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Constraints in transfer of beekeeping technology

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Abstract
Beekeeping is an ecologically sound, economically and socially acceptable enterprise. Delineation of constraint under transfer of technology (TOT) constraints responsible in adoption in the recommended technologies ultimately will help the research and extension system to strengthen the efforts and bridge between technology transfer and adoption. The objectives of the study were to analyze the transfer of technology constraints of the beekeepers and identify the TOT constraints faced by the beekeepers in communication of beekeepers. The study was conducted at Muzaffarpur, Vaishali and Samastipur districts of Bihar, because the State of Bihar is endowed with highly diversified and about bees-flora and favourable ecological conditions. Bihar is one of the largest producers, consumers and exporters of Litchi honey. Ninety percent of Litchi orchards of the country are located in Bihar State alone. Hence, the State is considered to be paradise of honey bees. The most important transfer of technology were low price of honey, lack of genetically superior bee queen, assured credit facility, non-availability of assured market and good quality inputs, lack of regular technical guidance for beekeepers are the major constraints as perceived by the respondent beekeepers.

Keywords: Beekeeping technology, litchi orchard, honey, honey bees

Introduction
The packages of practices based on scientific investigation are recommended to achieve greater production. This is true particularly in the developing countries like India, where prosperity of country is mainly dependent on agriculture in India, considerable change have been brought about in traditional agriculture during recent years through various programme involving use of modern input and new technology. However, the progress is not yet to the desired level of satisfaction because whatever progress that has been achieved so far, differs from one region to another. There is certain region where the progress in agriculture is more than the expectations. The extent of adoption of recommended beekeeping technologies by the beekeepers depends upon various factors as well as constraints faced by them. Constraints refer to the item of difficulties faced by the beekeepers in actual adoption of recommended technologies causing technological gap. It also plays an important role in adoption of recommended beekeeping technologies.
Delineation of constraint under transfers of technology constraints responsible in adoption the recommended technologies, ultimately will help the research and extension system to strengthen the efforts and bridge the gap between technology transfer and adoption. Therefore, the present study has been designed with the following objectives:

- To analyze and study the constraints associated with technological gap among the beekeepers.
- To ascertain suggestions of the beekeepers to overcome the constraints associated with technological gap.

Materials and Methods
The multistage sampling plan adopted in the study. The field investigation was carried out in Muzaffarpur, Vaishali and Samastipur districts of Bihar State which had maximum concentration of the beekeepers. One Block of each of these Districts having maximum number of beekeepers was selected purposively. On the same basis, six villages having maximum number of beekeepers were selected from each of the three Blocks. The sample size to be drawn from a Block was decided to be in proportion to the number of beekeepers in each of the three Blocks. The respondents were selected from the list of beekeepers for the six villages of a Block with the help of random number table, proportionate to the size of beekeepers in each village. Thus, in all 200 beekeepers were interviewed for this study.
The respondents were asked to report the constraints they face in adoption of recommended technologies causing technological gap in their beekeeping.

The frequency of the respondents was find out and expressed in the percentage. The extent of the seriousness of transfer of technology was measured by taking into consideration the scores of the respondents obtained in respect of 25 constraints. The respondents were asked to record their opinion on a three-point continuum scale. These points were 'Very serious', 'Serious' and 'Not so Serious' with weight age of 3, 2, and 1, respectively. All scores obtained by a respondent were summed up for all the Constraint items.

Thus, the Total Constraint Score (TCS) of each response was calculated. Further, Constraint Index Score (CIS) was computed with respect to Maximum Constraint Score (MCS) by using the formula adopted by Mahipal (1993) as given below:

$$CIS = \frac{TCS}{MCS} X\ 100$$

Thus, after computing individual Constraints scores, the respondents were categorized into low, medium and high level of Constraints groups by using Cumulative Cube Root frequency method. The component-wise relative ranks of these constraints as well as over all ranks were noted against each constraint. The extent of adoption of recommended technologies by the beekeepers depends upon various factors as well as constraints faced by them. Constraints refers to the item of difficulties faced by beekeepers in actual adoption of recommended technologies causing technological gap (sen, 1987)

Results and Discussion

Constraints associated with technological gap among beekeepers

During the investigation the respondents expressed variety of constraints which were grouped into five categories viz. technological, economic, transfer of technology, marketing and management are presented in table-1

Table 1: Degree of seriousness of constraints causing technological gap as perceived by the beekeepers (N=200)

S. No	Constraints	Very Serious		Serious		Not so Serious	
		f	%	f	%	f	%
1.	Lack of regular and skill related effective training	132	66	66	33	2	1
2.	Lack of infrastructure for producing genetically superior queen bee for supply to beekeepers at proper time.	92	46	94	47	14	7
3.	Lack of improved knowledge about honey production technology.	38	19	116	58	46	23
4.	Lack of technical knowledge for efficient management of bee colonies for higher honey yield.	26	13	86	43	88	44
5.	Lack of knowledge about scientific preventive measures against insects-pests and diseases.	10	5	42	21	148	74
6.	Lack of capital for establishing a beekeeping enterprise.	148	74	40	20	12	6
7.	Non-availability of credit in time due to corruption in officials.	62	31	120	60	18	9
8.	Complex and long procedure in funding & granting subsidies and loans.	58	29	26	13	116	58
9.	Migration and transportation of bee colonies.	38	19	86	43	76	38
10.	Delayed payment from sale of produce	12	6	68	34	120	60
11.	Inadequate technical guidance and cooperation by line departments.	150	75	40	20	10	5
12.	Poor rapport of extension agencies	82	41	112	56	6	3
13.	Lack of awareness about yield increase in crops/fruits by beekeeping through pollination.	32	16	88	44	80	40
14.	Lack of knowledge about information centre.	12	6	74	37	114	57
15.	Non-availability of reliable market information	40	20	100	50	60	30
16.	Non availability of assured market facilities	144	72	50	25	6	3
17.	Problem of marketing of unprocessed honey	74	37	94	47	32	16
18.	Poor quality control for production of honey	32	16	48	24	120	60
19.	Illiteracy is the hindrance in record keeping.	8	4	60	30	132	66
20.	High cost of improved inputs.	22	11	48	24	130	65
21.	Lack of technical knowledge for efficient seasonal bee management	132	66	60	30	8	4
22.	Interference by undesirable elements in migrating the bee colony	94	47	100	50	6	3
23.	Indiscriminate use of insecticides, pesticides, etc	40	20	74	37	86	43
24.	Global warming and unforeseen changes in climatic conditions	14	7	124	62	62	31
25.	Lack of proper planning and coordination among concerned departments.	16	8	52	26	132	66

It is revealed from Table1.that the constraints were recorded by the respondent beekeepers numbering 25 in total with varying degrees of seriousness. Out of these, as many as 11 constraints were detected to be "Very Serious" (Score > 48), 4 "Serious" (Score between (44 to 48) and 10 "Not so Serious" (Score up to 43). The five most serious constraints were 'inadequate technical guidance and cooperation by line departments', lack of capital for establishing a beekeeping enterprise', 'non- availability of assured market facilities', 'lack of regular and skill related effective training', and 'lack of technical knowledge for efficient seasonal bee management'.

The extent of the seriousness of these constraints was measured by taking into consideration the scores of the respondents obtained in respect of these 25 constraints. The respondents were accordingly grouped into three categories, i.e., Low, Medium and High, both component-wise and overall by using Cumulative Frequency Cube Root method as described in the Chapter on Methodology.

Constraints in beekeeping technology (component-wise)

The constraints of beekeeping technology were grouped into five broad areas, namely, technological, economic, transfer of technology, marketing and management constraints. The extent of seriousness of constraints of the respondent beekeepers was measured in respect of these five components also. The component-wise data about the field - level constraints of the recommended scientific beekeeping practices are presented in table-2.

Table 2: Constraints as perceived by the respondents in respect different technological gap among beekeeping (Component-wise). (N=200)

S. No	Constraints	TCS	CIS	Rank
A.	Technological constraints :			
1.	Lack of regular and skill related effective training	530	88.33	I
2.	Lack of infrastructure for producing genetically superior queen bee for supply to beekeepers at proper time.	478	79.67	II
3.	Lack of improved knowledge about honey production technology.	392	65.33	III
4.	Lack of technical knowledge for efficient management of bee colonies for higher honey yield.	338	56.33	IV
5.	Lack of knowledge about preventive measures against insect-pests and diseases.	262	43.67	V
B.	Socio-economic constraints			
1.	Lack of capital for establishing a beekeeping enterprise.	536	89.33	I
2.	Non-availability of credit in time.	444	74.00	II
3.	Complex and long procedure in funding granting of subsidies and loans due to corruption of officials.	342	57.00	IV
4.	Migration and transportation of bee colonies.	362	60.33	III
5.	Delayed payment from sale of produce.	292	48.67	V
C.	Transfer of Technology constraints:			
1.	Inadequate technical guidance and cooperation by line departments.	540	90.00	I
2.	Poor rapport of extension agencies	476	79.33	II
3.	Lack of awareness about yield increase in crop/fruits by beekeeping through pollination.	352	58.67	V
4.	Lack of knowledge about information centre.	298	49.67	IV
5.	Non-availability of reliable market information	380	63.33	III
D.	Marketing constraints;			
1.	Non availability of assured market facilities	538	89.67	I
2.	Problem of marketing of unprocessed honey	442	73.67	II
3.	Poor quality control for production of honey.	312	52.00	III
4.	Illiteracy is the hindrance in record keeping.	276	46.00	V
5.	High cost of improved inputs.	292	48.67	IV
E.	Management constraints:			
1.	Lack of technical knowledge for efficient seasonal bee management	524	87.33	I
2.	Interference by undesirable elements in migrating and transportation of the bee colonies.	488	81.33	II
3.	Indiscriminate use of insecticides, pesticides, etc.	354	59.00	III
4.	Global warming and unforeseen changes in climatic conditions.	352	58.67	IV
5.	Lack of proper planning and coordination among concerned departments.	284	47.33	V

It is clearly revealed from Table 1 that those constraints in the adoption of beekeeping technology which recorded more than 70.0 percent mean Constraint Score (CIS) in the Technological area were 'lack of regular and skill related effective training' (88.33) and 'lack of infrastructure for producing genetically superior queen bee for supply to beekeepers at proper time' (79.67). In the Socio-economic area, these were 'lack of capital for establishing a beekeeping enterprise' (89.33) and 'non-availability of credit in time' (74.00). Similarly, in TOT component, such constraints were 'inadequate technical guidance and cooperation by line departments' (90.00) and 'poor rapport of extension agencies' (79.33). In marketing field, these constraints were 'non-availability of assured market facilities' (89.67) and 'problem of marketing of unprocessed honey' (73.67). Among management constraints, the important ones were 'lack of technical knowledge for efficient seasonal bee management' (87.33) and 'interference by undesirable elements in migrating and transportation of the bee colonies' (81.33) (table 2).

Table 3: Component-wise extent of constraints and their overall ranks as perceived by the respondents beekeepers (N=200).

S. No.	Constraints	TCS	CIS	Rank
1	Technological constraints	2000	1.11	III
2	Economic constraints	1976	1.09	IV
3	Transfer of Technology constraints	2046	1.14	I
4	Marketing constraints	1860	1.03	V
5	Management constraints	2002	1.12	II

The transfer of technology constraints (CIS-1.14) was perceived as the most serious and was accorded first rank followed by management constraints (CIS-1.12), technological constraints (CIS-1.11), economic constraints (CIS -1.09), and marketing constraints (CIS-1.03) (table-3). Respondents were asked to suggest possible solution as they perceived to overcome the constraints associated with.

Table 3: Suggestion to overcome the constraints as perceived by the beekeepers (N=200).

S. No.	Suggestions	Frequency	Percentage	Rank
1.	Availability of credit in time without corruption of officials.	188	94	2nd
2.	Availability of assured market facilities and information.	184	92	3rd
3.	Availability of easy availability of inputs provided	192	96	1st
4.	Availability of processing plant of honey for quality control.	170	85	6th
5.	Regular and skill related effective training.	174	87	5th
6.	Providing genetically superior queen bee at proper time.	182	91	4th
7.	Regular technical guidance and cooperation by the line department	144	72	8th
8.	Projection by undesirable elements in migrating the bee colony	164	82	7th

It is cleared that more than 90 per cent of beekeepers had suggested marketing network should be formed through cooperative societies, short term skill related effective training programmed at regular interval, easy available of genetically superior bee queen at proper time, easy availability of credit in time, regular technical guidance and cooperation by line

department and availability of assured market facility were suggested by more than75 percent of beekeepers respectively.

Conclusion

The main conclusion of this study are low price of honey, lack of genetically superior bee queen, assured credit facility, non availability of assured market and good quality inputs, lack of regular technical guidance for beekeepers are the major constraints as perceived by the respondent beekeepers. Majority of the respondents suggested that marketing network should be formed through cooperative societies, short term skill related effective training programmed at regular interval, easy available of genetically superior bee queen at proper time, easy availability of credit in time, regular technical guidance and cooperation by line department and availability of assured market facility.

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