technologies could be ineffective if there were no convenient marketing conditions. Despite the economic and social importance of honey, apiculture research had primarily focused on biophysical elements such as yield enhancement and production system analysis. Furthermore, previous honey research focused on the production system (Nuru, 2007; Gallmann and Thomas, 2012; Awraris et al., 2015).

The issue of honey production and marketing affected all players and channels. This suggested that there were a scarcity of data on the honey value chain, honey market types, and marketing systems; challenges and opportunities in honey production and marketing; the actors and their roles and functions, including the profit and margin alone the honey value chain in the study area. Honey producers had a lower income and live in extreme poverty. In this regard, the BMZ had launched a program named "ONE WORLD—NO HUNGER." This effort aimed to eliminate poverty, increase productivity, and ensure food security in rural areas by implementing agricultural innovation on a large scale. As a result, a value chain strategy was used to fully comprehend and intervened to handle the problem of honey production and marketing across all players and channels.

Furthermore, beekeepers in this area continued to face input, production, and market-related issues. As South Wollo Zone we have identified that there is a potential of honey production (beekeeping) practices. But there is no work done so far concerning its value chain and the current knowledge on bee product value chain is poor and inadequate for designing policies and institutions to overcome perceived problems in the production and marketing system (Gallmann et.al, 2012). Hence, honey value chain analysis was a unique research technique for identifying current bottleneck problems among honey value chain actors and proposing potential upgrading actions. As a result, this study focused on identifying the actors, their functions, activities, and degree of coordination; calculating the profit margin of chain participants and identifying constraints and opportunities in the honey value chain in Legehida Woreda.

Material and methods

This chapter outlined the description study areas, data type, data sources, data collection techniques, sampling procedure, and sample size. It also described the data analysis methods (descriptive statistics, value chain study approaches, market cost & margin, and SWOT Vs PESTEC matrices analysis).

Description of the Study Area

The study was conducted in Legehida districts of south Wollo zone, Amhara national regional state, Ethiopia. Legehida Woreda is located about 104 kilometers to the southwest of Dessie, the capital of South Wollo, 578 kilometers to the east of Bahirdar, and 540 kilometers to the north of Addis Ababa. Woreillu Woreda is to the east, Jama Woreda is to the south, Kelala Woreda is to the west, and Legambo Woreda is to the north (CSA, 2023).

According to the Legehida Woreda Government Communication Affairs Office bulletin (2011), the entire land area of the Woreda is 42935 hectares; accordingly, the Woreda has 16 kebele administrations (4 lowland, 9 midland, and 3 highlands). According to the District Board's 2019 report, the district had a total population of 81,719, with the bulk of them living in rural areas. Male household headed account for over 69119, while female household headed account for 12600 of the household.

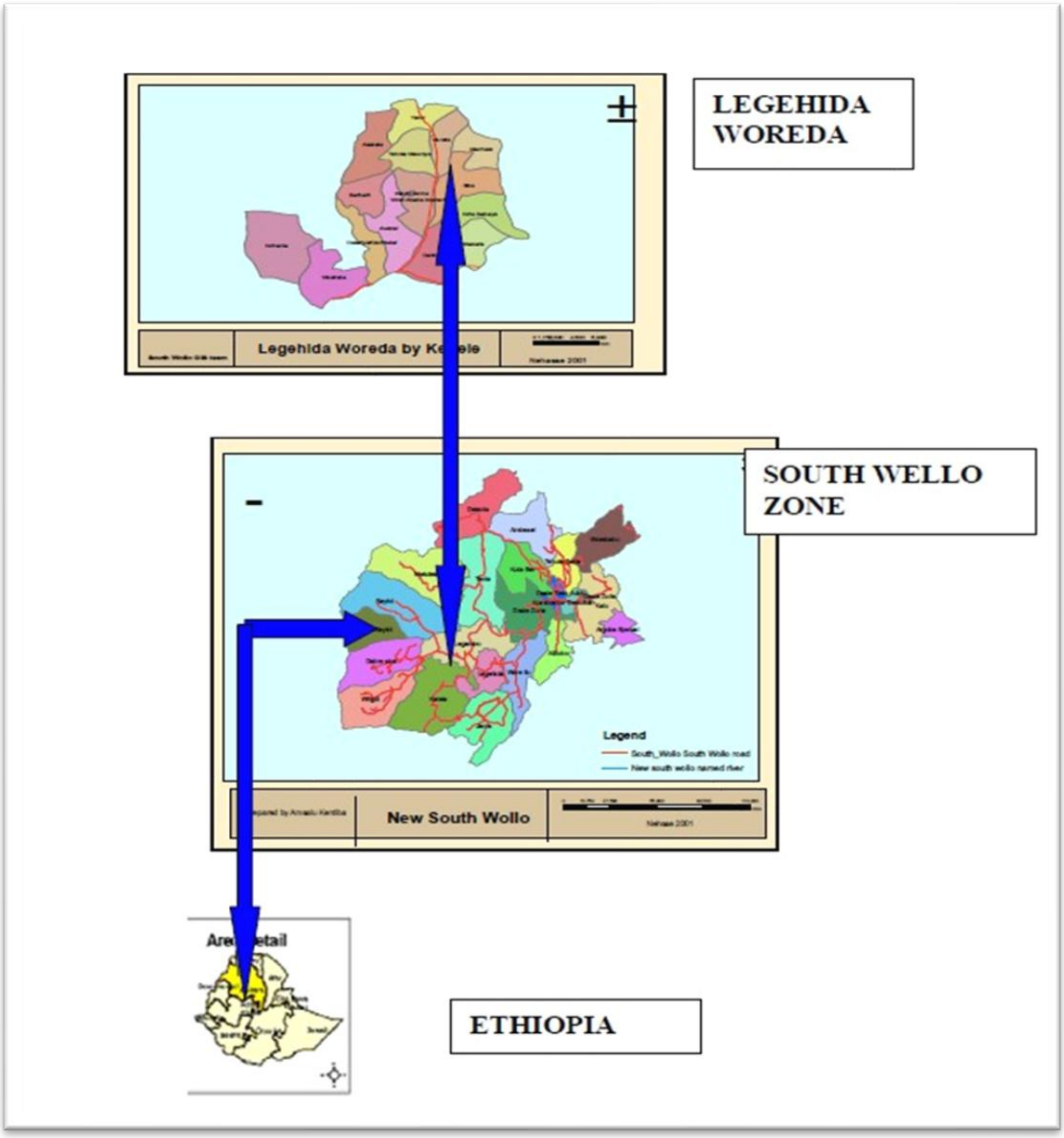

Fig 1: Map of South Wollo Zone-Legehida woreda Administrative boundaries
(Source: South Wollo Zone DoFED, 2024)

The Woreda's terrain is rugged and mountainous. Mountainous land accounts for 36.23 percent of the Woreda's total land area, while rugged terrain accounts for 17.38% and flat ground accounts for 42.69 percent. Agro-ecological zones in the Woreda include 19.8% lowland (kola), 55.5 percent midland (Woyna dega), and 25.7% highland (dega). The Woreda receives 990–1400 mm of rain every year, and temperatures range from 17–

25 degrees Celsius (LWGCAO, 2011). Beginning at the end of May and lasting until October, the rainfall distribution pattern is unimodal.

Total number of beehives owned at district level from 2020 to 2024: in 2020, there were about 3044 traditional, 732 improved, and 30 transitional hives, for a total of 3806; 3204 traditional, 773 improved, and 37 transitional hives, for a total of 4014; in 2023, there were about 3375 traditional, 892 improved, and 195 transitional hives, for a total of 4462 beehives owned by producers in the study area (District livestock and fishery development office, 2020).

According to the district livestock and fishery development office report for 2020, the total amount of beehives owned by the study kebele honey producers was 591 (402 traditional, 185 modern, and 4 transitional beehives) in Siba, 228 (153 traditional, 74 modern, and 1 transitional beehive) in Denbiya Afafa, and 328 (282 traditional, 45 modern, and 1 transitional beehive) Lguama kebele, (District livestock and fishery development office, 2020).

Because of the district's favorable agroecology and ability to house bees for feed, it is a suitable place to produce honey. In this woreda, there were two honey harvesting periods, April to June and September to October, of which the former was the major harvesting period, contributing 95% of the annual honey production. The total amount of honey produced for the last 3 consecutive years, from the traditional 96.23 tons, the modern 71.91 tons, and the transitional 1.73 tons, come to a total of 169.87 tons of honey produced in the study district (District livestock and fishery development office, 2020).

Research Design

A cross-sectional survey was administered to participants in the honey value chain development scheme. The relevant data was collected at a single point in time or over a short period of time (Creswell, 2012). This design was appropriate for studies that aimed to find out the prevalence of a phenomenon, situation, problem, attitude, or issue by taking a cross-section of the population (Kumar, 2011). This was because of the time and cost allowed for the research and due to the inherent problem of a time series survey. As these studies involved only one contact with the study population, they were comparatively cheap to undertake and easy to analyzed. Furthermore, descriptive survey research was employed.

Description of study participants (Population)

According to Kumar (2011), the "population" of a study refers to the entire group of individuals selected for the study. For this study, the population comprised rural households in the Legehida district in South Wollo Zone. The information was gathered from various rural households, including those engaged in honey production and family member producer households that remained at home during data collection (husband, child, wife, or other family members). Furthermore, the research incorporated some government and non-government officials and experts who were working on honey production issues.

Sources and Types of Data required

Both qualitative and quantitative types of data from both primary and secondary data sources were employed for this study. Primary data were collected using a structured questionnaire for honey producers. Primary data were collected from beekeepers and focused on value chain actors and their roles and functions, marketing channels, production costs, marketing costs, and the demographic and socioeconomic characteristics of the households. In addition to the questionnaire, qualitative data were gathered through focus group discussion, observation, and key informant interviews using checklists. Secondary sources of data were collected from publications, articles, books, figures, and reports to access studies relating to honey value chain, like volume of sale, price, input supply, and number of hives in the study area were collected from the Woreda agricultural development office and Non-governmental organization like GIZ, Ethiopia.

Sampling Procedure and Sample Size

To gather vital data for the study, three types of structured questionnaires were designed for formal surveys of honey producers, traders (collectors and retailers), and consumers. Checklists were prepared to gather data through KII and FGD.

Producer's sampling: For this study, a multi-stage sampling technique was used. **Initially**, the district was chosen purposively based on the funding organization's interests, as it was its intervention area and the researcher was well acquitted the area. In the **second stage**, stratified sampling was applied to stratify the woreda into three based on its agro-ecological condition and select one kebele from each stratum. The woreda stratified as Dega, Woyina Dega, and Wurchi, hence selecting one kebele from each stratum. Accordingly, 3 kebeles were selected from a total of 16 kebeles. These selected kebeles were Siba (04), Denbiya Afafa (013), and Luguama (016) kebeles. In the **third stage,** the households involved in honey production from the designated kebeles were chosen at random using a probability proportional to size method. Then, in the study woreda, a total sampled honey producer household that were used for this study were determined based on the

$$\mathbf{n= N/1+N\ (e^2)} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \textit{(1)}$$

$$\textbf{Then,}\quad \mathbf{n=\frac{422}{1+422 *(0.0025)} = 205}$$

Table 1: Sample size determination

No	Kebele	Population	Sample	Total sample
1	Siba (04) kebele	108	53	53
2	Denbiya Afafa (013) kebele	131	64	64
3	Luguama (016) kebele	183	88	88
	Total	422	205	205

Note: Every sample was drawn at systematically from the population of kebeles producers.

following formula supplied by Yamane (1967) at a 5% level of precision: the researcher was used to determine the representative sample size from the given population from the total households in the three kbeles. The sample size was proportionally determined for each honey-producing household.

Trader Sampling: In addition to farm households, sample respondents were selected from other actors in the value chain based on their size, availability, and specific roles within the chain. There were 18 honey traders in the study area, and due to their small number, nearly all were interviewed.

Non-probability sampling, specifically purposive sampling, was used to select participants such as consumers, key informants, and focus group discussants. Sampling consumers proved challenging due to the absence of a consumer list and the large, unlisted population (absence of a sampling frame). Therefore, purposive sampling was employed to select 29 consumers during the honey purchasing period in the Weyinamba and Shekif markets, where a large number of honey consumers were present. Participants for the key informant interviews (KII) and focus group discussions (FGD) were also chosen through purposive sampling, based on the study's objectives and the relevance of the participants to the interview and discussion topics.

Methods and Instruments for Data Collection

Quantitative Methods

A questionnaire had been widely used as a method of data collection by a large number of people involved in the research, primarily for quantitative data examination using statistics (Kothari, 2004; Kumar, 2011). A survey of households was complemented the qualitative data to provide statistical verification of the interviewees' perceptions and extent of usage. The survey was incorporated evidences of quantitative innovation, benefits, and usage in the home and market. Questions might focus on: what to ask producers, traders (local collectors and retailers), and consumers.

What to ask producers What are the sources of input for the honey product? What are the Local suppliers of inputs? Improved variety? What are the detail lists of inputs? How do you practice the production process of the product? List of implements? What are the input requirements per hive? Pre-production constraints, Post-harvest constraints? For whom to sell? Who decide the price? How do you sell the product? How do you sell for investors? Is there suspicion on measurement errors? Remedies for measurement errors, Is there government support?

What to ask Processors (if present): Where is the source of the product? Do you believe the product quantity and quality is sufficient? If there is quality problem, what are the sources of quality deterioration of the product? What are the difference between immediate processed on quality and quantity? What are the averages products used as raw material per annum?

What to ask Traders: Who is the Product/service source of supply? (Small holder farmers, large farm, whole sellers,) For whom you are selling the product? (Whole seller, local trader, manufacturing/ processing, exporters, drier, cooperatives and others (mention)?), what are the verifiable supports of government? What are the sources of market information on price and demand?

What to ask Consumers: What are the types of product consumed by the respondent? (Fresh, dried, floor), a. Do you prefer fresh/dried? Mention reason? b. What are the varieties of the product consumed? What are the reasons for preference c. where you purchase the product? d. What is the purchase price fresh product for a kilo gram in Birr? What are the problems and solution in product marketing?

Such questions would be rearranged/phrased/designed for each product and service data collection tool preparation.

Qualitative Methods

Document review (Secondary Source)

This involved an in-depth review of relevant documents. Documents to be reviewed before leaving Dessie and/or at field level and analysed depending on availability were: GIZ document, National statistics and reports from south wollo zone office of Agriculture and Rural Development.

Focus Group Discussion (FGD) (Primary Sources)

The focus groups were organized to obtain a general overview of the strengths and weaknesses of the honey value chain from men, women, children, and people with special needs beneficiaries or civil society leaders, separately. It was also being conducted with a small number of people from the community as a whole, including those who couldn't produce honey. Each focus group should contain around ten respondents. Groups need to be reasonably homogenous to ensure that people can speak freely. Depending on the location, this might mean taking into account an ethnic group's age, gender, religion, and health status. A reasonable duration for focus groups with adults could be around two hours; for focus groups with children, slightly less. There were also mixed groups like Woreda or Kebele-level committees.

Checklists were prepared and used, and photos were taken. The draft content of the FGD checklists and questions was shared with the client before finalization to ensure that they addressed priority issues.

The focus proposed was listed below:

Discussions with multilevel stakeholders and government employees: Such as steering committee members: The members of the core assessment team conducted two in-depth interviews at the zone/woreda level and one in-depth interview in a sample of three kebeles on the value chain mapping.

Discussions with community members: Nine (3 Kebeles x 3 members) FGDs were organized to discuss the competitiveness of the enterprise and generating decent jobs. However, the above lists were changed later, after a thorough review of the program's content and processes.

Key Informant Interview (KII) (Primary Sources)

The individual interviews were guided by the particular experiences of the individuals. They were also provided with personal "stories" that were used to give a human dimension to complement the more remote and abstract nature of statistical evaluations. KII were conducted with people who were familiar with the GIZ project, such as:

- Multilevel stakeholders that includes GIZ and other project partners.
- The zonal, Woreda, Local Government (LG) from Office of Agriculture, livestock, health, education, women and children affaires, and other development offices. At grass root level this included health and agricultural extension workers, and co-operatives office staffs.
- What were the localities of supplying the product to the central market? What was the percentage of supply each locality? What were the opportunities for selling to local/regional/ national and export markets?

Field observations (Primary Sources)

Qualitative research draws its data from many sources not only from a variety of people but perhaps also from objects. Therefore, field observation was done by the core survey team when doing key informant interviews and FGD.

- Check infrastructure availability, quality, and strength of material
- This includes observation and review of documentation system and capacity level of target communities to sustain the production and marketing of honey products etc….
- Comparison visit similar honey value chain activities implemented by other agencies in the sample Woreda and Kebeles
- Checklists were prepared and used, photos were taken and information collected

To ensure confidentiality, surveys should note the village where the interviewee resides, a numerical reference and the interviewer's name, but not the interviewee's name or inclusion of questions that easily allow identification of the interviewee.

Methods of Data Analysis

The study was used both quantitative and qualitative data analysis methods. Descriptive statistics, marketing cost & margin (market performance) and ranking index analysis were quantitative and, Value Chain Study Approaches and SWOT Vs PESTEC analysis were qualitative data analysis methods which were employed in this study.

Quantitative data analysis methods

Descriptive Statistics

This method of data analysis involved the use of ratios, percentages, means, variances, and standard deviations in the process of examining and describing marketing functions, household characteristics, intermediary roles, and market and trader characteristics of actors along the value chain.

Data Analysis for Margin and Cost of Marketing

To evaluate market performance, the cost and margins of marketing agents or actors in various channels were considered.

When there are multiple parties involved in the market chain, the margin is determined by comparing the final price to the consumer with the price fluctuations at various segments. All marketing margins thus have the consumer price as their base or common denominator. The Total Gross Marketing Margin (TGMM), which is calculated as a percentage, is always connected to the final price or the amount paid by the end user (Mendoza, 1995). The following is the formula to compute TGMM:

$$TGMM = \frac{\text{Consumer price-farmers price}}{\text{Consumer price}} * 100 \ldots\ldots \textbf{(2)}$$

Here, it is helpful to establish the concept of producer participation, also known as producer's gross margin (GMM) or farmer's piece, which is the percentage of the final customer price that goes to the farmer in their capacity as a producer. The formula used to determine the producer's margin, or share in the consumer price (GMMp), is:

$$GMMp = = \frac{\text{Consumer price-marketing cost}}{\text{Consumer price}} * 100 \ldots\ldots \textbf{(3)}$$

The computation of the consumer price share or market intermediary portion is as follows:

$$MM = \frac{\text{Selling price-buying price}}{\text{Final consumer price}} * 100 \ldots\ldots \textbf{(4)}$$

Where: MM= Marketing Margin (%)

The percentage over the final price that the intermediary earns as his net income after deducting his marketing expenses is known as the net marketing margin (NMM) in a marketing chain when there is just one trader between the producer and the consumer. The amount of net income that can be attributed to pure profit (i.e., return on capital) is determined by how much the middleman's own salary which is frequently assumed is factored into the total cost of marketing.

$$NMM = \text{Gross}\frac{\text{Market Margin-Marketing cost}}{\text{Consumer price}} * 100 \ldots\ldots \textbf{(5)}$$

Where: NMM=Net Marketing Margin

Qualitative data analysis methods

Value Chain Study Approaches

The study issue determined the value-chain analysis method used (Kaplinsky and Morris, 2001). As a result, in this study, four aspects of value-chain analysis were used: value chain mapping, identifying the benefits distribution among actors in the chain and investigating the role of upgrading in the supply chain to assess actor characteristics, profit and cost structures, and product flows along the supply chain, as well as employment characteristics and the destination and volume of local sales.

Strengths, Weaknesses, Opportunities, and Threats; (SWOT) analysis

To analyze threats and opportunities in business activities, the SWOT analysis approach was the most well-known tool for auditing and analyzing the overall strategic position of the business and its environment (Osita et al., 2014). Its primary goal was to identify strategies that create a firm-specific business model that aligned an organization's resources and capabilities with the requirements of the environment in which the firm operates. In other words, it served as the foundation for assessing internal potential and constraints as well as probable or likely external possibilities and dangers. It considered all positive and negative elements affecting the firm's success, both inside (strengths and weaknesses) and outside (opportunities and constraints).

Results and Discussion

Honey production in Legehida District

With regard to the respondents' honey type, they were expected to produce pure honey, crude wax, and queen rearing using modern hives. The majority of respondents (59.8%) produce pure honey and queen rearing, but 3.5% still produced crude honey, implied that they were attempting to use a honey extractor to filter honey from its wax but were still using traditional honey harvesting techniques, which diminished all foundation sheet structures. Furthermore, none of the respondents were able to properly utilize the advantages of modern hives, producing pure honey, crude wax, or colony breeding.

As shown in Figure 2, 6.3% of the respondents had no modern hive at all; they owned only traditional hives. With respect to honey harvesting frequency, only 9.8% of the respondents harvest once a year, and 83.9% harvest twice a year. Honey harvesting frequency might vary due to honey bee forage availability and seasonal suitability. From the above result, the researcher inferred that in the study area, common honey harvesting occurred twice a year.

In terms of respondents Honey type using a traditional hives pure honey, crude wax and queen rearing. The majority of respondents, (50.7%) produced crude honey, followed by 36.6% of the respondents who were

Table 2: SWOT/PESTEC Matrix Analysis

External Factors	Internal Factors	
	Strength	**Weakness**
Opportunities	SO strategies	WO strategies
Threats	ST strategies	WT strategies

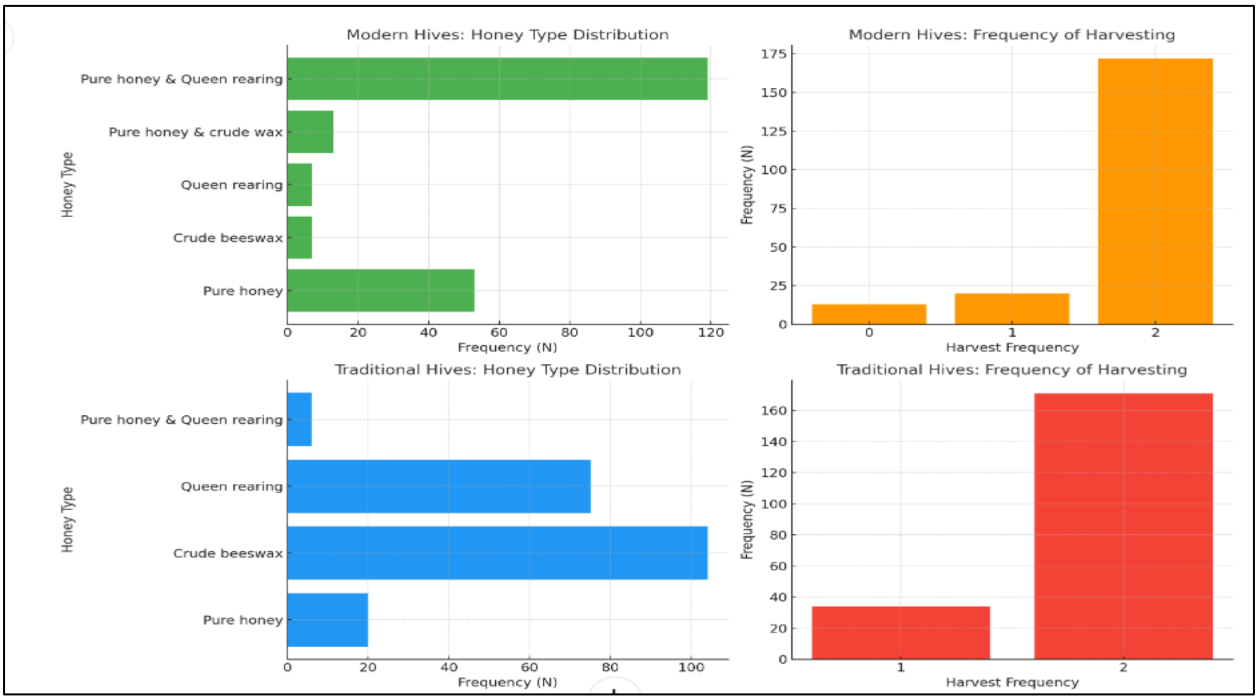

Fig 2: Descriptive statistics for honey type and frequency of harvesting using both hives
(Source: Survey result, 2024)

Table 3: Descriptive statistics for harvesting season in both traditional and modern hives

Honey harvesting season	Frequency (N)	Percent (%)	Cumulative frequency
Jul to Sep &Jan to Mar	7	3.4	3.4
Oct to Dec & Jan to Mar	112	54.6	58.0
Oct to Dec & Apr to June	86	42.0	100.0

(Source: Own Computation, 2024)

using traditional hives to rear queens; 9.8% of the respondents also produced pure honey; and 2.9% of the respondents use traditional hives to both produced pure honey and rear queen bees. This implied that they did not use a honey extractor to filter honey from its wax and were still practicing the traditional way of harvesting honey. According to the BOARD's beekeeping expert, this was due to a lack of awareness and improper distribution of the equipment (the honey extractor) during honey harvesting season.

With respect to honey harvesting frequency, 16.6% of the respondents harvested once a year, and 83.4% harvested twice a year. Honey harvesting frequencies were varying due to honey bee forage availability and seasonal suitability. From the above result, the researcher inferred that in the study area, common honey harvesting occurred twice a year.

The finding that 83.4% of respondents harvested honey twice a year aligns with studies by Tesfaye and Belay (2018), Ayele et al. (2021), and Getachew and Man (2014), which indicate that biannual honey harvesting is common in areas where climatic conditions and forage availability support multiple nectar flows. This practice ensures optimal honey production, with harvests timed to seasonal changes. The smaller proportion of respondents harvesting once a year may reflect localized conditions with limited forage or different beekeeping practices.

Table 3 showed the respondents' harvesting season in the production year 2023–2024. Of the 3.4% who responded, their harvesting season was in two seasons from July to September and from January to March, whereas 54.6% of the respondent‘s harvesting season was in two seasons from October to December and from January to March, and 42% of the beekeepers were also harvesting honey in two seasons: October to December and April to June. So the peak honey harvesting season in the study area was from October through December and from January to March.

In case of respondents‘ beekeeping experience, 29.3% had in beekeeping for more than 10 years, 57.1% had 5-10 years of experience (the majority of respondents), and the minority of respondents (13.7%) had less than

5 years of beekeeping experience. The average mean difference in beekeeping experience was also 8.71 years (Figure 3). Based on the above result, the majority of beekeepers engaged in honey production using both modern and traditional hives were moderately experienced. This might result in moderate efficiency in the utilization of new inputs. In relation to the respondent‘s number of hive possessions, the average holding for modern hives was 2.63, with a minimum of 0 and a maximum of 5. And the respondent‘s average holding for traditional hives was 4.77, with a minimum of 1 and a maximum of 12. This was because the majority of beekeepers own between 3 and 5 modern hives and 5 traditional hives per household. The above result indicated that honey production using traditional hives was more widely adopted and expanded than honey production using modern hives in the study area.

The old and contemporary hives produced significantly different amounts of honey. On average, it was about 5.11 kg/hive and 8.09 kg/hive for the traditional and modern hives, respectively (Table 5). As compared to the national average yield of honey per hive (kg/hive), 7.3kg, and 13.3kg for traditional and modern beehives, respectively (CSA, 2017), the district had moderate potential for honey production.

The survey result in Figure 3 indicated that the selling price of honey from modern hives in the 2023/22 production period was between birr 350 and birr 460 per kg, and the selling price of honey from traditional hives in the 2023/22 production period was between birr 300 and 430 per kg. According to the researcher's "Weyinamba" market day observations, the price of honey ranges from 325 to 420 birr per kg for honey from modern hives and from 290 to 400 birr per kg for honey from traditional hives. The price difference was based on the color of the honey; the highest price was given for the white honey and the lowest for the amber one.

The survey result in Table 4 showed that 74.1% of the beekeepers were members of savings and credit cooperatives that were established in their local *kebeles*. The benefits of being a member included credit inputs for beekeeping and other agricultural production. It was known that the establishment of cooperatives was intended to create market linkages for products produced in the study area. But this was not functional, and producers were not selling their products to those institutions (cooperatives). The above result indicated that the majority of the beekeepers in the study area were not selling their product to those institutions. This might exposed them to marketing problems and reduced their market bargaining power.

With respect to honey extraction, even though the majority of the producers (96.5%) of the respondents extract honey using a honey extractor, 3.5% of the respondents were still not using an extractor in the modern hives (harvesting through the honey comb and foundation sheet). 49.5% of the target groups extract honey, and 50.5% of the respondents still did not extract honey using a honey extractor in the traditional hive. 53.5% of the respondents, using both traditional and modern hives, did not extract honey using honey extractors (Table 4). Their reasons for not using the extractor were a lack of honey extractors, a lack of awareness of how to extract honey using the extractor, and poor market demand for extracted honey. Extracted honey was wax-free honey, and this was also suitable for adulteration. It was difficult to identify the adulterated honey from the pure one. As a result, producers were forced to harvest honey with its comb in order to avoid the occurrence of the problem.

Value Chain Analysis

This part discussed the full range of activities for the honey produced using traditional and modern hives. The main objective of this part was to identify the actors and service providers in the value chain, their roles and functions, and to map the flow of products, value addition, flow of information and knowledge, relationships, constraints, and opportunities within the chain in the study area.

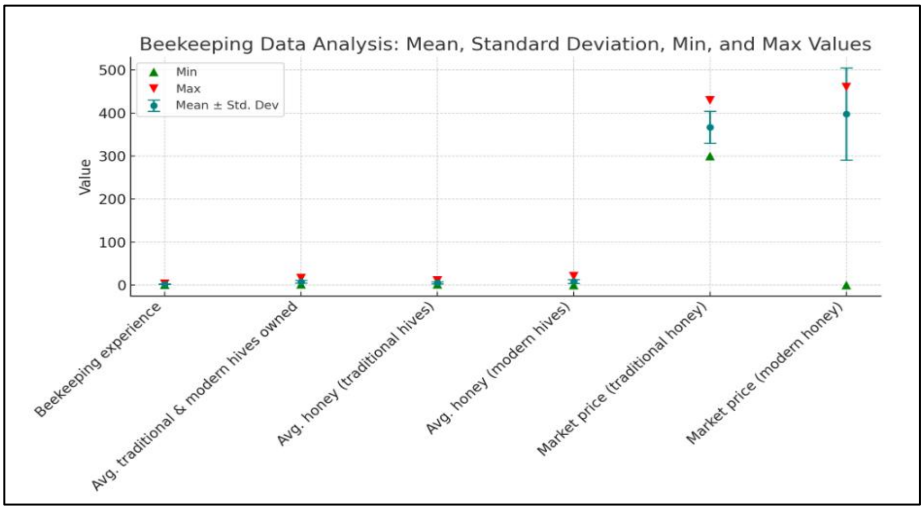

Fig 3: Descriptive Statistics for beekeeping experience, amount of honey produced, market price of honey from each hives (Source: Survey result, 2024)

Mapping core processes

Any mapping of core processes in a value chain analysis needed to be identified first so as to better understand the main stages in the value chain. Hence the core processes in the study area were input supply, production, collection, retailing, and consumption.

Mapping main value chain actors and activities

According to GTZ (2007), the phrase "value chain actors" refers to all persons, businesses, and government agencies involved in a value chain, particularly value chain operators, operational service providers, and support service suppliers. In a broader sense, certain government entities at the macro level were also considered value chain players if they serve critical tasks in the value chain's business environment. In the study area, there were different public and non-public actors involved along the honey value chain, upstream from input supply to downstream consumers, each playing a different role with different functions. The major actors participating in the honey value chain and their roles were discussed below.

Input suppliers

Input suppliers were the first actors in the honey value chain. In the study area, there were governmental (BoARD and Zonal Research) and nongovernmental (GIZ Ethiopia) organizations with the common objective of honey product maximization and quality improvement through the provision of modern beekeeping inputs with clear technical advice to the beekeepers.

Beekeepers (Producers)

Beekeepers were the second actor in the honey value chain. In the study area, small-scale honey producers were producing honey using traditional, modern, or both types of hives. These actors performed activities like making foundation sheets, colony transfer, supplementary feeding, and internal and external hive inspection, honey harvesting, storing honey in plastic containers, and transporting it to market. They sold their produce to local collectors, retailers, and consumers directly.

Local honey collectors

Local honey collectors were the third link or chain actor in the honey value chain in the study area, and they were engaged in performing activities like buying honey from beekeepers that come from different localities and then selling it to retailers and consumers. These actors perform honey-collecting activities not as their main income source but in addition to their business (a commodities shop). They were also found in the kebeles of Weyinamba, Lguama, and Shekif in the Legehida district.

Retailers

Honey retailers in the study area were engaged in activities like purchasing honey from local collectors and directly from producers. Furthermore, they perform value-adding activities like sorting and packaging. These actors were also found in *Weyinamba* and sell honey directly to consumers.

Consumers

From the perspective of the consumer, the shorter the marketing chain, the more likely the retail price was low. Consumers in this study refer to households that purchased and consumed honey. They were individual families that purchased the commodities only for their own use. Consumer preference depends on the purpose of consumption, and most of the time white honey was preferred. People in the district believed that because of the cold weather conditions in the district, newcomers to the area were consume honey.

Supporting services and enablers

These were the actors who provide supported services such as training and extension, information, financing, and research. According to Martin et al. (2007), enablers in a value chain comprised all chain-specific players who provided regular support services or represented the value chain participants' shared interests. The honey value chain supporting function players were those who were not directly associated with the honey value chain but provided various supports to the value chain actors. In the study areas, there were many institutions supporting the honey value chain in one way or another. The most common support providers were the District Livestock and Fishery Resource Development Office, the District Trade and Market Development Office, Amhara Micro Finance Institutions, private transporters, banks, private credit providers, and private input suppliers. Some service providers extend their services beyond one function, while others were limited to a specific function.

Table 4: Descriptive Statistics for membership to cooperatives and honey extraction

Variables	Items	Frequency (N)	Percent (%)	Com.Freq
Cooperative membership	Yes	152	74.1	74.1
	No	53	25.9	100.0
Honey extraction in modern hives	Yes	198	96.5	96.5
	No	7	3.5	100.0
Honey extraction in traditional hives	Yes	101	49.5	49.5
	No	104	50.5	100.0

(Source: Own Computation, 2024)

Note: ⟶ product and input flow, ⟶ financial flow and ⟵----⟶ Information flow

Before producing the above map of honey value chain, it should be first identify how many beekeepers sold their product to local collectors, retailers, and consumers. According to the study results, 68.99 producers sold their honey directly to customers, 68.9 producers sold their product to local collectors, and the other 55.1 producers sold the product to retailers. According to the aforementioned data, 7.15Qts of the total quantity of honey given to the market (20Qts) by the producers were sold directly to customers, 7.14Qts to local collectors, and 5.71Qts to retailers. This research result was supported by Wang (2015) study on honey value chain analysis of the Ahferom area in Tigray. In his study, the majority of movable-frame hive producers sold their honey directly to consumers. Getachew and Man (2014), on the other hand, claimed in her research on honey value chain analysis in the Gera district of Jimma zone, Oromia region that a significant amount of honey produced was sold to wholesalers.

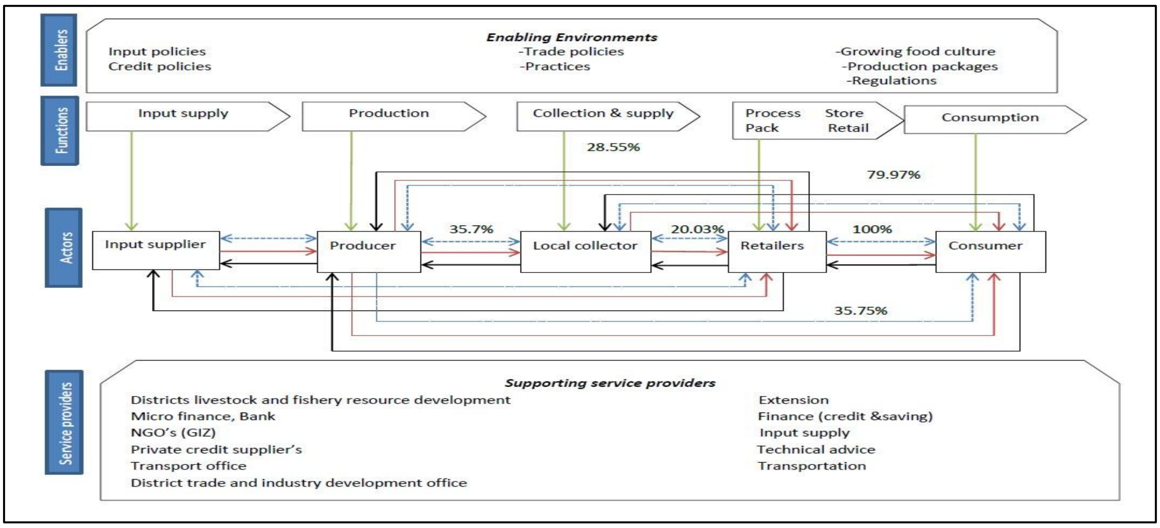

Fig 4: Mapping of honey value chain in Legehida Woreda
(Source: Own Sketch from the survey result, 2024)

Market Performance Analysis (Marketing Cost and Margin of actors)

Marketing Channel

In Legehida Woreda, four alternative marketing channels were identified. In 2023/22, sampled respondents in the Weyinamba, Luguama, and Shekif honey markets supplied 20 Qts of honey from the total amount of honey produced using both traditional and modern methods and both hives. From the total quantity marketed, the main marketing channels identified from the point of production until the product reached the final consumer through different intermediaries were depicted in Figure 5.

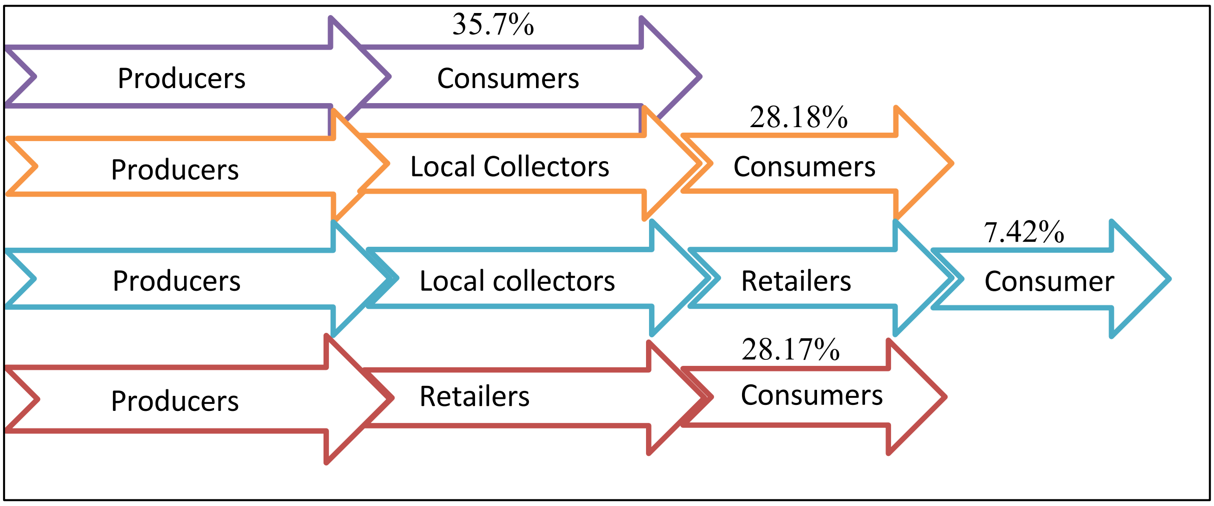

Fig 5: Market channel in Legehida District
(Source: Own Sketch, 2024)

In the above figure, one can see that individual beekeepers were selling a large quantity directly to consumers through their market channels, and the role of intermediaries was not that significant.

Channel I: Producers → Consumers: This was the shortest route for producers (honey) to sell directly to consumers at the farm gate. It represented 35.7% of the total honey marketed, which amounted to 7.15Qts or 7150 kilograms, of honey during the survey period. The channel was found to be the most important in terms of volume. For the honey value chain analysis, findings such as direct sales from producers to consumers are consistent with studies in similar contexts. For instance, in Mesela District, it was found that honey producers primarily sold directly to consumers, accounting for a significant portion of the total market volume (Yuya, 2022).

Channel II: Producers → Collector → Consumers: Rural collectors were buying honey from individual beekeepers in the study area, which they then sold to the ultimate consumers. During the survey period, it accounted for 28.18%, or 5.64 Qts, (5640 kilograms) of honey. In terms of volume, the channel was shown to be the second-most important marketing channel.

Channel III: Producer → Collector → Retailer → Consumer: Rural collectors purchased honey from producers in the study area and resold it to retailers, who resold it to consumers. It accounted for 07.42% (1.48Qts means 1480 Kgs) of total honey marketed during the survey period. The channel was found to be the least important in terms of volume.

Channel V: Producer → Retailer → Consumer: District retailers bought directly from the producer and resold to consumers. It represented 28.17% (5.63 Qts and 5634 Kgs) of total honey marketed during the survey period. In terms of volume, the channel was shown to be the third most important marketing channel.

The amount of honey transacted in these market channels was different. The survey results revealed that consumers and collectors were the dominant receivers of honey, with a percentage share of 35.7% and 28.18%, respectively, in terms of volume of honey supply.

Market Performance Analysis (Cost and Margin)

Table 5 depicted how each actor in the honey value chain added values to the product as it moved from one to the next via sorting, packaging, and extraction. Beekeepers had the highest profit share, followed by retailers and local collectors, with 83.25, 7.6, and 9.14 percent in the chain with a single exchange, respectively. In honey value chains, beekeepers often capture the highest profit share due to their primary role in production

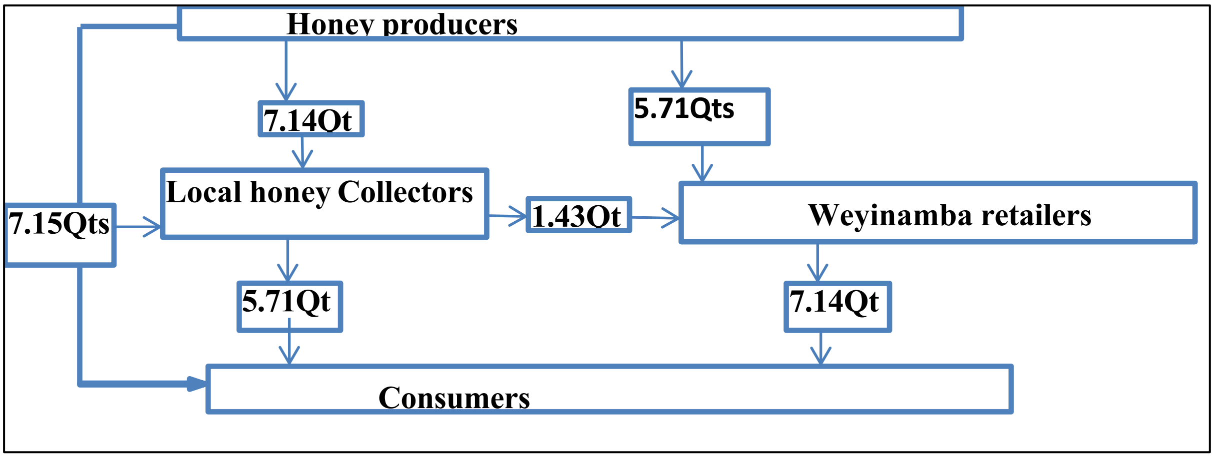

Fig 6: Honey market channel in Legehida Woreda
(Source: Own Sketch, 2024)

Table 5: Honey marketing cost and profit share of actors

Item(birr/Kg)	Beekeeper	Local collector	Retailer	Sum
Purchasing price	-	364.8	377.3	742.1
Production cost	61	-	-	61
Marketing cost	23.5	6	6.45	35.95
Total cost	84.6	370.8	383.75	839.15
Sale for consumers	382.45	392.1	410.6	1185.3
Market margin	297.85	21.3	26.85	346
Share margin (%)	86.1	6.12	7.76	100
Profit margin	279.8	6.9	8.3	90.8
Profit (%)	83.25	7.6	9.14	100

(Source: Own survey, 2024)

and initial processing, followed by local collectors and retailers. Studies have shown that producers typically benefit most, as they engage in labor-intensive tasks such as sorting, extraction, and initial packaging. For instance, research by Kebede and Tadesse (2012) and Yuya (2022) highlights how beekeepers dominate profit shares, while collectors and retailers receive smaller portions. Similarly, Fischer and Qaim (2012) and Getachew and Man (2014) emphasize the diminishing profit margins as honey moves through the value chain, with beekeepers earning the highest due to their central role in production and processing.

Honey marketing margin at different channels

In the section that followed, the sales prices of various channel participants and actors (honey producers, local collectors, and retailers) as well as their marketing expenses were compiled to determine market margin. The gross margin might demonstrate where values were added in the marketing chain. According to the above data, the greatest and lowest producers' total gross marketing margins (TGMM) were 19.1% and 0% in channels III and I, respectively. Without taking into account channel I (producers selling directly to consumers), the producers' share were highest in channel II and lowest in channel III, at 86.3 and 67.1 percent, respectively. This was because intermediaries were involved in the channel. The highest net market margin for honey producers in the study area was found in channel I, followed by channels II, IV, and III at 76, 68.3, 63.7, and 62.8%, respectively (Table 6).

Studies on honey value chains, such as those by Yuya (2022) and Fischer & Qaim (2012), highlight that producers earn the highest margins when selling directly to consumers, as intermediaries are absent. Similarly, Kebede & Tadesse (2012) and Getachew & Man (2014) found that as intermediaries enter the value chain, the gross margins for producers decrease. In direct-to-consumer channels, like channel I, producers' net margins were highest, while in channels with more intermediaries, such as II and III, margins were lower due to profit sharing. These findings underline the importance of direct marketing for maximizing producer profits.

Constraints and Opportunities alone in the Honey Value Chain at Legehida District

Constraints of honey production

The result in Figure 7 indicated that, out of the listed pests and predators, respondents of the study area ranked ants, spiders, and birds as 1st, 2nd, and 3rd, respectively. From the above finding, the researcher was inferred that beekeepers in the study area were still suffering due to the consequences of pests and predators. Furthermore, producers were not getting adequate and consistent training and technical advice on how to protect their hives from honey bee pests and predators.

One of the merits of value chain analysis is that it helps to clearly identify bottlenecks to the development of the chain right from input supply until the consumption level in intense way. Accordingly, a number of constraints and opportunities are explained by different actors through focus group discussion and questionnaire. From results, major constraints which are currently hindering the development of the honey value chain can be categorized according to the three basic stages: the farm level, the marketing/traders stage, and consumer stage.

Table 6: Honey market margin of actors in different channels

Actors	Marketing Measures Per Kg	Marketing Channel			
		I	II	III	IV
Beekeepers	Production cost	61	61	61	61
	Marketing cost	23.5	6	6.45	6.45
	Selling price	382.5	392.1	392.1	410.6
	Market Margin	297.85	337.5	344	337.5
	GMM (%)	100	86.3	67.1	81.8
	NMM (%)	76	68.3	62.8	63.7
	TGMM (%)	0	13.7	19.1	18.3
Local collectors	Selling price	-	392.1	392.1	-
	Marketing cost	-	6	6	-
	Market Margin	-	21.3	21.3	-
	GMM (%)	-	13.7	13.7	-
	NMM (%)	-	10.5	10.5	-
Retailers	Selling price	-	-	410.6	410.6
	Marketing cost	-	-	6.45	6.45
	Market Margin	-	-	26.85	26.85
	GMM (%)	-	-	19.2	18.2
	NMM (%)	-	-	14.8	13.9

Where: **GMM**= Gross Marketing Margin, **NMM**= Net Marketing Margin and **TGMMp**=Total Gross Marketing Margin
(Source: survey result, 2024)

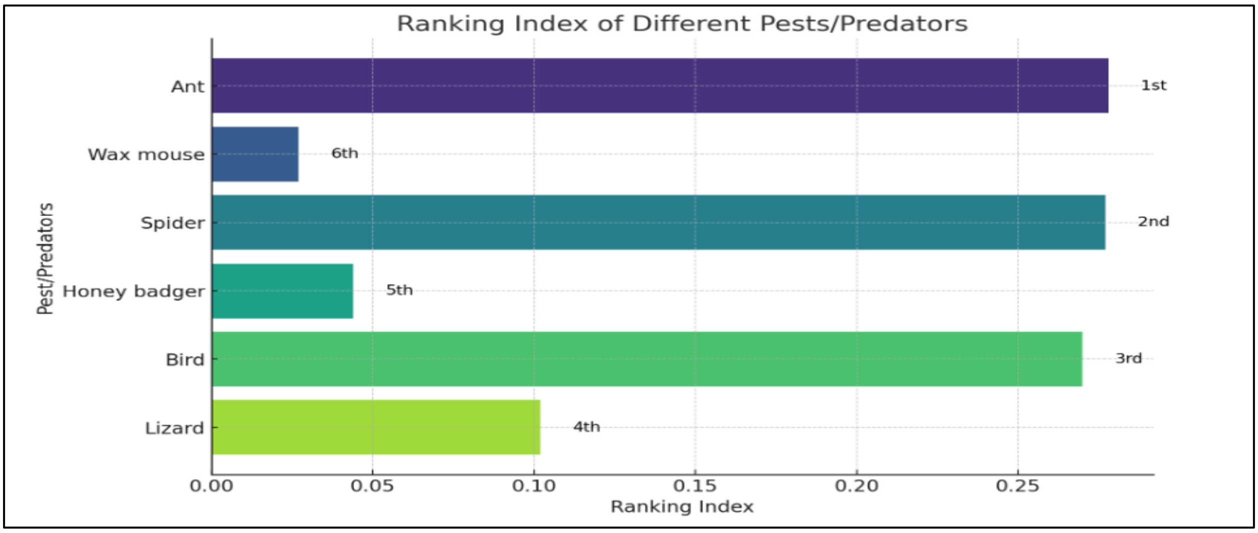

Fig 7: Pests and Predators
(Source: survey result, 2024)

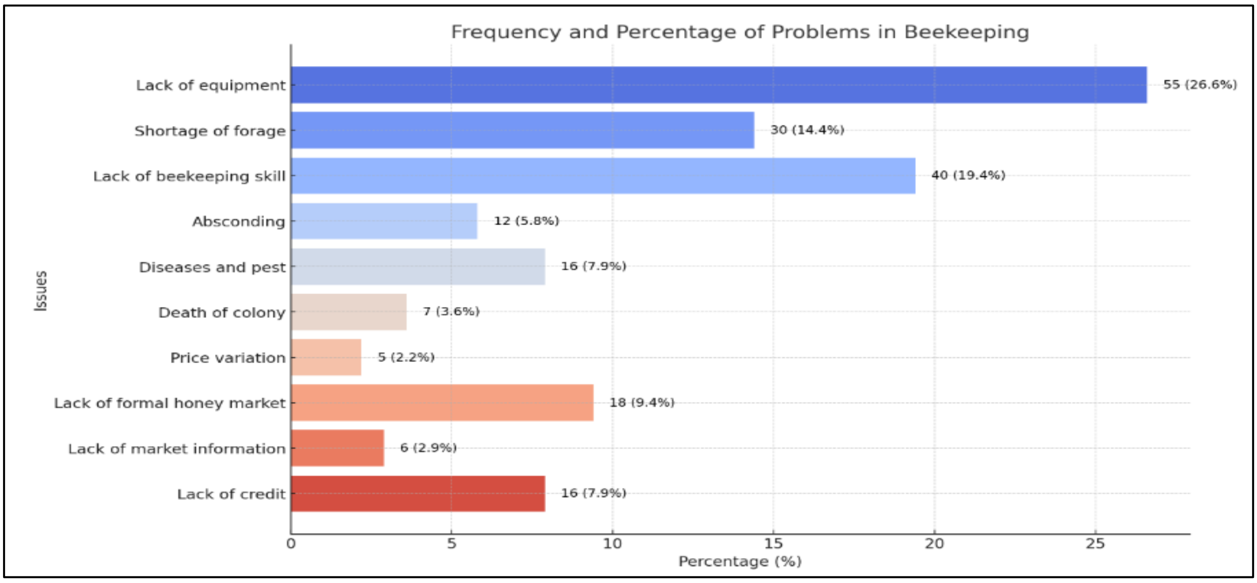

Fig 8: Problems faced by Beekeepers indicating input, production, marketing and credit problems
(Source: Survey result, 2024)

At the farm-level, key constraints faced by beekeepers are the shortage of improved beekeeping equipment and lack of improved honey production skill, absconding of bee colony, seasonal shortage of forage, diseases and pest, lack of formal honey market, inadequate credit service, lack of market information, death of colony and lack of honey producer cooperative in the District. Concerning inputs supply, about 26.6% and 14.39% of sampled farmers reported problem of shortage of improved beekeeping equipment and seasonal shortage of forage, respectively. With regard to production, 19.4%, 5.8%, 7.9% and 3.6 of sampled producers faced lack of modern beekeeping skill, bee colony absconding, diseases, pest and death of colony, respectively.

Concerning credit and marketing 2.2%, 9.4%, 2.9% and 7.9% of sampled beekeepers reported problem of harvest time price variation, lack of formal honey market in the District, lack of market information and lack of credit, respectively (Figure 8). This will make producers to not fully utilize their full capacity and limit the amount of honey marketed surplus. As a result, producers became at the position of price taker in honey value chain in the district.

Constraints of honey Consumers

In the case of **honey consumers**, in the study area, 49.16% of the consumers were unable to identify the adulterated honey from the pure one. Furthermore, with percentages of 31.2, 37.8, and 31, respectively, consumers preferred honey harvested from traditional, modern, or both types of hives. Consumers preferred honey produced from traditional hives because of its flavor, and they also felt that honey harvested from traditional hives was not suited for truly adulterating with foreign components such as sugar and banana. 85.7% of consumers preferred the white honey.

Opportunities of honey production

Despite the challenges in the study area, beekeeping was a sustainable form of agricultural activity that benefits both the environment and provided economic reasons for the conservation of native habitats in order to perpetuate their life cycle, as well as potentially increased yield and quality of vegetables, fruits, and forage crops through pollination. Honey production options in the area included the availability of area closures, simple access to contemporary beekeeping supplies; bee feed availability, inspiring government policy, and demand for quality and quantity of honey.

SWOT Analysis

PESTEC and SWOT Analysis

To analyzed and summarized the different constraints and opportunities of honey production in the study area, PESTEC and SWOT matrices analyses were integrated and presented as follows in Table 8.

Conclusion and recommendations

Conclusion

In conclusion, the honey value chain in the study area reveals several challenges, including the absence of formal licenses for traders, a lack of integration with processing plants, and limited support from traders in terms of input, credit, and technology for producers. The direct-to-consumer sales model was dominant due to producers seeking better prices, but the market was controlled by a few traders, resulting in an oligopolistic structure. This limited the bargaining power of producers and contributed to poor market organization. Furthermore, constraints such as inadequate training, lack of technical advice, and insufficient support for beekeeping practices hindered the development of the sector. These issues highlight the need for improved market structures, better producer support, and enhanced coordination within the honey value chain.

Table 7: Key Threats and Opportunities with Strengths and Weakness of honey value chain (SWOT analysis)

Strength	Weakness
Production • Maximum output (Large Volume) • Extension services are available. • A sufficient labor force • Research facilities are available. • NGO accessibility	**Production** • Input supply is difficult to get (affordability issue). • Activities that bring little value(value addition) • Inadequate storage facilities • Low household consumption
Marketing • Cooperatives and unions are available. • Local processors that are available • Adequate market intelligence(information)	**Marketing** • Inadequate collaboration with other value chain participants • Poor storage materials are used. • Limited financial access • Low amounts of added value • Inadequate infrastructure • Feeder routes (roads) are inaccessible, and farmers are not connected to markets
Production Opportunity • Access to suitable environments • Infrastructure improvements might make honey production easier. • The government is currently supporting a self-contained strategy to establish a contemporary marketing system (cooperatives) • Compactly constructing manufacturers • The existence of some non-governmental organizations (NGOs) and research institutions employed as development initiatives by providing input supply	**Production Threats** • Pests and disease • Female production involvement is low. • Application of pesticides and herbicides (chemical toxicity) • Credit availability for honey production is limited. • Inadequate access to honey processing materials • Distance between home and nearest market • The expense of transportation • For honey consumption, most producers employed traditional value addition methods
Marketing Opportunities • Infrastructure development might help with honey marketing by connecting consumers and producers. • Another potential for area producers was the prevalence of beneficial government programs that promote small scale firms	**Marketing Threats** • A scarcity of packaging materials • Little female marketing engagement, low input Quality issue • High market center separation • Credit is difficult to obtain for honey marketing

(Source: Survey Result, 2024)

Table 8: - Analysis of honey production and marketing constraints and opportunities in Legehida district

PESTEC	SWOT analysis			
	Strength	**Weakness**	**Opportunity**	**Threat**
Political	- The existence of assisting organizations	- Inadequate infrastructure - Inadequate data and information flow	- Significant employment creation	- Policy decisions based on little knowledge
Economical	- Rapidly increasing demand for honey products - Contribution to poverty alleviation - Sources of cash income	- High input costs - Small household income - Low amount of honey	- Increasing consumer income	- Inflation is quite high.
Social	- Trader with significant barging power	- The issue of links between chain actors -A scarcity of training opportunities	- Nutrition and health contribution	- Rapid human population growth
Technological	- AI and health services provision	- Inadequate processing equipment	- Breeding technologies are readily available.	
Environmental	- Agro ecology that is suitable for forage development	- Inadequate sanitation	- The presence of proper agro-ecology for the introduction of promising breeds	- A rough and rocky terrain
Cultural	- Honey is used for therapeutic purposes in traditional medicine.	- The use of underage labor - Religion prohibits the use of animal products during fasting periods	- Numerous religious festivals occur.	- Fasting for a long time

(Source: Survey result, 2024)

Recommendations

On the basis of the study, possible recommendations might be provided so that future intervention methods at various levels aimed at enhancing the overall performance of the honey value chain were considered. As a result, the researcher had provided the following policy implications: Strengthening the linkage among value chain actors is vital for value chain development, establishing strong market organization, provide modern beekeeping equipment, training and technical advice for the beekeepers, There is a need to prioritize the frequency of extension contacts in providing timely information on honey production and marketing, The concerning body in this sector must first develop equitable accessibility to infrastructures and improving adult education, Consistent training and frequent technical advice and establishing honey collection centers in potential production area and equipping them with the necessary facilities.

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