NATIONAL AGRICULTURE INSURANCE SCHEME ADOPTION AMONG FARMERS: A FACTORIAL ANALYSIS IN J&K STATE

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ABSTRACT: Agriculture crop insurance has an important role in agricultural production and is a tool to support farmers against threats. Investigation of factors affecting farmers' adoption of national agriculture insurance scheme strategy was the objective of this study. The research was conducted in Jammu and Kashmir State, India. Survey was the research method, and data was collected by questionnaire and schedule interview. Data were analyzed by Excel and SPSS 18 Version software. Findings revealed that the farmers with higher rate of Agriculture crops insurance adoption, were younger with higher level of literacy, they had more crop area and more income, they had more awareness towards the goals and advantages of crop insurance, they often consult with other farmers and they have more participation in training classes and sessions. Also, rate of their contact with agricultural agents and insurance agents was higher, they more participated in extension lectures and more visited crop insurance company's activities. The results revealed that four independent variables explain adoption of agriculture crop insurance. Consult with other farmers is the main independent variable. The variables affecting crop insurance (31 variables) were classified to nine factors according to factor analysis technique. Extension- education factor, economic factor, communication channels factor, opinion leadership factor, facility factor, confidential factor, supervision factor, and diversity factor are the factors. Based on the research findings, some recommendations are presented at the end of the paper.

Agri-horticulture has held a crucial place in the economy and culture of Jammu and Kashmir. Nearly 75% of the population resides in the rural areas and is directly or indirectly linked with this sector for the livelihood. Regardless of its importance to growth, income, food and nutritional security, the sector is witnessing a gradual slump in its contribution to the Gross State Domestic Product (GSDP). Agricultural activities are carried with different risks such as natural disasters. Agriculture crop insurance is one of the most mechanisms to reduce financial damage in agri-horticulture sector. It is a new idea and innovation for rural areas especially in third world. Then, different factors influence adoption of crop insurance.

The steps, ideas and philosophy of adoption process have been explained in different studies which view the innovation as a key issue related to technology changes and these studies have been focused on adoption rate and its level (Rogers, 7).

Various studies have explained the adoption process in the form of systematic models. The diffusion model was the most widely used pattern for adoption of innovations (Rogers, 8). Based on this model, innovative farmers adopt the new ideas and these ideas transform to another farmers in time. The focus of this model is in relationship between awareness and adoption. Awareness is perceived as an essential condition for adoption of innovations in the diffusion model (Hooks *et al.*, 3). Another necessary condition for adoption is a favorable attitude toward innovation. The model says that knowledge gained through access to different information sources is posited to be an important determinant of adoption behaviour (Rogers, 7). Also, the diffusion model asserts that adopters' characteristics are important determinants of adoption process. It is hypothesized that farmers'

education, age and farming experiences is related to adoption.

The diffusion model was criticized (Rogers, 8), so that the farm structure model (economic constraint model) was offered which emphasizes access to resources as predictive factors of adoption (Napier *et al.,* 5). Based on this model, the socio-economic status of farmers is related to adoption behavior.

An alternative model, multiplicity model, to identify adoption process, combines the diffusion and farm structure models to explain adoption process (Nowak, 6).

On adoption of crop insurance and its determinants, Mishra (4) revealed that increasing the value of insurance, identifying the target farmers, to provide financial resources and suitable communication with farmers are the major determinants of adoption of crop insurance.

Other studies showed that there is positive and meaningful correlation between amount of land and the value of farm with demand for insurance. Smith and Goodwin (9) concluded that the adoption of crop insurance is influenced by variables such as farmers' education, their risk, and the variation in productivity and the value of insurance.

Some workers indicated that attitude and knowledge regarding the insurance process, and its

advantages were the major factors to adopt crop insurance. Investigation factors affecting farmers' adoption of crop insurance was the objective of this study.

MATERIALS AND METHODS

Agricultural producer farmers who produce agri-horticultural crops in Jammu and Kashmir state were the statistical population of this study. Kashmir is one of the big states which lies in north-west of India. The state was separated of three divisions, Jammu, Kashmir and Ladakh. According to National Agriculture Insurance Scheme report of Agriculture Insurance Company of India and Jammu and Kashmir Banks report 2012, Statistical populations (Agriculture producer farmers under cover of National Agriculture Insurance Scheme) of Jammu and Kashmir were totally 33000 Agriculture crops producers). Proportional stratified random sampling (Table 1) was used to determine sample population. Each geographical division (District) is assumed as stratify. Then, based on proportion of Agriculture producers' population in each District, the sample size was determined according to Kucran sampling formula.

Survey was used as research method. A questionnaire was prepared for data collection. Its validity was examined by face validity. A pilot

Table 1: Statistical population and sample size according to proportional stratified random sampling.

Kashmir Division			Jammu Division		
District	**Statistical population**	**Sample size**	**Shahrestan**	**Statistical population**	**Sample size**
Srinagar	182	14	Jammu	549	42
Baramulla	600	45	Rajouri	523	40
Kulgam	210	16	Kathua	626	48
Budgam	320	24	Poonch	780	59
Pulwama	312	24	Doda	282	21
Anantnag	206	16	Kishtwar	412	31
Total	1830	139	Total	3172	241

Source: *Author*

study was operated. Chronbach Alpha test was executed in order to examine the questionnaire internal consistency and its reliability. The alpha parameter was equated 0.91. The data were collected by facial interview with the farmers.

RESULTS AND DISCUSSION

In relation to sample group demographic characteristics (Table 2), the education level of sample revealed that distribution of education condition of wheat producers is approximately normal and seems appropriate. About 24, 24.5, and 20 per cent of respondents have benefited from education in primary, secondary and high school levels, respectively. Therefore, almost all of wheat producers have been benefited of literacy in desirable levels.

Spearman correlation coefficient was executed to determining correlation rate between independent variables and farmers' acceptance of crop insurance (Table 3). Age had a significant negative correlation with insurance acceptance. It means insurance acceptance rate is higher between younger farmers. If we assume crop insurance as an innovation, it is natural that older farmers to be

Table 2: Education level of respondents.

Education level	Frequency	Per cent
Literacy	68	18.5
Primary school	88	23.9
Secondary school	90	24.5
High school	72	19.6
Diploma and higher education	50	13.5
Without any response	12	-
Total	380	100

Source: Author

lateness. Whereas, farmers with higher education better understand the crop insurance advantages, their adoption increases with increasing education level, significantly.

Background of wheat cultivation variable had no correlation with insurance adoption. But the adoption rate increased with increasing wheat crop area, and farmers' income enhancement, significantly. These findings are justified with the reason that threat of unexpected factors is increased by increasing crop area and farmers expect to alleviate these threats by crop insurance. Besides, farmers with higher income have less difficulty to pay crop insurance charge.

Table 3: Correlation coefficients between independent variables and farmers' acceptance of crop insurance.

Variables	r
Age	-0.265**
Level of education	0.508**
Land holdings(ha)	0.213**
Background of agriculture activities (Year)	-0.106
Income	0.219**
Farmers awareness of goals and advantages of agriculture crop insurance	0.598**
Consultation with other farmers	0.373**
Participation in training classes and sessions	0.888**
Amount of contact with insurance agents	0.626**
Participation in extension lectures	0.857**
Watching films and video clips related to agriculture crop insurance	-0.012
Study of extension bulletins and journals related to agriculture crop insurance	0.079
Visiting of Agriculture crops insurance company's activities	0.855**
Participation in Agriculture crops insurance workshops	-0.011
Contact with agricultural extension agents	0.678**

*Significant at 0.05 level of probability; **Significant at 0.01 level of probability.

Farmers' awareness of goals and advantages of crop insurance; consult with other farmers; participation in training classes and sessions toward necessity of insurance; amount of contact with insurance agents; participation in crop insurance workshops; and amount of contact with agricultural extension agent had significant correlation with crop insurance acceptance variable.

Multiple regression analysis according to stepwise method was executed to determine independent variables' effect on crop insurance acceptance changes, as dependent variable, simultaneously (Table 4). The variable of consult with other farmers could explain 81 per cent of dependent variable changes ($R^2 = 0.81$). It shows the importance of farmers' negotiation with each other and their communication on decision making toward crop insurance. Whereas, most of farmers in research area had similar condition, they believed that the experience of each farmer can be generalized to the others. Considering that the triability of innovation is one of the stages of the adoption of innovations, when one farmer examines crop insurance, his experience is a criterion for other farmers to decision making.

Amount of contact with insurance agents explained 15 per cent of dependent variable changes (Table 4). It reveals the important role of insurance agents towards farmers' acceptance. Then, insurance agents are the second information source of farmers after the other farmers in relation to decision towards accept or reject crop insurance.

These two independent variables explained 0.96 per cent of dependent variable changes.

Farmers' awareness rate of goals and advantages of crop insurance could explain 2.3 per cent of dependent variable changes (Table 4). Awareness especially about the advantages of an innovation is the first stage in adoption of innovations conforming to reports of Ghalavand (2).

Finally, amount of land which each farmer allocated to wheat cultivation was the fourth and last independent variable which has been inferred in regression equation according to stepwise method ($R^2=0.004$). These four variables explained 98.7 per cent of dependent variable changes. The multiple regression equation has been written in below:

$$Y=2.41 \ X_1+1.01 \ X_2 +1.3 \ X_3-0.133 \ X_4+5.5$$

Factor analysis to understand factors network related to agriculture insurance adoption of farmers.

According to factor analysis, Kaiser-Meger-Olkin (KMO) parameter and its Bartlet equated 0.74 and 9724.39, respectively, were significant at 0.99 levels. It shows the correction of the factors entered for factor analysis. Kaiser method and per cent of variance have been executed to determine number of factors. Only those factors have been selected that their Eigenvalues based on Kaiser Method have been higher than 1. Finally, nine

Table 4: Results of multiple regression analysis according to stepwise method to determining independent variables' influence on crop insurance acceptance.

Independent variables	B	S.E.B	Beta	R^2 adjust	R^2 change	T	Sig.
Consult with other farmers	2.41	0.126	0.579	0.81	0.81	19.15	0.000
Amount of contact with insurance agents	1.01	0.102	0.363	0.96	0.15	9.95	0.000
Farmers awareness of goals and advantages of agriculture crops insurance	1.30	0.207	0.189	0.983	0.023	6.30	0.000
Each farmer's crops area	-0.133	0.044	-0.71	0.987	0.004	-3.017	0.006
Dependent variable: Crop insurance adoption							
F= 533.36 Sig: 0.000 Constant= 5.50							

Source: Research Finding.

Ghalavand

Table 5: Extracted factors with their specification, based on factor analysis.

Factors	Special Amount (Eigen value)	Variance per cent of S.A.	Cumulative Frequency of Variance Per cent
First	7.48	22.67	22.67
Second	4.18	12.67	33.35
Third	2.74	8.31	43.67
Fourth	2.45	7.45	51.12
Fifth	2.27	6.90	58.02
Sixth	1.69	5.12	63.15
Seventh	1.53	4.65.	67.8
Eighth	1.22	3.71	71.52
Ninth	1.15	3.51	75.03

Source: Research findings.

factors (Table 5) extracted and they could explain 75.03 per cent of total variance.

Variables' situation after factors rotation according to Verimax method and factors nominating have been illustrated in Table 6. It should be pointed that 24 variables after Verimax rotation because of low factor loading (less than 1) and non significance of their correlation with other factors, were eliminated of analysis process. The reason for this elimination is that the common level of the variables was overlap with more important variables, before. Therefore, these variables could be integrated with the other variables. The results are in line to the reports of Bhende (1).

Regarding to the results of factor analysis in Table 6, the factors affecting on crop insurance acceptance have been classified in nine factors (1) Extension-education; (2) Economic; (3) Communication channels; (4) Motivate; (5) Opinion leadership; (6) Facility; (7) Confidential; (8) Supervision; and (9) Diversity factors. They could explain 75.03 per cent of total variance, as mentioned before. Extension-education factor with special amount (Eigen value) which is equated 7.48 could explain 22.67 per cent of total variance. This factor is the most important factor in compare to the others. It includes the variables such as execute of training classes, bulletins, leaflets, workshops, newspapers, radio and TV programmes, and so on in order to persuade farmers to taking action towards crop insurance.

Economic factor has been the second factor that could explain 12.67 per cent of total variance with special amount that equaled 4.18. It includes variables such as area of wheat cultivation by each farmer, land revenue system, income, insurance contract payment, and discount towards agricultural crops insurance (Table 6). Third factor was communication channels. This factor with special amount equal 2.74 could explain 8.31 per cent of total variance. It contains variables awareness of crop insurance advantages, contact with insurance agents, and deliver information towards insurance to farmers. Motivate factor was considered as fourth factor. This factor with 2.45 special amounts could explain 7.45 per cent of total variance, consists of three variables on time indemnity payment, discount considering for farmers who were without crop damage, and give present to farmers from insurance companies.

Opinion leadership has been the fifth factor. Its special amount was equal 2.27 and explained 6.9 per cent of total variance. Arrange group discussion towards crop insurance advantages, beneficiary of local leaders and local council role towards crop insurance encouragement were the variables in this factor. The sixth factor, facility, could explain 5.12 per cent of total variance with 1.69 of special amount. It consists of four variables i.e. facility toward indemnity payment; discount consideration for farmers who were without crop damage; insurance companies performance towards their commitments; and make facility in official process for contracting of crop insurance.

Confidential factor was the seventh factor with special amount equated 1.53 that could explain 4.65 per cent of total variance. It has two variables: satisfaction of insurer farmers of their crop insurance; and persuasion of farmers to insure their crops by insurance agents. Supervision factor with special amount equated 1.22 was the eighth

Table 6: Variables of each factors and the coefficients which have been extracted of rotated matrix.

Factors	Variables	Coefficient
Educational factors	Execute of training classes towards crop insurance advantages	0.857
	Distribution of training bulletins and leaflets	0.707
	Execute of workshops	0.875
	Contact with agricultural extension agents	0.779
	Distribution of newspaper towards crop insurance affairs	0.699
	Use of radio for farmers' enlightenment towards crop insurance advantage	0.843
	Use of TV for farmers' enlightenment toward crop insurance advantage	0.834
	Use of propagator films towards crop insurance	0.573
Economics Factors	Area of wheat cultivation	0.902
	Land revenue system	0.768
	Farmers' income	0.803
	Primary insurance contract payment	0.735
	Discount toward agricultural crops insurance	0.859
Communication Channels Factor	Awareness towards crop insurance advantages	0.767
	Contact of farmers with crop insurance agents	0.897
	Information deliver towards crop insurance to farmers	0.819
Motivate Factor	On time indemnity payment to indemnity farmers	0.522
	Discount considering for farmers who were without crop damage	0.671
	Give present to farmers by insurance companies	0.603
Opinion Leadership Factor	Arrange group discussion toward crop insurance advantages	0.742
	Beneficiary of local leaders role towards crop insurance encouragement	0.877
	Beneficiary of local council role towards crop insurance encouragement	0.515
Facilities Factors	Facility toward indemnity payment	0.877
	Discount consideration for farmers who were without crop damage	0.532
	Insurance companies performance towards their commitments	0.712
	To facilitate official process for contracting of crop insurance	0.591
Confidential Factors	Satisfaction of insurer farmers of their crop insurance	0.940
	Persuasion of farmers to insure their crops by insurance agents	0.943
Supervisions Factors	On time indemnity payment to indemnity farmers	0.613
	Continuous control of insurance process correctness by inspectors	0.569
Diversities Factors	Diversification of crop insurance options	0.825

Source: Research finding.

factor that explained 3.71 per cent of total variance. This factor consisted of two variables: on time indemnity payment to indemnity farmers; and continuous control of insurance process correctness by inspectors. Diversity was the ninth and the last factor with special amount equated 1.15. It explains 3.51 per cent of total variance and contains one variable which is diversification of crop insurance options.

Conclusion and Recommendations

Agriculture is a risky occupation. Natural disasters are the most threats in agricultural activities. Almost 31 of 40 types of natural disasters which have been distinguished in the world occur in Jammu and Kashmir. Therefore, Jammu and Kashmir has stood on tenth rank in relation to natural disasters in the world. Insurance is one of the usual strategies to alleviate threats in agri-horticultural production. There are many factors out of farmers control and unpredictable. Accordingly, insurance has an important status in agri-horticultural production. Encouragement of farmers to insure their crops by extension agents

could be an appropriate strategy to alleviate agricultural risks.

Findings revealed that the farmers with higher rate of crop insurance acceptance were younger with higher level of literacy, they had more crop area and more income, they had more awareness towards the goals and advantages of crop insurance, they often consult with other farmers and they have more participation in training classes and sessions. Also, rate of their contact with agricultural extension and insurance agents was higher, they more participated in extension lectures and more visited crop insurance company's activities.

Multiple regression analysis revealed that four independent variables could explain about 99 percent of farmers crop insurance acceptance changes. The variables consult with other farmers, amount of contact with insurance agents, farmers' awareness of goals and advantages of crop insurance.

The variables affecting crop insurance acceptance (31 variables) were classified to nine factors according to factor analysis technique. These nine factors were more general. This classification helps authors to achieve higher theoretical level in relation to the factors which influence on crop insurance acceptance. Consequently, extension-education factor, economic factor, communication channels factor, opinion leadership factor, facility factor, confidential factor, supervision factor, and diversity factor influence on crop insurance acceptance. They could explain about 75 per cent of total variance. Based on the findings, some recommendations are presented in the following.

In order to accelerate crop insurance adoption process, identifying the first adopters between farmers is very important. According to this research finding, those farmers are younger with higher level of education, higher wheat crop area, more income and better communication with other farmers, insurance agents and agricultural extension workers. They could affect decision making of the other farmers, because, based on the findings farmers' consultant with each other had very important role on their decision making towards crop insurance adoption. Simultaneously, strength of extension educational programs towards crop insurance has a great effect on farmers' acceptance regarding to the research findings. Insurance agents can facilitate the farmers' acceptance process by use of some manners such as present motivate factors, facility factors, confidential factors, supervision factors and diversity factors.

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