

AGRICULTURAL RISKS AND THE DEMAND FOR AGRICULTURAL INSURANCE OF FARMERS IN THE MEKONG DELTA REGION, VIETNAM

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Abstract

This study was conducted to assess risks in agriculture and determine farmers' needs for agricultural insurance in the Mekong Delta region. The research data come from direct interviews of 503 households engaged in livestock, farming, and aquaculture activities. The analytical results show that households are negatively affected by the main risk groups, including production risk, market risk, and financial risk. Farmers have low demands for agricultural insurance. The factors affecting farmers' needs for agricultural insurance are the number of risks, investment cost, education level, and training participation. In which, the number of risks is the factor that has the most impact on farmers' demands for agricultural insurance.

Keywords: farmers, agricultural insurance, agriculture risk.

INTRODUCTION

The Mekong Delta is famous for its strong agricultural industry. It is known as the rice bowl of Vietnam as well as the major aquaculture and seafood exporter. The development of the agricultural sector, especially rice farming and fisheries, has promoted economic growth and created jobs for people in rural areas. However, the agricultural production growth is unsustainable and low-competitive. In recent years, the agricultural industry develops on breadth through increasing acreage and number of crops. Agricultural activities fluctuate due to production risks, market risks, and financial risks (Nghi and Hien, 2014). The Vietnamese Government has implemented many policies to support farmers to reduce the impact of agricultural risks. In particular, the "Agricultural insurance" program is an effective tool to ensure production efficiency. However, the implementation process encounters certain difficulties, the most common is the limited awareness of farmers about the program's benefits. This situation may affect the ability to participate in the agricultural insurance program of farmers. Therefore, this study is carried out to analyze the current status of agricultural risks and find out factors affecting the demands for insurance of farmers in the Mekong Delta.

RESEARCH METHODOLOGY

Research model

Agricultural insurance is a topic concerned by domestic and foreign researchers. According to Njavro & Pleško (2007), Lien et al. (2003), one of the most effective methods to avoid risks is agricultural insurance. However, not all farmers are aware of this issue and participate in insurance. Farmers' participation in agricultural insurance depends on many different factors. According to Goodwin & Katens (1993), two essential factors affecting farmers' demand for agricultural insurance are production area and total cost. Makki & Somwaru (2001) showed that the larger the production scale, the more risks the household face, the higher the need for insurance. Nghi et al. (2013) have demonstrated factors affecting farmers' needs for agricultural insurance are education level, production area, technical training, investment costs, and total risk. Therefore, the research model of factors affecting farmers' demands for agricultural insurance in the Mekong Delta is proposed below.

$$\text{INSURANCE} = \beta_0 + \beta_1\text{EDUCATION} + \beta_2\text{TRAINING} + \beta_3\text{AREA} + \beta_4\text{RISK} + \beta_5\text{COST}$$

In which, the variable INSURANCE is a dependent variable, receiving the value 1 if the farmer has agricultural insurance demand, and receiving the value 0 otherwise. The independent variables in the model are explained as follows:

Table 1: Interpretation of independent variables in the research model

| Variable | Description | Expectation |
|-----------|---|-------------|
| EDUCATION | Education level, get the values corresponding to the number of school years of the household head up to the study time (year). | + |
| TRAINING | Dummy variable, get the value 1 if the farmer participated in the technical training, and get the value 0 otherwise. | + |
| AREA | The household's total rice production area (1,000 m ²). | + |
| RISK | The total number of risks: taking the value corresponding to the number of risks that farmers face in the latest crop, including production risks, market risks, and financial risks. | + |
| COST | Total investment cost in the latest crop (million VND). | + |

Data collection and analytical methods

To evaluate the status of agricultural risks, the descriptive statistical method is used with the research criteria (frequency, proportion, mean, maximum, minimum, standard deviation). Besides, a probit regression model is used to determine factors affecting the needs of agricultural insurance of farmers.

To ensure the scientificity and accuracy of primary data, the research team use stratified sampling and random sampling to conduct the survey. The stratification criteria include production area, production type, and production scale. The interviewees are heads of households engaged in agricultural production activities in the Mekong Delta, with a

sample size of 503 households. Specifically, 132 of them grow dragon fruit, 120 households grow rice, 118 raise pigs, and 133 raise prawn.

RESEARCH RESULTS AND DISCUSSION

Current status of agricultural risks in production activities

The survey results tell that agricultural households in the Mekong Delta face five main types of risks. They include production risk, market risk, financial risk, institutional risk, and personal risk. However, due to the limited ability of respondents to estimate the institutional risk and personal risks, the study only focuses on the three remaining risks. Most agricultural households in the region face production risks: weather risk, disease risk, water source risk, seed risk, etc.).

Table 2: Current status of production risks

| Risk | Frequency (household) | Percentage (%) | The impact degree on profit (%) | | |
|-----------------------------|-----------------------|----------------|---------------------------------|-------|-------|
| | | | Min | Max | Mean |
| Pig farming | | | | | |
| Weather risk | 47 | 39.80 | 2.0 | 20.0 | 5.00 |
| Disease risk | 51 | 43.20 | 0.5 | 82.2 | 28.53 |
| Seed risk | 53 | 44.90 | 2.3 | 100.0 | 17.74 |
| Rice farming | | | | | |
| Weather risk | 80 | 66.70 | 5.0 | 50.0 | 26.40 |
| Disease risk | 73 | 60.80 | 2.0 | 50.0 | 22.00 |
| Seed risk | 11 | 9.20 | 4.0 | 20.0 | 11.50 |
| Dragon fruit farming | | | | | |
| Weather risk | 58 | 43.90 | 2.0 | 70.0 | 27.93 |
| Disease risk | 19 | 14.40 | 1.0 | 20.0 | 5.95 |
| Prawn farming | | | | | |
| Weather risk | 110 | 82.70 | 5.0 | 70.0 | 18.33 |
| Water source risk | 117 | 88.00 | 5.0 | 60.0 | 18.73 |
| Disease risk | 101 | 75.90 | 5.0 | 70.0 | 21.99 |
| Seed risk | 59 | 44.40 | 3.0 | 30.0 | 10.98 |

The survey shows that pig farmers often bear the risks of disease, weather, and seed. They are most affected by the disease risk with an average profit impact level of 28.53%, followed by breed quality risk (17.74%), and weather risk (5%). Meanwhile, rice-growing households are more exposed to weather and disease risks than pig farming households. There are 66.7% of households face weather risks (the level of impact on profits reaches 26.4%), and 60.8% of households are at risk of disease (profit impact level reaches 22.0%). The risk of seed does not affect profits much because farmers carefully select high-quality seed before every crop. As for dragon fruit growing households, they usually face weather risk and disease risk, specifically 43.9% of farmers are exposed to weather risk (average impact level on profits is 27.93%), and 14.4% of households are at risk of

disease (the average profit impact level 5.95%). Especially for prawn farming households, besides disease, weather, and seed risks, households face the risk of water pollution. The farmers suffering from this type of risk account for 88% with an average profit impact level of 18.73%. Also, the remaining risks strongly affect prawn farming households. On average, the impact of weather risk reduces the profit by 18.33%, disease risks reduce the profit by 21.99%, and seed risks decrease 10.98% of the profit.

Table 3: The status of market risk

| Risk | Frequency (household) | Percentage (%) | The impact degree on profit (%) | | |
|-----------------------------|-----------------------|----------------|---------------------------------|-------|-------|
| | | | Min | Max | Mean |
| Pig farming | | | | | |
| Seed cost | 57 | 48.30 | 2.32 | 60.98 | 14.56 |
| Feed cost | 65 | 57.50 | 0.60 | 41.10 | 12.22 |
| Product price | 62 | 52.50 | 3.00 | 68.50 | 26.45 |
| Rice farming | | | | | |
| Seed cost | 16 | 13.30 | 1.00 | 6.00 | 2.56 |
| Fertilizer and drug cost | 106 | 88.30 | 1.00 | 12.50 | 5.20 |
| Labor cost | 93 | 77.50 | 1.00 | 20.00 | 6.10 |
| Product price | 29 | 24.20 | 4.00 | 35.00 | 11.60 |
| Dragon fruit farming | | | | | |
| Fertilizer and drug cost | 119 | 90.20 | 0.37 | 25.00 | 6.44 |
| Labor cost | 111 | 84.10 | 0.75 | 21.40 | 3.60 |
| Product price | 55 | 41.70 | 25.38 | 75.00 | 25.83 |
| Prawn farming | | | | | |
| Fertilizer and drug cost | 38 | 28.60 | 1.00 | 8.00 | 4.39 |
| Feed cost | 62 | 46.60 | 2.00 | 30.00 | 8.00 |
| Product price | 59 | 44.40 | 5.00 | 60.00 | 20.68 |

The above result shows that all three types of agricultural production (livestock, farming, and aquaculture) are affected by market risk. In which, 57.5% of pig farming households are at risk of feed cost and it affects from 0.6% to 41.1% of the profit. Besides, 46.6% of prawn farming households have similar problems with an average loss of 8% in profits. In addition, 48.3% of pig raising and 13.3% of rice-growing households are at risk of seed cost with an average profit impact of 14.56% and 2.56%. Other factors have certain influences on the production efficiency although the impact level is not high. Especially, the risk of output product price affects all types of agricultural productions. This type of risk reduces the profit of pig farming households by 26.45%, dragon fruit growers have a 25.83% reduction in profits. The proportion of rice farming households experiencing this risk is less than the other two types of production, with a decrease of 11.6% in profits.

Table 4: Status of financial risk

| Risk | Frequency (household) | Percentage (%) | The impact degree on profit (%) | | |
|---|-----------------------|----------------|---------------------------------|-------|------|
| | | | Min | Max | Mean |
| Pig farming | | | | | |
| Lack of production capital | 83 | 70.3 | 0.36 | 57.14 | 6.10 |
| Increasing loan interest rates | 36 | 30.5 | 0.03 | 11.00 | 6.20 |
| Rice farming | | | | | |
| Lack of production capital | 54 | 45.0 | 0.03 | 15.00 | 7.40 |
| Increasing loan interest rates | 27 | 22.5 | 0.01 | 5.00 | 2.40 |
| Dragon fruit farming | | | | | |
| Lack of production capital | 8 | 6.1 | 2.00 | 10.00 | 6.40 |
| Increasing loan interest rates | 15 | 11.4 | 0.65 | 4.80 | 2.56 |
| Changes in the credit purchases of agricultural materials | 81 | 62.1 | 0.29 | 5.00 | 1.60 |
| Prawn farming | | | | | |
| Lack of production capital | 62 | 46.6 | 2.00 | 25.00 | 5.82 |
| Increasing loan interest rates | 6 | 4.5 | 2.00 | 5.00 | 3.17 |
| Changes in the credit purchases of agricultural materials | 19 | 14.3 | 2.00 | 10.00 | 4.19 |

Besides production risks and market risks, farmers in the Mekong Delta are also affected by financial risks (the lack of production capital, rising interest rates, or changes in credit purchases of inputs). Based on the result, 70.3% of pig farming households, 45% of rice farmers, 6.1% of dragon fruit farmers, and 46.6% of prawn farmers face the problem of capital shortage. Depending on the type of production, this type of risk has different impact levels. However, the lowest average level of impact on the profit is 1.6% and the highest is 7.4%. Compared with the influence of production risk and market risk, the financial risk has less impact on production efficiency.

Households' demand for agricultural insurance

The study proposes two agricultural insurance packages, selling price insurance and production insurance, to measure the willingness to participate in agricultural insurance. According to the survey result, 34.2% of households have the demand for price insurance. Most of them are very unwilling and unwilling to participate in price insurance. The reason is that farmers do not have an understand and are not confident in insurance companies. They believe that with a small production scale, it is not necessary to participate in insurance. Although the output price fluctuates, some farmers are still afraid to pay an initial fee to ensure the price floor for products. For the production insurance package, the participation rate is lower than price insurance (21.5%). Furthermore, the percentage of farmers who are very unwilling and unwilling to participate in production insurance is very high (78.5%).

Table 5: Level of farmer's demands for agricultural insurance

| | Price insurance | | Production insurance | |
|--|-----------------------|----------------|-----------------------|----------------|
| | Frequency (household) | Percentage (%) | Frequency (household) | Percentage (%) |
| Demand for insurance | 172 | 34.2 | 108 | 21.5 |
| Willingness to participate in insurance | | | | |
| Very unwilling | 175 | 34.9 | 170 | 33.8 |
| Unwilling | 156 | 31.0 | 225 | 44.7 |
| Neutral | 10 | 1.9 | 17 | 3.4 |
| Willing | 100 | 19.9 | 73 | 14.5 |
| Very willing | 62 | 12.3 | 18 | 3.6 |

Factors affecting farmers' demands for agriculture insurance

The study uses the probit model to estimate the factors affecting farmer needs for agricultural insurance. The Corr test values are all less than 0.8, so multicollinearity between independent variables can be ignored (Nam, 2008). Besides, the model test value (Prob > chi²) = 0.000 shows that the research model has a high significance level (1.0%).

Table 6: Estimation result by the probit model

| Variable | Estimated coefficient | dY/dX | Z value | P > z |
|------------------------|-----------------------|--------|---------|--------|
| Constant | -2.083 | - | -6.02 | 0.000 |
| EXPERIENCE | 0.011 | 0.004 | 1.40 | 0.163 |
| EDUCATION | 0.082 | 0.031 | 2.97 | 0.003 |
| COST | -0.002 | -0.001 | -3.23 | 0.001 |
| RISK | 0.487 | 0.182 | 7.88 | 0.000 |
| TRAINING | 0.385 | 0.144 | 2.36 | 0.018 |
| LR | 87.640 | | | |
| Pro > chi ² | 0.000 | | | |
| Log-Likelihood | -173.672 | | | |

Based on the above table, except for the EXPERIENCE, the remaining variables are statistically significant at the 5% level. The result is explained in detail below.

The variable RISK has a positive relationship with farmers' needs for agricultural insurance, with a significance level of 1%. Specifically, if a farmer encounters one risk in production, the probability to buy insurance increases by 18.2%. This result is understandable because the more risks the farmer takes, the lower the profit they get, or even they lose the initial investment amount. Therefore, farmers have the demand for their production security and get compensation if they encounter production risks.

The variable COST is statistically significant at the 1% level. However, this variable negatively impacts the need for agriculture insurance. Theoretically, if farmers spend a large amount of initial investment cost, the risks are more likely to happen. However, the actual survey says that most farmers consider that the initial investment cost is too large compared to their financial ability. Hence, farmers may not spend any more money on insurance, especially that they receive compensation once the risk happens.

The variable TRAINING: As expected, this variable is positively correlated with the need to participate in agricultural insurance of farmers at a 5% significance level. Farmers who take technical training courses have a higher capability to buy agricultural insurance of 14.36% than the group of farmers not taking training courses. Participating in the training courses helps farmers identify potential risks in production and be aware of the benefits of agricultural insurance.

The variable EDUCATION: this variable is significant at a 1% significance level and positively correlated with the need for insurance. If the household head has an education level higher than one school year, the probability of buying insurance increases by 8.17%. To some extent, this proves that the farmer with high education background has a high understanding and deep insight into the problem. Thus, these household heads are willing to participate in agricultural insurance.

CONCLUSIONS AND RECOMMENDATIONS

In summary, farmers in the Mekong Delta region face many difficulties and risks in the production process, which greatly affect production efficiency. Farmers are affected by three main risk groups: production risk, market risk, and financial risk. Farmers are not familiar with agricultural insurance, so the demand for insurance is low. The study has pointed out affecting factors to insurance demands are the number of risks, total costs, education level, and training participation. The “number of risks” factor has the most influence on the ability to buy agricultural insurance.

Several recommendations are proposed to prevent agricultural risks for farmers by agricultural insurance: (i) Farmers should take part in training courses or cooperatives to improve production techniques, share experiences, and better awareness about agricultural insurance. Moreover, farmers need to update market information for a better production orientation. (ii) The local agricultural industry should open seminars and technical training to provide farmers with information about the importance and benefits of agricultural insurance in preventing risks. (iii) To help farmers easily access agricultural insurance, the local authority needs to cooperate with insurance units to develop a reasonable fee and complete contract terms for higher insurance demands.

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