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Factors Affecting Rice Farmers to Participate in Agricultural Insurance

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ABSTRACT

Nowadays, agriculture has an important role as compared to other economic sectors, in terms of assuring required food for growing population in the world. given the role of insurance in reducing income risk and fluctuations in sustainable agricultural development, in the present paper, factors affecting the demand for the insurance of products (rice) have been studied. The main objective of the present study is to study on effective factors on crop insurance demand in west mazandaran province. This study was a descriptive-correlation research, carried out in 2012-2013 in west Mazandaran province (Ramsar and tonekabon cities). from two insured and uninsured farmer groups, a sample of 234 individuals was selected and required data were collected using random sampling method through interview and filling questionnaires. The data collected from the farmers were analysed using descriptive statistics and logit regression model. Result showed that the most important of effective factors on insurance demand were the level of education, age of farmers, acreage level, contacts to agriculture experts, Rate of annual income from rice cultivation. The major challenge faced by farmers in the course of their participation in agricultural insurance was delay in indemnity payment. It is recommended that effective service delivery by insurance service providers will ensure continuity of farmers' participation in agricultural insurance and also participation by farmers who are yet to participate.

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INTRODUCTION

Agricultural section is known as the most important economic parts and the axis of programs of the national sustainable development. The agricultural sector is characterized by a strong exposure to risk which is still likely to increase in the near future. The farmers do not have security because from one hand, natural factors mostly threaten them to reduce the quantity of their crops and from another hand; they are faced with fluctuation of prices in the market (Sadati, *et al.*, 2010).

Risk plays an important role in human livelihood particularly for third world Countries farmers who are exposed to the vagaries of weather and price shocks (Kurosaki and Fafchamps, 2002). According to the Food and Agriculture Organization of the United Nations (FAO) reports, out of forty types of natural disasters recorded all over the world, its 31 species occur in Iran and this country is considered among 10 first disastrous countries in the world (FAO, 2012).

However, due to the increased complexity and variation in agriculture risk, farmers find it very difficult in making rational decisions when faced with risks. This decision-making process consists of a series of actions and choices over time, through which a farmer evaluates an innovation and decides whether to incorporate it into his ongoing practices. Due to the diversity of social, economic and natural factors influencing the adoption of an innovation, making such a decision is not a simple process (Sadati, *et al.*, 2010).

Among the identified factors, the role of insurance in achieving sustainable agricultural development is very important that if such aims are ensured, other agricultural objectives of agricultural department will also be obtained. The insurance of agricultural products is one of the most important ways for reducing agricultural risk that can help the stability of farmers' incomes. Due to various climates, Iran has certain capabilities in producing various types of agricultural products (Pishro *et al.*, 2011).

For Drought plain countries like Iran, structural measures for management of disaster risk and its consequences often were found less effective. So non-structural measures like micro-insurance or crop insurance are being suggested as a risk management strategy.

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Agricultural insurance, sometimes referred to as crop insurance, provides farm operators with increased income, improved economic security, peace of mind, and hope in future through lowering the level of risk, thereby bringing higher levels of investments and flourishing economy. Therefore, agricultural insurance is known as a tool for development and insurers are recognized and employed as development institutions. In fact, crop insurance was developed as a form of technology used to meet the needs of small-scale farmers and reduce risk aversion. Given the particular texture in rural areas and cultural attitudes of farmers, agricultural insurance, just like any other novel technology, faced several obstacles in its early stages of development and found its way through the rural communities only by reliance on time and promotion. Despite its long history in Iran, crop insurance has not yet been seriously received by farmers. In other words, in the current situations, agricultural insurance is limited to certain group of farmers who were forced to acquire insurance either for obtaining loans from Iranian agriculture bank (Bank Keshavarzi) or to cover risks to which they have been exposed more than other farmers (Darijani & Ghorbani, 1998).

As previously mentioned. Despite the importance of insurance in sustainable development, insurance has not comprehensively welcomed by farmers and some farmers are refusing to accept insurance. Sustainable development is the management and preservation of natural resources and directing agricultural evolutions and structure based on the insurance of agricultural products. One of the fundamental goals of sustainable agricultural development is to create employment in rural areas (Zahedi, 2007). Romun and Yuanyony (2008) stated that the insurance of agricultural products increases the farmers' ability in managing agricultural risk and allows that they can increase the investment rate in the agricultural department.

Development of agricultural insurance can play a significant role in compensation of damages to agricultural sections and provide secure financial independency for insurance fund and its financial independency from the government and also causes agricultural added value increase, income increase, and rural poverty reduction. In the meantime, achieving this goal requires the identification and investigation of factors affecting the adoption of insurance plan because strategies can be achieved to remove obstacles and reinforce positive points in this field to encourage farmers to adopt this plan and provide proper ground for more suitable planning to attract them for participation in this project. Achieving this goal requires the identification and evaluation of factors affecting the adoption of insurance plan by the farmers and investigation of their views and opinions (Navaee and *et al.*, 2013).

By attention to what mentioned before, general purpose of this research is to study and analyze factors that affect demand for insurance among rice cultivating farmers in Ramsar and Tonekabon cities. We study and analyze that what factors influence on farmers demand to adoption of crop insurance. Our reason for this selection is that on one hand, rice main part of farmers' cultivation program at understudy area and on the other hand, rice is one of the strategic crops in Iran and knowing factors which are help programmers to apply suitable policies. Major hypothesis of the study is that there is significant relation among variables like age, literacy (level of education), having job other than rice cultivation, cultivation variety, type of ownership, rate of annual income.

MATERIALS AND METHODS

The present study is an applied descriptive-correlational research. Correlations between variables were examined based on the objectives. In descriptive research, actual data and detailed information are gathered on certain phenomena for objective, actual, and formulated description of a situation or subject without any inference. Statistical community includes all farmers who have cultivated Rice in geographical area of Ramsar and Tonekabon in farming season in 2012-2013. In order to achieve the goals of study, we collected data from the individual by means of a questionnaire and in-depth interviews, among a cross of farmers population (400). Out of universe population, 234 respondents were selected using random sampling method. For determining the validity of questionnaire, the content validity was used which was obtained by an experts' panel consisting of specialists in agricultural and development and rural development. Cronbach's alpha was used to measure reliability of the index that its extent was 0.84 and showed that mentioned variable has high reliability.

Considering purpose of the study, dependent variable in this research includes condition of Rice insurance acceptance by farmers that is binominal variable with quantites 0 and 1.

Quantity of this variable for insured farmers who didn't have tendency to accept insurance is 0 (zero).

Since in formulation of these variables, error sentence has variance dissimilarity problem, usage of classic regression model entail biased and misleading results. Thus, it is not recommended to use. One of the appropriate models for these kinds of dependent variables is Logit model that has been used at present research as well. Logit model has been founded on gathering probability of logistics. Based on this pattern, the probability of one producer participation at activities like insurance acceptance is calculated by equation 1:

$$P_i = f(z_i) = F(\beta_0 + \sum_{j=1}^n B_j X_{ji}) = \frac{1}{1+e^{-z_i}} = \frac{e^{z_i}}{1+e^{z_i}} \quad (1)$$

At above equation, π_i is acceptance of agricultural insurance by its farmers, f is function. Equation, Z_i is index of farmer's reaction, B_0 is latitude from origin of the model, n is total number of observations, X_j includes explanatory variables of the model which contain a set of economical & social features of an individual, i is farmer number, e is Nepernumber(basis of natural logarithm)and B_j includes model parameters which are under estimation. At Logit model, Z_i (reaction index) is a random variable which predicts probability of dependent variable occurrence. If the quantity of Z_i becomes more than threshold extent (like Z_i^*), farmers will accept the insurance; otherwise he won't accept it. This index is obtained from equatin2 for i th farmer.

$$Z_i = \ln \frac{\pi_i}{1-\pi_i} = \beta_i + \sum_{j=1}^n B_j X_{ji} \quad (2)$$

As above equation demonstrates, for calculating Z_i we should first estimate regression model of equation3.

$$Z_i = \beta_0 + \sum_{j=1}^n B_j X_{ji} + V_i$$

Then by applying estimated parameters of the model and quantities of explanatory variables, we should calculate the quantity of Z_i for each farmer. In this model relative effect of every X_j explanatory variables on probability of acceptance of agricultural insurance can be calculated by taking differential from the model proportional to explanatory variable and in from of equation 4

$$\frac{\partial \pi_i}{\partial X_{ji}} = \frac{\pi_i(1-\pi_i)}{(1+e^{Z_i})^2} \quad (4)$$

Where π_i is probability of occurrence of dependent variable and X_{ji} is vector of explanatory variable of the model. Generally, predicted changes in probability of acceptance of agricultural insurance can be used to estimate the change of the number of farmers who accept agricultural insurance. There for, by comparing the quantity of estimation of farmers who accept agricultural insurance before & after policy making changes we can evaluate their effects. Independent variables include: age of rice cultivating farmers, level of education, Farm size, type of ownership, Accessibility to credit, rate of annual income, experience in agriculture activities, Family size, job other than rice cultivation, Amount of contact with insurance experts.

X1= Age of rice cultivating farmer

X2= level of education

X3=Farm size

X4= type of ownership

X5= Accessibility to credit

X6= Rate of annual income from rice cultivation

X7= experience in agriculture activities

X8= Family size

X9= Job other than rice cultivation

X10=Amount of contact with insurance experts

Y = 1: the farmers that are under the insurance

Y = 0: the farmers that are not under the insurance

RESULTS AND DISCUSSION

In this research by attention to theories, previous experimental studies and performed studies by researchers on insurance, a set of properties of under study wheat cultivating farmers which are probably more effective on farmers demand for insurance in this area, were considered as independent or explanatory variables in the model and were tested.

SHAZAM software and maximum likelihood estimation method were used for estimation of Logit model. Before estimation of Logit model and also after primary estimations, variables colinearity, dissimilarity variance and model explanation were considered and there was no problem concerning these items for final model. To estimate Logit model, we analyze coefficients of variables, Z statistic, level of significance and other existing cases at the model. Results obtained from estimation of Logit model have been offered at table1 as it can be observed in table 1, MACFADDEN R-squared, CHOW R-squared and Goodness of fit index are equal to 0.66, 0.67 and 0.87, respectively. Results of all indices show that the model is suitable for explaining variables behavior.

According to Table 1,there is a statistically negative and significant relationship between the age of farmers and the insurance of products that is the more the age of farmers, the lower the possibility of product's insurance will be by farmers. In other words, due to the risk aversion, older farmers have tendency to various innovations such as the insurance of products and use traditional ways for confronting the risk in agriculture activities. This result is consistent with the result of similar study by Abdulmalik *et al.* (2013).

Table 1: Results of Logit model.

variables	coefficient	Standard deviation	Marginal effect
Constant	-1.22	2.52	-0.78
Age	-2.80	0.85	-0.14**
Education	0.11	0.29	0.70***
Farm size	0.56	0.22	0.36***
type of ownership	0.20	0.72	0.28
Accessibility to credit	-0.82	0.24	-0.52
Rate of annual income from rice cultivation	0.17	0.84	0.11**
experience in agriculture activities	-0.28	0.18	-0.17
Family size	-0.26	0.62	-0.16
Job other than rice cultivation	0.98	0.60	0.14
Amount of contact with insurance experts	0.16	0.63	0.10*
MCFADDEN R-SQUARE: 0.66			
CHOW R-SQUARE:0.67			
GOODNESS OF FIT: 0.87			

(***) ,(**) ,(*) Respectively indicate significance levels at 1%, 5% and 10% is

Source: Research findings

The coefficient of educational level of the farmers was found to be positive and significant at 1% and this conforms to the a priori expectation that the higher the educational level of farmers, the higher their participation in agricultural insurance scheme. This result is strongly in agreement Olubiyo *et al.* (2009); Masoumi and khodadadi (2013).

Based on the results, there is a positive and significant relationship between farm size and the adoption probability of insurance by farmers. In other words, the probability of adoption of the insurance will be increased by increasing the acreage of products. As the table shows, by 1% increase in the rate of acreage, the adoption probability of insurance by farmers increases 36%. In other words, farmers who use larger areas for farming are more likely to use services provided by insurance funds. This means that this group of farmers experience higher levels of economic welfare compared to those farmers who allocate smaller areas to farming rice. Therefore, greater farmers are more willing to obtain insurance and act based on development. This result is consistent with the result of similar study by Fallah *et al.* (2012).

The findings also suggest that farmers with more contacts to agriculture experts are more developed regarding crop insurance. In fact, level of contact with experts is directly connected to farmer's awareness and knowledge. The higher the level of this knowledge over insurance, the more willing farmers will be to get their products insured. This result seems logical because people who communicate with formal & informal agricultural institutions and instructional programs are more informed of new technologies, facilities and opportunities. Therefore they show positive reaction to new innovation as well, and their awareness about benefits of agricultural crops insurance will increase. This result is consistent with the result of similar study by Fallah *et al.* (2012).

Present research demonstrated that there is significant relation between income & acceptance of insurance. Estimated coefficient for variable "income" is significant at level 5% and positive estimated coefficient demonstrates that if farmer's income from rice cultivation increase, their tendency to accept and demand for insurance will increase. The reason is that if farmers' income from rice cultivation increases, their ability to pay insurance premium will increase and thus, rice cultivating farmers will increase the demand for insurance. This result is consistent with the result of similar study by Masoumi and khodadadi (2013).

Conclusion:

Agricultural insurance is a confident supporting tool for financial resources of agricultural producers and investors. It is an effective tool for risk management in agriculture and its adoption by farmers as a new technology is dependent on many factors. In this study, the factors affecting the adoption of crop insurance in Ramsar and tonekabon cities of Iran were investigated. we conclude that socio-economic factors such as the level of education, age of farmers, farm size, contacts to agriculture experts, Rate of annual income from rice cultivation have significant roles in the adoption of product's insurance. It is obvious that recognizing this issue plays a vital role in promoting aims of the sustainable agricultural development.

By attention to importance of agricultural crops insurance in decrease of production risks, making appropriate policies for increasing farmers tendency to accept insurance will be very important. In this direction, It is recommended that by attention to positive coefficient remark of the variable "communication with experts, it is necessary to program to promote farmers knowledge and increase their tendency to accept insurance of agricultural crops specially rice. It will be possible if agriculture experts and insurance representatives have more communication with farmers. Also, by considering positive and direct effect of farmers' annual income on acceptance of insurance, policies should be programmed to increase farmers income. Thus, protecting producers at harvest time and preventing from reduction in price of crops are considered effective factors for improvement

of farmer situation, increase of farmer ability to pay insurance premium and increase of his tendency to insure crops in order to maintain previous years incomes. Finally, it should be mentioned that creating necessary facilities for insurance of agricultural crops like on-time payment of insurance, increase in paid compensation, decrease in insurance premium, fulfillment of pledges by insurance company and facilitating official affairs of insurance for agricultural crops is an effective step toward farmers tendency to accept insurance.

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