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## Impact analysis of K.V.K. adopted village for beekeeping with special reference to status of pests and predators in gird zone of Morena district

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### Abstract

Krishi vigyan Kendra Morena is actively engaged in dissemination of improved technology for over all development of integrated agriculture including beekeeping in adopted villages of Mirghan and Sirmour ka pura farmers of these villages adopted beekeeping in different blocks of Morena district including Mirghan and Sirmour ka pura were studied for various factors such as socio personal characteristics like age, education, caste, size of family and social participation. Socio economic characteristics like occupation, annual income, size of land holding and socio economic status. Socio psychological characteristic like knowledge, Cosmo politeness and scientific orientation and communicational characteristics like contact with extension agencies and source of information. In K.V.K. adopted villages Mirghan and Sirmour ka Pura the majority of the farmers fall under the medium and high level as compared to the beekeepers of the other block of Morena district. Thus it can be concluded that for creating awareness regarding beekeeping practices, identification of pests, and predators other management practices related to regarding general health of the bee colonies and upliftment of the economic status of the beekeepers there is a need of organizing, extensive training and demonstration programme in block level for the development of beekeeping as a agro based business but still there is a scope in popularization of the beekeeping and creating more awareness specially management aspect of bee pests and predators so that beekeeping becomes more profitable and popular among the farmers.

**Keywords:** beekeeping, programme, Krishi Vigyan Kendra, characteristics, management, Morena, practices

### Introduction

The cropping system of the Gird zone provides sufficient flora for honey bees therefore, this zone of M.P. is a paradise for beekeepers not only for the state but also neighboring states. It has tremendous back up of bee flora from field crop as well as from horticultural crops. Commercial bee keeping is popular in this zone from October to March – April. Beekeepers of this zone are adopted the stationary beekeeping, they placed their apiaries in orchards and in vegetable growing areas during off season and in toria, mustard, and barseem in honey flow season. Beekeepers from adjoining states have migrated their apiaries in the month of October, November and emigrated in the month of March – April.

Occurrence of pests and predators in residential apiaries as well as in migratory apiaries may be different. If so than this may be hazardous and leads exposure of residential and migratory apiaries vice versa.

Krishi vigyan Kendra Morena is actively engaged in dissemination of improved technology for over all development of integrated agriculture including beekeeping in adopted villages of Mirghan and Sirmour ka pura farmers adopted beekeeping in different blocks of Morena district including Mirghan and Sirmour ka pura were studied for various independent factors such as socio personal characteristics like age, education, caste, size of family and social participation, socio economic characteristics like occupation, annual income, size of land holding and socio economic status. Socio psychological characteristic like knowledge, Cosmo politeness and scientific orientation and communicational characteristics like contact with extension agencies and source of information.

These independent variables were correlated with the dependent variables viz. extent of adoption of beekeeping technology by the farmers of KVK adopted and other villages of Morena district

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**Methodology**

**Sampling Methods**

**1. Selection of study area:** Gird zone of Madhya Pradesh especially Morena District is suitable for commercial beekeeping. Residential and migratory beekeeping are popular in this zone. Beekeepers from neighboring states migrate their bee colonies in honey flow season in Morena district. Thus the beekeeping is practiced throughout the year that's why the Morena district was ideal for studying the pests and predators complex in migratory as well as in residential apiaries of *Apis mellifera*.

**2. Selection of blocks:** Morena district has seven blocks, occurrence of pests and predators were studied in five blocks only looking to the availability of beekeepers. While detailed studies on farmer's practices was conducted in Morena block only.

**3. Selection of villages:** Selection of villages was based on the percentage of beekeepers engaged / involved in beekeeping in a particular village. One village per block was selected viz. Bhatpura (Sabalgarh), Sirmor ka pura, (Ambah), Rajoudha (Kailarash), Sikroda, (Joura) were selected except in Morena block where two villages namely Banmore & Nurabad were selected.

**4. Selection of beekeepers (Sample Size):** Beekeepers from the identified villages were selected at randomly covering all socio economic groups. In all 120 beekeepers from 6 villages (20 respondents/village) were selected. While in case of migratory beekeepers 80 respondents from 6 villages were selected depending upon the presence of migratory beekeepers in village however minimum 10 beekeepers per village were selected. Beekeepers were interviewed and the information was collected as per the interview schedule.

**5. Factors to be studied:** Various factors related to socio-economic status (occupation, annual earning and land holding), socio-personal status (age, education level, caste, size of family, and social engagement) and general awareness, socio-psychological status (knowledge, perception and dissemination) were studied. These factors treated as an independent variables this was compared with dependent variable viz. extent of knowledge of pests and predators of bees and adoption of various management practices.

**6. Collection of Data:** Dependent variables and independent variables were recorded at the time of interview through asking a set of questions with the respondents and scores were allotted for each item to draw an interpretation, correlating both the variables for particular sets of variables. Details of scores allotted for each variable (independent) are given in table.1.

**7. Statistical methods used:** The collected data were tabulated and appropriate statistical techniques were applied for analysis of data. The statistical analysis viz. percentage, frequency, mean, standard deviation, coefficient of correlation and randomized block design were applied. Frequency and percentage: Frequency and percentage were used for making simple comparisons.

**Mean and Standard deviation**

**1. Mean:** Mean of sample was calculated by using the

following formula

$$\bar{X} = \frac{\sum x}{N}$$

Where

$\bar{X}$  = Mean of the frequency  
 $\sum X$  = Sum of total number of frequency  
 N = Total number of frequency

**2. Standard deviation:** Standard deviation was conducted by using following formula

$$r = \frac{N\sum XY - \sum X\sum Y}{\sqrt{N\sum X^2 - (\sum X)^2 \sum Y^2 - (\sum Y)^2}}$$

Where

SD. = Standard deviation  
 X = Deviation obtained frame mean  
 N = Number of observations

**Person's Coefficient of correlation:** The significance of differences in occurrence of pests and predators in different block of Morena district were tested through "F" test at 1% level of significance. The population counts were transformed by  $\sqrt{X + 0.5}$  and the structure of statistical analysis of variance is given below:

Source of variance	D.F.	S.S.	M.S.S.
Between blocks	r-1	-----	VB
Between treatments	n-1	-----	VT
Error	(r-1)(n-1)	-----	VE
Total	Nr-1		

Where

D.F. = Degree of freedom  
 SS = Sum of Square  
 MSS = Mean sum of Square  
 r = Number of replications  
 n = Number of treatment  
 VB = Variance for blocks  
 VT = Variance for treatment  
 VE = Variance for error

**Standard errors and critical difference**

The standard error of critical difference between the treatment means based on r replication is estimated by the relation.

$$(SEm) \text{ Diff} = \sqrt{2 VE/r}$$

Where,

VE = is pooled error variance  
 Here  $r_1 = r_2 = r_3$

Critical difference (CD) at 5% level of Significance = (SEm) Diff at 1% for error degree of freedom.

**Simple Correlation:** Correlation between dependent and independent variables were worked out by applying correlation analysis.

X = Independent factor  
 Y = Dependent factor

## Significance of correlation coefficient

$$t = \frac{\sqrt{n-2}}{\sqrt{1+r^2}}$$

## Result and Discussion

Study will be conduct independent variables and dependent variables of socio personal characteristic Pareek and Trivedi (1964) <sup>[10]</sup> for assessing the socio-economic status various criteria viz, occupation, annual income, size of land holding, house and material possessions and summation of respective scores was used to various categories of beekeepers into low, medium and high categories respectively. And Socio economic Occupation Annual Income Size of land holding Socio-psychological Characteristics Level of Knowledge about Beekeeping Cosmo politeness Scientific Orientation Communication Skills Contact with extension agencies, Information Sources etc. Data presented in (Table 1 and Table 2.)

### Personal characteristics of beekeepers

**1. Age:** As far as age of the beekeepers is concerned data indicated that 52.5% beekeepers belonged to middle age group (30-50 year). While 32.5% belong to low age group below 30 years and only 15% beekeepers belong to high age group that is more than 50 years. It is concluded that the majority of beekeepers in Morena district were belong to middle age group. Parameters of age were co related with the other factors it were data suggested that the age of the beekeepers were negatively correlated with the social participation ( $r=-0.630$ ), Knowledge of the subject (0.573), knowledge regarding beekeeping ( $r = -0.513$ ), information gathering ( $r = -0.410$ ), knowledge of bee flora ( $r = 0.395$ ), knowledge of bee equipments ( $r =0.515$ ), knowledge of bee diseases ( $r=-0.449$ ), knowledge of bee wax extraction ( $r=-0.388$ ). While the age of the beekeepers were strongly related with the communication skill of the beekeepers ( $r = -0.775$ ), scientific orientation ( $r = 0.789$ ) and knowledge of bee pest ( $r = 0.673$ ). Parameters of age were not correlated with the knowledge of bee predators, knowledge of honey extraction

and knowledge of pesticides hazards of the bees. Thus it can be concluded that the age of the beekeepers were negatively related with the various variables. The young beekeepers were more active and more responsible to the various problems of the beekeeping as compared to the beekeepers those belongs to the higher age group. Kubica *et al.* (1986) <sup>[8]</sup> concluded that Age between 35-45 years is most active and risk taking for adoption of new technologies.

**2. Education:** Education level of the beekeepers were examined maximum 30% of them were educated up to high school followed by 27. 5% and 17.50% educated up to higher secondary and college above respectively. While 7.5% illiterate beekeepers particularly those belong to higher age group. High percentage of educated beekeepers were attributed to the fact that were 52.5% and 32.5% beekeepers were belongs to the middle age and low age group. Education is a factor which were directly correlated with the general behavior of the beekeepers and had a strongly positive correlation with the social participation ( $r = 0.654$ ), communication skill ( $r = 0.880$ ), scientific orientation ( $r = 0.916$ ) and knowledge of bee pests ( $r = 0.795$ ). Level of education of beekeepers were also positively correlated with the knowledge of the subject ( $r = 0.485$ ), information gathering ( $r = 0.431$ ), knowledge of bee flora ( $r = (0.495)$ ), knowledge of bee equipment ( $r = 0.552$ ), knowledge of bee pests management ( $r = 0.596$ ), knowledge of bee diseases ( $r = 0.412$ ) and knowledge of bee wax extraction ( $r = 0.413$ ) and economics status ( $r = 0.0492$ ). The variables which were not correlated with the education were knowledge of pesticide hazards. ( $r = 0.246$ ), knowledge of honey extraction ( $r = 0.25$ ) and knowledge predators ( $r = 0.108$ ). Thus it can be concluded at the education of beekeepers influences most of the variables except few those which were not familiar among the beekeepers of the Morena district Similarly Samrith *et al.* (1991) <sup>[11]</sup> concluded that education was positively correlated with adoption of improved agricultural practices. Scientific farm innovation is positively correlated with the education of the respondents.

**Table 1:** Various variables related to the beekeeping

S. No.	Category	Frequency	Percent	Rank
<b>(i) Age</b>				
1.	Young (< 35)	39	32.5%	II
2.	Middle (30-50)	54	52.5%	I
3.	Old (50>)	27	22.5%	III
<b>(ii) Education</b>				
1	Illiterate	9	7.50%	V
2	Primary	9	7.50%	V
3	Middle	12	10.00%	IV
4	High school	36	30.0%	I
5	Higher secondary	33	27.50%	II
6	Collage level	21	17.50%	III
<b>(iii) Caste</b>				
1	Schedule caste	12	10.0%	IV
2	Schedule tribe	15	12.50%	III
3	Other backward caste	27	22.50%	II
4	General Caste	66	55.00%	I
<b>(IV) Family Size</b>				
1	Small (4 Members)	27	22.50%	III
2	Medium (5-10)	57	47.50%	I
3	Large (Above 10 members)	36	30.00%	II
<b>(V) Social Participation</b>				

1	No participation	15	12.5%	III
2	Participated in constructive activities	36	30.00%	II
3	Play Leading role in village activity	69	57.00%	I
<b>B. Socio Economic status</b>				
<b>(i) Occupation</b>				
1	Beekeeping	12	10.0%	IV
2	Farming	66	55.0%	I
3	+Beekeeping	0	0.0%	V
4	Labour +Beekeeping	18	15.0%	III
5	Service+ Beekeeping Business +Beekeeping	24	20.0%	II
<b>(ii) Annual Income</b>				
1	Up to Rs18,000	30	25.0%	II
2	Rs18,000 to 40,000	45	37.5%	I
3	Rs40,000 to 50,000	21	17.5%	IV
4	Above Rs. 50,000	24	20.00%	III
<b>(iii) Size of land holding</b>				
1	Marginal (Up to 1 ha)	15	25.0%	III
2	Small (1 to 2 ha)	45	37.5%	II
3	Medium (2 to 4 ha)	57	47.5%	I
4	Large (above > 4 ha)	3	2.5%	IV
<b>C. Socio-psychological Characteristics</b>				
<b>Level of Knowledge about Beekeeping</b>				
1	Low	37.5	31.50%	II
2	Medium	56.0	46.6%	I
3	High	26.3	21.90%	III
<b>Cosmo politeness</b>				
1	Low	82.6	68.8%	I
2	Medium	24.2	20.16%	II
3	High	13.2	11.04%	III
<b>Scientific Orientation</b>				
1	Low	74.2	61.8%	I
2	Medium	23.4	19.5%	II
3	High	13.2	18.66%	III
<b>D. Communication Skills</b>				
<b>(I) Contact with extension agencies</b>				
1	Low	78.1	65.08%	I
2	Medium	33.2	27.0%	II
3	High	8.72	7.25%	III
<b>(II) Information Sources</b>				
1	Low	81.3	67.75%	I
2	Medium	23.1	19.25%	II
3	High	15.6	13.00%	III

**3. Caste:** In Morena district most of the beekeepers 55.0% belong to be a general category and 22.5% belong to be a other back caste, percentage 10 and 10.5% respectively. Correlation between caste and various variables related to the extent of adoption of beekeeping technology were non significant. Thus it can be concluded that the caste of the beekeepers did not have any influence on the extent of adoption of beekeeping technology by the beekeepers and other variables pertaining to the general awareness of beekeepers. Adoption behavior of small beekeepers in relation to their socio-personal characteristics had non-significant relationship between their caste and adoption of improved practices Solunke and Thorat, (1975).

**4. Size of the family:** Size of the family is the positive characters for dissemination of knowledge among the family members in family persons of various age groups, experience, and occupation share their views, this leads to pecculation of knowledge of various fields. In Morena district among the beekeepers 47.50% belong to medium size family. While 30% of them belong to big family. In case of beekeepers size of the family did not related with the social participation ( $r = -0.263$ ) and knowledge of subject ( $r = 0.117$ ), information

gathering ( $r = 0.139$ ), knowledge of bee flora ( $r = 0.274$ ), knowledge of bee equipments ( $r = 0.035$ ), knowledge of bee predators ( $r = 0.081$ ), knowledge of bee diseases ( $r = 0.251$ ), knowledge of honey extraction ( $r = 0.091$ ) and knowledge of bee pesticide hazards ( $r = 0.002$ ). While the other variables such as communication skill, scientific orientation, knowledge of bee management, knowledge of bee pests, knowledge of wax extraction and economic status were negatively correlated with size of the family “ $r$ ” value were  $-0.361$ ,  $-0.445$ ,  $-0.450$ ,  $-0.411$ ,  $-0.324$  and  $0.310$  respectively. Data indicated that in smaller family sharing of general problem of beekeeping were high as compared to the bigger size of the family. Sarkar and Bandyopadhyay (1996) found out that adoption of scientific farm innovations, practices were negatively correlated with the size of the family.

**5. Social Participation:** Social participation of beekeepers may influence their adoption behavior. The beekeepers may get an opportunity for more learning and exposure toward new ideas and may be motivated for adoption. In Morena district 57.5% beekeepers play leading role in village activity and 30% of them engaged in constrictive activity while 12.5% beekeepers had no participation in any activities Extent of social participation had direct and positive correlation with



communication skill ( $r = 0.547$ ), knowledge about the subject ( $r = 0.551$ ), scientific orientation to the problems ( $r = 0.537$ ), knowledge of bee equipments ( $r = 0.310$ ), Knowledge of bee pests ( $r = 0.497$ ), knowledge of bee diseases ( $r = 0.311$ ), knowledge of bee wax extraction ( $r = 0.363$ ), knowledge of pesticides hazards ( $r = 0.352$ ), and economic status ( $r = 0.432$ ). Data suggested that as per the priorities out of the awareness of the beekeepers. Ingle *et al.* (1991) [5] found that social participation were positively and significantly correlated with the knowledge of respondents about improved fish farming practices.

They gain the information related to their interest but those think which did not comes in priority list of them they ignore or least interested about that particular information such as knowledge of bee flora, knowledge of bee predators and honey extraction mostly were done as per the norms fix by the beekeepers looking to the demand under the influence of other beekeepers. Generally they extract honey in 7-10 days intervals they did not bother about the maturing of honey in a comb as per the standards.

**Socio economic**

**1. Occupation:** In Morena district not a single beekeepers came in this categories That is labor beekeeping most of them (55.0%) engaged in beekeeping along with the farming and only (20%) of them engaged in beekeeping along the with the business. Out of total beekeepers only (10%) were engaged in beekeeping activity alone most of them were migratory beekeepers.

Occupation directly related with the adoption of management practices ( $r = 0.321$ ) in Morena district. While the relation were negatively correlated with communication skill, information gathering, knowledge of bee equipments, knowledge of bee predators and positively correlated with the social participation, knowledge of the subject scientific orientation, knowledge of bee flora, knowledge of bee diseases, knowledge of bee pests, honey extraction, wax extraction and pesticide hazard and economic status but it

were non significant. Data suggested that the beekeepers concentrated their activity on the management practices of bees in beekeeping were the sole and key factor for the success of the beekeeping. Deshmukh *et al.* (2007) [4] also reported that the 96.52% respondents having agriculture as their main occupation while remaining 3.47% having subsidiary occupation.

**2. Annual Income:** Most of the beekeepers 37.50% were ranged from 18, 000 to 40, 000 followed by beekeepers of 18, 000 per annum earning group. Deshmukh *et al.* (2007) [4] found that 81.59% of respondents fall under medium level of income while 10.76% were of high level of income and remaining only 7.63% were of low level of income having significant variation in adoption of improved agricultural technologies.

**3. Size of land holding:** In Morena district 47.5% beekeepers had 2.24 hectare land holding and 37.55% belong to small 1.22 hectare land holding groups and marginal land holding up to one hectare. Assessed by 2.5 beekeepers. Size of land holding may influence the aptitude of future planning of the beekeepers and that may also related with the aptitude for learning and adoption of improved technology by the beekeepers with this views land holding were co related with the other parameters like communication skill, information gathering, knowledge of bee equipments, knowledge of bee predators and disease positively correlated with the social participation, knowledge of the subject scientific orientation, knowledge of bee flora, knowledge of bee diseases, knowledge of pests, honey extraction, wax extraction and pesticide hazard of the bees, but the correlation were found non significant. While positive trend were observed in parameters like knowledge of subject, knowledge of pesticide hazard, but the correlation were found statistically non significant. Samrith *et al.* (1991) [11] concluded that land holding were positively correlated with adoption of improved agricultural practices.

**Table 2:** Correlation studies of various variables related to beekeeping

Independent variables									
Variables	Age	Education	Caste	Social Participation	Monthly Income	Subject Knowledge	Communication Skill	Scientific Orientation	Use of source of improvement
Social Participation	- 0.63*	0.654**	NS -0.143	Nil	NS 0.105	-	-	-	-
Subject Knowledge	- 0.513*	0.485*	NS -0.058	0.551*	NS 0.196	-	-	-	-
Communication Skill	- 0.775**	0.88*	NS - 0.134	0.547*	NS 0.114	-	-	-	-
Approach of Solving Problem	- 789**	0.916**	NS - 0.098	0.537*	NS 0.1	-	-	-	-
Information Gathering	-0.401*	0.431*	NS - 0.133	NS - 0.016	NS 0.052	-	-	-	-
Scientific Orientation									
Dependent variables	Age	Education	Caste	Social Participation	Monthly Income	subject Knowledge	Communication Skill	Scientific Orientation	Use of source of improvement
Knowledge of bee flora	- 0.395*	0.459*	NS -0.179	NS 0.124	NS 0.231	-0.023	0.372*	0.558*	0.206
Knowledge of bee equipments	- 0.515*	0.552*	NS -0.225	0.31*	0.393	0.228	0.551*	0.453*	0.298
Knowledge of bee management	-0.499*	0.569*	NS -0.092	NS 0.299	NS 0.209	0.111	0.558*	0.634*	0.217
Knowledge of bee pests	-0.673*	0.795**	NS -0.12	0.497*	NS -0.017	0.330*	0.652*	0.740*	0.358*
Knowledge of bee predators	NS -0.202	NS 0.108	NS -0.185	NS 0.127	NS 0.112	0.165	0.0362	0.189	0.119
Knowledge of bee diseases	-0.449*	0.412*	NS 0.009	0.311*	NS 0.103	0.236	0.376*	0.328*	0.155
Knowledge of bee honey extract	NS -0.077	NS 0.025	NS 0.17	NS 0.154	NS -0.022	0.127	0.043	0.099	0.07
Knowledge of bee honey extraction	-0.388*	0.413*	NS -0.26	363*	NS -0.054	0.256	0.379*	0.439*	0.071
Knowledge of pesticides hazards	NS -0.233	NS 0.246	NS 0.139	352*	NS 0.17	0.363	0.14	0.127	0.106
Economic status	Nil	0.492*	NS -0.205	342*	0.369	0.256	0.458*	0.428*	0.331*

At 0.005 level :  $r = 0.306$   
 NS - Non -Significant -  
 Significant at 0.05 probability level\* -  
 Significant at 0.306 probability level\* \*

## Socio psychological characteristics of beekeepers

**1. Level of knowledge about beekeeping technology:** Data indicated that knowledge of beekeeping were medium level 46.6% most of the beekeepers and only 21.9% beekeepers had complete knowledge of beekeeping. While 31.5% beekeepers had low level of knowledge about beekeeping. Chapke (2000) revealed that 75.91% of respondents had moderate knowledge about bio control measure whereas comparatively less percentage of respondents had low (16.05%) and high (8.04%) level of knowledge about bio control practices. Thus for improving the productivity of honey in the areas as a whole more emphasis should be given in training and practical demonstration of beekeeping. In K.V.K. adopted villages the% of beekeepers had high levels of knowledge about the beekeeping but there is a need of intensification of demonstration technology to increase the ratio of adoption of improved practices by the beekeepers. Data further suggested that the level of subject knowledge were restricted to knowledge of bee pests ( $r = 0.330$ ), and knowledge of pesticide hazards to the bees ( $r = 0.363$ ). Samrith *et al.* (1991)<sup>[11]</sup> concluded that level of knowledge was positively correlated with adoption of improved agricultural practices.

**2. Knowledge of Cosmo politeness:** Cosmo politeness is the tendency of an individual to be in contact with outside his own community based on belief that all the need of individual cannot be satisfied with in his own community. Result reviled that in Morena district majority of beekeepers posses low level of Cosmo politeness and only (1.04%) four percent of beekeepers had high level of Cosmo politeness and majority of them were migratory beekeepers. Chittaranjan *et al.* (2006)<sup>[2]</sup> revealed that cosmopoliteness had positive and significant relationship (at 1%) with knowledge level on recommended practices of scientific beekeeping.

**3. Scientific orientation:** It refers to the tendency of individual to use scientific approach in solving the problems. In Morena district majority of beekeepers 61.8% did not use scientific approach for solving their problems related to beekeeping with scientific orientation. Scientific orientation of beekeepers were influenced by age of the beekeepers. Higher the age more the experience and high level of scientific orientation to solve their problems ( $r = 0.789$ ). Education and Social participation were also positively related with the scientific orientation of beekeepers ( $r = 0.916$ ), and ( $r = 0.537$ ). Tendency of scientific orientation to the problems of a beekeepers make them well aware person about the timely handling and proper management of the various problems related to their occupation. The respondent bears the high level of scientific orientation they also had a good knowledge of bee flora ( $r = 0.558$ ), Bee equipments ( $r = 0.453$ ), knowledge of bee management ( $r = 0.634$ ), Bee pests ( $r = 0.740$ ), Bee diseases ( $r = 0.328$ ), and wax extraction ( $r = 0.439$ ). Knowledge regarding pesticide hazard and bee predators were low in those respondent also who had good scientific orientation probably due to that they did not recognized these constraints as a problem. The economic status of the respondents were also high those had good scientific orientation ( $r = 0.458$ ). Chandra and Reddy (2002)<sup>[3]</sup> observed that there were positive and significant association between scientific orientation and viewing behavior of the respondents.

## Communication skill

Communication skill is a individuals characteristics of the

beekeepers to express their views or problems for taking advise /comments of the other persons or affords the made by them to fetch the information from the available sources the person had good communication skills also had a good knowledge of the occupation and their surrounding as compared to the others and they had a good knowledge of bee flora ( $r = 0.372$ ), Good knowledge of bee equipments ( $r = 0.551$ ), Knowledge of bee management ( $r = 0.558$ ), Bee pests ( $r = 0.652$ ), Bee disease ( $r = 0.376$ ), and wax extraction ( $r = 0.379$ ). Except the good knowledge of bee predators and honey extraction they were well worse with all technology related to their occupation and they also bears a good colony status ( $r = 0.458$ ). Kalaskar *et al.* (1999)<sup>[6]</sup> revealed that extension contact were significantly correlated with adoption of integrated pest management practices by the respondents. (Table No 2).

**1. Contact with extension agencies:** Frequency of contact with extension agencies for getting technical support by the beekeepers were assessed. Data revealed that 65.08% beekeepers had low level of extension contact 27.6% had minimum level of extension contact while only 7.25% had a high level of extension contact with extension agencies beekeepers from K.V.K. adopted villages had a frequent contact with the K.V.K. and other agencies therefore most of them belong to high level of extension contact group. Deshmukh *et al.* (2007)<sup>[4]</sup> reported that majority of respondents (79.51) had medium extension contact while 13.88% had high and 6.59% had low level of extension contact.

**2. Sources of information:** Set of eleven information sources were identified including- Mass media, Group discussion and personal interest to seek information based on the data obtained the beekeepers were divided into three categories for use of information sources regarding beekeeping. Data suggested that 67.75% of beekeepers belong to low level use of information sources only 13.00% used the maximum available sources for getting the information beekeepers of K.V.K. adopted village relatively more aware about obtaining the information sources ( $r = 0.431$ ). While it were negatively correlated with the age ( $r = 0.401$ ), those beekeepers used maximum sources of information posseses good knowledge of bee pests ( $r = 0.358$ ) and economic status ( $r = 0.331$ ). Leuthoid and Kennedy (1976)<sup>[9]</sup> concluded that the leading type of mass media used most essential personal sources of information were other beekeepers and their own observations. The apiary inspectors were important for a fair number of beekeepers, whereas cooperative extension service agents and dealers were of lesser significance, particularly at the persuasion or decision for new technological innovations.

## Conclusion

The overall result indicated that majority of beekeepers were belong to age group of 30 to 50 years and educated up to high school (13%). Caste had no effect on adoption of beekeeping although the percentage of beekeepers belong to general categories (55%) but it were the reflection of caste ratio existed in the study area, size of the family were medium 47.5% having 5-10 members in a family, social participation were 57.50%. As far as the socio economic status of beekeepers were concern the maximum beekeepers 55.05% adopted beekeeping along with the farming and 37.5% beekeepers had Rs.18, 000 -40, 000/- annual income and

medium land holding (47.5%). About the knowledge of beekeeping only 21.9% beekeepers had a high level knowledge about beekeeping practices. The low level of knowledge of beekeeping were probably due to low level of Cosmo politeness among the majority (68.8%) of the beekeepers due to higher percentage of low medium (31.5%) and medium (46.6%) level of knowledge about beekeeping and the scientific orientation of the beekeepers were also low in majority of them (61.8%). Threshed out result regarding communication skill of the beekeepers suggested that there were higher percentage of beekeepers in Morena district. Those belong to low level of extension contact (65.08%) and low level of use of information sources (67.75%).

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