



Research Article

POTENTIALITY OF BEEKEEPING IN DOUBLING FARMERS' INCOME IN JHARKHAND: A WAY TO SWEET REVOLUTION

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Abstract: The present study was conducted in Ranchi district of Jharkhand to assess the potentiality of beekeeping as a subsidiary as well as primary source of income for the resource poor small and marginal farmers. The present study will also reveal the scope of "Doubling Farmers' Income" in the state by introducing honey farming as potential source of livelihood. About 47 beekeepers from 10 different blocks of the district have been taken as the respondents to obtain the primary data of the study through schedules. It could be revealed that, the total cost of rearing 100 bee hives and producing honey was Rs. 178000 and the beekeepers were able to earn nearly about Rs 2 lakhs per annum in the Ranchi district. The results revealed that, honey has immense potential to increase the farmers' income as an additional as well as main occupation source. Entrepreneurship development by providing proper training programmes, and other handholding supports from various stakeholders will develop the sector in the state to pave the way for sustainable sweet revolution and Doubling of Farmers' Income by the desired timeline.

Keywords: Honey, Beekeeping, Apiculture, Doubling Farmers' Income, Honey cooperatives

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Introduction

Honey is the natural, sweet, viscous food substance produced by the bees and other related insects from the floral nectar of blossoms and secretions of other insects (honey dew) through alchemical processes like enzymatic activity, regurgitation inside the body. It was the first natural sweet food experienced by our ancestors inhabiting in forests and rock shelters. Honey mainly consists of 76% sugar, 18% water and the rest 6% is constituted by other elements. It is remarked that darker honey is rich in minerals than the lighter one. Beekeeping can be taken up by a lot of small and marginal farmers in the state of Jharkhand, as it has the potentiality to add substantially to the existing income levels of the farmers. India has huge potentiality for practicing apiculture and the main reason is that its huge varieties of flora and fauna providing opportunities to develop a beekeeping industry. About 21% of the country is covered by forest but commercial use and experiments with plants species for honey production is significantly very less. Keeping in view the importance of beekeeping as a subsidiary sector for increasing the farmers' income in the state of Jharkhand, the present study was taken up in Ranchi district to find out the profitability of beekeeping for the farmers in Jharkhand. The Ranchi district of the state Jharkhand is among the areas in India which consists of a very much favourable condition for bee keeping and honey production due to the presence of many floras like Karanj, Berseem, Eucalyptus, litchi, jamun, surbujia, acacia, rapeseed, shisham, mustard, maize, moringa, borassus and coriander that attracts the honey bees for nectar and there are also many beekeepers present in the district. Most of the farmers living in the district are small scale tribal and poor marginal farmers. Practice of Agriculture is very tough in the area due to scanty rainfall and lack of water in this plateau region. According to Sanjay Seth, the chairperson of Khadi Board, there is requirement to initiate production of bulk organic honey of Pongamia (Karanj) which is sufficiently available in the district especially in the dense forest regions. Beekeeping is a unique allied agriculture sector which needs less time and labour but more skill. Landless farmer can take up initiatives with

tools and equipment only. Moreover, beekeeping practice fits well for small scale farmers and also provides a sustainable livelihood to economically backward classes.

Conceptual Framework

The conceptual framework of the study presents two alternatives to honey producers of Ranchi district to market their honey. The first option is direct marketing where the producers can sell their products directly to the consumers from their own house, retail stores; road side stands at retail price while the second option is indirect marketing where the producers sell their products to several intermediaries at wholesale price before the product reaches to the consumer. The key link between the producers and consumers is the information flow between them. So, there are different marketing options for the producers where they should choose the best option following the market information which guides the commercial beekeepers to produce their honey based on the target markets and existing demand.

Data and methodology

The Ranchi district had been chosen for the present study because there are many beekeepers around the district, those who get their inputs and information from the KVIC and Ramakrishna Mission, Divyayan KVK. The beekeepers from the blocks of Angara, Burmu, Nagri, Ormanjhi, Namkum, Bero, Ratu, Itki, Kanke and Bundu of Ranchi district were chosen for the same reason. A total of 47 beekeepers were randomly selected (including individual beekeepers, cooperative based beekeepers and institution based beekeepers). The primary data for the present study was collected using structured schedule for the period 2017-18. Collected data was summarised and analysed by using various statistical tools for representation purpose. Rank Based Quotient (RBQ) technique was applied to rank various parameters of interest using the following formula.

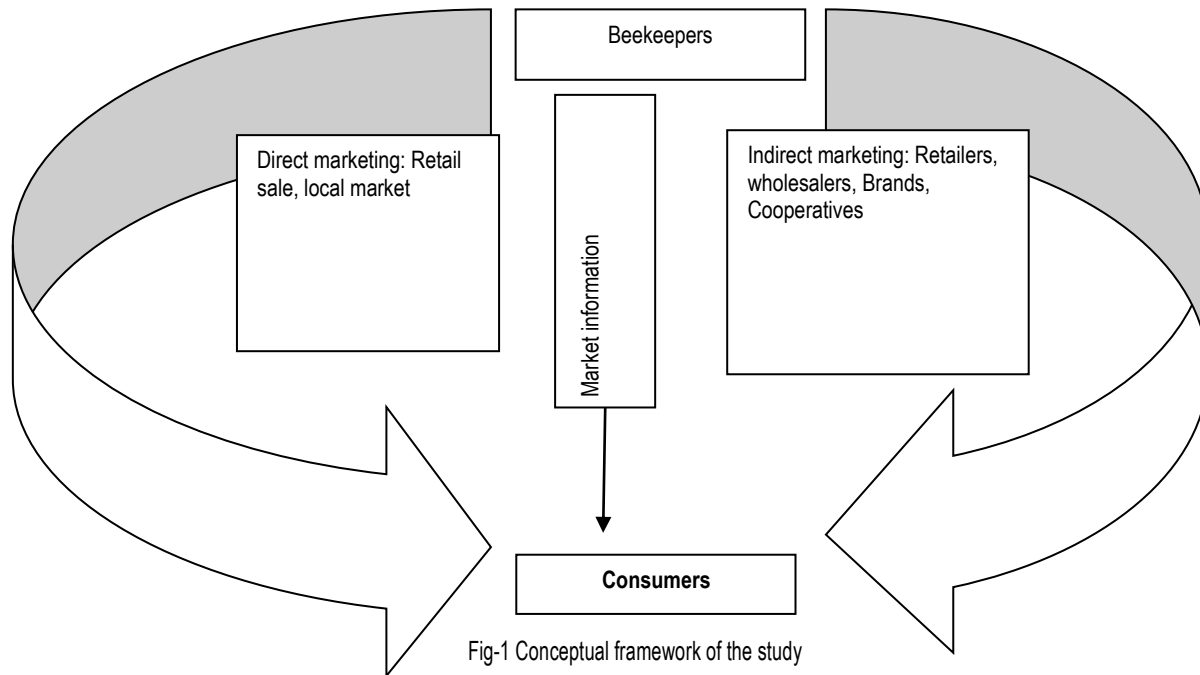


Fig-1 Conceptual framework of the study

$$RBQ = \frac{\sum_{i=1}^n F_i(N+1-i)}{N \times n} \times 100$$

Where,

Fi = Frequency of the beekeepers for the i^{th} rank of the quality parameter or constraint.

N = Number of respondents

n = Maximum number of rank given to the various constraints and quality parameters by a beekeeper among all the beekeeper respondents.

Results and Discussion

An attempt was made to analyse the cost and returns from the bee-keeping in the selected study area. This would help to identify the profitability of doing bee-keeping as a subsidiary as well as primary occupation for the farmers. The average cost and income for 100 bee hives of all the respondents have been calculated and represented in the following [Table-1].

Cost of producing honey / 100 hives

Table-1 Cost of producing honey per 100 hives

Particulars	Cost (Rs)
Bee box	49927.71
Wax sheet	11396.25
Feeding	35472.76
Medicine	1107.139
Labour	12756.6
Transportation	33903.45
Maintenance	8109
Total input-	152673
Harvesting	255.3
Processing	180.45
Preservation	20977.62
Packaging	3914.3
Total-	177900.67

Source: Primary data and author's calculation

From the above table it can be revealed that, the total cost of rearing 100 bee hives and producing honey was Rs. 178000, which includes the cost of bee box at Rs. 49927.71, wax sheet Rs 11396.25, feeds Rs. 35472.76, medicine Rs. 1107.139, labour Rs. 12576.6, cost of transportation Rs. 33903.45, cost of maintenance Rs. 8109, cost of running the honey extractor for harvesting honey at Rs 255.3, processing the honey Rs 80.45, preservation or wholesale packing at Rs 20977.62 and cost of packaging honey for retail at Rs 3914.3. This indicates

that, when the farmers produce bee box, wax sheet, colonies using own labours, the cost comes down and it becomes profitable for the beekeeper. Basically the durability of the bee boxes was 3-5 years. Each box needs 14 wax sheets which cost around Rs 30 each and remains for 3-4 years. Each box needs 10kg of food supplement per year along with medicines. For more number of bee boxes the beekeepers need more labourers to maintain the boxes for feeding, harvesting, processing and packaging. For transportation of colonies for foraging a truck is needed which can transport about 200 boxes and charges Rs 50-55 thousand for each trip. Again for harvesting a honey extractor is required which costs about Rs 5000-10000 for 10 years duration. To process honey much expenses is not required as it is favourable as natural product. So to retain the moisture the honey is heated on a steel container kept on boiling water and it is measured with an instrument called honey refractometers which helps to measure the moisture content in it. For wholesaling the honey is sold in the containers in which it was kept for preservation or storage. For retailing the honey requires plastic jars of 250g, 500g and 1kg respectively each having a different price.

Cost of producing 100 bee colonies

It was also revealed in the study that many beekeepers sell bee colonies to the other beekeepers those who are new in the business for more profit and income from the enterprise per year. Out of the 47 beekeeper respondents only 28 of them sold bee colonies and also the producing and selling quantity of colonies is not uniform for all the 28 beekeepers. The cost of producing bee colonies have been derived from the farmer through the schedule and from that the cost of producing 100 bee colonies for all the farmers selling colony have been observed. So, the average cost of producing 100 bee colonies for 28 beekeepers was Rs 93105.43.

Yield analysis

The information about the total yield of honey per year in three distinct seasons was collected from the beekeepers. It could be found that, the average number of harvesting of honey per year was 14 times per farmer. It was calculated that the average number of hives for all the 47 respondent beekeepers in the study area was about 375 hives per individual. The average yield quantity was classified into three different seasons- 1st yield comes in the month of November to December. Then again honey was harvested on January and at last the honey was harvested on March. This study about the yields of honey for the beekeepers will provide the information about the production quantity of honey which should meet the district, state and even national demand of honey.

Table-2 Honey yield of the beekeepers

Season	Average (quintal)	Yield
March	37.34	
January	37.09	
Nov-Dec	37.15	
Total	111.58	

Source: Primary data and author's calculation

From the above table it is revealed that, the average yield quantity of honey during the season of March was 37.34 quintal, the average yield of honey during January was 37.09 quintal, and the average yield of honey during Nov-Dec was 37.15 quintal for all the beekeeper respondents. Therefore, the average total yield of honey per year for all the 47 beekeepers was 111.58 quintal. So the production per hive should be increased to get into the competition of the international honey market to increase income and fulfil the global demand of honey. There is a huge scope of profit in honey production in the international market but the present production quantity could not sustain in the global market.

Income from honey production

Along with the cost, the income details were also collected from the beekeepers. It was found that the beekeeper respondents in the study area sold their produced honey at wholesale and retail market. The production quantity for all of the beekeeper respondents was not uniform as they owned different number of bee hives. The study on the income details of the respondent beekeepers will help us to understand the feasibility of honey in the market for the producers. It will also reveal the path paved till now for the planned goals to achieve like "Sweet Revolution" and "Doubling farmer's income by 2020". This will also provide information about the economic condition of the bee keepers as this profession was their primary occupation and this analysis will also specify the satisfaction from the income of the producers. The average total income of the beekeepers from producing honey per 100 hives is represented in the following [Table-3].

Table-3 Income from honey/100 hives

Sale	Average quantity (quintal)	Average Price (Rs/kg)	Income (Rs)
Wholesale	27.69	114.15	316081.35
Retail	1.67	280.00	46760.00
Total			362841.35
Net income	Total income – Total cost = Rs (362841– 178000) = Rs 184841		

Source: Primary data and author's calculation

The average wholesale quantity sold from 100 hives for all of the beekeepers was 27.69 quintal while the average retail quantity sold from 100 hives was nearly about 2 quintals per year. The average wholesale and retail price of honey per kg was derived for all of the beekeepers. The average total income from wholesale and retail sale of honey from 100 hives per year was Rs. 362841.35. This is the average total income from 100 bee hives per year for all of the respondent beekeepers. Therefore, the average net income from honey per 100 hives per year for all the beekeepers of the study area was Rs (362841.35 – 178000) i.e., Rs 184841. This indicates that from 100 bee hives the beekeepers were able to earn nearly about Rs 2 lakhs per annum in the Ranchi district.

Income from selling honey bee colonies

In this study it was found that 28 respondent beekeepers used to produce and sell bee colonies even outside the district as well as the state. The average selling price for bee colony for all the respondents was Rs 1632.14/colony. So, the average income from selling 100 bee colonies for 28 beekeeper respondents of the study area = Rs 163214. Therefore, the average net income from selling 100 bee colonies was Rs (163214 – 93105.43) i.e., Rs 70,108.57. The 28 beekeepers earn nearly about Rs 70 thousand per annum at an average by selling 100 bee colonies.

Constraints faced by the beekeepers

In this study, the respondent beekeepers were asked about the major constraints that they face in their business. The identification and analysis of constraints would help to understand the obstacles for the honey producers as well as the

present market of honey. In this perspective, five major problems of the beekeepers in the Ranchi district were identified. These were the overall marketing of honey and honey products, diseases of the bee colonies which has an impact on destroying colonies, land availability for keeping the bee boxes and foraging of the bees, chemicals like insecticides and pesticides used in the plants which also causes destruction of the colonies and the transportation of the bee colonies for foraging of the bees which causes death of the bees while transport.

Table-4 Constraints faced by the beekeepers

Constraints	R.B.Q.	Overall Rank
Overall Marketing of honey and honey products	69.79	I
Disease infestation in colonies	68.09	II
Land availability for keeping the bee boxes and foraging	61.70	III
Chemical treatment	53.19	IV
Transportation for forward and backward linkages	48.09	V

Source: Primary data and author's calculation

It can be seen that constraint of overall marketing of honey and honey products had the highest RBQ value (69.79). The price received by the honey producers in the wholesale market was very low and though the retail price was set by the producers themselves the demand of raw honey in retail was very low. Moreover, the market for other bee products like pollen, wax, nectar etc. were also absent in the district and the production practice was also absent. The price of honey also fluctuates very much which causes a lot of problem to the producers in obtaining their profit and income. The next constraint was diseases infestation of the honey bees (68.09) which caused destruction of the colonies and caused huge loss to the farmers. Most diseases were caused by the infestation of the viruses, bacteria, fungi and protozoa and also some foul brood diseases. Again the land availability for foraging of the bees (61.70) was another important constraint of the beekeepers. Due to the lack of required quantity of flora present in the Ranchi district, the beekeepers had to roam with their colonies throughout the state to several districts and also throughout the nearby states like Bihar, Uttar Pradesh, West Bengal, and Chhattisgarh. Sometimes it gets hard to convince the land provider as misconception prevails like bees hamper production of crops or they suck nutrients from the plants which may cause diseases to the plants. That is why acquiring land for bee forage becomes very much hard for the beekeepers.

Quality parameters preferred by the customers (as revealed by the producers): In this study, the respondent beekeepers were asked about the major quality parameters of honey preferred by the customers before buying their product. The identification and analysis of the quality parameters preferred by the customer would help to understand the quality demand of honey in the present market of Ranchi district and how to develop the produce for increasing the sale of honey to the customers in the market. In this context, five major quality parameters preferred by the customers according to the beekeepers of Ranchi district were identified. These were organic honey i.e. natural and purity of honey which should not include any adulteration, colour of the honey, density of honey which also indicates purity, taste of honey which includes several favourable flavours of honey and the price of honey.

Table-5 Quality parameters of the customers

Quality Parameters	R.B.Q.	Overall Rank
Colour	77.02	I
Taste	72.34	II
Density	65.53	III
Organic	55.32	IV
Price	29.79	V

Source: Primary data and author's calculation

Results indicate that most of the customers buy honey looking at the colour of the product, due to lack of knowledge and awareness about honey. The next quality parameter as preferred by the customers was taste of honey. This means the consumers want different flavours for good smell and taste. If the producers develop and increase the taste of different flavoured honey it will also increase the consumption quantity. But adulteration should be prohibited. The next quality parameter was density of the honey.

The customers preferred proper density and moisture content of the honey. For this, proper harvesting, processing and packaging are very much necessary. Otherwise adulteration or moisture could hamper the quality and longevity of the honey. So to increase the selling quantity the beekeepers should consider these factors. It can be seen that to increase the selling quantity, the honey must be kept pure without any kind of adulteration for taste, colour, flavour etc. The pure honey is not perishable easily moreover it lasts for several years.

Conclusions and Recommendations

It can be seen from the present study that, beekeeping as a subsidiary as well as primary source of occupation have the potentiality to add to the farmers' income in resource poor states of the country. The study concludes that; involvement of young individuals will lead to a long future for the beekeeping sector. The individuals involved in the sector of beekeeping were consistent in their occupation and were also satisfied than other enterprises. None of the respondents wanted to shift their occupation from beekeeping, moreover there were many newcomers in the sector who wants to continue beekeeping practices as the main occupation for earning their livelihoods. The difference between the wholesale price and retail price of honey was very much distinctive and it is very much unsatisfactory for the beekeepers as the retail demand of raw honey is very much unprofitable to continue in the business. Skill development for proper management including increasing the honey production, production of bee products other than honey, proper preservation, processing and packaging for maintaining a standard quality to cope with the national and international market is very much necessary in the training programmes. Proper extension of market information of the beekeeping sector in the ground level should be implemented properly because the availability of information for the researchers of honey and honey market in the Ranchi district are also unsatisfactory. Organising beekeepers' cooperatives through programmes and policies for improving the market efficiency is also very much important. Most importantly the pricing structure of honey should be improved as there were absence of any standard price of honey in the study area as per recommended by the Government. This also leads to the unequal economic distribution to the producers of the beekeeping sector.

Application of research: Studies shows of doubling farmers' income by including beekeeping as a subsidiary or main business enterprises among the small and marginal resource poor farmers.

Research Category: Honey, Beekeeping, Apiculture, Doubling Farmers' Income, Honey cooperatives

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