Statistical Analysis of Personal and Socio-Economical Characteristics and Their Relationship with Net Income

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Research Article

Abstract: In the present study an attempt has been made to study the socio economic characteristics of the respondents and their relationship with net profit. To the rabbit farmers in the selected Thane and Nashik districts of Maharashtra. Correlation and multiple regression techniques were used for the analysis. It is observed from the analysis that the rabbit farming is concentrated in rural areas. The socio economic status of rabbit farmers was low to medium. The correlation and regression analysis indicated that variables namely No of rabbits /units, Experience in rabbit farming, Annual Income, Training in rabbit farming, Expenditure on feed, Average age at the time of selling and Average weight at the time of selling were having positive and significant cause and effect relationship with net income. The multiple correlation analysis was carried out to know the joint effect of the entire input variable on dependent variable. The value of coefficient of multiple determinations (R^2) indicated that 76.9 % variation in the dependent variable (Net income) has been significantly explained by eleven socio economic characteristics under study. This coefficient of multiple determinations (R^2) was statistically significant.

Key Words: Rabbit farming, Net Income, Socio Economic, Correlation, Regression.

1.0 Introduction

The study of relationship of personal and socio economic characteristics of farmers with their net income from rabbit farming is of paramount importance for judging their socio economic development. Therefore, the present study was undertaken. For establishing relationship the statistical methods like correlation and regression were used. Such type of studies was conducted in other states of India. However, very few studies were conducted in Maharashtra. In the present study an attempt has been made to study the socio economic characteristics of the rabbit farmers and their relationship with net profit from this enterprise in the selected Thane and Nashik districts of Maharashtra. The research has been carried out on these aspects some important references presented here. Puthira Prathap and Ponnusamy (2006) in their study socio economic study revealed that a majority of the respondents were young, had studied up to high school, and had high level of innovativeness. The *relationship between the independent variables and attitude of the respondents* was studied; 'family- type' had a positive and significant relationship with attitude. Based on the findings, implications were drawn for the extension agencies involved in promotion of rabbit farming. Sawant et.al. (2007) reported in their paper *on agriculture development in Maharashtra, problems and prospects,* that land holding of maximum farmers in Maharashtra is very small in size or marginal and of low quality without good facility of irrigation. 148 out of 355 taluka in the state of Maharashtra are consistently draught prone, which hampers the agril. crop production and ultimately the economy of the state. Das and A K Sikka (2007) also studied Relationship /Effect of different housing and feeding systems on the performances of broiler rabbit in Eastern Himalayan Region of India conducted at Livestock and Fishery Improvement and Management Programme (LFIMP).Rabbit keeping in commercial base started in the last century. The scarcity of food following first and Second World War pave the way for extensive rabbit rearing. Later on F.A.O. through different package programs encouraged the farmers for rabbit farming. Thus rabbit farming gradually spread to other countries. In European countries the growing of rabbits had been established as one of the bigger business. On world level, it is calculated that at an average one man consumes 200 grams of rabbit meat per year but it is revealed that in France country only one man consumes 10 kilos of rabbit meat in a year. Out of the total rabbit meat production in the world, 85% are produced in European countries. The references shows that the climate of Maharashtra is suitable for rabbit farming and most of the farmers are diverting to this subsidiary occupation. The rabbit farming is a Subsidiary Occupation. Therefore, good employment for rural families irrespective of their education, race, age, gender,

or in other words entire family of village will get good opportunity of self-employment resulting in good income without dislocating from their own village. This will help in uplifting village economy and life standard. Indirectly this will also help to control migration to city. It is observed that most of the unemployment is concentrated in age group of 18 to 29. They need self employment therefore meat rabbit farming will play a vital role in solving problem of unemployment to some extent in rural Areas of Maharashtra.

2.0 Research Methodology
2.1 Sampling Technique

General data of meat rabbit farmers growing rabbits on commercial basis in different districts of Maharashtra were collected from Rabbit Interbreed Corporate Husbandry Pvt. Ltd., Nashik and Four Seasons Agro Pvt. Ltd. Thane. District wise meat rabbit farmers producing rabbit meat on commercial basis in different districts of Maharashtra was 256. Simple random sample from Thane and Nashik district with 44 and 30 rabbit farmers respectively was selected for the present study.

2.2 Statistical Methods Used

The statistical tools for the study were used as Frequency Distribution, Percentage Distribution, Mean, Range, Standard Deviation, Correlation Coefficient, Multiple Regression Analysis and Step down Regression Analysis.

1. **Correlation Analysis:** Was applied to test the association of the Independent with Dependent Variables.
2. **Multiple Linear Regression Analysis:** Was carried out to know the functional relationship of the Independent Variables with Dependent Variables.

1. **Correlation Coefficient**:

For assessing the relationship between personal and socio-psychological characteristics, as well as the parameters of economic feasibility and economics of production rabbit meat, **KARL Pearson's Co-efficient of Correlation,** "r" was worked out as under:

3.0 Results and Discussions
3.1 Personal and Socio-Economic Characteristics of Rabbit Farmers:

Under this head, the personal and socio-economic characteristics of the sample rabbit farmers are presented. The distribution of respondents according to age, level of education, occupation, land holding and annual income

1. Age

The findings pertaining to age of the respondents are presented in Table 1.

Table 1: Distribution of rabbit farmers according to their age

$$r_{xy} = \frac{\Sigma xy - 1/n \, \Sigma x \, \Sigma y}{\sqrt{\Sigma x^2 - \frac{(\Sigma x)^2}{n}} \sqrt{\Sigma y^2 - \frac{(\Sigma y)^2}{n}}}$$

Where,

r = Coefficient of Correlation

X = Score of Independent Variables

Y = Score of Dependent Variables

n = Number of Respondents.

2. Multiple Linear Regressions

The functional relationship of dependent variables with independent variables was studied by fitting Multiple Linear Regression Equation as below:

$$Y = a + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + b_5x_5 + b_6x_6 + b_7x_7 + b_8x_8 + b_9x_9 + b_{10}x_{10} + b_{11}x_{11} + e$$

Where Y = Net returns (Rs.)

X_1 = Education

X_2 = Number of rabbit / units
X_3 = Experience in rabbit farming
X_4 = Gross Annual Income
X_5 = Training in rabbit farming
X_6 = Expenditure on number of labour used

X_7 = Expenditure on feed
X_8 = Expenditure on medicine
X_9 = Depreciation cost
X_{10} = Average age at the time of sale.
X_{11} = Average weight at the time of sale

a = Constant
b_1 to b_{11} = Regression coefficients
e = Error term.

The statistical analysis was carried out using SPSS 19.0 Version.

etc discussed in brief. It was essential to study the socio personal, economical characteristics of the sample studied so as to find out their attitude towards the concept of rabbit farming development in Maharashtra. The distributions of respondents according to these characteristics are presented as follows.

Sr.No.	Age in years	Respondents (N=74)	
		Number	Percentage
1	Young (Up to 35 years)	54	73.0
2	Middle (36 to 50 years)	17	23.0
3	Old (Above 50 years)	03	4.0

	Total	74	100

Mean: 32   Standard Deviation: 8.70

It is seen from the Table 1 that 73 per cent of the respondents belonged to the young age group (up to 35), while 23 per cent of the respondents were in the middle group (36 to50 years) and rest 4.0 per cent of them were from old age group (Above 50 years). The results indicated that most of the respondents were in young age. This indicated that the most of the respondents are from young age group. The rabbit farming is flourishing in recent years and hence, most of the young respondents entered in this farming. The results are in confirmatory with the results obtained by D. Puthira Prathap and K A Ponnusamy (2006) in their study entitled Factors influencing the attitude of farmers of Tamil Nadu, India towards rabbit farming.

2. Education

The data regarding educational level of the respondents is given in Table 2. It was found that all the sample members were literate. The interesting feature of the findings has been the very high percentage of respondents had education up to higher secondary class i.e. 37.80 per cent followed by 36.50 per cent respondents had education to the secondary level. Only 4.0 per cent of the respondents had education up to graduate level. The rabbit farming is not a very skilled job and hence, most of the respondents are HSC and most of them are young. The results are in confirmatory with the results obtained by D Puthira Prathap and K A Ponnusamy (2006) in their study entitled Factors influencing the attitude of farmers of Tamil Nadu, India towards rabbit farming. This clearly indicated that rabbit farming especially for meat had attracted comparatively well educated and young people.

Table 2: Distribution of respondents according to their education

Sr.No.	Education level	Respondents (N=74)	
		Number	Percentage
1	Primary	15	20.30
2	Secondary	27	36.50
3	Higher Secondary	28	37.80
4	Graduate	04	0 5.40
5	Post Graduate & above	00	0.00
	Total	74	100.00

Mean Score:3.30   Standard Deviation: 0.85

3. Size of Land Holding:

The Table 3 gives the overall idea about the land holding pattern of the sample respondents as under. It was observed from the Table 3 that 21.60 per cent of the respondents were marginal farmers who possessed land up to 1 hectare. The proportion of small farmers (48.60 per cent) who possessed land between 1.01 to 2 hectares was more. The percentage of semi-medium has been 29.70 per cent. No farmer was having land in the category of medium to large. Thus, it can be seen that the rabbit farming is done mostly by marginal to semi medium farmers. No large farmer is in the rabbit farming

Table 3: Distribution of respondents according to their size of land holding

Sr. No.	Size of land holding in ha.	Respondents (N=74)	
		Number	Percentage
1	Landless	0	0.0
1	Marginal Farmers (Up to 1 Ha)	16	21.60
2	Small Farmers (1.01 to 2 Ha)	36	48.60
3	Semi-Medium Farmers (2.01 to 4 Ha)	22	29.70
4	Medium Farmers (4.01 to 6 Ha)	0.0	0.00
5	Large Farmers (6.01 to 8 Ha)	0.0	0.00
	Total	74	100.00

4. Major Occupation

It can be seen from the Table 4 that, majority (100 per cent) of the respondents had farming as main and along with rabbit farming as a subsidiary business, Very few (2.70 %) were having rabbit farming as a independent profession.

Table 4: Distribution of respondents according to their major occupation

Sr. No.	Major Occupation	Respondents (N=74)	
		Number	Percentage
1	Business + Rabbit farming	2	2.70
2	Independent Profession + Rabbit farming.	4	5.40
3	Agriculture + Rabbit farming	68	91.90
4	Service	0	0.00
	Total	74	-

Also 1.35 per cent was having business. This clearly indicates that the agriculturist had rabbit farming. This may be because the feeds can be generated through the agriculture.

5. Annual Income

Distribution of respondents according to their level of annual income is given in Table 10.It can be observed from Table 5 that 63.50 per cent of the respondents were from the middle income group i.e. annual income Rs. 258385 to 339780. The respondents from higher income group were only 21.60 per cent, while from low income group it was 14.90 %. The analysis clearly indicated that most of the respondents were from middle income group, because the total income is inclusive of income from rabbit farming.

Table 5: Distribution of respondents according to their annual income

Sr. No	Annual income	Respondents (N=74)	
		Number	Percentage
1	Low (Up to Rs.258385)	11	14.90
2	Medium (Rs. 258385 to 339780)	47	63.50
3	High (Above Rs.339780)	16	21.60
	Total	74	100.00

Mean=299082   Standard Deviation=40697

The results are in confirmatory with the results obtained by D. Puthira Prathap and K A Ponnusamy (2006) in their study entitled Factors influencing the attitude of farmers of Tamil Nadu, India towards rabbit farming.

6. Social Participation

The findings pertaining to social participation of the respondents are presented in Table 6.

Table 6: Distribution of respondents according to their social participation

Sr.No.	Social Participation	Respondents (N=74)	
		Number	Percentage
1	Low (less than equal to 1)	34	45.95
2	Medium (1.01to 3.0)	28	37.80
3	High (Above 3)	12	16.25
	Total	**74**	**100.00**

Mean= 1.77   Standard Deviation=0.80

It is revealed from Table 6 that 45.95 percent of the respondents had low social participation followed by medium level of social participation (37.80 %). Only 16.25 per cent respondents had high level of social participation. This low level of participation may be because of most of the respondents are from very remote areas where social activities are negligible and from young age group and they are busy in agriculture as well as rabbit farming and they may not get more time to participate. The results are in confirmatory with the results obtained by D Puthira Prathap and K A Ponnusamy (2006) in their study entitled Factors influencing the attitude of farmers of Tamil Nadu, India towards rabbit farming.

3.2 Correlation Analysis

The relationship between selected independent variables with the average net income from rabbit meat was estimated by **Correlation Analysis** and is presented in this section.

Correlation with Dependent Variable Net Income

To ascertain the relationship between the average Net Income per year and selected socio-economic characteristics of the respondents and other production variables influencing the net income, the correlation coefficient were estimated using standard statistical package. On the basis of operational measures developed for the variables, hypotheses were stated for testing the relationship and their significance. The correlation coefficient between Net Income (Dependent variable Y) and various independent variables is depicted in the following Table 7.

Table 7: Correlation Coefficient of different independent variables with dependent variable Average Net Income Per Unit per Year

Sr. No.	Independent Variable	Variable code	Correlation Coefficient
1	Education	X-1	0.163^{NS}
2	No of rabbits /units	X-2	0.270*
3	Experience in rabbit farming	X-3	0.487*
4	Annual Income	X-4	0.824**
5	Training in rabbit farming	X-5	0.615**
6	Expenditure on labour	X-6	-0.503**
7	Expenditure on feed	X-7	0.361*
8	Expenditure on medicine	X-8	0.138^{NS}
9	Depreciation cost	X-9	-0.434*
10	Average age at the time of selling	X-10	0.569**
11	Average weight at the time of selling.	X-11	0.482*

*, **   : Statistically significant at 5% and 1% level of significance respectively

It is noted from Table 7 that the independent variables number of rabbits /units, Experience in rabbit farming, Annual Income, Training in rabbit farming, Expenditure on feed, Average age at the time of selling and Average weight at the time of selling were statistically positively significant at 1% or 5 % level of probability. This indicated that with increase in the use of these independent input variables the net income increased significantly. However, education and expenditure on medicine were positive but statistically non-significant. This indicated that with increase in the score of education and expenditure on medicine could not increase the net income significantly. However, more expenditure on labour and depreciation cost significantly reduced the net income. The correlation coefficient for family labour with net income is negative and significant indicates that as expenditure increases on labour, net income decreases significantly. However for employment generation it could not significant correlation because this farming provides employment mostly to rural family labours and very few hired labours were utilized. Thus, it can be seen from the foregoing analysis that except education and expenditure on medicine all other variables were significantly related to dependent variable net income.

3.3 Multiple Regression Analysis:

The functional analysis presented in Table 8 for dependent variable Net Income indicated that the variables namely No of rabbits /units, Experience in rabbit farming, Annual Income, Training in rabbit farming, Expenditure on feed, Average age at the time of selling and Average weight at the time of selling were having positive and significant cause and effect relationship with net income. This indicates that with per unit increase in the use of these variables, the net income increased significantly. The input variables namely Depreciation cost and Expenditure on labour were having negative regression coefficient. This indicated that these variables decreased net returns. However, the input variable expenditure on labour were statistically non significant. The relationship of education score was non significant, indicating the non importance of this variable in increasing net income.

The multiple correlation analysis was also carried out to know the joint effect of all the input variable on dependent variable. The value of coefficient of multiple determination (R^2) is 0.769 & it is statistically significant at 1 % level of probability. The value of R^2 indicated that 76.9 % variation in the dependent variable (Net income) has been significantly explained by 11 independent variables under study. This variation covered is adequate. The unexplained variation is 23.1 % may be due to climatic effect, personal management not identified or the factors such as beyond the control of farmers.

Table 8: Regression Coefficients of different independent variables with dependent variables Net Income (Y)

Sr. No.	Independent Variable	Variable code	Regression Coefficient	t- Calculated value
1	Education	X-1	4861.70[NS]	0.89
2	No of rabbits /units	X-2	12525.80*	2.06
3	Experience in rabbit farming.	X-3	1961.50**	3.24
4	Annual Income	X-4	0.20**	2.75
5	Training in rabbit farming	X-5	18210.90*	2.53
6	Expenditure on labour	X-6	-0.705 [NS]	1.20
7	Expenditure on feed	X-7	2.56**	3.11
8	Expenditure on medicine	X-8	0.443 [NS]	0.315
9	Depreciation cost	X-9	-6.44**	5.37
10	Average age at the time of selling	X-10	33930.90**	4.47
11	Average weight at the time of selling.	X-11	34398.30**	3.14

Coefficient of Multiple Determination R^2=0.769 F cal.=4.93**

*, **: Statistically significant at 5% and 1% level of significance respectively.

Thus It can be concluded from the study that the socio economic status of rabbit farmers were low to medium. The characteristics namely No of rabbits /units, Experience in rabbit farming, Annual Income, Training in rabbit farming, Expenditure on feed, Average age at the time of selling and Average weight at the time of selling were having positive and significant cause and effect relationship with net income.. The value of coefficient of multiple determination (R^2) indicated that 76.9 % variation in the dependent variable (Net income) has been significantly explained by eleven socio economic characteristics under study.

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