

Perception of Beekeepers Towards Bee Keeping in Coastal Zone of Karnataka State

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ABSTRACT

The present study was conducted in Dakshina Kannada district of Coastal zone in Karnataka state during 2022 to analyze the perception of bee keepers towards bee keeping and to find out the association and extent of contribution of the profile characteristics of bee keepers on their perception towards bee keeping. The data were collected randomly from 60 bee keepers from five taluks of Dakshina Kannada using a pre-tested interview schedule. Expost-factor research design was employed in the present study. The results revealed that a high percentage (48.34%) of bee keepers had better perception towards beekeeping. The chi square test revealed that 17 out of 22 independent variables shown significant association with their perception towards beekeeping, where in, number of bee hives, experience in beekeeping, innovativeness. training on bee keeping and extension participation had highly significant association with their perception towards bee keeping. Further, all the 22 profile characteristics of beekeepers contributed to the tune of 73.10 per cent in developing better perception towards beekeeping.

Keywords : Bee keeping, Beekeepers, Dakshina Kannada, Perception, Ecological Benefits, Economic benefits

BEEKEEPING is an art and a mesmerizing science and it offers an immense potential for providing employment to the rural folk in India, where many evergreen and moist deciduous forests, orchards etc. constitute good beekeeping areas. The unique feature of beekeeping is that the capital investment required is small and unlike many other industries, it does not need raw material, as nature offers the same in the form of nectar and pollen. Beekeeping is a very fascinating occupation and it can be practiced equally by men, women, grown up children and even by physically handicapped and old persons. The investment required is low and the economic returns are comparatively very high. Beekeeping improves the economic condition of the farmers; restrict the migration of rural youth to urban areas and helps in holistic development of rural society. It is a subsidiary, complementary, supplementary and a family business enterprise which is pollution free (Tarakini *et al.*, 2020).

India is an exclusive country which habitats four bee species. Of these: two domesticated species, viz. *Apis cerana* (oriental honey bee) and *A. mellifera* (occidental or European honeybee) and two wildspecies, viz., *Apis dorsata* (giant/rock honeybee or dumna) and *A. florea* (dwarf honeybee). Honey harvesting by smoking away the honeybees and squeezing out their combs for honey has been traditional in India for the last several thousand years. Honeybees are special gift to mankind because beekeeping can be done for both their pollination services and their cherished products such as honey, beeswax, propolis, bee venom, etc. These products have their wide spread use in different small and large scale industries in India.

Honey has been traditionally used in various diet preparations, medicines, cosmetics, ointments and house-hold items. Honeybee apiaries, thus, prove of

great value in terms of food and medicinal security. More than 2.50 lakh farmers in India are involved in beekeeping. The average quantity of honey produced per beehive per year in our country was 8.5 kg in 2014, as compared to 1.50 kg during 1953-54. During 2017-18, the global market for apicultural products was estimated at USD \$8,819 million. In India, currently the total number of bee hives is estimated at 12 lakhs. The country's apiculture market size was worth Rs. 16,818 million in 2018, is further projected to reach Rs.33,128 million by 2024, with 12 per cent average growth rate per year during (Jagadeesh *et al.*, 2022). Thus, keeping in view the importance of bee keeping, In view of the importance of bee keeping, the present study was undertaken with the following specific objectives:

1. To analyze the perception of bee keepers towards beekeeping and
2. To find out the association and extent of contribution of profile characteristics of beekeepers on the perception towards beekeeping

METHODOLOGY

The present study was conducted in the purposively selected Dakshina Kannada district of Coastal zone in Karnataka state during 2022. The list of beekeepers who were maintaining at least five *Apis cerena* colonies for the past three years and were members and regular honey suppliers to the Beekeeper's Co-operative Society, Puttur of Dakshina Kannada district was prepared by employing simple random technique. Twelve beekeepers from all the five taluks (Mangalore, Bantval, Puttur, Belatangadi and Sullya) of Dakshina Kannada district were randomly selected to constitute 60 bee keepers for the study.

The perception of beekeepers towards bee keeping was considered as dependent variable for the study. Perception of beekeepers towards bee keeping in the present study is operationally defined '*as the extent of mental awareness of bee keepers about the ecological and economic benefits of beekeeping*'. Summated rating scale suggested by Likert (1932) and Edwards (1969) was followed to develop a

standardized scale for analyzing the perception of beekeepers towards beekeeping. Fourteen and eighteen statements originally selected under ecological benefits and economic benefits. The developed perception scale was found to be highly reliable (0.771) and valid (0.8430). The developed perception scale consists of 21 statements categorized under ecological benefits (10 statements) and economic benefits (11 statements) of rearing honey bees. The response was collected on a five-point continuum, namely, strongly agree, agree, undecided, disagree and strongly disagree with an assigned score of 5, 4, 3, 2 and 1 for positive statements and reverse scoring for negative statements, respectively. The perception score of this scale ranges from a minimum of 21 to a maximum of 110 score. Based on the mean (78.66) and half standard deviation (12.02), the respondents were categorized as poor, good and better perception. Higher score on this scale indicates that the respondent has better perception towards bee keeping and the lower perception score indicates that the respondent has poor perception towards bee keeping.

Information regarding 22 profile characteristics (independent variables) of beekeepers were collected using a structured schedule with suitable scales. The collected data were scored, tabulated and analyzed using frequency, mean, percentage, chi-square test and multiple regression analysis.

RESULTS AND DISCUSSION

Perception of Beekeepers towards Beekeeping in Coastal Zone of Karnataka

The results in Table 1 reveals the data on the perception of beekeepers towards the ecological and economic benefits of beekeeping.

Ecological Benefits of Rearing Honey Bee

It is observed from Table 1 that among the ten perception statements with respect to the ecological benefits of rearing honey bee, the statement 'Bees play a key role in pollination of agri-horticultural and other crops' obtained perception score of 241 and was accorded the first rank, while the statement

TABLE 1
Perception of beekeepers towards beekeeping in coastal zone of Karnataka (n=60)

Perception statements	Beekeepers	
	Perception score	Rank
Ecological benefits of rearing honey bee		
Bees play a key role in pollination of agri-horticultural and other crops	241	I
Beekeeping is an environmentally friendly subsidiary income generating activity	236	II
Beekeeping has been a skillful low impact technologies to deliver great benefits to people and biodiversity	231	III
Bees contribute to complex and interconnected ecosystems that allow a diverse number of different species to co-exist	208	IV
Closer the relationship between life forms and apiculture is realized, the much higher will be the consciousness of conservation of forest and crop species	205	V
Bees are responsible for the production of many seeds, nuts, berries, and fruit, which serve as a vital food source for wild animals and man	201	VI
Honey bee is a unique pollinator as it provides multiple by-products in addition to pollination services	199	VII
Bees are the vital part of food chain and they act as a food source for predators	188	VIII
Beekeeping requires least land area and even, backyard is sufficient, hence it releases people from land demanding activities and reduces pressure on land	181	IX
Bee hive fences are used as multi-dimensional conflict mitigation tool in protecting crops against elephants raids - a livestock wild interface	161	X
Economic benefits of rearing honey bees		
Apiculture is a non-farm income generating activity to increase income of the rural and urban households	226	I
Apiculture can be integrated into already existing agriculture enterprises such as piggery, diary, horticulture and field crops	224	II
Beekeeping is not labour intensive activity	202	III
Beekeeping is a cash crop	200	IV
Apiculture uses inexpensive, locally available resources, with quick returns	189	V
The growing market potential for honey and its products has resulted in bee keeping emerging as a viable enterprise	187	VI
Beekeepers can be better organized by enrolling themselves in Beekeeping Associations for adopting improved techniques, increasing production and strengthening their position in the market	185	VII
Bee keeping requires relatively lower levels of investment and is a non-physically demanding work	180	VIII
Beekeeping is easy to manage even by women and children	169	IX
By practicing beekeeping the farmer family becomes less vulnerable to economic pressure strengthening their ability to look into the future	153	X
Selling a secondary product such as bee wax, royal jelly, bee venom etc., brings a far better return for the producer than selling the raw commodity	151	XI

‘Beekeeping is an environmentally friendly subsidiary income generating activity’ received a score of 236 and was ranked second. The statement ‘Beekeeping has been a skillful low impact technology to deliver great benefits to people and biodiversity’ obtained a perception score of 231 and was ranked third by the beekeepers, whereas the statement ‘Bees contribute to complex and interconnected ecosystems that allow a diverse number of different species to co-exist’ was ranked fourth with apperception score of 208. The statement ‘Closer the relationship between life forms and apiculture is realized, the much higher will be the consciousness of conservation of forest and crop species’ received a perception score of 205 and was ranked fifth, while the statement ‘Bees are responsible for the production of many seeds, nuts, berries and fruits, which serve as a vital food source for wild animals and man’ obtained a perception score of 201 and was ranked sixth.

The perception statement ‘Honey bee is a unique pollinator as it provides multiple by-products in addition to pollination services’ obtained an perception score of 199 and was ranked seventh, while the remaining three statements, namely, ‘Bees are the vital part of food chain and they act as a food source for predators’, ‘Beekeeping requires least land area and even, backyard is sufficient, hence it releases people from land demanding activities and reduces pressure on land’ and ‘Bee hive fences are used as multi-dimensional conflict mitigation tool in protecting crops against elephants raids - a livestock wild interface’ were ranked eighth (188 score), ninth (181 score) and tenth (161 score), respectively.

Economic Benefits of Rearing Honey Bees

In respect of the perception of beekeepers towards the economic benefits of rearing honey bee, the statement ‘Beekeeping is a non-farm income generating activity to increase income of the rural and urban households’ obtained perception score of 226 and was assigned the first rank while the statement ‘Beekeeping can be integrated into already existing agriculture enterprises such as piggery, diary, horticulture and field crops’ received a score of 224

and was ranked second (Table 1). The perception statement ‘Beekeeping is not a labour intensive activity’ obtained a perception score of 202 and was ranked third by the bee keepers, while the statement ‘Beekeeping is a cash crop’ was ranked fourth with a perception score of 200. The statement ‘Beekeeping uses inexpensive, locally available resources, with quick returns’ received a perception score of 189 and was ranked fifth, whereas the statement ‘The growing market potential for honey and its products has resulted in bee keeping emerging as a viable enterprise’ obtained a perception score of 187 and was ranked sixth. The statement ‘Beekeepers can be better organized by enrolling themselves in Beekeeping Associations for adopting improved techniques, increasing production and strengthening their position in the market’ obtained a perception score of 199 and was ranked seventh.

The perception statement ‘Bee keeping requires relatively lower levels of investment and is a non-physically demanding work’ was ranked eighth with the score of 180, while the remaining three statements, namely, ‘Beekeeping is easy to manage even by women and children’, ‘By practicing beekeeping the farmer family becomes less vulnerable to economic pressure strengthening their ability to look into the future’ and ‘Selling a secondary product such as bee wax, royal jelly, bee venom *etc.*, brings a far better return for the producer than selling the raw commodity were ranked ninth (169 score), tenth (153 score) and eleventh (151 score), respectively.

Beekeeping is an environmentally friendly activity helping in the pollination of crops and is vital part of the food chain requiring least land area. Besides, beekeeping is also a non-farm activity which uses locally available resources and family labour for obtaining quick returns. The beekeepers are well aware of the ecological and economic benefits of beekeeping; hence they possess better perception towards beekeeping.

Overall Perception of Beekeepers towards Beekeeping

The results in Table 2 reveals that nearly half of the beekeepers had better perception (48.34%)

TABLE 2
Overall perception of beekeepers towards
beekeeping in coastal zone of Karnataka
(n=60)

Perception categories	Beekeepers	
	Number	Per cent
Poor (Below 72.65 score)	13	21.66
Good (72.65 to 84.67score)	18	30.00
Better (Above 84.67score)	29	48.34
Total	60	100.00
Mean	78.66	
Standard deviation	12.02	

Mean = 191.89; Standard deviation = 28.08

towards beekeeping, while 30.00 and 21.66 per cent of the bee keepers had good and poor perception towards beekeeping, respectively. The beekeepers are well aware of the ecological and economic benefits of beekeeping, hence more than three-fourth of the beekeepers had good to better perception (78.34%) towards beekeeping. The present findings are in line with the findings of the study conducted by Preethi *et. al.* (2017), Yehual *et. al.* (2013) and Sharma and Das (2018).

Association between the Profile Characteristics of Bee Keepers and their Perception towards Beekeeping

The Chi square test was applied to find out the association between profile characteristics of beekeepers and their perception towards beekeeping (Table 3). The results revealed that 17 out of 22 independent variables exhibited significant to highly significant association with the perception of bee keepers towards beekeeping. The variables such as number of bee hives, experience in beekeeping, innovativeness, training on bee keeping and extension participation of bee keepers had a highly significant association with their perception towards bee keeping at one per cent level of probability, whereas education, farming experience, annual income, achievement motivation, scientific orientation, risk orientation, cosmopolitaness, decision making ability, market orientation, economic motivation, mass media

TABLE 3
Association between profile characteristics of bee
keepers with their perception towards beekeeping
(n=60)

Characteristics	df	Chi-square value	Contingency coefficient
Age	4	2.367 ^{NS}	0.122
Education	4	11.673 [*]	0.267
Family size	4	6.812 ^{NS}	0.187
Farm size	4	7.816 ^{NS}	0.189
Farming experience	4	11.888 [*]	0.266
Number of bee hives	4	13.968 ^{**}	0.269
Experience in beekeeping	4	14.891 ^{**}	0.287
Annual income	4	10.689 [*]	0.265
Innovativeness	4	15.061 ^{**}	0.342
Achievement motivation	4	12.619 [*]	0.311
Scientific orientation	4	11.692 [*]	0.268
Risk orientation	4	12.692 [*]	0.309
Cosmopolitaness	4	11.600 [*]	0.268
Decision making ability	4	12.692 [*]	0.310
Credit orientation	4	5.692 ^{NS}	0.111
Market orientation	4	10.888 [*]	0.262
Economic motivation	4	11.692 [*]	0.265
Social participation	4	6.991 ^{NS}	0.188
Mass media exposure	4	12.620 [*]	0.308
Training on beekeeping	4	15.699 ^{**}	0.343
Extension agency contact	4	13.612 [*]	0.312
Extension participation	4	14.001 ^{**}	0.313

NS=Non-significant; *=Significant at 5%;
**= Significant at 1%; df=degrees of freedom

exposure and extension agency contact of bee keepers were found to be having a significant association with their perception towards bee keeping at five per cent level of probability. Variables such as age, family size, farm size, credit orientation and social participation of bee keepers had a non-significant association with their perception towards beekeeping, For every unit increase in the education, farming experience, annual income, achievement motivation, scientific orientation, risk orientation, cosmopolitaness, decision making ability, market orientation, economic motivation, number of bee hives, experience in beekeeping, innovativeness, mass media exposure,

TABLE 4
Extent of contribution of profile characteristics of beekeepers on the perception towards beekeeping

Characteristics	Regression coefficient	SE of Regression coefficient	't' value
Age	0.374	0.4161	1.110 ^{NS}
Education	0.276	0.5550	2.010 [*]
Family size	0.1936	0.1861	0.9610 ^{NS}
Farm size	0.7550	0.6161	0.8160 ^{NS}
Farming experience	0.3128	0.7879	2.5181 ^{**}
Number of bee hives	0.2507	0.6816	2.718 ^{**}
Experience in beekeeping	0.3295	0.9281	2.816 ^{**}
Annual income	0.3702	0.7816	2.111 [*]
Innovativeness	0.4009	0.9618	2.399 [*]
Achievement motivation	0.3283	0.6928	2.110 [*]
Scientific orientation	0.3401	0.8100	2.381 [*]
Risk orientation	0.3884	0.8192	2.109 [*]
Cosmopoliteness	0.2410	0.5892	2.444 [*]
Decision making ability	0.3885	0.8128	2.108 [*]
Credit orientation	0.3399	0.6666	1.961 ^{NS}
Market orientation	0.3371	0.7866	2.333 [*]
Economic motivation	0.2412	0.5986	2.481 [*]
Social participation	0.7523	0.8961	1.191 ^{NS}
Mass media exposure	0.3591	0.7981	2.222 [*]
Training on beekeeping	0.3263	0.9191	2.8160 ^{**}
Extension agency contact	0.3860	0.8181	2.119 [*]
Extension participation	0.3228	0.9681	2.999 ^{**}

NS= Non-significant; *=Significant at 5%; **= Significant at 1%; R²=0.731; F=22.66**

training on bee keeping, extension agency contact and extension participation of bee keepers there will be an increase in developing better perception towards bee keeping. The above findings are in line with the findings reported by Darshan *et al.*, (2019) and Meghajit Sharma Shijagurumayum *et al.*, (2022).

Extent of Contribution of Profile Characteristics of Beekeepers on the Perception towards Bee keeping

The results in Table 4 revealed that education, farming experience, annual income, achievement motivation, scientific orientation, risk orientation, cosmopoliteness, decision making ability, market orientation, economic motivation, number of bee hives,

experience in beekeeping, innovativeness, mass media exposure, training on bee keeping, extension agency contact and extension participation of bee keepers have significantly contributed in developing better perception towards bee keeping, while age, family size, farm size, credit orientation and social participation of bee keeper have not significantly contributed in developing better perception towards bee keeping. All the 22 profile characteristics of beekeepers had contributed to the tune of 73.10 per cent (R² = 0.731) in developing better perception towards beekeeping and the 'F' value (22.66) indicated significant differences at one per cent level. Similar findings were reported by Sharma *et al.*, (2022).

It could be concluded from the results of the research study that more than three fourth (78.34%) of the beekeepers possessed good to better level of perception towards beekeeping. Mass media exposure, training on bee keeping, extension agency contact and extension participation of beekeepers had significant association with their perception towards beekeeping. Therefore, the apiculturists and extension personnel may conduct education activities (discussion meeting, demonstration, farmers field school and training programmes) to the beekeepers regarding the scientific bee keeping practices for developing better perception of beekeepers towards beekeeping in getting increased honey yield and higher returns. The mass media may also publish case studies of successful beekeepers for motivating the beekeepers to adopt sustainable beekeeping practices for utilizing locally available resources and family labour to get quick returns from beekeeping.

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