



## **Socioeconomic Analysis of Beekeeping in the Northern region of Iraq**

### **Irak'ın Kuzey Bölgesindeki Arıcılığın Sosyo-ekonomik Analizi**

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**Abstract**

Beekeeping is an old and widely spread activity in many countries around the world, and is considered one of the projects that have speed in the capital cycle, with the pollination of economic and medicinal plants being a parallel activity in most countries. There are an estimated 150,000-200,000 honey bee colonies in the northern region of Iraq. The total honey production in northern Iraq is estimated at up to 550-850 tons, and only a small amount of this is marketed. The apiculture sector in northern Iraq still faces challenges with respect to climate change, marketing, and importation as a result of the quality of honey and competition in the market. The objective of this study was to determine the factors affecting honey production in the Northern region of Iraq. The study utilized data from 184 randomly selected beekeeping households through face-to-face interviews, using a semi-structured questionnaire. The data was analyzed by using descriptive statistics and frequency tables. According to the results, 75.0% were married, 18.5% were over the age of 51, and the average productivity of honey bee colonies was 5-10 kg/year. The study recommended reducing input, while increasing beekeeping production and productivity. It is critical to support beekeepers in their efforts to adopt improved beekeeping technologies.



## 1. Introduction

In the Quran, there is something strange about the number 16 and the bees. Chapter 16 is called (The Bees). The only verse that mentions the bees is made up of 16 words. And those words are made up of 16 different letters (Taghavizad, 2011). Beekeeping, using man-made hives and harvesting honey from them, has been practiced by humans for at least 5,000 years. Honey bees have traditionally been kept in many countries and used for a variety of purposes (Mohammed et al., 2017). Accordingly, human societies have long been aware of the worthwhile benefits to be gained from bees (Ito, 2014). As evidenced by its ability to adapt to a wide range of climatic conditions (Pocol et al., 2014). The honey bee (*Apis mellifera*) is one of the most successful species in the animal kingdom. The benefits of beekeeping, also called apiculture, include the pollination of crops, and harvests of honey, beeswax, royal jelly, propolis, and pollen, as well as bee venom, another product from which people can benefit (Wambua et al., 2016).

Beekeeping and honey hunting play an important role in increasing and diversifying rural communities' incomes, as well as providing a means of self-employment (Zheng et al.,

2011). Beekeeping helps people's livelihoods in almost every country on the planet (Hirata et al., 2017).

Beekeeping is an important agricultural activity throughout the world. It is also an important asset in assuring plant biodiversity in many natural ecosystems (Abebe, 2009). The production of honey is also thought to be a resource-saving and environmentally friendly activity (Okpokiri et al., 2015).

Today, there are 91 million beehives in the world, and these hives produce 1.9 million tons of honey. A quarter of all honey produced is traded, with nearly 20 honey-producing countries accounting for 90% of all exports (Gupta et al., 2014). The global honey production per beehive is around 20 kg, with 64 kg in Canada, 55 kg in Australia, 33 kg in China, 27 kg in Mexico, 40 kg in Argentina, and 40 kg in Hungary (Guoda and Chun, 2003). Climate change has an important effect on the plants from which bees feed, and thus indirectly affects colonies and their honey yields (Babatunde et al., 2013).

Honey price and quality depend on the global economic situation, and are also influenced by geographical location and seasonality (FAO, 2018).

The traditional method of beekeeping has been practiced for a long time (Popescu et al., 2013). Modern beekeeping involves the use of cutting-edge technology to produce honey and other bee products. However, it is critical that people become educated on modern beekeeping methods, in order to increase a country's honey production, as well as the number of people who engage in the industry (Seitz et al., 2016).

Honey production in the northern region of Iraq has recently attracted the interest of various agencies, due to its potential to help revitalize the northern Iraqi economy, reduce poverty, and conserve forests. Northern Iraq is believed to have a high potential for honey production (Azawy et al., 2021). In addition, its geographical position and the large variety of cultivated and wild flora are favorable factors for the development of beekeeping (Faraj, 2019). Although the data about beekeeping in the northern Iraqi zone is not sufficient, it is estimated that around 150,000-200,000 beehives and approximately 10,000 beekeepers exist in the region (Rudaw, 2018).

According to Rudaw (2020), honey hive productivity was so poor that honey harvesting ranged from 5–10 kg per hive. However, most people trust Kurdish honey because "honey produced in the northern Iraqi region is pure; people know where it comes from, and they have no faith in imported honey, regardless of the price." A kilo of Kurdish honey costs between 30,000 and 150,000 dinars (20 to 100 dollars).

The population of the region consumes only 8% of the honey produced, and the remaining majority is sold to other regions of

Iraq. Imports increased slightly due to higher domestic market prices and challenges in some export markets (Rudaw, 2019). Most of the region's honey currently comes from Turkey, Iran, the United Arab Emirates, Kuwait, Lebanon, Germany, Australia, and China, but they are seeking to eradicate imports and eventually export more local honey. Interestingly, some of the honey from other countries arrives in dinner plate-sized plastic tubs, which are about the size of the slabs of naturally constructed comb floating in the honey. It is also known that 625 tons of honey were produced in 2008. In 2016, the northern region produced 950 tons of honey. The worst year in recent memory for beekeepers was 2017 when production levels fell by 89% compared to 2016 and decreased by approximately 100 tons, while honey production in the north increased by 500 tons in 2018 (Anonym, 2018).

The major challenges that have hampered the untapped potential of beekeeping are; a lack of bee forage; a lack of rainfall; agrochemical poisoning; a lack of honey storage facilities; a lack of financial assistance from the government to deal with swarm sickness and virus transmission by the ectoparasitic mite, *Varroa destructor*, other parasites, and disease; poor nutrition due to changing land-use patterns; and decreased forage availability (Ayoub et al., 2015).

The process of honey cultivation and harvesting has increased in the northern region of Iraq, and there is a need to meet the challenges of ever-increasing honey demand by designing machines to assist local fanners. In order to

increase household incomes, employment, and food production in northern Iraq, this study was designed to investigate the socio-demographic characteristics of honey production in the region.

## **2. Material and Methods**

The northern Iraqi zone is an autonomous region in federal Iraq. The northern region of Iraq covers an area of about 40,600 km<sup>2</sup> with a populace of around 15-20% of the total Iraqi population. It, which includes the five Kurdish-majority governorates of Erbil, Halabja, Dohuk, Suleymaniah, and Kerkuk and borders Syria in the northwest, Turkey in the north, and Iran in the northeast. It is estimated that 70% of the population is engaged in agricultural practices. The climate is semi-arid continental, with hot and dry summers from June to September, and cold and wet winters. Autumn, like spring, is a great time to visit the region because it is dry and mild. In October, the average temperature is 24-29°C (75-84°F), with temperatures cooling slightly in November (KRG Ministry of Planning and UNDP, 2012).

In this study, a total of 184 beekeepers were interviewed in Hawler, Sulaymaniyah, Dohuk, and Halabja. In addition, three honey buyers (individuals and businesses) were identified and interviewed, through referrals from beekeepers who worked with them. In-depth interviews were conducted to gather information about honey production, processing, and marketing. The data was collected between April and December 2018 in the northern Iraqi zone. It was coded and entered into SPSS for analysis, and analyzed using descriptive statistics and frequency tables.

## **3. Results and Discussion**

Honey plays an important role in the sustenance of livelihoods in the area. The north of Iraq is a region where beekeeping has real potential to expand, in order to take advantage of the country's diverse climatic conditions and growing seasons (Gebrehiwot, 2015).

Table 1 shows the distribution of respondents based on their socio-demographic characteristics. According to the results, 75% of the 184 producers were married, and 25% were single. In terms of age distribution, 18.5% were younger than 30 years old, 24.5% were between 31 and 40, 38.6% were between 41 and 50 had, and 18.5% were older than 51. The results revealed that education is an important entry point for the fast transfer of improved beekeeping knowledge. Furthermore, the educational level of farmer may play an important role in determining the type of development and extension service approach (Mujuni et al., 2012). Based on the educational status of the sample beekeepers 22.8% of the respondents have not attended any education while 21.7%, 33.7% and 21.7 attended elementary, high school and university degree respectively. According to Table 1, 41.3% of farmers who diversify into honey production do so to ensure an optimal and continuous flow of income. In addition, most of the beekeepers had a middle level of income, while 22.8% and 12% had low and high levels of income, respectively.

The results also indicated that 43.5% of beekeepers had more than 11 years of experience. Experience and competence, as well as cumulative knowledge of beekeeping, are

required for producers to obtain, process, and use information relevant to their practice. The more years producers spend farming, the more they become aware of new production techniques, thereby increasing their productivity. It is also assumed that experience leads to improved skills and better enterprise management, further contributing to higher production and productivity (Vural and Karaman, 2009). According to the district office of agriculture, they have a shortage of apiculture-trained personnel, as well as financial and logistical

challenges in expanding the scope of their services. This has been exacerbated by the lack of practical training for farmers and experts. Farmers have little or no practical beekeeping training, and neither do agricultural experts, who thus cannot effectively advise farmers. These results suggest that beekeepers who gain technical skills and knowledge about bee farming are more likely to make better use of apicultural resources, allowing them to reap the full benefits of beekeeping.

Table 1. Demographic characteristics of respondents

Variable	Frequency	Percentage
<b>Age (year)</b>		
≤30	34	18.5
31-40	45	24.5
41-50	71	38.6
≥51	34	18.5
<b>Marital status</b>		
Married	138	75.0
Single	46	25.0
<b>Educational status</b>		
No education	42	22.8
Elementary	40	21.7
High	62	33.7
University degree	40	21.7
<b>Main Job</b>		
Farming	44	23.9
Civil Servant and beekeeper	64	34.8
Honey Production	76	41.3
<b>Income</b>		
Low Income	42	22.8
Middle Income	120	65.2
High Income	22	12.0
<b>Beekeeping Experience</b>		
≤5	51	27.7
6-10	53	28.8
≥11	80	43.5
<b>Total</b>	<b>184</b>	<b>100.0</b>

The Table 2 presents farmers' production structure. According to the results, only 37.5% of the farmers in the study area used the

traditional method of beekeeping, while 62.5% used a modern method. The study found that transitional and modern beehives led to better

honey yield and quality than traditional hives in the study area.

Table 2 showed the skills acquired (informal education) by the 184 respondents; 35.9% said they were participating in a beekeeping course, while 64.1% said they were not.

According to the findings, only 56.5% of the respondents claimed to have been visited by extension workers. This suggests that there is a weak link between extension workers and honey producers. Farmer-to-farmer experience sharing visits also help to develop a positive attitude toward innovation or new technology. Table 2 indicated that there was a market for beehives in

the study area, as evidenced by 62% of the households involved in purchasing from the market that exported to the foreign market.

Table 2 shows the respondents' reasons for honey production. Out of the total of 184, 75% selected commercial purposes, and 25% selected home consumption and as hobby.

According to the results, 70.7% of honeys were harvested between August and October. In line with Middle Eastern culture, as well as national religious customs, honey producers use honey instead of sugar to sweeten their foods and increase their caloric intake (Haddad, 2018).

Table 2. Production structure of respondents

Variable	Frequency	Percentage
<b>Method of beekeeping</b>		
Modern	115	62.5
Traditional	69	37.5
<b>Participate in beekeeping course</b>		
Yes	66	35.9
No	118	64.1
<b>Learn to keep bees</b>		
With a technician, extension workers	104	56.5
With another beekeeper	50	27.2
Alone	30	16.3
<b>Sources of the beehives you used</b>		
Contracted by himself	32	17.4
Constructed by locally bought	38	38.0
Bought from market	114	62.0
<b>Reason for honey production</b>		
For home consumption	24	13.0
For commercial purpose	138	75.0
As hobby	22	12.0
<b>Honey harvesting season</b>		
April to July	54	29.3
August to October	130	70.7
<b>feed bees with sugar syrup, sweet dough or honey</b>		
Yes	94	51.1
No	90	48.9
Total	184	100.0

Honey production per farm varied from 166.16 kg to 1,427.82 kg in 2018, depending on colony size, with an average honey production per farm of 748.77 kg for 90.45 colonies. The average honey yield per colony was calculated to be 7.648 kg, significantly less than the stated

national average of 16 kg (as shown in Table 3). The honey yield per hive varied according to colony size, ranging from 6.181 kg for Group 1 to around 8.008 kg for Group 2, and 8.757 kg for Group 3.

Table 3. Honey production and yield in apiaries surveyed

Number of colonies	Number of farms	%	Number of colony	Honey production (kg)	Yields per colony (kg)
≥50 colonies	60	32.06	26.88	166.16	6.18
51-100 colonies	57	31.06	81.45	652.33	8.01
101≤ colonies	67	36.40	163.04	1427.82	8.76
Average/Total	184	100.00	90.45	748.77	7.65

These negative changes cause problems for agriculture: absence or inadequate rainfall, climate change (dry season), choosing a stable place, lack of technical skills, absence of government support, lack of veterinary medicine, lack of money to invest, and instability

of price (Table 4). Poor bee product marketing and inadequate advertising of bee products to consumers, border problems, etc., are also great negative challenges in agriculture and ecological systems that need to be addressed and monitored (Adgaba et al., 2014).

Table 4. Problems of beekeeping and honey production

Problems Encountered	Frequency	Percentage
Absence or inadequate rainfall (climate change) / (dry season)/ (Choosing stable place)	38	20.7
Lack of technical skills	32	17.4
Absence of government support/ Lack of Veterinary Medicine	30	16.3
Instability of price/Supply and Demand	20	10.9
Rate of cost is higher than revenue	17	9.2
Poor bee product marketing and inadequate advertising of bee products to consumers	21	11.4
Border problem -war	26	14.1
Total	184	100.0



#### 4. Conclusion and Recommendation

This study was conducted in order to determine the socioeconomic impact of beekeeping and honey production in the northern Iraqi zone in 2018. Honey plays an important role in the sustenance of livelihoods in the area. The north of Iraq is a region where beekeeping has real potential to expand, in order to take advantage of the country's diverse climatic conditions and flowing seasons. The major challenges that hampered this untapped potential were a lack of bee forage, a lack of rainfall, agrochemical poisoning, pests and predators, a lack of honey storage facilities, poor cropping methods, poor pre-and post-harvest handling, poor production technologies, poor management practices, a lack of extension services, and a lack of market information.

Generally, the honey bee population decline affects almost everyone in Iraq's northern region; we all consume food pollinated by honey bees. The current level of food production and the agricultural economy in northern Iraq is clearly jeopardized unless honey bee populations are stabilized. This issue should be a top priority for policymakers in Iraq's north.

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