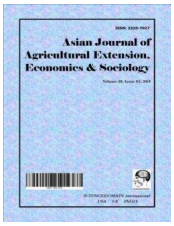

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Risk Aversion Behaviour of Dry Land Farmers in Tamil Nadu

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Authors' contributions

This work was carried out in collaboration between all authors. All authors read and approved the final manuscript.

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ABSTRACT

This study investigated the risk aversion behaviour of dry land farmers in Manaparai taluk of Tiruchirappalli district in Tamil Nadu State, using multiple linear production function. Structured questionnaires were used to collect data from 120 respondents randomly selected from designated locations in the project area. The findings revealed that, the risk assuming ability of small farmers was improving with the increase in the size of the farm, years of farming experience and also with the social status (upper caste) the risk assuming ability of medium farmers improved with an increase in non-farm assets and farming experience of the farmer. Risk aversion increased with an increase in the number of dependents in the family, and the risk assuming capacity of large farmers improved with years of farming experience, years of education, extension agency contact and mass media exposure and also with the social status (upper caste). These results suggest that provision of timely and adequate co-operative credit and subsidised inputs were the most felt needs of all the size groups of farmers and this study also reveals that, dry land farming can be improved by solving the important measures as expressed by the farmers were writing off loans in drought years, creation of drought relief fund, non-farm employment opportunities, livestock loans, crop insurance and long term loan for well digging.

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Keywords: Risk aversion; multiple linear production function; Tamil Nadu.

1. INTRODUCTION

Dry land farming occupies a unique position in the agricultural scenario of the country and plays an important role in the food system of India. Dry land agriculture means areas which receive an annual rainfall of 750 mm or less and there is no irrigation facility for raising crops. It has distinct importance of the sphere of agricultural production. Dry land agriculture accounts for nearly two-thirds of total cropped area and generates nearly half of the total value of agricultural output [1,2]. In Tamil Nadu state also dry land farming is important and widely practiced. But dry land farmers face many problems. Results from agricultural experimental stations show that substantial improvements in dryland crop yields are possible [3,4,5]. However, to improve yields investments are needed in three fields [2]. First, the agricultural production potential of the land needs to be improved. Low and erratic rainfall, poor or steeply sloped soils and a short cropping season make the uncertainty of dryland agriculture in semi-arid regions high. To improve the conditions for agricultural production, investments are needed in soil and water conservation to improve soil fertility, increase soil moisture and allow for supplemental irrigation in critical stages of growth [6,7]. Second, investments are needed in crop variety improvement to reduce vulnerability to pests and diseases and increase yields through improved production techniques [8]. Third, investments in infrastructure are required to reduce the costs of agricultural production and improve the socioeconomic conditions for agricultural production in semi-arid zones [9]. The dry land areas suffer due to frequent weather aberration resulting in crop failure and widespread unemployment. Since the cultivation in dry land areas involved high risks of crop failure, Improving dry land crop yields is important, both to maintain food security and to improve the livelihoods of the poor [8]. Also, with a depleting resource base and with stagnating productivity in irrigated areas, clear that the dry land agriculture have tremendous potential for increasing farm production [2]. The farmers in such a situation were unable to make high investment in their land for improvement. The present study is undertaken to study the risk aversion behaviour of dry land farmers in the study area.

2. METHODOLOGY

2.1 Method of Data Collection

Structured questionnaires were used to collect data from the respondents. Multiple linear production function was used in the risk aversion functions. A total of 120 farmers were randomly selected from Manaparai taluk in Trichy district of Tamil Nadu. Out of 21 revenue villages in Manaparai taluk, six villages were selected purposively on the basis of the highest percentage area under dry land farm technology. Twenty farmers were selected randomly from each of the six villages in equal proportion from each category (low, medium and high) of households. In this study we used multi stage random sampling.

2.2 Risk Aversion Index

Risk is a social and cultural construction and its meaning may differ significantly among societies with different political and economic circumstances [10]. Risk aversion is the behavior of humans (especially consumers and investors), when exposed to uncertainty, to attempt to reduce that uncertainty. A risk attitudinal scale was developed to measure farmers' risk attitudes based on the way that they manage risk according to the methodology used by [11]. A set of six questions on production, marketing and financial risks reflecting the risk aversion behaviour of farmers was selected in consultation with experts in the selected field of study. In order to test the reliability of the measurement tool, the six questions were administered twice to a set of 30 farmers outside the study area with an interval of 15 days and the responses were collected.

The reliability coefficient was worked out using the following formula:

$$r_{tt} = 2\ roe / 1+roe \quad (1)$$

r_{tt} = reliability coefficient,
roe = correlation between scores on responses on a particular date and scores on responses of the same 30 respondents after 15 days.

The reliability coefficient was 0.87 and found significant. The set of six questions was

administered to the sample farmers 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.

2.3 Risk Aversion Functions

Small farm: $RA = b_0 + b_1$ depnts $+ b_2$ f size $+ b_3$ nf asset $+ b_4$ edn $+ b_5$ expn $+ b_6$ extn media $+ b_7$ caste (2)

Medium farm: $RA = b_0 + b_1$ depnts $+ b_2$ f size $+ b_3$ nf asset $+ b_4$ edn $+ b_5$ expn $+ b_6$ extn media $+ b_7$ caste (3)

Large farm: $RA = b_0 + b_1$ depnts $+ b_2$ f size $+ b_3$ nf asset $+ b_4$ edn $+ b_5$ expn $+ b_6$ extn media $+ b_7$ caste (4)

where, RA = Risk aversion, edn = Years of Education, expn = Farming experience in years, depns = Number of dependants in the family, f size = Size of the farm in hectares, nf asset = Value of non-farm assets in 000' Rs, extn media = Contact with extension agency and Mass media exposure, and caste = Intercept dummy, = 1, for SC/ST = 0, otherwise, b_0 = Regression constant, b_1-b_7 = Partial regression coefficients and = Error term.

3. RESULTS AND DISCUSSION

3.1 Risk Aversion Functions for Small Farms

The results of the linear risk aversion function for small farmer is presented (Table 1). As shown by the value of R^2 the estimated equation could explain 72 per cent of the variation in the risk aversion behaviour of small farms. The coefficients of farm size, Farming experience and Dummy for caste status were statistically significant and were found to influence the risk aversion behaviour of small farmers.

The coefficients of all the other variables were not statistically significant, implying that they had no influence on the risk aversion behaviour. The coefficients of farm size was negative with a value of 6.00, indicating that every additional hectare of land from existing mean level, would reduce the risk aversion behaviour of small farmers by 6.00 per cent. The coefficient of farming experience indicated that the risk aversion decreased by 1.43 per cent with increase in the age of the farmer by one year. The coefficient of caste dummy had a negative and significant relationship with the level of risk aversion, indicating that for a farmer of non-scheduled caste and scheduled tribe status the risk aversion reduced by 4.06 per cent. The results of the analysis indicated that the risk assuming ability of small farmers was improving with the increase in the size of the farm, years farming experience and also with the social status (upper caste).

3.2 Risk Aversion Functions for Medium Farms

The results of estimated linear risk aversion function for medium farmers are presented (Table 2). The coefficient of multiple determinations (R^2) was 0.95 and significant. This indicated that the estimated function could explain 95 per cent of variation in the risk aversion behaviour of medium farmers. 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 0.94 per cent.

Table 1. Estimated risk aversion function for small farmers

Sl.	Variable	Co-efficients (b_i)	Standard error (SEb_i)	Level of significance
1.	Number of dependants in the family	2.16	0.019	NS
2.	Size of the farm in hectares	-6.00	0.02	**
3.	Value of non-farm assets in 000' Rs.	3.66	2.04	NS
4.	Years of education	-2.16	0.03	NS
5.	Farming experience in years	-1.43	0.02	**
6.	Extension agency contact and mass media exposure	1.11	0.01	NS
7.	Dummy for caste status	-4.06	0.02	*

Intercept $b_0 = 0.73$ $R^2 = 0.72$ $F = 7.11$ $N = 78$ $SE = 0.27$

** Significant at 0.01 per cent level ** Significant at 0.05 per cent level and NS - Non significant*

The coefficient of Number of dependants in the family had a positive relationship with risk aversion, indicating that with every increase in the number of dependants in the family, the risk aversion increased by 1.04 per cent. The coefficient of farming experience indicated that the risk aversion reduced by 2.59 per cent with the increase in the age of the farmer by one year. The results of the analysis indicated that the risk assuming ability of medium farmers improved with an increase in non-farm assets and farming experience of the farmer. Risk aversion increased with an increase in the number of dependents in the family.

3.3 Risk Aversion Functions for Large Farms

The result of estimated risk aversion function for large farmers is presented (Table 3). As shown by the value of R^2, the estimated equation could explain only 80 per cent of variation in the risk aversion behaviour of large farmers. The coefficient of farmer's education in year had a negative relationship with risk aversion behaviour and indicated that with the addition of every year from the existing mean level would reduce the risk aversion nature of large farmers. The coefficient of farming experience, caste status and extension agency contact and mass media exposure had a negative relationship with risk aversion. This indicated that the risk aversion behaviour of large farmers could be decreased by increasing the farming experience and the frequency of extension agency contact and mass media exposure in large farms. The dummy variable representing the caste status indicated that the risk aversion behaviour decreased in the case of scheduled caste farmers in large farms. The results indicated that the risk assuming capacity of large farmers improved with years of farming experience, years of education, extension agency contact and mass media exposure and also with the social status (upper caste).

The analysis on risk aversion behaviour of different size group of farmers revealed that the increase in years of farming experience reduces the risk aversion irrespective of the size group. Apart, the extension agency contact and mass media exposure, value of non-farm assets, size of the farm, years of education and social status (upper caste) were found to reduce the risk aversion of dry land farmers. Increase in the number of dependents in the family increases the risk aversion.

3.4 Measures Needed to Improve Dry Farming

An opinion survey was conducted to study the measures needed for improving the economic condition of dry land farmers and results are presented (Table 4). Provision of timely credit in required quantity was the most needed measure expressed by small farmers followed by subsidised inputs, writing off crop loans in drought years, creating non farm employment opportunities, crop insurance, land revenue remission in bad years and livestock loans. Medium farmers felt that subsidised inputs as the most important measure followed by provision of timely credit in required quantity, writing off crop loans in drought years, creation of drought relief fund, livestock loans, creation of non farm employment opportunities provision of long term loans for well digging. Large farmers opined that provision of timely credit in required quantity as the most felt need followed by creation of non farm employment opportunities, drought relief fund, subsidised inputs, crop insurance, writing off loans in drought years, subsidised agricultural implements, land revenue remission during crop failure and long term loan for well digging.

Table 2. Estimated risk aversion function for medium farmers

Sl.	Variable	Co-efficients (b_i)	Standard error (SEb_i)	Level of significance
1.	Number of dependants in the family	1.04	0.01	*
2.	Size of the farm in hectares	0.06	0.04	NS
3.	Value of non-farm assets in 000' Rs.	-0.94	0.03	*
4.	Years of education	2.07	0.02	NS
5.	Farming experience in years	-2.59	0.02	**
6.	Extension agency contact and mass media exposure	0.03	0.01	NS
7.	Dummy for caste status	-0.06	0.01	NS

Intercept b0 = 0.93 F =18.50 N = 22 SE = 0.03 R2 = 0.95

** Significant at 0.01 per cent level ** Significant at 0.05 per cent level and NS - Non significant*

Table 3. Estimated risk aversion function for large farmers

Sl.	Variable	Co-efficients (b_i)	Standard error (SEb_i)	Level of significance
1.	Number of dependants in the family	1.17	0.34	NS
2.	Size of the farm in hectares	1.05	0.07	NS
3.	Value of non-farm assets in 000' Rs.	1.66	1.37	NS
4.	Years of education	-7.86	0.32	*
5.	Farming experience in years	-1.36	0.03	**
6.	Extension agency contact and mass media exposure	-1.58	0.46	**
7.	Dummy for caste status	-13.13	2.89	**

Intercept b_0 = 64.75 F = 13.40 N = 20 SE = 4.38 R^2 = 0.80

** Significant at 0.01 per cent level ** Significant at 0.05 per cent level and NS - Non significant*

Table 4. Measures needed to improve dry farming

Sl.	Measures	Small farmers	Medium farmers	Large farmers
1	Provision of adequate and timely Institutional credit	23 (52.27)	18 (40.00)	12 (38.71)
2	Subsidised inputs	20 (45.46)	21 (46.67)	6 (19.36)
3	Writing off crop loans in drought years	12 (27.27)	11 (24.44)	5 (16.13)
4	Creating non farm employment opportunities	12 (27.27)	7 (15.56)	9 (29.03)
5	Long term loan for well digging	4 (9.09)	6 (13.33)	2 (6.45)
6	Crop Insurance	8 (18.18)	4 (8.88)	6 (19.35)
7	Creation of drought relief fund	11 (25.00)	8 (17.78)	6 (19.36)
8	Land revenue remission in bad years	7 (15.91)	4 (8.89)	3 (9.68)
9	Writing off interest, penal interest and rescheduling of loans	2 (4.55)	1 (2.22)	1 (3.23)
10	Livestock loans	6 (13.64)	8 (17.77)	2 (6.45)
11	Subsidised agricultural implements	-	1 (2.22)	3 (9.68)
12	Streamlining input delivery system for match industries	4 (9.09)	3 (6.67)	-

** Figures in parenthesis indicate % of multiple responses*

The results indicated that provision of timely and adequate co-operative credit and subsidised inputs were the most felt needs of all the size groups of farmers. The other important measures expressed by the farmers were writing off loans in drought years, creation of drought relief fund, non farm employment opportunities, livestock loans, crop insurance and long term loan for well digging.

4. CONCLUSION

Measures needed to improve dry farming as expressed by farmers indicated necessity of providing timely and adequate credit and also the provision of subsidised inputs. Provision of Crop insurance and Creation of drought relief fund were the felt needs of all framers and especially large farmers. Extending Crop insurance to dry crops in the study region may be explored. The results indicated that provision of timely and adequate co-operative credit and subsidised inputs were the most felt needs of all the size groups of farmers. The other important measures expressed by the farmers were writing off loans in drought years, creation of drought relief fund, non-farm employment opportunities, livestock loans, crop insurance and long term loan for well digging. Dry land farming can improve by solving the above measures.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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