# Identification and assessment of constraints associated with production, post production and marketing of honey and bee products in Jammu division.

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*Abstract*—This present study is a part of Ph.D reserch and identifies and assesses the constraints associated with production , post production and marketing of honey and bee products in Ramban ,Kathua and Jammu districts of Jammu Division, J&K. The research emphasized on untapped potential in beekeeping as the global and national demand for honey and hive products is increasing. A stratified sampling approach was used to survey 200 beekeepers across high (Ramban), medium (Kathua), and low density (Jammu) districts. Data was collected on production and marketing costs, marketing channels, profitability, socio-economic variables and constraints faced ,using a structured questionnaire. The findings of the analysis highlighted variations in costs, returns, and adoption rates across districts. Ramban emerged as the most productive (7196 quintals) and profitable district ( gross returns = Rs 17,744.53/quintal), with the highest benefit-cost ratio (24.78) and gross returns. Direct marketing (producer to consumer) yielded the highest producer share in consumer prices(97.78 % average of 3 districts ). Key constraints identified include high feed and labour costs, marketing barriers, and limited post-harvest infrastructure. Factors like number of bee colonies and experience were significant predictors of profitability and enterprise adoption. The findings concluded that honey production is a profitable venture in the areas under study (BCR - 1 : 21.4). It was recommended that strategic interventions such as improved market access, value addition, cooperative models , reduce price spreads between producers and consumers, and cost reduction policies can be implemented .

*Index Terms*- Beekeeping, Marketing chain, Economic analysis , profitability, Beekeeping adoption , constraints

## I. INTRODUCTION

[Beekeeping (or apiculture) is the maintenance of bee colonies commonly in man-made hives by humans. Beekeeping is an agro-based occupation that provides income and employment generation for rural and tribal families. It plays a vital role in the present context of the commercialization of agriculture and liberalization of the economy. It covers the entire scope of honeybee resources, bee-products, beekeeping practices, pollination services and their interface with business systems and ecological integrity. Bees are a special gift to mankind due to their pollination services and valued products like honey, beeswax, propolis, bee venom etc (Das et.al, 2022).

Bees are the masterminds of pollination the process by which pollen is transferred from one flower to another enabling fertilization and fruit production. In fact bees are responsible for pollinating roughly one-third of the world's crops including apples, berries, melons, almonds and coffee ( Khalifa et.al 2021). Unfortunately bee populations face numerous threats including habitat loss, pesticide use and climate change. This decline in bee numbers poses a serious threat to global food security and ecosystem health. By practicing sustainable agriculture supporting local beekeepers and raising awareness about the importance of bees can contribute to safeguarding these vital pollinators for future generations.

Apiculture (beekeeping) is dependent on floriculture (the cultivation of flowers) because bees crucial pollinators rely on flowers for their food source (nectar and pollen). India's floriculture industry has grown into a high-performing sector earning its status as a "sunrise industry" with a 100 per cent export orientation. (Ministry of Statistics and Programme Implementation, Government of India, 2025).

Beekeeping is an enticing, lucrative and intriguing rural agri-horticulture business. It does not require cutting-edge technology a large financial

investment or vast infrastructure. It is effective as an allied activity in an integrated agricultural system for boosting the farming community's economy. A beekeeper keeps bees to harvest honey and other hive products, fertilize crops or breed bees for sale to other beekeepers. Beekeeping has several advantages including providing self-employment to rural and forest based populations the production of honey, pollen, beeswax, venom, and royal jelly providing employment to rural educated youths in the collection, processing, and marketing of bee products and it is most important in the cross-pollination of various agricultural and horticultural crops thereby improving their quality (Narang, A. et al. (2022).

**Status of Honey Production in World**:

In 2024, the FAO reported honey production reached 18,94,000 metric tons. The global honey market size was valued at USD 9.40 billion and is projected to grow to USD 15.59 billion by 2032. (Food and agriculture organization, 2024). The global honey market is expected to grow at a CAGR of 5.83% in the forecast period 2023-2029 (Food and agriculture organization, 2024).

**Status of Honey Production in India**

India honey market size was worth around USD 305 million in 2023 and is predicted to grow to around USD 585 million by 2032 with a compound annual growth rate (CAGR) of roughly 7.5% between 2024 and 2032. In FY 2024-25 India is estimated to have produced approximately 1,46,000 metric tonnes of honey with a value of USD 177.52 million in exports. (The Agricultural and Processed Food Products Export Development Authority, Ministry of Commerce and Industry, Government of India, 2024). Honey market is expected to generate US$2.45 billion in revenue and is predicted to grow annually by 5.37% (CAGR 2024-2028) (The Agricultural and Processed Food Products Export Development Authority, Ministry of Commerce and Industry, Government of India, 2024). About 12,699 beekeepers are currently registered on the National Bee Board with 19.34 lakh honey bee colonies. (National Beekeeping and Honey Mission, Department of National Beekeeping and Honey Mission, Government of India , 2022-2023). More than half of India's honey production is almost exported to 83 nations including the USA, Saudi Arabia, United Arab Emirates, Bangladesh, Canada, etc. (National Beekeeping and Honey Mission, Department of National Beekeeping and Honey Mission, Government of India 2022-2023).

In order to strengthen India's honey production and export capacity National Beekeeping and Honey Mission (National Beekeeping and Honey Mission, Government of India 2022-2023) have formulated and released guidelines for beekeepers (Debroy, 2019; NBB, 2020; Chetri et al., 2021). National Beekeeping and Honey Mission (NBHM) is a Central Sector Scheme for promoting scientific beekeeping for holistic growth of beekeeping sector to enhance agriculture production. The NBHM has sub-schemes – Mini Mission I, II and III. Under Mini Mission-I projects for production and productivity improvement of various crops through pollination assisted by adoption of scientific bee keeping are given; under Mini Mission - II post-harvest management of bee keeping is supported and under Mini Mission - III research and technology generation is provided. The financial assistance is provided as per the scheme guidelines.

**Table 1.1 - Operation of beekeeping and honey mission projects in different states and UTs of India**.

| S.NO | STATES /UTs | 2020-21 | 2021-22 | 2022-23 | 2023-24 | 2024-25 | TOTAL |
|---|---|---|---|---|---|---|---|
| 1 | Andhra Pradesh | -- | -- | 1 | -- | -- | 01 |
| 2. | Arunachal Pradesh | -- | 1 | 1 | 3 | 3 | 08 |
| 3. | Assam | 1 | 2 | 7 | 3 | 4 | 17 |
| 4. | Bihar | 2 | -- | 1 | 1 | 2 | 06 |
| 5. | Chhattisgarh | -- | 2 | 2 | -- | 3 | 07 |
| 6. | Gujarat | 3 | 4 | -- | 1 | 2 | 10 |
| 7. | Haryana | -- | 4 | -- | 3 | 3 | 10 |
| 8. | Himachal Pradesh | 2 | 2 | 2 | -- | 3 | 09 |
| 9. | Jammu & Kashmir | 7 | -- | 4 | 1 | 6 | 18 |
| 10. | Jharkhand | -- | -- | -- | 11 | 1 | 12 |
| 11. | Karnataka | 7 | 5 | 3 | 2 | 3 | 20 |
| 12. | Kerala | -- | 4 | -- | -- | 1 | 05 |
| 13. | Madhya Pradesh | -- | 4 | 2 | 2 | 2 | 10 |
| 14. | Maharashtra | 2 | -- | 2 | 1 | 9 | 14 |
| 15. | Manipur | -- | 1 | 2 | 1 | 1 | 05 |

| 16. | Meghala ya | -- | -- | -- | -- | 2 | 02 |
|---|---|---|---|---|---|---|---|
| 17. | Mizoram | -- | -- | -- | -- | -- | -- |
| 18. | Nagaland | -- | -- | -- | 2 | 4 | 06 |
| 19. | Odisha | -- | 1 | -- | 1 | 1 | 03 |
| 20. | Punjab | -- | 3 | 1 | -- | 5 | 09 |
| 21. | Rajastha n | 2 | 2 | 1 | -- | 10 | 15 |
| 22. | Sikkim | -- | 1 | -- | -- | 1 | 02 |
| 23. | Tamil Nadu | 5 | -- | 2 | 1 | 1 | 09 |
| 24. | Telangan a | -- | 1 | 4 | 4 | 4 | 13 |
| 25. | Tripura | -- | 1 | -- | -- | 2 | 03 |
| 26. | Uttar Pradesh | 3 | 3 | 12 | 2 | 10 | 30 |
| 27. | Uttarakh and | 2 | 8 | 5 | 1 | 7 | 23 |
| 28. | West Bengal | -- | 1 | 1 | 3 | 11 | 16 |
| 29 | Andama n & Nicobar Islands | -- | -- | -- | -- | 1 | 01 |
| 30. | National/ Central Level Agencies | 5 | 2 | 6 | 1 | -- | 14 |
| | **Grand Total** | **41** | **52** | **59** | **44** | **10 2** | **298** |

**(Source- National beekeeping and honey mission, Government of India 2025)**

Covid-19 pandemic has also witnessed surge in honey consumption due to its health inducing properties . The growing health and wellness trends are expected to propel the India honey market growth over the projected period. Based on the flavour, the multiflora honey segment is expected to dominate the market over the forecast period, based on the seasonality, the autumn and spring season segment is expected to capture the largest market share over the forecast period, based on the distribution channel the business to consumer segment is expected to garner a significant revenue share over the forecast period. and based on the state, Maharashtra is expected to dominate the market over the projected period

It was reported that India's export of honey had increased between 2013-14 to 2019-20 by 110% (National Beekeeping and Honey Mission, Department of National Beekeeping and Honey Mission, Government of India, 2021). In 2023-24, India exported

107,963.21 metric tonnes of natural honey valued at Rs 1,470.84 crore (approximately $177.52 million USD) with the USA, Saudi Arabia, the UAE, Bangladesh, and Canada being key export destinations. Some of the major exports of honey from India include mustard, eucalyptus, lychee, sunflower, pongamia, multi-flora Himalayan, acacia, and wild flora honey.

**Table 1.2 - Top export countries/destinations of Indian honey in world (2023-24):**

| S.No. | Country | Quantity in Metric Tonnes |
|---|---|---|
| 1 | United States of America | 89,494.70 |
| 2 | United Arab Emirates | 8,524.01 |
| 3 | Saudi Arab | 1,735.37 |
| 4 | Qatar | 1,030.19 |
| 5 | Libya | 1,125.26 |
| 6 | Morocco | 1,070.18 |
| 7 | Bangladesh | 682.15 |
| 8 | Nepal | 605.48 |
| 9 | Canada | 366.28 |
| 10 | Portugal | 554.4 |

**(Source- Directorate General of Foreign Trade, Government of India, 2024)**

To enhance exports the Indian government prioritizes value-added honey products, organic certification, and strict adherence to international quality standards. Efforts are also underway to train beekeepers, improve infrastructure and invest in cutting-edge research. With rising global demand for natural and organic products India's honey industry can achieve robust growth. Additionally the industry strengthens quality control and sustainability measures. (National Bee Board, Ministry of Agriculture and Farmers Welfare,2023).

**Status of Honey Production in Jammu and Kashmir**

Jammu & Kashmir Union Territory recorded 146000 quintals of honey production in the year 2023-24, with Jammu division holding the share of 4425.35 quintal. The total number of beekeepers in Jammu division were 2471 with 82660 bee-colonies. Jammu and Kashmir witnessed a 'Sweet revolution' through apiculture development schemes launched by the government such as free of cost facilities for processing crude honey.(Ministry of Micro, Small & Medium Enterprises, Government of India 2025). Besides developing infrastructure for post-harvest management value addition and marketing, Jammu and Kashmir government has also launched a Rs 46.65 crore

'Promotion of Beekeeping' project beekeeping or Apiculture has been one of the age-old traditions in Jammu and Kashmir which is now turning into a lucrative business with governments' progressive policies and initiatives.

**Table 1.3 - Distribution of bee-keeping units (District wise) and honey production in Jammu division.**

| S. No. | District | Bee Colonies | Honey Production | No. of Bee-keepers (Apis melifera) | No. of Bee-keepers (Apis indica) | Total |
|---|---|---|---|---|---|---|
| 1 | Ramban | 41486 | 2451.95 | 477 | 1250 | 1727 |
| 2 | Doda | 11067 | 754.02 | 135 | 67 | 202 |
| 3 | Kathua | 4999 | 300.25 | 75 | 107 | 182 |
| 4 | Udhampur | 4764 | 228.35 | 94 | 0 | 94 |
| 5 | Jammu | 5000 | 317.3 | 80 | 0 | 80 |
| 6 | Reasi | 635 | 11.4 | 65 | 0 | 65 |
| 7 | Kishtwar | 6092 | 90.5 | 40 | 0 | 40 |
| 8 | Rajouri | 4477 | 111.49 | 38 | 0 | 38 |
| 9 | Poonch | 522 | 25.62 | 23 | 0 | 23 |
| 10 | Samba | 3618 | 134.47 | 20 | 0 | 20 |

**(Source : SKUAST JAMMU,2023)**

For standardisation small-time keepers are also offered the service of honey testing and logo stamping for better returns in the market. These processing units are a one-stop-solution to reducing the moisture of honey, filter and bottle it. To increase their earnings manifold new-age agripreneurs are making value additions to honey by making products such as soaps, candles, cosmetics, ayurvedic medicines etc which are in high demand in the Indian market. As a result consumers have been switching to value addition and presenting a big opportunity for the youth to start a profitable venture.

The UT administration through its Krishi Vigyan Kendras (KVKs) of SKUAST-J and SKUAST-K and the Department of Agriculture is imparting technical skills among the farmers. The advanced two apitherapy centres and GI labs are established to increase the production of high-quality honey. Besides, monitoring and traceability is done through GI labs and 20 Custom Hiring centres (CHCs) are established for extending pollination facilities. Under the project, the value addition of honey is also being envisioned coupled with efficient growth of the bee sector using native honey bees. Generation of additional Rs 475 crore income by the sale of by-products has been targeted under the project.

The value addition will be possible by harnessing the potential of by-products. 86 enterprises will be set up in the coming five years under the project. The potential of apiculture has not been tapped fully in Jammu and Kashmir hence under this project latest interventions are being brought to produce good quality honey in huge quantity to uplift our beekeepers. (Government of Jammu & Kashmir , Department of Information & Public Relations,2023).

**GI Tag and its impact on honey production and marketing**

GI (Geographical Indication) tags are a type of intellectual property right that is used to protect products that have a specific geographical origin and possess qualities or a reputation that are attributable to that origin (Buwa,2023). The tags are used to help consumers identify and distinguish between products that are associated with specific regions or areas, and to prevent others from using the same geographical name to market their own products. In India GI tags are granted by the Geographical Indications Registry which is a government agency that operates under the Ministry of Commerce and Industry.

Products that are granted GI tags in India include agricultural products, handicrafts, textiles, food and beverages, and industrial products. (Ministry of Commerce and Industry,2024)These tags serve as a testament to the Unique Qualities and Characteristics of these local specialities and open up doors for their promotion and recognition on an International Scale. The Sulai Honey of district Ramban is given GI tag and has been declare as One District One Product (ODOP) by Govt of India because not only it has an exquisite taste but also is organic in nature. A Geographical Indication (GI) tag on honey positively impacted honey production by boosting producer revenue, increasing rural employment, and enhancing exports. It assured consumers of the honey's quality and authenticity thus preventing adulteration and promoting trust in the product. Furthermore, GI tagging encouraged

sustainable beekeeping practices and lead to better market access and higher prices for producers (WIPO,2024).

## II. LOCALE OF STUDY

A. The present study was conducted in Jammu, Kathua and Ramban districts of Jammu division of Union Territory of Jammu and Kashmir, selected on the basis of highest number of bee colonies.

## III. SAMPLING DESIGN

i. **Selection of districts** : Multistage random sampling technique was employed to select number of beekeepers. At the first stage of sampling - three districts (Jammu, Kathua and Ramban) were selected purposively on the basis of having density of total beekeepers, considering three ranges; i.e. high density (more than 1000), medium density (between 100 to 999) and low density (less than 100) (Kumar et.al , 2020 ; Thakur et.al , 2023). Ramban was the only district which falls under the category of first range of >1000 with 1727 beekeepers (Table 1). Within the second range (100 to 999), there were two districts, namely Kathua and Udhampur. Kathua was selected randomly from within this second range. Further there were seven districts which fall under the third category of low density (less than 100) and Jammu was selected randomly from this range as well.(Table 1.3)

ii. **Selection of districts** : Multistage random sampling technique was employed to select number of beekeepers. At the first stage of sampling - three districts (Jammu, Kathua and Ramban) were selected purposively on the basis of having density of total beekeepers, considering three ranges; i.e. high density (more than 1000), medium density (between 100 to 999) and low density (less than 100) (Kumar et.al , 2020 ; Thakur et.al , 2023). Ramban was the only district which falls under the category of first range of >1000 with 1727 beekeepers (Table 1). Within the second range (100 to 999), there were two districts, namely Kathua and Udhampur. Kathua was selected randomly from within this second range. Further there were seven districts which fall under the third category of low density (less than 100) and Jammu was selected randomly from this range as well.

iii. **Data Collection:** Both primary as well as secondary data was collected and used for the present research. The primary data was collected through key informant interview and personal interview using standardized questionnaire. The questionnaire was employed to inquire the cost of production of honey, productivity, channels of marketing, relationship with other marketing intermediaries and challenges & constraints in the marketing. Moreover, marketing analysis of the honey and bee products, marketing chain was studied by taking number of intermediaries into consideration. The secondary data was collected from Division of Entomology, SKUAST- Jammu, relevant websites, government publications, public records on honey production and data from Krishi Vigyan Kendras (KVKs) etc.

## IV. STATISTICAL ANALYSIS

**Constraints associated with production and marketing of honey and bee products.**

The constraints associated with production and marketing of honey and bee products were identified using responses obtained from the bee-keepers. The Garrett ranking method is a statistical technique used to analyze and prioritize constraints faced in honey and bee product production and marketing by asking respondents to rank various issues in order of importance, then converting those ranks into numerical scores using a specific formula, allowing identification of the most significant challenges beekeepers encountered in both production and marketing aspects of their business, hence providing a hierarchical understanding of the constraints based on perceived severity by stakeholders. To estimate the constraint experienced by beekeepers, problems faced by beekeepers in running the beekeeping venture were enumerate. Based on discussion with beekeepers, extension personnel and review of literature, a list of 32 constraints was prepared. Out of these constraints, 14 were related to production of honey , 8 were related to post production and 10 were to marketing aspect of honey. The respondents were asked to rank these constraints in the decreasing order of importance. These ranks were analysed through Garrett's ranking technique.As per the above quoted method, respondents were asked about their opinions to assign the rank for all factors and the outcomes of such ranking was converted into score value with the help of the following formula:

$$\text{Per cent Position} = (R_{ij} - 0.5) / N_j$$

Where:

$R_{ij}$ = Rank given to I position by the $j^{th}$ Individual
$N_j$ = Numbers of problems ranked by $j^{th}$ Individual
The percent position was converted into scores by referring to the table given by Garrett and Woodworth (1969) (transmutation of orders of merit into units of amount or scores). Then for each factor, the scores for each individual was added and then total value of scores and mean values of score were calculated. These mean scores for all the factors were arranged in descending order and the most influencing factors were identified through ranks assigned. The factors having highest mean value was considered to be the most important factor.

V. RESULTS

***Production, Post production* and Marketing Constraints faced by farmers.**

  i.    Production constraints
  ii.   Post production constraints
  iii.  Marketing constraints

The Production , Post production and Marketing constraints faced by beekeepers in Jammu division are presented in Tables 4.34,4.35,4.36,4.36,4.38 and 4.39

**TABLE 4.34 : Production constraints faced by the farmers in the study area**

| | Constraints | Per cent farmers facing constraints (Multiple responses by mean percent method) | Ranking |
|---|---|---|---|
| 1 | Lack of technical know-how | 76.16 | I |
| 2 | Lack of species available | 42.42 | VII |
| 3 | Costly inputs | 51.90 | VI |
| 4 | Low quality inputs | 40.92 | VIII |
| 5 | Equipment availability | 11.5 | XII |
| 6 | Labour availability | 6.99 | XIV |
| 7 | Pest attack on honey | 63.81 | III |
| 8 | Attack / disease | 52.21 | V |
| 9 | Lack of financial resources | 67.46 | II |
| 10 | Infrastructural problem | 30.05 | X |
| 11 | Death of colony | 58.65 | IV |
| 12 | Migration | 8.75 | XIII |
| 13 | Swarming | 18.9 | XI |
| 14 | Shortage of forage | 31.33 | IX |

TOTAL NO OF RESPONDENTS – 200

The table 4.34 revealed that in terms of Production constraints maximum beekeepers (76.16%) faced problem of Lack of technical know-how followed by (67.46%) Lack of financial resources. (63.81%) of the respondents had the problem of Pest attack on honey , (58.65%) faced death of colony , (52.21%) suffered by attack / disease . (51.9%) said costly inputs was a big constraint. (42.42%) faced lack of species available and (40.92%) faced issue of low quality of inputs. (31.33%) said shortage of forage, (30.05%) encountered infrastructural problem and (18.9%) were facing problem of swarming and (18.5%) lack of input availability . Finally it was seen that (8.75%) were facing the problem of migration of honeybees and (6.99%) faced Labour availability during peak harvesting season to take care of hives , bees, feeding etc. Furthermore when value of mean percent was calculated in terms of Garrett ranking methods , higher the score value higher was the intensity of Production constraints. Following outcome was derived :

**Table 4.35: Garrett score value of Production constraints faced by the farmers in the study area**

| S.No | Constraints | Percent rank | Garrett score value | Ranking |
|---|---|---|---|---|
| 1 | Lack of technical know-how | 3.57 | 85 | I |
| 2 | Lack of species available | 46.42 | 52 | VII |
| 3 | Costly inputs | 39.2 | 55 | VI |
| 4 | Low quality inputs | 53.57 | 48 | VIII |
| 5 | Equipment availability | 82.14 | 64 | XII |
| 6 | Labour availability | 96.42 | 17 | XIV |
| 7 | Pest attack on honey | 17.8 | 68 | III |
| 8 | Attack / disease | 32.14 | 59 | V |

| | | | | |
|---|---|---|---|---|
| 9 | Lack of financial resources | 10.7 | 75 | II |
| 10 | Infrastructural problem | 67.8 | 41 | X |
| 11 | Death of colony | 25 | 63 | IV |
| 12 | Migration | 89.2 | 25 | XIII |
| 13 | Swarming | 75 | 37 | XI |
| 14 | Shortage of forage | 60.71 | 45 | IX |

**TOTAL NO OF RESPONDENTS - 200**

Maximum beekeepers (85 score value) faced problem of Lack of technical know-how followed by (75 score value) Lack of financial resources , (68 score value) of the respondents had the problem of Pest attack on honey , (64 score value) Death of colony , (63 score value )Attack / disease , (59 score value) Costly inputs, (55 score value) Lack of species available , (52 score value) Low quality inputs, (48 score value) Shortage of forage, (45 score value) Infrastructural problem, (41 score value) Swarming , (37 score value)Equipment availability , (25 score value ) were facing the problem of Migration of honeybees and (17 score value)faced Labour availability during peak harvesting season to take care of hives , bees, feeding etc.

**TABLE 4.36: Post Production constraints faced by the farmers in the study area**

| S.No | Constraints | Per cent farmers facing constraints (Multiple responses) | Ranking |
|---|---|---|---|
| 1 | Unavailability of expert for grading and bottling | 68.5 | I |
| 2 | Sterilized Condition | 28.61 | V |
| 3 | Costly packing material or non-availability of packing material | 59.75 | II |
| 4 | Spoilage | 9.86 | VII |
| 5 | Lack of storage facilities | 37.9 | IV |
| 6 | Lack of cold storage | 21.89 | VI |
| 7 | Unavailability of labour for harvesting | 2.09 | VIII |

| | | | | |
|---|---|---|---|---|
| 8 | Unavailability of harvest equipment | 48.65 | III |

**TOTAL NO OF RESPONDENTS - 200**

The table 4.36 revealed that in terms of Post Production constraints, Maximum (68.5%) beekeepers faced problem of Unavailability of expert for grading and bottling of honey harvested followed by (59.75%) beekeepers were facing issue of high cost of packing material and nonavailability. (48.65%) faced unavailability of harvest equipment constraint, (37.9%) beekeepers stated that Lack of storage facilities and (28.61% ) sterilized condition were a important post production problem leading to economic and honey wastage. Also (21.89%) stated lack of cold storage also created an hindrance post production. Finally(9.86%) faced spoilage and (2.09%) beekeepers had issue of availability of labour for harvesting .Furthermore when value of mean percent was calculated in terms of Garrett ranking methods , higher the score value higher was the intensity of Post Production constraints. Following outcome was derived :

**Table 4.37: Garrett score value of Post production constraints faced by the farmers in the study area**

| S.No | Constraints | Percent rank | Garrett score value | Ranking |
|---|---|---|---|---|
| 1 | Unavailability of expert for grading and bottling | 6.25 | 80 | I |
| 2 | Sterilized Condition | 56.25 | 47 | V |
| 3 | Costly packing material or non-availability of packing material | 18.75 | 68 | II |
| 4 | Spoilage | 81.25 | 32 | VII |
| 5 | Lack of storage facilities | 43.25 | 53 | IV |
| 6 | Lack of cold storage | 68.75 | 60 | VI |
| 7 | Unavailability of labour for harvesting | 93.75 | 20 | VIII |

| 8 | Unavailability of harvest equipment | 31.25 | 59 | III |
|---|---|---|---|---|

**TOTAL NO OF RESPONDENTS - 200**

Maximum (80 score value) beekeepers faced problem of unavailability of expert for grading and bottling of honey harvested followed by (68 score value) Beekeepers were facing issue of high cost of packing material and nonavailability . (60 score value) faced unavailability of harvest equipment constraint, (59 score value) beekeepers stated that lack of storage facilities and (53 score value) sterilized condition were a important post production problem leading to economic and honey wastage. Also (47 score value) stated lack of cold storage also created an hindrance post production. Finally(32 score value)faced spoilage and (20 score value) beekeepers had issue of availability of labour for harvesting .

**Table 4.38: Marketing constraints faced by the farmers in the study area**

| S.No | Constraints | Per cent farmers facing constraints (Multiple responses) | Ranking |
|---|---|---|---|
| 1 | Prevalence of low prices in local and distant markets | 61.83 | I |
| 2 | Lack of regulated markets | 36.45 | IV |
| 3 | Lack of link roads | 16.45 | VII |
| 4 | High transportation cost | 23.82 | V |
| 5 | Lack of market information | 19.26 | VI |
| 6 | Delayed payments by traders | 45.1 | III |
| 7 | Malpractices by traders | 56.37 | II |
| 8 | No govt support | 6.45 | VIII |
| 9 | Less demand | 1.88 | IX |

**TOTAL NO OF RESPONDENTS - 200**

The table 4.38 revealed that in terms of Marketing constraints. At marketing phase , Maximum beekeepers (61.83%) faced problem of prevalence of low prices in local and distant markets they have to transport their produce to a distant markets and it will cause them a higher marketing cost. (56.37%) Beekeepers expressed their grief on malpractices (45.1%) delayed payments by traders that is not getting remunerative price for the produce by traders. Lack of regulated markets and high cost of transportation on the produce to distant market was a major economic growth setback for (36.45% ) and (23.82%) beekeepers respectively. Finally (19.26%) Beekeepers stated lack of market information created a gap in the real-time market updates, (16.45%) said  lack of link roads  , (6.45%) said No govt support led to low price/lack of remunerative prices and (1.88%) less demand lead to low returns for beekeepers. Furthermore when value of mean percent was calculated in terms of Garrett ranking methods , higher the score value higher was the intensity of Marketing constraints. Following outcome was derived :

**Table 4.39: Garrett score value of Marketing constraints faced by the farmers in the study area**

| S.No | Constraints | Percent rank | Garrett score value | Ranking |
|---|---|---|---|---|
| 1 | Prevalence of low prices in local and distant markets | 5.5 | 81 | I |
| 2 | Lack of regulated markets | 38.8 | 56 | IV |
| 3 | Lack of link roads | 72.2 | 38 | VII |
| 4 | High transportation cost | 50 | 50 | V |
| 5 | Lack of market information | 61.1 | 44 | VI |
| 6 | Delayed payments by traders | 27.7 | 62 | III |
| 7 | Malpractices by traders | 16.6 | 69 | II |
| 8 | No govt support | 83.3 | 31 | VIII |
| 9 | Less demand | 94.4 | 19 | IX |

**TOTAL NO OF RESPONDENTS - 200**

Maximum beekeepers (81 score value) faced problem of Prevalence of low prices in local and distant markets they have to transport their produce to a distant markets and it will cause them a higher marketing cost. (69 score value) Beekeepers expressed their grief on malpractices and (62 score value) delayed payments by traders that is not getting remunerative price for the produce by traders. Lack of regulated markets and high cost of transportation on the produce to distant market was a major economic growth setback for (56 score value) and (50 score value) beekeepers respectively. Finally (44 score value) Beekeepers stated lack of market information created a gap in the real-time market updates, (38 score value) said lack of link roads , (31 score value) said No govt support led to low price/lack of remunerative prices and (19 score value) less demand lead to low returns for beekeepers.

## VI. DISCUSSION

The study of production faced by beekeepers in Jammu division showed that maximum beekeepers (76.16%) faced problem of Lack of technical know-how followed by (67.46%) Lack of financial resources (63.81%) of the respondents had the problem of Pest attack on honey (58.65%) Death of colony (52.21%) Attack / disease (51.9%) Costly inputs (42.42%) Lack of species available (40.92%) Low quality inputs (31.33%) Shortage of forage (30.05%) Infrastructural problem (18.9%) Swarming (18.5%) Equipment availability (8.75%) were facing the problem of Migration of honeybees and (6.99%) faced Labour availability during peak harvesting season to take care of hives bees feeding etc.

The evaluation of post-production constraints revealed that in terms of Post Production constraints Maximum (68.5%) beekeepers faced problem of Unavailability of expert for grading and bottling of honey harvested followed by (59.75%) Beekeepers were facing issue of high cost of packing material and nonavailability . (48.65%) faced Unavailability of harvest equipment constraint (37.9%) beekeepers stated that Lack of storage facilities and (28.61% ) Sterilized Condition were a important post production problem leading to economic and honey wastage. Also (21.89%) stated Lack of cold storage also created an hindrance post production. Finally(9.86%) faced spoilage and (2.09%) beekeepers had issue of availability of labour for harvesting .

The study of marketing constraints showed that at marketing phase maximum beekeepers (61.83%) faced problem of Prevalence of low prices in local and

distant markets they have to transport their produce to a distant markets and it will cause them a higher marketing cost. (56.37%) Beekeepers expressed their grief on malpractices (45.1%) delayed payments by traders that is not getting remunerative price for the produce by traders. Lack of regulated markets and high cost of transportation on the produce to distant market was a major economic growth setback for (36.45% ) and (23.82%) beekeepers respectively. Finally (19.26%) Beekeepers stated lack of market information created a gap in the real-time market updates (16.45%) said lack of link roads (6.45%) said No govt support led to low price/lack of remunerative prices and (1.88%) less demand lead to low returns for beekeepers.

## VII. CONCLUSION

In the present study a total number of 200 beekeepers were selected from Jammu, Kathua and Ramban districts of Jammu and Kashmir, the constraints faced by beekeepers were categories into three groups viz. production , post-production and marketing. Constraints faced in honey and bee product production, post-production and marketing were prioritized by asking respondents to rank various issues in order of importance. Those ranks were then converted into numerical scores using a specific formula, allowing identification of the most significant challenges beekeepers encountered by their business, hence provided a hierarchical understanding based on perceived severity by stakeholders.

Based on discussion with beekeepers, extension personnel and review of literature, a list of 32 constraints was prepared. Out of these constraints, 14 were related to production of honey , 8 were related to post production and 9 were to marketing aspect of honey. The respondents were asked to rank these constraints in the decreasing order of importance. These ranks were analyzed through Garrett's ranking technique. As per the above quoted method, respondents were asked about their opinions to assign the rank for all factors and the outcomes of such ranking was converted into score value with the help of the following formula:

$$\text{Per cent Position} = (R_{ij} - 0.5) / N_j$$

Where:

$R_{ij}$ = Rank given to I position by the $j^{th}$ Individual

$N_j$ = Numbers of problems ranked by $j^{th}$ Individual

Then for each factor, the scores for each individual was added and then total value of scores and mean values of score were calculated. These mean scores for all the factors were arranged in descending

order and the most influencing factors were identified through ranks assigned. The factors having highest mean value was considered to be the most important factor.

I. **Production constraints:** 14 production constraints were enumerated, namely, lack of technical know-how, lack of species available, costly inputs, low quality inputs, equipment availability, labour availability, pest attack on honey, attack / disease, lack of financial resources, infrastructural problem, death of colony and migration, swarming and shortage of forage These constrained were then ranked in decreasing order of their severity as per the information collected by questionnaires filed by respondents. Study showed that lack of technical know-how was the constraint that was ranked I$^{st}$ as it was faced by maximum (76.6%) beekeepers and labour availability was ranked 14th as it was faced by minimum (6.99%) beekeepers.

II. **Post-production constraints**: 8 post-production constraints were enumerated, namely, unavailability of expert for grading and bottling, sterilized condition, costly packing material or non-availability of packing material, spoilage, lack of storage facilities, lack of cold storage, unavailability of labour for harvesting, unavailability of harvest equipment. Study showed that unavailability of expert for grading and bottling was the constraint that was ranked Ist as it was faced by maximum (68.5%) beekeepers and unavailability of labour for harvesting was ranked 8$^{th}$ as it was faced by minimum (2.09%) beekeepers.

III. **Marketing constraints:** 9 marketing constraints were enumerated, prevalence of low prices in local and distant markets, lack of regulated markets, lack of link roads, high transportation cost, lack of market information, delayed payments by traders, malpractices by traders, govt support and less demand. Study showed that prevalence of low prices in local and distant markets was the constraint that was ranked I$^{st}$ as it was faced by maximum (61.83%) beekeepers and labour availability was ranked 9$^{th}$ as it was faced by minimum (1.88%) beekeepers.

## VIII. FUTUTRE SCOPE

i. Developing strategies to manage bee diseases and pests, which can significantly impact production.
ii. Understanding how climate change may impact bee health and honey production and adapting strategies accordingly.

## ACKNOWLEDGMENT

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