

## Beekeeping: Opportunities and Challenges in Haryana

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**ABSTRACT:** Beekeeping is gaining popularity among the peasantry due to its low input cost and good returns, though it remains underexplored. In this context, a study was conducted at CCS Haryana Agricultural University, Hisar (2021-22) in which multiple responses were received from people participated in trainings on beekeeping, and some existing beekeepers. Findings revealed that mostly male and young candidates (81.99%) educated up to senior secondary (73.56%) were more interested in beekeeping, with most (51.72%) of them being agriculturist, or laborers (18.77%). Majority (87.74%) were landless or small farmers with low to medium income level. Many respondents (77.39%) were unaware of the role of bees in pollination, and 60.15 per cent had limited knowledge of honey's importance. About 70 per cent showed interest in adopting beekeeping as a primary or supplementary activity. Key constraints included lack of insurance, bee flora shortages, marketing, hive theft, and pesticide risks. Promoting beekeeping among unemployed youth and small farmers by increasing awareness and addressing these constraints could enhance its adoption.

**Keywords:** Beekeeping, enterprise, respondents, opportunities, challenges, subsidiary activity.

### INTRODUCTION

India is predominantly an agricultural country, where the economy heavily relies on agriculture for livelihoods (Lal *et al.*, 2012). However, with the gradual decrease in per capita land holdings and rising unemployment, people need to explore other profitable enterprises within the agricultural sector, such as beekeeping, mushroom production, and dairy farming, to boost their family income. Among these, beekeeping stands out as it requires relatively small capital investment. It is a vital activity for strengthening the livelihoods of rural communities, offering a promising non-farm venture that can significantly enhance the income of smallholders and contribute to the national economy. Beekeeping plays a crucial role in diversifying and increasing the income of Indian smallholder farmers and landless youth. Given the challenges posed by depleting natural resources and the reduced profitability of traditional agriculture, beekeeping holds great potential to uplift the economy of Indian farmers (Singh *et al.*, 2010). In addition of providing honey and other bee products, honey bees also play an important role in increasing the yield of agricultural/horticultural crops by means of pollination, and improve the quality of produce. Singh (2000); Monga and Manoch (2011) also reported that the honey bees increased agricultural productivity to the tune of 30–80 per cent annually through cross-pollination. There is growing recognition that honey bees represent a cost-effective input for promoting sustainable, eco-friendly agriculture and enhancing crop productivity.

Beekeeping in Haryana offers significant potential due to the state's favorable climate, diverse flora, and agriculture-based economy, which enhances crop yield through pollination, and provides opportunities for income diversification. The varied cropping patterns, affected by different soil types, irrigation facilities, temperature, relative humidity, and agro-climatic conditions, make Haryana suitable for beekeeping, particularly with *Apis mellifera*. Haryana is among the top seven honey producing states, yielding approximately 4,500 metric tons annually, with over 5,000 active beekeepers. Additionally, a pioneering initiative by the Haryana government aims to establish the country's first honey trade center, or "mandi." For fully realizing the potential of beekeeping in the region, it is crucial to address the industry's challenges. For effective promotion of apiculture among farming communities, it is essential to understand the socio-personal profiles of those interested in adopting beekeeping and the obstacles they face. In this context, the present study was conducted to explore the socio-economic status of aspirants, their perspectives on beekeeping, and the major challenges in adopting it as an entrepreneurial venture.

### MATERIAL AND METHODS

The present study was carried out at SNIATTE, Directorate of Extension Education, CCS, Haryana Agricultural University, Hisar (Haryana) during the year 2021-22. The institute organized eleven trainings on bee keeping for farmers, women and unemployed youth during the study period, in which 261 trainees participated from different districts of Haryana. In order

to know the socio-economic characteristics of the beekeeping aspirants and constraints therein, the general information and background of the participants such as sex, age, education level, occupation, landholding etc. was collected by preparing a questionnaire. The information regarding major problems in beekeeping in Haryana was also collected from some existing beekeepers. The data were tabulated and analyzed in terms of frequency and percentage using computer software MS Excel.

## RESULTS AND DISCUSSION

### A. Socio-economic profile of the respondents

**Social profile.** Findings of the study revealed that mostly male candidates (89.66%) seemed to be more interested in beekeeping as compared to the females (10.34%) highlighting a gender imbalance in participation (Fig. 1). The majority of respondents (81.99%) were in the young age group (18-35 years), followed by 15.71% in the middle age group (36-50 years). Only 2.30% were above the age of 50 years. Many of the respondents had completed senior secondary education (41.38%), followed by those with graduation (24.90%). A smaller percentage had either very low or very high level of education. This indicates that beekeeping is liked by predominantly male and young with moderate to high level of education. These results are confirmed by the findings of earlier studies where similar observations were reported (Moniruzzaman and Rahman 2009; Lal *et al.* 2012; Sharma and Dhalwal 2014; Kareem *et al.*, 2017; Singh *et al.*, 2018; Singh *et al.*, 2021). The gender imbalance indicates a need for initiatives to increase female participation in beekeeping. The dominance of younger individuals in the age distribution suggests that beekeeping is particularly appealing to this group. The educational distribution indicates that beekeeping attracts individuals across a range of educational levels, but it is most common among those with secondary and graduate education.

**Economic profile.** The majority of respondents were primarily engaged in agriculture (39.46%), followed by labor (18.77%) and students (12.64%) as depicted in Fig. 2. A smaller portion of respondents were involved in beekeeping either solely (5.36%) or in combination with agriculture (12.26%). The least represented occupations included business (1.92%) and service (1.15%). Many of respondents (41%) were small farmers (1-2 ha), representing followed by marginal farmers (25.67%) and landless (21.07%). Medium and large farmers were very less in number, with large farmers being the least represented (1.53%). The largest group of respondents (49.81%) had a medium annual income (Rs. 100-200 thousands), followed by those (29.97%) with low income (<Rs. 100 thousands) and high income (22.22%) having more than Rs. 200 thousands annually. The economic profile of the respondents showed that agriculture was the predominant occupation of the respondent, with notable involvement in labor and education. Most respondents were small-scale farmers, with a significant presence of marginal farmers and the landless. Nearly half fell

within the medium-income bracket, indicating moderate economic stability. Sharma and Daliwal (2014) also reported that people having small land holding and farming as a major occupation were more engaged in beekeeping. Similar findings were reported by Singh *et al.* (2018); Singh *et al.* (2021). It indicated the centrality of agriculture in the respondents' livelihoods and the potential for diversification into beekeeping and other activities to enhance income levels, particularly for those in lower income and landholding categories.

### B. Importance of beekeeping

The data response of the trainees were received regarding the importance of various aspects of beekeeping, including the role of honey bees in pollination, the importance of honey, and the significance of bee products. The data is categorized into three key areas, with each area showing the percentage of trainees who responded "Yes" or "No" to the perceived importance of that aspect (Fig. 3).

**Importance of honey bees in pollination.** A significant majority (77.39%) of the trainees do not recognize the importance of honey bees in pollination. Only 22.61 per cent acknowledged this role, indicating that many trainees might not fully understand or appreciate the critical ecological service that honey bees provide. This could point to a need for further education on the environmental impact of beekeeping.

**Importance of honey.** Majority of trainees (60.15%) still did not consider honey to be particularly important. Conversely, 39.85 per cent of the trainees recognized the value of honey, suggesting need to educate the people about honey's nutritional, economic, and cultural importance, though training or other awareness programme.

**Importance of bee hive products.** A large majority (76.63%) of trainees did know the importance of other bee products (such as bee wax, royal jelly, propolis, etc.), with only 23.37% acknowledging their value. This reflects a general lack of awareness or interest in the broader range of products that can be derived from beekeeping

This revealed that the majority of trainees have limited recognition of the broader ecological and economic significance of beekeeping. This suggests that while trainees are interested in beekeeping, many may not fully appreciate its wider benefits and potential, highlighting a need for more comprehensive education on the subject.

### C. Reason of participation in training programmes

The responses received from 261 trainees regarding reason of participation in training organized into four categories, each representing a particular reason for attending training on beekeeping (Fig. 4). The distribution of responses reflects varying degrees of interest, ranging from serious vocational aspirations to casual interest.

**Adoption of beekeeping as a vocation.** Majority of the trainees (45.21%) showed interest in adopting beekeeping as a full-time vocation suggesting that a significant portion of the trainees view beekeeping as a viable career path.

**To increase family income.** The second most common reason, with 24.90 per cent of trainees attending this training, was the desire to increase family income through adoption of beekeeping as subsidiary entrepreneur. This indicates that many trainees see beekeeping as a potential supplementary income source to support their households.

**Improving existing skills and knowledge.** More than twenty per cent of the trainees were motivated by the opportunity to enhance their existing skills and knowledge in beekeeping. Such trainees might already be engaged in beekeeping and focused on personal development and professional growth within the field.

**Just for the sake of knowledge.** The least common reason, selected by 8.81 per cent of the respondents, was attending the training simply for the acquisition of knowledge without an immediate practical application in mind.

These insights suggest that beekeeping training appeals not only to those seeking a new career but also to those looking to enhance their economic stability and personal development. Similar observations were reported by Singh *et al.* (2018).

#### *D. Challenges in beekeeping*

To identify the major challenges in the beekeeping sector, feedback was gathered from 105 current beekeepers. Numerous challenges were reported by these beekeepers, which are hindering the development of beekeeping in Haryana. The constraints are presented here in order of their severity (Fig. 5).

**Lack of insurance coverage.** The most common challenge reported by the respondents was lack of insurance coverage of bee colonies. Owing to one or the other reason, bee boxes get fire many a times which leads to great loss to the beekeepers in absence of insurance coverage of the same.

**Shortage of bee flora.** Shortage of bee flora was the next major problem in beekeeping. Nearly 92.38 per cent of beekeepers reported this constraint, indicating that the lack of sufficient flowering plants negatively impacts honey production. Bee flora is essential for providing nectar and pollen, and its scarcity can lead to reduced honey yields and affect the overall health of bee colonies. In Haryana state, the climatic conditions do not support the availability of flora round the year which insists the beekeepers for migration of the bee colonies for a certain period of time.

**Marketing of bee products.** Marketing challenges are also a significant concern, with 90.48% of beekeepers citing this as an issue. Beekeepers struggle with finding reliable markets, getting fair prices for their honey, and competing with large-scale producers. These problems can hinder the profitability and sustainability of beekeeping as a business. In Haryana state, there is no any established marketing structure which provides the surety for fare price of bee products.

**Theft of bee hives.** Theft of bee hives is another major concern which is increasing day by day. This problem not only results in immediate financial loss but also disrupts the beekeeping operations. As bee hives are kept in open farm, it is not possible to provide security round the clock. This issue underscores the need for

better security measures and possibly insurance to mitigate the impact.

**Indiscriminate use of pesticides.** Pesticide poisoning due to indiscriminate use of pesticides is a significant threat to honey bees, as reported by more than 80 per cent of beekeepers. The use of harmful pesticides in agriculture can lead to the death of bee colonies, reducing honey production and affecting pollination services that are critical for many crops.

**Migration of honey bee colonies.** More than 80 per cent of the respondents stated that beekeepers face problems in migration of honey bees colonies. Migration of honey bee colonies is necessary for accessing different floral resources throughout the year. But the process of migration involves high transport cost and mortality of the bees leading to great losses to the beekeepers. Issues like transportation difficulties, legal restrictions, and lack of suitable locations for setting up colonies during migration contribute to this problem.

**Support provided by the government.** Despite various government initiatives to support beekeepers, more than 80 per cent of respondents are not aware of these programs. This lack of awareness prevents beekeepers from accessing financial aid, training, and other resources that could help them overcome the challenges they face.

**Public unawareness.** Public unawareness about the importance of bees and their role in pollination is also a major concern for beekeepers. This lack of understanding can lead to practices that harm bee populations, such as the overuse of pesticides, or it may result in a lack of support for beekeeping initiatives.

**Pest and disease incidence.** The presence of pests and diseases affecting honey bees is also one of the major challenge affecting beekeeping. These biological threats can devastate colonies, reducing honey production and increasing the costs associated with managing and treating affected colonies.

**Management during extreme weather conditions.** Managing honey bee colonies during extreme weather conditions is indeed a significant challenge for beekeepers. Extreme weather events such as intense heat, cold, heavy rainfall, droughts, and storms can severely impact the health and productivity of honey bee colonies.

These results are in accordance with the findings of the earlier workers (Baite *et al.*, 2015; Singh *et al.*, 2016; Singh *et al.*, 2021) who also reported marketing of bee products as major problem in beekeeping. Phadke (2008) also identified the excessive use of pesticides, lack of forage during certain months, and the intense summer heat as significant challenges to the development of beekeeping in agricultural plains of India. Asrani *et al.* (2017) also highlighted that technical challenges such as migration of bee colonies, fear of pest and disease and management during dearth period were among the primary constraints faced by respondents. Singh and Singh (2019) also observed the similar response from the beekeepers regarding management of bee colonies during dearth period.

This indicates that beekeeping entrepreneurs in Haryana face a wide range of challenges, with lack of insurance

coverage and shortage of bee flora being the most critical issues. These constraints highlight the need for targeted interventions, such as improved insurance schemes, better marketing strategies, enhanced awareness of government support, and solutions to

mitigate the effects of pesticides and extreme weather conditions. This requires targeted interventions from both the government and industry stakeholders to support and strengthen the beekeeping sector in Haryana.

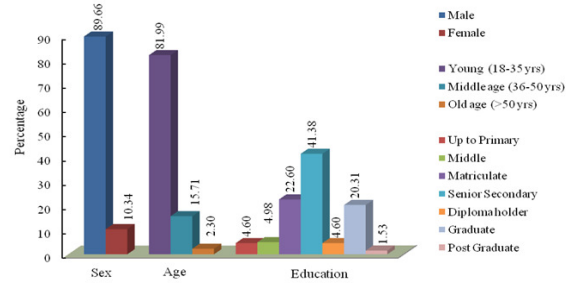


Fig. 1. Social profile of the respondents.

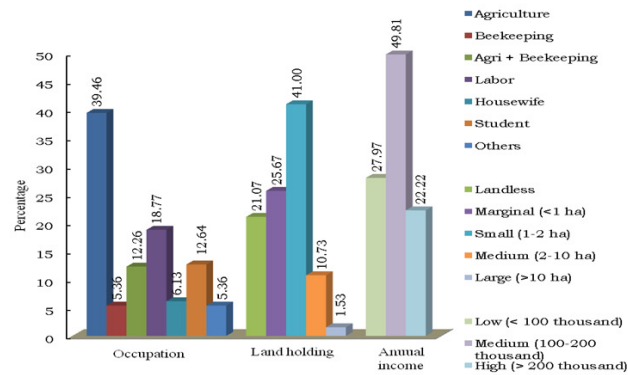


Fig. 2. Economic profile of the respondents.

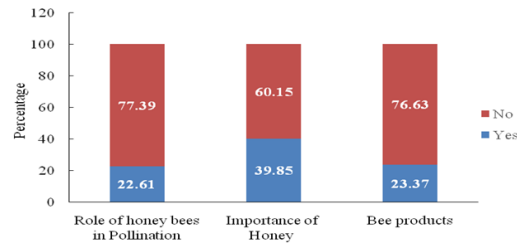


Fig. 3. Importance of beekeeping.

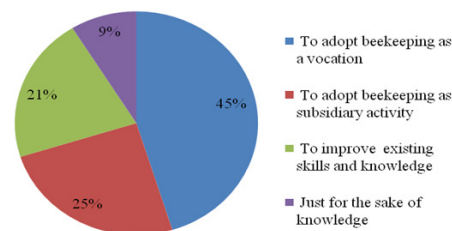


Fig. 4. Reason of participation in training programmes.

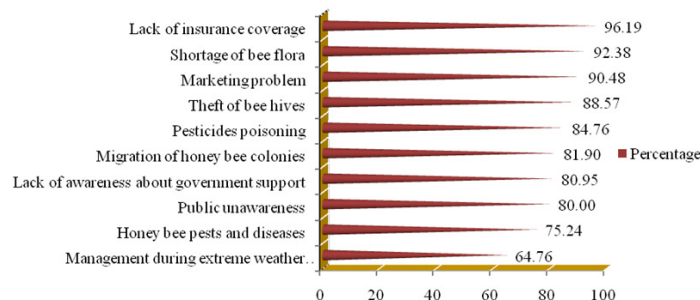


Fig. 5. Challenges in beekeeping.



## CONCLUSIONS

On the basis of this study, it can be concluded that the unemployed youth, landless laborers and marginal/small farmers having low to medium level of income may be targeted for promoting beekeeping. For this, efforts should be focused on continuing and intensifying initiatives that increase awareness and knowledge regarding importance of beekeeping among the people. Though, beekeeping is becoming an increasingly appealing occupation in Haryana, the challenges identified in this study must be addressed to accelerate its adoption. Beekeeping has significant potential to provide employment, particularly in rural areas, and to improve the economic conditions of farmers, especially in view of the declining profitability of agriculture due to factors such as climate change.

## FUTURE SCOPE

Future research should focus on enhancing awareness about bees' roles and the benefits of honey, particularly among young, male, and senior secondary-educated individuals. It should explore risk mitigation strategies like insurance and policies, and address constraints such as bee flora shortages and marketing challenges. Additionally, research on improving profitability for small farmers and studying the socioeconomic impacts and potential for technological innovations in beekeeping could further promote its adoption as a sustainable livelihood.

**Conflict of Interest.** None.

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