Analysis of Socio-economic factors on dry farming households of Ananthapuramu district of Andhra Pradesh, India

Abstract

This study examines the socio-economic profile, household income, and risk aversion behaviour of dry farming households in the Ananthapuramu district of Andhra Pradesh. The research employs a range of analytical tools, including percentages, averages, Lorenz curve, Gini ratios, and multiple linear regression analysis, to investigate income inequalities and risk aversion among farmers. Data was collected through structured questionnaires from 120 randomly selected respondents within the study area. The results revealed that a significant proportion of farmers fell within the age group of 30-39 years (33%), while the majority had attained primary level education (33%). The average family size was 4 to 5 members (68%), comprising 33% males, 31% females, and 35% children. The composition of earners and dependents was found to be 1:1.98, indicating a relatively balanced distribution between those who contributed to household income and those who relied on it. Regarding asset ownership, most farmers possessed land as the primary asset, followed by buildings and implements. The majority of the sampled farmers operated small farms, with 1 to 2 hectares being the prevalent farm size. Income sources were primarily derived from cultivating crops such as groundnut, paddy, cotton, Bengal gram, and tomatoes, alongside income from livestock activities. The study further assessed income inequality using Gini ratios and Lorenz curves. It was found that farmers with less than 1 hectare of land experienced higher income inequality compared to those with larger farms (1-2 hectares and more than 2 hectares). Risk aversion index of the dry farming households was calculated and found to be 3.60 indicating that farmers are risk averters.

Key words: Socio-economic profile, literacy level, Lorenz curve, Gini ratio, Earners and dependents and Risk aversion.

1. Introduction

Globally dryland (arid and semi-arid) ecosystems occupy more than 3 billion ha and are home to 2.5 billion people: equivalent to 41% of the earth's land area and more than one-third of its population (ICARDA, 2010, ICARDA, 2012). In view of their area and current intensive uses, drylands and their allied agricultural production systems are of great significance. In the agricultural scenario of the country, dry farming holds a distinctive position and plays a vital role in India's food system. It encompasses regions that receive an annual rainfall of less than 750 mm or less and have limited or no irrigation facilities for crop cultivation (Mallikarjunarao *et al*., 2015). The study area chosen is in arid agro-ecological zone with a total area of 19.13 lakh ha. The net sown area was 69.6 per cent of total geographical area and of which the rainfed area is 814.4 thousand hectares. Ananthapuramu district of Andhra Pradesh was selected since its average annual rainfall was very low compared to other districts (Table.1). The district is marked by dry summers and mild winters with annual rainfall of 560 mm. Dry farming is important and widely practiced. But dry farmers face many problems. Frequent weather aberrations in dry land areas result in crop failure and widespread unemployment. Due to the high risks of crop failure in these regions, improving dry land crop yields is crucial for maintaining food security and enhancing the livelihoods of the poor. Moreover, with a depleting resource base and stagnant productivity

in irrigated areas, it is evident that dry land agriculture has tremendous potential for increasing farm production. However, farmers in such situations are unable to make substantial investments in their land for improvement. In the light of this, the study was undertaken to study the socio-economic profile, household income and risk aversion behaviour of dry farming households in Ananthapuramu district.

1.1. Statement of problem: The livelihoods and sustainability of households engaged in dry farming in the Ananthapuramu district of Andhra Pradesh are notably impacted by the socio-economic variables at play. The complex interactions between these variables (Age, Education status, family size and composition, Earners and Dependents, Average size of operational holdings, Assets position, Area under different crops, Crop and allied activities and Income) and how they affect household welfare and agricultural productivity, however, are not well understood. By thoroughly examining the socioeconomic variables impacting dry farming households and their consequences for regional sustainable development, this study seeks to close this gap."

Table: 1. District and Month wise Integrated Rainfall (mm) Report from: Jan -2021 to Dec - 2021

S.No	District	Actual(mm)	Normal(mm)	% Dev
1.	Srikakulam	20.1	25.9	-22.5
2.	Vizianagaram	58.6	25.5	129.9
3.	Visakhapatnam	23.1	22.4	3.3
4.	East Godavari	16.5	19.7	-16.2
5.	West Godavari	18.8	17.7	6
6.	Krishna	30.9	15.8	96.3
7.	Guntur	27.9	18.5	51.2
8.	Prakhasam	34.4	16.3	111.6
9.	Nellore	51.3	19.9	157.5
10.	Chittoor	20.2	12.1	66
11.	Kadapa	7.3	3.4	112.6
12.	**Anantapur**	**2**	**2.9**	**-32.7**

13.	Kurnool	7.4	4.6	60.8
State		22.9	14.9	53.6

(Source: Andhra Pradesh State Development Planning Society, Government of Andhra Pradesh)

Table: 2. Month Wise Normal and Actual rainfall of year 2022-2023

(In mm)

S.no	Season	Actual rainfall	Normal rainfall	% of deviation (2022-2023)
	South-west monsoon			
1	June	**82.5**	61.0	**35.2**
2	July	**61.8**	63.9	**-3.3**
3	August	**186.2**	83.8	**122.2**
4	September	118.8	110.9	**7.1**
	North-Eastern monsoon			
5	October	143.3	100.9	**42.0**
6	November	22.3	28.6	**-22.0**
7	December	33.1	9.3	**256.4**
	Winter period			
8	January	1.9	1.6	**18.8**
9	February	0.0	1.3	**-96.5**
	Hot weather period			
10	March	5.1	2.9	**76.0**
11	April	8.2	12.1	**-32.2**
12	May	97.5	36.7	**165.6**

(Source: Office of the Assistant Director of Statistics, Ananthapuramu District)

2. Material and Methods

The study was carried out in Ananthapuramu district of Andhra Pradesh. Structured questionnaires were used to collect data from the respondents. From the district three mandals were selected, from each

mandal, two villages were selected and from each village 20 farmers were selected making a total sample of 120 farmers. The conventional methods of analysis viz., percentage and average analysis were carried out to estimate the distributions of socio-economic variables such as age, sex, education, land holding pattern, etc., of the sample farm households. In order to estimate the magnitude of influence of the identified variables over the specified dependent variables, functional analyses were performed. To study the income distribution of sample farmers Lorenz curve and Gini ratios were used. Similarly, risk aversion index was calculated by framing seven questions based on production, marketing and financial risks reflecting the risk aversion behaviour of farmers and respective risk aversion scores were worked out. A linear regression coefficient was fitted with risk aversion coefficient of the farmers as dependent variable, and number of dependents, size of the farm in hectares, value of non-farm assets, years of education, extension agency and mass media exposure as independent variables.

2.1. Income Distribution

To construct the income distribution table, the number of income classes were decided by Yule's formula i.e., $2.5 \text{ X } n^{1/4}$ where n is the total number of observations.

The class interval (CI) was then formed out by using the following formula:

$$CI = \frac{\text{Maximum income value in the data set - Minimum income value in the data set}}{\text{Number of classes}}$$

The discontinuous classes were taken for the income classification and were given accordingly.

2.2. Lorenz Curve

One of the most useful graphical representations of distribution of income is Lorenz curve (Martin 2023). The Lorenz curve was constructed by plotting cumulative percentage share of income against the corresponding cumulative percentage share of households and successively joining the points by a smooth curve. The area between the egalitarian line or line of equality and the Lorenz curve represented the degree of inequality i.e., wider the area, larger the inequality in the distribution of income.

2.3. Gini Ratio

The area enclosed between the Lorenz curve and egalitarian line or line of equality was taken as a measure of income inequality. The distribution of income was evaluated through the estimation of Gini ratio which was defined as twice the area between Lorenz curve and egalitarian line. This ratio varies between zero (for total equality) and one (for total inequality). The important feature of Gini ratio is that equi-proportional increase at all income levels would not affect the Gini ratio (Martin, 2023). However, it is sensitive to disproportionate changes at all levels of income.

Gini ratio = $1 - P_j (Y_j - Y_{j-1})$

Where,

P_j = Proportion of households in the jth group

Y_j = Cumulative proportions of income in the j^{th} group

Y_{j-1} = Cumulative proportions of income in the $(j-1)^{th}$ group

N = Total number of groups

2.4. Risk aversion index

Risk aversion is the behaviour of humans (especially consumers and investors), when exposed to uncertainty, to attempt to reduce that uncertainty. A set of seven questions on production, marketing and financial risks reflecting the risk aversion behaviour of farmers was selected and these questions were administered to the sample farmers in the study area and the responses were collected and the respective risk aversion scores were worked out. The proportion of individual score to the maximum score was computed and expressed as percentage to represent the risk aversion behaviour for a farmer.

2.5. Risk Aversion though multiple linear regression (MLR)

As risk aversion was considered as predominant in deterring the farmer to seek higher income, the relationship of selected socio- economic characters were studied through multiple regression analysis.

A linear regression coefficient was fitted with risk aversion coefficient of the farmers as dependent variable, and number of dependents, size of the farm in hectares, value of non-farm assets, years of education and extension agency and mass media exposure as independent variables.

The model specified is as follow:

RA = b_0 + b1 depnts + b2 f size + b3 nf asset + b4 edn +b5 expn +b6 extn media

Where,

RA = Risk Aversion

Depnts = Number of dependents

f size = Size of the farm in hectares

nf assets = Value of non-farm assets in 000' Rs

edn = Years of Education

expn= Experience

extn media = Contact with extension agency and Mass media exposure.

S.NO	Age Groups	Number of farmers	Percentage
1	20 to 29	6	5.00
2	30 to 39	33	27.50
3	40 to 49	32	26.67

4	50 to 59	25	20.83
5	Above 59	24	20.00
	Total	120	100

3. Results and Discussions

3.1. Age Distribution

The majority of the farmers (27.50 per cent) were in the age group of 30 to 39, this implies that farmers in the study area are young and active. This is necessary in order to reduce the income risks as they may have other sources of income too. This is followed by 32 farmers (26.67 per cent) in the age group of 40 to 49. Very few (only six). **Table: 3 Age-wise distribution of respondents**

were under the age group of 20 to 29. So, majority of the sample farmers were only middle aged and average age of the selected farmers was 47 years. Farmers above 59 years of age constituted about 20 per cent of the total sample framework. The majority of the farmers (27.50 per cent) were in the age group of 30 to 39, this implies that farmers in the study area are young and active. This is necessary in order to reduce the income risks as they may have other sources of income too. This is followed by 32 farmers (26.67 per cent) in the age group of 40 to 49. Very few (only six) were under the age group of 20 to 29. So, majority of the sample farmers were only middle aged and average age of the selected farmers was 47 years. Farmers above 59 years of age constituted about 20 per cent of the total sample framework.

Fig 1: Age-wise distribution of respondents

3.2. Educational status

Table 4: Distribution of respondents according to their educational status

S.No	Literacy level	Number of farmers	Percentage
1	Illiterate	31	25.83
2	Primary	33	27.50
3	Middle	19	15.83
4	Secondary	13	10.83
5	Intermediate	17	14.17
6	Collegiate	7	5.83
	Total	120	100.0

Educational status of sample is analysed and was observed that about 27.50 per cent of the farmers had completed primary education. About 25.83 per cent of farmers were illiterates. Among the sample farms, 19 farmers had completed their middle school education and they accounted for 15.83 per

cent of the total sample. Remaining10.83 per cent and 14.17 per cent had completed secondary and intermediate education respectively. Only 5.83 per cent of farmers had collegiate level education.

Fig 2: Distribution of Educational status

3.3. Family Size

Table 5: Distribution of respondents according to their Family size

S.NO	Size of family	Number of Households	Percentage
1	2 to 3	7	5.83
2	4 to 5	82	68.33
3	>5	31	25.83
	Total	120	100
	Average family size	**4.85**	

The family size of the respondents was analysed and was observed that about 68.33 per cent of households had a family size of 4 to 5 and 25.83 per cent of households had family size of more than 5 members and remaining 5.83 per cent of farm households had 2 to 3 family members.

Fig 3: Distribution of Family Size

3.4. Family Composition

Table 6: Distribution of respondents according to their family Composition

S. No.	**Particulars**	**Number**	**Percentage**
1	Mal**e**	194	33.33
2	Female	182	31.27
	Total Adults	376	64.60
3	Total Children	206	35.40
	Total Family Members	582	100

It was that adults constitute 64.60 per cent of the total members of the household and among them, 33.33 per cent of the family members were mal

Fig 4: Distribution of family composition

3.5. Composition of Earners and Dependents

Table 7: Distribution of respondents according to earners and dependents

Particulars	Number of family members	Percentage
Earners	195	33.51
Dependents	387	66.49
Total family members	582	100.0

The Earner-Dependent Ratio estimated to be 1:1.98, indicating that there are 198 dependents for every 100 earners constituting 66.49 per cent dependents and 33.51 per cent earners. The results on par with the studies of Kaur and Singh 2020, wherein it was highlighted that 34.96 per cent were earners and remaining 65.04 per cent were dependents.

Fig 5: Distribution of earners and dependents

3.6 Average size of Operational Holding

The average size of the sample farms with less than one hectare was 0.41 ha and between 1 to 2 ha was 1.52 ha. The farmers who had an average holding size of 2.67 ha, owned 31 per cent of the total area. Besides, 21 farm households had more than 4 hectares and 41.65 per cent of the area with an average size of 5.63 ha. The average size of the operational holding in the study area found to be 2.36 hectares.

Table 8: Distribution of respondents according to average size of operational holdings

Farm size (Ha)	Number of farms	Percentage	Area	Percentage	Average size
Less than one	26	21.67	16.52	5.82	0.41
1 to 2	40	33.33	60.88	21.45	1.52
2 to 4	33	27.50	88.17	31.07	2.67
More than 4	21	17.50	118.2	41.65	5.63
Total	120	100	283.77	100.0	2.36

Fig 6: Distribution of Average size of Operational holding

3.7 Asset position

Table 9: Distribution of respondents according to their asset position

S. No	Assets	Value (Rs.)	Percentage
1	Land	1,47,79,687.50	94.97
2	Buildings	4,43,750.00	2.85
3	Tools and implements	84,866.66	0.55
4	Livestock	2,54,591.59	1.64
	Total	1,55,62,895.75	100

The value of various farm assets was studied and represented in table 7. It is observed that the land is the predominant asset among all other farm assets and it contributes 94.97 per cent of the total value of the assets followed by buildings contributing about 2.85 per cent. Livestock is another major asset but contributed only 1.64 per cent of the total value of assets followed by tools and implements which contributed about 0.55 per cent of the total asset's value.

Fig 7: Distribution asset position

3.8. Area under different crops

Groundnut tops the area under cultivation contributing about 47.85 per cent to the total area cultivated in the sample farms followed by tomato. Besides compared to the previous year there was an increase in the area under groundnut whereas there was a decrease of area under paddy, cotton and tomato. And in the year 2022-2023, Bengal gram was brought under cultivation contributing 5.39 per cent to the total cultivated area.

Table 10: Area under different crops

S.No	Crops	Area (2022-2023)	Percentage
1.	Groundnut	120	47.85
2.	Paddy	33.89	13.42
3.	Bengal gram	13.61	5.39
4.	Cotton	37.81	14.97
5.	Tomato	46.4	18.37
	Total	252.55	100

3.9. Crop and allied activities of Sample farmers

It could be observed from the table that about 16.67 per cent of the total sample farmers were involved in crop activity only while 83.33 per cent had both crop and livestock activities. Moreover, among the different size groups of farmers, farmers (85.71 per cent) who had more than four hectares of land carried out both crop and livestock activities and all the farm sizes preferred crop and livestock rather than going for only crop activity.

Table 11: Crop and allied activities of Sample farmers

Farm Size	Number of farmers		
Farm size (Ha)	Crop activity only	Crop + Livestock	Total farms
Less than one	5 (19.23)	21 (80.76)	26 (100.00)
1 to 2	**7** (17.50)	33 (82.50)	40 (100.00)
2 to 4	5 (15.15)	28 (84.85)	33 (100.00)
More than 4	3 (14.29)	18 (85.71)	21 (100.00)
Total	20 (16.67)	100 (83.33)	120 (100.00)

3.10. Sources of income of Respondents

It could be seen from table 10 that the average income realized from crops per farm household was Rs. 34044.23/- in farm of less than one hectare to Rs. 180952.22/- in farms of more than 2 hectares. It could also be observed that the share of crop enterprise to total income increased with increase in farm size. The next major component of agricultural income was livestock enterprise and the income

realized from this activity declined with increase in farm size. Thus, it could be seen that the share of income from livestock to total income varied from 47.61 per cent in farms of more than 2 ha to 79.77 per cent in farms of less than 1 ha. In sum, the share of total agricultural income to total income was found to be maximum in farms of more than 2 ha (96.30 per cent) and minimum in farms of less than 1 ha (94.54 per cent) with an overall share of 95.71 per cent for the entire sample framework. The non-farm income was found to be more in farms of less than 1 ha (5.46 per cent) as compared to other two categories of farms.

Table 12: Sources of income of Respondents

S. No	Activities	Income from different size of farms			Average Income
		Less than one hectare (N=26)	1-2 hectares (N=40)	More than 2 hectares (N=54)	
1	Crops	34044.23 (14.76)	82787.25 (26.84)	180952.22 (48.68)	116400.5 (36.18)
2	Livestock	1,84000 (79.77)	2,11,000 (68.42)	1,77,000 (47.61)	1,91,525 (59.53)
A	Total Agricultural Income (1+2)	218044.23 (94.54)	293787.25 (95.27)	357952.22 (96.30)	307925.5 (95.71)
4	Non-farm	12596.15 (5.46)	14563 (4.72)	13750 (3.69)	13771 (4.28)
5	Total Income (A+4)	230640.38 (100.00)	308350.25 (100.00)	371702.22 (100.00)	321696.5 (100.00)

3.11. Income Distribution

To analyse the distribution of income, the 120 sample farmers selected were divided based on the farm size i.e., less than 1 hectare, 1-2 hectares and greater than 2 hectares and the Gini ratios were analysed for each of these farm sizes and a were presented.

3.11.1 Distribution of Total Household Income in Less than 1ha Size Farms

There were 26 farmers who come under less than 1 ha size farm to the total of 120 farmer respondents. It can be observed that approximately 30.76 percent of farmers in this group achieved an average income of 2.47 lakh rupees, followed by 26.92 percent who attained 3.47 lakhs. Furthermore, 19.23 percent of farmers earned an average income of 1.57 lakhs, while 11.53 percent realized 74,270 rupees. Additionally, only 7.70 per cent of farmers achieved an income of 44,000 rupees, contrasting with 3.86 per cent who earned 4.85 lakh rupees.

Table 13.a. Distribution of Total Household Income in Less than 1ha Size Farms

S.No	Income group	Households (Numbers)	Average income (Rs/farm)	Percentage of total		Cumulative percentage	
				Households	Income	Households	Income
1.	<50,000	2	44,000	7.70	1.50	5.77	1.10
2.	50,000-1,00,000	3	74,270	11.53	3.70	15.38	3.71
3.	1,00,000-2,00,000	5	1,57,028	19.23	13.09	30.77	12.27
4.	2,00,000-3,00,000	8	2,47,693	30.76	33.04	55.77	36.09
5.	3,00,000-3,50,000	7	3,47,476	26.92	40.58	84.62	73.39
6.	3,50,000-4,00,000	0	0	0	0	0	0
7.	4,00,000-5,00,000	1	4,85,000	3.86	8.09	100.00	100.00
	Total	26		100.00	100.00	-	-

3.11.2 Distribution of Total Household Income in 1-2 ha Size Farms

The findings revealed that 25 per cent of respondents in the group achieved an average income of Rs. 2.57 lakhs, while 20 per cent of farmers had an average income of Rs. 3.35 lakhs. Additionally, 12.5 per cent of farmers realized an average income of Rs. 1.45 lakhs, Rs. 76,726/-, and Rs. 4.11 lakhs, respectively. Furthermore, 10 per cent of farmers earned an average income of Rs. 4.70 lakhs, and 7.5 per cent realized an average income of Rs. 3.67 lakhs. This data is based on a sample size of 40 farmers out of a total of 120 respondents.

Table 13.b. Distribution of Total Household Income in 1-2 ha Size Farms

S. No	Income group	Households (Numbers)	Average income (Rs/farm)	Percentage of total		Cumulative percentage	
				Households	Income	Households	Income
1.	<1,00,000	5	76,726	12.5	3.36	7.50	1.79
2.	1,00,000-2,00,000	5	1,45,800	12.5	6.38	20.00	6.90
3.	2,00,000-3,00,000	10	2,57,859	25	22.58	38.75	21.62

4.	3,00,000-3.50,000	8	3,35,929	20	23.55	61.25	45.40
5.	3,50,000-4,00,000	3	3,67,230	7.5	9.65	75.00	62.23
6.	4,00,000-4,50,000	5	4,11,150	12.5	18	85.00	76.23
7.	4,50,000-5,00,000	4	4,70,475	10	16.48	100.00	100.00
	Total	40		100.00	100.00	-	-

3.11.3. Distribution of Total Household Income in >2 ha Size Farms

The average income in the group found to be Rs. 4.43 lakh, with 24.07 per cent of farmers earning this amount. Additionally, 22.22 per cent of farmers earned Rs. 2.50 lakhs, and another 22.22 per cent earned Rs. 3.38 lakhs. Furthermore, 14.81 per cent of farmers realized an average income of Rs. 5.34 lakhs, while 12.96 per cent earned Rs. 1.54 lakhs. In addition, 1.85 per cent of farmers earned Rs. 7.77 lakhs, and the same percentage earned Rs. 8.75 lakhs. Out of the total sample of 120 farmers, there are 54 farmers in this category of farms of larger than 2 hectares.

Table 13.c. Distribution of Total Household Income in >2 ha Size Farms

S.No	Income group	Households (Numbers)	Average income (Rs/farm)	Percentage of total		Cumulative percentage	
				Households	Income	Households	Income
1.	1,00,000-2,00,000	7	1,54,082	12.96	5.44	7.41	2.82
2.	2,00,000-3,00,000	12	2,50,396	22.22	15.15	25	13.06
3.	3,00,000-4,00,000	12	3,38,620	22.22	20.48	47.22	31.34
4.	4,00,000-5,00,000	13	4,43,818	24.07	29.08	70.37	56.18
5.	5,00,000-6,00,000	8	5,34,687	14.81	21.56	89.81	81.96
6.	6,00,000-7,00,000	0	0	0	0	0	0
7.	7,00,000-8,00,000	1	7,77,000	1.85	3.88	98.15	95.59
8.	8,00,000-9,00,000	1	8,75,000	1.85	4.41	100.00	100.00
	Total	54		100.00	100.00		

3.12. Gini Ratio

The Gini coefficient is used to express the extent of inequality in a single figure, it most often ranges from 0 to 1. It is observed that the Gini ratio of respondents with less than 1 ha farm size was 0.295 and respondents with 1 to 2 ha farm size was 0.242. Similarly, Gini ratio of respondents with greater than 2 ha farm size was 0.229. From this, it can be stated that income inequality was more in the respondents of less than 1 ha group followed by 1-2 ha farm size and greater than 2 ha farm size. These conclusions were stated based on the standard that Gini ratio close to '0' said to have less income inequality and ratio close to '1' have more income inequality (Hasell and Roser 2023).

Table 14: Gini Ratio of farmers of different farm sizes

S. No	Particulars	Gini Ratio
1.	Total income in < 1ha	0.295
2.	Total income in 1 – 2 ha	0.242
3.	Total income in > 2 ha	0.229

3.13. Lorenz curve graphs

The Lorenz curve is a graphical representation of income or wealth inequality. The graph plots percentiles of the cumulative population on horizontal axis and plots the percentage of cumulative income on vertical axis. The straight line that originates from the origin represents the line of equality, depicted by a 45-degree upward-sloping line. The Lorenz curve, which lies below the line of equality, illustrates the actual distribution of income or wealth. The closer the Lorenz curve is to the line of equality, the lower the level of income inequality. The area between these two lines is referred to as the inequality gap (Sitthiyot and Holasut 2021). The distribution of total income for households with different farm sizes is depicted using the Lorenz curve graph. Based on the observation of the three graphs, it is evident that the inequality gap greater for households with less than 1 ha, followed by those with 1-2 ha, and finally households with more than 2 ha.

Fig 8: Distribution of Total Income of Less than 1Ha Farms

Fig 9: Distribution of Total Income of 1-2 Ha Farms

Fig 10: Distribution of Total Income of greater than 2 Ha Farms

3.14. Risk Aversion Behaviour of Farm Households

In order to assess the risk aversion behaviour of households, a risk aversion index was constructed by framing statements on production, marketing and financial risk reflecting the risk aversion behaviour of farmers. A score value of '0' means "risk taker" and value of '5' means "risk averter". As the score value increases from 0, the farmer is more risk averter. The proportion of individual score to the maximum score was computed and expressed as percentage to represent the risk aversion behaviour for a farmer. In the study, the risk aversion index was calculated and found to be 3.60 indicating that farmers are risk averters.

The collective influence of socio-economic factors and their prediction value were studied through multiple linear regression analysis using risk aversion index as dependent variable and number of dependents in the family, size of farm, value of non-farm assets, years of education, farming experience in years and extension agency contact and mass media exposure as independent variables. The coefficient of multiple determination (R^2) was 0.8198 indicating the goodness of fit implying that, 81.98 per cent of variation in farmers risk aversion behaviour could be explained by the specified independent variables. The coefficients of dependents in the family, size of farm, value of non-farm assets and farming experience in years were statistically significant and were found to influence the risk aversion behaviour of farmers. The coefficients of other variables i.e., value of non-farm assets and extension agency contact and mass media exposure were not statistically significant, implying that they had no influence on the risk aversion behaviour of the farmer.

The coefficient of farm size was negative with a value of 2.56, indicating that every additional hectare of land from existing mean level, would reduce the risk aversion behaviour of farmers by 2.56 per cent. The coefficient of non-farm assets had a negative relationship with risk aversion, indicating that with every increase of 1000 rupees in the value of non-farm assets, the risk aversion reduced by 0.643 per cent. The coefficient of farming experience indicated that the risk aversion reduced by 3.514 per cent with the increase in the experience of the farmer by one year and the coefficient of Number of dependents in the family had a positive relationship with risk aversion, indicating that with every increase in the number of dependents in the family, the risk aversion increased by 0.215 per cent.

Table 15: Influence of Socio-Economic Factors on Risk Aversion Behaviour

S.No	Variables	Regression coefficient	t-value	Probability
1.	Intercept	4.363***	45.982	0.000
2.	No. of dependents in the family	0.215**	3.536	0.042
3.	Size of farm (ha)	-2.561**	-1.653	0.025

4.	Value of non-farm assets (‘0000 rupees)	-0.643**	-1.255	0.038
5.	Years of education	-1.595^{NS}	-1.419	0.999
6.	Farming experience	-3.514**	-2.683	0.064
7.	Extension agency and mass media exposure	0.525^{NS}	0.675	0.425
	R square	0.81983		
	Adjusted R Square	0.82117		
	Number of Observations	120		

*** Significance at one per cent level, ** Significance at five per cent level.

Table 16: Risk Aversion Index

S.No	Particulars	Percentage Scores
1.	Will you go for a risky crop if the returns for that crop is higher?	0.538
2.	What will be the percentage of area under that crop? (0-100% area, 1-75% area, 2-50% area, 3-25% area, 4-10% area and 5-0% area)	0.520
3.	Will you market the produce when there are price fluctuations?	0.480
4.	Will you use market information for next season?	0.530
5.	Maintained savings previously to protect yourself from hard times	0.495
6.	Do you prefer loans from credit institutions over non-institutional sources (Money lenders, traders, Relatives etc.,)	1.036
	Total	**3.60**

4. Conclusion:

About 27 per cent of farmers belong to the age group of 30 to 39 indicating most of the farmers in the study were young and 27.5 per cent were literate at primary level and 68.33 per cent of households were of family size of 4 to 5. The earner and dependent ratio were 1:1.98, indicating for every 100 earners there are 198 dependents. Even though 82.5 per cent of operational holdings of the farmers were under cultivation, the cropping intensity was 100 per cent. Although a large proportion of operational holdings are under cultivation, there exists a gap between potential and actual yields, suggesting inefficiencies in farming practices. A skewed distribution of income was found particularly in farm of less than 1 ha as against farms with 1-2 ha and more than 2 ha. Risk aversion index was found to be 3.60 indicating higher levels of aversion to risk. The linear regression fitted to analyse the factors influencing this index concluded that the coefficients of dependents in the family, size of farm, value of non-farm assets and farming experience in years were statistically significant and were found to influence

the risk aversion behaviour of farmers. These findings underscore the need for targeted interventions to address productivity gaps, income disparities, and risk management strategies tailored to the specific circumstances of smallholder farmers.

5. Policy Implications:

- **Assistance for Young Farmers:** Given that the majority of farmers are between the ages of thirty and forty-nine, policies ought to concentrate on offering training, education, and funding that is specifically suited to the requirements of young farmers.
- **Increasing Cropping Intensity and Closing Yield Gaps:** Cultivated crops have yield gaps even while a large percentage of operational holdings are under cultivation. To boost output and cut waste, policies should prioritize enhancing agricultural practices, granting access to premium inputs, and supporting sustainable farming methods.
- **Reducing Income Disparities:** To ensure fair growth in agriculture, there is a need for focused interventions, especially for small-scale farmers when income distribution is uneven. This could entail offering smallholder farmers access to markets, extension services, and financial inclusion programs.
- **Handling Risk Aversion:** It appears from the high-risk aversion index that farmers are reluctant to try new things or put money into projects that might not work out. Among the policy measures that could assist farmers in reducing risks and adjusting to shifting market and environmental conditions are insurance plans, risk-sharing arrangements, and capacity-building initiatives.
- **Support for Non-Farm Activities:** Given that non-farm assets have a significant impact on risk aversion behavior, policy ought to promote the diversification of sources of income outside agriculture

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