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Relationship of Socio-Personal, Economic and Communicational Variables of Trained and Untrained Beekeepers with Knowledge of Beekeeping Entrepreneurial Development Training Program

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Abstract

Knowledge of an innovation is requisite for its successful adoption. It is an essential requirement for occupational socialization of entrepreneurs as it forms the basis for action preceding the act of adoption. The aspect of the study was to find out relationship of socio-personal, economic and communicational variables of trained and untrained beekeepers with knowledge of beekeeping entrepreneurial development training program. Maximum percentage of trained beekeepers were of middle age group and medium level of education, belonged to nuclear family, had medium family size, small land holding, farming occupation and medium family income. They had medium cosmopoliteness and were member of one organization, possessed milch animal, had medium innovation proneness, medium economic motivation, were high management orientation and high risk taking ability. Most of the untrained beekeepers were of middle age group, low level of education, belonged to joint family, had large family size and landless, farming occupation and medium family income. Further, they had low cosmopoliteness, low innovation proneness, low economic motivation, low management orientation, low risk taking ability and did not possess any animal and membership of any organization. For trained beekeepers, the variables viz. education, size of holding, occupation, family income, cosmopoliteness, social participation, animal possession, innovation proneness, economic motivation, management orientation and risk orientation were found to be positively and significantly correlated with the level of knowledge about beekeeping practices whereas incase of untrained beekeepers, the variable education, occupation, family income and cosmopoliteness were significantly and positively correlated with the level of knowledge about scientific beekeeping enterprises. The results thus indicates that beekeeping entrepreneurial training is an effective medium for increasing knowledge, changing attitude, inoculating necessary skills and enhancing decision making ability to adopt the technology.

Key words : Trained beekeepers, Untrained beekeepers, Knowledge, Socio-personal, Economic variables.

Beekeeping is ecologically sound, economically viable and socially acceptable enterprise. By assuring a stable occupation and source of income to rural people, it holds great promise to raise their standard of living, promote their economic independence and boost up their socio-economic status. Beekeeping is an enterprise which can be practiced by any one irrespective of sex, age, religion, caste and education. It is a non-land based activity which does not exert any pressure on agricultural land for raw materials and also does not compete with other resources of farming system. Beekeeping industry also offers many other important products like royal jelly, pollen, bee venom, bee wax and propolis. It can be sideline, subsidiary, semi-commercial or commercial business. In developing countries, it can be used in rural development programs designed to increase the income not only individuals but also of the group and thus has great potential in raising the economic and social status of rural communities. However, lack of education and training, remoteness, poverty and lack of apicultural traditions are hindrances in the development and promotion of beekeeping technology in these countries. People engaged in traditional beekeeping be motivated to adopt modern beekeeping by providing technical guidance, financial support and regular follow-up. Adequate manpower to be developed at village, block and district level for effective training at regular interval. Beekeeping entrepreneurs lack knowledge and awareness about scientific beekeeping enterprise. They do not have access to training through which they can increase their knowl-

Table 1. Socio-personal, economic and communicational characteristics of trained and untrained beekeepers.

Characteristics	Trained Beekeepers (n=80) f	%	Untrained Beekeepers (n=80) f	%	Total Beekeepers (n=160) f	%
Age						
Young (below 36 years)	26	32.5	23	28.7	49	30.9
Middle age (36—50 years)	42	52.5	37	46.3	79	49.4
Old age (above 50 years)	12	15	20	25	32	20
Education						
Illiterate	4	5	28	35	32	20
Low (up to 2)	17	21.3	31	38.75	48	30
Medium (3–4)	47	58.8	18	22.5	65	40.65
High (5–6)	12	15	3	3.75	15	9.375
Family Type						
Nuclear family	42	52.5	33	41.25	75	46.87
Joint family	38	47.5	47	58.75	85	53.12
Family Size						
Small (up to 5 members)	25	31.3	16	20	41	25.62
Medium (6—9 members)	32	40	30	37.5	62	38.75
Large (10 and above)	23	28.8	34	42.5	57	35.62
Size of Holding						
Landless	5	6.3	37	46.25	42	26.25
Marginal (upto 2.5 acre)	22	27.5	36	45	58	36.25
Small (2.6 to 5 acre)	35	43.8	7	8.75	42	26.25
Medium (5.1 to 10 acre)	18	22.5	0	0	18	11.25
Occupation						
No work	10	12.5	11	13.75	21	13.12
Agricultural Labour	24	30	30	37.5	54	33.75
Farmer	39	48.75	36	45	75	46.87
Services	7	8.75	3	3.75	10	6.25
Business	0	0	0	0		
Family Income						
Low (1)	3	3.8	18	22.5	21	13.13
Medium (2 and 3)	59	73.8	59	73.8	118	73.75
High (4)	18	22.5	3	3.8	21	13.13
Cosmopoliteness						
Low (upto 10)	16	20	48	60	64	40
Medium (11—20)	41	51.2	32	40	73	45.63
High (21—31)	23	28.8	0	0	23	14.38
Social Participation						
No member of any organization (0)	16	20	69	86.25	85	53.13
Member of one organization (0)	38	47.5	11	13.75	49	30.63
Member of more than one organization (2)	26	32.5	0	0	26	16.25
Animal Possession						
No animal	29	36.25	55	68.75	84	52.5
Milch animal	30	37.5	19	23.75	49	30.63
Milch as well as draft animal	21	26.25	6	7.5	27	16.88

Table 1. Continued.

Characteristics	Trained Beekeepers (n = 80) f	%	Untrained Beekeepers (n = 80) f	%	Total Beekeepers (n = 160) f	%
Innovation Proneness						
Low (1—4)	0	0	59	73.75	59	36.87
Medium (4.1—7)	42	52.5	21	26.25	63	39.37
High (7.1—9)	38	47.5	0	0	38	23.75
Economic Motivation						
Low (1—4)	0	0	53	66.25	53	33.73
Medium (4.1—7)	42	52.5	27	33.75	69	43.13
High (7.1—9)	38	47.5	0	0	38	23.75
Management Orientation						
Low (1—30)	0	0	45	56.25	45	28.13
Medium (30—60)	28	35	35	43.75	63	39.37
High (60—90)	52	65	0	0	52	32.5
Risk Orientation						
Low (upto 13)	0	0	54	67.5	54	33.75
Medium (14—26)	33	41.2	26	32.5	59	36.87
High (27—40)	47	58.8	0	0	47	29.37

edge to keep pace with the changing rural agricultural scene.

Adoption of scientific beekeeping enterprise is governed by several socio-personal, economic and communicational characteristics of trained and untrained beekeepers and relationship of these attributes with knowledge of beekeeping entrepreneurial development training program. However, all these attributes of trained and untrained beekeepers and their relationship with knowledge of beekeeping entrepreneurial development training program have not been studied together sufficiently in the past. In extension, limited number of researches are available to assess the characteristics, particularly about the trained and untrained beekeeping entrepreneurs and their relationship with knowledge regarding scientific beekeeping enterprise. Keeping this in view, the present study was carried out with the objective to analyze the profile of trained and untrained beekeeping entrepreneurs and their relationship with knowledge of beekeeping entrepreneurial development training program.

Methods

The present study was conducted in four selected blocks of Samastipur and Muzaffarpur districts.These are Pusa and Kalyanpur from samastipur district and Mushari and Muraul from Muzaffarpur district. Then, from each blocks, two villages making a sample of eight villages were selected by random sampling techniques. A sample of 80 trained beekeeping entrepreneurs were selected from four experimental villages and 80 untrained beekeeping entrepreneurs were from other four control villages in order to avoid interactional and diffusional effect. Thus, a total sample of 160 beekeeping entrepreneurs were selected as respondents for field investigation.

A well structured interview schedule for assessing the socio-personal, economic and communicational characteristics of trained and untrained beekeeping entrepreneurs and their relationship with knowledge of beekeeping entrepreneurial development training programme were administered. The data collected through interview was tabulated and analyzed using frequency, percentage and correlation value.

Results and Discussion

The frequency and percentage distribution of

Table 2. Relationship of socio-personal, Economic and communicational variables of trained and untrained beekeepers with knowledge about beekeeping entrepreneurial development training program. * 5% level of significance, **–1% level of significance.

Characteristics	Value of Correlation Coefficient	
	Trained beekeepers	Untrained beekeepers
Age (X_1)	– 0.4316**	– 0.1360
Education (X_2)	0.7726**	0.3082*
Family type (X_3)	0.0083	– 0.2055
Family size (X_4)	–0.2721	– 0.1199
Size of holding (X_5)	0.5926**	0.2528
Occupation (X_6)	0.3757**	0.2887*
Family income (X_7)	0.6321**	0.3859*
Cosmopoliteness (X_8)	0.8352**	0.3234*
Social participation (X_9)	0.7805**	0.1284
Animal Possession (X_{10})	0.6288**	0.1392
Innovation proneness (X_{11})	0.8170**	0.1989
Economic motivation (X_{12})	0.8871**	0.1665
Management orientation (X_{13})	0.8532**	0.2280
Risk orientation (X_{14})	0.8554**	0.1807

trained and untrained beekeeping entrepreneurs for each selected independent variables are presented below.

Age

On the basis of their age, the entrepreneurs were classified into three age groups viz. young (below 36 years), middle (36—50 years) and old age (above 50 years). In trained beekeeping entrepreneurs, 52.5% of respondents were of middle age group followed by young (32.5%) and old age group (15%) respondents. While in untrained beekeeping entrepreneurs, the maximum percentage of entrepreneurs were of middle age group i.e. 46.3% followed by entrepreneurs of young (28.7%) and old age group (25%). It indicates that the young and middle age entrepreneurs were more exposed to scientific beekeeping enterprise as they were more receptive of new ideas with less bondage for tradition as found in old age entrepreneurs.

Education

Table 1 reveals that majority of the trained beekeeping entrepreneurs attained medium level of education (58.8%) followed by 21.3% having low level of education. On the other hand, a relatively large percentage of untrained beekeeping entrepreneurs (38.75%) were having low level of education followed by illiterate and medium level of education.

Family Type, Size, Income and Occupation

Table 1 shows that compared to 52.5 and 47.5% of trained beekeeping entrepreneurs, only 41.25 and 58.75% of untrained beekeeping entrepreneurs were having nuclear family and joint family. In trained beekeeping entrepreneurs, 40% of entrepreneurs belonged to medium family size and 31.3% constituted small family size. While 42.5% of untrained beekeeping entrepreneurs belonged to large family size followed by 37.5% that constituted medium family size. About three-fourth of the trained beekeeping entrepreneurs (73.8%) belonged to medium income group followed by high income group (22.5%) whereas majority of the untrained beekeeping entrepreneurs (73.8%) belonged to medium income group followed by low income group (22.5%). In trained beekeeping entrepreneurs, 48.75% of entrepreneurs were farmers followed by agricultural labor (30%), had no work (12.5%) and doing service (8.75%). While in untrained entrepreneurs, the maximum percentage (45%) of entrepreneurs were farmers followed by agricultural labor (37.5%), 13.75 percent had no work and 3.75% service holder. Majority of the trained beekeeping entrepreneurs were having small land holding followed by marginal, medium and landless. But in untrained, majority of entrepreneurs were landless entrepreneurs followed by marginal and small entrepreneurs.

Social Participation

Among trained beekeeping entrepreneurs, 20% of entrepreneurs had no involvement in any social government institutions and 47.5 and 32.5% entrepreneurs were members of one organization and more than one organization respectively. Majority of untrained beekeeping entrepreneurs (86.25%) were not members of any organization followed by members of one organization.

Animal Possession

In trained beekeeping entrepreneurs, 37.5% entrepreneurs had milch animals, 36.25% had no animal and 26.25% entrepreneurs had milch and draft animals. While untrained entrepreneurs, 23.75% entrepreneurs had milch animal, 68.75% had no animal and 7.5% entrepreneurs had milch as well as draft animals.

Cosmopoliteness Innovation, Management, Motivation, Risk Orientation

The maximum percentage of trained beekeeping entrepreneurs had medium (51.2%) cosmopoliteness followed by the high (28.8%) and low (20%) level (Table 1). Most of untrained beekeeping entrepreneurs (60%) had low cosmopoliteness followed by the medium (40%) level of cosmopoliteness. Both the categories of entrepreneurs differed with respect to cosmopoliteness. The beekeeping entrepreneurial training might have helped in developing cosmopoliteness in the trained entrepreneurs. As the trained entrepreneurs established close linkage with various information source viz. mass media, personal cosmopolite and personal localite, their knowledge level was higher. Trained entrepreneurs who have utilized various sources of information and have large contact with university scientists and subject matter specialists, have higher rate of adoption of enterprise.

Innovation proneness develops awareness, interest leading to evaluation, trial and finally adoption of a enterprise. Among trained beekeeping entrepreneurs, 52.5% entrepreneurs had medium innovation proneness and only 47.5% had high innovation proneness. The entrepreneurs under low innovation proneness were found to be nil. While in untrained beekeeping entrepreneurs, 26.25% had medium innovation proneness and 73.75% had low innovation proneness. There were no entrepreneurs having high innovation proneness. Trained entrepreneurs having more innovation proneness would have more interest and desire to seek changes in enterprise technique and to introduce practical and feasible changes in his own operation.

Among trained beekeeping entrepreneurs, 65% entrepreneurs had high management orientation followed by 35% had medium management orientation. On the other hand, 43.75% untrained entrepreneurs had medium management orientation followed by low management orientation capacity (56.25%). Thus trained beekeeping entrepreneurs possessing better management orientation capacity had higher level of adoption of enterprise.

For trained beekeeping entrepreneurs, 52.5% entrepreneurs had medium economic motivation and 47.5% had high economic motivation, whereas 33.75% of untrained beekeeping entrepreneurs had medium and 66.25% had low economic motivation.

Risk orientation means willingness of entrepreneurs to take risk and face uncertainty in making innovation decision involved in the adoption of enterprise. In trained beekeeping entrepreneurs, 58.8% entrepreneurs had high risk orientation capacity and only 41.2% had medium risk orientation capacity. On the other hand, for untrained entrepreneurs, 32.5% had medium risk orientation capacity and 67.5% had low risk orientation capacity.

Relationship of Socio Personal Economic and Communication Variables with Beeking

Knowledge of an innovation is requisite for its successful adoption. It is an essential requirement for occupational socialization of entrepreneurs as it forms the basis for action preceeding the act of adoption. The correlation of the selected socio-personal, economic and communicational characteristics with level of knowledge of trained and untrained entrepreneurs is given in Table 2.

Trained Beekeepers. The variable viz., education, size of holding, occupation, family income, cosmopoliteness, social participation, animal possession, innovation proneness, economic motivation, management orientation and risk orientation were found to be positively and significantly correlated with the level of knowledge about beekeeping practices of trained entrepreneurs (Table 2). However, the variable age was negatively but significantly correlated with level of knowledge. The other variables viz. family type and family size were not found to be correlated significantly with level of knowledge about beekeeping entrepreneurial development training.

Age was negatively correlated with level of

knowledge. It means, with increase in age there was decrease in level of knowledge of entrepreneurs. Young entrepreneurs had more level of knowledge as compared to middle and old aged entrepreneurs. Young entrepreneurs are more exposed to modern trend and new ideas with less bondage for tradition as found in middle and old age entrepreneurs who were brought up in old ideas. This situation might had compelled the young entrepreneurs to learn more of new technology. So, emphasis should be given to young entrepreneurs in effective entrepreneurial training programs for rapid diffusion, popularization and saturation of new technology in the community.

Education is key to success. Educated entrepreneurs are more likely to have keen interest of acquiring the knowledge of the latest scientific beekeeping technology. Therefore, assuming that higher is the education of a entrepreneur, higher would be the knowledge of scientific beekeeping technology. Thus this variable was highly correlated with the acquisition of knowledge of scientific beekeeping technology. The findings of Pal (1970), Sharma and Dey (1970), Samasundram and Singh (1978), Mishra and Sinha (1981) and Nigam (1995) also revealed a positive and significant correlation between education and level of knowledge.

Cosmopoliteness was found to have significant and positive correlation with impact of entrepreneurial training (level of knowledge). Therefore, the entrepreneurs having more sources of information about beekeeping technology had frequent contact with beekeeping scientists and other personnel to have more knowledge as compared to untrained entrepreneurs who utilize fewer sources and had less contact with such extension agencies. Adoption of an innovation is function of contact with the information sources. This indicates that training program on beekeeping had played a significant role in developing cosmopoliteness in trained beekeepers. This finding is in conformity with the findings of Samasundaram and Singh (1978) and Jha (1978).

A significant and positive correlation was found between innovation proneness and level of knowledge. Entrepreneurs having more innovation proneness would obviously have more interest and desire to seek changes in their techniques. This might have compelled the trained entrepreneurs to increase their level of knowledge about beekeeping technology. Management orientation was found to be positively and significantly correlated with level of knowledge. Management in farming situation means how well a farmer organizes and utilizes the resources at his disposal to obtain a good produce and a good price by intelligent marketing. Trained entrepreneurs had high management orientation capacity towards scientific bee management, comprising of planning, production and marketing functions.

Size of holding and occupation were also expected to increase interest among the entrepreneurs to gain more knowledge about scientific honey production technology because larger is the farm size and income, greater would be the ability to take risk and this risk taking ability, in turn, would motivate the entrepreneurs to acquire intensive knowledge of scientific beekeeping technology. There was highly significant relationship of land holding size with knowledge of scientific beekeeping technology. One cannot ignore the importance of income in modern technology. The entrepreneurs total income indicates their investment potential. The new technology is input oriented and these inputs are costlier. The optimum and timely procurement of these inputs are also essential. It is assumed that the entrepreneurs having higher income would show greater degree of interest in acquiring the knowledge of scientific practices. This finding was supported by Trigged (1963), Singh et al. (1985), Singh (1987) and Verma (2003) who reported positive and highly significant relationship between family income and knowledge about scientific beekeeping practices.

Economic motivation was found to have significant and positive correlation (at 1% level of significance) with level of knowledge about beekeeping practices. This is probably due to the will of the entrepreneurs to get maximum benefit from the enterprise and hence the trained entrepreneurs had become more receptive towards new innovations to fulfill their desire and hence their knowledge level also increased. Till the entrepreneurs are motivated (for profit maximization) he cannot see the need for increasing their production. This finding is in conformity with Sethy et al. (1984), Shailaja et al. (1996) and Senthamarai (1997). Entrepreneurs taking more risk to get maximum production adopt more technologies. This study supports the view that readiness to take risk is positively and significantly related with acquiring the

knowledge of scientific beekeeping practices. The finding is in conformity with the findings of Mahipal (1983), Singh (1987), Nataraju and Channegowda (1987), Prabhu et al. (1990), Deolankar (1993) and Manker et al. (1998).

Social participation and animal possession were found to be significantly and positively correlated with level of knowledge about beekeeping entrepreneurial training. Participation in various organizations changes the outlook of entrepreneurs and it may influence the behavioral components of entrepreneurs. Animal possession indicates sound financial status of the entrepreneurs which motivate them to acquire more knowledge and to adopt new technology. This finding is in line with the findings of Singh et al. (1985), Singh et al. (1988), Singh et al. (2000) and Verma (2003).

Untrained Beekeepers. The variables viz., education, occupation, family income and cosmopoliteness were found to be positively and significantly correlated with the level of knowledge of untrained entrepreneurs about scientific beekeeping enterprise. However, the age, family type and family size were negatively and non-significantly correlated with level of knowledge. The other variables viz., size of holding, social participation animal possession, innovation proneness, economic motivation, management orientation and risk orientation were non-significant with the level of knowledge of beekeeping technologies of untrained entrepreneurs.

Education was found to have significant and positive correlation of with level of knowledge. With increase in education, there was increase in level of knowledge of beekeeping enterprise of untrained entrepreneurs. Education develops inquisitiveness and inclination to know and understand more of technical know- how. Such behavior of education has also influenced the untrained entrepreneurs in attaining the level of knowledge of enterprise. Cosmopoliteness was found to have significant and positive correlation (at 5% level of significance) with level of knowledge. The untrained entrepreneurs, although could not receive formal training but they had frequent contacts with voluntary organizations and fellow beekeepers to have more knowledge. The finding is in conformity with the finding of Saha (1973), Katarya (1980), Katarya (1989) and Kumar (2002).

Conclusion

Maximum percentage of trained beekeeping entrepreneurs were of middle age group (52.5%) and medium level of education (58.8%), belonged to nuclear family (52.5%), had medium family size (40%), small land holding (43.8%), farming occupation (48.75%) and medium family income (73.8%). Further, they had medium cosmopoliteness (51.2%) and were member of one organization (47.5%), possessed milch animal (37.5%), had medium innovation proneness (52.5%), medium economic motivation (52.5%) were high management orientation (65%) and high risk taking ability (58.8%). Most of the untrained beekeeping entrepreneurs were of middle age group (46.2%), low level of education (38.75%), belonged to joint family (58.75%), had large family size (42.5%) and landless (46.25%), farming occupation (45%) and medium family income (73.8%). However, they had low cosmopoliteness (60%), low innovation proneness (73.75%), low economic motivation (66.25%), low management orientation capacity (56.25%), low risk taking ability (67.5%) and did not possess any animal and membership of any organization. The variable viz. education, size of holding, occupation, family income, cosmopoliteness, social participation, animal possession, innovation proneness, economic motivation, management orientation and risk orientation were found to be positively and significantly correlated with the level of knowledge about beekeeping practices of trained entrepreneurs. In untrained beekeepers, the variables viz. education, occupation, family income and cosmopoliteness were found to be positively and significantly correlated with the level of knowledge about scientific beekeeping enterprise.

References

Deolankar. 1993. Profile of entrepreneur development. *Yojana* 37 : 13—15.

Jha R. S. 1978. *Socio-economic, psycho-personal and communicational characteristics of small farmers.* M. Sc. (Ag.) thesis. Div. Agric. Extn. BAC, Sabour, India.

Katarya J. S. 1980. *A study on the impact of farmers training center and Krishi Vigyan Kendra in relation to change in farm technology in Haryana state.* Ph. D. thesis. Ag. Ext., IARI, New Delhi, India.

Katarya J. S. 1989. Association of farmers characteristics

with adoption of wheat technology. *Indian J. Ext. Edn.* 25 : 117—120.

Kumar R. 2002. *A study of selected factors associated with adoption of boro rice production technology.* M. Sc. thesis, Ext. Edn., R. A. U., Pusa, Bihar, India.

Mahipal. 1983. *A study of socio-economic and psychological correlates in adoption of dairy innovation in the ORP area of NDRI, Karnal*. Ph. D. thesis. Karnal, India.

Manker S. A., S. N. Rajput and G. S. Gawande. 1998. Attributes of cotton variety AKH-848635 influencing its adoption. *Maharashtra J. Ext. Edn.* 17 : 11—14.

Mishra S. P. and B. P. Sinha. 1981. Socio-economic correlates of technological knowledge of farm enterprises. *Indian J. Ext. Edn.* 14 : 54—63.

Nataraju M. S. and M. B. Channegowda. 1987. Socio-economic characteristics of dairymen in relation to their extension participation. *Ind. J. Ext. Edn.* 23 : 36—41.

Nigam S. 1995. Women entrepreneurship : Profile problem and prospects in India—A review analysis. *SEDME* 4.1 and 4.2 : 29—41.

Pal R. S. 1970. *A critical study of farmer's training and education to the changes in their behavioral component, New Delhi, IARI.* Ph. D. thesis. IARF, New Delhi, India.

Prabhu M. K., Krishna and K. Kundan Chandra. 1990. A study of knowledge level of farmers towards soil conservation practices. *Indian J. Ext. Edn.* 26 : 86—88.

Saha N. 1973. Adoption problems of small farmers. *Kurukshetra* 21 : 10—11.

Senthamarai G., M. Mandharan and J. J. Paul Man Singh. 1997. Socio-personal and psychological characteristics of farm women. *J. Ext. Edn.,* 8 : 1607—1608.

Sethy B., B. P. Sinha and R. Bahal. 1984. Some entrepreneurial characteristics in adoption of an improved farm technology. *Indian J. Ext. Edn.* 20 : 26—31.

Shailaja S., G. Sobhana and Jayalekshmi. 1996. Comparison of personal socio-psychological factors and entrepreneurial behavior of rural women. *Maharashtra J. Ext. Edn.* 15 : 115—120.

Sharma S. K. and P. K. Dey. 1970. Relative effectiveness of radio and television as mass communication media in dissemination of agricultural Information. *Indian J. Extn. Edn.* 6 : 62—67.

Singh Balkishan, Mahipal and K. C. Tyagi. 1988. Adoption behavior and psychological characteristics of dairy farmers. *Dairy Guide* 10 : 41—45.

Singh Balkishan, Mahipal and K. C. Tyagi. 1985. Some selected socio-personal economic characteristics of the farmers of progressive and non-progressive dairy village.*Dairy Guide* 21 : 101—103.

Singh M., N. C. Verma, A. K. P. Singh and S. Sinha. 2000. Contribution of socio-personal and economic variables on the extent of participation of women in agriculture, allied and household activities. RAU *Jo. Res.* 10 : 140—143.

Singh U. P. 1987. *A study of ability, willingness, knowledge and adoption behavior of different categories of farmers in relation to scientific rice production technology in siwan district of north Bihar.* M. Sc. (Ag.) thesis. Dep Extn. Edn., RAU, Pusa, Bihar, India.

Samasundaram D. and S. N. Singh. 1978. Factors affecting the knowledge of adopter and non-adopter small farmers. *Indian J. Ext. Edn.* 14 : 29—30.

Trigged G. 1963. *Measurement and analysis of socio-economic status of rural families.*Ph. D. thesis. IARA, New Delhi, India.

Verma J. P. 2003. Effectiveness of training program for farmers. *Kurkshetra* 51 : 49—52.