



ANALYSIS OF THE HONEY VALUE CHAIN IN YEMEN

April - 2026

United Nations Development Programme (UNDP)

Disclaimer

This report presents the findings of a commissioned study on the Yemeni honey sector. We extend our sincere gratitude to the Honey Value Chain Specialist and the Agribusiness/Market Integration Consultant that authored this study. Special thanks are also due to the many Yemeni beekeepers and industry experts whose generous insights and firsthand experiences made this study possible.

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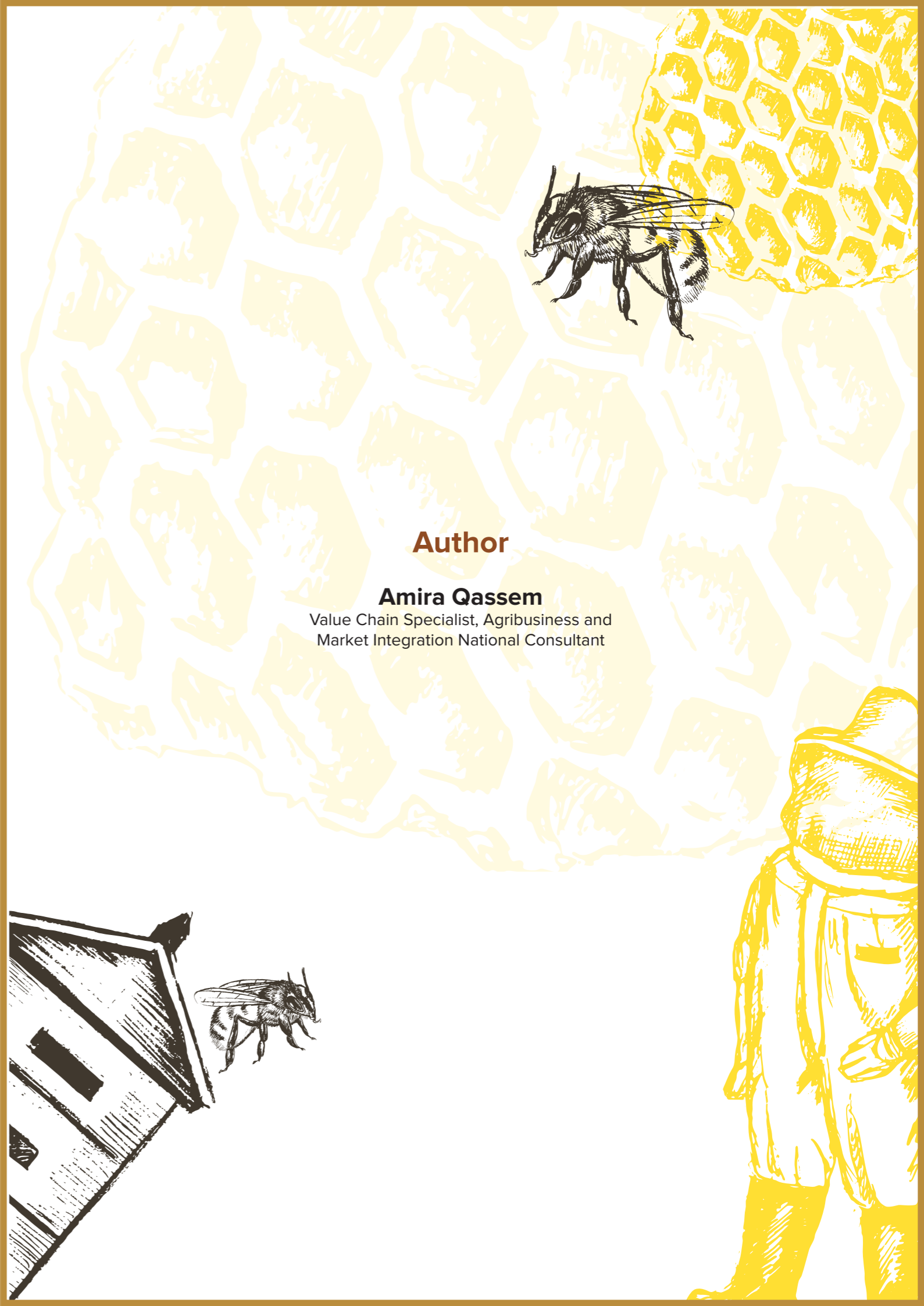
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Executive Summary

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This study provides a comprehensive analysis of Yemen's honey value chain, highlighting its significant contributions to the national economy and rural livelihoods. Yemeni honey, renowned for its exceptional quality and distinct flavours, holds immense potential for expansion and increased profitability. The sector faces considerable obstacles, however, mainly due to the ongoing conflict, inadequate infrastructure and limited market access.

Key findings

Impact of the conflict: The ongoing conflict has severely disrupted honey production, leading to a drastic decline in exports and putting the livelihoods of thousands of beekeepers at risk.

Infrastructure deficiencies: Inadequate transportation networks, storage facilities and processing technologies lead to post-harvest losses, reduced quality and limited market access for Yemeni honey.

Market access constraints: Lack of awareness of Yemeni honey in international markets, limited marketing efforts and weak branding hamper the sector's ability to reach its full potential.

Sustainability concerns: Traditional beekeeping practices, while culturally significant, often lack the efficiency and environmental considerations necessary for long-term sustainability.

To revitalize Yemen's honey value chain, above all, it is essential to establish peace and stability in honey-producing regions to ensure the safety of beekeepers and allow the sector to recover. At the same time, it is crucial to invest in infrastructure upgrades, such as improved transport networks, modern storage facilities and advanced processing technologies, to increase efficiency and minimize post-harvest losses.

Expanding market access requires an effective marketing strategy that highlights the unique qualities of Yemeni honey, strengthens branding and facilitates participation in international trade fairs. Finally, encouraging beekeepers to adopt modern and sustainable practices, including by seeking organic certification and prioritizing biodiversity conservation, will improve the long-term viability and competitiveness of Yemeni honey.

By addressing these challenges and implementing recommended interventions, Yemen can unlock the full potential of its honey value chain, transforming it into a thriving economic growth engine, generating sustainable livelihoods for beekeepers and positioning Yemeni honey as a premium product on the global market.



1. Introduction: The honey value chain in Yemen

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The honey value chain in Yemen plays a crucial role in the country's agricultural sector and economy. It comprises multiple stages, from beekeeping and honey production to processing, packaging and distribution, and involves the participation of various actors, including beekeepers, honey collectors, processors, traders and retailers. These actors work together to ensure the production and supply of honey throughout the country. Honey has been a long-standing source of income for thousands of people in Yemen and contributes to food security. It also holds cultural and traditional significance and is known for its high quality and unique flavour.

The Amarn governorate (Alosimat area) produces specific types of honey, including sidr honey, renowned for its rich flavour and distinct aroma; alfalfa honey, valued for its light color and delicate floral-herbal notes; and multifloral honey, offering a diverse flavour profile from various flowering plants. These varieties highlight the unique characteristics of the flora and traditional beekeeping practices employed in the region. Similarly, the Hadhramaut governorate (Doan area) is known for its exceptional honey, such as sidr honey with its complex flavour profile, sumar honey with a mild taste and subtle floral undertones, and Doan honey, known for its exceptional quality and diverse flavour notes.

Despite its contributions, the honey value chain faces numerous challenges hindering its growth and development. These include a lack of infrastructure, limited access to markets, quality control issues, and the impact of conflict and political instability. Long-running conflict has diminished institutional support and maintained traditional, less-efficient production practices.

These factors, combined with the current instability affecting all aspects of life, including in areas known for honey production such as the Al-Osaimat District, have heavily impacted the honey value chain. It has become difficult for beekeepers to access markets and export their products. Before the conflict that intensified in 2015, Yemen was exporting around 50,000 tons of honey per year. Since then, exports have fallen by more than 50 percent. Conflict has damaged not only honey production facilities but also the overall economy, disrupting the livelihoods of around 100,000 people working in honey farms.

Furthermore, climate change, diminishing biodiversity and the scarcity of honey bee pastures, such as sidr or salam trees, have decreased honey production. Yemeni beekeepers grapple with unpredictable climate conditions. During the dry season, pastures can become depleted, forcing beekeepers to purchase pollen grains essential for bee nutrition. If beekeepers cannot afford the high transport costs for these grains, hives may be abandoned.

Resolving these challenges and providing support to the honey industry in Yemen is crucial for revitalizing the sector, improving livelihoods and promoting economic stability.



2. Basic concepts and definitions

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2.1 Honey

Honey is a natural sweet substance produced by honeybees from the nectar of plants or secretions of living parts of plants, which the bees collect, transform by combining it with specific substances of their own, dehydrate, store and leave in honeycombs to ripen and mature. The composition of honey typically includes different sugars, predominantly fructose and glucose, organic acids, enzymes and small quantities of other substances derived from the collection process. Honey's colour, flavour and consistency can vary significantly depending on its botanical source.

Honey is valued for several qualities:

- **Nutritional value:** Honey is a source of energy due to its sugar content, and contains small amounts of vitamins and minerals.
- **Medicinal properties:** Historically and in contemporary times, honey has been used for its therapeutic properties, such as antimicrobial effects and wound healing.
- **Food and industrial uses:** Beyond its use as a sweetener in food and beverages, honey is also an ingredient in cosmetic and pharmaceutical products.
- **Shelf life:** Honey has a very low moisture content and acidic pH, which inhibit the growth of microorganisms, making it a long-lasting food product that does not spoil easily.

2.2 Constituents of honey

Honey, a unique and natural product, is predominantly composed of sugars, with fructose and glucose being the most abundant, accounting for roughly 80 percent of its weight. Alongside these monosaccharides, it contains disaccharides such as maltose and sucrose as well as a variety of oligosaccharides. The water content in honey, usually 17 to 20 percent, is crucial as it influences longevity and resistance to fermentation. Honey's enzymatic content, including amylase, invertase, glucose oxidase and catalase, introduced by bees, assists in sugar processing. The presence of organic acids, particularly gluconic acid, imparts flavor and contributes to the stability of honey due to its slightly acidic nature.

Additionally, honey is a minor source of proteins and amino acids; vitamin C; select B vitamins, including niacin, riboflavin and pantothenic acid, and B6; and folic acid. All contribute to its nutritional profile. Minerals and trace elements, such as iron, zinc, potassium, calcium, phosphorus, magnesium and selenium, are present in small quantities.

Rich in antioxidants, honey's polyphenols and the variety of aroma compounds and flavonoids are key to its health benefits and the distinctive taste and aroma of different honey varieties. Other constituents, such as pollen grains and wax particles, may also be found due to natural bee collection and processing activities. The particular composition of honey is greatly influenced by the nectar's botanical source, geographic conditions and beekeeping practices, leading to a diverse spectrum of honey types with unique colours, flavours and textures found worldwide.

2.3 Value chains

The value chain concept, formulated by Michael Porter¹, encompasses the entire series of activities and processes that a business undertakes to bring a product or service from conception to delivery and beyond. It serves as a framework for analysing the specific actions that contribute to a company's competitive advantage by breaking down the process of producing goods or services into key stages. This analysis ranges from initial design to the procurement of materials, production, marketing, distribution and after-sales service, all with the intent to optimize value creation and minimize costs.

In this framework, activities are categorized as primary and support. Primary activities, which include inbound logistics, operations, outbound logistics, marketing and sales, and services, are central to the physical creation and distribution of the product. Support activities, such as procurement, technology development, human resource management and firm infrastructure, while not directly involved in production, play a critical role in enhancing the effectiveness and efficiency of primary activities.

By thoroughly examining these aspects, businesses can pinpoint opportunities for adding value or cutting expenses, thereby gaining a marketplace advantage. The value chain serves as a strategic tool that aids in identifying both strong points to leverage and weaknesses to address. It can inform management decisions on improving the interconnectedness of activities, and offers insights into the management of environmental and social impacts at each stage of production. The value chain is a relevant concept across diverse industries, from agriculture to manufacturing and service industries.

2.4 Value chain mapping

Value chain mapping is a critical tool for understanding the various stages, actors and interactions within a specific industry or sector. It is based on measuring productivity and production capacity along with profitability and cost. By identifying and analysing activities and relationships to understand how value is created and distributed, it allows a comprehensive analysis of value adding activities and relationships throughout the production process.

¹ **Porter, M. E. (1985).** *Competitive Advantage: Creating and Sustaining Superior Performance*. Free Press.



3. Objectives, Research, and Methodology

3. Objectives, Research, and Methodology

The overall objective of this study is to analyse the current structure of the honey value chain, identify challenges and opportunities, and propose strategies for improvement. Specific objectives include to determining the profitability and market share of honey among actors in the study area and to map the honey value chain.

Northern Yemen is a mountainous region with a temperate climate and an average annual rainfall of 600–1,000 millimetres.

It is suitable for growing many different types of crops and for bee foraging. Southern Yemen is a hot, lowland region with an average annual rainfall of only 200 millimetres. The bulk of beekeepers in both regions are small-scale; the majority practices transhumance or moving bees based on a seasonal cycle. In the north, beekeepers move their hives to different areas of the mountains depending on the season and crops. In the south, they move their hives in search of water and forage.

The honey value chains in each region are quite different in both their structure and level of development. This difference is a result of historical, political and economic factors as well as differing ecological and social contexts. Honey production in northern Yemen is a relatively well-developed traditional agroforestry activity. It is closely associated with the production of crops and livestock. In the past, beekeepers used to pay part of their honey to the owners of crops and trees.

These agreements have now mostly disappeared but they indicate the close link between beekeeping and access to land. In northern Yemen and most other mountainous regions of the Arab world, honey has long been an important product, valued for both home consumption and as a supplementary cash earning.



4. Data collection

4. Data collection

To study the honey value chain in Yemen, this study combined primary and secondary data collection methods. Primary data were collected through interviews and surveys with key actors in the honey value chain, including beekeepers, collectors, processors, traders and consumers. Secondary data were gathered from existing literature, reports and studies on the honey value chain in Yemen.

Additionally, data on market trends, pricing and demand were collected from relevant government agencies and organizations involved in the honey sector. The combination of primary and secondary data collection methods provided a comprehensive understanding of the honey value chain.

Gross margin and marketing margin techniques were used to analyse quantitative data and determine the profitability and market share of honey value chain. This involved attaching prices to various quantities of outputs and inputs along the value chain.



5. Analysis of findings

5. Analysis of findings

The northern and southern regions of Yemen face diverse impacts on beekeeping and honey production from a range of historical, political, economic, environmental and social factors. The interplay between these factors and the regional variations that result need to be considered in interventions to strengthen the honey value chain.

Historically, the long tradition of honey production in specific regions, such as northern Yemen, has led to the development of expertise and better reputations in the market, especially for premium varieties such as sidr honey.

Customary practices that differ by region also affect the efficiency and modernization of honey production techniques. Political instability has had a significant impact, with some regions experiencing more severe disruptions due to the conflict. This has created challenges in maintaining production, accessing markets and sustaining exports.

Economically, barriers to entry, such as high input and transportation costs coupled with limited access to financial resources, also contribute to regional disparities.

The availability of equipment and support services varies by region, affecting production capabilities and profitability. Environmental factors, including distinct geographic landscapes and climatic conditions, lead to diverse nectar sources and thus differences in honey composition and production volume. Social factors also play a crucial role, as differences in community participation, gender roles and cultural attitudes towards beekeeping can influence the dynamics of the honey value chain.

5.1 Honey production and beekeeping practices

Beekeeping is a traditional form of agriculture in Yemen. The most abundant natural vegetation is a wild, spiny, evergreen shrub called ziziphus. It produces small yellow berries and is found in many places, particularly on the crests of ridges and lower mountain slopes. Other important bee plants are various species of acacia, wild lavender and different citrus trees. The only species of bee found in both northern and southern Yemen is *Apis mellifera jemenitica*, a sub-species of the Asiatic honeybee, which is unique to Yemen.

Beekeeping by small farmers occurs in many different forms. Beekeepers may keep their hives in one location throughout the year, or they may practice transhumance, following available forage over several hundred kilometres. The type and form of the hive may vary considerably. In northern and north-eastern Yemen and most parts of the mountainous region, beekeepers usually keep their bees in fixed-comb mud hives. Improved traditional methods of box hive beekeeping, promoted by GTZ, provide greater potential for honey production. Because the hive is movable, the beekeeper can maximize honey production through transhumance.

Another form of beekeeping involves housing the bees in log hives made from acacia wood. These hives are extremely heavy to transport and are therefore often site-hived close to the beekeeper's house. Site hiving is valuable in allowing the keeper to protect the bees from theft and predation, as well as in completing management tasks.

The climate in Hadhramaut is dry and arid with extreme temperatures ranging from very hot in the day to very cold during the night. Hadhramaut has less bee flora and fauna than Al-Mahra and thus yields less honey.

5.2 Honey production

The diverse landscape of Yemen provides various environments suitable for beekeeping, including mountainous regions and humid coastal areas such as the Tihama region on the Red Sea coast. The Amman Governorate in the north is particularly known for its sidr honey, which comes from jujube trees. Southern Yemen, with its mountains and wadis, offers different climatic zones and floral diversity that could be advantageous for honey production. Terraced agriculture on mountain slopes provides diverse crops that could serve as forage for bees.

Beekeeping in Yemen faces numerous challenges, such as diseases affecting bees, a lack of modern beekeeping practices, inadequate government support and insufficient capital and equipment. These factors have slowed the development of honey production, limiting its potential as a leading component of the local economy. Improving beekeeping techniques and marketing strategies could enhance honey production in both northern and southern Yemen, potentially leading to greater income for rural households and contributing to poverty reduction. In the south, improved beekeeping practices have resulted in better honey yields compared to traditional methods. The area is favourable for beekeeping due to its diverse bee flora and favourable climate conditions, providing forage throughout the year and thus minimizing dearth periods for bees.

The beekeeping and honey production industry faces dire challenges due to the ongoing conflict. First, beekeepers are burdened with arbitrary zakat levies and suffer extortion at numerous checkpoints, which adds financial strain to their already precarious trade. Mobility restrictions compound the challenges. Widespread checkpoints hinder the transportation of bees across different regions for seasonal foraging, often doubling costs for beekeepers.

Climatic challenges also present barriers. Unexpected rainfall and shifts in climate disrupt the blooming of sidr trees and other plants critical for nectar collection, resulting in decreased honey production and quality. Illegal logging, fuelled by poverty, leads to the loss of sidr trees. These issues emphasize the urgent need for sustainable agricultural practices and environmental protection to ensure the resilience of the beekeeping and honey industry.

Other concerns centre on a lack of regulatory frameworks, which puts the reputation of Yemeni honey at risk, such as when traders mix Yemeni honey with lower-quality products.

5.3 Use of inputs in honey production

The use of inputs in honey production was reported to be very low (Table 1). The distribution and types of hives have significant implications for the honey value chain. In the north, modern hives make up 72 percent of all hives, with traditional hives making up the remaining 28 percent. The southern region demonstrates an even greater reliance on modern hives, which make up 87 percent of the total, with traditional hives at only 13 percent.

These shares confirm a transition to modern beekeeping that likely influences the overall efficiency of production, honey quality and the potential for increased production. Modern

hives are generally associated with higher yields and easier management. This can contribute positively to the honey value chain, from more efficient honey extraction processes to potentially increased market value. The uptake of modern beekeeping practices is an important element in understanding the dynamics of the honey industry and prospects for future development.

The transition to modern beekeeping practices has faced challenges. Despite the high quality of Yemeni honey and the potential increase in productivity from using modern beehives, suppliers of modern beekeeping equipment are scarce, leading to high costs. A lack of awareness or training on how to effectively use modern equipment is another issue. Traditional methods in many places remain ingrained and reliable.

To address these issues, programmes and support could focus on subsidizing the cost of modern beehives, developing local supply chains to reduce prices and providing comprehensive training to demonstrate the long-term benefits of modern equipment. Combining rich traditional knowledge of beekeeping with modern practices could achieve a more successful transformation. This approach would ideally respect and build on local expertise while addressing economic barriers to modernization.

Table 1: Use of inputs in beekeeping

Input	Shares of different hives in the north, percentage	Shares of different hives in the south, percentage
Modern hives	72	87
Traditional hives	28	13
Total	100	100

Source: Field survey, 2024.

Shares of modern and traditional hives directly influence the honey value chain, particularly in terms of honey yield and quality. Modern beehives facilitate higher yields through ease of management and extraction processes, thereby potentially increasing the volume of honey. Traditional beehives are generally associated with higher-quality honey, valued for its traditional production methods, flavour and medicinal reputation. These dynamics shape how Yemeni honey is marketed and positioned both domestically and internationally.

The distribution of hive types in various regions also impacts market dynamics and prices. As modern hives generally lead to more honey, there is a risk of market saturation, which could lead to price adjustments. Conversely, traditional hives lend themselves to the production of marketable honey at a high price, influenced by exceptional quality. This differentiation creates regional variations in pricing strategies, ultimately shaping the economic landscape of the industry. Through effective strategies and development support, Yemeni beekeepers can improve their operations to preserve the esteemed heritage of Yemeni honey while promoting the high quality expected by global consumers.

5.4 Honey production at the household level

Honey production at the household level, particularly in regions with a strong tradition of beekeeping, typically involves traditional methods passed down through generations. In northern Yemen, many households use traditional log and bark hives, which are typically less productive than modern hives but are inexpensive and easier to construct with local materials.

Low productivity has been exacerbated in recent years by conflict, which has made it very expensive to maintain bees and move the hives to pastures throughout the seasons. The study found that the average amount of honey produced from traditional and modern hives per season ranged from 3.5 to 5 kilograms.

Household-level production typically includes harvesting honey seasonally, depending on the local climate and flower bloom cycles. Harvesting techniques, handling and processing of honey at this level are often rudimentary and may affect the quality of the final product. Modern beekeeping equipment such as protective clothing and honey extractors are not commonly used, as they can be expensive and difficult to obtain.

Interventions aimed at improving honey production at the household level could focus on introducing improved management practices, modern beekeeping techniques and better equipment. Such efforts should consider the cultural and economic contexts of the beekeepers, who may have limited resources to adopt new methods.

5.5 Barriers to financial assistance for honey producers

A range of different factors deter Yemeni beekeepers from seeking financial assistance. Among people surveyed, only 2 percent were not seeking financing, meaning their current resources are adequate or they prefer alternative financing methods. Religious reasons were an important factor for 12 percent, suggesting that religious beliefs or regulations deter them from taking out loans, likely linked to the concept of usury. A notable 27 percent cited the incompatibility of the payment system with the nature of their income, highlighting a possible disparity between the financial structure of loans and cyclical income patterns in honey production.

The most pronounced barrier, experienced by 39 percent of the sample, was difficulty in providing collateral to secure loans. Finally, high interest rates or profit requirements deterred 20 percent of respondents, indicating that borrowing from financial institutions was not economically viable. These factors collectively illustrate a market environment in which financial mechanisms are not well suited to the operational realities and cultural contexts of Yemeni honey producers.

Table 2: Lack of access to loans or financing

Input	Shares of different hives in the north, percentage	Shares of different hives in the south, percentage
Modern hives	72	87
Traditional hives	28	13
Total	100	100

Source: Field survey, 2024.

5.6 Harvesting, packaging and selling honey

5.6.1 Honey harvesting

Beekeepers carefully align their production practices with the specific flowering times of the nectar plants on which their bees depend. Drawing on their extensive knowledge of local flora cycles, they engage in vigilant seasonal monitoring to anticipate the flowering times of plants such as the sidr and sumor trees. Hive management intensifies before peak foraging periods to build colony health and strength, often including supplemental feeding.

Beekeepers also strategically use swarm control measures to maintain colony productivity. As part of migratory beekeeping practices, hives are moved to areas rich in target forage plants, thereby optimizing accessibility to nectar and improving honey production. Vigilance in protecting colonies from pests and diseases is essential to sustain strong bee populations for future nectar flows.

At the end of the flowering period, effective and efficient harvesting techniques capture the honey at its peak, preserving both its distinct qualities and market value. Beekeepers proactively establish marketing plans that account for harvest times, allowing them to interact with buyers and streamline post-harvest distribution. Their adaptability is also demonstrated by their responsiveness to climatic and environmental changes that can influence flowering patterns, thus guaranteeing sustainable management of their apiaries.

Honey harvesting is seasonal depending on weather changes. Beekeepers indicated that it takes four to six months from colonizing the hives until the harvest. Harvest periods depend on the type of honey, local environmental factors and specific flowering patterns of nectar sources.

Table 3: The honey harvest seasons for two types of honey, sidr and sumor

Honey type	Start of harvest season	End of harvest season	Optimal time
Sidr	sumor	25 November	End of November
Sumor	1 October	25 March	Some places on 1 February

Variations in harvest times for different types of honey have a significant impact on the value chain. Producers must strategically plan operations based on the flowering times of sidr and sumor plants to optimize honey yield and quality. Different harvest seasons lead to fluctuations in the market supply: sidr honey hits the markets first, potentially at high prices due to its freshness and medicinal reputation, followed by sumor honey, which may face different market dynamics depending on the existing sidr supply. Beekeepers must allocate resources, including labour and equipment, to meet the demands of each harvest season. They also engage in seasonal hive management to strengthen bee colonies and ensure abundant production.

Labour allocation is critical given the labour-intensive approach to harvesting, as is keeping equipment ready to use for harvesting, processing and storage. Beekeepers maintain market relationships in advance of harvests to establish contracts and report the expected quality and quantities of honey, thereby ensuring a smooth flow within the value chain and maximizing profitability. These concerted efforts contribute to the resilience of the honey industry, promoting stability and growth despite a challenging context.

5.6.2 Packaging of honey

Most value chain actors sell their honey in villages and central markets in different available containers. For local markets, honey is often packaged in 5–20 litre plastic containers. The size generally depends on the operational scale and target market, whether local or international. Glass jars are generally preferred for their ability to preserve the quality of honey and ensure its purity for consumers.

For commercial distribution and exports, there are strict packaging standards to comply with international quality and safety protocols. Honey destined for foreign markets must be packaged in high-quality materials that not only preserve the product but also provide complete product information and sourcing details.

These containers can be specially designed and labelled bottles or jars that comply with international requirements for materials to store food as well as health and safety standards. All collectors, wholesalers and retailers interviewed used plastic containers or bottles to pack honey for sale to consumers.

5.6.3 Selling honey

Honey pricing within the value chain is a multifaceted process with inputs and negotiations among different stakeholders. In the survey, 16 percent of respondents confirmed that the seller determines the price, reflecting production expenses, from beekeeping to distribution, and profit margins. In 75 percent of cases of honey sales, market-based prices are subject to fluctuations in supply and demand, forcing sellers to adapt in response. Around six percent of respondents confirmed that contractual agreements provide a structured approach to pricing.

Buyers and sellers negotiate terms that typically include fixed prices for specific volumes and qualities within a certain time frame, providing some financial predictability in a volatile market. When buyers set prices, this often indicates a market in which they have greater influence, perhaps due to an oversupply of honey or strong bargaining power. This may pressure sellers to accept lower prices, thereby affecting the profitability of their operations. Each pricing strategy or combination thereof reflects the dynamics and distribution of power among producers, suppliers, distributors and buyers within the honey value chain.

Both quality standards and market demand dictate the valuation of honey. Meeting quality standards – encompassing attributes such as flavour, color and purity – results in higher market prices. Producers must factor the additional costs of meeting these criteria into their pricing strategies. Certifications such as organic or single origin can elevate the status of a product, driving up prices to reflect perceived quality.

Simultaneously, market demand drives prices. Trends towards natural and healthy products may amplify interest and willingness to pay for premium honey varieties, for example. Specialty honeys, which stand out for their health-promoting properties, often command high prices, influenced by consumer awareness and preferences. Market saturation, however, can force prices to fall to maintain a competitive advantage and market share.

Sellers' pricing decisions are anchored in a dynamic balance between quality parameters and demand, aimed at establishing a price that reflects the value of the honey, guarantees sales and secures profitability. They take a holistic view to optimize economic results.

5.7 Evaluating honey pricing in the local market

An assessment of prices of Yemeni honey found that 71 percent of those surveyed considered the prices “low”. This suggests undervaluation in the market, where the price may not match the expected quality or value of the honey. Only 13 percent of study participants described market prices as “high”, exceeding their expectations or perceived value. Around 16 percent gave “average” scores for pricing, suggesting it is neither excessively low nor disproportionately high. The findings indicate a predominant view that prices should be reassessed to better reflect the value of the product. It is critical for stakeholders to optimize pricing strategies that align with market expectations and deliver fair value to producers and consumers.

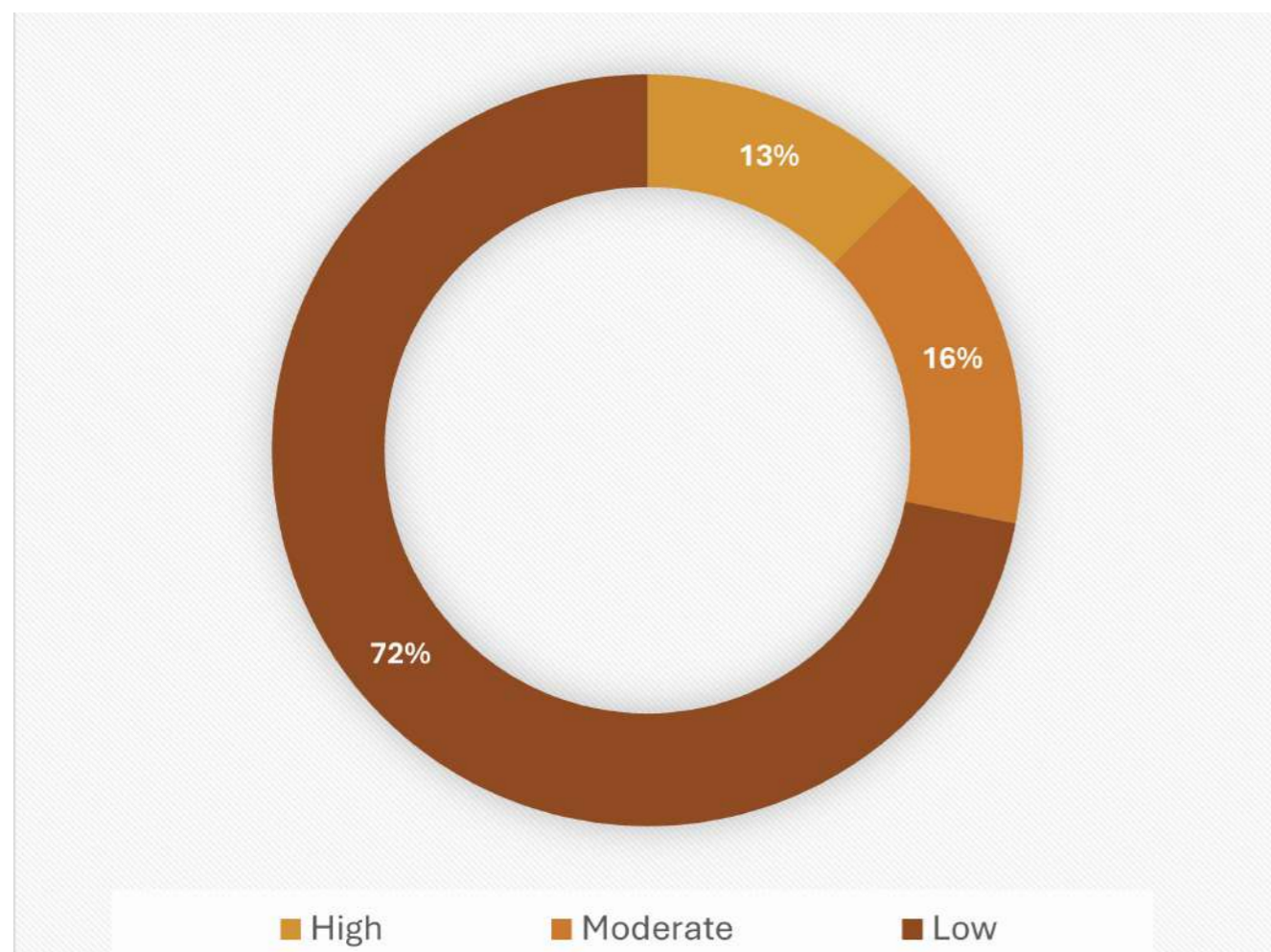


Figure 1: Ratings of local market prices by honey producers and sellers

To address different perceptions of pricing, producers and sellers can adopt several strategies.

Improving consumer education about the unique qualities and careful production processes involved in Yemeni honey can clarify its higher value proposition. Offering a range of differentiated products based on quality, variety and packaging can cater to different consumer segments, including those who are price sensitive. Strengthening quality control and acquiring relevant certifications can bolster the premium status of honey. By pursuing direct marketing avenues, producers can minimize intermediary costs, which could lower retail prices. Reducing operational expenses through improved efficiency can also contribute to more favourable pricing.

Transparency on factors determining prices can promote consumer understanding and trust. Introducing targeted promotions or creating loyalty programs could attract customers who find current prices too high. Expanding the product line with value added offerings can also attract those looking for distinctive products. Regularly collecting consumer feedback enables responsive, data-driven price adjustments, ensuring prices reflect consumer expectations and the economic context.

Together, these strategies could optimize the market positioning of Yemeni honey and align it more closely with consumers' expectations and financial realities in the local market.

5.8 Influences on honey pricing: seasonality type and sensory attributes

The survey indicated that “type of honey” was the most important determinant of price in the local market; 28 percent of respondents identified it as the main factor. This highlights variations in value likely due to differences in quality, medicinal properties and flavour profiles. The second most notable factor was the “color and taste of honey,” according to 21 percent of respondents. This suggests that sensory attributes play a crucial role in consumer preferences and willingness to pay, reflecting the importance of taste and visual appeal in market valuation.

“Honey seasons” are the third most influential factor, according to 19 percent of respondents. Seasonality can affect supply and therefore prices, with certain times of the year producing more varieties of higher quality honey. Another 15 percent of respondents indicated “market strength”, which encompasses market conditions and the balance between supply and demand. Other price determinants comprised “raw honey” (eight percent), “production costs” (five percent) and “others” (four percent). While these factors received less attention from respondents, they are still relevant to pricing overall. Surprisingly, “distance to market” was only identified by one percent as a factor, suggesting that transport and logistics have minimal impacts on pricing.

Table 4: Factors that influence the price of honey

Reasons	Percentage
Honey seasons	19
Honey type	28
Color and taste of honey	21
Distance from the market	1
Costs of production	5
Market strength	15
Raw honey	8
Others	4
Total	100

Source: Field survey, 2024.

Realigning the perceived value of Yemeni honey with its market price and enhancing its appeal to different consumer segments requires a multipronged strategy encompassing education, quality assurance, market adaptation and cost management. Initiatives to raise consumer awareness of the distinctive attributes and health benefits of Yemeni honey could enhance its perceived value, thereby justifying a higher price. Quality certifications can reinforce honey's premium status, differentiate it from competitors and enable a higher price range. As seasonality affects the characteristics of honey, marketing campaigns could promote the exclusivity of certain seasons, thereby emphasizing the rarity and specialty of the product. Offering a product assortment that fits different price points can meet the needs of a broad consumer base, ensuring there is something for everyone.

Producers could review their operations to identify cost-cutting measures that do not compromise quality, potentially allowing for more competitive pricing. By creating direct sales channels, producers and sellers could reduce costs associated with middlemen and offer honey at prices that appeal to more consumers. Transparency about how prices are determined could engender consumer trust and foster an understanding of product value. Collecting consumer feedback through surveys and focus groups allows producers to better understand market sentiments, allowing them to adapt more effectively. The introduction of different packaging sizes can provide options

for all budgets, thereby expanding the market reach. Additionally, innovative value added products derived from honey can attract discerning customers willing to pay a premium for new products. Collectively, these strategies aim to synchronize price perception with the intrinsic value of Yemeni honey, positioning it favourably in the competitive honey market.

5.9 Honey processing practices

A significant majority of honey producers, 91 percent, use filtration in honey processing. This reflects a strong industry preference for a practice likely to improve quality and appearance. Among materials used for honey filtration, stainless steel filter presses are most common; 44 percent of respondents opted for this method, highlighting factors such as durability and hygienic benefits. Stainless steel screens were favoured by 18 percent of participants, suggesting they prefer the fine filtration provided by these screens. Manual filtration was used by 24 percent, reflecting the durability of this traditional approach, which is cost-effective and simple, and suitable for small-scale operations. Some 15 percent of respondents used nylon fabric filters, likely due to their softness, ease of handling and ready availability.

The distribution of preferences highlights the fact that honey producers consider various factors, including the scale of production, cost and desired quality of honey, when choosing their filtration method.

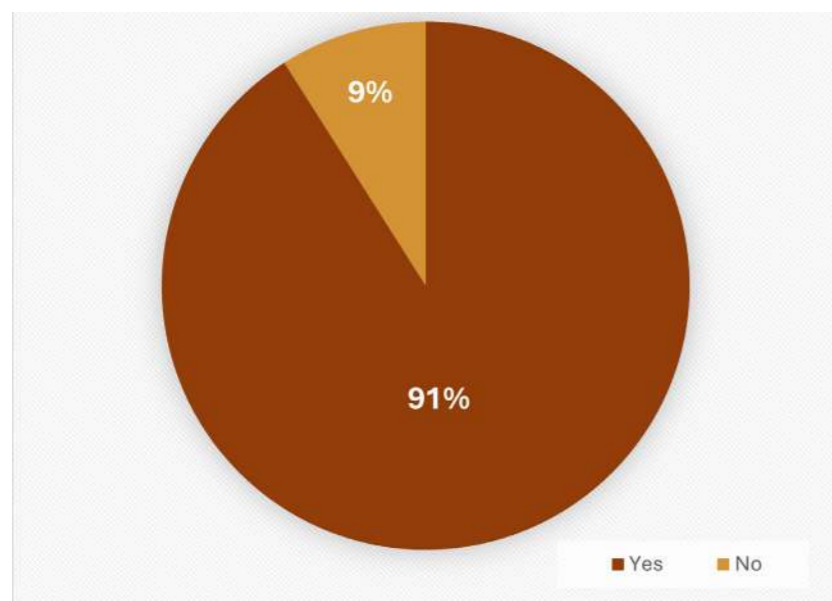


Figure 2: Honey filtration practices among beekeepers

The filtration method plays a crucial role in determining the final qualities of honey, including its clarity, purity and overall sensory attributes. Finer filtration, often achieved with high-quality materials like stainless steel screens, ensures a clear and pure product by removing minute particles, which is aesthetically pleasing for consumers. This level of filtration could also remove pollen content, however, which is valued for its health benefits and unique taste, deeply linked to the botanical origins of honey. Texture is affected by further filtration, which may delay crystallization, ensuring a liquid consistency for an extended period. This can be important for some consumer preferences and market demands. Additionally, the stability and shelf life of honey are improved when filtration successfully removes yeast particles and other contaminants that can lead to premature fermentation.

Overall, the balance between creating a clean, stable product and preserving the natural and sought-after characteristics of honey is a crucial consideration. Filtration decisions directly influence not only the marketability of honey but also its authenticity and appeal to consumers. This requires a careful approach to maximize benefits and minimize any negative impacts on the intrinsic value of the honey.

5.10 Influence of international honey imports on Yemen's market dynamics

Honey imports have impacts on the local honey market, especially on local price and quality. While these impacts have been recognized in general, they lack a quantitative or qualitative measure.

Figure 3 shows that honey from Pakistan represents 45 percent of imports, the largest share, followed by China at 33 percent and Türkiye at 8 percent. Honey imports can significantly affect the local honey market, shaping consumer preferences and the competitive landscape. Large volumes from China and Pakistan, for instance, could drive down local prices or push Yemeni producers to meet different quality standards.

Smaller shares of imports from Türkiye could add diversity and influence consumer expectations, potentially raising standards for high-quality honey. Lower shares of imports from Egypt, India, Germany, Oman and Saudi Arabia likely contribute to market diversity with a more limited direct impact on prices and quality.

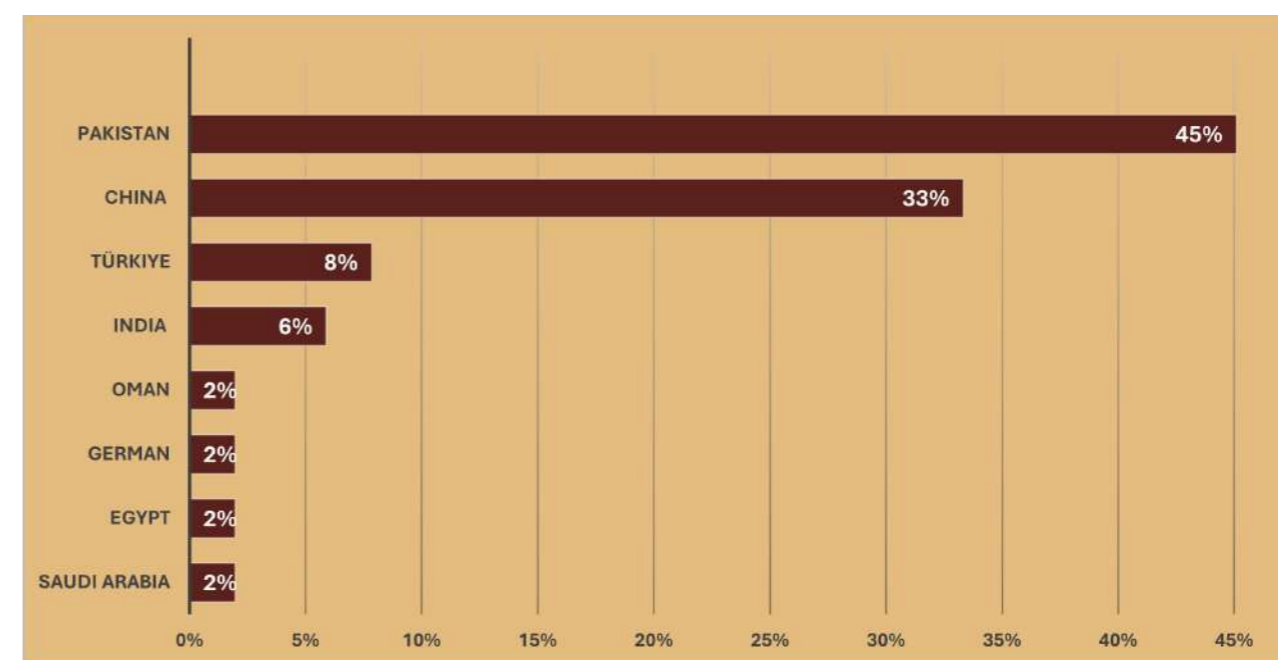


Figure 3: Origins of imported honey influencing Yemeni honey prices and quality

Yemeni honey producers can differentiate their products in a competitive market by highlighting the unique properties of their honey, such as exclusive floral sources and medicinal benefits, and by guaranteeing and certifying the quality of their products. It is also essential to develop a strong brand identity and engaging marketing strategies, including by telling stories about cultural heritage and using digital platforms. They could diversify their offerings with value added products such as beeswax and royal jelly.

Strategic partnerships could help reach international markets, while stronger cooperatives could back collective marketing and resource sharing. Training in modern beekeeping techniques will increase honey quality and yield, while adopting sustainable practices can meet the needs of environmentally conscious consumers. These approaches can create a distinct market niche for Yemeni honey, adding value to products amid global competition.

5.11 Consumer honey purchasing preferences: insights from direct, retail and online markets

A survey of consumer purchasing preferences for honey provided enlightening results. A significant majority of respondents, 71 percent, preferred to purchase honey directly from local farms or farmers' markets, demonstrating a desire for fresh, locally produced products. Thirteen percent favoured traditional shopping platforms like supermarkets, indicating that a considerable number value the ability to compare a wide range of products, prices and brands in person. Online stores and websites cater to a smaller segment, with four percent

of consumers opting for the convenience of digital purchasing. Finally, food exhibitions are an avenue for 12 percent of consumers, who take advantage of these events to discover and taste different honey-based products.

The predominance of the traditional method of purchasing honey suggests the importance of authentic, quality products, and a strong connection between producers and consumers. Data suggesting a preference for supermarkets indicate a market segment that values diversity of choice and physical comparisons. The relatively nascent preference for online honey purchases could indicate untapped market potential, with growth expected as digital platforms become more common. Finally, the potential of food exhibitions to attract consumers highlights the importance of experiential marketing in the food sector, providing a platform for producers to engage directly with consumers and build brand recognition. For value chain players in Yemen, aligning marketing and sales strategies to meet these preferences can improve their market position and response to consumer demands.

Direct engagement with customers through online platforms can lead to valuable feedback and a loyal customer base based on improved service quality. Additionally, e-commerce serves as a gateway to the global market, providing an opportunity for Yemeni producers to sell their distinctive honey products, such as the coveted sidr honey, to an international audience, overcoming traditional barriers to marketing exports. Through synergistic online strategies, honey players can significantly expand their market reach and boost sales domestically and abroad.

5.12 Consumer priorities in purchasing honey: authenticity, quality, and the influence of certification

The survey revealed discerning consumer attitudes towards honey quality and authenticity, which significantly influence purchasing decisions. A significant 49 percent of consumers prioritize purchasing authentic, pure honey, indicating a prevailing concern over product purity. High quality, particularly in relation to health and nutritional standards, is important to 34 percent of respondents, suggesting that consumers are particularly interested in the health benefits of honey and its role in their diet. A smaller segment, 14 percent, seeks quality certifications or recognitions from reputable organizations, demonstrating that official endorsements can be compelling in decision-making. Only three percent of consumers expressed particular interest in learning more about honey ingredients and the use of chemicals versus natural components in processing.

The clear preference for authenticity suggests that honey producers must prioritize maintaining the integrity of their product and communicate this transparently to customers.

Since a significant percentage of consumers also value high-quality honey, emphasizing health and nutritional benefits could be an effective strategy for producers and sellers. Interest in certifications by trusted organizations indicates an opportunity for producers to seek such certifications, as they can serve as powerful marketing tools, building credibility and consumer trust.

The relatively small percentage of consumers focused on specific ingredients and processing methods should not be overlooked. It represents an informed and potentially growing segment of consumers vigilant about food safety and manufacturing practices. For honey producers and sellers, addressing these concerns in a transparent manner can help meet the needs of this discerning group, potentially fostering greater overall consumer confidence.

Although quality certifications and details about ingredients and processing attract less attention, they remain relevant, especially for exploiting niche markets and for producers who want to distinguish their products in a crowded market. Adapting communications and marketing strategies that reflect these consumer interests can help producers and sellers align more effectively with market demands.

5.13 Financial and technical support

A survey of participants in the honey value chain revealed that 39 percent received some form of support; 61 percent did not receive any support (Figure 7). Various forms of technical assistance included management-related beekeeping training offered by the Pragma Cooperation Company, business continuity training by the Small and Micro Enterprises Promotion Services (SMEPS), and training in quality assurance by the Barakma organization and the Doan Foundation for Development.

Other reported technical support came from the Hadrami Beekeepers Association and training in the Kingdom of Saudi Arabia. Financial aid was part of the support received, with contributions such as beehives from the French Embassy, new agricultural tools and equipment, and funds from the SMEPS Agency and Social Development Fund. The World Food Programme provided financial support through the Hospital Medical Foundation.

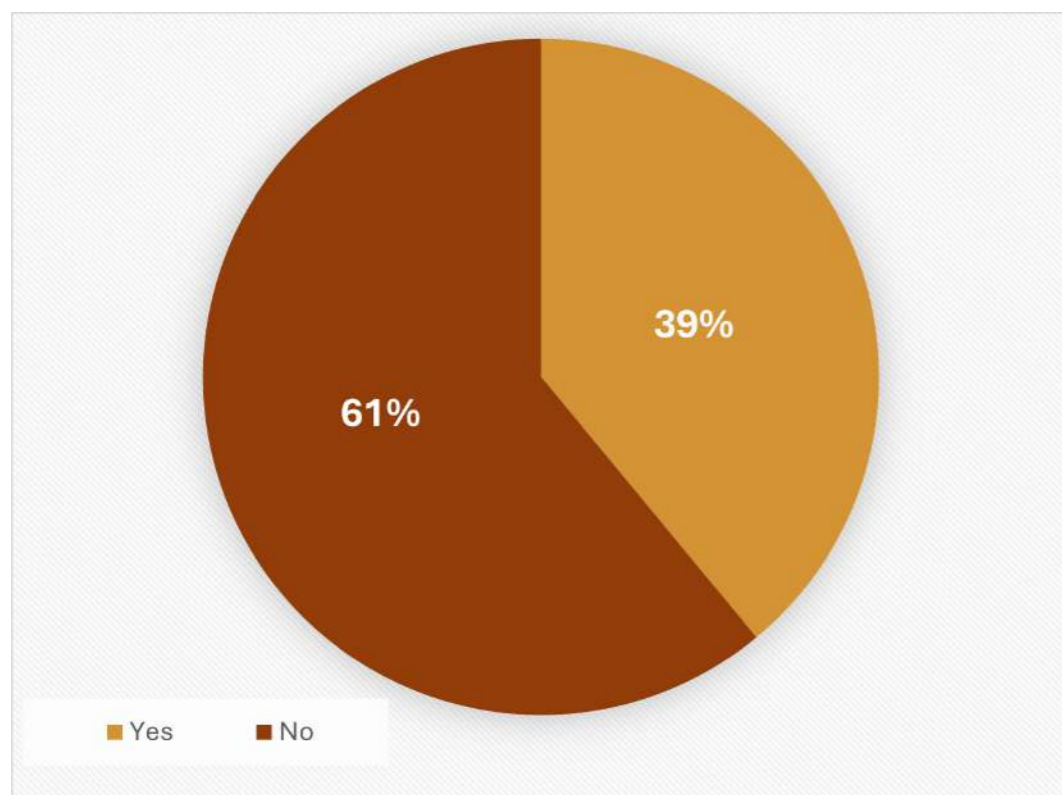


Figure 4: Support services for beekeepers

Technical training was emphasized as an important form of assistance, contributing to improved beekeeping practices and potentially to higher quality honey production. Financial assistance, although less frequently mentioned, enables beekeepers to invest in infrastructure and equipment that can lead to innovation and increased productivity.

The high share receiving no support suggests that assistance for beekeeping and the honey value chain may be insufficient. It indicates significant challenges for the industry, including limitations on growth and business development. A lack of support may result in a decline in the quality of honey production and a drop in overall productivity, as beekeepers may not have means to improve their techniques or invest in better equipment. This may magnify broader economic challenges by limiting expansion and the ability to innovate and improve sustainability.

The industry as a whole suffers from reduced competitiveness, particularly compared to other countries that actively support their

beekeeping sectors. Additionally, without adequate marketing and branding assistance, the reach and recognition of Yemeni honey in domestic and international markets remains limited. The lack of a strong support system makes small producers in particular more vulnerable to commercial exploitation, which risks compromising their livelihoods. Ultimately, the need for training resources, financial assistance, and support mechanisms is crucial to strengthening the resilience and progress of Yemen's beekeeping sector and ensuring a better future for those who depend on it.

The results suggest a need for increased awareness and access to support programmes. Entities providing support could consider more inclusive criteria and broader outreach efforts so that more stakeholders benefit from technical and financial assistance. Meanwhile, for participants in the honey value chain who have not received support, exploring partnerships, community initiatives or alternative funding sources could be vital in obtaining help needed to thrive in the industry.

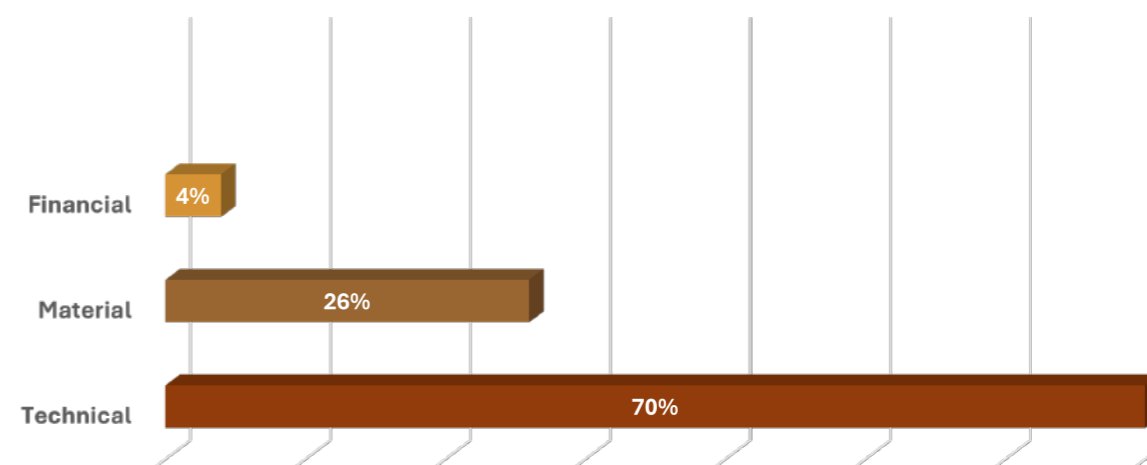


Figure 5: Types of support received by beekeepers

5.14 Prices, marketing and profit margins analysis along the value chain

This analysis compares the honey markets of the Amran and Hadhramaut regions, focusing on both government and desert area prices to uncover the intricacies behind their differences. These regions, each with distinct geographical and ecological characteristics, contribute differently to the honey value chain and, therefore, to its market prices. Amran, known for its specific production practices, produces honey with unique qualities that can affect its price in the market. The famous Hadhramaut governorate and desert areas offer a variety of honey products as reflected in their regional pricing strategies.

5.14.1 Prices in Sana'a (Al Osaimat area/ Amran governorate)

Table 5 shows data on hive products in the Al Osaimat area/Amran governorate. Logically, the maximum price should be higher than the minimum price. Based on the figures presented, however, raw honey has a maximum price of \$377 and a minimum price of \$321 with an average price of \$349. Beeswax, a byproduct of honey production, has a maximum price of \$598, a minimum of \$396 and an average price of \$497.

Table 5: Price range of hive products in US dollars

Hive product	Maximum	Minimum	Average price
Raw honey	377	321	349
Beeswax	598	396	497

Exchange rate: \$530 (\$1 USD = 530 YER).
Source: Field data, 2024.

The average price of raw honey and beeswax suggests that beeswax has a higher market value, which could be due to various factors such as demand in other sectors, perceived quality or additional processing requirements that add value.

The data indicate significant variability in product prices. For raw honey, despite the alleged error in the maximum and minimum prices, the average price still provides insight into what consumers might expect to pay. The high value of beeswax relative to honey could indicate niche market conditions or uses for beeswax that are driving up its price.

It is important to consider the value of products to consumers and the market dynamics that set these prices. Factors such as purity, reputation of the source, and supply and demand influence prices. Marketers and producers can use this information to adjust their strategies, perhaps targeting high-end markets where higher prices can be justified or looking for ways to improve the value of their products to compete and align with these price levels. Additionally, understanding these issues can inform decisions on directing production, targeting marketing efforts, and developing strategies to maximize profitability.

Prices along the honey value chain

Compared to wholesalers, beekeepers received significantly higher prices of \$400 per 7 kilograms. Collectors and wholesalers bought raw honey (sidr) from beekeepers for \$700 to \$900 per kilogram.

Marketing margins along the value chain

Table 6 shows gross margins received by different honey value chain actors, revealing different levels of profitability. These are influenced by the position and role of each player in the market, with wholesalers enjoying the greatest margin due to the scale of their operations.

Beekeepers, although they do not have an average purchase price indicated, sell sidr honey at an average of \$334 per 7 kilograms. As the first producers, their costs are linked to production rather than acquisition. Collectors buy honey at \$245 and resell it at \$264, representing a market margin of \$19 per 7 kilograms, suggesting a modest role in the value chain with limited profitability. Retailers have a slightly lower but similar margin; they buy honey at \$221 and resell it at \$238, thus achieving a market margin of \$17 per 7 kilograms. Cooperative associations buy at the same price as the retailers (\$221) but sell at a

higher price (\$264), which gives a better market margin of \$43 per 7 kilograms. Wholesalers have the largest market margin, buying honey at the lowest average price of \$189 per 7 kilograms and selling at the highest average price of \$328, giving them a lucrative margin of \$139 for each 7-kilogram unit.

Wholesalers appear to possess the greatest leverage or efficiency, allowing them to obtain the largest share of the market margin, potentially due to their wider market access, distribution efficiency or bulk processing capabilities. Cooperative associations also function well, likely benefiting from collective bargaining and possibly value added processes to achieve higher sales prices. Retailers and collectors, with lower margins, may operate in more competitive or restricted markets where there is less room to raise prices. Beekeepers distinguish themselves as primary producers; their costs are not directly comparable to market purchase prices, so their profitability should be assessed against production costs rather than market margins. These margin disparities between different players highlight the complex dynamics of the honey value chain, where position and scale can greatly influence profit potential.

Table 6: Distribution of gross marketing margins and market participant shares, US dollars per 7 kilograms

Actor	Average buying price	Average selling price	Market margin
Beekeeper	-	334	-
Collector	245	264	19
Retailers	221	238	17
Cooperative Association	221	264	43
Wholesaler	189	328	139

Exchange price: 530\$.
Source: Field survey data, 2024.

Gross margins for retailers

A profitability analysis of retailers selling sidr honey indicates an average selling price of \$238 per 7 kilograms. Compared to this total revenue, variable costs for transportation, labour, storage and containers are a surprisingly low \$6. This breaks down as \$2 for transportation, \$2 for labour, \$1 for storage and \$1 for containers. The retailer is left with a gross margin of \$232.

These results must, however, be approached with some caution. The very low variable costs described here are not typical of actual expenses incurred in retail operations, which usually include significantly higher expenses for transportation, labour and other operational costs. The reported figures might suggest that

only the direct and immediate costs associated with handling a single unit of honey were considered. This incomplete picture risks overlooking other indirect and overhead costs that typically affect retailers' bottom lines.

The allegedly high gross margin of \$232 could lead to the misconception that honey retailing is exceptionally profitable. But it is essential to consider all business expenses when evaluating profitability, including rent, utilities, marketing and additional staff salaries inherent in retail operations. A more comprehensive cost analysis is needed to accurately discuss the true profitability of retailers in the honey market and understand their financial health and commercial sustainability.

Table 7: Profitability of retailers

Item	Quantity (7 kilograms)	Price/unit, US dollars	Total, US dollars
Sidr honey output/7 kg	1	238	238
Total revenue			238
Variable costs			
Transport		2	2
Labour		2	2
Storage		1	1
Container		1	1
Total variable costs		0	6
Gross margin		0	232

Exchange rate: \$530.

Source: Field survey data, 2024.

Beekeeper profitability

A financial evaluation of beekeepers' gross margins shows that for every 7 kilograms of honey produced, beekeepers generate a total income of \$334. Their variable costs, which include hive construction, wages, packaging and transportation, total \$155. After accounting for these expenses, beekeepers are left with a gross margin of \$179 per 7 kilograms of honey sold. This equates to a gross margin as a percentage of sales of 53.6 per cent. This measure indicates that just over half of the revenue from honey sales is retained as a margin after covering variable costs associated with production and sales.

From this analysis, beekeeping appears to be a relatively profitable activity, with the gross margin representing a significant part of the total turnover. Efficiency in hive construction and management of labour and transportation costs are likely critical factors in maintaining this profitability. The figure for hive construction is particularly high, suggesting that it is a significant investment for beekeepers that could impact short-term profitability but is likely amortized over several years. Lower packaging and transportation costs indicate that these areas are managed profitably, contributing to the favourable gross margin. It is crucial for beekeepers to continue to find ways to optimize these variable costs to maintain and potentially improve their profit margin.

Table 8: Gross margins for beekeepers per 7-kilogram unit of sidr honey

Variable	Price per 7 kilograms	Total
Sidr honey output	334	334
Total revenue		334
Variable costs		
Hive construction	132	132
Labour wages	13	13
Packaging	4	4
Transport	6	6
Total variable costs		155
Gross margin		179
Gross margin as a percentage of sale		53.6%

Exchange rate: \$530.

Source: Field survey, 2024.

Costs among honey traders

As shown in Table 9, breaking down market costs across traders, both retailers and wholesalers, shows a combined total of \$5.50 per transaction, spanning multiple spending categories. These expenses include transportation (\$2), storage (\$1), loading (\$0.50), unloading (\$0.50) and honey containers (\$1.50). Transportation is the largest expense, accounting for more than a third of total market costs.

This could be due to the distance between production sites and markets or perhaps the cost of fuel and vehicle maintenance. Storage costs are also significant, reflecting the need for adequate facilities to maintain honey

quality. Loading and unloading are relatively minor costs, likely due to lower labour rates or efficient practices. The cost of each container for honey, \$1.50, indicates the importance of proper packaging to preserve product quality, facilitate handling and improve marketability.

Effective management of these expenses can improve competitive advantage and profitability. For example, traders could seek to negotiate better transportation rates or invest in cost-effective packaging solutions that do not compromise product quality. These figures also help to illustrate the low margins for some market players, highlighting the importance of volume and operational efficiency.

Table 9: Market costs among traders

Items	Costs, US dollars
Transportation	2.00
Storage	1.00
Loading	0.50
Offloading	0.50
Honey containers	1.50
Total	5.50

Source: Field survey data, 2024.

Sidr honey production cost structure, and gross, marketing and distribution margins

Table 10 presents different profit margins by various players in the honey value chain. Analysis of the gross, marketing and distribution margins reveals significant variations in profitability. Wholesalers have a selling price of \$277 for 7 kilograms of honey, purchase it at \$189 and incur a handling fee of \$5, leading to a gross margin of \$83, which equates to 29.96 percent of the sales price.

Their marketing and distribution margins are quite close, with the marketing margin at 29.96 percent and the distribution margin slightly lower at 28.88 percent. Retailers have a narrower margin, selling honey at \$238 per 7 kilograms, with a purchase price of \$221 and a handling fee of \$5. This translates to a gross margin of \$21, or 5.04 percent of the sales price.

The distribution margin is slightly higher at 6.72 percent, which could be attributed to additional distribution efforts beyond initial processing. Collectors, who play an intermediary role, sell the honey at \$264 per 7 kilograms with a purchase price of \$245 and handling fees of \$5. They achieve a gross margin of \$14 (5.30 percent of the selling price). Their marketing and distribution margins correspond to a

gross margin of 5.30 percent, which indicates constant added value throughout their activities. Beekeepers, as primary producers, have a selling price of \$334 for 7 kilograms with production costs amounting to \$113. Their gross margin of \$221, or 66.16 percent of the selling price, reflects the considerable value created by the honey production process.

Beekeepers, who benefit from the production of the raw material, keep the largest percentage of the sales price as a gross margin, emphasizing the importance of the direct value of production. Wholesalers also earn significant margins, likely due to their role in wholesale buying and selling, giving them a strong position in market dynamics.

Retailers and collectors, on the other hand, operate with lower margins, which can be a factor in competition in the retail space and the limited added value possible in their role as intermediaries. This analysis highlights the varying degrees of profitability within the honey value chain and the potential strategies these players could adopt, such as cost reduction or process optimization, to improve their respective margins.

Table 10: Gross marketing and distribution margins

Actor		Unit	Value
Wholesaler	Sales price	7 kg	277
	Purchase price	7 kg	189
	Handling cost	7 kg	5
	Gross margin	7 kg	83
		%	29.96%
	Marketing margin	%	29.96%
Distribution margin	7kg	80	
	%	28.88%	
Retailer	Sales price	7 kg	238
	Purchase price	7 kg	221
	Handling cost	7 kg	5
	Gross margin	7 kg	21
		%	5.04%
	Marketing margin	%	5.04%
Distribution margin	7 kg	16	
	%	6.72%	
Collector	Sales price	7 kg	264
	Purchase price	7 kg	245
	Handling cost	7 kg	5
	Gross margin	7 kg	14
		%	5.30%
	Marketing margin	%	5.30%
Distribution margin	7 kg	14	
	%	5.30%	
Beekeepers	Sales price	7 kg	334
	Production cost	7 kg	113
	Gross margin	7 kg	221
		%	66.16%
Marketing margin	%	66.16%	

Exchange rate: \$530.
Source: Interview of market actors, 2024.

5.14.2 Prices in Hadhramaut – the government and the desert

Sidr honey prices

Table 11 shows the maximum, minimum and average prices of honey in the Hadhramaut region, encompassing both government and desert prices during the sidr season. It reveals a significant range in prices. Raw honey reaches a high of \$459 and a low of \$105, for an average of \$282. Beeswax has an even wider price range, with the highest price at \$553 and the lowest at \$91, resulting in an average price of \$322.

The significant price range for raw honey and beeswax could reflect different levels of quality, purity and regional demand. The high maximum prices indicate a market for premium products, likely driven by the reputation of honey and beeswax from the Hadhramaut region. They may be associated with specific desirable properties, such as therapeutic or aromatic traits in sidr flowers.

The large gap between minimum and maximum prices suggests that consumers have access to a wide choice of products, ranging from premium to more economical options. This level of price variability could also indicate a diverse market with products aimed at different consumer segments.

Beeswax has a higher average price than honey. Beeswax is used in a variety of applications, including cosmetics, pharmaceuticals and food products. It may warrant a higher price due to its versatility. Considering average prices, beeswax appears to be the most valuable commodity in this region, potentially offering higher profitability to producers.

For producers and traders, understanding these price dynamics can help target appropriate consumer segments, set competitive prices and develop strategies to improve the perceived value of their products. Additionally, they could take advantage of high prices by promoting the unique qualities of their honey and beeswax, particularly attributes related to the sidr season, to differentiate their offerings in local and international markets.

Table 11: Price range of hive products in the sidr season, US dollars

Product	Maximum	Minimum	Average price
Raw honey	459	105	282
Beeswax	553	91	322

Exchange rate: 1,680\$.
Source: Field data, 2024.

Understanding price ranges is valuable for honey industry stakeholders, from beekeepers to retailers, as it can inform decisions on production direction, market targeting and pricing strategies. This also highlights the importance of differentiating products and communicating their value to consumers to realize better market prices.

Prices along the honey value chain

Beekeepers received significantly higher prices of YR 7,000 per 7 kilograms than the prices received by collectors and wholesalers. Collectors and wholesalers buy raw honey from beekeepers at YR 29,000 to 31,000. Retailers sell honey at the highest prices (\$40,000) compared to all other value chain actors; this could be because they represent the final point of sale to the consumer and therefore can set the retail price. They add a profit margin to the price paid to cover operational costs. Further, their proximity to consumers allows them to better understand preferences and demand and adapt offers accordingly. Retailers also add value through services such as branding, packaging and convenience, which justify higher prices. This control over pricing strategies, combined with the additional value provided, generally results in a greater share of profits within the honey value chain.

Marketing margins along the value chain

Table 12 shows gross marketing margins for different honey value chain actors. Beekeepers appear to sell their honey directly at an average price of \$435 per 7 kilograms without incurring purchasing costs, as they are the main producers. Retailers buy honey at \$239 for 7 kilograms and sell it at \$462 for the same quantity. This translates to a substantial market margin of \$223 that can be attributed to their direct interface with consumers and ability to add value through services such as branding.

Cooperative associations and wholesalers have an identical structure for buying and selling prices, buying at \$421 and selling at \$459 for 7 kilograms, giving a market margin of \$38 per 7 kilograms. This lower margin suggests that these players operate under a volume-based model, in which profits are made by moving larger quantities of honey rather than charging large markups.

Differences in margins among players reflect their different roles and added value in the supply chain. Retailers, because of their consumer-facing position, achieve the highest margins by taking advantage of additional services and consumer preferences. In contrast, cooperative associations and wholesalers appear to act as intermediaries, facilitating the circulation of lower value added goods while providing a crucial link between producers and retailers.

For market participants, understanding these margins is essential to strategic planning. Beekeepers could explore ways to align their prices and practices with market trends to maximize their returns. Retailers could focus on improving customer experiences and product quality to justify their higher prices. Meanwhile, cooperative associations and wholesalers could seek to increase efficiency or reduce costs to maintain profitability with slimmer margins. The data provide valuable insights on how each player can optimize their role within the honey market ecosystem.

Table 12: Distribution of gross marketing margins and market participants share

Actor	Average buying price, US dollars per 7 kg	Average selling price, US dollars per 7 kg	Market margin, US dollars per 7 kg
Beekeeper Retailers	-	435	-
	239	462	223
Cooperative associations Wholesalers	421	459	38
	421	459	38

Exchange rate: \$1,680.

Source: Field survey data, 2024.

Gross margins for retailers

A profitability analysis of retailers selling honey reveals several cost and revenue elements that contribute to their gross margin. A retailer buys a 7 kilogram batch of honey for \$239. This figure represents the total cost of goods sold and the initial revenue from the sale. The variable costs include transportation (\$0.30), labour (\$0.30), storage (\$0.42) and containers (\$0.54), totalling \$1.55.

By subtracting total variable costs (\$1.55) from total revenue (\$239), the retailer obtains a gross margin of \$237.45. This margin reflects the difference between the selling price and total variable costs associated with the sale. It constitutes a general indicator of profitability before considering other operational expenses.

The results indicate a very favourable gross margin for retailers, suggesting that the variable costs involved in selling honey are minimal compared to the retail price of the product. Data suggest that each unit of honey (per 77 kilograms) generates a gross margin that far exceeds the combined expenses of transportation, labour, storage and packaging. This large gross margin implies that honey retailing could be a very profitable business, if other fixed and overhead costs not considered in this calculation do not substantially erode the margin. Retailers can likely maximize profitability by managing variable costs and potentially realizing efficiencies in transportation, labour and storage, even if those costs are already low. The potential for revenue growth in honey retailing could encourage more investment.

Table 13: Profitability of retailers

Item	Quantity (7 kilograms)	Price/unit, US dollars	Total
Sidr honey output/77 kg	1	239	239
Total revenue			239
Variable costs			
Transport	1	0.30	0.30
Labour	1	0.30	0.30
Storage	1	0.42	0.42
Container	1	0.54	0.54
Total variable costs			1.55
Gross margin			237.45

Exchange rate: \$1,680.
Source: Field survey data, 2024.

Profitability measures for cooperative beekeepers

Based on Table 13, for a batch of 7 kilograms of honey sold at \$421 by a cooperative association, total expenses incurred for variable costs are remarkably low, just \$1.56. These costs include transportation, labour, storage and containers, each of which contributes minimally to overall expense. After accounting for these variable costs, a cooperative association obtains a substantial gross profit of \$419.44. This demonstrates a very efficient operation where most sales revenue is retained as profit.

This financial health allows the cooperative association to potentially invest in improving its

infrastructure, expanding services to members or contributing to community initiatives. The large gross margin also gives the cooperative the flexibility to address price changes or set a competitive price for its honey without significantly compromising profit margins. This analysis, while positive, primarily reflects gross margins, however; it does not include an assessment of fixed costs or other overheads that could influence overall profitability. Therefore, although the cooperative appears to be operating effectively within the honey value chain, its full financial viability would require a more comprehensive analysis including all cost factors.

Table 14: Profitability of cooperative associations

Item	Quantity (7 kg)	Price/unit	Total
Sidr honey output/7 kg	1	421	421
Total revenue			421
Variable costs			
Transport	1	0.30	0.30
Labour	1	0.30	0.30
Storage	1	0.42	0.42
Container	1	0.54	0.54
Total variable costs			1.56
Gross margin			419.44

Exchange rate: \$1,680.
Source: Field survey data, 2024.

Beekeeper profitability

Based on table 14, beekeepers have a substantial gross margin per each 7-kilogram unit. Total income generated from the sale of honey was \$435. Variable costs such as hive construction (\$16), salaries (\$0.89), packaging (\$0.42) and transportation (\$0.30) total \$17.61. The gross profit was \$417.39 or an impressive

95.95 percent of the gross profit sales price. These results suggest that beekeeping can be very profitable at the scale studied; however, profitability depends on the ability to control variable costs and maintain high revenues from honey sales.

Table 15: Gross margins of beekeepers

Variable	Unit	Price/7 kg	Total
Sidr honey output	1	435	435
Total revenue			435
Variable costs			
Hive construction	1	16	16
Labour wages	1	0.89	0.89
Packaging	1	0.42	0.42
Transport	1	0.30	0.30
Total variable costs			17.61
Gross margin			417.39
Gross margin as percentage of sale			95.95%

Exchange rate: \$1,680.
Source: Field survey, 2024.

Costs among honey traders

Table 16 shows that retailers and wholesalers experience identical costs in various operational areas. The costs for transportation, storage, loading, unloading and containers are the same for each group, amounting to 0.42, 0.42, 0.12, 0.18 and 0.54 cents, respectively. Total market costs for both retailers and wholesalers amount to \$1.70. This parity could indicate that the honey trading market has a level of cost uniformity across different stages of the supply chain. Additionally, there could be standardized pricing practices or policies within the market, resulting in consistent operational expenses for merchants at both the retail and wholesale levels. It would be useful to explore the implications of these uniform costs for competition and the profit margins of different market players.

Cost uniformity could lead to competition between retailers and wholesalers based on factors other than logistics expenses, such as price, quality and service offering. Since costs do not differ between the two, their strategies for maintaining or increasing profitability must lie elsewhere, perhaps in volume discounts, supplier relationships or efficiencies in other areas of their operations.

The significant cost share attributed to containers highlights the importance of packaging in the honey trade, potentially reflecting consumer preferences for quality packaging or industry requirements for quality preservation during transport and storage. The uniformity of these costs also suggests potential room for negotiation or cost-cutting strategies, such as purchasing supplies in bulk or investing in reusable containers or storage facilities. Overall, the cost structure indicates the importance of effective logistics management to maintain profitability for retailers and wholesalers.

Table 16: Market costs among traders

Items	Retailers	Wholesalers
Transportation	0.42	0.42
Storage	0.42	0.42
Loading	0.12	0.12
Offloading	0.18	0.18
Honey containers	0.54	0.54
Total	1.7 \$	1.7 \$

Exchange rate: \$1,680.
Source: Field survey data, 2024.

Honey production cost structure, and gross, marketing and distribution margins

Table 17 presents the gross, marketing and distribution margins of various players in the honey market, including wholesalers, retailers, cooperative associations and beekeepers. For wholesalers, the figures indicate a selling price of 459 units and a purchasing price of 421 units per 7 kilograms, resulting in a gross margin of 36 units or a margin of 7.84 percent. Likewise, the distribution margin of wholesalers is 37 units or a margin of 8.06 percent.

Retailers, on the other hand, show higher profitability with a selling price of 462 units and a much lower purchase price of 239 units per 7 kilograms. Their gross margin amounts to 221 units, a significant margin of 47.83 percent. The commercial margin is comparable at 48.22 percent, but the distribution margin is significantly lower at 1.08 percent, with only 5 units.

Margins for cooperative associations mirror those of wholesalers, with identical gross margin and distribution figures, marking a sales environment that may be similar or related for these two players.

The most striking results emerge from the beekeepers' data, which show a robust sales price of 435 units against a remarkably low production cost of 17 units per 7 kilograms, giving an impressive gross margin of 418 units, or 96.09 percent. This indicates an extremely favourable position for beekeepers in terms of profitability.

These results reveal substantial differences in profitability among different players in the honey market. While beekeepers enjoy the highest gross margins, indicating a strong economic incentive for production, wholesalers and cooperative associations have much narrower margins, suggesting operational efficiencies or business benefits from potential scale. Retailers fall somewhere in the middle, making considerable profits, thanks in part to the large margin between buying and selling prices. The data highlights the importance of market positioning and the scale of operation as determinants of profitability within the honey value chain.

Table 17: Gross, marketing and distribution margins

Actor			Value
Wholesaler	Sales price	7 kg	459
	Purchase price	7 kg	421
	Handling cost	7 kg	2
	Gross margin	7 kg	36
		%	7.84%
	Marketing margin	%	7.84%
	Distribution margin	7 kg	37
		%	8.06%
Retailer	Sales price	7 kg	462
	Purchase price	7 kg	239
	Handling cost	7 kg	2
	Gross margin	7 kg	221
		%	47.83%
	Marketing margin	%	48.22%
	Distribution margin	7 kg	5
		%	1.08%
Cooperative association	Sales price	7 kg	462
	Purchase price	7 kg	239
	Handling cost	7 kg	2
	Gross margin	7 kg	221
		%	47.83%
	Marketing margin	%	48.22%
	Distribution margin	7 kg	5
		%	1.08%
Beekeepers	Sales price	7 kg	435
	Production cost	7 kg	17
	Gross margin	7 kg	418
		%	96.09%
Marketing margin	%	96.09%	

Exchange rate: \$1,680.

Source: Field survey data, 2024.

Almarai honey prices

Table 18 shows a notable range in the prices of beehive products during the Tarim/Almarai season. For raw honey, the maximum recorded price is \$23.80, while the minimum is \$17.90, for an average of \$22. This indicates significant price variability and suggests a diverse market in which different qualities or types of raw honey are available, commanding different prices, due to factors such as purity, botanical origin and consumer demand.

Beeswax has an even greater price variation, with a high of \$62.30, a low of \$42 and an average of \$52.15. The higher spread in beeswax prices indicates that different qualities and uses can significantly influence prices.

Data indicate that consumers value different attributes associated with hive products, which is reflected in their willingness to pay a range of prices. For producers and marketers, these findings highlight the importance of understanding market dynamics and consumer preferences to price and strategically position their products. The higher prices of beeswax compared to raw honey suggest potential value addition and niche marketing opportunities.

Table 18: Price range of hive products in the Almarai season, in US dollars

Hive product	Maximum	Minimum	Average price
Raw honey	23.8	17.9	22.0
Beeswax	62.3	42	52.15

Exchange rate: \$1,680.

Source: Field survey data, 2024.

The variation in prices of bee products from one season to the next is influenced by a set of interdependent factors. Chief among these is seasonal variation in production, driven by flowering plant patterns and the resulting foraging activity of bees. Weather and climate conditions exert a significant influence, as extreme drought or cold can hamper nectar harvesting, leading to reduced honey yields and potentially higher prices. The quality and specific characteristics of honey are also likely to change depending on the types of flowers available during different seasons, affecting consumer preferences and prices.

Bee health is a crucial factor, as seasons marked by disease or pests can decrease productivity. Demand for honey may fluctuate based on seasonal holidays or health trends, leading to price variations. Supply chain dynamics, including production levels, imports, exports and market competition, also contribute to price fluctuations.

Economic variables such as changing labour, processing and transportation costs as well as larger policy and regulatory changes can impose financial pressures reflected in bee product prices. Growing consumer awareness of the virtues of certain varieties of honey may boost demand and lead to higher prices. Together, these factors create a complex and ever-changing pricing landscape for bee products throughout different seasons.

Prices along the honey value chain

Beekeepers received significantly higher prices of YR 7,000 per 7 kilograms compared to prices received by collectors and wholesalers. Collectors and wholesalers bought raw honey from beekeepers at YR 29,000 to 31,000. Retailers sold honey at the highest prices (\$40,000) compared to all other value chain actors; this could be because they represent the final point of sale to the consumer and therefore can set the retail price. They operate on the principle of adding a profit margin to the price paid, which covers operational costs and desired profit margins. Their proximity to consumers allows them to better understand

behaviours and preferences and adapt offers accordingly. Retailers also add value through services such as branding, packaging and convenience, which justify higher prices. Additionally, since they have a direct relationship with the end user, they can adjust their prices based on demand and perceived value. This control over pricing strategies, combined with the additional value provided, generally results in a greater share of profits within the honey value chain.

Marketing margins along the value chain

Table 19 delineates the distribution of gross marketing margins and the share of various participants within the honey market. It illustrates that beekeepers have an average selling price of \$22 per 7 kilograms and, since they produce the honey, their buying price is \$0; therefore, a calculated market margin does not apply. Collectors buy honey at an average price of \$18 and sell it for \$21 per 7 kilograms, yielding a market margin of \$3. Retailers purchase at the same average price as collectors (\$18) but sell at a higher price of \$24 per 7 kilograms, creating a larger market margin of \$6. Wholesalers have a slightly lower buying price of \$17 and an average selling price of \$22, leading to a market margin of \$5 per 7 kilograms.

The table suggests that retailers command the highest market margin among all intermediaries, indicating they may have more pricing power or added value services that justify a higher selling price. Collectors have the lowest market margin, which could potentially be due to their role as a first contact point in the supply chain after the beekeeper, with fewer value added activities compared to retailers or wholesalers. The market margins reflect the profit-sharing structure within the honey value chain and demonstrate how different roles and levels of added value contribute to the overall profitability of each actor. These findings emphasize the importance of strategic positioning in the market and the value each actor adds, as captured in their margin.

Table 19: Distribution of gross marketing margins and market participants share

Actor	Average buying price, US dollars per 7 kilograms	Average selling price, US dollars per 7 kilograms	Market margin, US dollars per 7 kilograms
Beekeeper	0	22	0
Collector	18	21	3
Retailers	18	24	6
Wholesaler	17	22	5

Exchange rate: \$1,680.

Source: Field survey data, 2024.

Findings from a panel discussion on the honey value chain were informative in illuminating factors that contribute to divergent market margins among bee collectors, retailers and wholesalers. Bee collectors, the first layer of collection and primary processing, earn their margins through collection costs and the liaison service between the beekeeper and the next stage of distribution.

Retailers stood out due to their significant market margins, which are attributable to significant added value through marketing strategies, branding efforts and the premium charged on direct interactions with end consumers. Close contact with consumers allows them to influence prices and demand a higher margin.

Wholesalers carry out transactions on a larger scale. The group saw this as a contributing factor to its relatively lower unit margins, justified by the volume of honey it processes, allowing lower margins to be offset through mass distribution.

The costs incurred at each stage played a crucial role in determining the margin. Various operational expenses, such as warehousing, transportation and retail overhead, contribute to the economic pressures on each player. Furthermore, pricing dynamics within

competitive sectors, market power, pricing flexibility and economies of scale shape market margins. The honey supply chain involves a complex interplay among these factors, creating a range in terms of profitability and efficiency for each type of market participant.

Gross margins for retailers

Table 20 details the profitability of retailers in the honey market. Retailers sell honey in 7-kilogram units for \$22 per unit, generating a total revenue of \$22. They incur variable costs that include transportation, labour, storage and containers, each costing \$0.42 for 7 kilograms of honey. Total variable costs are \$1.68 for the 7 kilogram unit. After accounting for variable costs, retailers' gross margin is calculated at \$18.32 per unit of honey sold. This reflects a substantial markup in costs incurred, indicating a healthy profit margin in the retail segment of the honey industry.

These data highlight the financial viability of honey retailing, with the gross margin suggesting that the honey retail sector makes significant profit after covering variable costs. However, this analysis does not consider fixed costs, which could also impact profitability. The results illustrate the importance of effective variable cost management to maximize profit margins.

Table 20: Profitability of retailers

Item	Quantity (7 kilograms)	Price/unit	Total, US dollars
Almrai honey output, 7 kg	1	22	22
Total revenue			22
Variable costs			
Transport	1	0.42	0.42
Labour	1	0.42	0.42
Storage	1	0.42	0.42
Container	1	0.42	0.42
Total variable costs			1.68
Gross margin			18.32

Exchange rate: \$1,680.

Source: Field survey data, 2024.

Beekeeper profitability

Table 21 presents an analysis of beekeepers' gross margins based on a field survey carried out in 2024. Beekeepers generate a total income of \$22 from 7 kilograms of honey. Their variable costs include construction of the hive at \$16, labour wages at \$0.42, packaging at an additional \$0.42 and transportation from the forest to their home at \$0.30, resulting in a total variable cost of \$17.14 for the same quantity.

Subtracting total variable costs from revenue yields a gross profit of \$4.86 per 7 kilograms of honey produced. This gross margin represents 22.09 percent of total revenue, implying that for every dollar earned from the sale of honey, approximately \$0.22 is retained as gross profit before factoring in fixed costs.

This analysis highlights that beekeepers, while benefiting from the full sale price of honey, face significant hive construction costs, which represent the majority of their variable expenses. This factor must be managed carefully as it significantly eats into potential profits. Nonetheless, the fact that beekeepers can maintain a gross margin above 20 percent is a sign of a viable business, provided they are able to control costs and maintain sales prices. Since this figure is an average, margins may vary depending on individual circumstances and market conditions.

Table 21: Gross margins for beekeepers

Variable	Unit	Price/7 kilograms	Total
Almrai honey output	1	22	22
Total revenue			22
Variable costs			
Hive construction	1	16	16
Labour wages	1	0.42	0.42
Packaging	1	0.42	0.42
Transport from forest to home	1	0.30	0.30
Total variable costs			17.14
Gross margin			4.86
Gross margin as percentage of sale			22.09%

Exchange rate: \$1,680.

Source: Field survey data, 2024.

Costs among honey traders

Table 22 presents a summary of market costs for retail and wholesale traders in the honey market. They incur the same costs for each item, with transportation, storage, loading, unloading and honey container each contributing to total market costs. Transportation and storage fees are each \$0.42, while loading and unloading fees are \$0.12 and \$0.18, respectively. The cost of a container for honey is \$0.30. Retailers and wholesalers incur a total market cost of \$1.40 for their business activities.

This uniformity in market costs for these two groups suggests a level playing field in terms of expenses associated with the logistics of the honey trade. Beyond these comparable market

costs, however, profitability could be affected by other factors, such as the scale of operation, the efficiency of their supply chain, bargaining power with suppliers and differences in price that retailers and wholesalers can charge their customers. The fact that market costs are identical for retailers and wholesalers highlights that these costs alone do not determine profitability; rather, it emphasizes the role of strategic pricing, operational efficiency and value added services in defining each merchant's gross margin. Additionally, each player's ability to manage these identical costs could have a significant impact on their competitive advantage and net profitability.

Table 22: Market costs among traders (USD)

Market cost items	Retailers	Wholesalers
Transportation	0.42	0.42
Storage	0.42	0.42
Loading	0.12	0.12
Offloading	0.18	0.18
Honey containers	0.30	0.30
Total	1.4	1.4

Source: Field survey data, 2024.

Honey production cost structure, and gross, marketing and distribution margins

Table 23 gives an overview of the gross, marketing and distribution margins of the different players in the honey market. Wholesalers have a selling price of \$22 for 7 kilograms of honey, with a purchase price of \$17 and a handling cost of \$2, leaving them with a gross margin of \$3, which translates to 13.63 percent of the sale price. Their marketing and distribution margins are the same at 13.63 percent. Retailers, on the other hand, sell honey at \$24 for the same quantity and buy at \$18, with the same handling cost of \$2, resulting in a higher gross margin of \$4 per 7 kilograms or 16.66 percent in proportion to the sale price. Their marketing and distribution margins also amount to 16.66 percent. Beekeepers show a different margin structure, with a sales price of \$22, but a lower production cost of \$12, leading to a higher gross margin of \$10 per 7 kilograms.

Therefore, beekeepers enjoy a significantly higher margin percentage than other players, i.e., 45.45 percent for both marketing and gross margin.

This distribution of margins among different players in the honey market indicates that beekeepers have potential to achieve the largest profit margin because they have the lowest relative costs. This could be because they are the producers and therefore do not have to bear the additional transaction costs of buying and reselling. On the other hand, even if retailers bear higher purchasing prices, they are still able to charge a higher selling price, giving them a higher margin than wholesalers. The similarity in wholesaler and retailer margins in percentage terms suggests that, despite the different roles they play within the distribution chain, certain costs and pricing power tend to equalize their profitability relative to their position in the value chain.

Table 23: Gross, marketing and distribution margins

Actor			Value (USD)
Wholesaler	Sales price	7 kg	22
	Purchase price	7 kg	17
	Handling cost	7 kg	2
	Gross margin	7 kg	3
		%	13.63%
	Marketing margin	%	13.63%
Retailer	Sales price	7 kg	24
	Purchase price	7 kg	18
	Handling cost	7 kg	2
	Gross margin	7 kg	4
		%	16.66%
	Marketing margin	%	16.66%
Wholesaler	Sales price	7 kg	22
	Purchase price	7 kg	17
	Handling cost	7 kg	2
	Gross margin	7 kg	3
		%	13.63%
	Marketing margin	%	13.63%
	Distribution margin	7 kg	3
		%	13.63%
Beekeepers	Sales price	7 kg	22
	Production cost	7 kg	12
	Gross margin	7 kg	10
		%	45.45%
	Marketing margin	%	45.45%

Exchange rate: \$1,680.

Source: Field survey data, 2024.

Sumor honey prices

Table 24 provides an overview of the prices of beehive products during the Tarim/Sumor season, listing the maximum, minimum and average prices for raw honey and beeswax. The maximum price of raw honey is \$132, while the minimum price is \$39, with an average of \$92. Beeswax presents a different pricing pattern, with a maximum price of \$91 and a minimum of \$56, averaging \$73.5.

The results indicate a wide range of prices for raw honey, perhaps reflecting differences in quality, harvest conditions or regional variations within the market during a specific season. The high maximum price of raw honey suggests that there is a premium segment willing to pay significantly more, possibly for honey of a particular quality or origin. On the other hand, beeswax maintains a narrower price range, albeit with a higher minimum price than raw honey, indicating a more consistent market value and perhaps more stable demand.

Table 24: Price range of hive products in US dollars, Sumor season

Hive product	Maximum	Minimum	Average price
Raw honey	39	132	92
Beeswax	91	56	73.5

Exchange rate: \$1,680.

Source: Field data, 2024.

Although raw honey generally trades at a higher market price than beeswax, the price range for honey is wider, indicating a more varied market with multiple segments. This highlights the value placed on different hive products and can be used to inform pricing strategies and

market positioning by producers and traders. It also suggests that producers may target different market segments by positioning their products to cater to both high-end and more cost-sensitive customers.

Marketing margins along the value chain

The variability in raw honey and beeswax prices in Sumor seasons, as shown in Table 25, could result from a confluence of factors. Seasonal influences on the production side can significantly alter both the yield and quality of hive products. Weather conditions and the health of bee colonies are an integral part of the quantity and characteristics of the harvest. Different floral sources, depending on the season, contribute not only to variations in taste and quality but also to the particular appeal and therefore price of honey. On the demand side, consumer preferences could fluctuate based on seasonal trends, health and wellness fads, and cultural or festive periods that traditionally result in higher consumption rates.

Production and harvesting costs incurred by beekeepers fluctuate with variations in labour requirements and harvesting methods. Increases in seasonal costs exert upward pressure on prices. In addition, the economic context – marked by inflation rates, exchange rate dynamics and trade policies – inevitably has repercussions on the valuations of agricultural products such as honey and beeswax. An intersection of these supply, demand, and economic factors is likely at play. A complex mix of the biological rhythms of bees’ foraging and harvesting activities, human-centered dimensions, market demand and economic frameworks influences seasonal price disparities.

Table 25: Distribution of gross marketing margins and market participants’ shares

Actor	Average buying price, US dollars per 7 kilograms	Average selling, US dollars per 7 kilograms	Market margin, US dollars per 7 kilograms
Beekeeper	0	79	0
Retailers	78	88	11
Cooperative associations	72	92	20
Wholesalers	72	92	20

Exchange rate: \$1,680.

Source: Field survey data, 2024.

In the honey value chain, profitability differs significantly among different players. Beekeepers are at the start of this chain, selling their honey at an average price of \$79 per 7 kilograms. Their cost of production is not reflected in an average purchase price, indicating a direct profit on sales rather than a market margin. Retailers buy honey at an average price of \$78 and resell it at \$88 per 7 kilograms, with a market margin of \$11. This margin highlights the role of retailers in adding value through marketing, branding and customer service. Cooperative associations and

wholesalers show a higher level of profitability, buying at \$72 and selling at \$92 per 7 kilograms, thus generating a significant market margin of \$20. These entities likely leverage economies of scale, logistical efficiencies or other market advantages to achieve higher margins, underscoring their effectiveness in optimizing costs and maximizing returns on their honey sales. The parallels between cooperative associations and wholesalers suggest that they might perform similar functions in the market or face similar competitive conditions.

Gross margins for retailers

Table 26 presents a profitability analysis for honey retailers. Retailers sell honey at an average price of \$77.4 per 7 kilogram unit, from which variable costs are subtracted to calculate the gross margin. Variable costs, including for transportation, labour, storage and containers, each amount to \$0.42, or a total of \$1.68 per 7 kilograms. Once these costs are deducted from total revenue, retailers are left with a gross profit of \$75.72 for every 7 kilograms of honey sold. Relatively low variable costs compared to the selling price highlight the potential profitability of honey retailing. The fact that these direct costs represent only 2.17 percent of total revenue suggests that retailers are operating with effective cost management in these areas. Additionally, with a gross margin representing 97.83 percent of revenue, honey retailing appears to be a particularly lucrative business before factoring in fixed costs such as rent, utilities and salaries.

Although the gross margin is substantial, it does not represent net profit because it does not consider the fixed costs that retailers must also cover. Despite this, the healthy gross margin suggests a margin of profitability even after accounting for these fixed costs. This information can serve as a strategic indicator for retailers who are considering entering or expanding into the honey market. This highlights the importance of keeping variable costs low while potentially leaving room for pricing strategies that can cater to diverse consumer segments. The data also highlight the importance of supply chain efficiency, as savings in logistics and storage can directly improve the bottom line of honey retailers.

Table 26: Profitability of retailers

Item	Quantity (7 kilograms)	Price/unit	Total
Sumor honey output/7 kg	1	77.4	77.4
Total revenue			77.4
Variable costs			
Transport	1	0.42	0.42
Labour	1	0.42	0.42
Storage	1	0.42	0.42
Container	1	0.42	0.42
Total variable costs			1.68
Gross margin			75.72

Exchange rate: \$1,680.

Source: Field survey data, 2024.

Gross margin and profitability in honey production

Table 27 specifies the gross margin of beekeepers for 7 kilograms of honey. Honey production is valued at \$79.20, putting total revenue at that figure. Beekeepers incur various variable costs, including hive construction at \$15.7, labour wages at \$0.42, packaging at \$0.42 and transportation at \$0.30, totalling \$16.84. After accounting for these expenses, beekeepers achieve a gross profit of \$62.36, which represents a whopping 78.73 percent of revenue.

This substantial percentage indicates that beekeeping, at the point of honey production, can be very profitable in relation to the sale price of honey. The analysis shows that despite the large initial cost attributed to hive construction, remaining variable costs such as labour, packaging and transportation contribute

minimally to total expenses, enabling a robust gross margin. Beekeepers benefit from the advantage of producing the primary product, thus capturing a significant portion of the market value from the start.

It is important to consider that this gross margin is a preliminary financial calculation. It does not include possible additional costs such as bee feed, medicines and overheads such as equipment depreciation and rental costs or land. Nonetheless, the data suggest a positive financial outlook for beekeepers, provided they manage their variable costs effectively. The high gross margin as a percentage of sales suggests financial room to invest in improving production efficiency and quality, which could further strengthen the profitability of beekeeping businesses. It also highlights the value of optimizing processes and exploring market opportunities that can support and increase the gross margin.

Table 27: Gross margins of beekeepers

Variable	Unit	Price/7 kilograms	Total
Sumor honey output	1	79.2	79.2
Total revenue	1		79.2
Variable costs			0
Hive construction	1	15.7	15.7
Labour wages	1	0.42	0.42
Packaging	1	0.42	0.42
Transport	1	0.30	0.30
Total variable costs			16.84
Gross margin			62.36
Gross margin as a percentage of sale			78.73%

Exchange rate: \$1,680.
Source: Field survey, 2024.

Costs among honey traders

Table 28 provides an overview of the market costs associated with the business activities of honey retailers and wholesalers. The table shows the same costs for transportation, storage, loading, unloading and containers for both retailers and wholesalers, with each item valued at \$0.42, \$0.42, \$0.12, \$0.18 and \$0.30, respectively. These individual costs add up to \$1.4 for each group of traders per unit traded.

The uniformity of market costs for both retailers and wholesalers indicates a standardized overhead structure for all business activities within the honey market. This cost standardization is rather intriguing as it suggests a level playing field in terms of logistics expenses borne by market participants, regardless of their position in the value chain. However, deeper analysis could reveal economies of scale for wholesalers who typically handle larger volumes; unit market costs could, in fact, be lower for them due to

volume reductions or more efficient logistics, which is not immediately apparent from the aggregate costs presented.

The results in Table 28 spark a discussion about competitiveness within the honey market. It appears that competitive advantage does not depend on fundamental market costs, since there is parity between retailers and wholesalers in this regard. Instead, differentiators likely include operational efficiencies, supplier relationships, marketing strategies and possible value added services that are not captured in market costs. Companies can focus on these aspects to improve their profitability and market share, leveraging other efficiencies to stand out in a market where basic trading costs are equal among competitors. The data imply that any economic analysis should consider these costs as a benchmark for operations, recognizing that strategies for achieving competitive advantage must go beyond simply managing market costs.

Table 28: Market costs among traders

Market costs items	Retailers	Wholesalers
Transportation	0.42	0.42
Storage	0.42	0.42
Loading	0.12	0.12
Offloading	0.18	0.18
Honey containers	0.30	0.30
Total	1.4	1.4

Exchange rate: \$1,680.
Source: Field survey data, 2024.

Honey production cost structure, and gross, marketing and distribution margins

Table 29 presents detailed gross, marketing and distribution margins for various players in the honey industry, including wholesalers, retailers, cooperative associations and beekeepers. The table shows the sale and purchase prices for 7 kilograms of honey, as well as the handling costs, to calculate the respective margins of each actor.

Wholesalers show a gross margin of \$19 per 7 kilogram lot of honey, with a selling price of \$92 and a purchase price of \$72, giving a gross margin of 20.65 percent. Their marketing and distribution margins are equivalent, constituting 20.65 and 21.73 percent, respectively. Retailers have a gross margin of \$9 on a selling price of \$88 and a buying price of \$78, which translates to a margin of 10.23 percent on gross, marketing and distribution margins.

Cooperative associations have a selling price of \$92 and a buying price of \$72, similar to wholesalers, but incur a higher handling cost of \$2, resulting in a gross margin of \$18 and a marketing margin identical to their gross margin at 19.56 percent, with a distribution margin of 21.73 percent. Beekeepers, the first producers, have a selling price of \$79 and production costs of \$17 per 7 kilograms, which translates into a significant gross margin of \$62 and a gross and commercial margin of 78.38 percent.

The analysis reveals significant variation in margins throughout the value chain. Beekeepers enjoy the highest gross and marketing margin percentage, indicating considerable profitability at the production stage before the honey is sold throughout the value chain. In contrast, retailers operate with the lowest margins, reinforcing their role as end-of-sale outlets with increased operational costs, potentially offsetting lower margins with higher sales volumes. Wholesalers and cooperative associations maintain healthy margins, thanks to their role as intermediaries.

These margins reflect the value added at each stage of the honey supply chain. While beekeepers have the highest percentage margins due to lower production costs compared to their selling price, wholesalers, retailers and cooperative associations achieve their margins by purchasing and adding value to the product before reselling it at a higher price. Handling costs, although relatively low, affect gross margin percentages, highlighting the importance of efficient logistics and handling to maintain profitability. Furthermore, the data show how mastering distribution and marketing aspects can significantly contribute to capturing value in the honey market.

Table 29: Gross, marketing and distribution margins

Actor			Value
Wholesaler	Sales price	7 kg	92
	Purchase price	7 kg	72
	Handling cost	7 kg	1
	Gross margin	7 kg	19
		%	20.65%
	Marketing margin	%	20.65%
	Distribution margin	7 kg	20
%		21.73%	
Retailer	Sales price	7 kg	92
	Purchase price	7 kg	72
	Handling cost	7 kg	2
	Gross margin	7 kg	18
		%	19.56%
	Marketing margin	%	19.56%
	Distribution margin	7 kg	20
%		21.73%	
Cooperative associations	Sales price	7 kg	92
	Purchase price	7 kg	72
	Handling cost	7 kg	2
	Gross margin	7 kg	18
		%	19.56%
	Marketing margin	%	19.56%
	Distribution margin	7 kg	20
%		21.73%	
Beekeepers	Sales price	7 kg	79
	Production cost	7 kg	17
	Gross margin	7 kg	62
		%	78.38%
Marketing margin	%	78.38%	

Exchange rate: \$1,680.

Source: Field survey data, 2024.

5.15 Value chain characteristics

This study found a dynamic and multifaceted honey value chain involving beekeepers, wholesalers, exporters and retailers, each playing a unique role in bringing the product to market. Beekeepers, the main producers, face challenges such as limited access to modern beekeeping practices and financial support; however, due to high demand for their products, they have a significant opportunity to increase their operations and profitability. Wholesalers act as middlepersons and play key roles in the storage and distribution of honey, but the study suggests their dominance in the chain could be better leveraged to support beekeepers.

Exporters, who often have established skills in brand recognition and quality assessment, primarily serve the Gulf countries. The study highlighted the need for improved certification and quality assurance to facilitate entry into new markets. A crucial finding is the importance of knowledge-sharing among value chain actors. The chain is today marked by relationships of trust, which, although beneficial, limit the widespread dissemination of good practices and innovations. Addressing these issues could enhance the efficiency, sustainability and resilience of the value chain and improve the livelihoods of those who rely on this industry.

Several key characteristics play a determining role in every aspect of the industry, from production to consumption. Honey production is enriched by its decentralized nature; beekeepers manage hives in various geographic areas by capitalizing on diverse flora. This decentralized approach is accompanied by the seasonal rhythm of honey production, closely linked to the flowering cycles of nectar-producing flowers, resulting in ebbs and flows in the honey supply throughout the year.

Since the industry is closely tied to natural resources, the health of the environment has a direct impact on the quality and volume of honey produced. The symbiotic relationship between beekeeping and agriculture is also important, with bees playing a vital role in pollinating crops, thereby improving agricultural productivity and highlighting the interconnectivity of ecosystems. Most honey production is in the hands of small farmers or individual beekeepers, creating an industry characterized by micro-scale, labour-intensive operations that are often complementary to other agricultural enterprises. In terms of techniques, there is a notable dichotomy. While some practitioners cling to traditional methods, others embrace modern technology and best practices in hive management, disease control and honey processing to increase efficiency and yields.

Quality control remains the cornerstone of the honey value chain, with various certifications (such as for organic or fair trade) acting as labels of quality, safety and authenticity. These open access to the market and bolster consumer confidence. Additionally, honey products are differentiated by distinct characteristics, based on floral sources, regional origins and processing techniques, allowing producers to access niche markets and obtain higher prices for exceptional varieties.

Further along the value chain, stakeholders add value through processing, packaging, branding and marketing, thereby enhancing the appeal and market value of honey. Consumers are increasingly aware of the health benefits of honey and its natural qualities. They not only seek quality but also prioritize transparency, traceability and eco-friendly practices, driving demand for premium and specialty honeys.

5.16 Functions

The honey value chain involves interconnected activities and stakeholders contributing to the production, processing and distribution of honey. From beekeepers managing bee colonies to consumers enjoying the final product, each stakeholder plays a crucial role in shaping the honey industry. This complex value chain encompasses functions such as beekeeping, honey production, post-production processing, packaging and labelling, distribution, quality control and certification, marketing and sales, consumption and waste management.

By understanding the functions and interactions of these stakeholders, the honey industry can address challenges, ensure quality and sustainability, and meet the demands of consumers while supporting the livelihoods of beekeepers and honey producers.

Within the honey value chain, various stakeholders perform a range of functions:

1. Beekeeping: This involves managing bee colonies, usually in hives created by beekeepers. Beekeepers monitor the health of the bees, protect them from predators, and manage parasites and diseases. They also ensure that bees have access to nectar and pollen sources.

2. Honey production: Bees collect nectar from plants and convert it into honey within the hive. Beekeepers then extract this honey, usually by removing honeycombs from the hives and using a machine to spin out the honey.

3. Post-production processing: Honey collected from hives often contains impurities, such as wax and dead bees. It is filtered to remove these impurities. Some honey is also pasteurized to kill any yeast or bacteria.

4. Packaging and labelling: Once processed, honey is packaged for sale. This could range from small, retail-ready jars to large drums for bulk sale. Labels are added to provide information about the honey, such as its origin, weight/volume, nutritional information and date of harvest.

5. Distribution: Once packaged, honey is distributed through a variety of channels. It could be sold directly at local farmers' markets, supplied to retail stores or exported internationally.

6. Quality control and certification: Norms and standards are essential in the honey value chain. Quality control involves lab testing of honey samples to ensure that they meet the required standards. For organic or specialty honey, certification bodies provide approval that the honey has been produced in accordance with specific rules.

7. Marketing and sales: Honey producers and traders promote their product to attract customers and drive sales. Marketing strategies could involve promoting the honey's unique characteristics, such as its origin or flower source, its health benefits, or its organic or sustainable certifications.

8. Consumption: The final link in the value chain is the end consumer. They may consume the honey directly, use it as an ingredient in cooking, or use it in industrial settings, for example, in the food industry or cosmetics manufacturing.

9. Waste management: After honey has been extracted from the honeycomb, beeswax and other residues remain.

Figure 6: Functions in the honey value chain: from beekeeping to a consumption map



5.17 Honey value chain analysis

Value chain analysis consists of identifying actors, supporters and their roles; mapping the flows of products and information; defining marketing channels; and pinpointing constraints and opportunities.

Honey value chain actors and their roles

The study delineated a variety of stakeholders and their corresponding responsibilities within the honey value chain, from the initial phases of production to the point of final consumption. The main actors in the honey value chain in the study region include those who provide the necessary inputs, honey producers, cooperative associations, individuals who collect honey locally, wholesalers, retail sellers and, ultimately, the consumers who purchase and use honey products.

Several common roles and responsibilities include:

Input suppliers provide beekeeping tools and play a crucial role in maintaining and expanding honey production operations. Their importance stems from their ability to provide beekeepers with essential equipment for effective bee management and honey harvesting.

The main difficulties faced by beekeeping tool suppliers in Yemen include external cost drivers, such as customs duties, postage and shipping costs exacerbated by the crisis and ongoing war. The escalation of the conflict is directly linked to rising prices and the inability of suppliers to withstand the increased tariffs imposed by the State. This situation has led to a lack of capital, high inflation and increased costs at all stages of the supply chain.

The responsibility for addressing and mitigating these challenges falls on a collective of different actors, including both local and national government agencies responsible for customs and tariff regulations, as well as international organizations with the power to influence trade policies and provide financial assistance amid the tumult. of war. Suppliers are actively calling on these stakeholders to implement solutions and provide relief, with the aim of stabilizing the beekeeping supply market and ensuring the continuity of honey production in Yemen.

Producers perform most value chain functions from the procurement of inputs to harvesting and marketing. Most honey producers in the study area sell their honey to different buyers at the farm gate or in village or district market centres. They sell crude honey to cooperatives, local collectors, retailers, processors and consumers.

Beekeepers face multifaceted challenges ranging from economic instability to operational problems. Strong fluctuations in honey prices and the instability of the local currency disrupt their finances, affecting supply and production. These financial obstacles, compounded by price and currency instability, require a collaborative response from the Government, financial institutions and beekeeping industry groups to stabilize the economy and support local supply chains.

Operational challenges range from low hive productivity and inadequate bee nutrition to diseases, pests, pesticide damage, marketing issues, limited nectar sources, poor conditions and extreme weather. While traditional practices pose sustainability concerns, modern beekeeping involves adapting to new technologies. Solutions include improved nutrition, vigilant hive management, pest control, and a transition to sustainable and effective practices supporting traditional and modern methods.

Yemeni beekeepers prefer to sell their honey directly, without going through wholesalers, in a market where the color and taste of the honey dictate prices. The market is, however, volatile due to monopolistic practices and weak supply-demand dynamics, which result in inconsistent honey prices. Beekeepers rely largely on self-generated income and have not sought loans, likely due to their autonomy or lack of access to credit. For successful beekeeping, they need resources such as hives and protective equipment, and diverse flora for bee nutrition. While many beekeepers demonstrate resilience, a difficult market without government or association support highlights the need for improved market conditions and financial services.

Honey collectors buy cured honey directly from smallholder producers at the farm gate and in local markets. Sometimes collectors add value to honey based on spatial and temporal differences (i.e., collecting from a distant location to make it easily available to the user and storing it for future use). Collectors sell directly to honey retailers, wholesalers and processors. There are both legal collectors who have licenses and illegal collectors without licenses.

Cooperatives are major actors who directly participate in the production and marketing of honey. They sell crude honey bought directly from producers to honey brewers and honey unions that process and pack honey for the export market by extracting the liquid honey from the honey comb. In addition, cooperatives process and pack honey by themselves and sell to local consumers at their own retail shops. Cooperatives also work with beekeepers and give trainings on bee forage development, queen rearing, harvesting and processing honey. Associations participating in the survey revealed that the most pressing challenge they face is financial—principally, the lack of a consistent source of income, coupled with the overall organizational fragility of the associations. This financial shortfall has prompted joint-stock projects aimed at establishing foundational revenue streams.

The main cause of financial problems appears to be the limited capacity to generate funds internally, which could stem from inadequate membership fees, insufficient sales of bee products or a lack of diversified income activities. The impact is far-reaching, potentially leading to diminished support for members, reduced capacity to invest in resources and training, and an inability to expand or sustain their operations. Solving this challenge lies with the leadership of associations, which are called on to strategize and execute financial remedies.

Prospective solutions may include engaging in activities that could attract external funding such as grants or partnerships, increasing association membership and fees, improving the marketing of bee products for better sales, and exploring new avenues for income diversification.

Associations could benefit from reassessing their financial strategies, building business acumen, and fostering partnerships both within and outside the beekeeping industry to create a stable economic environment for their members and stakeholders. Collaboration with other bee associations and industry players could also lead to the sharing of best practices and resource pooling, further enhancing financial stability and growth opportunities.

Wholesalers receive honey directly from local collectors who buy honey in local markets and at the farm gate directly from beekeepers. Wholesalers have intimate relationships with their suppliers, who bring honey to them. Wholesaler respondents provided information on average prices for different types of honey and the methods used to preserve it: The average price per kilogram of sidr honey is estimated at 185 Saudi riyals. Samr honey costs an average of 40 Saudi riyals per kilogram. Almarai honey, although not typically a brand of honey, is listed at 15 Saudi riyals per kilogram, which may reflect the price of another common or generic honey variety. Honey with wax is sold at an average price of 35 Saudi riyals per kilogram.

Wholesalers reported that steel containers (barrels) are used to store honey. The use of such containers helps keep the honey at a stable temperature and protects it from exposure to light and contamination, thus contributing to its longevity and maintaining its quality. Honey can generally be stored in such containers for up to one year without significant degradation in quality if conditions are appropriate.

The impact of imported honey on the local market has had mixed results. One of the most notable impacts mentioned by wholesalers is market saturation, where increased honey imports fill the market. This can potentially outstrip demand and lead to lower prices and a tougher competitive environment for local producers. Imports can also affect the perception of the price and quality of Yemeni honey, which can influence consumer behaviour. Wholesalers must adapt to these changes to maintain their market share and support the positioning of Yemeni honey as a high-quality product.

Retailers deliver honey to end users. They are small shops that buy semi processed or crude honey directly from producers, collectors and wholesalers. They process the honey and sell to local consumers. Their most pressing problem concerns high production costs, which significantly hamper the competitiveness and export potential of honey as a commodity. The decline of the beekeeping sector and resulting decrease in the number of hives drive up the cost of honey production. This limits the ability of local honey products to compete with imported products and restricts entry into potentially lucrative export markets.

Responsibility for addressing and resolving this issue is shared. Key ministries like agriculture, industry and trade, in collaboration with international agencies, have a role to play in policy formulation and providing support and resources to revive the beekeeping industry. Potential solutions include the establishment of laboratories to examine the specifications and quality of honey, which would ensure the

premium quality required for international markets. Additionally, establishing a canning and packaging line centre could standardize the final product for export, help reduce costs through economies of scale and improve overall marketability.

Retail participants recognized the systemic nature of the challenges faced as well as the need for strategic interventions at different stages of the supply chain. They highlighted the urgency of sector-wide improvements that can only be adequately delivered through collaborative efforts involving both government and industry stakeholders.

Consumers comprise different target markets. First, there are local markets where honey is distributed to local stores and markets to meet the needs of consumers in the area. Local consumers value having access to honey products that are readily available and easy to purchase. Additionally, honey is exported to Arab and European markets, indicating demand for honey in these regions as consumers appreciate and seek out Yemeni honey products. Some consumers actively seek high-quality natural and healthy products, and are willing to visit specialty stores to find such products.

Consumers often prefer premium honey that is natural and free from impurities and harmful chemicals. They also value honey from a trusted, reliable source, and want to know the origin and region where it was produced. Taste and flavour are important factors. A distinct, appealing flavour can range from sweet to tangy or herbal. Consumers are also looking for honey that offers health benefits and contains nutrients and active compounds that can support their well-being and strengthen their immune systems.

Trust is crucial for consumers. Some rely on products with certifications and accreditations from recognized bodies, such as organic or quality certificates. Attractive packaging that is safe, convenient and provides adequate protection to the honey also draws consumers.



6. Support provided by the honey value chain

6. Honey value chain supports

Several key supports facilitate the performance of key value chain players.

Agriculture offices support small-scale beekeepers and cooperatives to produce and market honey. They advise on the use of modern hives to improve the quality and quantity of honey produced. In line with production tips, they advise small beekeepers on marketing and selling their honey, such as through cooperatives or in bulk in high-value markets.

The study found the lack of effective implementation of legislation and laws as a significant and powerful problem impacting the agricultural sector, particularly the honey value chain. The root cause of this challenge is the weakness of State institutions, which struggle to function properly in a context of heightened conflict. This has led to the degradation of plant cover, particularly bee pastures essential for beekeeping and honey production.

Bee populations decline along with honey yields, affecting the livelihoods of those who depend on beekeeping as a source of income. The responsibility for addressing and resolving these issues ultimately lies with the Government, which is responsible for strengthening institutional frameworks, enforcing relevant legislation and fostering a stable environment conducive to reversing the decline of vegetation and fostering the beekeeping industry. These findings highlight the need for government intervention and policy implementation to safeguard and revitalize the honey industry in Yemen.

Yemen's agricultural offices have put forward a range of strategic solutions to strengthen the honey industry value chain, aiming to improve support for producers across multiple dimensions of the business. Efforts include preserving and improving local bee pastures and establishing a regulatory framework that facilitates friendly and productive farmer-beekeeper relationships.

The Federation of Yemen Chambers of

Commerce plays a central role in supporting the honey value chain. It can advocate for more favourable policies and regulations for the honey industry, thereby improving the legal and economic environment for beekeepers and honey traders. Such actions can facilitate greater market access and foster networking opportunities, connecting local honey producers with national and international buyers. The federation also provides essential business development services, including training and skills development in business management, marketing and finance, which are key to building a solid honey value chain. It helps guide honey producers in meeting quality standards and obtaining necessary certifications that can increase the competitiveness of Yemeni honey internationally.

The federation's dissemination of research and industry data provides stakeholders with information for strategic decision-making. Organizing participation in exhibitions and trade fairs is an avenue to help honey producers present their products on a bigger stage, thereby improving their visibility and attracting potential customers.

Quality control and certification bodies are responsible for setting and enforcing quality standards for Yemeni honey. They conduct quality control tests, inspect production facilities and grant certifications for honey that meets specific criteria, such as organic or fair-trade certifications.

The Agricultural Research Authority conducts scientific studies, develops best practices and provides technical support, including training and capacity-building for beekeepers and cooperatives on different aspects of beekeeping. Research findings contribute to the overall growth and sustainability of the Yemeni honey industry.

The General Administration of Agricultural Marketing and Trade at the Ministry of Agriculture and Irrigation, which is responsible for monitoring agricultural trade, ensuring quality standards, and supporting the marketing of agricultural products, has indicated several important challenges facing the sector. These include unregulated exports and imports, which lead to downstream problems such as inadequate post-harvest processing, the absence of dedicated export centres for processing, widespread adulteration of products, diminished value and credibility, and, consequently, the circulation of unreliable products within the country.

The root causes of these shortfalls include gaps in the current operational framework of beekeepers, traders and exporters as well as in monitoring by relevant government agencies. The consequences are far-reaching, compromising the potential growth and reputation of the agricultural sector, particularly the production and trade of honey, and affecting the quality of life among those who depend on this industry.

Various stakeholders share responsibility for addressing these issues. Beekeepers must adhere to higher standards, traders and exporters must adopt fair practices, and government agencies must enforce and perhaps introduce comprehensive regulations.

Solutions involve implementation of a well-defined mechanism for regulating exports and imports, the creation of centres specialized in the processing of products intended for export and the significant intensification of awareness campaigns aimed at educating all parties on best practices, the importance of quality and the long-term benefits of credibility and reliability. Through collaborative efforts and adherence to strengthened standards and regulations, Yemen can restore the integrity of its agricultural products, ensuring their value in local and international markets.

The Marketing Department of the Ministry of Agriculture has identified the unregulated nature of export and import practices as a critical challenge. This stems from the lack of a robust regulatory framework and effective

enforcement mechanisms, manifesting in a variety of detrimental ways. The consequences include the absence of essential post-harvest processing facilities, leading to potential spoilage and waste. A shortage of export centres capable of processing agricultural products for foreign markets hampers the ability of local producers to compete globally. Fake products have eroded confidence in quality, affecting the credibility of the entire agricultural sector.

The responsibility for addressing these issues and developing solutions lies with an integrated network of stakeholders. This includes beekeepers, whose practices directly affect product quality; traders and exporters, who are integral part to the supply chain; and government agencies responsible for policy development and implementation. To address these issues, a multipronged strategy is suggested. This includes establishing an appropriate regulatory mechanism to supervise exports and imports to ensure compliance with quality standards, and creating or strengthening export centres equipped for the efficient processing of products to bring them up to international standards. An increased focus on awareness and education would help align all parties with best practices and deepen understanding of the value and need for credibility and reliability in the marketplace. Collectively, these measures can be part of a comprehensive response that not only addresses the immediate problem of unregulated trade but also builds a more resilient and respectable reputation for Yemeni agricultural products internationally.

The Marketing Department of the Ministry of Agriculture plays a multifaceted role in the honey industry value chain, contributing significantly to its structure, quality and scope. The department establishes essential legislation and regulations to standardize the practices, safety and quality of honey products. In terms of direct support to honey producers, the entity provides financial assistance and funds, helping them cover costs associated with production and potentially investment in innovative practices. There is also a commitment to strengthening research and development, demonstrating the entity's recognition of the importance of continuous improvement and adaptation in the industry.

A full range of training programmes and technical consultations helps to improve grower skills. These programmes cover practical aspects such as effective bee care techniques, honey extraction methods, and the management of diseases and pests that affect bee colonies. Such training ensures that beekeepers are well equipped to effectively manage their operations, leading to improved productivity and product quality. Additionally, the marketing department promotes the honey industry both nationally and internationally.

Through marketing campaigns and engagements in various markets, it seeks to increase the visibility of local honey products and facilitate connections with potential buyers. Logistical support allows producers to obtain better market access. This includes facilitating transportation, storage and distribution channels to ensure that honey reaches consumers in excellent condition and within an optimal time frame.

The Microfinance Office provide credit services to traders and cooperatives. Financial institutions play a vital role in the development of the honey production industry by extending the necessary financing to honey producers. This support allows farmers to acquire beehives, essential beekeeping equipment and other resources needed for efficient production.

The availability of financing indeed constitutes a beneficial stimulus, potentially leading to greater production capacity and the overall growth of the industry. By investing in key tools and infrastructure needed for beekeeping, these institutions not only promote the expansion of individual operations but also help increase national honey production. Beyond the initial purchase of equipment, however, financial institutions need to consider the long-term sustainability and profitability of these businesses. Adequate financial support must be complemented by educational programmes and resources that enable farmers to maximize the use and lifespan of their hives and effectively manage honey production.

In discussing the impact of these financing mechanisms, it is also worth considering the broader economic implications. By giving honey producers the financial means to improve their methods and expand their businesses, these institutions indirectly support rural livelihoods and can help alleviate poverty. Ultimately, financial institutions that support honey producers bolster the honey value chain and lead the industry towards a stronger and more productive future. Their role could be further strengthened by a more integrated approach, such as by linking financial services with sector-specific training and development programmes.

Stakeholders and their roles in Yemeni honey production

These actors collaborate and interact within the honey value chain to ensure the production, processing, distribution and marketing of Yemeni honey to domestic and international markets.

Given concerns raised by various stakeholders, it is clear the honey sector faces critical challenges in quality control and standardization, despite the introduction of national standards in 2019. There is a notable gap in awareness and adoption of standards across the value chain, leading to inconsistencies in honey quality and reliability.

Adulteration is a significant problem that jeopardizes the integrity and marketing of Yemeni honey. Mixing local honey with imported products compromises the authenticity that Yemeni honey is known for, seriously affecting consumer confidence and export potential. Additionally, beekeepers' limited access to modern beekeeping technologies and training limits their ability to produce high-quality honey and other bee products.

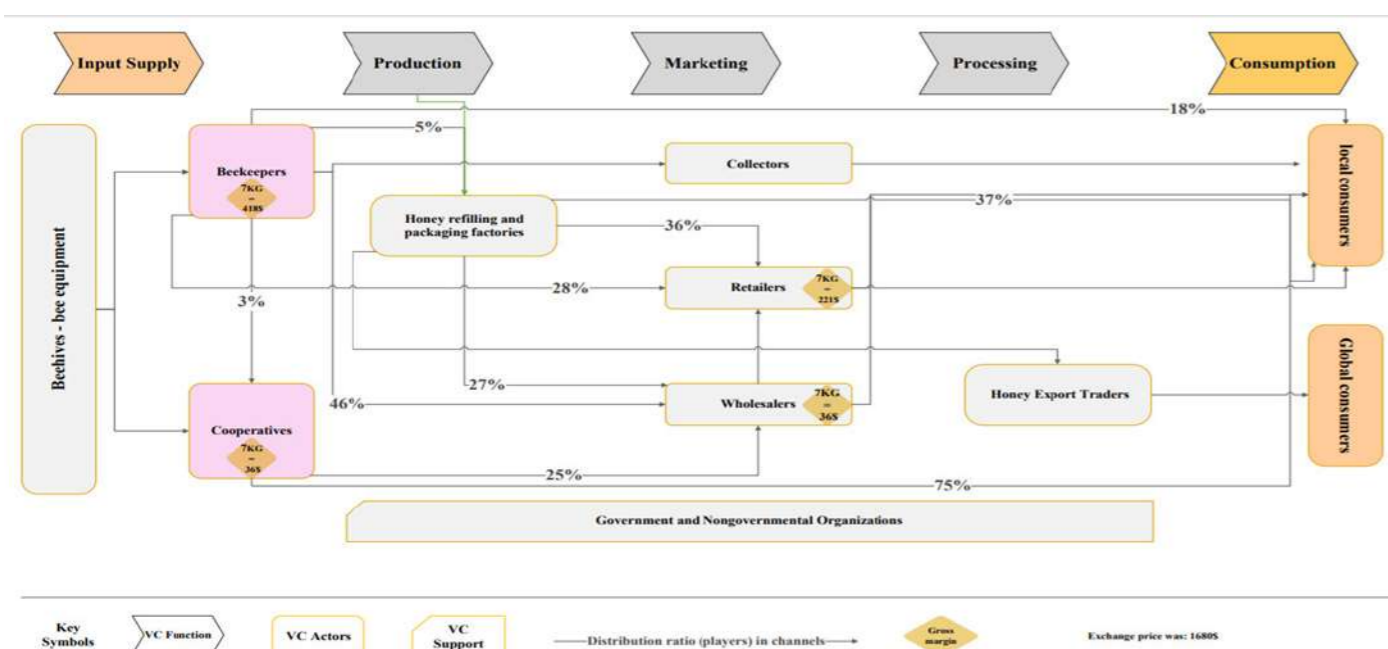
Certification represents a major obstacle to reaching international markets. Stakeholders aspire to meet the rigorous standards demanded by markets in the United States of America and Europe but fall short due to the absence of necessary advice and technical support. Overcoming these barriers requires concerted efforts by government and non-governmental organizations and industry experts. Strong education campaigns could promote newly established standards, investments to prevent honey adulteration, initiatives to provide modern beekeeping equipment, comprehensive training programmes for beekeepers and support for obtaining quality certifications in line with international expectations.

Within the study region, stakeholders are linked through primary pathways that facilitate the movement of honey to its end-users, as outlined in the subsequent mapping. Figure 7 delineates the multiplicity of interactions and processes from production to consumption. At the heart of this map is product flow, or the journey of honey from beekeepers to consumers, represented by arrows marking each transition through the collection, processing and distribution phases.

Product dynamics are complemented by information flow, which means the exchange of crucial data among chain actors, encompassing market trends, pricing, consumer insights and compliance with regulations. Beekeepers, for example, could assimilate best practices from research organizations or adjust their production in response to wholesalers' demands for quality and volume.

Support services are another layer of the ecosystem, representing various entities that support the operation of the chain but are not directly involved in the movement of honey through the chain. Services such as agricultural extension, financial loans, equipment supply and logistics are essential cogs in the machinery, facilitating smooth operations and improving overall efficiency of the honey value chain. This holistic representation allows stakeholders to perceive how products, capital and information intertwine, and the opportunities to refine and increase efficiency and profits at each stage of the chain. These embody the collective potential to strengthen the growth and sustainability of Yemen's honey industry.

Figure 7: Honey value chain: from beekeeping to consumption in southern Yemen



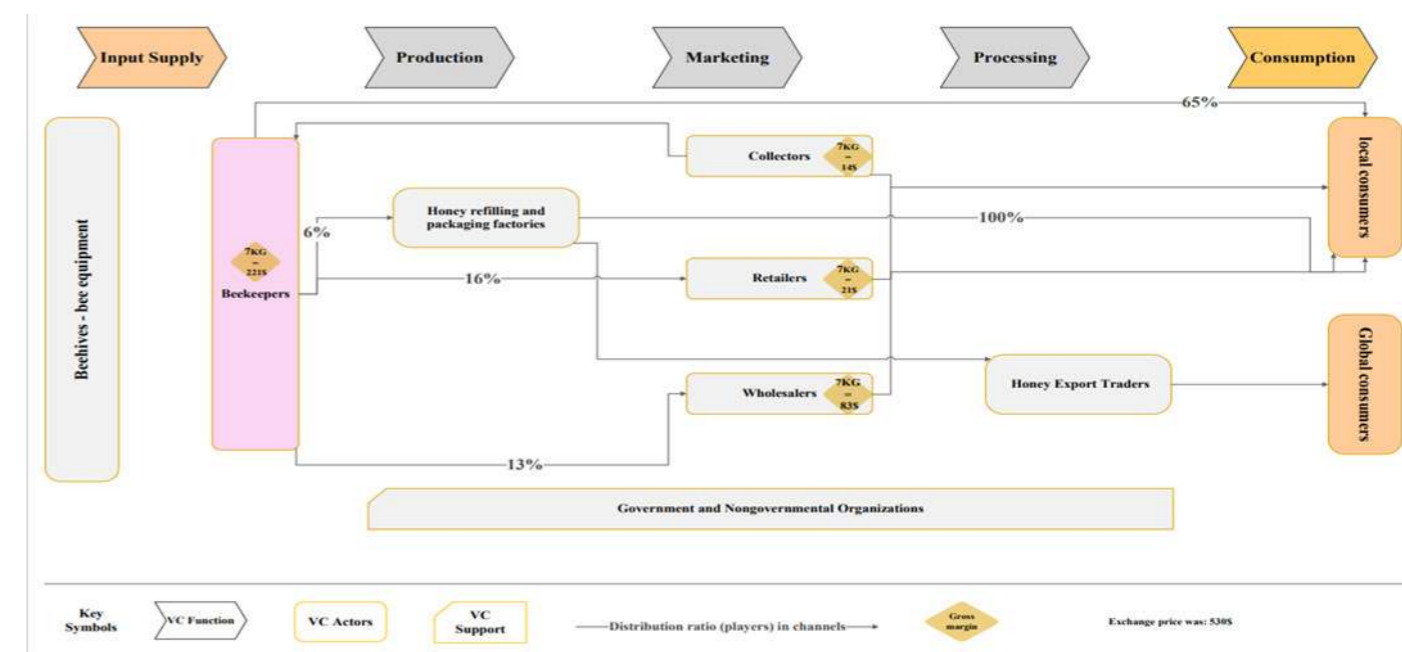
In the study area, beekeepers are the dominant actors in the honey value chain, receiving around 69 percent of the value added distribution. Wholesalers play a smaller but crucial role, purchasing the honey and providing distribution channels while ensuring a profit margin of around 17 percent. Retailers, who offer a variety of non-honey products, keep about 16 percent of the profits. Exporters play a key role in accessing high-end markets. The value chain also includes actors such as equipment suppliers, trainers and quality certification bodies, which are essential to meeting standards expected by international markets. Functions within the value chain include beekeeping, production, processing, certification, marketing and retail. These functions are essential to the circulation of honey in the market, ensuring that the product reaches consumers with the value created at each stage properly distributed among participants.

Actors are organized hierarchically, with different degrees of value capture and functional responsibility. Economic benefits are unequally distributed, with beekeepers

receiving the lion's share of 78.72 percent of the trade margin, highlighting their central role in value creation. Wholesalers, who capture a smaller portion of the value (21.42 percent), play a crucial intermediary role in handling and distribution. Retailers with 10.31 percent represent a more modest share but are nevertheless essential to final consumer transactions. The number of exporters is not specified but they are particularly important in introducing Yemeni honey to international markets and thus influencing the profitability of the entire chain.

Supporters of the value chain—suppliers of equipment, trainers and quality certificates—do not benefit directly in monetary terms but contribute indirectly to integrity and competitiveness in the global market for honey products. Functions within the chain, including production, quality control and marketing, are analysed to show value added points and potential bottlenecks. This builds a comprehensive picture of how honey is produced, processed and marketed in Yemen's unique socioeconomic context.

Figure 8: Honey value chain: from beekeeping to consumption map in northern Yemen



Although the value chain analysis map highlights how beekeepers are the main beneficiaries in terms of profits, differences in intermediary roles and margins suggest distinct regions or market sectors in Yemen. This is further reinforced by the variable exchange rates: 530 Yemeni riyals to the US dollar, indicating a stronger local currency, compared to 1,680 Yemeni riyals, indicating a weaker currency or market less integrated with global prices.

Beekeepers in northern Yemen, who may face higher production costs or a less favourable exchange rate, operate with a profit margin of 66.16 percent, which is large but much lower than the 96.09 percent enjoyed by their southern counterparts. This suggests an “aggregated” value chain in northern Yemen that is longer and has additional assembly costs. This variance in structure is reflected in the very different margins of wholesalers: 29.96 percent in northern Yemen compared to 7.84 percent in southern Yemen. This points to greater influence by wholesalers in the northern market, perhaps due to stronger relationships with beekeepers or less competition.

Retailers in the northern market operate with a small margin of 5.04 percent, compared to a large margin for their southern counterparts of 47.83 percent. This may indicate a highly competitive retail environment, a different pricing strategy or even a market with less consumer purchasing power. The presence of cooperative societies only in southern Yemen adds another layer of intrigue. While similar margins to wholesalers suggest that cooperatives have not fundamentally changed pricing dynamics, their impact likely extends beyond the numbers as they potentially provide beekeepers with access to resources, training and power collective bargaining.

These differences offer insights into the multifaceted world of Yemeni honey, where regional differences, market structures and even exchange rate fluctuations contribute to a complex and dynamic value chain.

6.1 Value chain performance

The study confirmed that Yemeni honey enjoys a strong reputation, especially in neighbouring Gulf markets, and that there is potential for expansion into global markets, leveraging unique quality attributes. Performance analysis, however, also highlighted several systemic inefficiencies. While some beekeepers and exporters make large profits, many small-scale producers are not maximizing their potential due to gaps in knowledge transfer, market access and financial support.

This variation in performance indicates the need for improved collaboration and organization among producers, as well as strengthened links with the market. The study highlights the lack of quality assurance facilities and standardized practices, which currently hamper the ability to support and grow the international consumer base. By addressing these areas of concern, there is an opportunity to significantly improve overall performance of the honey value chain to meet current and future market demands.

Performance can be assessed along various dimensions, revealing a complex interplay of factors. Ongoing conflict, seasonal fluctuations in production, resource limitations and logistical obstacles all hinder the journey of honey from producer to consumer and introduce inefficiencies. Beekeepers face significant financial pressures, with high costs of essential inputs such as bee food and modern hives often outweighing revenues from honey sales, thereby diminishing profits.

Sustainability issues are important as deforestation, invasive species such as gypsy moths and harmful vegetation like damsel trees threaten the future of beekeeping. These factors underscore the need for strategies to ensure the long-term viability of the honey value chain. There is a notable gap in value added activities. Although Yemeni honey is primarily sold as raw honey, the by-product market is largely untapped, suggesting potential for economic expansion.

Quality control is another area requiring special attention. The counterfeiting and adulteration of honey are common, with techniques such as nuclear magnetic resonance analysis proposed to authenticate the purity of honey. Additionally, inadequate branding and marketing efforts limit access to broader markets and constrain the commercial scope of the value chain and its overall growth potential.

6.2 Business enabling environment

Taking full advantage of strong global demand for Yemeni honey and overcoming existing supply constraints depends on creating a business-friendly environment. This involves targeted interventions and strategic initiatives in several key areas.

Policy and regulatory framework

Streamlining regulations: Simplifying and clarifying regulations related to honey production, processing and trade will reduce barriers to entry and encourage investment.

Quality control and certification: Establishing and enforcing clear quality standards and certification processes will improve the reputation and marketability of Yemeni honey.

Combating adulteration and fraud: Implementing measures to prevent adulteration of honey and ensure its authenticity will protect consumers and maintain the integrity of the industry.

Infrastructure development

Improve transport networks: Investing in better road infrastructure will make it easier to transport honey from production areas to markets, reducing spoilage and costs.

Improve processing and storage facilities: Establishment of modern honey processing and storage facilities will increase production capacity, improve quality and extend shelf life.

Promote sustainable packaging: Encouraging the use of high-quality, sustainable packaging materials will preserve the quality of honey and attract environmentally conscious consumers.

Capacity-building and knowledge transfer

Training and education: Providing beekeepers with training on modern beekeeping techniques, hive management and quality control will improve productivity and product quality.

Promote research and development: Investing in research into Yemeni honey varieties, bee health and sustainable production methods will drive innovation and competitiveness.

Facilitate knowledge-sharing: Creating platforms for knowledge exchange and dissemination of best practices among beekeepers will drive industry-wide improvement.

Access to finance and investment

Financial inclusion for beekeepers: Improving access to affordable credit and financial services will enable beekeepers to invest in their operations and increase production.

Attract private sector investments: Creating a favourable investment climate will encourage private sector participation in the honey value chain, thereby stimulating growth and innovation.

Support cooperatives and associations: Strengthening beekeeping cooperatives and associations will improve collective bargaining power, facilitate access to resources and promote sustainable practices.

Market development and promotion

Branding and marketing: Developing a strong brand identity and marketing strategy for Yemeni honey will improve its visibility and premium positioning in international markets.

E-commerce and digital platforms: Leveraging e-commerce platforms and digital marketing channels will expand market reach and directly connect producers with consumers.

Trade fairs and exhibitions: Participation in international trade fairs and exhibitions will introduce Yemeni honey to a global audience and facilitate export opportunities.

6.3 Honey marketing

Honey marketing is a multifaceted process that involves understanding consumer preferences, market trends and the complex network of players that move honey from hive to table. The honey industry is diverse and encompasses a range of products, from mass-produced varieties to niche artisanal offerings. In recent years, the focus has shifted to sustainability, traceability and quality, with consumers increasingly interested in the origin and production methods of the honey they purchase. Marketing strategies must both promote the natural benefits of

the product and adapt to changing consumer expectations and regulatory standards. The challenge is to balance traditional practices and modern marketing techniques to effectively position honey in competitive food markets while ensuring the sustainability and growth of apiaries. Given these dynamics, a strategic approach to marketing is essential to the commercial success of honey producers and sellers.

6.4 Domestic market for honey

The domestic market for honey in Yemen is predominantly characterized by local consumption, where a considerable amount of honey produced is for self-consumption or familial gifts, with trade through informal rather than formal market channels. Ongoing conflict poses significant challenges, creating supply constraints due to the destruction of hives and transportation difficulties, and adversely impacting demand. The honey industry also confronts environmental hurdles such as decreasing bee populations and suboptimal rainfall, alongside problems with pests. Quality concerns include instances of adulteration tarnishing the reputation of Yemeni honey domestically and potentially in export markets.

Honey production underpins the livelihoods of approximately 100,000 beekeepers in Yemen, playing a critical role in the country's food security and nutrition. Despite the present difficulties, the sector holds considerable potential for development that could fortify the economy and sustain communities, if current challenges can be effectively managed.

6.5 End market analysis

An end market analysis seeks to understand the demand dynamics affecting a particular sector or industry. It explores various aspects such as who consumers are, what they buy, why they prefer specific products and how they make their purchasing decisions. This helps identify market opportunities and challenges. In the specific context of developing the honey value chain in Yemen, the study provides a few relevant points.

1. Varieties: The honey produced in different parts of Yemen enjoys demand due to its variety. For instance, sidr honey made from jujube trees and sumor honey from vachellia tortilis are popular.

2. Adulteration: There seems to be a significant issue with honey adulteration. This impacts the reputation of Yemen's honey and poses challenges in ensuring high standards for the export market.

3. Export opportunities: Yemen's honey has potential export opportunities, given the unique sidr honey it produces. Yet it faces competition from other countries producing sidr honey, including Iraq and Saudi Arabia.

4. Quality control: A necessary part of end-market satisfaction and acceptance is stringent quality control. The study suggests that nuclear magnetic resonance analysis could be adopted to guarantee purity and subsequently increase the market value of honey.

5. Branding: Branding is still in its infancy in this sector, hinting at the potential of improved marketing and branding to increase market reach and perceived value.

6. Pricing: Honey prices are influenced by supply and demand dynamics. They are lower during the harvest period and rise outside of it. While these points shine light on some aspects of the end market scenario, a complete end market analysis might require further

research and a more profound exploration of trends in consumer demands, preferences and behaviours. The absence of consistent standards for Yemeni honey can have a significant impact on its reputation in several ways.

First, the lack of standardized quality control measures can result in significant variations in product quality. This undermines the reliability of the product, leading consumers to question its value and potentially to seek alternatives.

Second, inconsistent standards erode trust and authenticity. Consumers and buyers may doubt the quality and purity of Yemeni honey, especially when there are concerns about some producers mixing it with cheaper imported alternatives. Trust plays a crucial role in consumer decision-making, particularly for food products.

Third, inconsistent standards create challenges in exporting Yemeni honey. Many international markets require specific quality certifications, which may be difficult to obtain without strict and consistent standards in place. The absence of consistent standards can contribute to a negative brand image for Yemeni honey as a whole. If quality varies widely, it can lead to a general perception that Yemeni honey is of inferior quality, affecting all producers regardless of the quality they individually produce.

Lastly, inconsistent standards can pose potential health risks if safety and hygiene standards are not universally upheld. This can have severe consequences for the reputation of Yemeni honey, especially when adverse health effects are linked to consumption.

To buoy consumer confidence and maintain a strong reputation, it is crucial to establish and enforce consistent quality standards throughout the Yemeni honey industry. This will enhance overall quality, foster trust, facilitate exports and safeguard consumer health.

6.6 International market for honey

Yemeni honey, particularly premium varieties, is highly regarded in international markets. In wealthy Gulf countries, for instance, demand remains high. Key points about Yemen's position in the international honey market include:

Premium prices

Yemeni honey commands high export prices due to its perceived quality and medicinal properties, especially for the luxury sidr variant.

Quality concerns

The adulteration of Yemeni honey with cheaper varieties such as Kashmiri honey undermines its reputation. Without specialized honey centres or laboratories to assure quality prior to export, maintaining the high standard and reputation of Yemeni honey in the international market is a challenge.

Seasonality

The availability and price of Yemeni honey can vary throughout the year, which may influence trade volumes. For example, Sidr honey has high prices and high trade quantities during certain months.

Environmental concerns

Deforestation for firewood, the impact of pesticides on bees, and other environmental issues can affect honey production levels, which in turn can have implications for both domestic and international markets.

Export dynamics

The majority of Yemen's exported honey is the expensive sidr type, which may explain the discrepancy between domestic and export prices. The local market accounts for a wider variety of honey types, including less expensive ones.

Informal trading and financial challenges

Informal trading can affect formal sales and exports. Access to finance for beekeepers, especially in conflict areas, is considered risky, which can limit the capacity of producers to scale up for export.

Despite its esteemed position in the global market, Yemeni honey's export viability faces hurdles related to quality verification, environmental stewardship and the establishment of robust trade routes. Addressing these challenges is imperative for safeguarding and advancing Yemen's honey exports. A report in 2018, based on data from the Federation of Yemeni beekeepers, found that Yemen exported 50,000 tons of honey per year before the war took place in 2015. Exports have since fallen by more than 50 percent due to the conflict.

6.7 Market routes, actors and channels

Analysis of market routes, players and channels within the Yemeni honey sector reveals a complex network with distinctive characteristics. Beekeepers are the fundamental players, directly engaged in honey production and typically selling their products through multiple channels, including direct sales to consumers, wholesalers or exporters. The study found that the most effective business route for beekeepers was to establish relationships with exporters, based on trust and higher prices. Wholesalers play a central role, buying in bulk and selling to various stakeholders, including exporters and retailers. Retailers, who often act as exporters, distribute honey nationally and play a key role in selling small quantities. The channels used are traditional, with a heavy reliance on personal relationships and word of mouth, as well as modern methods such as digital marketing through social media platforms.

While the study confirmed the effectiveness of these traditional routes and personal networks, it also highlighted the potential benefits of more formalized and diversified marketing strategies, which could include online marketplaces and international trade fairs, thereby broadening the reach and improving the profitability of Yemeni honey in national and global markets. Market routes, players and channels could be as follows.

Market routes: These refer to the specific pathways that honey takes from the point of production to the end consumer. They could include local sales directly from producer to consumer, sales through platforms like farmers' markets or local grocery stores, wholesale to larger store chains, and exports to foreign markets.

Actors: The primary actors are beekeepers as the main producers of honey; processors, typically businesses or individuals who process raw honey to ensure it is safe and appealing for consumers; distributors responsible for moving the honey from processors to various retail outlets; retailers, the final point of sale for consumers, including grocery stores, farmers' markets, or online platforms; consumers who purchase and consume the honey; and other stakeholders such as government agencies (who oversee regulations and might provide subsidies), non-governmental organizations (who might offer support or funding for projects in the sector) and research institutions (who might contribute to improving production practices or developing new honey-related products).

Channels: These refer to the ways in which the honey is sold to the end consumer. For example, honey might be sold directly from beekeepers to consumers, or it could be sold to a distributor who then sells it to a grocery store. Other channels could include online sales, sales through food service outlets (like restaurants or cafes) or exports to foreign markets. The choice of channel could depend on various factors like the size of the beekeeping operation, the demand for honey in different markets, and the resources available to the beekeeper.

6.8 Honey marketing channels

The collapse of honey marketing channels in southern Yemen reveals a heavy reliance on middlepersons, particularly wholesalers, and a fragmented approach to reaching consumers. A significant 46 percent of honey passes through wholesalers before reaching consumers, indicating a complex supply chain that likely reduces producers' profit margins. Direct sales from producers to consumers represent only 18 percent, highlighting a missed opportunity to capitalize on direct relationships and potentially higher revenues.

Interestingly, cooperatives play a dual role, both selling directly to consumers (75 percent) and

engaging with wholesalers (25 percent). This suggests that cooperatives could play a key part in empowering producers by offering alternative routes to market. Likewise, processors take a mixed approach, selling through retailers (36 percent), wholesalers (27 percent) and directly to consumers (37 percent). This diversification could provide processors with greater flexibility and market reach.

The honey market in southern Yemen is complex, with a heavy reliance on middlepersons. Strengthening direct-to-consumer distribution channels, empowering cooperatives and optimizing processors' distribution strategies could lead to a more efficient and profitable honey value chain.

The main honey marketing channels identified from the point of production until the product reaches the final consumer in southern Yemen were:

Channel I: Producers ⇒ Consumers = 18%

Channel II: Producers ⇒ Retailers ⇒ Consumers = 28%

Channel III: Producers ⇒ Cooperative ⇒ Consumers = 3%

Channel IV: Producers ⇒ Processors ⇒ Consumers = 5%

Channel VI: Producers ⇒ Wholesalers ⇒ Consumers = 46%

Channel I: Cooperative ⇒ Consumers = 75%

Channel II: Cooperative ⇒ Wholesalers = 25%

Channel I: Processors ⇒ Retailers = 36%

Channel II: Processors ⇒ Wholesalers = 27%

Channel III: Processors ⇒ Consumers = 37%

Unlocking the full potential of the southern honey sector calls for a multi-pronged approach. The empowerment of producers should be paramount. This involves encouraging and supporting them in diversifying their marketing channels by facilitating access to retail sales opportunities, promoting direct sales and strengthening producer organizations.

At the same time, it is crucial to invest in added value. Promoting honey processing and value added product development will help to meet diverse consumer preferences and unlock higher profit margins. Cooperatives play a vital role and should be strengthened to efficiently aggregate, market and potentially process honey, ensuring better prices for their members. Finally, providing producers with current and accurate market information on prices, demand and consumption trends is essential for informed decision-making and a more resilient honey sector.

Compared to the south, honey marketing channels in the north have a more streamlined and producer-centred structure. Direct sales

The main honey marketing channels identified from the point of production until the product reaches the final consumer in the north were:

Channel I: Producers ⇒ Consumers = 65%

Channel II: Producers ⇒ Retailers ⇒ Consumers = 16%

Channel III: Processors ⇒ Consumers = 100%

Channel IV: Producers ⇒ Processors ⇒ Consumers = 6%

Channel VI: Producers ⇒ Wholesalers ⇒ Consumers = 13%

The northern honey market is characterized by a powerful direct sales model, which gives producers greater control and fosters strong relationships with consumers. This direct connection is a unique strength of the region. Yet there is still untapped potential. Expanding partnerships with retailers could broaden reach, while exploring value added products could diversify revenue streams. Additionally,

from producers to consumers dominate the market, capturing a remarkable 65 percent share. This direct approach gives producers greater control over pricing, fosters stronger customer relationships, and likely results in higher profit margins due to the elimination of costs for middlepersons.

Although wholesalers still play a role in the north, their influence is considerably reduced compared to the south, which has only a 13 percent market share. Retailers represent a 16 percent share.

Interestingly, northern processors appear to operate exclusively through direct-to-consumer sales (100 percent). This suggests a potential focus on value added products or specialty honey varieties that cater to a niche market. The northern Yemen honey market presents a more efficient and potentially profitable model for producers, primarily driven by the dominance of direct sales and reduced reliance on middlepersons. This streamlined structure empowers producers and promotes a closer bond between beekeepers and consumers.

a deeper understanding of the dynamics between traders and processors could open opportunities in specialized honey markets and even doors to exports. While northern beekeeping provides a promising foundation for producers, strategic exploration of growth areas can further amplify success and market penetration.

Honey marketing channels in Yemen reveal significant differences between the south and north. In the north, 65 percent of honey is sold directly from producers to consumers, fostering stronger relationships and higher profit margins. In southern Yemen, this percentage is much lower, at 18 percent, indicating a missed opportunity for producers. Sales through retailers are also higher in the south, at 28 percent compared to 16 percent in the north. Cooperatives play a limited role in the south, accounting for 3 percent of sales to consumers, while 75 percent of cooperatives sell directly. Northern Yemen does not have data on cooperative sales, but 6 percent of honey is sold through processors, similar to the 5 percent in the south.

North Yemen in particular highlights a strong focus on direct sales, with 100 percent of processors selling directly to consumers, with a focus on value added products. In contrast, southern Yemen relies heavily on wholesalers, with 46 percent of honey going through this channel compared to only 13 percent in the north. Overall, the southern honey market is characterized by a complex supply chain that reduces producers' profit margins. The northern market benefits from a more streamlined direct sales model, providing greater control and profitability for producers. Strengthening direct sales and cooperative structures in the south could improve market efficiency and producers' incomes.

Marketing channel	Northern Yemen	Southern Yemen
Producers ⇒ Consumers	65%	18%
Producers ⇒ Retailers ⇒ Consumers	16%	28%
Producers ⇒ Cooperative ⇒ Consumers	N/A	3%
Producers ⇒ Processors ⇒ Consumers	6%	5%
Producers ⇒ Wholesalers ⇒ Consumers	13%	46%
Cooperative Sales ⇒ Consumers	N/A	75%
Cooperative Sales ⇒ Wholesalers	N/A	25%
Processors ⇒ Retailers	N/A	36%
Processors ⇒ Wholesalers	N/A	27%
Processors ⇒ Consumers	100%	37%

Comparative analysis of marketing channels in the north and south

A comparative analysis of honey marketing channels in northern and southern Yemen reveals stark differences, highlighting the impact of the supply chain structure on producer empowerment and profitability. Northern Yemen boasts a streamlined, producer-centric model where direct sales to consumers dominate (65 percent), fostering strong customer relationships and brand loyalty. This minimizes reliance on intermediaries like wholesalers (13 percent) and retailers (16 percent), empowering beekeepers with greater control over pricing and maximizing profit margins. In contrast, southern Yemen presents a fragmented landscape heavily reliant on wholesalers (46 percent), which adds layers of complexity and cost, ultimately diminishing returns for beekeepers.

Direct producer-to-consumer sales reach a mere 18 percent in the south, indicating a missed opportunity to capitalize on direct engagement and potentially higher earnings. While cooperatives in the south offer alternative routes to markets, handling 75 percent of their sales directly to consumers, the streamlined structure on the north, with processors also focused on direct sales (100 percent), fosters a more efficient and potentially profitable model for producers, strengthening the connection between beekeepers and consumers. This difference underscores the importance of supporting direct marketing channels and empowering producers in the south to enhance market access and financial well-being.

6.9 Main markets

Yemeni honey occupies a concentrated and high-value market niche. The majority of exports has traditionally gone to Gulf countries, where consumers highly value the unique qualities of Yemeni honey, such as its richness and

medicinal properties. These regional markets have always been lucrative, with strong and sustained demand. On the other hand, the study also points to the untapped potential of Western and non-regional markets, where artisanal and organic food products are increasingly valued. Entering these markets requires overcoming regulatory barriers and establishing a strong brand strategy to differentiate Yemeni honey from products with other origins. Additionally, the online honey market is emerging as an important sales channel, with e-commerce providing the opportunity to reach a wider customer base on a global scale. In short, while current core markets remain strong, there is a strategic opportunity to explore and cultivate diverse market segments to ensure long-term growth and stability for Yemeni honey producers. The main international markets for Yemeni honey are as follows.

Most honey is exported to neighbouring countries, specifically within the Arab region. Some honey is exported to countries in Asia and the Pacific. From 2020 to 2023, exports went to: Australia, Canada, China, Iraq, Kuwait, Jordan, Lebanon, Malaysia, Qatar, Saudi Arabia, Singapore, United Arab Emirates and the United Kingdom. The study does not provide exact shares of exports going to each of these countries due to unavailability of data.

Not all exported quantities are registered, with a considerable amount passing through borders as gifts. Actual market reach might be greater than officially recorded. As honey production quality and output improve, and assuming the political and security situations stabilize, Yemeni honey's market could potentially expand.

6.10 Buyers and competition

Competition in the honey market is fierce, particularly between local and regional producers vying for discerning consumers willing to pay more for high quality and authenticity. Although Yemeni honey enjoys some loyalty and high prices, producers face competition from cheaper, mass-produced honey as well as other regions specializing in premium varieties.

Such competition could be managed more effectively through better marketing strategies, better product differentiation and quality certifications to attract a wider range of buyers. Addressing these competitive challenges is crucial for Yemeni honey producers to secure and increase their market share, both locally and in an increasingly globalized honey market.

Honey is exported to various international markets, where buyers range from individual consumers to food companies and retailers. Some countries, such as Iraq and Saudi Arabia, have started producing their own sidr honey, suggesting increased competition in international markets for a product long associated with Yemen.

Domestically, the honey market is subject to supply and demand dynamics, with local traders reportedly making profits within the range of 20 percent while exporters can make 30 to 50 percent. One major issue in both domestic and international markets is the prevalence of counterfeit and diluted honey, which can erode trust and affect market reputation. Stronger branding and quality assurance mechanisms could enhance Yemen's position against its competitors.

6.11 Yemeni honey: market potential and growth opportunities

Yemeni honey, particularly its rare sidr variety, has significant market potential due to its unique qualities and the growing global demand for natural and ethically sourced products. This

represents a significant growth opportunity, particularly in lucrative Western markets where Yemeni honey remains relatively unknown. To capitalize on this potential, Yemeni producers must prioritize several key areas.

Quality control and certification: Establishing consistent quality standards and achieving internationally recognized certifications are essential to meeting consumer expectations, overcoming regulatory hurdles and building trust with international buyers.

Supply chain improvement: Addressing supply chain constraints and investing in modernization efforts will improve production efficiency, product quality and on-time delivery to meet market demands.

Branding and marketing: Developing a strong brand identity and targeted marketing strategies will increase awareness, differentiate Yemeni honey from competitors and establish a preferred market position.

Value added and innovation: Exploring value added products, such as honey-infused cosmetics or health supplements, can cater to niche markets and improve profitability.

Beekeeper training and empowerment: Investing in beekeeper training programmes on modern techniques, quality control and sustainable practices will empower producers and further improve product quality and production efficiency.

By strategically addressing these factors, Yemeni honey can secure a leading position in the global market, foster sustainable economic growth and establish itself as a premium product sought after by discerning consumers around the world.

6.12 Quality factors

Although purity testing confirms the authenticity of a significant portion of Yemeni honey, maintaining and improving its quality requires addressing several key areas.

Beekeeping practices: Implementing and promoting good beekeeping practices, including hive management and bee health, is essential to ensure high-quality honey production.

Harvesting and processing: Proper harvesting techniques, careful selection of honey-producing flora and access to modern processing equipment are essential to preserve the unique flavor and nutritional value of Yemeni honey.

Packaging and storage: Using high-quality, food-grade packaging materials and ensuring proper storage conditions are essential to maintaining honey quality and extending shelf life.

Quality control and authenticity: Implementing strict quality control measures, including advanced testing methodologies such as nuclear magnetic resonance analysis, is crucial to ensure authenticity, combat tampering and maintain the reputation of Yemeni honey.

Environmental sustainability: Protecting the natural environment, particularly sidr and salam trees essential for unique honey varieties, is essential to ensure the long-term sustainability and quality of Yemeni honey.

6.13 Demand/supply situation

The study provide some general insights into demand and supply dynamics in the honey industry.

Demand situation

The study revealed significant international interest in the unique qualities of Yemeni honey. This positions Yemeni honey favourably in the global market, yet competition from other honey producers and synthetic products could impact market share. Adapting to consumer trends that prioritize sustainability and ethical

production could further increase demand for Yemeni honey.

1.Growing demand for natural and healthy products: There is a global trend towards natural and healthy food products, including honey. Consumers are increasingly seeking natural sweeteners and are aware of the health benefits associated with honey consumption.

2.Cultural and culinary use: Honey has a long history of cultural and culinary use in many regions, including Yemen. It is used as a sweetener, ingredient and traditional remedy in various cuisines and cultural practices.

3.Export opportunities: The demand for specialty and premium honey products, such as sidr honey, has been increasing in certain markets.

Supply situation

The study highlighted a difficult situation in the supply of Yemeni honey, with production affected by internal conflicts and environmental problems such as deforestation and the use of pesticides. These factors hinder beekeepers' ability to maintain healthy bee populations and produce honey consistently. As a result, the supply of high-quality Yemeni honey, such as the coveted sidr variety, struggles to keep pace with strong market demand, both locally and globally. Addressing these supply constraints is crucial to sustain Yemeni honey production and fully meet existing demand.

1.Beekeeping practices and capacity: The supply of honey depends on the number of beekeepers, their beekeeping practices, and the capacity to maintain healthy bee colonies and harvest honey. Factors such as access to suitable forage, the availability of beekeeping equipment and knowledge of beekeeping techniques can influence supply.

2.Environmental factors: The availability of floral sources and favourable climatic conditions for beekeeping play crucial roles in honey production. Factors such as weather patterns, habitat preservation, and the impacts of pests and diseases on bee colonies can affect the overall supply of honey.

3. Infrastructure and processing facilities:

Adequate infrastructure for honey extraction, processing and packaging is essential for maintaining quality and quantity. Access to modern beekeeping technologies and processing facilities can contribute to increased production levels.

4. Market access and distribution channels:

The availability of market access and efficient distribution channels is important for connecting honey producers with buyers and consumers. Well-established marketing networks, both domestic and international, can influence the supply situation.

6.14 Business enabling environment

A business enabling environment reduces risks and transaction costs for businesses, thereby promoting innovation, investment and economic development. It includes several key elements.

Legal and regulatory framework

•Clear and consistent laws and regulations: Predictable rules governing business registration, taxation, contracts, labour and environmental protection.

•Efficient and transparent administrative processes: Streamlined procedures for obtaining permits, licenses and approvals, minimizing bureaucracy and delays.

•Fair and effective dispute resolution mechanisms: Accessible and impartial courts or arbitration systems to resolve commercial disputes.

Infrastructure

•Reliable physical infrastructure: roads, ports, airports, telecommunications networks and quality energy supply to facilitate transportation, communication and operations.

•Access to finance: availability of affordable credit, financial services and investment capital to support business growth and expansion.

•Access to information and technology: Reliable internet connectivity, digital infrastructure and

access to market information and technology resources.

Human capital and skills

•Skilled workforce: Availability of a workforce with the education, skills and training necessary to meet industry demands.

•Flexible labour market: Regulations that enable efficient hiring and firing practices while protecting workers' rights.

•Education and training systems: Institutions that provide relevant skill development and training programmes to meet the changing needs of the industry.

Culture and institutions

•Entrepreneurial culture: A society that values innovation, risk-taking and business creation.

•Low levels of corruption: Transparent and accountable governance that minimizes corruption and unfair practices.

•Strong protection of property rights: Legal framework that protects investments and intellectual property.

Market dynamics

•Fair competition: Policies that prevent monopolies and promote a level playing field for businesses of all sizes.

•Access to markets: Open trade policies, efficient logistics networks and access to domestic and international markets.

•Consumer protection: Regulations that ensure fair prices, product safety and consumer rights.

A business enabling environment requires collaboration among government agencies, the private sector, civil society organizations and international development partners. By removing constraints and fostering a favorable ecosystem, countries can attract investment, boost entrepreneurship and create a thriving business sector that drives economic growth and improves livelihoods.



7. Constraints and opportunities

7. Constraints and opportunities

The Yemeni honey study identified significant constraints, such as limited access to capital, a lack of modern beekeeping tools and insufficient quality control measures that hamper production growth. Despite these challenges, the study also highlighted key opportunities, including the high demand for Yemeni honey and the potential to create more resilient beekeeping practices.

To take advantage of these opportunities, improving knowledge sharing and quality assurance and promoting stronger linkages in value chains are potential strategies. Addressing constraints and exploring these opportunities could lead to a more robust and profitable honey sector in Yemen.

7.1 Constraints within the honey value chain

The main constraints include the impact of the ongoing conflict on transport and safe access to beekeeping areas, the decline in bee populations due to environmental degradation and the lack of modern beekeeping infrastructure. Additionally, quality control is a pressing concern, with honey adulteration affecting the reputation of Yemeni honey abroad. Limited market access for small producers, insufficient capital or credit facilities for expansion, and the need for better knowledge sharing among beekeepers are other challenges. Addressing these constraints is critical to strengthening the honey value chain and improving the livelihoods of those who depend on it.

Access to knowledge and training: Yemeni beekeepers often have limited access to training or knowledge about modern beekeeping methods, impacting the productivity and quality of honey. They also may lack skills in important areas such as accessing credit, marketing, packaging and quality control.

Financial barriers: The high costs associated with beekeeping, such as for land, beehives and other necessary equipment, can limit new entrants. Beekeepers may also struggle to access capital or credit, hindering the expansion of their businesses.

Production difficulties: Several issues can affect honey production. These include diseases that affect bees, extreme weather events and environmental changes, all of which can reduce quality and output.

Quality and authenticity: Honey adulteration is a global problem. It can affect the marketability of Yemeni honey, especially in markets with high standards.

7.2 Opportunities within the honey value chain

Yemen's honey value chain has significant opportunities for growth and development. A key opportunity is strong demand for Yemeni honey, particularly in Gulf countries, due to consumer preferences and the potential for higher prices. There is also potential to diversify and create value added products, such as honeycomb and honey-infused candies. Environmental initiatives, such as planting sidr trees, can provide sustainable forage for bees, promoting the ecological health of the region and honey production.

Technological advancements, such as the use of mobile apps for costing and honey profiling for quality assurance, can help beekeepers maintain standards and reduce production costs. Additionally, developing branding and marketing strategies can increase competitiveness in the global market. These opportunities, if exploited, could increase incomes for rural households, youth and women, promoting economic development and poverty reduction.

Sustainable livelihoods: Given Yemen's favourable conditions for beekeeping, there is potential for it to provide sustainable livelihoods, particularly in rural areas.

Value addition: Different by-products of honey, such as beeswax, propolis and royal jelly, can be produced and sold, adding value to the entire chain.

Training and skill-building: Investments in human capital development could enhance the technical skills of beekeepers, boosting productivity and income.

Certification and quality control: By implementing and adhering to high quality standards and achieving certifications, Yemeni honey can gain a reputation for quality, helping to secure access to more profitable markets.

7.3 Strengths, weaknesses, opportunities and threats analysis

Yemen has a rich heritage of honey production, with unique honey varieties popular in regional and international markets. The honey value chain, which encompasses beekeepers, input suppliers, honey collectors, processors, wholesalers, retailers and consumers, plays a vital role in the Yemeni economy, especially in rural communities.

This valuable sector faces formidable challenges, however. Ongoing conflict, the impacts of climate change, economic instability and limitations within the value chain itself hamper the growth and sustainability of the industry.

To overcome these complexities and unlock the full potential of Yemen's honey sector, a comprehensive understanding of its strengths, weaknesses, opportunities and threats is crucial. This analysis provides a structured framework for examining each stage of the honey value chain, identifying key factors that influence its performance and offering insights for strategic interventions.

By analysing internal and external environments, this analysis can guide stakeholders, including beekeepers, policy makers, development agencies and investors, in formulating effective strategies to improve the competitiveness, resilience and inclusiveness of Yemen's honey value chain.

Input suppliers

Strengths:

•**Local availability of basic inputs:** Simple beekeeping equipment, such as smokers and hive tools, can be produced locally, providing some price stability and accessibility.

•**Growth potential:** As the honey sector receives more support and investment, demand for beekeeping inputs is likely to increase, presenting growth opportunities for suppliers.

Weaknesses:

•**Limited access to modern equipment:** Suppliers may struggle to provide specialized or high-tech beekeeping equipment, which could hinder the adoption of modern beekeeping practices.

•**Fluctuating prices of imported inputs:** Yemen relies on imports for some beekeeping products, making suppliers vulnerable to global price fluctuations and exchange rate volatility.

Opportunities:

•**Partnerships and training:** Collaboration with international organizations or experienced beekeeping associations could improve access to higher-quality inputs and provide training on modern input management to suppliers.

•**Diversification of input sources:** Explore alternative suppliers or promote local production of currently imported inputs to reduce dependence on a single source and mitigate price risks.

Threats:

•**Economic instability:** The ongoing conflict and economic crisis in Yemen may have serious consequences for the purchasing power of beekeepers, reducing demand for inputs and making it difficult for suppliers to maintain profitability.

•**Supply chain disruptions:** Conflict, insecurity and damaged infrastructure can disrupt the importation and distribution of beekeeping inputs, leading to shortages and delays for beekeepers and producers.

Beekeepers

Strengths:

•**Traditional knowledge and experience:** Many Yemeni beekeepers inherit generations of beekeeping knowledge, providing a solid foundation for honey production.

•**Unique honey varieties:** Yemen is known for producing distinctive and high-value honey varieties that command a premium in domestic and international markets.

Weaknesses:

•**Limited access to modern techniques:** Traditional beekeeping practices may not be as effective or productive as modern techniques. Lack of access to training and information on modern beekeeping practices can harm productivity and quality.

•**Financial constraints:** Beekeepers, especially smallholders, often face difficulties in accessing credit and financial resources necessary for investments in modern equipment, hive management and business expansion.

•**Production challenges:** Yemen's harsh environment, including pests, diseases, unpredictable weather and the impacts of climate change, can significantly affect honey yields and quality.

Opportunities:

•**Training and capacity-building:** Invest in comprehensive training programmes to raise awareness among beekeepers on modern and sustainable beekeeping practices, hive management, pest and disease control and quality control measures.

•**Improved access to financing:** Facilitate access to microfinance loans, government grants or other financial instruments specifically designed to help beekeepers invest in their operations.

•**Value added product development:** Explore opportunities to diversify revenue streams by producing and marketing value added products such as beeswax, propolis, royal jelly or honey-based cosmetics.

Threats:

•**Climate change:** Increasing droughts, unpredictable precipitation patterns and extreme weather events pose a significant threat to bee colonies and honey production, potentially leading to lower yields and income for beekeepers.

•**Conflict and instability:** Ongoing conflict disrupts access to markets, increases transport costs and creates insecurity, making it extremely difficult for beekeepers to maintain their livelihoods.

•**Adulteration of honey:** The presence of adulterated honey on the market can harm the reputation of authentic Yemeni honey, impacting consumer confidence and potentially reducing prices for beekeepers.

Honey collectors

Strengths:

•**Established networks:** Honey collectors often have well-established relationships with beekeepers in different regions, giving them constant access to honey supplies.

•**Market knowledge:** They have a good understanding of local honey demand, pricing trends and consumer preferences, which allows them to negotiate effectively.

Weaknesses:

•**Lack of transparency:** Prices and transactions between honey collectors and beekeepers may lack transparency, potentially leading to unfair practices.

•**Limited quality control:** Consolidating honey from different beekeepers can result in uneven quality, impacting the overall reputation of Yemeni honey.

Opportunities:

•**Formalization and standardization:** Adopting standardized rating systems, transparent pricing mechanisms and formal contracts can create a fairer and more efficient system.

•**Value chain integration:** Working more closely

with beekeepers to provide training on quality standards and harvesting practices can improve the overall quality of collected honey.

Threats:

•**Competition:** Intense competition among honey collectors could lead to exploitation of beekeepers through low prices or unfair practices.

•**Transportation challenges:** Poor infrastructure, insecurity and limited access to reliable transportation can disrupt honey collection and increase costs.

Wholesalers and retailers

Strengths:

•**Market reach:** Wholesalers have established distribution networks, while retailers provide direct access to consumers, creating a combined force to reach diverse market segments.

•**Storage and logistics:** Wholesalers often have storage facilities to manage inventory, complementing retailers' focus on display and sales, ensuring a smoother flow of honey from producers to consumers.

Weaknesses:

•**Price sensitivity:** Wholesalers and retailers operate in a price-sensitive market, which risks reducing margins and making it difficult to obtain fair prices from beekeepers and offer competitive prices to consumers.

•**Quality control challenges:** It can be difficult to maintain consistent honey quality. Wholesalers might prioritize volume over quality, while retailers might struggle to verify the authenticity of honey from various suppliers.

Opportunities:

•Value added products and branding:

Wholesalers and retailers can benefit from investments in honey processing, packaging and branding to differentiate Yemeni honey and achieve higher prices.

•E-commerce and direct sales:

Expanding online sales channels can create new revenue streams, reduce reliance on intermediaries, and provide greater market access for wholesalers and retailers.

Threats:

•**Economic instability:** Fluctuations in exchange rates, inflation and reduced consumer purchasing power can negatively impact the profitability of wholesalers and retailers.

•**Competition:** The honey market faces competition from imported honey and alternative sweeteners. Wholesalers and retailers must collaborate to promote the unique qualities of Yemeni honey in order to remain competitive.

7.4 Constraints analysis

Analysis of constraints in Yemen's honey industry highlights a number of critical challenges. Internal conflicts in the region have complicated logistics, transportation and access to beekeeping territories, disrupting the supply chain. Environmental threats, such as deforestation and the use of toxic pesticides, have negatively impacted bee health, thereby affecting honey yields.

The lack of organization of beekeepers, combined with insufficient access to capital and modern beekeeping equipment, constricts production. Additionally, the lack of specialized honey centres and strict quality control measures has led to an increased risk of honey adulteration, thereby endangering the reputation of Yemeni honey on the global stage. Addressing these issues is critical to ensuring the sustainability and growth of Yemen's honey sector.

The Yemeni honey value chain faces several major constraints:

Lack of accurate cost calculation: Beekeepers either do not know how to calculate the real cost of production or do not want to disclose it.

High cost of Langstroth hives: This type of hive, which can increase honey production, is too expensive for many beekeepers, particularly in northern Yemen.

Adulteration of honey: The majority of Yemeni honey is reportedly adulterated, negatively affecting its reputation.

Deforestation of sidr trees: Significant numbers of these trees, one of the main sources of nectar for honey production, are being cut down.

Environmental challenges: Environmental factors, such as the uncontrolled gypsy moth attacking the sumor trees and the undesirable taste caused by the dams tree in honey, hinder honey production. Pesticides used in commercial farms are killing honeybees from nearby hives.

Impact of climate change: Given Yemen's already challenging climatic conditions, further effects of climate change pose a significant threat to honey production.

Lack of data and access to finance: Fragmented data sources and the private sector's lack of access to finance are notable constraints. Branding is in its initial stages.

Conflict and instability: The ongoing conflict and instability in Yemen significantly disrupt the honey value chain, hindering economic activities and logistics, and increasing future uncertainty. Developing strategies to address these constraints is critical for the development and sustainability of the honey value chain.



8. Upgrading strategies and interventions for the Yemeni honey value chain

8. Upgrading strategies and interventions for the Yemeni honey value chain

This strategy presents a roadmap to improve the efficiency, productivity and commercial reach of Yemen's honey value chain. By prioritizing interventions based on their potential impact and feasibility, the objective is to improve the competitiveness and overall growth of this vital sector while ensuring its long-term sustainability.

8.1 Address critical challenges

Mitigating the impact of conflict

•**Short-term:** Collaborate with local NGOs and peacebuilding organizations to establish safe areas for beekeeping activities and facilitate honey transportation.

•**Long-term:** Advocate for policies that support conflict-affected beekeepers, including financial assistance, access to resources and market access initiatives.

Ensuring the health and productivity of honeybees

•**Training and extension services:** Train beekeepers on modern beekeeping practices, pest and disease management, and sustainable apiary management techniques.

•**Access to quality inputs:** Facilitate access to affordable, high-quality beekeeping equipment, disease-resistant bee strains and veterinary services.

8.2 Strengthen the enabling environment

Create favourable policies and regulations

•**Develop quality standards:** Establish and enforce clear quality standards for Yemeni honey, aligned with international best practices, to improve its marketing.

•**Streamline regulations:** Simplify regulations and licensing procedures for beekeepers and honey businesses to reduce barriers to entry and encourage growth.

Improving access to finance

•**Microfinance initiatives:** Collaborate with microfinance institutions to develop tailored loan products and financial education programmes for beekeepers.

•**Government grants:** Advocate for government grants or loan guarantees to help beekeepers invest in their operations and increase production.

Investing in infrastructure development

•**Transportation networks:** Improve road conditions and transportation infrastructure in beekeeping regions to facilitate efficient honey collection and transportation.

•**Storage facilities:** Invest in building modern storage facilities equipped with temperature control to preserve honey quality and reduce post-harvest losses.

8.3 Improve value chain efficiency and market access

Technical training and capacity-building

•**Business management skills:** Provide training programmes on business planning, financial management, marketing and value chain analysis to empower beekeepers.

•**Development of value added products:** Train beekeepers in the production of value added products such as beeswax, propolis and royal jelly to diversify sources of income.

Improved processing and packaging

•**Modern processing facilities:** Establish or upgrade honey processing facilities with modern equipment to ensure quality control, hygiene and efficiency.

•**Branding and packaging:** Develop attractive and informative packaging that meets international standards and highlights the unique qualities of Yemeni honey.

Market information and links

•**Market information systems:** Establish platforms that provide beekeepers with real-time market information, including prices, demand trends and buyer requirements.

•**Trade fairs and exhibitions:** Facilitate participation in national and international trade fairs to connect Yemeni honey producers with potential buyers and investors.

8.4 Promote sustainability and differentiation

Sustainable beekeeping practices

•**Organic certification:** Promote organic beekeeping practices and facilitate access to organic certification to meet the growing demand for natural and sustainable products.

•**Biodiversity conservation:** Encourage beekeepers to protect natural habitats, plant bee-friendly flora and adopt practices that support pollinator biodiversity.

Branding and product differentiation

•**Protection of geographical indications:** Ensure geographical indication protection for Yemeni honey varieties to differentiate them in the market and prevent fraudulent imitations.

•**Storytelling and marketing:** Develop a compelling brand narrative that highlights the unique qualities, heritage and sustainable production methods of Yemeni honey.

Added value and diversification

•**Product diversification:** Encourage the production and marketing of a wider range of honey products, such as flavoured honey, honey spreads and honey-infused cosmetics.

•**Market expansion:** Explore new market opportunities for Yemeni honey, particularly in niche markets that value high-quality, ethically sourced and sustainably produced products.

8.5 Process upgrading

Process upgrading refers to the methods and strategies implemented to make production processes more efficient and improve product quality. This often involves the adoption of new technologies.

The following are some general strategies.

1. Modernization of production processes:

Introducing modern beekeeping practices and equipment like Langstroth hives along with innovative honey harvesting and extraction techniques.

2. Quality control measures:

Implementing stricter quality control during honey extraction, processing and packaging to enhance quality and reduce adulteration.

3. Adoption of sustainable practices:

Incorporating sustainable and eco-friendly processes to minimize environmental impact and ensure the long-term health of bee populations.

4. Use of technology:

Utilizing technological innovations like digital hive monitoring systems to better understand hive health, and GPS for tracking migratory beekeeping practices.

5. Training and workshops:

Investing in human capital by providing training for beekeepers on upgraded processes, new techniques and technologies.

6. Improved pest management:

Implementing integrated pest management practices to control pests that threaten honey production.



9. Summary of key findings

9. Summary of key findings

Honey production plays a crucial role in Yemen's economy, providing livelihoods and contributing to food security, particularly at the household level.

Both traditional and modern beekeeping methods are practiced, influencing honey yield, quality and market value. Traditional methods often support household consumption and local markets, while modern techniques aim for larger-scale production and export potential.

The Yemeni honey value chain faces significant challenges, including the ongoing conflict, limited market access, lack of infrastructure and support services, and the impacts of climate change. These factors hinder the sector's growth and limit the potential economic benefits for beekeepers and related businesses.

Despite these challenges, opportunities exist to strengthen the honey value chain. Improved infrastructure, training programmes, market access and quality control measures could significantly enhance the sector's productivity and profitability.

9.1 Region-specific recommendations

• Northern Yemen

- Facilitate dialogue and cooperation between beekeeping communities and relevant authorities to establish consistent regulations and operational procedures. This could involve establishing cross-border trade agreements for honey in Yemen to alleviate market access challenges.

- Explore microfinance initiatives and targeted subsidies for beekeepers to support their operations and investments in quality improvement. Collaborate with NGOs to provide essential supplies and equipment.

• Southern Yemen

- Prioritize rebuilding and improving transportation networks in key honey-producing areas to facilitate access to domestic and international markets. Focus on developing cold chain logistics to maintain honey quality during transportation.

- Collaborate with internationally recognized institutions to develop and implement export certifications and quality standards aligned with international market requirements, thereby strengthening the reputation and marketing of Yemeni honey in the global market.

9.2 General recommendations

- Implement a national quality control programme, including training on standardized production methods, hive management and honey handling techniques. This programme should be accessible to beekeepers in both northern and southern Yemen.

- Develop a national honey branding strategy that highlights the unique qualities of Yemeni honey (e.g., sidr honey). Participate in international trade fairs and connect Yemeni honey producers with potential buyers in target markets such as Hong Kong Special Administrative Region of China.

- Encourage the formation of beekeeping cooperatives to improve collective bargaining power, facilitate access to resources and training, and promote shared best practices. Cooperatives can also play a crucial role in quality control and standardization.

- Implement strict quality control measures at different stages of the value chain to detect and prevent adulteration. Develop a system for certifying the authenticity of Yemeni honey to build consumer confidence.

- Actively seek partnerships with NGOs and international organizations to secure funding for infrastructure development, training programmes and market access initiatives.

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