
PREDICTION OF NET RETURNS FROM APPLE (*MALUS DOMESTICA BORKH.*) IN KASHMIR FROM SOME AGRO-ECONOMIC AND SOCIO-PERSONAL CORRELATES

*S. K Acharjee**, *W. Qadri*** and *A. Haque****

Introduction

The horticultural sector has established its credibility for augmenting the productivity of land, generating employment and, above all, providing nutritional security especially for those who need it the most production and management of apple in Kashmir has gone imbued. A mix of traditionally and modernity breeds on vacillating and hesitating approach in ensuring application of modern but risk prone, diverse but complex package of practice.

That is why the management of resource and technology in apple production merits a sincere and meticulous enquiry in the unique situation of Kashmir.

Sikka and Swarup (1978) found investment on apple to be profitable and financially variable proposition. Wani *et al* (1998) found that pesticide and human labour were being irrationally used by apple growers in Kashmir. Mishra (1996) reported a low level of extension effectiveness in Kashmir. **The general objective of the study was to predict the net return from apple from some agro-economic and socio-personal correlates.** In the process while the consequent variable was the net returns per unit area per unit time, the antecedent variables were age of the respondent, family size, family education, social interaction, media exposure, knowledge level, land holding size, area under field crops, irrigation use index, cropping intensity,

* *Reader, Department of Agricultural Extension, Bidhan Chandra Krishi Viswavidyalaya, Mohanpur, Nadia, West Bengal*

** *M.Sc (Ag), in Agricultural Extension, Bidhan Chandra Krishi Viswavidyalaya, Mohanpur, Nadia, West Bengal*

*** *Professor, Dept. of Agricultural Extension, Bidhan Chandra Krishi Viswavidyalaya, Mohanpur, Nadia, West Bengal*

yield from the major field crop, returns from other enterprises, animal resource, value of the forestry, area under apple, distance from home, age of the orchard, the cost of production, implement possession and value of the orchard shed.

Methodology

Pattan block of District Baramulla was selected as the location of the study. A list of 45 villages of the block was prepared from which 12 were selected following random sampling method. From these villages an exhaustive list of 232 apple growers was prepared. In selecting the respondents two criteria were applied:

1. That the growers owned and managed their own apple orchards, and
2. That the age of the orchards was more than 20 years.

Following a random number sampling method 100 respondents were ultimately selected for the study.

The analytical framework of the study included statistical tools like linear correlation, multiple regression analysis, path analysis and principal component analysis (factor analysis).

Results and Discussion

Table-1 presents the coefficients of correlation between productivity of apple and the twenty antecedent variables.

It was found that the variables average family education, media exposure and cost of production were positively and significantly correlated with the variable, net returns from apple.

Family education was positively and significantly correlated with the net returns. The very nature of the family process generally goes interactive, collective and sharing. Education in a family becomes actional in collective terms since mutual learning is the very integral part of any family life process. Family education, thus, had got a role in increasing the managerial efficiency of the entrepreneurial family.

Table 1. Coefficients of correlation between the consequent variable, net returns and the twenty antecedent variables

Variables		Correlation coefficient
Age of respondent	(X ₁)	- 0.2461*
Family size	(X ₂)	- 0.2699**
Average family education	(X ₃)	0.4312**
Social interaction	(X ₄)	0.0519
Media exposure	(X ₅)	0.2870**
Knowledge level	(X ₆)	0.1513
Land holding size	(X ₇)	0.0684
Area under field crops	(X ₈)	- 0.3161**
Irrigation use index	(X ₉)	- 0.2113*
Cropping intensity	(X ₁₀)	- 0.2291*
Yield of major field crop	(X ₁₁)	- 0.2755**
Returns from other fruit enterprises	(X ₁₂)	0.1601
Worth of animal resource	(X ₁₃)	- 0.1326
Value of forest trees	(X ₁₄)	- 0.0505
Area under apple	(X ₁₅)	0.1576
Distance from home	(X ₁₆)	- 0.1562
Age of orchard	(X ₁₇)	0.1873
Cost of production	(X ₁₈)	0.2229*
Implements possession	(X ₁₉)	- 0.0627
Value of orchard shed	(X ₂₀)	- 0.1170

* Significant at 5 percent

** Significant at 1 percent

Media are the provider of information about the 'greater world', about how to make a livelihood: improved, diverse and effective. In an era of information booming media are the important vehicle to get the technologies right into the need of the grass-root people. Rightly here, the variable, media exposure had shown a significant correlation with the productivity.

respondents were selected randomly from the Chattarpur village of Rudrapur Block, Distt, Udham Singh nagar. The data on farmers' preferences on wall newspapers were collected through focus group discussion. A modified version of pretest ion method developed by modi(1991) was used to collect farmers' reactions.

Findings:

Maximum number of the respondents were of middle age (42.80%), low cast (45.71%), neo - literates(28.57%), small farmers (28.52%) and low income group (40.00%) had only farming as occupation and possessed television (88.57%) and know two languages (51.43%). Only 37.14. Percent of the respondents were subscribing to newspapers/ magazines/books. As regards preference of mass media, a majority of the respondents preferred TV(97.14%)followed by film (88.57%) and vewspapers/magazines/ books(57.14%).

Problems Faced:

The main problems faced by the villagers were categorized into personal, social and agricultural. Regarding personal problems, half of the respondents reported credit followed by price rise (40%) and unemployment (24.28%).

Among social problems, an overwhelming majority (97.14%)reported drainage in the village followed by lack of facilities in the veterinary hospital (42.86%) and village school (15.17%). Regarding agricultural problems, majority reported increase in input and labor cost (85.71%)followed by exploitations by commission agents (41.43%), as well as pests/diseases/ weeds (18.57%).

The farmer' preferences on content, format, treatment and related aspects of wall newspaper based on focus group discussion were ascertained.

Farmers' Preferences:

Majority of the participants expressed the need for village newspaper. Old participants preferred a simple and easy to handle wall newspaper.

The young and middle aged participants wanted information on agricultural problems, new agricultural implements, market prices of food grains, storage and processing of paddy and ways to reduce labor cost. They also preferred 24 point size for head line, 18 points for the texts / colored photographs, line drawing, illustrations of 20 cmx20cm size paper of 82.5x90cm and 'Hamara Gaon' as title of the paper. The participants preferred news items, news stories/ article (success stories) on progressive farmers, poems, jokes and cartoons. The consensus of the participants was that the newspaper should be displayed at various places viz: pinhead Office, Post Office, Cooperatives, School Honey-bee Training Center, Agricultural Store, Temple and Shop.

Farmers' reactions:

Almost all the respondents expressed that the wall newspaper was good looking. A vast majority (80.00%) found that the pictorial symbols are easy to decode. The content was easy to understand as reported by half of the respondents. Majority of the respondents perceived the method of presentation as good, information was complete and suggested the inclusion of news items on agriculture and animal husbandry and use of simple languages.

Conclusion:

On the basis of the results obtained from this study, it may be concluded that participatory approach towards message design can be used for designing wall newspaper. The responses of the groups of farms provided important clues to the feasibility of implementing the approach. Despite of a good communication infrastructure, the mass media did not cater the information needs of the farmers. Adequate local talents are available in the village to write and illustrate the wall newspaper.

TECHNOLOGICAL NEEDS OF WOMEN IN DAIRYING

*K.Umarani **

Rural women, who constitute nearly 77% of the total female population of the country, play an important role in agriculture and animal husbandry besides the household responsibilities. Agarwal (1987) reported that the involvement and participation of rural women were more in animal husbandry than in agriculture. It is true that a nucleus of dairy unit more or less exists as a traditional component in every rural household as a source of draught power or nutritional substance for the family, or a secondary source of income. Venkatachalam (1993) and Sethi (1991) expressed that almost 80-90 per cent of the total work related to cattle care is performed by women. In many places the entire management of livestock, starting from cutting, collection, carrying and chaffing of fodder to feeding and milking, preparation of milk products, cleaning of cattleshed, collection of cowdung to the manure pits, preparation of cowdung cakes and their storage was done by women (Achanta, 1982).

In addition to these roles, women also play an equally important role in decision making regarding number of milch cattle to be kept, feeding of milch cattle, purchase of cattle feed, place of keeping animals in summer and cold season and selling and buying new cattle. Keeping in view the significant contributions made by women to the dairy sector, the present study was undertaken with the following objectives.

Objectives

1. to examine the awareness of women about the technologies related to dairying.
2. to find out the technological needs of women in dairying and
3. to find out correlation between the socio-personal factors and technological needs of women in dairying.

* *Faculty, National Institute of Agricultural Extension Management, Rajendranagar, Hyderabad – 500 030.*

Methodology

The study was conducted in three randomly selected villages from three different mandals under Ranga Reddy district of Andhra Pradesh. From each of the selected villages a total of twenty farm households having milch cattle were selected randomly. One woman member of the family was interviewed for the study thus making the total sample sixty. A well-structured interview schedule was used along with focused group discussion for collecting the information. To find out the awareness about dairy technologies, the practices of the respondents were compared with the package of practices recommended for dairy. If the practice of the respondents was matching or at least close to the recommended practice it was considered as 'awareness' otherwise as 'no awareness'. The data were analyzed using percentages. To find out the technological needs of the respondents in dairy, rank order method was followed by working out the mean scores for each of the item under package of practices. To find out the relation between the socio-personal factors and technological needs of the respondents in dairying, simple correlation coefficient was worked out.

Percentage of respondents aware of the technologies related to dairy are given in table-1

Mostly Jersey and Murrah breeds were reared by the respondents. Awareness about the balanced diet, feed requirement of young stock, heifer and milch animals was found to be very low. Though 69.6 per cent of respondents were aware of the care of newly born calf, they were having a misconception that feeding colostrum would cause indigestion to the calf. Regarding the care of pregnant animal, 83.9 per cent of the respondents were aware of the practices recommended except the diet requirements. It was learnt that the cattle sheds were cleaned with water once in three days or a week, but no disinfectant was used. Health and sanitation practices were followed by 73.2 per cent of the respondents as per the doctor's advise. Dehorning was not in practice. These results are in confirmation with the results of Arora S.K. *et al* (1995).

Technological needs of respondents in dairying are presented in the following table.

Table - 1. Awareness about the technologies related to Dairy

Sl. No.	Item	Recommended Practice	Per cent (n = 56)
1.	Breed	Cows-Ongole, Jersey, Buffalo-Murrah, Nili-Ravi	41.1
2.	Feed		
	- Balanced Feed	Green fodder – 30 kgs, Dry fodder - 3 kgs, Concentrate Mixture – 4 kgs (Gram, Brans), Mineral Mixture-60gms, Salt, Clean Water	29.3
	Feed		
	- requirement of young stock	5lts milk + 1.5 kg mixture weight	33.4
	Feed		
	- requirement of heifer	1 kg feed for every ½ kg body weight	23.6
	Feed		
	- requirement of milch animals	2 kgs feed for every kg body weight	15.9
3.	Management		
	- Care at calving	Keep the animal in clean surroundings, avail services of veterinary doctor	50.0
	Care of newly born calf	Clean it with wet cloth, udder to be cleaned with potassium permanganate solutions, within 6-10 hrs after birth allow it to take mother's milk	69.6
	Care of Pregnant animals	Do not make them run or fight with other animals, stop milking after the completion of 7 th month, mix one ounce bone meal and minerals in the feed	83.9
	-Cleanliness of cattlesheds	Cleaning every day and spraying 2% formalin as disinfectant	0.00
	Deworming	20 days after birth deworming should be done	16.1
	Dehorning	12 - 14 days age	0.00
4.	Health and sanitation	Treatment for Haemorrhagic Septicaemia, Black quarter and Foot and Mouth disease by taking the advice of Veterinary doctor	73.2

Table – 2. Rank order of the technological needs of respondents in dairying

S. No.	Subject matter areas	Mean score	Rank order (n=56)
1.	Balanced diet	2.429	I
2.	Health care and sanitation	2.214	II
3.	Care of pregnant animals and new born calf	2.211	III
4.	Right way of milking	2.071	IV
5.	Maintenance of cattle shed	1.964	V
6.	Processing of milk and preparation of milk products	1.946	VI
7.	Rearing of animals	1.895	VII
8.	Cultivation of fodder crops	1.786	VIII

Average mean score...2.065

It could be observed from the above table that the respondents considered balanced diet, health care and sanitation, care of pregnant animals and new born calf and correct procedure of milking as the most important areas of technologies compared to the others. Sushasini (1981), Verma and Singh (1994) also reported that farm women preferred the same areas of training.

The following table gives the correlation between the socio-personal factors and technological needs of the respondents in dairying.

It could be observed from table – 3 that caste and family income had shown negatively significant relationship at 0.05 per cent level with technological needs in dairying. It implies that higher the caste and family income, lower is the degree of technological need of respondents in dairy. Farm experience and participation in animal husbandry had a positively significant relationship at .05 per cent level. It could be inferred that as the farm experience and participation in animal husbandry increases, their desire for knowing technologies related to dairying also increases. The other factors have not shown any significant relationship with the technological needs of the respondents.

Table - 3 Correlation between the socio-personal factors and technological needs of the respondents in dairying.

S.No.	Variables	Dairying
1.	Age	-.1454
2.	Caste	-.3232*
3.	Education	-.0466
4.	Type of Family	-.0421
5.	Size of the Family	-.1619
6.	Category of the respondent	-.0767
7.	Ownership of Land	-.1582
8.	Family Income	-.2188*
9.	Farm experience	.1996*
10.	Participation in agriculture	-.0219
11.	Participation in horticulture	-.0657
12.	Participation in animal husbandry	.2969*

* significant at .05 level, ** significant at .01 level

Conclusion

The study reveals that the respondents were not aware of the importance of proportions of balanced diet. The respondents also consider that balanced diet, health care and right way of milking are some of the important areas of technologies they would like to learn. Hence, it is suggested that short duration training programmes on dairy practices would be useful to the farm women in acquiring the latest technical knowledge and skills with regard to dairying. In addition to training, the women are to be provided with proper institutional services like establishment of milk cooperative, credit and marketing which will enhance their managerial abilities in dairying. Simultaneously, research system should develop specific need based technologies, especially in those segments of dairying in which women are actively contributing.

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The cost of production represented the level of investment. This variable exhibited a direct bearing on the net returns.

The age of the respondent, the family size, the area under field crops, irrigation use index cropping intensity and yield of major field crops recorded significant but negative values for their correlation with the net returns.

The younger growers had gone successful in harvesting better returns. Since the mean age of the respondents was about 52 years, a further rise in their age affected their mobility; a very important trait required in apple entrepreneurship and hence reduced net returns.

Smaller size of the family breeds a greater opportunity for generating investible surplus in a farm family, which may subsequently be utilized in ancillary farm avocations.

It was interesting to note that the variables, area under field crops, irrigation use index, cropping intensity and yield of the major field crop had shown a negative significant bearing on the net returns. Smaller the area under field crops the higher was the net returns. This was not uncommon because more attention would have been paid for orchard management, had there been proportionately a smaller size of land under other crop husbandry. It was also evincing that irrigation use index had contributed inversely to net returns. This could be because, in Kashmir apple is grown on drought resistant rootstock under rain-fed condition and so extracts little utility from irrigation intervention. A lower profile of cropping intensity means higher time and resources to be articulated for orchard management. The other way, while the farmers had been intensive for orchard management, they experienced a poor productivity due to worse management of field crops.

Table-2 presents the regression analysis to delineate the effect of the twenty antecedent variables on net returns. It was found that family education, media exposure, knowledge level, age of the orchard and cost of production had recorded a substantial effect on productivity.

Family education, as discussed earlier, being more intrigued with the family life processes, provides a broad basing of knowledge and enhances managerial efficiency of the entrepreneurial family.

Table 2. Regression analysis: Effects of the twenty antecedent variables on net returns from apple

	Standardized regression coefficient (β)	Partial regression coefficient (b)	Standard error of 'b'	t-value
Intercept constant	-	5.48	1.68	-
Age of respondent (X_1)	0.015	0.001	0.004	0.282
Family size (X_2)	0.150	0.031	0.028	1.090
Family education (X_3)	0.382	0.106	0.051	2.076*
Social interaction (X_4)	- 0.072	- 0.065	0.078	0.814
Media exposure (X_5)	0.366	0.088	0.042	2.116*
Knowledge level (X_6)	0.077	0.029	0.051	1.973*
Land holding size (X_7)	- 0.509	- 0.013	0.016	0.791
Area: field crops (X_8)	- 0.118	- 0.013	0.032	0.404
Irrigation use index (X_9)	- 0.080	- 0.004	0.013	0.288
Cropping intensity (X_{10})	- 0.076	0.003	0.043	0.070
Yield of major field crop (X_{11})	- 0.113	- 0.292	0.237	1.228
Return from other fruit (X_{12})	0.060	0.007	0.065	0.115
Animal resource (X_{13})	0.088	0.004	0.006	0.636
Forest trees (X_{14})	- 0.060	- 0.003	0.003	1.130
Area under apple (X_{15})	0.609	0.017	0.019	0.904
Dist. From home (X_{16})	- 0.110	- 0.038	0.218	0.174
Age of orchard (X_{17})	0.116	0.022	0.012	1.835*
Cost of production (X_{18})	0.204	0.159	0.067	2.381**
Implements possession (X_{19})	0.081	0.175	0.159	1.102
Orchard shed (X_{20})	0.020	0.007	0.008	0.873

$R^2 = 0.4917$ F value for R = 3.59* ** Significant at 5 percent ** Significant at 1 percent

Media exposure goes as a provider of information for a society relatively closed; the impact of media has gone conspicuous and decisive.

Knowledge level indicated the respondents' know-how about orchard management. This enhanced their ability to harvest better returns.

The age of the orchard decides the productivity life of the orchard. Until the age of about 40 years, when the yield starts declining, it goes on adding the bearing space of the trees. In the present investigation, since the mean age of the orchards was about 32 years, this variable contributed substantially to the net returns.

The cost of production is one of the most important considerations to apply and manipulate the essential inputs to organize production. It is the determinate of the extent of external input supply and the exploitation of the internal resources in the effort to achieve maximum returns. This variable, therefore, recorded a significant effect on net returns from apple.

For the rest of the variables the trends are clear but not significant enough to draw a conclusion.

The R^2 value was 0.4917. It was to state that, all the twenty antecedent variables put together, about 50 percent of the variation embedded in the consequent variable, net returns from apple had been explained.

Table-3 presents the path analysis delineating the direct and indirect effect of the exogenous variables on the consequent variable, net returns from apple. It was evinced that the highest positive direct effect on the consequent variable was recorded by the variable, area under apple. The other variables that followed were the media exposure and family education.

The substantial negative direct effects had been due to the variables, land-holding size, and yield from major field crop and area under field crops.

Area under apple represents the scale of production. This suggests its increased role in post-harvest activity, especially, during marketing of the fruit. The large growers were in a position to dictate terms in the market and could evade the chunk being taken away by the market intermediaries and thus earned greater returns. As such, the highest indirect effect of, as many as, eight variables had been articulated through the variable, area under apple.

The residual effect was 0.5083. Thus, the constellation of the twenty antecedent variables together could not explain about 50 percent of the variation in the consequent variable, net returns. This went suggestive to include more number

Table 3. Path analysis of net returns form apple as consequent variable by twenty exogenous variables

Variables	Total effect (r)	Direct effect (β)	Indirect effect (r-β)	Substantial indirect effects					
				I	II	III			
Age of respondent	(X ₁) - 0.2461*	0.0149	- 0.2312	X ₅	- 0.1072	X ₅	- 0.2064	X ₁₅	0.2019
Family size	(X ₂) - 0.2699**	0.1497	- 0.1202	X ₃	- 0.2216	X ₇	- 0.1309	X ₃	- 0.1131
Family education	(X ₃) 0.4312**	0.3815	0.0497	X ₅	0.2207	X ₇	- 0.1990	X ₁₅	0.1944
Social interaction	(X ₄) 0.0519	- 0.0717	0.1236	X ₅	0.1289	X ₁₅	0.1057	X ₇	- 0.0729
Media exposure	(X ₅) 0.2870**	0.3657+	- 0.0787	X ₅	0.1928	X ₂	- 0.1608	X ₁₅	- 0.1036
Knowledge level	(X ₆) 0.1513	0.0770	0.0743	X ₅	0.2282	X ₂	- 0.0569	X ₁₅	0.0540
Land holding size	(X ₇) 0.0684	- 0.5094	0.5778	X ₁₅	0.5773	X ₈	- 0.1169	X ₅	- 0.0829
Area: field crops	(X ₈) - 0.3161**	- 0.1180	- 0.1981	X ₇	- 0.2400	X ₉	0.1052	X ₁₅	- 0.0928
Irrigation use index	(X ₉) - 0.2113*	- 0.0802	- 0.1311	X ₁₅	- 0.2815	X ₇	0.2959	X ₁₁	- 0.1478
Cropping intensity	(X ₁₀) - 0.2291*	- 0.0764	- 0.1527	X ₅	- 0.1849	X ₇	- 0.1095	X ₂	0.1064
Yield : field crop	(X ₁₁) - 0.2755**	- 0.1125	- 0.1630	X ₁₅	- 0.2961	X ₇	- 0.2615	X ₁₅	- 0.1949
Return from other fruit	(X ₁₂) 0.1601	0.0599	0.1002	X ₁₅	- 0.3305	X ₇	- 0.2560	X ₉	- 0.0695
Animal resource	(X ₁₃) - 0.1326	0.0876	- 0.2202	X ₇	- 0.1764	X ₁₅	0.2705	X ₁₅	- 0.0787
Forest trees	(X ₁₄) - 0.0505	- 0.0602+	0.0097	X ₅	0.0722	X ₁₅	- 0.0634	X ₃	0.0347
Area under apple	(X ₁₅) 0.1576	0.6090 +	- 0.4514	X ₇	- 0.4846	X ₉	- 0.1484	X ₅	- 0.0776
Dist. From home	(X ₁₆) - 0.1562	- 0.1097	- 0.0465	X ₁₅	- 0.1158	X ₈	0.0858	X ₅	0.0723
Age of orchard	(X ₁₇) 0.1873	0.1159	0.0714	X ₃	0.1448	X ₅	0.0999	X ₁₅	0.0466
Cost of production	(X ₁₈) 0.1229	0.2044+	- 0.0815	X ₁₅	0.996	X ₅	- 0.0746	X ₇	- 0.0675
Implements possession	(X ₁₉) - 0.0627	0.0810	- 0.1437	X ₁₅	- 0.3718	X ₇	- 0.1648	X ₉	0.1134
Orchard shed	(X ₂₀) - 0.1170	0.0196	- 0.0974	X ₁₅	- 0.2923	X ₃	0.2904	X ₉	0.1249

Residual effect 0.5083

*Significant at 5 percent

**Significant at 1 percent + Direct effect surpassing total effect

of relevant variables to evince a more effective contribution on the consequent variable.

Table 4 presents the factor analysis to draw a logical inference about the principal components or factors controlling and manipulating the variation in the consequent variable, net returns from apple. This was done to note the nature of congregation or *communality* of the different variables to form groups, or factors. In the process, using *Principal component* analysis for extraction of factors and *varimax* rotation, factors with *eigenvalues* more

Table 4 . Factor analysis of the antecedent variables

Factor	Percent of variance explained	Cumulative percent variance	Variables interpreting the factor		Factor loading	Communality
1	23.906	23.906	Age of respondent	X ₁	0.763	0.652
			Family size	X ₂	0.824	0.787
			Family education	X ₃	0.629	0.675
			Media exposure	X ₅	0.771	0.728
			Knowledge level	X ₆	0.618	0.707
			Area under field crops	X ₈	0.536	0.690
2	22.458	46.364	Cropping intensity	X ₁₀	0.731	0.606
			Family education	X ₁₃	0.527	0.675
			Land holding size	X ₇	0.770	0.864
			Irrigation use index	X ₉	0.670	0.707
			Yield of major field crop	X ₁₁	0.684	0.620
			Returns from other fruit enterprises	X ₁₂	0.685	0.737
3	9.893	56.258	Area under apple	X ₁₅	0.836	0.826
4	7.510	63.768	Area under field crop	X ₈	0.583	0.607
5	7.178	70.925	Cost of production	X ₁₈	0.693	0.790
			Age of orchard	X ₁₇	0.723	0.762

than 1 were retained. The variables with *factor loading* more than 0.5 and *communality* more than 0.6 were used to interpret the factors.

Factor 1 accounted for 24 percent of the total data variance and interpreted by six variables, viz., age of the respondent, family education, media exposure, knowledge level, area under field crops and cropping intensity. This factor has been named as the **farm-family system**.

Factor 2 explained about 22.5 percent variance and was interpreted by the variables, family education, land holding size, irrigation use index, yield of the major field crop, return from other fruit enterprises and the area under

apple. This factor has been named as the **agro-economic system**.

The factors 3,4 and 5 explained about 10, 7.5 and 7.2 percent of the total data variance respectively and were interpreted by one variable each and were named as **family support system, investment level and orchard resource system**.

All the five factors put together could explain about 71 percent of the data variance.

Naming of the factors for apple productivity

Variables	Factors	Attributes
Age of the respondent, Family education, Media exposure, Knowledge level, Area under field crops. Cropping intensity,	Farm-family system	Develops family efficiency for orchard management
Family education, Land holding size, Irrigation use index, Yield of major field crop, Return from other fruit enterprises, Area under apple	Agro-economic system	Provides incentives for orchard management.
Area under field crop	Family support system	Provides support for the family.
Cost of production	Investment level	Justification for input use.
Age of orchard	Orchard resource system	Determining the possibility of the level of orchard pro ductivity.

Conclusion

Return from any enterprise is a composite behaviour and, by natural course, goes as a recipient of contributions from well-clustered scores of variables. For delineating strategic intervention it is not only essential to identify the

relational uniqueness of different causal factors but also their nature and degree of gregariousness. Hence the study has beamed adequately on the casual roles of different agro-economic and socio-personal factors, and beyond that, through factor analysis, has identified five very significant factors, viz., **farm-family system, agro-economic system, family support system, investment level and orchard resource system** which have clearly indicated the area, well decisive and distributed, for future intervention and development of apple enterprise. Such many studies on the orchard crops may also get fruitful in isolating the crucial factors and important components contributing substantially in characterizing the economic profitability of the enterprise.

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