Farmers' Perceptions of Agricultural Insurance: A Case Study of Altınekin District, Konya, Turkey

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Abstract. The study aims to determine farmers’ perceptions of agricultural insurance and analyzing the relationships between factors affecting farmers’ willingness to take out agricultural insurance in Altınekin District of Konya Province. To obtain data using a questionnaire by interviewing 30 farms enterprises in 2019. A pilot evaluation, descriptive analyses and chi-square test were used. The results showed that the most grown plants were wheat, barley, sugar beet, corn and pumpkin. Farmers’ agricultural income from food crops was 785.871,29 TL. As many as 86,67% of farmers know information about agricultural insurance and 56,67% of them assume that agricultural insurance was important. More than 60% of farmers know that the government provides support to agricultural insurance. However, 61,11% of farmers felt that support from the government had not been effective. The results of the study showed that 56,67% of farmers were willing to purchase agricultural insurance again. A significant relationship between agricultural income and premiums paid for agricultural insurance, the premiums paid for agricultural insurance and the amount of support paid by the government, the membership of agricultural organizations and the information source of agricultural insurance, and the age and the information source of agricultural insurance were found.

Keywords: Crop production, Agricultural Insurance, Willingness to purchase, Chi-Square Test, Konya

1. Introduction
The agricultural sector is a very important sector of human life. Agriculture will always be needed throughout human life. Agricultural sectors support to reduces poverty and help to protect the environment [1]. There is a risk in every farming activity. When managing farming activity, weather conditions, post-harvest, government policies, etc. faced the risk. All of these risks affect agricultural profitability. There are five types of risk which are production risk, price or market risk, financial risk, institutional risk, and personal risk [2]. Meanwhile according to [3] five risks identified in agriculture namely production risk, marketing risk, credit risk, personal risk and environmental risk. Then [4] added political and commercial risks to this list.
There are several options for managing risks that involve a combination of strategy and tools to manage the risks faced by farmers. One of them is agricultural insurance. Insurance can be a component of a comprehensive risk management strategy.

The agricultural sector contributes to the economy of Turkey, but the uncertainty risk is a major challenge to agricultural sustainability. Fluctuations in income are also caused by the risk of uncertainty in the production, harvesting and marketing process. Changes in policy from the state also affect farmers' income. To reduce the impact of the risks faced by farmers, Turkey's Government encourages farmers to manage the risks. Agricultural insurance is one of the risk management mechanisms to ensure income stability.

In Turkey, Agricultural Insurance pool and TARSIM started the activities in 2006 [5]. The government provides insurance premiums subsidies for the farmers. This was a government way to provide a sustainable food supply and against the impact of risks. In Konya Province between 2012-2018, the number of farmers who carried out agricultural insurance was increase 117% [6].

This study was aimed to examine farmers' perceptions of agricultural insurance. The specific objectives were to describe the socio-economic characteristics of the farmers and analyze the relationships between factors affecting farmers' to take out agricultural insurance.

2. Materials and Methods

2.1. Study Area
Total agricultural land in Turkey is 37,802 million hectares [7]. Konya has 4,084 million hectares or about 10.80% of the total land in Turkey. More than 65% of the total area of Konya Province is used as agricultural land with an irrigation area of 5.4 million or 30% of the total agricultural area in Konya. As many as 91,3 thousand farmers were registered in Konya Province. Altinekin is one of Konya Province's district with geographical location of Altinekin District which located between 38° 08' and 38° 34' latitudes and 32° 32' and 32° 58' longitudes [8]. There are 645,960 decares of agricultural land in Altinekin. More than 69% of the land is wetlands. Wheat and sugar beet are the most grown products. Which sunflower and pistachio placed in the third and fourth positions of the most grown products [9].

2.2. Data Collection

The target population of this study were farmers who had agricultural insurance in Altinekin District. According to the objective of the study, Altinekin District was chosen as the study area because the number of farmers who had agricultural insurance in Konya. Mainly primary data were used for this study. A questionnaire by interviewing 30 food crop farmers in 2019 was used to obtain data. A pilot evaluation was used. Data were collected on 10, 13 and 14 December 2019.

2.3. Data Analysis Techniques

2.3.1. Descriptive Analysis. Most of the results of the study are presented in tabular and descriptive forms. Descriptive tools like frequency distribution, percentages, averages and ranking techniques were used to analyse the socio-economic characteristics of the respondents. Agricultural Income is defined as a portion of the gross product that the entrepreneur and his family can spend over a year to meet their needs without a reduction in their pure capital value [10].

2.3.2. Chi-Square Test of Independence. The Chi-Square test of independence was used to analyze the relationships between the factors affecting farmers' willingness to take agricultural insurance. Factors affecting agricultural insurance; between agricultural income and the number of premiums paid for agricultural insurance, between the amount of premium paid for agricultural insurance and the amount
of support paid by the state, between membership status to agricultural organizations and sources of information about agricultural insurance, and between age groups and sources of information about agricultural insurance. By using the chi-square test of independence observations should be presented as a series of classified or grouped composites. This form of representation is called the maintenance chart. This table consists of rows and columns with variable classes. If the number of rows and columns (columns) in the table (r) is represented by (c), a (r * c) cotgenez table is obtained. Cross-classification is done to test the relationship (dependency or independence) between line items and items in columns. For this, the expected frequency (Ei) of the elements in each row and column should be compared with the observed frequency (Oi) [11]. Chi-square test statistics are calculated by the following formula:

\[ X^2 = \sum \frac{(O_i - E_i)^2}{E_i} \]

\( X^2 > x^2_a \); \( (r - 1) * (c - 1) \) means H0 hypothesis is rejected, H1 hypothesis is accepted. 
\( X^2 < x^2_a \); \( (r - 1) * (c - 1) \) means H0 hypothesis is rejected, H1 hypothesis is accepted.

\( a \); Probability of error (significance level).

Hypothesis:

a. H0: There is no significant relationship between agricultural income and the number of premiums paid for agricultural insurance,
H1: There is a significant relationship between agricultural income and the number of premiums paid for agricultural insurance.

b. H0: There is no significant difference between the amount of premium paid in agricultural insurance and the amount of support paid by the state,
H1: There is a significant difference between the number of premiums paid for agricultural insurance and the amount of support paid by the state.

c. H0: There is no significant difference between the membership status of agricultural organizations and their sources of information on agricultural insurance,
H1: There is a significant difference between the membership status of agricultural organizations and their sources of information on agricultural insurance.

d. H0: There is no significant relationship between age groups and their sources of information on agricultural insurance,
H1: There is a significant relationship between age groups and their sources of information on agricultural insurance.

Oi and Ei represent observed and theoretical frequencies for each class. If X2 is greater than the critical value, we reject the Ho hypothesis that is observed and confirmed by the theoretical distribution. In this section, the chi-square test of independence was used to measure whether there is a relationship between the factors determining the willingness of farmers to take out insurance, their exposure to risk and the amount of premium paid.

3. Results and Discussion

3.1. Socio-economic Characteristics of the Respondents

Socio-economics were important characteristics that could help farmers’ to increase production by increasing the efficiency of adopting new practices or technologies. These features help shape farmers’ entrepreneurial skills in rational decision-making, especially those related to agricultural business systems. Socio-demographic characteristics have been researched to investigate the suitability of farmers for agricultural insurance skills [12,13].
Table 1. Socio-demographic characteristics of the respondents

| Variables                     | Mean  | Std. Deviation |
|-------------------------------|-------|----------------|
| Age of household head (Years) | 49,20 | 10,40          |
| Household size                | 4,50  | 1,74           |
| Farming experience (years)    | 28,90 | 10,53          |
| Labour (day)                  | 767,98| 338,21         |
| Farm size (da)                | 595,68| 1,117,23       |
| Farm income (TRY)             | 398,239,09 | 803,588,79 |

The average age of farmers in the study area was 49,20. Besides, the average age of farmers in Konya 2019 was 46,23 [14] and in 2017 was 49,54 [15]. It showed that farmers in Konya Province are in the productive age. This allowed farmers to be more contributed to their farming activities. The average household size of the respondents was about 5 persons. This suggested the possibility of more availability of family labour for farming activities. Farmers in the study area had an average of 28,90 years of agricultural experience. According to [14] in Konya farmers have 21,49 years, meanwhile reported by Falola et. al. [13] that in Nigeria farmers had 25,58 years of farming experience. As farmers’ farming experience increased, more problems were encountered by farmers. It was possible for farmers to carry out farming activities more effectively and efficiently. The workforce capacity in the research area has been calculated by calculating the Male Labor Unit coefficients. Family labour potential was 80,25% of the total workforce and foreign labor force was 19,75%.

Table 2. Characteristics of the farmers

| Variables                        | Category             | Frequency | Percentage |
|----------------------------------|----------------------|-----------|------------|
| Educational level                | Primary Education    | 17        | 56,67      |
|                                  | Secondary Education  | 7         | 23,33      |
|                                  | Tertiary Education and above | 6 | 20,00 |
| Social security                  | SSK                  | 7         | 23,33      |
|                                  | BAĞKUR               | 22        | 73,33      |
|                                  | Pension fund         | 1         | 3,33       |
| Agricultural organization membership | Yes               | 29        | 96,67      |
|                                  | No                   | 1         | 3,33       |
| State support amount (TRY)       | 1-10000              | 21        | 70,00      |
|                                  | 10001-20000          | 5         | 16,67      |
|                                  | 20001-30000          | 1         | 3,33       |
|                                  | Above 30000          | 3         | 10,00      |
| Debt (TRY)                       | 0-100000             | 22        | 73,33      |
|                                  | 100001-200000        | 3         | 10,00      |
|                                  | Above 200000         | 5         | 16,67      |

Average land ownership in the study area was 595,68 da. However in 2017 was 117,47 da [15] and in 2019 it was 207,89 da [14]. In 2019, 12 types of food crops were produced. These products were wheat, barley, sunflowers, sugar beet, corn, birdseed, pumpkin, dried beans, potatoes, alfalfa, fig trees,
and oats. Average income of farmers in agricultural activities as much as 398,239,09 TRY. The income of farmers per decare was 568,57 TRY. Agricultural income is one of the criteria for success in farming activities.

The level of education of farmers in the study area was still low with 56.67% of them graduating from elementary school. In another study, 67.74% [16] and 54.44% [15] farmers who carried out agricultural insurance in Konya Province were elementary school graduates. Education influences farmers’ decisions to adopt new knowledge and technology [17]. Around 73.33% of farmers had social security managed by BAĞKUR. This showed that most farmers were self-employed so they were members of the social security fund for farmers (BAĞKUR). About 96.67% of farmers were members of agricultural organizations. Membership in agricultural organizations provided benefits for farmers to gain access to information and endorsement. In the study area 70% received funding support from the government with an amount below 10,000 TRY for farming activities. Support provided in the form of subsidies for agricultural insurance premiums and subsidies for seeds as well as fertilizer. Around 73.33% of farmers had loans under 100,000 TRY. These debt funds were used to carry out agricultural activities. Farmers borrowed funds from banks with a term of one year.

Table 3. Farmers’ perception of agricultural insurance

| Variables                                      | Category   | Frequency | Percentage |
|------------------------------------------------|------------|-----------|------------|
| Affected with risk                            | Yes        | 13        | 43.33      |
|                                                | No         | 17        | 56.67      |
| Food Crops Agricultural insurance premium amount (TRY) | 1-1000    | 11        | 36.67      |
|                                                | 1001-2000  | 7         | 23.33      |
|                                                | Above 2000 | 12        | 40.00      |
| Agricultural insurance information status     | Yes        | 26        | 86.67      |
|                                                | No         | 4         | 13.33      |
| The information about state support of agricultural insurance | Yes | 18 | 60.00 |
|                                                | No         | 12        | 40.00      |
| The effectiveness of government support        | Yes        | 11        | 61.11      |
|                                                | No         | 7         | 38.89      |
| The importance of agricultural insurance      | Important  | 17        | 56.67      |
|                                                | Not important | 13         | 43.33      |
| Willingness to reinsurance of food crops      | Yes        | 17        | 56.67      |
|                                                | No         | 13        | 43.33      |

In the last five years, farming activities 56.67% were not affected by risk. Risks encountered by farmers were natural disasters such as hail and drought. More than 40% of farmers paid insurance premiums above 2,000 TRY. It caused farmers in the study area to have a large area of land so the insurance premiums paid are also higher. In addition, farmers did not only insure one type of agricultural product.

According to the research as many as 86.67% farmers were knowing information of agricultural insurance. The government subsidized agricultural insurance premiums by 50%, but only 60% of the farmers knew this information. The other studies showed that in Konya Province 98.39% of farmers know the information about government’s subsidies [16]. As many as 61.11% of farmers said that government support was not effective. It caused by farmers were not satisfied with the solution to the drought that faced in farming activity. The farmers 56.67% stated that agricultural insurance is
important. While in Samsun Province 35.71% of farmers said the importance of agricultural insurance [18] From the study area, 56.67% of farmers want to re-carry out agricultural insurance the following year. This can be caused by many factors including the obligation of farmers to take part in agricultural insurance if they want to take a loan. In addition, farmers’ awareness of the importance of agricultural insurance to face risks is also a reason for farmers to take out agricultural insurance again.

3.2. Analysis of the relationships between factors affecting farmers' willingness to take out agricultural insurance

The study was conducted with the chi-square test of independence for the relationships between factors affecting the willingness to take out agricultural insurance. Factors affecting agricultural insurance; between agricultural income and the number of premiums paid for agricultural insurance, between the amount of premium paid for agricultural insurance and the amount of support paid by the state, between membership status to agricultural organizations and sources of information about agricultural insurance, and between age groups and sources of information about agricultural insurance.

3.2.1. Analysis of the relationship between agricultural income and the number of premium paid for agricultural insurance

Table 4. Chi-Square test analysis of the relationship between agricultural income and the number of premium paid for agricultural insurance

|                         | Asymp. Sig. (2-sided) |
|-------------------------|-----------------------|
| Pearson Chi-Square       | .001                  |
| Likelihood Ratio         | .198                  |
| Linear-by-Linear Association | .010          |
| N of Valid Cases         |                       |

According to the chi-square analysis results, between the agricultural income and the premium amount paid for agricultural insurance, Sig. 0.001 p <0.05, H0 is rejected. That is, there is a significant difference between agricultural income and the number of premiums paid for agricultural insurance. As the income level of farmers increases, premium payments for agricultural insurance increase.

3.2.2. Analysis of the Relationship between the Amount of Premium Paid for Agricultural Insurance and the Amount of Support Paid by the State

Table 5. Chi-square test analysis between the amount of premium paid for agricultural insurance and the amount of support paid by the state

|                         | Asymp. Sig. (2-sided) |
|-------------------------|-----------------------|
| Pearson Chi-Square       | .000                  |
| Likelihood Ratio         | 1.000                 |
| Linear-by-Linear Association | .000          |
| N of Valid Cases         |                       |

According to chi-squared test analysis results, between the premium amount paid for agricultural insurance and the amount of support paid by the state, sig. H0 is rejected because it is 0.000 p <0.05. In other words, agricultural insurance has shown that there is a significant difference between the number of premiums paid and the amount of support paid by the state. The state has awarded 50% of
the support to the amount of the premium paid, if the amount of support varies, the farmers’ agricultural insurance will change the amount paid.

3.2.3. Analysis of Relationships Between Membership Status of Agricultural Organizations and Sources of Information on Agricultural Insurance

Table 6. Chi-square test analysis among the sources from which they get information about membership in agricultural organizations and agricultural insurance

|                           | Asymp. Sig. (2-sided) |
|---------------------------|-----------------------|
| Pearson Chi-Square        | .000                  |
| Likelihood Ratio          | .001                  |
| Linear-by-Linear Association | .357                |
| N of Valid Cases          |                       |

According to the results of the chi-square test analysis, among the sources, they obtained information about the membership status of agricultural organizations and agricultural insurance, sig. H0 is rejected because it is 0.000 p <0.05. It can be said that there is a significant difference between the membership status of agricultural organizations and their sources of information on agricultural insurance. If satisfaction with membership to agricultural organizations is high, more information about farmers can be obtained about agricultural insurance.

3.2.4. Analysis of the Relationship Between Age and Sources of Information on Agricultural Insurance

Table 7. Chi-square test analysis among the sources they get information about age and agricultural insurance

|                           | Asymp. Sig. (2-sided) |
|---------------------------|-----------------------|
| Pearson Chi-Square        | .019                  |
| Likelihood Ratio          | .005                  |
| Linear-by-Linear Association | .213                |
| N of Valid Cases          |                       |

According to the result of chi-square test analysis, age and sources of information about agricultural insurance was sig. H0 is rejected because it is 0.019 p <0.05. Therefore, a significant difference was found between age groups and sources of information on agricultural insurance. Age has affected the receipt of information obtained by farmers. As farmers grow older, more contacts will be established and more information has been available.

4. Conclusion

Konya City is one of the cities with extensive agricultural land ownership. Farmers' agricultural income from food crops was 785.871.29 TL. But on the other hand, Konya City is one of the areas facing many agricultural risks. Agricultural insurance is one of the solutions chosen by farmers to face risks. As many as 86.67% of farmers knew information about agricultural insurance and 56.67% of them assume that agricultural insurance was important. More than 60% of farmers knew that the government provided support to agricultural insurance. However, 61.11% of farmers felt that support from the government had not been effective. The results of the study showed that 56.67% of farmers were willing to purchase agricultural insurance again. A significant relationship between agricultural income and premiums paid for agricultural insurance, the premiums paid for agricultural insurance and the amount of support paid by the government, the membership of agricultural organizations and the information source of agricultural insurance, and the age and the information source of agricultural insurance were found.
Konya Province is dry land, it caused water shortage in their agricultural activities. To reduce the impact of water scarcity, farmers seek support from the government. The solution that can be made is to optimize the comprehensive irrigation function by providing support for management information and irrigation machines. According to the farmers, the support provided by the state is insufficient. By collecting the data about plant species to be sown in the next season can be alternative solutions to providing certified fertilizers and seeds to be the right target. The government has to make a support combination that suitable for the socio-economic characteristics. This should increase research on plant breeding according to regional characteristics.

The results showed that farmers’ willingness to re-insurance for agriculture is still quite low. A clear explanation of the agricultural insurance plan is required so that farmers can understand the importance of agricultural insurance. The government may need a strategic policy to convince farmers of the reliability of their insurance plans by increasing their awareness and understanding of crop insurance through advertising and education. Providing insurance in accordance with the characteristics of the risks faced by certain areas can increase farmers’ willingness to re-insurance for agricultural insurance.

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