International Journal of Development and Sustainability
ISSN: 2186-8662 – www.isdsnet.com/ijds
Volume 10 Number 4 (2021): Pages 160-181
ISDS Article ID: IJDS18031101

Eliciting attitude of farmers toward agricultural insurance and willingness to pay in Çarşamba district of Samsun, Turkey

Benardict Kiprop Kipkemoi, Vedat Ceyhan

Department of Agricultural Economics, Ondokuz Mayis University, Körfez Mahallesi, 19 Mayıs Ünv., 55270 Atakum/Samsun, Turkey

Abstract

This study examined the attitude of farmers toward agricultural insurance and willingness to pay for agricultural insurance in Çarşamba district of Samsun province, Turkey. Research data were collected from randomly selected 42 farmers using structured questionnaires. Risk attitudes of farmers were elicited using the modified Neumann-Morgenstern model. Logit model was used to explore the factors influencing agricultural insurance motivation. Research results showed that the level of buying agricultural insurance contract was not satisfactory level. The most important reason for not having agricultural insurance was limited content of the insurance policy. Lack of trust, unclear content of insurance policy, high level of bureaucracy, limited information on insurance, high premium, presence of small farm size, and long waiting period for claim were other barriers to adoption of agricultural insurance. Research findings also showed that nearly half of farmers were eager to buy agricultural insurance policy. Farmers were ready to pay 29,5₺ for insurance contract of hazelnut, while that of peach contract was 18₺. The variables of family size, schooling, and experience and farm size affected the willingness positively and all of them were statistically significant. However, the variables of awareness of government support for insurance, credit use and the amount of the support payment affected the farmers' willingness to pay for agricultural insurance negatively. Designing farmers' extension education program focusing on agricultural insurance to enhance farmers' information may accelerate the dissemination of agricultural insurance. Simultaneously, revising the content of the insurance policy and reducing bureaucracy may increase the farmers' interest in agricultural insurance. In addition, long waiting period for claim should be shortened through reducing bureaucracy. Agricultural insurance promotion activities should focus on the educated farmers having large farms.

Keywords: Risk Attitudes; Insurable Risk; Willingness to Pay; Agricultural Insurance; Turkey

Cite this article as: Kipkemoi, B.K. and Ceyhan, V. (2021) "Eliciting attitude of farmers towards agricultural insurance and willingness to pay in Çarşamba district of Samsun, Turkey," *International Journal of Development and Sustainability*, Vol. 10 No. 4, pp. 160-181.

*Corresponding author. *E-mail address: kipkemoikiprop@yahoo.com*

1. Introduction

Agriculture is one of the drivers of Turkish economy, contributing about 8% of the GDP, 20% of share of employment and agro-food exports constituted 11% of total exports (OECD, 2013; World Bank, 2013–2014; TURKSTAT, 2014). The total utilized agricultural area in Turkey is 38.56 million hectares and 41% of it is sown area allocated to cereals and other field crops, while 38% of it is under permanent meadows and pastures (TURKSTAT, 2014). Despite the fact that agriculture contributes to the economy of Turkey, risks and uncertainties pose a great challenge to its sustainability.

In Turkey, more than 3.5 million farms have conducted their activities under risky and uncertain conditions. Risks and uncertainties in production and marketing stage of agricultural activities make the Turkish farmers unstable due to income fluctuations. Some personal risks and institutional risks sourced by policy changes have increased the volatility of the income fluctuations for Turkish farmers. Consequently, some Turkish farmers have preferred to the transfer of their risks. Turkish government also encouraged the farmers to manage their risks. Agricultural insurance is one of the risk transfer mechanism to ensure income stability.

Low level of willingness to pay for agricultural insurance poses a significant risk to sustainable agriculture amid high cases of climate change in Turkey. Turkish government provides a subsidy for insurance premiums to farmers (TARSİM, 2014). Risk attitude and social economic factors tend to influence the willingness to pay for agricultural insurance premiums (Uysal, 2005; Ali, 2013; Birinci and Tümer, 2006) leading to insurance companies recording low uptake level of agricultural insurance premiums. However, there is limited information on the risk attitude of farmers and willingness to pay for agricultural insurance, thus hindering the government effort to ensure sustainable food supply and to counter effects of risk.

Çarşamba district is one of the rich agricultural lands in Turkey. Hazelnut farming is predominantly practiced and it contributes to the economy of the farmers. The farmers face risk and uncertainties that affect their agricultural income. Therefore, research was done to elicit attitude of farmers toward agricultural insurance and willingness to pay as agricultural, as agricultural insurance is one of the risk management strategies. The findings will be able to inform policy measures that will be implemented in Çarşamba district and other parts of Turkey as well as the rest of the countries in the World.

1.1. Limitation of the study

The study was limited by finance, cultural difference, weather conditions, and language barrier. In addition, the cultural practice played a significant role. It was difficult for the inclusion of a significant number of females to respond to questions. The number of women interviewed was because of our convincing evidence of the importance of the study. Most of the respondents were male. Most farmers were not able to answer some of the questions touching on their financial status. The persuasion of the respondents on confidentiality of the information made it possible. The weather condition was snowing, making the assessment to many places not possible. Revisits of the area of study were made during favorable weather conditions. Moreover, the language barrier was another problem as some of the responds required translation and research assistants helped in solving the aforementioned problem.

2. Methodology

2.1. Study area

The research was conducted in the Çarşamba district of Samsun, Turkey. It lies on 41°31'N 35°35'E and 15M above the sea level. Çarşamba is located to the west of Tekkeköy, east of Terme and surrounded by Salıpazarı and Ayvacık in the South (URL1, 2015). The typical central Black Sea climate is exhibited in the research area. The summers are cool and the winters are mild and rainy. The annual average rainfall is 600–700 mm, while the annual average temperature is 15–17°C. During the month of October until end of December, experience more rain and less snow. July and August are the hottest months while the coldest months are January and February (URL2, 2015). Çarşamba is the third district in terms of population in Samsun with a population of 136.775 million people, in which 68.162 million are male and 68.613 million are female. There was a slight increase in the population of the people of Çarşamba since the year 2007 (URL3, 2015). Çarşamba Plain has 53300 hectares of agricultural land in which vineyards, orchards, meadows, and cultivated fields are found. The important agricultural products of the district are hazelnuts, wheat, corn, vegetables, sunflowers, sugar beets, and rice (URL2, 2015).

2.2. Data collection

The research data were collected from randomly selected farms using a structured questionnaire through face to face interview in the Çarşamba district of Samsun Province. Ağcagüney, Şeyhgüven, and Aşağı Dikencik Villages were selected purposely to represent the Çarşamba district based on the judgments of experts. 10115 farms conducted their agricultural activities in three villages constituted the research population. Farm size was the sampling criteria, when constructing the sampling frame. Optimum sample size was calculated using simple random sampling method and through the formula below (Yamane et al., 2001).

$$n = \frac{N(zS)^2}{Nd^2 + (zS)^2}$$

In the equation, n was the number of sample farms, N was the total number of farms, S was standard deviation, and d was the error. The calculated optimum sample size was 42 with the 10% precision and 90% confidence. Random numbers table was used to determine the sample farms.

2.3. Data analysis

2.3.1. Determination of annual working unit (AWU)

Table 1 provided the labor units of male and female according to the age levels and it was used in calculating the farmers' AWU.

2.3.2. Methods used to measure farm economic performance

Liquidity measures and profitability measures were used to explore economic performance of farms. When revealing liquidity of sample farms, we calculated the current ratio and acid test ratio (Weygandt et al., 2001).

Table 1. The age and labor units of farmers (Erkuş and ve Demirci, 1985)

Age	Male	Female
7–14	0.50	0.50
15–64	1.00	0.75
65–+	0.75	0.50

The formula for calculating current ratio is given by:

$$\text{Current Ratio} = \frac{\text{Current assets}}{\text{Current liabilities}}$$

The current ratio is considered as favorable when it has a value between 2 and 2.5 (Vintila, 2006). If the value is higher than 2, it means an underutilization in the use of resources and if the ratio is <2, it means lack of liquidity to pay short term financial obligation.

The other liquidity measure is acid-test ratio that defers from current ratio as inventory is eliminated from the current asset, which forms the numerator (Fraser and Ormiston, 2004). The acid-test ratio consists of the assets that are most easily converted to cash: Cash and cash equivalents, short-term investments, and accounts receivable. A value of the ratio between 0.8 and 1 is said to be optimal (Wild et al., 2007). The acid-test ratio is computed by formula below:

$$\text{Acid} - \text{test ratio} = \frac{\text{Current Assets} - \text{Inventories}}{\text{Current Liabilities}}$$

When revealing the profitability of the sample farms, we used the return on asset as a measure. Profitability is defined as "the ability of a given investment to earn a return from its use" (Harward and Upto, 1961). In other words, it means the ability of farm to generate profit using the available resources. Return on total assets measure the overall efficiency of the farm to manage assets to produce profit. Return on total assets shows the amount of profit earned over average total assets (Fraser and Ormiston, 2004). The formula is given by the formula below:

$$\text{Return on total assets} = \frac{\text{Net profits after taxes}}{\text{Average total assets}}$$

2.3.3. Methods used for risk analysis of farms

2.3.3.1. Eliciting risk attitudes of sample farmers

Empirical studies to elicit risk attitudes of farmers have continued in two different dimensions. Experimental gambling method, which is based on the choices between certain and risky hypothetical or actual alternatives, is the first dimension (Dillon and Scandizzo, 1978; Binswanger, 1980; Grisley and Kellog, 1987). The second is the indirect approach, which is based on the observed economic behavior (Moscardi and Janvry, 1977; Knight et al., 2003). We preferred to use the experimental approach. The modified Neumann-Morgenstern model was used to elicit utility function from sample farmers in the research area. Certainty equivalents were elicited using a sequence of risky outcomes and matched with utility values (Hardaker et al., 1997).

2.3.3.2. Determining the insurable risk

When examining the risks faced by farmers whether insurable, or not, the study used the risks faced by sample farmers, their probability and amount of loss calculated using farmers' response. The study followed the seven different characteristics of insurable risk suggested by Hardaker et al. (1997) as criteria. The first requirement is the great number of farmers faced with risk. The second is that the risks faced with and their loss should be definable and measurable. The presence of the opportunities for estimating the possible loss and calculating the probability of the loss are the third and fourth characteristics. The fifth characteristic is that the probability of occurrence is low and the loss is large. Last two characteristics of insurable risk should not to be catastrophic risk and having random loss, respectively. When examining the risks faced by sample farmers, the study used the tradeoff between premium paid by farmers and potential loss. It was assumed that the risk was insurable if the premium paid by sample farmers was lower than that of potential loss, while the reverse was the case if the premium paid by farmers was larger than that of potential loss. If the probability of the occurrence of the risk was below 0.5, the probability was assumed low, whereas if the probability of the occurrence was more than 0.5, the probability was assumed to be high.

2.3.3.3. Exploring the influencing factors on agricultural insurance motivation

Logit model that was one of the limited dependent variable models was used to explore the influencing factors on agricultural insurance motivation. Agricultural insurance motivation was the dependent variable of the logit model. Farmers who had insurable risk and purchased the agricultural insurance policy were included the model by 1, while farmers who had insurable risk and not purchase the agricultural insurance policy included the model by 0. Socio-economic characteristics of farmers such as age of farmers, education level of farmers, experience level of farmers, family size, and income, and farm characteristics such as farmland, return on assets, and working capital were included in the model as independent variables. The general form of logit model was presented below.

$$Pi = F(Zi) = F(\alpha + \beta Xi) = \frac{1}{(1+\exp^{-(Zi)})} = \frac{1}{1+\exp^{-(\alpha+\beta Xi)}}$$

Where F was the cumulative probability function, α and β were the parameters reflected the relationship between agricultural insurance motivation and independent variables.

2.3.3.4. Exploring the relationship between the premium and willingness to pay

Farmers' willingness to pay for agricultural insurance was explored using the response of farmers to scenario-based questions. After gathering the amount of premium that farmers were willing to buy agricultural insurance, regression analysis was performed to reveal the relationship between the amount of premium and the number of policies. Dependent variable was the number of insurance policies, while the variable of the amount of premium that farmers were willing to pay was independent variable. Model parameters were estimated using ordinary least squares method. Linear regression among the potential function form such as logarithms, semi-logarithms, and polynomial was selected as a functional form to produce best fit. After checking the theoretical expectations, statistical significance level of model parameters was tested using t test. Following, multiple determination coefficients was used to reveal the level of explained variance. When exploring the sensitivity of the farmers to the changes of the amount premium, elasticity was calculated by taking the first derivative of the linear regression model and interpreted.

2.3.3.5. Statistical analysis

The students' t-test was used to test the hypothesis that insured and not insured farmers were differed in terms of the scale variables such as the age and education level of farmers, farmland, hazelnut area, and income. When examining the dependency among the categorical variables, Chi-square test was used.

3. Research results and discussion

3.1. Socio-economic characteristics of farms

Research results showed that the sample farms had 32.9 da. of farmland and about 9 da. of it was dry land. The percentage of the own farmland was approximately 96%, while that of rented land and sharecropping land was 3% and 1%, respectively (Table 2). This suggests that most farmers conducted their activities on their own land. The number of parcels about 4 and mean parcel size was approximately 9 da, indicating that the presence of land fragmentation in the research area. Under the prevailing market condition, the value of irrigated farmland per decare was approximately 14 thousand Turkish Liras (1 ₺ = $ 0,34), while that of dry farmland was a thousand Turkish Liras (Table 3). It implies that the irrigated land was more valuable than that of dry farmland. The difference in the value of land was attributed to the opportunity of growing more crop on the irrigated land throughout the year.

In the research area, farmers allocated their farmland to field crop production and fruit production. Sample farms tend to produce more fruit rather than other crops. They allocated 95% of their farmland to the fruit production, while the share of field crops was very low. The main cash crop for sample farmers

Table 2. Farmland associated with tenure in sample farms

Land tenure	Mean (da)	Std. Deviation	%
Own land	31.50	29.20	95.70
Land rented from outside	0.30	1.70	0.80
Sharecropping land	1.06	4.80	3.50
Total farmland	32.86	28.40	100.00

Table 3. Land characteristics of sample farms

Land characteristics	Mean	Std. Deviation
Irrigated land (da)	1.60	1.30
Own dry land (da)	31.30	9.14
The number of parcels (unit)	3.60	1.80
The mean parcel size(da)	9.14	3.19
Value of irrigated land per decare (₺)	13738.10	5170.60
Value of dry land per decare (₺)	1023.80	3841.30

was hazelnut. Hazelnut constituted 76% of the total farmland. Peach followed it by 19%, while kiwi fruit production area was very rare (Table 4). The results were in tandem with Kılıç (1997) that about 60% of Turkish hazelnut crop was produced in the Eastern Black Sea Region.

In sample farm, the mean age of farmers was approximately 55 years and their schooling was 7 years, on average, indicating that most of the farmers were old and educated. It is an indication of lack of active labor force in the area of study. In Imo state of Nigeria, Chikaire et al. (2016) found out that the mean age of respondents was 55.2 years, which was lower than the results thereof. The agricultural experience of sample farmers was vast. The mean family size was 5 people, on average, and 3 of them participated the agricultural activities. This means that more than half of the family members were working on the farm and it is consistent with Ilkkaracan and Tunalı (2004) that agriculture sector was still contributing immensely to employment in rural areas in Turkey and that production is carried in small farms by unpaid family work or employed in own count. The mean working days per year were 108. Sample farms had the opportunity to get income outside of the farm. The off-farm income was higher than agricultural income outside the farm. Farmers gained an approximately 17 thousand Turkish Liras of off-farm income and 357 ₺ of agricultural income outside the farm (Table 5). This was because of the need to meet the financial obligations such as payment of debts. Covey et al. (2011) showed that off-farm income constituted 80–90% of farm family income. Sample farms had the labor capacity of 3,63 AWU and 77% of

Table 4. Utilization of farmland in sample farms

Crop	Mean (da)	%
Field crops	1.67	5.08
Maize	1.67	5.08
Fruit	31.19	94.92
Hazelnut	24.88	75.72
Kiwi fruit	0.12	0.36
Peach	6.19	18.84
Total farmland	32.86	100.00

Table 5. Some socio-economic characteristics of sample farms

Variables	Mean	Std. Deviation
Age of farmers (year)	55.40	13.60
Schooling (year)	6.80	4.00
Agricultural experience of farmers (year)	33.30	13.70
Working day in a year (day)	107.90	58,90
Off farm income (₺/year)	16952.40	7541.60
Agricultural income from outside the farm (₺/year)	357.10	2314.50
Family size (person)	5.00	-
Number of people working in agriculture	3.00	-

it was family labor. In the research area, one AWU engaged with the approximately 9 decares of farmland (Table 6).

Regarding the social security, most of the farmers had the social security in the research area. 52.4% of the sample farmers joined the social security fund for 37 farmers' umbrella, while that of Retirement fund and Social Insurance Institute were 7% and 38%, respectively (Table 7). The reason for the difference in the percentage of farmers having social securities was that most farmers were self-employed, thus they were members of social security fund for farmers (BAĞKUR). Some of the farmers employed on contract basis, thus joined Social Insurance Security. Social security is a tool for promoting growth through human capital accumulation and motivate aggregate savings and risk-taking (Alderman and Yemtsov, 2012). Therefore, those farmers were having extra cash and were able to engage in agricultural enterprise in spite of the risks.

3.2. Capital structure of sample farms

The capital structure of sample farms is presented in Table 8. In the research area, farms conducted their agricultural activities using 364 thousand Turkish Liras of total assets. 75.22% of this amount was constituted of land related capital, while the rest was buildings and crops. Machinery constituted the 4.49% of the total fixed assets. The percentage of current assets was approximately 3%. Thus, fixed assets took the largest share of total assets, that more people engaged in crop production than livestock production and farming was not highly mechanized.

Table 9 presented the sources of total assets. In the research area, approximately 97% of the farm capital was equity, while the share of the debts was 3%. Sample farms tended to use current debt rather than long-term debt. This depicts that the farmers were engaged in profitable enterprises. Guin (2011) recommended that short-term assets needed to be financed with short-term liabilities and long-term assets need to be financed with long-term liabilities. The respondents may have used the current debts to finance expenses such as fertilizers, seeds, and ploughing.

Table 6. The labor capacity of the sample farms and size of farmland per annual working unit

Labour capacity	Mean
Family labor (annual working unit)	2.80
Total (annual working unit)	3.63
Farmland/total annual working unit (da/annual working unit)	9.07

Table 7. Social security of the sample farms

Social security	Frequency	Percent
BAĞ-KUR	22	52.40
Retirement fund (Emekli sandığı)	3	7.10
Social Insurance Institute	16	38.10
Not having social security	1	2.40
Total	42	100.00

Table 8. The distribution of the total assets

Assets	₺	%
Non-current assets		
Land	264763.11	75.22
Drainage, irrigation, etc.	4646.20	1.32
Building	18725.60	5.32
Perennial crops	44033.32	9.12
Machinery	15804.13	4.49
Livestock	4012.63	1.14
Total fixed assets	351984.99	96.61
Current assets		
Cash, received etc.	12357.10	3.39
Total current assets	12357.10	3.39
Total assets	364342.09	100.00
Total assets per decare	11074.23	

Table 9. The farm liabilities

Liabilities	₺	%
Debts		
Current debt	9880.95	2.71
Long term debt	2476.19	0.68
Total liabilities	12357.10	3.39
Equity	351984.99	96.61
Total liabilities (₺ /farm)	364342.09	100.00
Liabilities per decare	11074.23	

3.3. Economic performance of sample farms

In the research area, farms gained approximately 76 thousand Turkish Liras per year from the crop production. The percentage of the hazelnut production value was 66%, while that of peach and maize were 33% and 1%, respectively. This indicated that hazelnut production was the most source of income of the farmers. This is inconsistent with Dikmen (1999) that hazelnut is the source of income to farmers in the Black sea region of Turkey. The percentage of government support of the total crop production value for hazelnut, maize and peach was 6 %, 0.023%, and 0.08%, respectively (Table 10). Hazelnut farmers received the highest number of government support of all the crops grown. This was because hazelnut was the main crop in the area of study. According to Minister of Science, Industry and Technology (2010) income support and compensatory payments were given to farmers with licensed orchards and

Table 10. Production value associated with crop

Hazelnut area (da)	24.88
Hazelnut production quantity (kg/da)	161.31
Hazelnut price (₺/kg)	11.38
Hazelnut income (₺)	45672.41
Government support (₺)	4492.26
Production value of hazelnut (₺)	50164.67
Maize area (da)	1.67
Maize production quantity (kg/da)	900.00
Maize price (₺ /kg)	0.80
Maize income (₺)	1202.40
Government support (₺)	17.58
Production value of maize (₺)	1219.98
Kiwi area (da)	0.12
Kiwi production quantity(kg/da)	0.00
Kiwi price (₺/kg)	0.00
Kiwi income (₺)	0.00
Government support (₺)	2.51
Production value of kiwi (₺)	2.51
Peach area (da)	6,19
Peach production quantity (kg/da)	1597.46
Peach price (₺ /kg)	2.50
Peach income (₺)	24720.69
Government support (₺)	65.30
Production value of peach (₺)	24785.99
Total crop production value (₺)	76173.15
Total land size (da)	32.86
Production value per decare (₺)	2318.11

unlicensed orchards of hazelnuts, respectively. In addition, payments were made to farmers who changed to alternative crops.

Farms obtained 4351.9 ₺ of income from animal husbandry per year, which was 5.4% of the gross production value of 80525 ₺. This indicated that crop production dominated the animal husbandry in farms. Sample farms also gained 1695 ₺ from agricultural activities such as hiring labor or renting machinery outside the farm and they reached the total sales value of 82220 ₺. Sample farms gained 2502 ₺ per decare. The farmers were having an extra source of income apart from their own farm income.

Regarding the production cost of the farm, fixed operating cost was 2305 ₺, on average, while that of variable operating cost was 15527.14 ₺ in sample farms. This showed that most farmers' budget consisted of fixed operating cost. The percentage of variable cost was 87%. Crop production cost constituted 81% of the total variable operating cost, while that of animal husbandry was 9% (Table 11). This could be because most farmers engaged in crop production enterprise.

In the research area, farms obtained gross income of approximately 67 thousand Turkish Liras per year and 2030 ₺/da. The mean net income of sample farms per year and per decare was about 64388 ₺ and 1959 ₺, respectively (Table 11). Therefore, the farms were making a profit.

When glancing at the liquidity of sample farms, it was clear based on the liquidity measures such as current ratio and acid test ratio that sample farms did not face with serious liquidity problem due to satisfactory value of liquidity measures. The farms were having enough cash to meet their short-term financial obligations. The profitability of sample farm was moderate level. The return on asset was 17.67 % (Table 12). This means that for every Turkish Lira a farmer invested in the farm generated 0.17 ₺ in profit during the year.

3.4. Risk attitudes of farmers and risk sources faced by sample farmers

The majority of the farmers were risk averse (73.8%) in the research area. The percentage of risk lover farmers was 2% (Table 13). Most farmers were not taking risks because they engaged in a single crop production, thus they had no alternative income to gain from in case of crop failure. This is consistent with

Table 11. Production cost and gross income in sample farms

Production cost	₺	%
Variable cost per year	15527.14	87.07
Fixed cost per year	2305.00	12.93
Total cost per year	17832.14	100.00
Gross farm income per year	66692.86	
Gross farm income per decare	2029.61	
Net farm income per year	64387.86	
Net farm income per decare	1959.46	

Table 12. Liquidity and profitability of sample farms

Liquidity and profitability	Value
Liquidity	
Current ratio	1.25
Acid test ratio	1.31
Profitability	
Return on assets (%)	17.67

the results of Demiryürek et al. (2012) that in hazelnut production, organic hazelnut producers were less risk averse than conventional producers**.** Research results conformed to Uysal (2015) that 78.5% out of 107 farmers interviewed were risk averse while others were risk lovers.

The most affected production branch by natural risk was crop production in the research area. About 76.2% of the sample farmers perceived the crop production as the most sensitive agricultural activity from catastrophic risks. Animal production and green housing followed it (Table 14). It means that farmers incurred losses mostly in crop production compared to other production entities. Therefore, this calls for enterprise diversification.

Based on the farmers' response, the probabilities of occurrence for frost, hail, and storm were 4.3%, 1.7%, and 1.2%, respectively. The amount of loss was 639.29 ₺ for frost, 285.71 ₺ for hail, and 264.29 ₺ for storm (Table 15). Frost was the main risk with high probability of occurrence and causing highest amount of loss to the farmers. Therefore, farmers need to insure their crops against frost. The results harmonized with the Union of Chambers of Agriculture in Turkey, (2016) which recorded that frost affected most of the fruit crops' flowers on its trees. The fruits affected included hazelnuts, apricots, walnuts, almonds, peaches, nectarines, grapes, cherries, pears, plums, and kiwi**.** When checking the risks faced by sample farmers whether insurable, or not, it was clear that the risks faced by sample farmers were insurable and it was only 31% of the sample farmers, while the reverse was the case for other farmers (Table 16). It means that the number of farmers facing uninsurable risks was higher than the insurable risk because the probability of risk occurrence was low and the loss was high.

Table 13. Farmers' attitude toward risk

Risk attitude	Frequency	Percent
Risk lover	11	26.2
Risk averse	31	73.8
Total	42	100.0

Table 14. Farmers' opinion on effects of natural risks associated with production system

Production system	Frequency	Percent
Crop production	32	76.2
Animal production	3	7.1
Green housing	7	16.7
Total	42	100

Table 15. The probability of occurrence of risk and amount of loss

Risk faced	Probability of occurrence	Amount of loss (₺/da)
Frost	0.043	639.29
Hail	0.017	285.71
Storm	0.012	264.29

3.5. Farmers' awareness of agricultural insurance

The farmers were having varied responds on agricultural insurance in the research area. About 64% of the sample farmers did not know the government support related to agricultural insurance, while the percentage of farmers who were aware of was 36% (Table 17). Lack of information on government support could be the reason behind the difference. Similarly, according to Goudappa et al. (2012), the research done in North Eastern parts of Karnataka in India shows that despite the National Agricultural Scheme crop insurance scheme operating since 2002–03, more than 80% of respondent were not aware of the implementing agency and the one who do compensation.

In the research area, approximately 36% of the sample farmers believed that the agricultural insurance was useful, while the rest had a negative belief (Table 18). This pattern was the parallel with the awareness of the farmers on agricultural insurance. These findings indicated that there might have been lack of information on agricultural insurance in the research area. According to Chikaire et al. (2016), the poultry farmers agreed that agricultural insurance was beneficial and it was needed as a protection against the effects of losses and damages. Regarding the information sources, half of the sample farmers got information from the directorate of agricultural ministry. The second order information source was the internet. Unfortunately, the share of officers of insurance companies was the least (Table 19). The preference of the directorate of ministry of agriculture by farmers could be that it provided all information on agriculture. It was inferred based on the research results that there was a need of extension education about agricultural insurance. Half of the farmers were willing to participate in extension education related agricultural insurance, while

Table 16. Distribution of the sample farmers associated with insurable risk

Sample farm and risk	Frequency	%
The number of farmers faced with insurable risk	13	30.95
The number of farmers faced with uninsurable risk	29	69.05
The total number of farmers	42	100.0

Table 17. Farmers' awareness about government support of agricultural insurance

Farmers awareness	Frequency	%
The number of aware farmers on government support	15	35.71
The number of unaware farmers on government support	27	64.29
Total	42	100.00

Table 18. Farmers' opinion about the benefits of agricultural insurance

Farmers opinion	Frequency	%
Useful	15	35.71
Not useful	27	64.29
Total	42	100

the share of farmers having negative attitudes toward extension education. Interestingly, the number of indifference farmers was high in the research area (Table 20). The farmers who were in need of extension might have seen the importance of insurance in mitigating risks while those having negative attitude toward extension education could have had bad experience of agricultural insurance companies. The large number of undecided farmers may be due to poor extension education on agricultural insurance.

3.6. Farmers' attitudes toward agricultural insurance

In the research area, 31% of the farmers faced with insurable risk had never bought insurance contract. However, 69% of the farmers faced with an insurable risk somehow bought an insurance contract (Table 21). Farmers indicated that the most important reason for not having an agricultural insurance contract was the lack of information. These farmers required the extension of the insurance policy. The second was limited content of the insurance policy, while the third was lack of trust of agricultural insurance. Farmers needed to be convinced and clarity on agricultural insurance. The other reasons for not having agricultural insurance were high premium, unclear content of insurance policy, presence of limited farmland, high bureaucracy, and long waiting period for claim, respectively (Table 22).

Table 19. Information sources of farmers about agricultural insurance

Information sources	%
Directorate of agricultural ministry	52.61
Insurance company	21.05
Internet	26.34
Total	100.00

Table 20. Willingness to participate in extension in extension education on agricultural insurance

Willingness state	Frequency	%
Willing to attend extension education	22	52.38
Unwilling to attend extension education	9	21.43
Indifference	11	26.19
Total	42	100.00

Table 21. Distribution of the sample farmers having insurance contract

Distribution of farmers	Frequency	%
The number of farmers faced with insurable risk	13	30.95
Number of farmers having insurance contract	9	21.43
Number of farmers not having insurance contract	4	9.52
The number of farmers faced with uninsurable risk	29	69.05
The total number of farmers	42	100.0

Table 22. The reasons for not having agricultural insurance

Reasons	Score	Order
Lack of information	207	1
Presence of limited farmland	18	6
High premium	28	4
High bureaucracy	9	7
Long waiting period for claim	0	8
Unclear content of insurance policy	23	5
Lack of trust of agricultural insurance	107	3
Limited content of the insurance policy	111	2

Student t-test results revealed that the education level of insured farmers was higher (8.0) than that of uninsured farmers (6.5) ($p<0.01$), meaning that education played a significant role in taking insurance since farmers could able to make informed decisions on agricultural insurance. Knight et al. (2003) deduced that education could promote openness to new ideas and modern practices. Insured farmers had a larger farmland and hazelnut orchards ($p<0.05$). Hazelnut yield also was higher comparing the rest ($p<0.01$). This depicts that farmers with larger farmers considered the economic viability in taking agricultural insurance than smaller scale farmers. Farmers having agricultural insurance policy benefited more government support than that of others ($p<0.05$) (Table 23). The difference thereof could be as provided by Minister of Science, Industry and Technology (2010) that income support and compensatory payments were given to farmers with licensed and unlicensed orchards of hazelnuts. The difference between insured farmers and uninsured farmers was not statistically significant in terms of age of farmers, experience of farmers, family size, number of workers, and assets ($p>0.10$). This means that there was no relationship between insured and uninsured farmers in terms of age of the farmer, the experience of the farmer, family size, number of workers, and assets.

Regarding the relationship between risk attitudes and agricultural insurance, it was clear that the tendency of risk averse farmers to agricultural insurance was stronger than that of risk lover farmers ($\chi 2$=2,640, $p<0.10$). In the research area, the percentage of insured farms among risk averse farmers was higher comparing to risk lover ones. While 26% of the risk averse farmers had the agricultural insurance policy, only 9% of the risk lover farmers had the agricultural insurance policy (Table 24). This means that risk averse preferred insurance as a risk management strategy. The results conformed to Kahneman and Tversky (1979) that risk averse individuals tend to buy insurance. Based on this finding, the research corroborated with the hypothesis of farmers' attitudes to agricultural insurance varied associated with risk attitudes.

3.7. Influencing factors affected willingness to pay for agricultural insurance

Research findings showed that 55% of the sample farmers were willing to pay for agricultural insurance policy, while that of unwilling ones was 45%. Farmers were willing to pay 29.5 ₺ for insurance contract of hazelnut, while that of peach contract was 18 ₺. When considering the current premium for hazelnut and peach, the amount of premium that sample farmers willing to pay was lower comparing current premium. For the hazelnut, the amount of premium that sample farmers willing to pay was lower than that of the

Table 23. Comparative statistics associated with having agricultural insurance

Variables	Insured farms		Uninsured farms	
	Mean	Std. Dev.	Mean	Std. Dev.
Age of farmers (year)	54.8	16.3	55.5	13.1
Schooling (year)*	8.0	5.5	6.5	3.5
Experience of farmers (year)	33.4	17.3	33.2	12.9
Working time (day/year)	133.3	92.6	101.1	45.6
Family size (person)	4.0	2.0	4.8	2.5
Number of workers (person)	2.6	1.4	3.2	1.8
Farmland (da)**	52.5	47.8	27.5	18.1
Hazelnut area (da)**	34.9	45.0	23.6	10.8
Hazelnut yield (kg/da)*	506.7	5500.2	334.5	2537.9
Government support (₺)**	6309.2	8125.8	4254.6	1942.4
Buildings (₺/da)	580.6	432.4	646.4	572.4
Machinery (₺ /da)	961.3	391.4	945.0	520.1
Animals (₺)	27940.0	58705.3	26675.8	52286.2

** and ** denotes p<0.05 and p<0.01, respectively*

Table 24. Distribution of the farmers associated with risk attitudes and having agricultural insurance

Variables	Risk attitudes of farmers				Total	
	Risk lover		Risk averse			
	Frequency	%	Frequency	%	Frequency	%
Insured	1	9.09	8	25.81	9	
Uninsured	10	90.91	23	74.19	33	
Total	11	100.00	31	100.00	42	100.00

current premium by 22%, while that of peach insurance contract was 64% of the current premium. The economic conditions of the farmers and the productive potential of the crop or livestock could be the influencing factor for the willingness to pay for agricultural insurance. In contrast, the average willingness to pay by cocoa farmers in Nigeria was N11087,5/ha ($69,85/ha) for Agricultural Insurance (Falola et al., 2013).

Based on the results of the regression analysis, the price elasticities of insurance contract demand for hazelnut and peach were 0.14 and 0.20, respectively, indicating that if the premium of the hazelnut insurance contract increased by 1%, the number of farmers who were willing to pay would decrease by 0.14%. If premium of the peach insurance contract increased by 1%, the number of farmers who were willing to pay would decrease by 0.2%. This implies that an increase in the price of premium will not increase the number of farmers buying insurance contracts. The relationship between insurance demand and the amount of premiums for hazelnut and peach is depicted in Figure 1 and Figure 2, respectively.

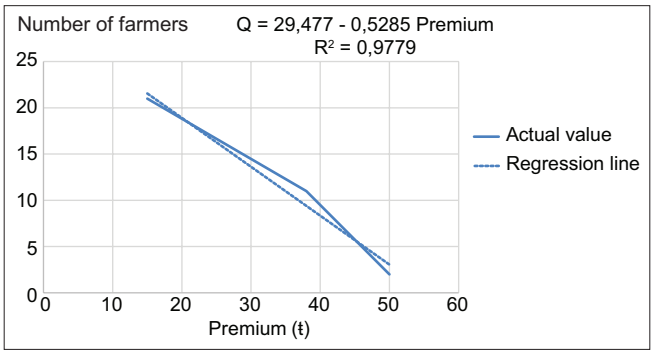

Figure 1. Relationship between insurance demand and amount of premium for hazelnut

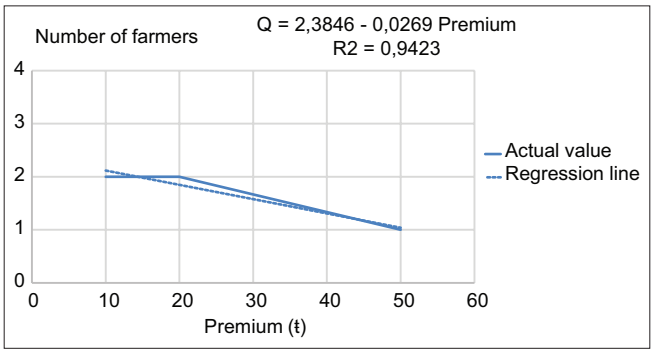

Figure 2. Relationship between insurance demand and amount of premium for peach

The amount of payment of risk lower hazelnut farmers that eager to pay was about 19₺ while the payment of risk averse farmers was about 23₺ (Table 25). There was no significant difference between the risk lover and risk averse farmers in terms of the amount of willingness to pay for agricultural insurance to against hazelnut risks ($p>0.05$). Risk lover and risk averse farmers producing peach were eager to pay 20₺ and 92₺, respectively, for agricultural insurance, indicating that the peach risk averse farmers were eager to pay more money comparing to the risk lover farmers ($p<0.05$). These findings confirmed the research hypothesis that the payment of risk averse farmers was higher than that of risk lover farmers. The difference in the amount the farmers were willing to pay for insurance for hazelnut and peach could be due to the difference in the cost of production and the market price of the two crops. The hazelnut could have had the highest cost of production and lowest market price.

These research findings corroborated with the results of Kunreuther and Pauly (2005). Kunreuther and Pauly (2005) suggested that risk averse farmers are willing to pay a premium more than or equivalent to the expected value of losses from uncertainty.

The results of the estimated logit model were presented in Table 26. LR statistics of logit model suggested that the model was statistically significant at the significance level of 1%. Estimated McFadden R-squared coefficient was 0.317, indicating that independent variables of logit model explained 32% of the total variance of the dependent variable. Logit model developed for exploring influencing factors affected the farmers' willingness to pay for agricultural insurance showed that the variables of family size, schooling, experience, and farm size affected the willingness positively and all of them statistically significant. However, the variables of awareness of government support, for insurance, credit use and the amount of the support

Table 25. Amount of payments by risk attitude

Crop	Attitude	Mean	Std. Dev.	Sig.
Hazelnut amount (₺)	Risk lover	19.2222	16.74648	0.597
	Risk averse	23.2258	20.54866	
Peach	Risk lover	20.0000	21.60247	0.079
Amount (₺)	Risk averse	92.0000	62.35383	

Table 26. The parameters of the logit model

Variables	Parameters	Standard error	Z statistics	Exp (b)
Constant	−8.840	5.164	−1.711*	0.001
Family size (person)	0.497	0.293	1.691*	1.644
Schooling (year)	0.792	0.309	2.562***	2.207
Experience (year)	0.149	0.007	2.060**	1.161
Awareness of government support	−1.229	1.047	−1.175	0.292
Credit use	−1.896	1.171	−1.619*	0.150
Farm size (da)	0.175	0.034	5.147***	1.191
Support payment	−0.349	0.231	1.511	0.705
Model performance parameters				
McFadden R-squared		0.317		
Standard error of regression		0.351		
Sum of squared residuals		4.441		
Log likelihood		−13979		
LR statistics		12.948		

, ** and * denotes p<0.1, p<0.05 and p<0.01, respectively. [1]The dependent variable of the model was dummy. 0 reflects the farmers who are not eager to pay for agricultural insurance, while that of eager farmers is 1*

payment affected the farmers' willingness to pay for agricultural insurance negatively. The most important factor affected the farmers' willingness positively was schooling. If the schooling of the farmers increased by 1 year, the probability of being a willing group would increase by 2.2 times ($p<0.01$). Schooling makes the farmer to gain knowledge on agricultural insurance, thus can be able to make sound decisions. This is consistent with Ali (2013) that education influenced willingness to pay for agricultural positively and significantly. The following factor was family size. If the family size increased one person, the probability of being a willing group would increase by 1.64 times ($p<0.10$). The family formed a basis for information sharing and could make a basis of sound decision making. Sakurai and Reardon (1997) explained that demand for agricultural insurance decrease with an increase in family size. Farm size and experience were the other positive influencing factors and the probability of being a willing group would increase by 1.19 and 1.16 times, respectively, if they increased one decare and 1 year. This could be because large farms could yield high returns and farmers feel the need to pay for agricultural insurance due to the fear of losing the

large amount of money invested in. Mabe et al. (2014) showed that farm size was positive and significant. The possible explanation for farming experience as an influencing factor could be that farmers had knowledge of the risk occurrence of risk hazards and possible losses and thus, found insurance as a possible risk management strategy. Acquah (2011) found out that farming experience was a determinant of willingness to pay for climate change mitigation.

The credit use was the only statistically significant factor affected the farmers' willingness negatively. If farmers were credit user, the probability of being in a willing group would decrease by 85%. This could be because, owing to the low amount of income, the farmer feels strained and thus, unable to pay for the extra cost of agricultural insurance. Karbasi and Kambozia (2003) found out that agricultural credit increased the chance of acceptance of insurance for barley. The variables of awareness of government support and support payment were not statistically significant ($p>0.10$). The government supports could make the farmers' economic condition stable, hence the need to pay for insurance declines. Sakurai and Reardon (1997) showed that if there is high public and private aid, it leads to low participation and willingness to pay for insurance. On the contrary, Yu (2015) concluded that the premium subsidy could enhance the investment of the risky crop by promoting the insurance purchase.

4. Conclusions and recommendations

The study examined the attitude of farmers and willingness to pay for agricultural insurance in Çarşamba district of Samsun province, Turkey. The sample farms had an average of 3.9 da. and out this about 9 da. was dry land. 96% of the total land was own land. The value of irrigated farmland per decare was approximately 14 thousand Turkish Liras. Sample farms tend to produce more fruit rather than other crops and hazelnut was the main crop. Most farmers in the area of study were old and have low education levels. The agricultural experience of the sample farmers was vast and they depended on family labor for production. The mean working day of farmers per year was 108 days. Sample farms had the opportunity to get income outside of the farm. Besides, most of the farmers were members of BAĞ-KUR type of social security. Farms conducted their agricultural activities by using 364 thousand ₺ of total assets and 75.22% of it constituted by land related capital. Approximately 97% of the farm capital was equity, suggesting that farming was a profitable business, and sample farms tended to use current debt rather than long-term debt. Farms gained approximately 76 thousand Turkish Liras per year from the crop production and hazelnut production value took the highest pie of it at about 66%. The crop production dominated the animal husbandry in farms. The amount of fixed operating costs was higher than that of variable cost and crop production contributed highest percentage of variable cost. The farms obtained gross income and net income of approximately 67 thousand Turkish per year and 64388 Turkish Liras per year, respectively. In light of the research findings, it was clear that the liquidity of sample farms was satisfactory level, while the profitability level of them was moderate.

In the research area, most farmers were risk averse and agricultural insurance application was suitable risk management strategies for sample farmers due to the probability of occurrence was low for risks of frost, hail and storm, but the amount of potential loss for them was high. The risks mostly affected crop production and frost were the prevalent risk causing highest amount of loss. The share of farmers faced insurable risk was low. Therefore, few farmers believed that the agricultural insurance was useful in the research area, there

was a lack of information on agricultural insurance such as government support of insurance in the research area, and farmers were willing to get education on agricultural insurance.

In Çarşamba, buying agricultural insurance contract was not satisfactory level. The most important reason for not having agricultural insurance was the lack of information on agricultural insurance. High price of premium, unclear content of insurance policy, the presence of limited farmland, high bureaucracy level, and long waiting period for claim were other barriers to dissemination of agricultural insurance.

Research findings showed that nearly half of farmers were willing to pay for agricultural insurance policy. Farmers were willing to pay 29.5 ₺ for insurance contract of hazelnut, while that of peach contract was 18 ₺. The variables of family size, schooling, and experience and farm size affected the willingness positively, while the variable of credit use affected the farmers' willingness to pay for agricultural insurance negatively.

Designing farmers' extension education program focusing on agricultural insurance to enhance farmers' information may accelerate the adoption of agricultural insurance with special focus on adult education. Insurance companies promoting agricultural insurance should engage in rigorous marketing and build trust on the farmers. Simultaneously, revising the content of the insurance policy and reducing bureaucracy may increase the farmers' interest for agricultural insurance. In addition, the shortening period for claim through reducing bureaucracy is needed and insurance companies should promote the use of current technology such as remote sensing and drone to enhance assessment of the hazard thus reducing the long period of claim. Furthermore, promotion activities should focus on the educated farmers having large farmland. Besides, land consolidation should be encouraged and grouping small-scale farmers for the purposes of making the payment of premium economical for farmers.

Further research should be done on topic thereof which includes more number of women engaging in agricultural activities. A research with larger sample size should also be done.

Acknowledgment

I sincerely wish to express my gratitude to all who ensured the success of this research.

References

Acquah, D.H. (2011), ''Farmers perception and adaptation to climate change: A willingness to pay analysis'', *Journal of Sustainable Development in Africa*, Vol. 13 No. 5, pp. 150-161.

Alderman, H. and Yemtsov, R. (2012), ''Productive role of safety nets: Background paper for the World Bank 2012-2022 social protection and labour strategy: Social Protection'', Discussion Papers 67609, The World Bank, Washington, DC.

Ali, A. (2013), ''Farmers' willingness to pay for index based crop insurance in Pakistan: A case study on food and cash crops of rain-fed areas'', *Agricultural Economics Research Review*, Vol. 26 No. 2, pp. 241-248.

Binswanger, H.P. (1980), ''Attitude towards risk: Experimental measurement in India'', *American Journal of Agricultural Economics*, Vol. 62, pp. 395-407.

Birinci, A. and Tümer, E.I. (2006), ''The attitudes of farmers towards agricultural insurance: The case of Erzurum, Turkey'', *Austrian Journal of Agricultural Research*, Vol. 57 No. 2, pp. 49-55.

Chikaire, J.U., Tijjani, A.R. and Abdullahi, K.A. (2016), ''The perception of rural farmers of agricultural insurance as a way of mitigation against climate change variability in Imo State, Nigeria'', *International Journal of Agricultural Policy and Research*, Vol. 4 No. 2, pp. 17-24.

Covey, T., Green, R., Jones, C., Johnson, J., Morehart, M., Williams, R., McGath, C., Mishra, A. and Strickland, R. (2011), *Agricultural Income and Finance Outlook*, Economic Research Service, United States.

Demiryürek, K., Ceyhan, V. and Bozoğlu, M. (2012), ''Risk attitudes of organic and conventional hazelnut producers in Turkey'', *Human and Ecological Risk Assessment: An International Journal*, Vol. 18 No. 2, pp. 471-482.

Dikmen, N. (1999), *Hazelnut Importance, Problems and Suggestions in the Black Sea Region and to the Turkish Economy*, Black Sea Region Research Institute, Athens, Greece.

Dillon, L.J. and Scandizzo, P.L. (1978), ''Risk attitudes of subsistence farmers in northeast Brazil: A sampling approach'', *American Journal of Agricultural Economics*, No. 60 Vol. 3, pp. 425-435.

Erkuş, A. and ve Demirci, R. (1985), *Tarımsal Işletmecilik ve Planlama*, A.Ü. Ziraat Fakültesi Yayın No. 944. A.Ü. Basımevi, Ankara.

Falola, A., Ayinde, O.E. and Agboola, B.O. (2013), ''Willingness to take agricultural insurance by cocoa farmers in Nigeria'', *International Journal of Food and Agricultural Economics*, Vol. 1 No. 1, pp. 97-107.

Fraser, L. and Ormiston, A. (2004), *Understanding Financial Statements*, Pearson Prentice Hall, New Jersey.

Goudappa, S.B., Reddy, B.S. and Chandrashekhar, S.M. (2012), ''Farmers perception and awareness about crop insurance in Karnataka'', *Indian Research Journal of Extension Education*, Vol. 2, pp. 219-222.

Grisley, W. and Kellog, E. (1987), ''Risk-taking preferences of farmers in Northern Thailand: Measurements and implications'', *Agricultural Economics*, Vol. 1 No. 2, pp. 127-142.

Guin, L. (2011), *Matching Principle*, Murray State University, Murray, Kentucky.

Hardaker, J.B., Anderson, J.R. and Huirne, R.M. (1997), *Coping with Risk in Agriculture*, CAB International, New York.

Harward, B.B. and Upto, M. (1961), *Introduction to Business Finance*, McGraw Hill, New York.

Ilkkaracan, I. and Tunalı, I. (2010), ''Agricultural transformation and the rural labor market in Turkey'', in: Karapinar, B., Adaman, F. and Ozertan, G. (Eds.), *Rethinking Structural Reform in Turkish Agriculture: Beyond the World Bank's Strategy*, Nova, New Yor, pp. 105-108.

Kahneman, D. and Tversky, A. (1979), ''Prospect theory: An analysis of decision under risk'', *Econometrica*, Vol. 47 No. 2, pp. 263-291.

Karbasi, A. and Kambozia, N. (2003), ''Survey effective factors on agricultural crops insurance demand'', *African Journal of Agricultural Research*, Vol. 11, pp. 167-185.

Kılıç, O. (1997), *Economic Analysis of Hazelnut Producing Farms in Lowlands of Çarşamba and Terme Districts of Samsun Province and Searching Alternative Feasible Farm Plans*, Ankara University, Department of Agricultural Economics, PhD Thesis, Turkey.

Knight, J., Weir, S. and Woldehanna, T. (2003), ''The role of education in facilitating risk-taking and innovation in agriculture'', *The Journal of Development Studies*, Vol. 39 No. 6, pp. 1-22.

Kunreuther, H. and Pauly, M. (2005), ''Insurance decision-making and market behavior'', *Foundations and Trends in Microeconomics*, Vol. 1 No. 2, pp. 63-127.

Mabe, F.N., Nketiah, P. and Darko, D. (2014), '' Farmers' willingness to pay for weather forecast information in Savelugu-Nanton municipality of the Northern region'', *Russian Journal of Agricultural and Socio-Economic Sciences*, Vol. 12 No. 36, pp. 34-44.

Minister of Science, Industry and Technology (2010) "Hazelnut Report", Minister of Science, Industry and Technology, New Delhi.

Moscardi, E. and Janvry, A. (1977), ''Attitudes toward risk among peasants: An econometric approach'', *American Journal of Agricultural Economics*, Vol. 59, pp. 710-716.

OECD (2013), *Agricultural Policy Monitoring and Evaluation OECD Countries and Emerging Economies*, Organisation for Economic Co-operation and Development, Paris, France.

Sakurai, T. and Reardon, T. (1997), ''Potential demand for drought insurance in Burkinafaso and its determinants'', *American Journal of Agricultural Economics*, Vol. 79 No. 4, pp. 1193-1207.

TARSİM (2014), ''Agricultural insurance pool insurance report'', TARSİM, Annual Report.

TURKSTAT (2014), ''Statistical Data Base'', available at: http://www.turkstat.gov.tr (accessed 07 November 2016).

Union of Chambers of Agriculture in Turkey (2016) available at: http://www.tzob.org.tr (accessed 07 November 2016).

URL1 (2015) available at: http://www.turkcebilgi.com/uploads/media/harita/samsun_ilceleri.png (accessed 12 November 2016).

URL2 (2015), available at: http://www.carsamba.bel.tr/index.php/kent-rehberi/iklim-ve-bitki-ortusu (accessed 12 November 2016).

URL3 (2015), available at: http://www.nufusu.com/ilce/carsamba_samsun-nufusu (accessed 12 November 2016).

Uysal, K.Ö. (2005), ''A research on the attitudes of farmers towards risk: Case of Aegean Region farmers'', *Ege University Agriculture Faculty Journal*, Vol. 42 No. 3, pp. 147-158.

Vintila, G. (2006), *Gestiunea Financiara a Intreprinderii*, 6th ed., Didactica si Pedagogica, Bucuresti.

Weygandt, J.J, Kieso, D.E. and Terry, D.W. (2001), *Intermediate Accounting: Cash Ratio Analysis*, Vol. 1., 10th ed., Bearcat Company, Goshen, Indiana, p. 211.

Wild, J.J., Subramanyam, K.R. and Halsey, R.F. (2007), *Financial Statement Analysis*, 9th ed., McGrow-Hill, New York.

Yamane, T., Alptekin, E., Apaydın, C., Bakır, M.A. and Gürbüzsel, E. (2001), *Temel Örnekleme Yöntemleri*, Literatür Yay, İstanbul.

Yu, J. (2015), *Effects of Subsidized Crop Insurance on Crop Choices*, Western Agricultural Economics Association Annual Meeting, San Francisco, CA.