

Study of Commercial Honey Production in and around Vikrampur, Dhanupur, Handia, Prayagraj

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ABSTRACT

This study examines the status, practices, and potential of commercial honey production in and around Vikrampur, Dhanupur, and Handia blocks of Prayagraj district, Uttar Pradesh. The region, located in the fertile Gangetic plains, provides favorable agro-climatic conditions for beekeeping due to the abundance of nectar-rich crops such as mustard, eucalyptus, sunflower, and other seasonal flora. These floral resources play a crucial role in enhancing honey yield and quality, making the area suitable for both stationary and migratory apiculture. The research focuses on the socio-economic profile of beekeepers, production techniques, and marketing systems involved in commercial honey production. It highlights that most beekeepers operate at small to medium scales, relying on traditional as well as modern hive management practices. Beekeeping is emerging as an important supplementary income source for rural households, contributing to livelihood diversification, employment generation, and agricultural sustainability through pollination services. The study also evaluates the botanical and physicochemical characteristics of honey produced in the region. Analysis indicates the presence of both unifloral and multifloral honey types, with dominant pollen sources such as *Brassica campestris* and *Coriandrum sativum*, reflecting the agricultural landscape of Prayagraj. However, several constraints affecting commercial honey production have been identified, including lack of technical knowledge, inadequate storage and processing facilities, market price fluctuations, and challenges related to quality standards and adulteration. These issues limit profitability and hinder the growth of organized apiculture in the study area. The study concludes that with proper training, improved infrastructure, government support, and better market linkages, commercial honey production in Vikrampur, Dhanupur, and Handia has significant potential to develop into a sustainable agro-based enterprise, contributing to rural economic development and ecological balance.

INTRODUCTION

Apiculture, commonly known as beekeeping, is an important branch of agriculture concerned with the scientific management of honeybee colonies for the production of honey and other valuable bee products. It is one of the oldest livelihood activities practiced by humans and has gradually evolved from a traditional household practice into a modern agro-based enterprise. In recent decades, commercial beekeeping has gained significant attention because of its economic, ecological, and agricultural importance. Honeybees produce not only honey but also beeswax, royal jelly, pollen, and propolis, all of which have considerable commercial and medicinal value. Honey itself is widely consumed as a natural food product and is extensively used in pharmaceuticals, cosmetics, and traditional medicine.

Apart from its economic value, beekeeping plays a vital role in agricultural development through pollination services. A large proportion of agricultural crops depend on insect pollination, with honeybees serving as the most efficient pollinators. Bee pollination significantly enhances crop productivity, improves fruit quality, and supports biodiversity conservation. Thus, apiculture contributes not only to honey production but also to ecological sustainability and food security.

India possesses highly favorable conditions for beekeeping due to its rich floral diversity and varied climatic conditions. The country has emerged as one of the leading producers and exporters of honey in the world. States such as Uttar Pradesh, Punjab, Bihar, and Madhya Pradesh have shown substantial growth in commercial honey production. The increasing demand for organic and natural products has further accelerated the expansion of the beekeeping sector. Honey production offers numerous advantages, particularly for rural communities, including low investment requirements, minimal land dependency, and additional income opportunities.

The present study focuses on the rural regions of Vikrampur, Dhanupur, and Handia in Prayagraj district, Uttar Pradesh. These areas are situated in the fertile Gangetic plains and possess suitable climatic and ecological conditions for apiculture. The region experiences a subtropical monsoon climate with diverse agricultural crops and flowering vegetation such as mustard, sunflower, litchi, mango, eucalyptus, and neem, which provide continuous nectar resources for honeybee colonies. Despite its potential, commercial honey production faces several challenges including pest attacks, climate variability, excessive pesticide use, lack of technical knowledge, and marketing constraints. Therefore, scientific management practices, training programs, and government support are essential for sustainable development. The present study aims to examine the status, opportunities, and challenges of commercial honey production and evaluate its contribution to rural socio-economic development in the Prayagraj region.

LITERATURE REVIEW

The literature review forms an important component of any research study as it provides a conceptual framework and understanding of previous work conducted in the concerned field. In the area of apiculture, numerous national and international studies have explored honey production, bee behavior, floral resources, socio-economic significance, and challenges associated with commercial beekeeping. These studies provide valuable insights into the scientific and practical aspects of honey production.

Globally, beekeeping is widely practiced in countries such as China, Argentina, the United States, Turkey, and Russia. International research indicates that honey production largely depends on climate, vegetation patterns, and the adoption of modern beekeeping techniques. Studies reveal that movable-frame hive technology significantly improves honey yield, while migratory beekeeping enhances productivity by allowing colonies to follow seasonal flowering patterns. Researchers have also highlighted the adverse effects of climate change, habitat degradation, and temperature fluctuations on bee populations. Additionally, growing demand for organic honey has increased the global importance of sustainable apiculture practices.

The present study was conducted at a commercial beekeeping site located in **Dhanupur, Uttar Pradesh, India** (Latitude: **25.428171° N**, Longitude: **82.268101° E**). The study area represents a rural agricultural landscape characterized by crop fields and suitable floral resources that support honeybee foraging activity. The region provides favorable environmental conditions for apiculture due to its agricultural diversity and seasonal flowering patterns.

The image shows a managed honeybee colony maintained in a modern hive system with movable frames. Wooden hive frames containing honeycomb structures and active bee populations indicate organized scientific beekeeping practices. Such hive arrangements facilitate colony inspection, brood management, honey extraction, and monitoring of bee health. The site was selected because it represents active commercial honey production practices and offers suitable conditions for observing colony management, production systems, and beekeeping operations.

In India, beekeeping has long served as a traditional rural activity and an important supplementary source of income. Studies conducted in states such as Uttar Pradesh, Punjab, Himachal Pradesh, and West Bengal emphasize the economic potential of apiculture among small and marginal farmers. Major nectar sources identified include mustard, litchi, sunflower, and eucalyptus. Research also suggests that government initiatives, subsidies, and training programs have encouraged farmers to adopt beekeeping. However, lack of awareness, inadequate technical knowledge, and limited scientific training remain major barriers to expansion.

Research conducted in Uttar Pradesh identifies the state as a suitable region for commercial honey production due to favorable agro-climatic conditions and rich floral diversity. Studies further indicate that areas with mustard cultivation and fruit orchards support better honey production. However, challenges such as pesticide use, poor marketing infrastructure, and inadequate storage facilities negatively influence productivity and profitability.

Previous studies also emphasize the importance of climate and vegetation in determining honey yield. Floral diversity, seasonal variations, and suitable environmental conditions significantly affect bee activity and colony performance. Economic studies reveal that beekeeping requires relatively low investment and provides additional income through honey and related products.

Despite extensive research, limited village-level studies are available for regions such as Vikrampur in Prayagraj district. Therefore, the present study seeks to address these gaps by examining local conditions, production practices, economic viability, and challenges of commercial honey production at the field level.

MATERIALS AND METHODOLOGY

The methodology adopted for the present study was designed systematically to examine the status and cost-effectiveness of commercial honey production in selected villages of Prayagraj district. Research methodology plays an important role in ensuring scientific accuracy, reliability, and validity of findings by explaining the procedures used for data collection, sampling, and analysis.

The study followed a descriptive and exploratory research design. The descriptive approach was used to analyze existing beekeeping practices, honey production levels, marketing systems, and socio-economic conditions of beekeepers. The exploratory aspect helped identify local challenges, traditional practices, and emerging trends in apiculture.

The study area comprised three villages of Prayagraj district—Vikrampur, Jagdishpur, and Lokapur—located within the fertile Gangetic plains of Uttar Pradesh. The region experiences a subtropical climate with temperatures ranging from 5°C–45°C and annual rainfall between 800–1000 mm. Rich floral resources including mustard, litchi, eucalyptus, sunflower, mango blossoms, and various wild flowering plants make the area suitable for commercial beekeeping.

A simple random sampling technique was employed for selecting respondents. Approximately 90 respondents were chosen from the selected villages to ensure representation of different categories of beekeepers. Both small-scale and commercial apiarists were included in the study.

The study relied on both primary and secondary data sources. Primary data constituted the major source of information and were collected directly from beekeepers through structured questionnaires, personal interviews, field observations, and group discussions. Information gathered included socio-economic characteristics, number of bee colonies, honey yield, management practices, migration systems, production costs, marketing channels, and problems faced by beekeepers.

Field observations were conducted to assess hive conditions, feeding methods, hygiene practices, and honey extraction procedures. Personal interviews provided detailed information regarding practical experiences and awareness of government schemes. Group discussions helped understand common challenges and local practices.

Secondary data were collected from government reports, ICAR publications, books, journals, research articles, and district agricultural records.

Collected data consisted of both quantitative and qualitative information. Quantitative data included honey yield, income, and production cost, while qualitative data focused on farmer perceptions and constraints. Statistical tools such as percentage analysis, mean calculations, and comparative analysis were used for interpretation. Graphical presentation through bar diagrams and pie charts further enhanced data representation.

To ensure reliability, responses were cross-verified through repeated interactions, field observations, and comparison with secondary sources. Ethical principles including informed consent, confidentiality, and academic use of data were strictly maintained throughout the study.

RESULTS AND DISCUSSION

This chapter presents the analysis and interpretation of primary data collected from beekeepers of Prayagraj district through structured questionnaires, personal interviews, and field observations. The findings focus on socio-economic characteristics, beekeeping practices, honey production, marketing systems, and major constraints affecting commercial honey production.

The socio-economic profile revealed that the majority of respondents (40%) belonged to the 40–60 years age group, indicating that middle-aged individuals are more actively engaged in beekeeping. Participation of younger people was comparatively low, suggesting limited interest among youth in apiculture. Educational status showed that most respondents had primary or secondary education, which supports the adoption of improved practices when adequate training is available. However, lower levels of higher education may limit the use of advanced scientific techniques. Occupational analysis indicated that beekeeping was largely practiced as a secondary occupation integrated with agriculture, serving as an additional source of household income.

Regarding beekeeping practices, *Apis mellifera* was the dominant species used by 70% of beekeepers due to its higher productivity and adaptability. Most respondents maintained small to medium-scale apiaries with 10–20 colonies, indicating

semi-commercial production systems. More than half of the beekeepers practiced migration of bee colonies in search of better floral resources, particularly during mustard and litchi flowering seasons.

Honey production analysis showed that most farmers produced 10–20 kg of honey per colony annually, reflecting moderate productivity levels. Mustard season contributed nearly 60% of total honey production, making it the most important nectar flow period in the study area. Annual income analysis revealed that half of the respondents earned between ₹50,000 and ₹1 lakh from beekeeping, suggesting that apiculture has considerable economic potential.

The marketing system was largely unorganized, with honey sold through local markets, wholesalers, companies, and direct customers. Price variation was observed due to differences in quality, branding, and processing methods. Packaging systems were mostly traditional, with plastic bottles commonly used.

Major constraints identified included bee diseases, lack of training, low market prices, climate change, and inadequate equipment. Problems such as Varroa mite infestation, wax moth attack, colony absconding, and queen bee failure significantly affected productivity. Furthermore, awareness of government schemes and training opportunities was low. Overall, the study highlights strong potential for commercial honey production but emphasizes the need for modernization, technical support, and improved market linkages for sustainable growth

CONCLUSION AND SUGGESTIONS

This chapter summarizes the major findings of the study and presents suggestions for improving commercial honey production in the Prayagraj district. The conclusions are based on primary and secondary data collected from beekeepers through questionnaires, interviews, and field observations. The study examined socio-economic conditions, beekeeping practices, honey production patterns, marketing systems, constraints, and future opportunities in apiculture.

The study revealed that most beekeepers belong to middle and lower-middle income groups and treat beekeeping as a supplementary source of income rather than a primary occupation. Most respondents were within the age group of 40–60 years and possessed education up to secondary level. Youth participation in beekeeping was found to be comparatively low. Most farmers combined agriculture with apiculture, indicating that beekeeping remains a developing rural enterprise.

Regarding management practices, *Apis mellifera* was identified as the most commonly used bee species due to its high productivity. Most beekeepers operated small- to medium-scale apiaries containing 10–20 colonies. Some farmers practiced migration of colonies to increase honey yield; however, scientific management techniques were mainly adopted by trained beekeepers. Traditional methods and inadequate technical knowledge resulted in reduced productivity and colony losses.

Honey production varied according to season, floral availability, and management practices. Mustard season contributed the highest honey yield, while litchi honey was valued for quality but produced in smaller quantities. Average honey production ranged between 10–20 kg per colony annually, and only a few farmers achieved higher production levels.

The marketing system was largely unorganized. Farmers mainly sold honey directly to consumers or local markets. Lack of branding, quality certification, and organized market channels limited profitability. Despite this, beekeeping significantly contributed to rural income, with many farmers earning ₹50,000–₹1,00,000 annually.

Major constraints included lack of scientific training, bee diseases, climate variability, weak infrastructure, poor awareness of government schemes, and inadequate marketing support. Awareness regarding programs such as the National Beekeeping and Honey Mission remained low.

The study concludes that honey production in Prayagraj has significant potential but requires modernization and institutional support. Regular training, scientific hive management, improved marketing systems, infrastructure development, youth participation, and stronger government support are essential for sustainable growth. With proper intervention, the region can emerge as an important honey-producing hub in Uttar Pradesh, contributing to rural employment, agricultural productivity, and environmental sustainability.

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