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Full Length Research Paper

Survey of effective factors on adoption of crop insurance among farmers: A case study of Behbahan County

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Agriculture sector is characterized by a strong exposure to risk. Incidence of risk in agriculture is important to policy makers at both national and international levels. Fluctuations in producer's income and the threat of catastrophic losses in particular can present difficult welfare problems for producers, national governments and the international community. The purpose of this study was identifying effective factors on adoption of crop insurance among farmers. The target population in this research includes all farmers in Behbahan county, Khozestan province (7314) out of which a number of 150 people were selected by a simple random sampling method using Cochran's formula and questionnaires were used as tools for collecting data. According to the findings of the study, there are positive correlation among age, experience in agricultural activities, literacy, extension participatory, amount of dry lands and satisfaction of insurance. In addition, result of regression showed that amount of dry lands, extension participatory, income of agriculture and satisfaction of insurance were effective factors on adoption of crop insurance indicator in this region that together explained 53.9% of total variance.

Key words: Crop insurance, adoption, agriculture, Behbahan County, Iran.

INTRODUCTION

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. The most obvious aspect of rural life is uncertainty. 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. It has long been argued that poor farmers in developing countries attempt to minimize their exposure to risk by growing their own food (Roumasset, 1976; Fafchamps, 1992a), avoiding new technologies (for example, Feder, 1980; Feder et al., 1985; Antle and Crissman, 1990) and diversifying their activities (for example, Robinson and Brake, 1979 and Walker and Ryan, 1990). Risk avoidance inhibits gains from specialization and prevents third world agriculture from achieving its full potential.

Nowadays, agriculture has an important role as compared to other economic sector, in terms of assuring required food for growing population in the world. General view in agriculture is a lack of certainty (Ezat and Najafi, 2002) and agriculture production risks of crop failure or decreased yields are caused mainly by adverse weather events (drought, excess precipitation and floods), followed in small part by pests, diseases and fire. Few economic sectors are vulnerable to climatic (stochastic) variation (Dismukes and Glauber, 2000 and Glauber and Collins, 2004) and these concerns have spurred a large

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body of research on ex-post risk management practices in developing countries. Third world households have been shown to accumulate grain, livestock and financial assets as a form of precautionary saving. Gifts and mutual credit have also been identified as major conduits for the sharing of risk among members of the same community or with distant relatives (Kurosaki and Fafchamps, 2002). Over time, several risk management tools were created by producers to manage these risks, including insurance schemes. Under some insurable conditions, the insurance allows an individual to turn a future and an uncertain expenditure (loss), which is usually high into an anticipated, certain and lower expenditure (premium) (Booth et al., 1999).

Crop insurance has been used in a variety of forms and purposes in more than 70 countries, according to an FAO survey published in 1991. In particular, developing countries have established crop insurance programs not only to provide farmers with another risk management tool, but also to promote other goals, such as improving farmers' access to credit, promoting production of high-value crops that might also have higher yield risk and providing more stability to agriculture and related industries (Vandeveer, 2001). There have been quite some varying degrees of success over the years, across countries and several types of insurance programs (Hazell et al., 1986; Hueth and Furtan, 1994; Mishra, 1996).

However, due to the increased complexity and variation in agriculture risk, farmers find it very difficult in making rational decisions when faced with risks. Crop insurance is one of the solutions that farmers can use when faced with risks. On the other hand, farmers that are faced with many problems adopt the innovation of crop insurance. 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 incurporate 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. Interference by the private sector and government polices (subsidized prices, low interest loans and extension campaigns) add to the complexity of the decision process.

The classification as to whether the technology is appropriate or not, is sometimes made by an expert. Nevertheless, through lack of knowledge or inaccurate perceptions, an individual's evaluation of an innovation may not agree with that of the expert. Most individuals perceive their actions to be appropriate. One of the main benefits of the insurance is the fact that it allows the insured to balance their income whenever an adverse event occurs, or on the condition in which such event does not take place and this is done through the payment of premium and the receiving of compensation (indemnity), in case of misfortune (Arrow, 1971 and Rothschild and Stylists, 1976). In developing countries, markets for formal insurance and reinsurance are either underdeveloped or non-existent. Apart from the standard reasons for insurance market failure (asym-metric information problems, which is most likely to be a larger problem in rural areas of developing countries and covariance of risk), a common reason for its failure in developing countries is the lack of effective legal systems to enforce insurance contracts (Barnett et al., 2006). The size composition of farm households sector also has major consequences for agricultural credit and crop insurance (Hazell, 1992). Baker (1990) found that crop insurance is a kind of technique that probably in the beginning of entering rural community meets several problems. Ghadirian and Ahmadi (2002) have obtained in their study on efficient factors, the tendency for Soya's insurance from Golestan province in Iran to work. Factors such as age of beneficiaries, farm size, diversity of products, level of insurance of other crops and previous records of risk in Soya's farms have negative influence on the propensity and elasticity of farmers related to Soya insurance, while the amount of credits which have been received by farmers, had positive effect on the propensity of farmers to purchase insurance (Ghadirian and Ahmadi, 2002). However, several problems inhibit the development of crop insurance, moral hazard (Goodwin and Smith 1998), adverse selection (Goodwin, 1994 and Quiggin et al., 1994), systemic risk (Miranda and Glauber, 1997) and the absence of long-term data on agricultural yield and actuarial methods to accurately calculate the fair premium rate.

Survey of effective factors on demand for crop insurance in Fars province in Iran showed that land ownership, wheat production of previous year, age, level of education, farmer's capital, risk taking and previous record for facing risk, have positive correlation in adoption of wheat insurance; but other factors like land value, crop rotation and land diversity have negative correlation with adoption of wheat insurance (Torkamani, 2002). Bouquet and Smith, in their study pointed out that: previous record in facing risk, amount of debt to credit institutions and banks, variations of product quantity, literacy of farmers and rate of insurance are effective variables in the adoption of insurance by wheat farmers in Montanat State in U.S.A (Boquet and Smith, 1996). Agahi et al. (2008) found positive effect of crop insurance in tropical and temperate regions of Kermanshah province of dry wheat farmers' technical efficiencies. However, crop insurance coverage did not affect technical efficiency among farmers in cold regions due to higher rainfall in the cold regions of Kermanshah province. Baker in his study has examined demand for rainfall insurance in half-dry areas. The results showed that knowledge of farmers related to advantages and significance of rainfall insurance have positive impact on their propensity for accepting insurance (Baker, 1990). According to Ridant, high degree of adoption of crop insurance in central Illinois, U.S.A depends on existence

Table 1. Classification of farmers according to amount of adoption of crop insurance indicator.

Cumulative percent	Percent	Frequency	
12.0	12.0	18	Very low (0 - 0.25)
29.3	17.3	26	Low (0.25 - 0.50)
56.0	26.7	40	Moderate (0.50 - 0.75)
100.0	44.0	66	High (0.75 - 1.00)
	100	150	Total

of probable hazards in agriculture, insurance expenditures which farmers should pay, feeling of satisfaction from getting insurance and other factors like: psychological and social impacts (Tiraee, 2002). Agricultural education, history of risk, the amount of debt to credit institutions and banks, manufacturing and product rate fluctuations and rate insurance, affect in the participation of farmers in insurance scheme (Baquet and Smith, 1996). Farmers' awareness of the importance of insurance and its effects on their income supports the insurance (Baker, 1990). The study demonstrated that changing the amount of insurance could persuade exploiter with different degrees of risk aversion crops amenable to accepting insurance (William et al., 1993). Background exposure risk is one of the most important factors in accepting agricultural products insurance. Voluntary insurance of agricultural products may be more attractive to farmers that are faced with greater danger (Ahsan et al., 1987).

RESEARCH METHOD

The study population and sample consisted of all farmers of Behbahan county in khozestan province that consists of 7,314 farmers. 150 people were selected by simple random sampling method using Cochran's formula. This study employed a questionnaire that comprised two sections for data collection consisting of 1) Information about the state of crop insurance between farmers and their experience and the amount of satisfaction of insurance, and 2) The individual and land factors (level of education of farmers, age, knowledge and land area). In this research, data were analyzed using the SPSS software.

RESULTS

Identification of farmers' characteristics under this study

The entire farmers' household heads interviewed were men and the average age and agricultural experience among them was 41 and 18 years, respectively. About 22.7% of the respondents were unable to read and write, while 30.7% of them finished primary school and only 18% finished high school. The average family size was eight members and around half (58%) of the research sample households were involved in agricultural activities to support their livelihood. In addition, approximately 42% of the sample population was involved in off-farm works as officer, traders and transporter and 34% of the interviewed sample participated in extension courses.

Two-thirds of the sample households owned agricultural lands and the average size of farmlands owned by them was 5.5 ha. Average annual household income of agriculture (related to the past 12 months) was about US$ 3,200 and their income of off-farm activities was US$ 1,350 per year. Dividing the median yearly income by average household size and 12 months, average per capita income equals US$ 47.36 per month. 95% of respondents have said that the amount of their products in the current farming season was wasted. Accordingly, 63% of them have expressed that their products were emitted before harvest, 24 during harvest and 7.7 after harvest. 19, 10.7, 29.3, 34, 84, 32.7 and 8% of interviewed farmers claimed that insects, plant diseases, weeds, wild animal attacks, climatic change, pests and transportation are factors that wasted their products this season.

Classification of farmers according to adoption amount of crop insurance indicator

Adoption of crop insurance indicator had been made with dividing the amount of insurance lands on total land of respondents. According to this indicator, farmers were classified in groups as indicated in Table 1. Table 2 shows the classification of farmers according to adoption amount of crop insurance indicator indicating that majority of farmers had a high level of this indicator.

Correlation analysis of adoption of crop insurance with some variables

Pearson correlation was used to test the relationship between adoption of crop insurance indicator and other variables. According to Table 3, there are positive correlation between age and experience in agricultural activities with this indicator. In addition, there are positive significant relationships between adoption of crop

Table 2. Correlation between adoption of crop insurance and other variables.

Variables	Adoption of agriculture insurance	
	Correlation	p-value
Age	- 0.230**	0.005
Experience in agriculture activities	0.240*	0.012
Extension participatory	0.187**	0.000
Family size	- 0.270**	0.001
Literacy	0.144*	0.025
Agrarian land	0.230**	0.005
Number of land pieces	0.244**	0.006
Income of Agriculture	0.193*	0.018
Amount of dry lands	0.453**	0.003
Satisfaction of insurance	0.123*	0.014
Experience in damages	0.303**	0.000
Experience in agriculture insurance	0.158*	0.032

* P-value≥0.05, ** p-value≥0.01.

Table 3. Results of multiple regression analysis.

Source of variation	Degrees of freedom	Sum of squares	Mean square	F-Ratio	P-Value
Regression	411.92	4	142.523	0.673	0.000
Residual	351.255	191	83.965		
Total	273.374	195			

insurance indicators and variables such as: income, literacy, extension participatory, agrarian land, number of land pieces, agriculture income, amount of dry land, satisfaction of insurance and experience in damaged and agriculture insurance. In the other hand, there are negative relationships between farmers' age and their family size with this indicator.

Identifying the effective factors on adoption of crop insurance indicator

Table 4 and 5, presents the selected variables influence on the adoption of crop insurance indicator. This objective was accomplished using multiple regression analysis. Among 12 variables that entered into the model, only four had significant influence on adoption of crop insurance indicator. These variables together explained 53.9% of the variance of effective factors on adoption of crop insurance in the region selected for the study. The variable that first entered the regression model was ‘‘amount of dry lands’’. Considered alone, this variable explained 47.2% of the variance for adoption of crop insurance indicator. The second variable that entered into this model was ‘‘extension participatory’’ and it explained 4.2% of the variance. The third was ‘‘income of agriculture’’ and it explained 1.1% of the variable alone. Finally, the fourth variable was ‘‘satisfaction of insurance’’ which explained 1.4% of the indicator.

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 Behbahan county of Iran were investigated. Results showed that majority of farmers were middle-aged and their level of literacy was primary. From economic point of view, their average income was about US$ 3,200 per year and majority of the farmers (66%) had not participated in any of the extension courses. Results showed that in terms of crop insurance adoption, majority of the farmers accepted crop insurance in high level and only one-third of them accepted it in low level.

Results of correlation test indicated that younger farmers had more adoption of crop insurance. This result was in accordance with Ghadirian and Ahmadi (2002), but not with Torkamani (2002). On the other hand, the amount of adoption of crop insurance was in positive correlation with the level of literacy and income of the farmers. The investigated factors have positive effect on risk aversion. Younger farmers with high level of literacy

Table 4. Variables in the equation.

Variables	R^2 Cumulative	R^2 Change	F Change	P Change	Beta
Amount of dry lands	0.472	0.472	8.394	< .01	0.546
Extension participation	0.514	0.042	3.694	< .01	0.230
Income of agriculture	0.525	0.011	2.529	< .01	0.132
Satisfaction of insurance	0.539	0.014	2.415	< .01	0.126

Table 5. Variables not in the equation.

Variables	Beta	t	Sig-t
Age	- 0.36	- 0.532	0.596
Literacy	0.021	0.323	0.747
Experience in agriculture activities	0.50	0.775	0.439
Family size	- 0.065	- 1.254	0.211
Agrarian land	0.016	0.320	0.750
Number of land pieces	0.046	0.887	0.376
Experience in damages	0.029	0.585	0.560
Experience in agriculture insurance	0.040	0.817	0.415

and more income have more risk compared to older farmers with low level of education and income. When ever the amount of risk is more, the amount of adoption of new technologies will be more. Ghadirian and Ahmadi (2002), Smith and Baquet (1996) and Tiraee (2002) reported that the amount of insurance adoption had positive correlation with the amount of received loan by farmers and less debt to credit bank and low cost of insurance, respectively. All of these studies emphasis is on the positive correlation between financial status of farmers and amount of crop insurance adoption. In addition, the amount of adoption has positive correlation with the amount of agricultural land. According to results, there is a positive correlation between the amount of satisfaction of insurance in previous years and amount of insurance adoption. This result is in agreement with Ghadirian and Ahmadi (2002), Tiraee (2002) and Rydant (1979). Experience in damages also showed positive correlation with adoption of insurance as reported by Ahmadi (2002). Results of multiple regression analysis showed that the amount of dry lands, participation in extension courses, income of farmers and amount of satisfaction of previous insurance affects crop insurance adoption and explained about 54% of this index. According to this study, findings recommended that; firstly, extension courses increase the amount of farmers' awareness about premium of insurance and secondly, it increase farmers' financial ability with more payment of their loan or reduce cost of insurance.

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