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Major constraints faced by the beekeepers in production and marketing of honey in the Nainital district of Uttarakhand

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Abstract

Indian agriculture sector accounts for 17.32 per cent of India's gross domestic product (GDP) in financial year 2017-18 and provides employment to more than half of the total workforce of the country. Agriculture not only means the cultivation of land for crop production but also includes practices of allied activities such as livestock, poultry, beekeeping, sericulture etc. Beekeeping (or Apiculture) is one of such activities. Beekeeping is an agro based seasonal activity. It is currently one of the most widespread agricultural allied activities carried out throughout the world. Originally honey bees were mainly reared in traditional nets, bamboo holes, crevices of walls, wooden log, forest trees etc. and honey was extracted through crude method of squeezing the combs which resulted into destruction of bee colonies and deterioration of the quality of honey produced. At current time India ranks first in terms of number of beehive stocks followed by China in the World. The average annual production of honey worldwide was about 1.8 million MT during 2016-17. In Uttarakhand, beekeeping forms an integral part of small holder farming system and plays a significant role as source of additional cash income in subsistence farming. There were several problems that faced by the bee keeper. Beekeepers have no opportunity to decide or get satisfactory price of their produce. Beekeepers mostly sold their honey directly to the processor. March and April were most important months from view of level of production and disposal of honey. Unconditional weather and climatic conditions, bee diseases and unfixed price of honey were major problems faced by the beekeepers.

Keywords: gross domestic product, allied activities, bee keeping, unconditional weather

Introduction

India is primarily an agriculture-based country and its economy largely depends upon agriculture. Indian agriculture sector accounts for 17.32 per cent of India's gross domestic product (GDP) in financial year 2017-18 and provides employment to more than half of the total workforce of the country. Agriculture not only means the cultivation of land for crop production but also includes practices of allied activities such as livestock, poultry, beekeeping, sericulture etc. Beekeeping (or Apiculture) is one of such activities. It is defined as the scientific method of conservation and rearing of bees for the production of honey and other important hive products such as bee-wax, royal jelly, propolis and bee-venom. Breeding of bees for sale and use for pollination in certain crops are other important subsidiary uses. In India only five honey bee species are found viz. *Apis dorsata* (Rock bee), *Apis florea* (Dwarf bee), *Tetragonula iridipennis* (Dammar or Stingless bee), *Apis cerana indica* (Indian hive bee), *Apis mellifera* (European or Italian bee). The first four are indigenous, while latter one has been introduced from abroad and successfully established in late sixties (1960). For commercial beekeeping in Indian conditions *Apis mellifera* is more suitable, as its production performance is much better than the other species and is less prone to swarming and absconding.

Beekeeping is an agro based seasonal activity. It is currently one of the most widespread agricultural allied activities carried out throughout the world. Apiculture and agriculture are interdependent and thus cannot run in isolation as both have mutual benefits from each other. Honey bee pollination services have been reported to increase the yields and quality of many important cultivated crops, owing to which beekeeping has emerged as an important component for sustainable development of agriculture and horticulture. Total area of bee dependent crops in India is around 55 million hectares and 200 million colonies are needed to meet this, while at present only 1.8 million colonies are present (NBB 2017). Hence there is huge potential for the beekeeping in India.

It is an important means of economic development in rural areas, since it provides employment, income generation, ecological balance and human nutrition.

Honey production is the major aim of beekeeping industry. Honey is the most important primary product both from the quantitative and economic point of view and has been used by mankind for many years as a source of food, medicine and for cultural ceremonies (Cartland, 1970; Mcinerney, 1990 & Molan 1999) [2, 3, 5].

Originally honey bees were mainly reared in traditional nets, bamboo holes, crevices of walls, wooden log, forest trees etc. and honey was extracted through crude method of squeezing the combs which resulted into destruction of bee colonies and deterioration of the quality of honey produced. These practices have been replaced by the modern beekeeping practices introduced from western countries in which bees are reared in movable frame bee hives (Langstroth, Newton, and Bis) of wooden boxes. Besides the hives, the beekeepers need equipments and implements like the hive stand, nucleus box and smoker. The industry also needs equipments and machinery for handling and processing of honey, bees wax, for manufacture of comb foundation sheets, and for other operations. Modern beekeeping is based on heavy use of equipments and honey processing plants which results in higher efficiency and also ensures the quality of produced honey.

India has vast potential for beekeeping due to diversity in availability of flora and fauna. At current time India ranks first in terms of number of beehive stocks followed by China in the World. The average annual production of honey worldwide was about 1.8 million MT during 2016-17. There are 15 countries in the world which account for 90 per cent of the world honey production and export led by China, producing nearly 7 lakh MT and has 12.3 per cent shares in total world export during 2016-17 (Ministry of Agriculture, China). European Union is the largest importer of honey followed by North America. During the year 2016-17, India has produced a total of 95,000 MT of honey, out of which 45537.99 MT of natural honey was exported to other countries of the world and earned a foreign exchange of US\$ 84.23 million (India Stat, 2018). The major export destinations of honey export for India are Bangladesh, United States of America, United Arab Emirates, Morocco and Saudi Arabia. Of the total production of honey in India about 61 percent was contributed by four States viz. West Bengal, Uttar Pradesh, Punjab and Bihar (NBB, 2016) [6]. The per capita consumption of honey in India during 2015-16 was only 38 grams as compared to 1800 grams in Germany during similar year.

In Uttarakhand, beekeeping forms an integral part of small holder farming system and plays a significant role as source of additional cash income in subsistence farming. The credit for popularizing beehives and modern beekeeping in Kumaon and other parts of Northern India goes to Mr. R.N. Mutoo as he established bee Centre at Jeolikote, Nainital. The central Government has taken certain positive initiatives and launched National Mission for overall development of beekeeping in North Eastern and Hilly State of the country (HMNEHS). Thus, there is a wide scope for beekeeping as a remunerative enterprise in Uttarakhand. Total number of beekeeping units in India is about 2.5 Lakh out of which only about 8,700 units are in Uttarakhand (3.48 per cent) producing 2500 MT of honey in 2016-17. Nainital, Haridwar, Pauri and Pithoragarh are the important honey producing

districts in Uttarakhand.

The findings of the study would explore the fact about major constraints faced by the beekeepers in production and marketing of honey in Nainital district.

Methodology

This study was conducted in the Nainital district of Uttarakhand. This district accounted for maximum number of beekeepers rearing *Apis mellifera* (200) and highest production of honey (396 MT) among all districts of Uttarakhand in 2016-17 (Rajkiya Moan Palan Kendra, Jeolikote). The study is based on both primary as well as secondary data. The primary data were collected from the sample beekeepers by personal interview method pertaining to year 2017-18, using a pre-tested structured survey schedule designed for the study. Secondary data was collected from various published and un-published sources such as records of Khadi Village Industries Commission, Haldwani; Krishi Vigyan Kendra, Nainital; Rajkiya Moan Palan Kendra, Jeolikote; National Bee-Board, Dehradun, etc. Nainital district is comprised of eight blocks out of which Bhimtal and Ramnagar blocks were selected purposely for the study on the basis of potentiality for beekeeping. A list of beekeepers of both the blocks registered with National Bee Board having more than 10 hives was obtained from Rajkiya Moan Palan Kendra (RMPK), Jeolikote. As most of registered beekeepers were rearing *Apis Mellifera* species through migratory beekeeping practices, 30 migratory beekeepers from each block were selected randomly from the list and in all 60 beekeepers were included in the sample for detailed analysis. These beekeepers were classified into three categories: small beekeepers (10 to 70 bee colonies), medium beekeepers (71 to 140 bee colonies) and large beekeepers (above 140 bee colonies). 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 19 constraints was prepared. Out of these constraints, 11 were related to production of honey and 8 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.

Result and Discussion

Constraints faced by the beekeepers

Nainital district had a historical tradition and culture of beekeeping. Apiculture has an enormous potential in the area due to availability of endowment diversity of flora. In addition to this, the beekeepers of the area are well experienced, trained and hold great technological knowledge about the management of bees. They also have a better and regular contact with the extension agencies which are continuously working to enhance and encourage beekeeping activities. However, despite the above-mentioned facts, the district has not been free from the problems that come in the way of beekeepers to operate their enterprises successfully. As an outcome, the enormous potential for beekeeping remained untapped. This chapter is devoted to study about severity of the problems that were faced by the beekeepers while practicing beekeeping. For this, various constraints related to the beekeeping were identified and were grouped into two categories i.e. production and marketing of honey. Specifically eleven constraints related to production of honey

and eight linked with marketing of honey were identified. The respondents were asked to rank these constraints on the basis of severity and their importance for them. These constraints were analyzed and prioritized using the Garrett ranking techniques by enumerating the feedback of all respondents.

Constraints related to honey production

There were various problems limiting production of honey. The production level was directly related to the strength and activity of the bees in the colony. The major constraint in exploitation of the untapped potential of beekeeping activity has been presented in the Table 1. The table indicated that the most prioritized constraint with mean score of 59.37 was unfavourable weather and climatic conditions. The extreme hot and cool weather results in reduction of bee population in

the colony. The cloudy and rainy season also exerts adverse impact on the bee colonies. In addition to this, these extreme weather conditions are most favourable for occurrence of disease and infestation of predators along with this nectar availability gets reduced.

Bee diseases and natural enemy's problems were the second most serious constraint in the eyes of the beekeepers. The mean score for this problem was 57.43. Several diseases were reported to occur in the bee colony causing a huge damage to the bee colony. Sometimes the occurrence of these diseases was not seen instantly and which actually cause havoc in later stages. These diseases lead to the inactiveness and even death of bees. The attacks of natural enemies like wasp, ant, wax moth, etc. also cause damage to bee colonies.

Table 1: Problems related to honey production in the Nainital district

S. No.	Constraints faced by the beekeepers	Garrett mean score	Rank
1	Unfavorable weather and climatic conditions	59.37	1
2	Shortage of bee forage	55.37	3
3	Bee diseases, predators and natural enemy problems	57.43	2
4	Lack of Credit supply for technology advancement	44.84	10
5	Problems during migrations	54.71	5
6	High cost of standardized beekeeping equipment	42.96	11
7	Death, Absconding, swarming and theft problem of bee colony	50.82	7
8	High cost of supplement feed (sugar syrup)	55.11	4
9	Cumbersome process and policy for forest land use right	52.61	6
10	Lack of Skilled labour availability	44.85	9
11	Pesticide poisoning	46.53	8

Next prioritized constraint was the lack of bee forage and secured 3rd rank (mean score 55.37) among eleven constraints. The availability of flora in the study area and places where the beekeepers visited during migrations had been continuously depleting. The unavailability of desired bee flora had reduced the honey yield as perceived by the beekeepers.

High cost of supplement feed was also reported by beekeepers as one of the major constraints with the mean of score 55.11. The reason was the high prices of sugar (used as supplement feed) during the period of 2017-18.

Fifth major constraint reported by beekeepers with mean score of 54.71 was problems related to migration. The beekeepers had to face many problems during migration from one place to another. High transportation cost, hesitation of farmers to keep the boxes in their field and unavailability of labour for loading and unloading, teasing by police men, shifting and travelling only in night hours etc. were reported as major issues that were resisting beekeepers to migrate their bee colonies to places where floral resources were unexploited.

Other important problem reported by beekeepers was cumbersome process and policies for forest land use right with mean score of 52.61. The beekeepers were permitted to keep their hive in forest by forest officials only for limited period due to several rules and regulation. The various policies like compulsory registration at least for three years reduced the utilization of forest flora resources. This results in migration to other floral resources otherwise leads to reduction in honey production.

Swarming, absconding, theft and vandalism have also caused the reduction in number and strength of bee colonies. These problems cause a jerk in the operation size of beekeepers as the apiary size gets reduced instantly. The rank of this

constraint was seventh with the mean score of 50.82.

Pesticide poisoning with mean score of 46.53 was also a constraint faced by beekeepers as bees got infected because of the pesticide sprays in the crop field. It causes death to honey bees and was ranked eighth by the beekeepers.

Lack of skilled labour availability emerged as another constraint as most of the beekeepers performed maximum beekeeping activities by themselves. But the beekeepers who needed the skilled labour found it hard to meet out their need. The mean score of lack of skilled labour was 44.85 and ranked ninth by the beekeepers. Lack of credit supply for technology advancement and high cost of standardised equipments were other constraints faced by the beekeepers as only few beekeepers wanted to adopt new technology and standard equipments while rest were not interested in them.

Constraints related to marketing

In the recent past the popularity of beekeeping as a income generating activity has increased among rural people. Many of the progressive farmers adopted it and Nainital district has become highest producer of honey among all districts of Uttarakhand. Despite of these facts yet proper structured market was not available in the area. Improper marketing facilities emerged as crucial factor affecting sustainability of beekeeping business in the area. Various problems faced by beekeepers related to the marketing and sale of the produce are enumerated in Table 2.

The most important and prioritized problem was unfixed price of raw honey with mean score of 72.90. Beekeepers reported that the price of raw honey was unstable and a huge fluctuation was seen in price of honey. As an outcome of this fluctuation beekeepers felt about sale insecure of honey over time. It reduced the beekeepers' confident to expand their business. Same result was found by Firdoos (2001) [7] in his

study. The unorganized and unregulated market structure emerged as second most important problem for marketing of honey. It was also reported by beekeepers that buyers purchased their honey from their places. So, there was availability of market at their door step but there were only few buyers in the market who usually form a cartel for them. It led to imperfect market structure without essential competitions among buyers. The next problem for marketing of honey experienced in the area was lack of government

concern and support for marketing of honey with mean score of 55.77 was ranked 3rd. Government has focused on increasing beekeeping activities and honey production but does not take any significant initiative to provide better marketing facilities for the sale of honey in the district like cooperatives societies for milk procurement. Government does not show interest to fix the minimum support price for honey.

Table 2: Marketing problems faced by the beekeepers in the Nainital district

S. No.	Constraints	Garrett mean score	Rank
1	Unfixed price of raw honey	72.90	1
2	Lack of government concern and support for marketing of honey	55.77	3
3	Unorganized and unregulated markets	57.73	2
4	Lack of proper storage containers and facilities	44.16	5
5	Lack of information about honey market	43.23	6
6	Lack of credit supply for high-cost standard implements used in processing, packaging and quality testing	38.33	7
7	Cumbersome procedure for registration as a firm for sale of honey in retail	54.14	4
8.	Unavailability of Quality testing lab	36.31	8

The next important constraint got mean score of 54.14 and ranked fourth by the beekeepers was cumbersome procedure to register a firm to sell the branded honey in market. It reduces the opportunity of value addition to the bee products. Other important problem was lack of proper storage containers and facilities. Non-availability of standard storage container in the locality forced beekeepers to sell their produce during limited months. This problem got rank fifth in perception of the beekeepers with securing mean score of 44.16.

The problem of lack of information about honey market was secured sixth rank and mean score was 43.23. Beekeepers fully relied on local processors and trader for retrieving information about prevailing market prices.

The equipment used in standard processing, packaging and quality testing of honey were required higher investment. The financial situation of the beekeepers does not allow them to set up the infrastructure on their own. Financial institution does not supply credit for this purpose. This constraint was secured seventh rank.

The problem which least prioritized with minimum mean score of 36.31 by beekeepers was non-availability of quality testing laboratory like it is for soil testing, seed testing etc. There was no lab or any set up to testing the quality of honey. It results in similar prices for different quality of honey and beekeepers does not get advantage of producing better quality honey.

Overall, it was noted that unfixed price was the major problem which affect beekeepers most. Other problems were also important but the problem of honey pricing should be solved on priority basis. In view of beekeepers if they get real prices of their produce, many problems had been solved by themselves. The low and volatile price of honey make beekeepers confidence and motivation down.

Conclusion

There were only few buyers in the market and there was no competition in the market for purchases of honey among buyers. Beekeepers have no opportunity to decide or get satisfactory price of their produce. Beekeepers mostly sold their honey directly to the processor. March and April were most important months from view of level of production and disposal of honey. Unconditional weather and climatic

conditions, bee diseases and unfixed price of honey were major problems faced by the beekeepers.

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