



ISSN Print: 2618-0723
 ISSN Online: 2618-0731
 NAAS Rating (2026): 5.04
 IJAESD 2026; 9(10): 105-109
www.extensionjournal.com
 Received: 07-08-2026
 Accepted: 19-09-2026
 Published: 03-10-2026

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Profitability and cost structure of honey production among different scales of beekeeping in Vidarbha region

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DOI: <https://www.doi.org/10.33545/26180723.2026.v9.i10b.4367>

ABSTRACT

The present study was conducted in Vidarbha Region of Maharashtra to examine the cost structure and profitability of honey production among different scales of beekeeping. A total of 100 beekeepers were selected from two districts of Maharashtra and each 50 beekeepers were classified into small scale (100-500 kg/year), medium scale (501-1000 kg/year), and large scale (1001 kg/year and above). Primary data were collected for the agricultural year 2025–26 using a structured interview schedule. The analysis was carried out using simple tabular analysis and benefit–cost ratio.

The analysis showed 33 beekeepers i.e. 44.00 per cent had small-sized families of up to four members. About 56 beekeepers i.e. 56.00 per cent had completed primary education. Occupational analysis indicated that 25 beekeepers i.e. 25.00 per cent of respondents were engaged in beekeeping along with agriculture, followed by beekeeping with agriculture and dairy i.e. 20.00 per cent. Annual income increased with the annual of honey collection, from Rs. 1,27,221.43 among small beekeepers to Rs. 2,04,168.50 among medium and Rs. 2,86,500.00 among large beekeepers. The average cost of honey collection increased from Rs. 59.87 per kg for small beekeepers to Rs. 67.23 and Rs. 82.38 per kg for medium and large beekeepers, respectively.

Gross returns were Rs. 207.70, Rs. 246.94 and Rs. 287.88 per kg for small, medium and large beekeepers, respectively, while net returns were Rs. 147.83, Rs. 179.71 and Rs. 205.50 per kg. The benefit-cost ratio was highest among medium beekeepers (3.67), followed by large (3.49) and small beekeepers (3.47).

Keywords: Honey collection, Cost structure, Bee wax, Occupation, Amravati, Wardha

Introduction

Honey is sweet natural substance derived from the nectar of flowers and is valued not just for its sweetness but also for its health benefits. As more consumers choose sustainable and healthy options, like honey, beeswax, and propolis these products are high in demand. This growing interest makes beekeeping an attractive and profitable option for both small and large producers. Apiculture involves managing and breeding honeybees year-round to harvest both direct and indirect benefits. It is seen as a low-cost farming practice with considerable economic potential. Beekeeping is an agro-based, eco-friendly activity that integrates seamlessly with existing cropping systems and has multiple direct and indirect benefits. Large quantity of honey in the market is from wild bees. This honey accounts about 50 per cent (9000 MT) of the honey sold on the Indian market. India Honey Market was valued at USD 449.8 Million in 2025 and is expected to reach USD 626.8 Million by 2033, at a CAGR of 5.3 per cent during the forecast period 2025 – 2033. India's total honey production stands at approximately 144 thousand metric tonnes (MT), with exports reaching 100,773 MT valued at USD 206.47 million in FY 2024-25, while imports remain minimal at around USD 1.38 million. Top honey producing States are Uttar Pradesh 17.11 per cent, West Bengal 16.20 per cent, Punjab 14.08 per cent, Bihar 12.33 per cent, and Rajasthan 9.15 per cent. (source: www.nbb.gov.in)

Objectives of the study

1. To study socio-economic status of selected beekeepers.
2. To examine the income generation through collection of honey.

Materials and methods

The present study was conducted in Vidarbha Region of Maharashtra to examine the cost structure and profitability of honey collection among different categories of beekeeping. A total of 100 beekeepers were selected from two districts of Maharashtra and each 50 beekeepers were classified into small scale (100-500 kg/year), medium scale (501-1000 kg/year), and large scale (1001 kg/year and above). Primary data were collected for the agricultural year 2025–26 using a structured interview schedule. The analysis was carried out using standard cost concepts and benefit–cost ratio. The information gathered included socioeconomic characteristics of the households, Total costs, and returns from honey collection. The data collected

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were systematically tabulated and analysed using averages, percentages, and ratio analysis. Cost concepts such as total cost, gross return, net return, and average cost were computed to assess profitability. The benefit–cost ratio (B:C ratio) was calculated to evaluate the economic viability of beekeeping across different beekeepers. This methodological framework ensured a comprehensive assessment of cost structure and profitability of honey collection in the study area.

A) Total cost of honey collection

The cost of honey collection refers to all expenses incurred by honey collectors from the time they enter forest to harvest honey until the honey is brought to the collection center or market. These Costs includes:

- Transportation costs
- Equipment costs
- Labour costs

B) Benefit cost analysis of beekeepers

Benefit Cost analysis is an important economic tool used to evaluate the profitability of beekeeping. It compares the total returns obtained from beekeeping with the total cost incurred in collection of honey. A

higher B:C ratio indicates a more profitable enterprise.

$$\text{Benefit-Cost Ratio} = \frac{T_r}{T_c}$$

Tr = Total returns per kg of honey

Tc = Total cost per kg of honey

Results and discussion

1. Socio-economic characteristics of beekeepers

The demographic characteristics of the beekeeper respondents are delineated in Tables 1 through 3. Table No. 1. revealed that, a 44.00 per cent of the sample beekeepers had small size of households up to 4 members. A 40.00 per cent of beekeepers had medium size of households 5-7 members while 16.00 per cent of them were observed to be large households i.e. 8 members and above. In case of small beekeepers 44.00 per cent of the beekeepers were belonged to medium size of households i.e. 5-7 members. A 37.50 per cent of the beekeepers were belonged to small size of households up to 4 members while a few of them 18.50 per cent of the beekeepers were belonged to large size of households.

Table 1. Family size of the sample beekeepers

Size of Households	Beekeepers	Small Beekeepers (100-500 kg/year)	Medium Beekeepers (501-1000 kg/year)	Large Beekeepers (1001 kg/year and above)	Overall
Small (up to 4)		28 (37.50)	13 (65.00)	3 (60.00)	44 (44.00)
Medium (5-7)		33 (44.00)	6 (30.00)	1 (20.00)	40 (40.00)
Large (8 and above)		14 (18.50)	1 (5.00)	1 (20.00)	16 (16.00)
Total		75 (100.00)	20 (100.00)	5 (100.00)	100 (100.00)

Table 2. Level of literacy of Sample Beekeepers

Level of literacy	Beekeepers	Small Beekeepers (100-500 kg/year)	Medium Beekeepers (501-1000 kg/year)	Large Beekeepers (1001 kg/ year and above)	Total
Illiterate		3 (4.00)	2 (10.00)	1 (20.00)	6 (6.00)
Primary (up to 4 th std)		44 (58.60)	10 (50.00)	2 (40.00)	56 (56.00)
Secondary (5 th to 12 th std)		21 (28.00)	5 (25.00)	2 (40.00)	28 (28.00)
Graduation and above		7 (9.40)	3 (15.00)	-	10 (10.00)
Total		75 (100.00)	20 (100.00)	5 (100.00)	100 (100.00)

(continued on next page)

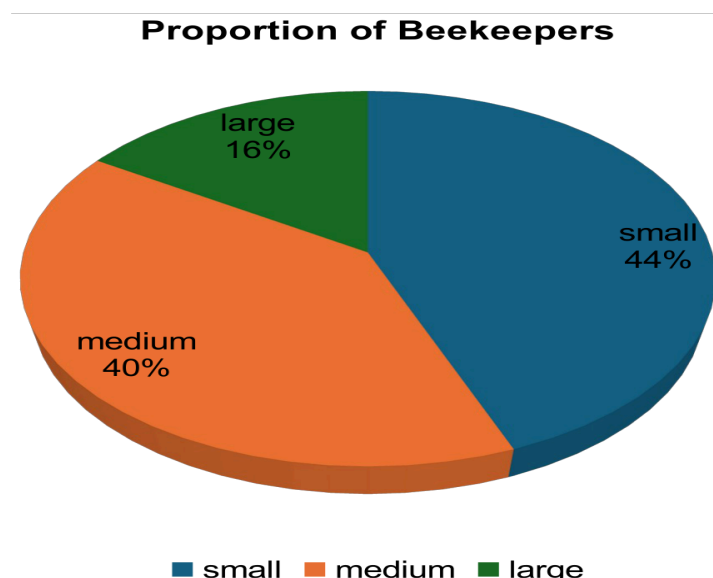


Figure 1. Family size of the sample Beekeepers

Table 3. Occupation of the sample beekeepers (Numbers)

Occupation	Beekeepers	Small Beekeepers (100-500 kg/year)	Medium Beekeepers (501-1000 kg/year)	Large Beekeepers (1001 kg/year and above)	Total
Beekeeping + Agriculture		20 (26.80)	3 (15.00)	2 (40.00)	25 (25.00)
Beekeeping + Agriculture + Dairy		16 (21.33)	3 (15.00)	1 (20.00)	20 (20.00)
Beekeeping + Goat Rearing		7 (9.34)	4 (20.00)	-	11 (11.00)
Beekeeping + Dairy		17 (22.57)	2 (10.00)	1 (20.00)	20 (20.00)
Beekeeping + Agriculture + Goat Rearing		11 (14.66)	7 (35.00)	1 (20.00)	19 (19.00)
Beekeeping + Poultry production		4 (5.30)	1 (5.00)	-	5 (5.00)
Total		75 (100.00)	20 (100.00)	5 (100.00)	100 (100.00)

The table 3 revealed that the larger proportion 25 out of 100 i.e. (25.00 per cent) of beekeepers were involved in beekeeping and agriculture as their occupation followed by (20.00 per cent) beekeepers who were dependent on beekeeping, agriculture and dairy for their livelihood. 19 out of 100 (19.00 per cent) beekeepers each were engaged on beekeeping, agriculture and goat rearing. 5 out of 100 (5.00 per cent) beekeepers dependent on beekeeping and poultry for their livelihood. Majority (40.00 per cent) of large beekeepers earned their living from beekeeping and agriculture. 7 of (35.00 per cent) medium beekeepers depended on beekeeping, agriculture and goat rearing for seeking out their livelihood. Larger proportion of small beekeepers (26.80 per cent) practiced beekeeping and agriculture for their living. Table No. 2. indicates that primary education was the most common educational level among the respondents. Out of the 100 beekeepers, 56 respondents (56.00 per cent) had completed primary education.

Among them, 44 (58.6 per cent) were small beekeepers, 10 (50.00 per cent) were medium beekeepers, and 2 (40.00 per cent) were large beekeepers. The second largest group comprised respondents with secondary education, accounting for 28 respondents (28.00 per cent). Out of these, 21 (28.00 per cent) were small beekeepers, 5 (25.00 per cent) were medium beekeepers, and 2 (40.00 per cent) were large beekeepers. Further, 10 respondents (10.00 per cent) had completed graduation and above qualifications. Among these, 7 (9.40 per cent) were small beekeepers and 3 (15.00 per cent) were medium beekeepers, while none of the large beekeepers belonged to this category. Only 6 respondents (6.00 per cent) were illiterate, including 3 (4.00 per cent) small, 2 (10.00 per cent) medium, and 1 (20.00 per cent) large beekeeper. Overall, the results revealed that the majority of beekeepers possessed primary or secondary education (84.00 per cent), indicating a satisfactory level of literacy among the respondents.

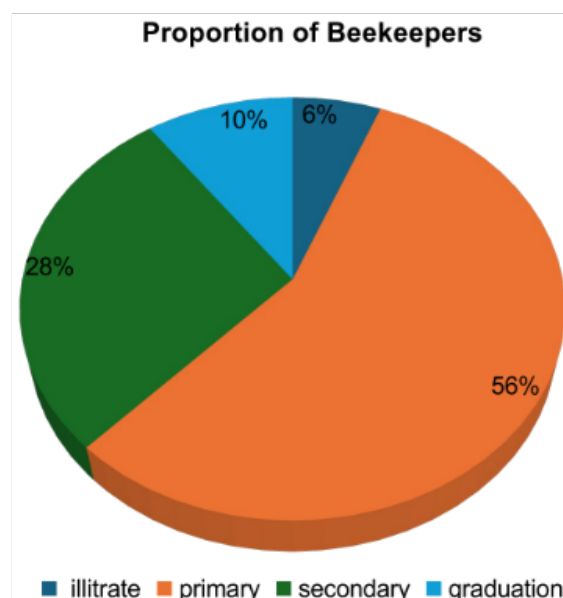


Figure 2. Level of literacy the sample Beekeepers

Cost structure of honey collection in different categories of beekeepers

The cost structure analysis of honey collection across different categories of beekeepers in Vidarbha region is presented in Table 4. The results indicate that the average cost of honey collection per kilogram incurred by small, medium and large beekeepers. The total cost of honey collection was Rs 59.87 per kg for small beekeepers, Rs 67.23 per kg for medium beekeepers and Rs 82.38 per kg for large beekeepers. The total cost comprises equipment costs, transportation costs and labour costs. Equipment costs were Rs 9.10 per kg, Rs 23.90 per kg and Rs 30.63 per kg for small, medium and large beekeepers, respec-

tively. Among the equipment components, bee suit constituted the highest cost at Rs 7.05 per kg for small, Rs 7.73 per kg for medium and Rs 9.98 per kg for large beekeepers. This was followed by the collection bucket, steel knife, rope and head lamp. Transportation costs were Rs 21.13 per kg for small beekeepers, Rs 22.09 per kg for medium beekeepers and Rs 25.68 per kg for large beekeepers, while labour costs were Rs 19.64 per kg, Rs 21.24 per kg and Rs 26.07 per kg, respectively. Thus, transportation and labour constituted important components of the total cost of honey collection. Overall, the findings show that, the cost of honey collection increased with the scale of beekeeping, from Rs 59.87 per kg for small beekeepers to Rs 82.38 per kg for large beekeepers.

Table 4. Average Cost of Honey Collection (Rs/Kg)

Sr. No.	Particulars	Cost of Honey Collection Small Beekeepers (100-500 kg/year)	Medium Bee-keepers (501-1000 kg/year)	Large Beekeepers (1001 kg/year and above)
A)	Equipment Costs			
i)	Bee Suit	7.05	7.73	9.98
ii)	Steel Knife	3.76	4.54	5.08
iii)	Collection Bucket	4.56	5.58	7.17
iv)	Head Lamp	1.15	2.54	3.69
v)	Rope	2.58	3.51	4.71
	Total (A)	19.10	23.90	30.63
B)	Transportation Costs	21.13	22.09	25.68
C)	Labour Costs	19.64	21.24	26.07
	Total (A+B+C)	59.87	67.23	82.38

Gross returns from honey and beeswax production in different categories of beekeepers

The gross return from honey and beeswax production represents the total value realized by beekeepers before reducing any costs. Results showed in (Table 5.) reveal that the table 5 revealed that, the returns from honey collection for small, medium and large beekeepers in terms of quantity, gross income, total cost, net income and benefit-cost ratio. The return from 1 kg of honey was Rs 162.70 for small beekeepers, Rs 194.44 for medium beekeepers and Rs 220.54 for large beekeepers. In addition to honey, beekeepers also obtained 50 gm of beeswax, which generated Rs 45.00, Rs 52.50 and Rs 67.34 for small, medium and large beekeepers, respectively. Consequently, the gross income obtained from 1 kg of honey, including the value of beeswax, was Rs 207.70 for small, Rs 246.94 for medium and Rs

287.88 for large beekeepers. The increasing gross income across the three categories indicates that larger-scale beekeepers obtained comparatively higher returns per kilogram, possibly due to better marketing, quality and utilization of by-products such as beeswax. The total cost of honey collection was Rs 59.87 per kg for small beekeepers, Rs 67.23 per kg for medium beekeepers and Rs 82.38 per kg for large beekeepers. After deducting the collection cost from gross income, the net income was Rs 147.83 per kg for small beekeepers, Rs 179.71 per kg for medium beekeepers and Rs 205.50 per kg for large beekeepers. The Benefit-Cost (B:C) ratio was 3.47 for small, 3.67 for medium and 3.49 for large beekeepers, indicating that honey collection was economically viable for all categories. The highest B:C ratio of 3.67 was recorded among medium beekeepers, suggesting comparatively better economic efficiency in this category. Overall, the find

ings indicate that honey collection generated substantial net returns, and the additional income from beeswax further enhanced the profitability of the enterprise.

Table 5. Returns from collection of honey (Rs/ Kg)

Sr. No	Particulars	Small Beekeepers (100-500 kg/year)		Medium Beekeepers (501-1000 kg/year)		Large Beekeepers (1001 kg/year and above)	
		Quantity (kg)	Amount (Rs)	Quantity (kg)	Amount (Rs)	Quantity (kg)	Amount (Rs)
1	Honey (kg)	1.00	162.70	1.00	194.44	1.00	220.54
2	Bees wax (gm)	50.00	45.00	50.00	52.50	50.00	67.34
3	Total cost/Kg	-	59.87	-	67.23	-	82.38
4	Gross income (Rs)	-	207.70	-	246.94	-	287.88
5	Net income (Rs)	-	147.83	-	179.71	-	205.50
6	B:C Ratio	-	3.47	-	3.67	-	3.49

Conclusions

The study revealed that 44 i.e. 44.00 per cent of the sample beekeepers had small size of households up to 4 members, reflecting their greater experience and participation in beekeeping activities. Most beekeepers belonged to small and medium-sized families, with joint families being predominant, indicating the contribution of family members to beekeeping. In terms of education, primary education completed by 56 i.e. 56.00 per cent of the sample beekeepers, showing a relatively low level of formal education among the respondents. The study revealed that household income increased with honey collection, and diversification into agriculture, dairy, and goat rearing further enhanced income. The cost of honey collection increased with the collection of honey, particularly due to higher equipment, transportation, and labour costs. The total cost of honey collection was Rs 59.87 per kg for small beekeepers, Rs 67.23 per kg for medium beekeepers and Rs 82.38 per kg for large beekeepers. Honey collection was found to be a profitable enterprise across all beekeeper categories, as the B:C ratio was greater than one. The Benefit-Cost (B:C) ratio was 3.47 for small, 3.67 for medium and 3.49 for large beekeepers. Among the different categories, medium-scale beekeeping provided the most efficient balance between costs incurred and income generated compared with small and large beekeepers. The returns from 1 kg of honey was Rs 162.70 for small beekeepers, Rs 194.44 for medium beekeepers and Rs 220.54 for large beekeepers.

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How to cite this article: Ingle AV, Sarap S, Lande S, Nawre M. Profitability and cost structure of honey production among different scales of beekeeping in Vidarbha region. *International Journal of Agriculture Extension and Social Development*. 2026;9(10):105-109. doi: <https://www.doi.org/10.33545/26180723.2026.v9.i10b.4367>