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Constraints analysis in adoption of beekeeping as an enterprise in Muzaffarpur district of Bihar

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Abstract

This study examined the economics of honey production and marketing in Muzaffarpur district, Bihar, India. 160 beekeepers (80 trained, 80 untrained) across sixteen villages (eight experimental, eight control) were surveyed. Constraints were categorized as socio-economic, technological, environmental, and marketing and management. Key socio-economic constraints included limited financial resources for establishing a beekeeping enterprises (70.62%), lack of managerial capabilities (59.37%). Technological limitations comprised lack of honey processing units (91.87%), lack of knowledge of beehive products apart from honey (83.75%) and lack of training in producing value-added bee products (69.37%). Scarcity of bee flora during off season (55.62%) posed a significant environmental challenge. Marketing constraints included Low selling price of honey (90.65%), limited markets for bee products other than honey (88.75%) and lack of consumer trust in honey quality (79.37%). Recommendations to bolster beekeeping enterprises include training in scientific beekeeping practices, accessible financial support, migration subsidies, and improved marketing infrastructure for bee products.

Keywords: Beekeeping enterprises, bee products, environmental challenge, honey, migration subsidies, value-added

Introduction

Beekeeping is both a forest- and agro-based industry, as well as a valuable self-help activity that provides food, cash income, and employment opportunities, particularly for the landless poor in subsistence economies (Panda and Padhi, 1995) ^[10]. The raw materials required for honey production are freely available from nature. Bee hives do not require additional land space and do not compete with agriculture or animal husbandry for resources. Beekeeping can be undertaken as a commercial enterprise by individuals of any gender or age, on either a small or large scale, making it particularly suitable for integrated agricultural systems (Gupta and Dogra, 1998) ^[4]. It offers underemployed agriculturists full-time employment opportunities and an additional source of income, requiring only a few hours of attention each week to maintain bee colonies.

Honeybees produce honey, a highly nutritious food with medicinal value. They also produce other valuable products such as beeswax, pollen, bee venom, royal jelly, and propolis, which serve as additional income sources. Apiculture and agriculture/horticulture are interdependent and cannot thrive in isolation. The integration of apiculture with agriculture is essential for the mutual benefit of both beekeepers and farmers. Bees are responsible for 90% of the pollination in agricultural crops globally, and without them, agricultural and fruit production would decrease to a quarter of current levels (Vaidya *et al.*, 1993) ^[19]. Through pollination, honeybees significantly boost agricultural

productivity and enhance agricultural sustainability. By foraging for pollen and nectar from flowers of various plant species, honeybees contribute to an annual increase in agricultural productivity by 30-80% through cross-pollination (Singh, 2000) ^[15].

India has approximately 50 million hectares of cross-pollinated crops that benefit from honeybee pollination. To ensure adequate pollination, three to nine bee colonies per hectare are generally required, depending on the crop. At the minimum requirement of three colonies per hectare, around 150 million colonies are necessary for effective pollination across 50 million hectares. However, there are currently only about 1 million bee colonies available in India. Furthermore, the population of wild insect pollinators is declining due to factors such as reduced hibernating and nesting sites caused by intensive agriculture, deforestation, land clearing, and excessive pesticide use (Singh *et al.*, 2006) ^[16].

Beekeeping exerts no pressure on agricultural land and produces honey, beeswax, pollen, and propolis from flowers that would otherwise dry up and go to waste. It requires minimal resources, land, and time, making it an ideal addition to the livelihood strategies of smallholder farmers. It provides an extra source of income with virtually no additional expenses while offering products with significant nutritive and medicinal properties (Lowore *et al.*, 2010) ^[9]. However, the beekeeping sector in India faces challenges such as climate change, lack of knowledge about best

practices, pesticide use, and habitat loss, which threaten bee populations (Kumar *et al.*, 2020a) ^[6]. To address these challenges, it is crucial to balance traditional knowledge with modern sustainable practices to ensure the continued growth of beekeeping in India.

The demand for high-quality honey has increased over the years due to its recognition as a naturally nutritious product. Other apiculture products, such as royal jelly, beeswax, and pollen, are also widely used in industries including pharmaceuticals, food and beverages, beauty, and more. Scaling up beekeeping can significantly increase farmers' incomes, generate employment, ensure food security, support bee conservation, and enhance crop productivity through improved pollination. While beekeeping is a common household activity across India, its potential has not been fully realized. Despite government interventions to address constraints, a significant gap remains between current honey production and its potential contribution to the economy (Gidey and Mekonen, 2010) ^[3].

Materials and Methods

The present study was conducted in four blocks of Muzaffarpur district in Bihar namely Kurhani, Sakra, Mushari, Aurai were selected. Further two villages from each block making by random sampling technique. A sample of 80 trained beekeeping entrepreneur were selected from eight experimental villages and 80 untrained beekeeping entrepreneurs were from other eight control village in order to avoid interactional and diffusion effect. Thus, a total sample of 160 rural entrepreneurs was selected as respondents. A well structured interview schedule for identification of constraints was administered. The data collected through interview were tabulated and analysed using simple statistical tools. The respondents were asked to report the constraints they face in adoption of recommended constraints in their beekeeping.

Results and Discussion

Beekeepers reported various constraints categorized into four groups: socio-economic, technological, environmental, and marketing.

Socio-economic constraints

The primary socio-economic constraint was limited financial resources for establishing a beekeeping enterprises (70.62%), followed by lack of managerial capabilities (59.37%), lack of awareness and motivation among consumer (53.19%) and challenge of increased competition (44.37%), negative social attitudes (29.38%), lack of support from society (22.50%) as given in Table 1. These

findings corroborate those of Kumari *et al.* (2015) ^[8] and Kumar *et al.* (2018) ^[5]. Other socio-economic challenges included inconsistent income generation (18.12%), fear of bee stings (14.37%), and fear of failure (11.87%), consistent with reports by Singh *et al.* (2016) ^[13] and Singh *et al.* (2021) ^[14]. Low profitability (income less than expenditures) was reported by a small percentage (5.62%), also supported by previous findings of Singh *et al.* (2021) ^[14].

Table 1: Socio-economic constraints faced by beekeepers

S. No.	Socio-economic constraints	Percentage (%)
1.	Negative Social attitudes	29.38
2.	Limited financial resources for establishing a beekeeping enterprise.	70.62
3.	Lack of support from society	22.50
4.	Inconsistent income generation	18.12
5.	Lack of managerial capabilities	59.37
6.	Challenge of increased competition	44.37
7.	Lack of awareness and motivation among consumer	53.19
8.	Phobia of getting stung by bees	14.37
9.	Fear of failure	11.87
10.	Low profitability (income less than expenditures)	5.62

Technological constraint

A major technological constraint reported by beekeepers (91.87%) was the lack of honey processing units, consistent with Kumar *et al.* (2020a) ^[6]. Lack of knowledge of beehive products apart from honey was the second most prevalent technological constraint (83.75%) followed by lack of training in producing value-added bee products (69.37%), aligning with Poornima (2013) ^[11]. Insufficient infrastructure for the scientific processing, storage, and marketing of honey and its products (64.39%) was also a setback for beekeepers as given in Table 2. These findings are in agreement with the findings of Kumari *et al.* (2015) ^[8]. A shortage of skilled labour also hindered beekeeping adoption (63.12%). Many beekeepers lacked knowledge in identifying bee diseases and pests (55.62%), similar to findings by Sumit *et al.* (2018) ^[17] and Kumar *et al.* (2020b) ^[7]. Other technological limitations included lack of technical knowledge for efficient management of bee colonies for higher honey yield (54.37%) and lack of knowledge of seasonal management in beekeeping practices (39.38%). These observations agree with Kumar *et al.* (2018) ^[5] and Sumit *et al.* (2018) ^[17]. Additionally, general beekeeping knowledge gaps (31.87%) and adherence to traditional beekeeping practices (20.62%) were reported, echoing Sumit *et al.* (2018) ^[17] and Singh *et al.* (2016) ^[13].

Table 2: Technological constraints faced by beekeepers

S. No.	Technological constraints	Percentage (%)
1.	General knowledge gaps about beekeeping	31.87
2.	Lack of knowledge about identification of diseases and enemies	55.62
3.	Lack of knowledge of beehive products apart from honey	83.75
4.	Lack of honey processing unit	91.87
5.	Lack of training in production of bee value added products	69.37
6.	Lack of skilled labour	63.12
7.	Lack of technical knowledge for efficient management of bee colonies for higher honey yield	54.37
8.	Adherence to traditional beekeeping practices	20.62
9.	Lack of knowledge of seasonal management in beekeeping practices	39.38
10.	Insufficient infrastructure for the scientific processing, storage, and marketing of honey and its products.	64.39

Environmental constraint

A primary environmental constraint reported by 55.62% of beekeepers was the scarcity of bee flora during off season. This aligns with Sumit *et al.* (2018) ^[17] and Asrani *et al.* (2007) ^[2], who reported similar concerns among 48.33% and 37% of their respondents, respectively. Unfavourable weather and climate conditions (34.36%) and limited availability of land (16.25%) were also cited as environmental constraints as given in Table 3. These findings are consistent with Sumit *et al.* (2018) ^[17] and Arya *et al.* (2021) ^[1].

Table 3: Environmental constraints faced by beekeepers

S. No.	Environmental constraints	Percentage (%)
1.	Unfavourable weather and climatic conditions	34.36
2.	Scarcity of bee flora during off season	55.62
3.	Limited availability of land	16.25

Marketing and management constraints

Low selling price of honey (90.65), limited markets for bee products other than honey (88.75%) and lack of consumer trust in honey quality (79.37%) were identified as key marketing and management constraints in beekeeping (Table 4), consistent with Singh *et al.* (2016) ^[13]. Insufficient marketing channels (78.13%) and inadequate attractive packaging (70.62%) and were also significant obstacles, similarly reported by Singh *et al.* (2016) ^[13]. Colony losses due to death, absconding, swarming, and theft (68.13%), were also highlighted, echoing findings by Sharma *et al.* (2018) ^[12], Arya *et al.* (2021) ^[1], and Asrani *et al.* (2007) ^[2]. Problem in managing bee colonies during the off-season (56.87%) and problem in marketing unprocessed honey (46.25%) presented additional challenges, consistent with Kumar *et al.* (2018) ^[5] and Asrani *et al.* (2007) ^[2].

Table 4: Marketing and management constraints faced by beekeepers

S. No.	Marketing and management constraints	Percentage (%)
1.	Low selling price of honey	90.65
2.	Lack of consumer trust in honey quality	79.37
3.	Inadequate attractive packaging	70.62
4.	Limited markets for bee products other than honey	88.75
5.	Insufficient marketing channel	78.13
6.	Problem in managing bee colonies in off seasons	56.87
7.	Colony losses due to death, absconding, swarming, and theft	68.13
8.	Problem in marketing of unprocessed honey	46.25

Conclusion

This study reveals that key constraints faced by beekeepers include insufficient capital for establishing enterprises, lack of honey processing units, inadequate packaging, and low consumer trust in honey quality. As beekeeping is predominantly practiced by small-scale and marginal farmers with limited financial resources, government intervention is recommended. Establishing regulated honey markets with minimum support prices and fostering beekeeper producer organizations, similar to farmer producer organizations, could address these challenges. These beekeeping entrepreneurs should receive support

from financial institutions and beekeeping research institutions.

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Conflict of Interest

On behalf of all authors, the corresponding author declares that there is no conflict of interest involved. No external funding was received for the research conducted, and there are no financial or non-financial interests to disclose.

References

1. Arya S, Kumar A, Kumar K, Kumar D. Major constraints faced by the beekeepers in production and marketing of honey in the Nainital district of Uttarakhand. *Pharma Innovation*. 2021;10(8):276-279.
2. Asrani S, Kaushik S, Sharma SK, Kaushik HD. Prospects of beekeeping in Haryana: Perceived needs, constraints and enablers. *J Daiying Foods & H.S.* 2007;26(1):48-53.
3. Gidey Y, Mekonen T. Participatory technology and constraints assessment to improve the livelihood of beekeepers in Tigray Region, Northern Ethiopia. *MEJS*. 2010;2(1):76-92.
4. Gupta JK, Dogra GS. Constraints and thrust areas for the development of apiculture in India. In: Mishra RC, Garg R, editors. *Perspectives in Indian Apiculture*. Bikaner: Agro Botanica Pub.; c1998. p. 1-13.
5. Kumar R, Singh SR, Mokhopadhyay SB, Singh YP. Constraints in transfer of beekeeping technology. *J Pharmacogn Phytochem*. 2018;7(2):1081-1084.
6. Kumar Y, Peshin R, Nain MS, Rather BA, Namgyal D, Kanwar MS, *et al.* Constraints perceived by the beekeepers of Jammu province in adoption of scientific beekeeping practices. *Indian J Ext Educ*. 2020a;56(4):49-53.
7. Kumar Y, Rather BA, Peshin R, Nain MS, Fatima K, Singh L, *et al.* Extent of knowledge of beekeepers in relation to improved apiculture practices in Jammu province. *Indian J Ext Educ*. 2020b;56(3):69-75.
8. Kumari AR, Kant L, Kumar R, Kumar S. Constraints and strategies in adoption of beekeeping by beekeeping entrepreneurs. *J Plant Dev Sci*. 2015;7(3):221-224.
9. Lowore J, Bradbear N, Ndyabarema R, Okello B. Market access for beekeepers. *Bees for Development*; c2010.
10. Panda P, Padhi. Beekeeping in Orissa. *Indian Bee J*. 1995;57(1):20-21.
11. Poornima BS. Constraints of beekeepers Uttarakannada. *Double Helix Res Int J Bio-Med Life Sci*. 2013;4(1):2278-8301.
12. Sharma S, Das D. Factors affecting adoption of beekeeping and associated technologies in Kamrup (rural) district, Assam state, India. *Biodivers Int J*. 2018;2(3):279-284.

13. Singh AK, Singh RP, Singh N. Constraints in adoption of beekeeping as an enterprise in Nagaland. *Indian J Ext Educ.* 2016;52(3):61-64.
14. Singh B, Singh S, Kumar N, Kumar D. Adoption of beekeeping as an enterprise in Haryana. *J Entomol Zool Stud.* 2021;9(3):348-351.
15. Singh D. A focus on honey bees in the tropics. *Curr Sci.* 2000;79:1155-1157.
16. Singh KA, Mishra RR, Sinha DK. Beekeeping: An economic analysis. *Proc National Seminar on Sustainable Beekeeping Development and Honey Festival; 7-9 Apr; RAU, Pusa (Bihar).* 2006. p. 107-114.
17. Sumit, Chauhan RS, Raj Kumar, Bishnoi D. Constraints in production and marketing of honey in Haryana. *J Pharmacogn Phytochem.* 2018;7(4):1110-1113.
18. Vaidya DN, Mehta PK. Honey bees as valuable pollinators. *Farmer and Parliament.* 1993;28:10-12.