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A study of natural risk affecting adoption of crop insurance: A case study of Kurdistan, Iran December 2007

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Crop insurance is an effective method which is being practiced by farmers in all economic sectors at all seasons in order to be able to minimize natural risk. Crop insurance is being considered as a proper mechanism for protecting financial resources of farmers. The purpose of this descriptive survey study was to investigate climate changes which are effective in the application of crop insurance in Kurdistan - Iran. Data were collected through 200 questionnaires which were completed by random sample of insured farmers in the year 2005 - 2006 from Kurdistan province in Iran. Face and content validity of the questionnaire were assessed by a panel of experts. A Cronbach's alpha reliability coefficient of .92 were obtained using a pilot test (N = 30) farmers who were not included in the study. Results of the study showed that the average application of crop insurance in the group with low degree of adoption was 30% of their entire under cultivation land while the results were 47 and 67%, for the group with the medium and high degree of adoption respectively. The regression analysis showed that forecasting the possibility of climate changes such as cold weather, frost, floods and drought display in total 56.7% of the variance for the application of crop insurance.

Key words: Adoption, risk, adverse events, Agricultural Products Insurance.

INTRODUCTION

Nowadays agriculture as compare to other economic sector, in terms of assuring required food for growing population in the world has an important role. General view in agricultural is a lack of certainty (Ezat and Najafi, 2002).

One of the main problems that make it difficult to achieve more agricultural development is natural risky variables. Degree of dependence in agricultural section on nature is too high that will cause intering natural risky variables and uncertainly in production function of agriculture crops.

Undoubtedly, one of the most important barrier factors of attracting private investment in agriculture is the existence of damaging natural events and incurable hazards that always menaced seriously agricultural products in a

country. The existence of high natural risks in a country, continuously lead farmers faces with many problems. It also will discourage them from investing in this sector in the next years. And also decrease in agricultural investment lead to decrease in agricultural output and therefore the society will face food scarcity (Matlabi, 2001).

The most obvious aspect of rural life is uncertainty. They don't 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 (Kerchegali, 2001).

Product also, in agricultural and livestock, has many basic differences. Its activities are faced with large scale of natural and unnatural risks. So work and activities in this section are connected with high degree of risk (Anderson and Dillon, 1992).

Baker (1990) found that crop insurance is kinds of techniques that probably in the beginning of entering rural community meet several problems.

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FAO researches (1991), showed that, near 70% of hazard and risk in investment is in cultivation, and finally they avoided from repaying rate of return on investment and it is arising from occurring natural events (Nori, 1999).

According to Krabasi (1999) for attracting corporation of agricultural beneficiaries, related to acceptance of crop insurance, efficient factors on demand for this technique or estimating demand should be recognized (Krabasi, 1999).

Background

Ghadirian and Ahmadi (2002), have obtained in their study on efficient factors to tendency for Soya's insurance from GOLESTAN province in IRAN that 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 has negative influence on propensity and elasticity of farmers related to Soya insurance. While the amount of credits, which have been received by farmers, had positive effect on propensity of farmers to purchase insurance (Ghadirian and Ahmadi, 2002).

Efficient factors on demand for crop insurance in FARS province (IRAN), showed that land ownership, wheat production of previous year, age, level of education, farmer's capital, risk taking, 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).

Ghorbani and Darvish (2001), in their study about factor effecting adoption of agricultural products' insurance found that, increase in insurance level and investigation of factors effecting adoption of insurance is important issue for policy makers in order to be able to recognize the strength and weaknesses of adoption process of insurance.

Bouquet and Smith, in their study pointed out that: previous recording facing risk, amount of debt to credit institutions and banks, variations of product quantity, literacy of farmers and rate of insurance, are effective variables of adoption of insurance of 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 acceptance insurance (Baker, 1990).

According to Ridant, high degree of adoption of crop

insurance in central Illinois U.S.A depends on existence 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).

The purpose of this study was to identify the most important risk factors in adoption of insurance in Kurdistan (Iran) province, with assumption that predict of probability of occurring risk of natural hazards is affected the rate of adoption of agricultural products' insurance.

In this paper agricultural products' insurance is considered as one of the efficient techniques which can reduce the coefficient of agricultural activities' risk and increases investment security.

METHODOLOGY

Present research in the case of goals is applied; because is looking for development of applied knowledge in a special case (insurance adoption and its development). Also in the case of data collection method, is containing descriptive researches.

Research method

Research method has applied in this study is, survey research and cross sectional. Also, on the base of research goal, has used correlation method for analyzing relationship between variables and estimated and express variation of dependent variables by using independent variables. Then correlation technique applied for analyzing relationship between independent and dependent variables. And also by using multiple regressions for estimated and express variation of dependent variables with including dependent variables.

Farmers forecast from occurring risk, is one of the main factors that can be useful in the field of applying suitable methods, for meeting risk. Pertaining question is this that, what kind of risk or natural events can influence on adoption of insurance by farmers? In other words what kind of risk (flood, cold...), has more effect on adoption of insurance?

Therefore, for answering to these questions, to examine the above variables, are so important. In order to find farmers' view and their attitude related to the prediction of each one of the above risks, a self-administered questionnaire, designed by the researcher, based on reviews of literature and existing instrumentation, was used to gather data for the study. Five Point Likert type Scales (questionnaire) were used to measure the main independent variables and dependent variables as follows:

1. Very high
2. High
3. Medium
4. Low
5. Too low

According to this questionnaire, rank of 1 is for those people who can predict the risk properly and 5 for those people who can not predict the risk. content and face validity of the instrument were assessed by a panel of expert. After making appropriate revisions per panel suggestions, reliability of Likert-type scale was calculated using a pilot test (N = 30) farmers who were not included in the study, resulted in a Cronbach's alpha reliability coefficient of .92 for the overall questionnaire.

Table 1. Coefficients variables entered into regression function.

Sig	T	Beta	SEB	B	forecasting	Dependent variable
0.000	9.434	0.534	0.007	0.067	X ₁ = occurring cold	Adoption level of product insurance
0.000	4.529	0.254	0.008	0.037	X ₂ = occurring frost	
0.022	2.304	0.111	0.006	0.014	X ₃ = occurring flood	
0.028	2.216	0.105	0.008	0.018	X ₄ = occurring drought display	
0.397	0.849		0.037	0.032	Fixed amount	

Source: Adopted From Research Findings.

Research findings

Descriptive section

Findings of the study showed that totally 32% of respondents couldn't predict the occurring cold weather, 19% in the middle and 49% could predict it, and considered it as a serious threat to their products.

Nearly 49%of responders didn't take flood as a serious risk for their product and had weak prediction for probability of occurring it. About 20.5% of them, were in the middle, and 30.5%of them predict the occurring flood. Also Collection of data show that near 45% of respondents, consider the probability of occurring frost, 27% in the middle and 27%also didn't predict it. In the case of drought display, 18% didn't predict drought display, 60%in middle of this category and 52% predict occurring it and considered it as a serious threat to their products, (Figure 1).

Multiple regression analysis

Step-wise multiple regression has used to determine linear function between dependent and independent variables. In This method, the most effective variables are entering one by one. In such a manner that significant test error reach 5%, in other words, variables are entering into function according to magnitude partial correlation with dependent variables. In the following part we explain the results of last step.

In this stage, results of variance analysis and sum of F calculated (63.928) in this level is significant. Therefore, with 99% probability, in total 56.7% of dependent variables variance, with the use of four variables including forecasting the possibility of climatic changes such as cold weather, frost, floods and drought display has expressed (Table 1).

According to coefficients and fixed value counted (Table 1), multiple regression function is as follows:

$$Y=B_0+B_1X_1+B_2X_2+B_3X_3+B_4X_4$$

$$Y=32\%+67\%+37\%+14\%+18\% X_4$$

To examine the existence of serial correlation in the final

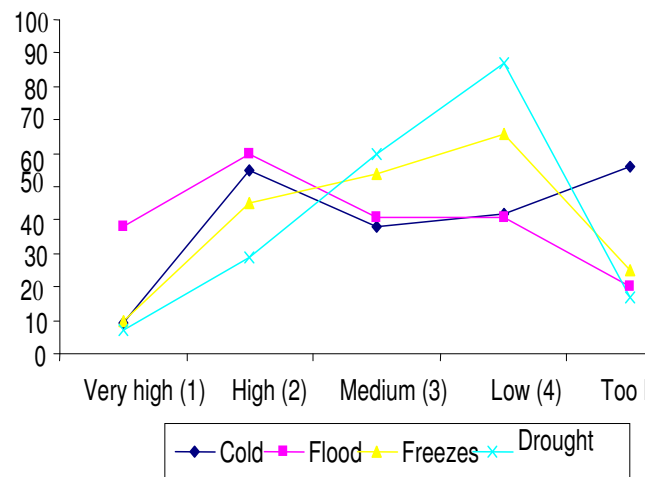


Figure 1. Estimation of frequency distribution of occurring risk. Source: Adopted from research findings.

model, from D.W test has used which the amount of 1.99 was near 2 and showed that the problem of estimated in the final model, does not exist; so suitable estimation has done.

Conclusion

According to analysis of the factors effecting adoption of crop insurance in Kurdistan province, based on the obtained results, we will conclude our findings as follows:

2%of responders couldn't predict the occurring cold weather, 19% in the middle and 49% could predict it, and considered it as a serious threat to their products.

Near 49%of responders, didn't take flood as a serious risk for their product and had weak prediction for probability of occurring it. About 20.5% of them, were in the middle, and 30.5%of them predict the occurring flood. Findings showed that near 45% of respondents, consider the probability of occurring frost, 27% in the middle and 27% also didn't predict it. In the case of drought display, 18%didn't predict drought display, 60% in middle of this category and 22% predict occurring it and considered it

as a serious threat to their products.

Results of the study showed that the average application of crop insurance in the group with low degree of adoption was 30% of their entire under cultivation land while the figure was 47 and 67% for the groups with the medium and high degree of adoption respectively.

56.7% of independent variable variances are expressed, with the use of a linear composition of four variables: forecasting occurring of drought display, frost, flood and cold weather ($R = 0.753$, $R^2 = 0.567$).

Finally based on the obtained results, we can say that the main part of dependent variable variances, are explained by natural variables (natural events) and another part also, is influenced by unnatural factors (economical, social, cultural and so on).

In fact these research findings shows challenges and problems which affected agricultural activities. Findings in this study are closed to results which has done by Farming Agricultural Organization (FAO).

Recommendations

For correct and efficient use from results of this study, some suggestions have been made on the base of obtained results from descriptive and inferential statistics. In addition, on the base of direct observation in this investigation and results from interview with farmers, some advice has given to them related to the use more crop insurance.

Regarding to descriptive results, 49% of responders (cold weather occurring probability), 49.5% (storm occurring probability), 30.5% (flood occurring probability), 45% (frost occurring probability) and 22% (drought display occurring probability) have predicted and consider them as a great threat for their products, and from one side there is a significant and positive correlation (1%) between four first variables and adoption of crop insurance and also (5%) between drought display and dependent variable. And from another side in the multiple step-wise regression analysis, the variable of (cold weather occurring probability), with 67% positive coefficient, the variable of (frost occurring probability), with 37% positive coefficient, the variable of (flood occurring probability), with 14% positive coefficient and the variable of (drought display occurring probability), with 18% positive coefficient has set in the final regression function, therefore in the field of risks covered by insurance (insurable risks) suggested that in the field study and same areas, adjusted and optimized crop insurance should be done. And the above variables should use as a main priorities to cover the risk of crop insurance.

Finally for more applicable result of this study, the following recommendations have been made:

- For developing the insurance culture, it is necessary to increase farmers' knowledge through good and more relationship with insurance agents.

- One of the important factors that can influence on adoption of crop insurance is previous risk record of farms. Therefore identification of different types of risks and the effects of each one on crops and covering them by insurance can be effective in order to be able to increase agricultural products.

- Prepare the suitable ways for Farmers Corporation and their contribution with experts in a way that they can forecast damages and estimate compensations.

- Suitable methods should be applied for forecasting damages and estimate compensations. In this case determining the damages measurement indexes and using professional experts in the farm, are very important.

- Government incentives through price support, increasing of agricultural products and effective use of applied methods can encourage farmers to adopt more and more insurance.

- It is Suggested that compensation of damage, should be only restricted to real damages till the culture of using insurance, be congenial with rural culture.

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