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An Analysis of Farmers' Perception and Awareness towards Crop Insurance as a Tool for Risk Management in Tamil Nadu

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Abstract

To insulate farmers against risks in agriculture, government has launched several schemes such as National Agricultural Insurance Scheme and weather index based crop insurance schemes. But their coverage seems to be limited among the farmers primarily due to lack of full information. This paper has reported the results of a survey of 600 farmers conducted to assess their perception about various facets of crop insurance schemes. The Probit and Tobit models have been employed to analyse the factors affecting awareness among the farmers. Crop diversification index has also been used to examine the farmers' adjustment mechanism against risks. The survey has revealed that most farmers (65%) are aware of risk mitigation measures of the government. But, only half of the farmers have been found aware about the crop insurance schemes/products. This implies that there is need to disseminate information about insurance schemes across the target groups. Further, it has been shown that factors such as gross cropped area, income from other than agricultural sources, presence of risk in farming, number of workers in the farm family, satisfaction with the premium rate and affordability of the insurance premium amount significantly and positively influence the adoption of insurance and premium paid by the farmers. The study has clearly brought out the urgency of developing more innovative products, having minimum human interventions.

Key words: Crop insurance, Risk management, Crop diversification index

JEL Classification: Q14, Q18

Introduction

Agriculture is a risky prospect, wherever it is subject to vagaries of nature like flood, drought and cyclone. Agriculture contributes 24 per cent to the GDP and any disturbance in its production has a multiplier effect on the economy of a country like India. Since, economic growth and agricultural growth are inextricably linked to each other, managing risks in agriculture is a big challenge to the policy makers and the researchers. The risk aversion induces under-

investment in agriculture, leading to inefficiency. Crop insurance helps in stabilization of farm production and income of the farming community. It helps in optimal allocation of resources in the production process. The Indian Government has been concerned about the growing risk in agriculture, which culminates in unfortunate phenomenon of farmers' suicides, as happened in Maharashtra. In the face of uncertainty and risk in agriculture, various schemes have been evolved over time in different countries to protect farmers; these include guaranteed prices, subsidised credit, and crop insurance, which are of immediate concern in the short-run.

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Crop insurance is recognised to be a basic instrument for maintaining stability in farm income, through promoting technology, encouraging investment, and increasing credit flow in the agricultural sector. The basic principle underlying crop insurance is that the loss incurred by a few is shared among others in an area, engaged in a similar activity. Also, losses incurred in bad years are compensated from resources accumulated in good years (Dandekar, 1976).

Crop insurance contributes to self-reliance and self-respect among farmers, since in cases of crop loss they can claim compensation as a matter of right. Thus, it cushions the shock of crop loss by assuring farmers' protection against natural hazards beyond their control. The central and state governments in India have instituted several crop insurance schemes as safety measure in recent years. Realising the importance of crop insurance as a tool for managing risk and uncertainties in agriculture, the present paper has examined the farmers' awareness about crop insurance and perception about various risks involved in agriculture.

Methodology

The study was conducted in Tamil Nadu by interviewing 600 farmers spread over 27 out of 32 districts of the state. For maximizing information base, those farmers were selected in the sample, who were covered under the on-going Cost of Cultivation for Principal Crops scheme of the Government of India. The sampled farmers were from the categories of marginal to large farms cultivating all important crops in one or two seasons under various agro-ecological situations, such as tank irrigation, groundwater irrigation, canal irrigation and rainfed farming. Data were collected during January – March, 2009.

Probit and Tobit Models

The Probit and Tobit models were employed to study awareness about crop insurance schemes and premium paid for crop insurance. The dependent variable was the awareness level being the major tool of risk minimization, which was defined as $Y=1$ if farmers were aware about crop insurance, and 0, otherwise. The Probit model was specified as per Equation (1):

$$Y = a_0 + \beta_1 \text{EDN} + \beta_2 \text{EXP} + \beta_3 \text{SOCIAL} + \beta_4 \text{EXTN} + \beta_5 \text{NEWS} + U_i \quad \dots(1)$$

where,

Y	=	Awareness about crop insurance (1 for aware, 0 otherwise)
EDN	=	Education level of farmer
EXP	=	Farming experience of farmers (years)
SOCIAL	=	Social participation of farmer (1 for participation in social organisation, 0 otherwise)
EXTN	=	Extension agency contact of farmer (1 for yes, 0 otherwise)
NEWS	=	Newspaper reading habit of farmer (1 for yes, 0 otherwise)
U_i	=	Error-term

The Tobit model was specified as per Equation (2):

$$Y = a_0 + \beta_1 \text{FSIZE} + \beta_2 \text{GCA} + \beta_3 \text{IRRN} + \beta_4 \text{AGINCOME} + \beta_5 \text{OINCOME} + \beta_6 \text{RISK} + \beta_7 \text{CREDIT} + \beta_8 \text{OWN} + \beta_9 \text{EARNMEMB} + \beta_{10} \text{SATISFATION} + \beta_{11} \text{AFFORD} + \beta_{12} \text{DINDEX} + U_i \quad \dots(2)$$

where,

Y	=	Amount of insurance premium paid (Rs)
FSIZE	=	Size of holding (ha)
GCA	=	Gross cropped area (ha)
IRRN	=	Percentage of irrigated area to total area (%)
AGINCOME	=	Annual income from agriculture (Rs)
OINCOME	=	Annual income from other than agriculture (Rs)
RISK	=	Occurrence of risk (1 for occurrence, 0 for non-occurrence)
CREDIT	=	Credit availed (1 for credit availed, 0, otherwise)
OWN	=	Capacity to manage with own resource (1 for yes, 0 otherwise)
EARNMEMB	=	Number of earning members in the family (No.)
SATISFATION	=	Satisfaction towards crop insurance schemes (1 if satisfied; 0, otherwise)
AFFORD	=	Affordability of farmers to premium rate (1 for yes, 0, otherwise)

DINDEX = Diversification index of the farms,
and

U_i = Error-term

Results and Discussion

Data were analyzed using tabular analysis, index numbers, ranking technique and functional analysis.

Socio-economic Characteristics of Sample Farmers

Among the 600 sample farmers, more than 82 per cent were in the age group of above 40 years. A large number of respondents (30 %) were at the age of more than 60 years. Regarding education, it was found that 14.3 per cent were illiterate, 34.8 per cent had studied up to primary level and 36.7 per cent had attended school up to secondary level. Thus, only aged and less-educated farmers were involved in the farming activity in the study area. The distribution of average annual agricultural income among the respondents showed that about 50 per cent of the respondents were in the lower income category (Rs 50000 or less). About 80 per cent of the farmers were in the income category of Rs 1 lakh or less. The results revealed that the proportion of lowest income group (< Rs 25000) was equal to the proportion of high income group (more than Rs 1 lakh). This depicts the level of income asymmetry in the rural areas.

The income distribution was more skewed among farmers. The average size of a farm-family in Tamil Nadu was 4.5 with 1.85 earning members (Table 1). About 86 per cent of the families had less than six members. The prevalence of joint-family system was waning out gradually in the state. The study further

revealed that about 60 per cent of the families had more than one earning member (almost 99 % of the families had 1 to 4 earning members). About 45 per cent of the families had two earning members, while 38 per cent had a single earning member. The results showed that the members of the farm families were looking for alternative sources of income.

Before investigating the farmers awareness about crop insurance, an attempt was made to find farmers' attitude about personal and vehicle insurance policies. It was found that about one-third of the farmers (201) had insured their lives at an average sum insured of Rs 130050/-. These farmers had together taken 358 life insurance policies at the rate of 1.75 policies per family. About one-sixth of the farmers had vehicle insurance at an average sum assured of Rs 17690/-. It indicated that most farmers were aware about insurance as a protection mechanism.

Land and Irrigation Details of Farmers

Fragmented landholdings and sub-optimal productivity were the important characteristics of the holdings of farmers in the study area. Small and marginal farmers (up to 2 ha) accounted for around 42 per cent of the total holdings, which is a positive aspect as the same at all-India level is more than 80 per cent. About 50 per cent farmers had landholdings of 2-6 ha and about 8 per cent had more than 6 ha land. The cropping intensity and irrigation intensity were worked out to be 115.46 per cent and 126.87 per cent, respectively. The farmers had adopted crop insurance in paddy and sugarcane, which facilitated slightly better irrigation facility of 127 per cent. The survey included many irrigated farmers also as they had the capacity to adopt crop insurance.

Table 1. Size and earning members in a family of sample respondents

Family-size category (No.)	Family members		Earning members	
	Number	Percentage	Number	Percentage
1-2	79	13.17	497	82.83
3-4	255	42.50	96	16.00
5-6	182	30.33	6	1.00
7-8	63	10.50	1	0.17
9-10	13	2.17	0	0.00
>10	8	1.33	0	0.00
Average size	4.5		1.85	

Table 2. Distribution of annual income among sample respondents

Income categories (Rs)	Number	Percentage
<25000	121	20.17
25,001-50,000	173	28.83
50,001-75,000	110	18.33
75,001-1,00,000	83	13.83
1,00,001-1,50,000	51	8.50
>1,50,000	62	10.33

Credit Flow among Sample Respondents

In Tamil Nadu, a large number of Primary Agricultural Co-operative Banks (PACBs) apart from many commercial banks and Regional Rural Banks are working for financial inclusion in the state. In Table 3, the credit facilities utilized by the sample respondents have been presented. It was found that most of the short-term credits were disbursed by the PACBs, especially to small and marginal farmers, while medium-term loans were obtained from the commercial banks.

Farm Risks and Associated Loss Suffered by Sample Farmers

Farmers in Tamil Nadu are more vulnerable to natural calamities, especially droughts, floods and cyclones. The state receives bounteous amount of rain during monsoon, especially the north-east monsoon. But the distribution of rainfall is highly uneven and hence it results into frequent incidents of droughts. In the study area, 233 farmers reported about the incidence of drought and 167 about flood (Table 4). The crop losses due to droughts were reported to be in the range from 27 per cent (in sugarcane) to 50 per cent (in banana). The yield loss due to incidence of droughts was maximum (50%) in banana, followed by paddy (42%), groundnut (28%) and coconut (38%). The incidence of drought was reported to be every three years by the respondents. About 28 per cent of the farmers (167 farmers) reported the occurrence of flood every year or every alternate years, causing yield loss of about 48 per cent in paddy and 60 per cent in banana.

Table 3. Details of credits availed and repayment among sample farmers

(in lakh ₹)

Sources of credit	Credit availed		Repayment	
	No. of farmers	Amount	No. of farmers	Outstanding amount
Short-term credit				
Commercial banks	26	35.38	16	29.50
Cooperatives	99	34.80	68	25.06
LDBs	2	0.39	2	0.11
Friends and relatives	11	5.20	5	3.35
Moneylenders	15	5.29	12	3.39
Sugar mills	7	5.13	7	5.13
Total	160	86.19	110	66.54
Medium-term credit				
Commercial banks	12	21.00	10	15.79
Cooperatives	4	2.97	4	2.97
Friends and relatives	1	2.00	1	2.00
Sugar mills	1	0.75	1	0.75
Total	18	26.73	16	21.52
Long-term credit				
Commercial banks	10	25.50	6	18.45
Money lenders	11	4.21	6	1.03
Total	21	29.71	14	19.48

Table 4. Details of farm risks and associated loss among sample farms

Types of risk	Number of respondents	Frequency of occurrence	Crops	Loss	
				Average loss (Rs)	Yield (%)
Drought	233	Every third year	Banana	50000	50.00
			Coconut	142142	37.86
			Cotton	384091	23.09
			Groundnut	4841	38.33
			Maize	14000	28.33
			Onion	3571	27.86
			Paddy	15128	41.91
			Sugarcane	18233	26.79
Flood	167	Every year or alternate year	Paddy	34567	48.31
			Banana	37285	60.36
Cyclone	60	Occasionally	Paddy	29941	34.41
Pests	102	Every year	Paddy	9134	24.89

Table 5. Awareness about any risk mitigating measure implemented by government/bank/ organization

Farm-category (ha)	Number of farmers	Awareness		Insurance	
		Aware	Not aware	Insured	Not insured
0-1	119 (19.83)	88 (73.95)	31 (26.05)	32 (26.89)	87 (73.11)
1.01-2	133 (22.17)	77 (57.89)	56 (42.11)	37 (27.82)	96 (72.18)
2.01-4	181 (30.17)	119 (65.75)	62 (34.25)	69 (38.12)	112 (61.88)
4.01-6	115 (19.17)	73 (63.48)	42 (36.52)	34 (29.56)	81 (70.44)
>6	52 (8.67)	35 (67.31)	17 (32.69)	16 (30.77)	36 (69.23)
Total	600 (100.00)	392 (65.33)	208 (34.67)	188 (31.33)	412 (68.67)

Note: The figures within the parentheses indicate percentage under a category

Sources of Information

Farmers acquire information from various sources including government departments (76%), neighbours and fellow farmers (13%), agricultural universities and research institutes (9%), and NGOs (2%). Mass media instruments like news papers, televisions, etc. play an important role in disseminating information about various insurance products or schemes implemented by the public sector and the private insurance companies.

Awareness of Farmers about Risk Mitigation Measures Implemented by Government

The awareness among farmers about crop insurance and risk management measures implemented

by the government was very high (Table 5). Awareness was more among marginal farmers (about 74 %). At the farmers' level, there are other non-monetized strategies such as crop diversification, water harvesting structure, growing perennial less water-consuming trees, drilling new bore-wells, growing rainfed crops, farm diversification and so on. It was observed that these resulted in lesser awareness of farmers about crop insurance details (48 %). The perception about crop/livestock insurance was reported by 15 per cent of the farmers (Table 6). When two-thirds of the farmers were aware about the risk mitigating measures being implemented by the government, only half of the target group were aware about the crop insurance schemes/products.

Table 6. Perception of farmers about risk reduction

Perception	Number	Percentage
Providing crop/livestock insurance (A)	89	14.83
Providing relief fund at disaster times (B)	113	18.83
Providing technology, input, credit, etc. (C)	94	15.67
A and B	28	4.67
B and C	58	9.67
A and C	8	1.33
All of the three (A, B and C)	55	9.17
No idea	155	25.83

Farmers Awareness about Crop Insurance Schemes in Tamil Nadu

The probit regression was performed to identify the factors that influenced the awareness of farmers about crop insurance schemes/products implemented by government and other financial institutions. The estimates of the probit model have been presented in Table 7. The social participation and education level of the farmers were found to significantly influence the farmers' awareness about crop insurance schemes or products. Participation in social and community-based organizations like farmers association, self-help groups, watershed association, and cooperative credit societies, increased the probability of being aware. Thus, for encouraging participation of farmers in social activities, education has been found an important tool to improving the awareness about insurance schemes.

Crop Insurance Details among Sample Farmers

Details about crop insurance actually adopted by the sample farmers have been presented in Table 8. In

Table 8. Insurance details of sample farmers

Crops	Number of farmers	Area (ha)	Premium paid (₹)	Sum insured (₹)
Paddy	127 (67.55)	2.25	590	56336
Groundnut	20 (10.64)	0.65	396	40654
Rice fallow pulse	13 (6.91)	3.24	546	55192
Sugarcane	28 (14.89)	1.59	910	28040
Total	188 (100.00)	8.03	2442	180222

Note: Figures within parentheses indicate percentage of farmers to total number of farmers insured

Table 7. Estimates of Probit regression model of farmers' awareness about crop insurance

Dependent variable: Awareness
Number of observations: 600

Variable	Coefficients	'p' values
Constant	0.218	0.9197
EXP	0.629	0.1499
EDN	0.873*	0.0852
SOCIAL	0.512***	0.0003
EXTN	0.165	0.2221
NEWS	0.131	0.2155
Log likelihood function	-402.1247	

Note: * and *** denote significant at 10 per cent and 1 per cent levels, respectively

Tamil Nadu, crop insurance products are available for many crops. For instance, the crops covered under NAIS include all food crops (cereals, millets, and pulses) and oilseeds, annual commercial/horticultural crops like cotton, sugarcane, potato, chillies, onion,

ginger, turmeric, jute, tapioca, banana, and pineapple. Farmers insured mainly their paddy crops (68%) because it is more vulnerable to floods, cyclones and drought. Out of the total 188 farmers who adopted crop insurance products, 127 were rice growers. On an average, a rice grower insured his crop by paying a premium amount of ₹ 590 (₹ 262/ha).

Satisfaction of farmers with Present Agricultural Insurance Schemes

The response of farmers on satisfaction with the crop insurance schemes has been presented in Table 9. Only less than one-third of the respondents (30 %) expressed satisfaction while about 50 per cent expressed dissatisfaction over the prevailing crop insurance products and schemes. The remaining 20 per cent could not response either way. Two out of every three farmers expressed displeasure about the procedural complexities in claims of their insurance. The method of area approach being followed by the insurance company in loss assessment was totally unacceptable to the farmers. In this method, loss due to natural calamities is taken into account at the *firka* level and the individual losses are not at all considered. This is one of the important weaknesses of the crop insurance products as perceived by the farmers.

Acceptable Premium to Farmers

It is important to analyse acceptable rate or willingness to pay the insurance premium by farmers for their crops. It was found that of the 600 respondents, 55.5 per cent were willing to go in for crop insurance,

Table 9. Satisfaction of farmers with agricultural insurance schemes

Response	Number	Percentage
Satisfied	180	30.00
Not satisfied	295	49.17
Not satisfied with		
a) Crops covered	69	23.39
b) Sum assured	66	22.37
c) Premium rate	58	19.66
d) Claim procedure	227	76.95
e) Documentation	129	43.73
f) Area approach	183	62.03
g) Loss assessment	177	60.00
No response	125	20.83

while 14.5 per cent could not take any decision. Although 333 out of 600 farmers expressed willingness to insure their crops, only 188 of them had adopted crop insurance and most of them were satisfied with the insurance products. Almost all the willing-to-insure farmers (96%) accepted a premium amount of up to 2 per cent of sum insured.

Farmers' Investment on Insurance Premium

The crop insurance scheme is implemented in the state for the notified crops in notified blocks. The scheme has differential premium rates and varies across crops. For food crops and oilseeds in *kharif* season, it is 3.5 per cent of the sum insured for bajra and oilseeds and 2.5 per cent of sum insured for other food crops or actuarial rates, whichever is less. For *rabi* season, it is 1.5 per cent of sum insured for wheat and 2.0 per cent for other food crops and oilseeds or actuarial rates, whichever is less. For annual commercial/ horticultural crops, the actuarial rate of premium is followed. The Tobit regression was undertaken to identify the factors that actually contributed to the premium amount paid by the farmers for crop insurance schemes. The results of the Tobit regression have been presented in Table 10.

Table 10. Results of Tobit regression on factors influencing the premium paid

Dependent variable: Total premium paid
Number of observations: 600

Variable	Coefficients
Constant	2730.43
FSIZE	-128.21***
GCA	177.77***
IRRN	-0.420
AGINCOME	-0.0008
OINCOME	0.312***
RISK	1120***
CREDIT	0.0014
OWN	229.67
EARNINGMEM	205.90*
SATISFACTION	6.42**
AFFORD	198.08***
DINDEX	-59.18**
Model	Tobit
log likelihood function	-896.59

Notes: *, **and *** denote significance 10 per cent, 5 per cent and 1 per cent levels, respectively

Table 11. Crop diversification indices among sample farms

Indices	Crops	Index value
Harfindhal index		0.55
Diversification index		0.45
Margalef index of crop concentration	Paddy	0.72
	Pulses	0.59
	Sugarcane	0.61
	Groundnut	0.58

It could be inferred from the results of the Tobit model that all the independent variables had the expected sign. The factors such as gross cropped area (GCA), income other than agricultural sources (OINCOME), presence of risk in farming (RISK), number of workers in the farm family (EARNINGMEM), satisfaction with the premium rate (SATISFACTION) and the affordability of the insurance premium amount (AFFORD) found to significantly and positively influence the adoption of insurance and premium paid by the farmers. The size of holding (FSIZE) and crop diversification index (DINDEX) were found to be negatively influencing the insurance premium paid by the farmers. The farmers possessing large size of holdings hesitated to pay for the insurance premium for two reasons. First, they diversified their farming operations and second there was uncertainty about the claims made. Farm diversification helps the farmers to internalize the losses due to risk, as diversification increases the adoption of crop insurance and thereby the premium paid by farmers decreases.

Crop Diversification — A Tool of Risk Minimization

About risk mitigation, 38 per cent of the farmers responded that they could manage their farm risk with

their own resources. Regarding mechanism of risk management other than input reduction, question on diversifying their cropping activities was posed. Various indices of crop diversification were calculated at farm level.

Harfindhal index¹, crop diversification index, Margalef index² of crop richness, Shannon index of crop evenness or equitability were worked out and the results are presented in Table 11. The value of crop diversification index was 0.45, indicating that the farmers of Tamil Nadu follow less-diversified cropping systems. The crop concentration index showed that crop concentration was 0.59 in the case of pulses (rice fallow pulses), 0.61 in sugarcane and 0.72 in paddy, indicating that the sample farmers were concentrating more on paddy and sugarcane.

Conventional Self-adjustment Strategies Adopted by Farmers in the Event of Occurrence of Risk

Apart from crop diversification, various other conventional practices were being followed by the farmers; these included institutional farm credits, loans from friends, relatives and moneylenders, sale / lease out of assets and livestock, hypothecation and mortgaging of lands, assets, jewels, etc. The risk relief measures undertaken by the farmers were analysed

¹ It is a measure of concentration. Index was computed by taking the sum of square of area proportion of each crop in the gross cropped area. This index was worked out by the following formula

$$HI = \sum_{i=1}^N P_i^2$$

where, N= Total number of crops, and P= Average proportion of the *i*th crop in gross cropped area.

With increase in diversification, the index decreases. The index takes a value of one when there is a complete specialization and approaches to zero as *N* is large, i.e. diversification is perfect.

The diversification index is calculated as : DI=1-HI

² Margalef index of richness $D=(S-1)/\ln A_i$ ($D>0$)

where, A_i = Total area planted of the *i*th cereal crop or crop variety to gross cropped area, and *S* = Number of varieties or the number of crops.

Table 12. Self adjustment strategies of risk management adopted by the farmers

Channel	Mean Garette score	Rank
Sale of assets	38.15	X
Sale of livestock	38.53	IX
Loan from friends and relatives	78.07	I
Bank loan	55.45	IV
Moneylenders	52.42	VII
Government relief	54.81	V
Agricultural insurance	54.79	VI
Cooperative banks	59.68	III
Lease/sale of lands	51.24	VIII
Hypothecation of assets/jewels	62.88	II

and have been presented in Table 12. Self-supporting relief measures like sale of assets, hypothecation of assets and jewels and borrowing from friends and relatives as short term loans were the highly preferred risk relief measures, as revealed by the respondents. Farmers were comfortable with the co-operative banks because these institutions were in the vicinity and were mainly concentrating on agriculture and the related activities in the rural areas. The procedures followed by the cooperative banks were relatively easy. Hence, the farmers preferred cooperatives as their top choice of insurance providing agency.

Conclusions

It has been found that the crop insurance scheme is popular among the paddy growers in Tamil Nadu. However, to enhance its adoption, determinants of dissemination strategy are required to be examined. Easy availability of credit is indispensable for encouraging promotion and adoption of insurance products. Most of the short-term credits are disbursed by the cooperative banks, especially to the small and marginal farmers, while medium-term loans are obtained from the commercial banks. This indicates that the institutional mechanism for credit delivery is already in place. Among the various sources of risk, frequency of droughts is reported to be once in every three years. The crop losses due to droughts have been reported to be in the range of 27 per cent (in sugarcane) to 50 per cent (in banana). In paddy, the incidence of drought had cost about 42 per cent yield loss. Two-thirds of the farmers have been found aware of various risk

mitigating measures, including the institutional initiatives being implemented by the government. But only half of the sample farmers are aware about the crop insurance schemes/products. Better opportunities for non-farm employment and scope for crop diversification have made the farmers more confident in managing the risks with their own resources. The diversification potentially internalizes the risk involved in agricultural production.

The method of area approach followed by the insurance company in loss assessment is not acceptable to the farmers. The loss due to natural calamities is taken into account at *firka* level and individual losses are not at all considered. Despite several innovations including Weather Index Based Crop Insurance Scheme (WBCIS), area approach continues to rule the insurance schemes. This acts as a weakness of the crop insurance schemes implemented by the government. There is also the problem of knowledge entitlement among the farmers about the insurance scheme and products suitable for the local conditions.

The study by using Probit model has revealed that encouraging social participation of the farmers will increase the awareness of the farmers about the crop insurance schemes. Education level has also emerged as a critical factor for enhancing awareness about innovative products in crop insurance. Income from non-agricultural sources and the presence of a number of earning members in the family encourages the farmers to go in for crop insurance. Farmers are investing in crop insurance and other farming-related activities with the income derived from sources other than agriculture. It has been pointed out that a large number of farmers are deprived from the access to relevant information for insurance products.

It has been found that the factors such as gross cropped area, income other than agricultural sources, presence of risk in the farming, number of workers in the farm family, satisfaction with the premium rate and affordability of the insurance premium amount influence significantly and positively the adoption of insurance. The study has clearly brought out the urgency of developing more innovative products, having minimum human interventions. There is a need for appropriate stakeholders interface and capability building initiatives to enhance adoption of crop insurance scheme and its reach to the target group.

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References

- Dandekar, V.M. (1976) Crop insurance in India, *Economic and Political Weekly*, **11**(6): A61-A80.
- Garrett, H.E. and Woodworth, R.S. (1969) *Statistics in Psychology and Education*, Vakils, Feffer and Simons Pvt. Ltd., Bombay. 329 p.
- Magurran, A. (1988) *Ecological Diversity and its Measurement*. Princeton University Press, Princeton, NJ, USA.
- Tobin, J. (1958) Estimation of relationship for limited dependent variables, *Econometrica*, **26** (10): 24-36.

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