

## Greek Agricultural Insurance: Exploring Satisfaction and Developing a Typology of Farmers

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**Abstract:** *Insurance is a form of risk management used to hedge against a contingent loss. Agricultural insurance is a special line of property insurance applied to agricultural firms. The existence of an appropriate institutional framework pertaining to the insurance system in agriculture is considered to be an essential step as regards the course of competitiveness in Greek agriculture. This paper is based on an empirical study on a sample of farmers (n=200). The aim of this research study is to examine the farmers' satisfaction with current structures and services related to agricultural insurance, as provided in Greece at present. On a second level, the objective of this paper is to develop a typology of farmers, based on their satisfaction structures (using a methodological scheme based on Principal Axis Factoring (PAF) and Hierarchical Cluster Analysis. The results of this typology will allow for conclusions and proposals to be reached, regarding the potential for improving agricultural insurance, with the growth of the agricultural sector as the ultimate objective. The PAF highlighted four factors-dimensions that can be used to analyse the farmers' satisfaction with agricultural insurance. The first and most important factor is linked to the financial terms of insurance and the amount of insurance coverage. The second focuses on the human aspect of service, facilities and equipment. The third is linked to the terms of financing, and the fourth factor exclusively defines the particular properties of agricultural insurance.*

**Keywords:** Agricultural Insurance, Competitiveness, Satisfaction, Principal Axis Factoring, Cluster Analysis

### 1. INTRODUCTION

Greek agriculture is currently undergoing a particularly decisive period as regards its future growth, by having to address the challenges of an increasingly competitive market for agricultural products. Its adjustment to the new globalised environment will essentially depend on the further improvement and development of its structures, with the aim of strengthening its competitiveness in the international market (Mamatzakis, 2003; Galanopoulos *et al.*, 2004). One of the most important factors for the development of the agricultural sector in Greece is related to its adequate protection from agricultural risks, through agricultural insurance and compensation programmes. The implementation of a sound agricultural policy, through the application of agricultural risk management policies and, more specifically, through agricultural insurance and compensation programmes, is expected to enhance the protection of agricultural income and rationalise the production process (Papageorgiou *et al.*, 2005).

By the term agricultural insurance, we refer to the insurance of agricultural production (plant and animal production, as well as livestock), which is implemented according to formal insurance procedures, i.e. with a proposal being submitted on behalf of the farmer, the acceptance of the proposal and of the risk therefore, the issuance of an insurance contract by the insurance agent, the payment of a premium etc (Georgiadis, 2003). The principle of insurance is "risk sharing" which functions on the basis of transferring the risk to a third party, through payment of an insurance premium (Kang, 2007). Agricultural production and agricultural capital insurance is one of the most effective agricultural policy measures in addressing and managing the risks and crises that are directly linked to the agricultural sector. Through insurance, stability in the production programming of the farm is ensured to a great extent, as well as its economic survival, since it provides farmers with the possibility to have a minimum fixed income, in case of damage to the production or livestock (Papageorgiou *et al.*, 2005).

Since 1963, through various agencies, the Greek state has undertaken the responsibility to protect agricultural income from natural or other disasters, almost exclusively. This network of agencies constitutes the "ELGA system" (Greek Agricultural Insurance Organisation) (Georgiadis, 2003). Recently, due to the need to ensure the maximum stability possible in the programming of farms, and the economic sustainability of the agricultural world in case of damage to the agricultural

production or livestock, but also because of the need to restructure ELGA, the “system of protection and insurance of agricultural activity” was instituted (Law 3877/2010). Thus, the above-mentioned services are provided through a unified national system, which is organised and operates according to the provisions of L. 3877/20-09-2010, and under the auspices of the Minister of Agricultural Development and Food. The protection and insurance services for agricultural activities are provided by:

a) the Greek Agricultural Insurance Organisation (EL.G.A.), (a private legal entity with a public utility status), b) insurance agencies, mutual-type associations and Mutual Service Funds and c) the Crisis and Risk Management Directorate for the Agricultural Sector (article 2 of the law) for Emergency Planning Policy programmes, concerning the insurance of agricultural production and agricultural capital.

The protection services for agricultural activities include: a) mandatory insurance with EL.G.A. against all agricultural risks (referred to in article 5 of the law in question), b) optional insurance contracts for producers, with a subsidised premium, which are signed with insurance agencies, mutual-type associations or other insurance bodies, including EL.G.A., and cover risks that are not covered or are partly covered by the mandatory insurance scheme mentioned in (a), c) coverage provided through the State Subsidy Programmes approved by the EU and d) proactive protection of agricultural production, and the plant, animal, fishing, aquaculture and real estate capital of farms.

The farmers’ satisfaction with the public services involved in agricultural insurance is of particular importance, since it is related to their continued involvement with the agricultural sector, and therefore with the development of agricultural production. Quite often, public sector organisations, including those run by the Ministry of Agricultural Development and Food, are accused of low performance levels, which lag behind those of private organisations; this deficiency, is usually related both to quality and customer service levels, but also to the efficiency of the public service provision system (Frederickson, 1991, Poister and Henry, 1994). In a democratic society however, public satisfaction/discontent with public services is a fundamental issue (Poister and Henry, 1994). In modern times, the term customer tends to acquire a broader meaning – which includes elements of citizenship – and refers to a responsible consumer, who is socially aware, and will occasionally sacrifice his/her personal pleasure for the benefit of the community (Lane, 2000). As a result, public organisations from the broader, mainly public, sector, as well as public services of the Central Government, have now begun to treat citizens (constituencies) as “individual” consumers/customers (Lane, 2000; Barzealey, 1992; Kernaghham 2000; Dimitriades and Maroudas, 2007).

Thus, both private companies, as well as several public organisations of the broader public sector, are now placing particular emphasis on customer satisfaction (Lane, 2000; Barzealey, 1992; Kernaghham 2000). The realisation that customer satisfaction is possibly the greatest resource for developing a sustainable competitive advantage has had a decisive impact on the establishment of organisational priorities and practices, both in the private and public sector (Woodruff, 1997). Customer satisfaction is also considered a prerequisite for customer loyalty and customer commitment, which are also viewed as a necessary precondition for attaining financial goals, such as increasing the profitability of your market share and the return on invested capital (Hackl and Westlund 2000; Bolton and Drew, 1994; Cronin and Taylor, 1992).

The object of this paper is to examine farmers’ satisfaction with the existing structures and services of the system governing agricultural insurance, and more specifically, the national system for the protection and insurance of agricultural activities, as implemented in Greece. On a second level, this paper aims to develop a farmer typology, based on the farmers’ satisfaction structures. According to the results of the typology, it will be possible to arrive at conclusions and proposals, regarding the potential for improving the protection systems for agricultural income, with the growth of the sector as the ultimate objective.

## 2. MATERIALS AND METHODS

The present paper is based on an empirical study involving a sample of 200 farmers, who are active in the Region of Central Macedonia. The farmers in the sample were selected from the Farmers’ Register lists, kept at the Directorates of Agricultural Development of the Region’s Prefectural Authorities using Systematic Random Sampling (Farmakis, 2002). The study was conducted during the period 2010-2011. The initial data was collected following personal interviews with the farmers and using a specially structured questionnaire, which was based on a previous questionnaire with 30 questions, involving a survey of farmer satisfaction regarding issues pertaining to Agricultural Credit (Aggelopoulos *et al.*, 2009). The final questionnaire used includes 25 questions, divided into 5 units. More specifically, the units refer to the demographic data of the farmers in the sample (5 questions), the financial insurance terms (8 questions), the services and information provided (4 questions), the type of insurance coverage offered (5 questions) and the contribution of agricultural insurance to the protection of agricultural income (3 questions). The majority of the questions were closed, multiple-choice questions, and the interviewees were also requested to answer questions on a graded “Likert-type” ordinal scale. For a summary

presentation of the available data, methods of Descriptive Statistics were used. The statistical analyses were carried out using the SPSS version 15 software, enhanced with the module Exact Tests.

The demographic characteristics of the farmers who took part in the research are presented in Table 1. The sample included 178 men (89%) and 22 women (11%). Of the total sample, 89 farmers (44.5%) were aged 36-45 years, 68 farmers (34%) were aged 18-35 years, while 43 (21.5%) were aged 46 years and above.

**Table 1: Socio-economic profile of the sample**

Socio-Economic Factors		Number of Farmers	(%)
Gender	Male	178	89.0
	Female	22	11.0
Age	(1) 18-35 yrs	68	34.0
	(2) 36-45 yrs	89	44.5
	(3) >46 yrs	43	21.5
Educational Level	(1)Elementary education	84	42.0
	(2)Basic education	67	33.5
	(3)Secondary education	36	18.0
	(4)Technical & vocational training	3	1.5
	(5)Higher education	10	5.0
Employment sectors	(1)Agriculture	135	67.5
	(2)Animal breeding	23	11.5
	(3)Mixed sectors	42	21.0

As regards the level of education, 84 of the farmers interviewed (42%) have elementary education, 67 (33.5%) basic education, 36 (18%) secondary education, 3 (1.5%) are graduates of a technical school or institute of vocational training (IEK) and 10 (5%) are higher education graduates. As regards the agricultural sector they are involved in, 135 (67.5%) are involved in plant production sectors, 23 (11.5%) in animal production sectors, and 42 (21%) in mixed activities.

In order to test the construct validity of the satisfaction measurement scale as regards agricultural insurance, Principal Axis Factoring with Varimax rotation was applied (Hair *et al.*, 1995; Tench, 1975; Thompson, 2004; Aggelopoulos *et al.*, 2009). In order to test the reliability (in the sense of internal consistency) of the measurement scale, Cronbach's  $\alpha$  coefficient was calculated and evaluated. More specifically, the Principal Axis Factoring (PAF) highlighted 4 factors (Table 2) that explain 80.5% of the total variance. The overall reliability of the satisfaction measurement scale (16 questions) is highly satisfactory, with Cronbach's  $\alpha$  0.93. The first factor explains 44.6% of the total variance and has a high reliability, with Cronbach's  $\alpha$  0.91. In addition, the discrimination indices for this factor, which constitute construct validity indices, ranged at 0.72-0.81, which is quite high above the limit (0.20).

### 3. RESULTS AND DISCUSSION

The first factor is mainly structured by questions Q<sub>1</sub>, Q<sub>2</sub>, Q<sub>11</sub> and Q<sub>13</sub> and can be identified as the satisfaction coefficient that expresses the "financial terms of insurance and the amount of insurance coverage". The second factor explains 16.6% of the total variance and also has a high reliability, with Cronbach's  $\alpha$  0.89; it is mainly structured by questions Q<sub>3</sub>, Q<sub>5</sub>, Q<sub>7</sub> and Q<sub>8</sub>. This satisfaction coefficient focuses on the "the human aspect of service, facilities and equipment". The discrimination indices for this factor ranged at 0.63-0.75. The third factor explains 10.5% of the total variance, has a high reliability, with Cronbach's  $\alpha$  0.82, and is mainly structured by questions Q<sub>4</sub>, Q<sub>9</sub>, Q<sub>12</sub> and Q<sub>14</sub>. According to the semantic content of these questions, this satisfaction coefficient refers to the options for insurance coverage. For this factor, the discrimination indices ranged at 0.43-0.72. The fourth factor explains 8.8% of the total variance, has a satisfactory reliability, with Cronbach's  $\alpha$  0.76, and is related to questions Q<sub>6</sub>, Q<sub>10</sub>, Q<sub>15</sub> and Q<sub>16</sub>. This factor expresses the satisfaction coefficient viewed as defining the particular properties of agricultural insurance. For this factor, the discrimination indices ranged at 0.38-0.55.

Based on the data presented in Table 2, we can observe the following: as regards the first satisfaction coefficient, the four questions it comprises received the following answers on average:

**Table 2: Coefficients of farmer satisfaction with the Agricultural Insurance system**

Questions	Factors			
	F <sub>1</sub>	F <sub>2</sub>	F <sub>3</sub>	F <sub>4</sub>
Q <sub>1</sub> cost of insurance	0.850			
Q <sub>2</sub> amount of insurance coverage	0.835			
Q <sub>11</sub> sense of transaction security	0.810			
Q <sub>13</sub> flexibility of the insurance system	0.785			
Q <sub>3</sub> geographical distance from administrative services		0.840		
Q <sub>5</sub> friendly attitude of staff		0.765		
Q <sub>7</sub> service provided by staff		0.705		
Q <sub>8</sub> technical knowledge of staff		0.685		
Q <sub>4</sub> flexibility of insurance terms			0.735	
Q <sub>9</sub> level of insurance coverage			0.710	
Q <sub>12</sub> fair distribution of resources			0.635	
Q <sub>14</sub> inclusion level of new insurance risks			0.605	
Q <sub>6</sub> improved competitiveness				0.810
Q <sub>10</sub> quick and timely loss estimation				0.605
Q <sub>15</sub> adjustment to modern risk management tools				0.590
Q <sub>16</sub> substantial protection of agricultural income				0.570
Cronbach's $\alpha$	0.91	0.88	0.82	0.75
Mean	4.0	3.5	3.1	3.0
St. D.	0.5	0.5	0.4	0.4

- Table 2 only presents the loadings with an absolute value  $\geq 0.55$ . Loadings of this class for this particular sample size are statistically significant at a significance level  $\alpha=0.05$  and a validity level 0.80.

As can be seen in Table 3, the farmers express a neutral-medium level of agreement about the third and fourth dimension of satisfaction, since the overall average for the four relevant questions that constitute these two factors, is equal to 3.1 and 3 respectively. In comparison, the farmers express a more positive level of agreement concerning the first and second dimension of satisfaction, since the overall average for the relevant questions that comprise them is equal to 4 and 3.5 respectively.

Based on what was mentioned in this unit, the construct validity of the measurement scale, pertaining to the farmers' satisfaction with the Agricultural Insurance system, is documented to a satisfactory degree.

In order to develop the typology of the farmers in the sample, based on the factorial structures (dimensions) F<sub>1</sub>, F<sub>2</sub>, F<sub>3</sub> and F<sub>4</sub>, highlighted by the PAF, Hierarchical Cluster Analysis was used (Hair *et al.*, 1995; Sharma, 1996). The squared Euclidean distance was used to measure the dissimilarity among the farmers, and the method used for the cluster formation was based on Ward's criterion. The analysis indicated three farmer clusters. The first cluster (S<sub>1</sub>) includes 92 farmers (46.0%), the second cluster (S<sub>2</sub>) 67 farmers (33.5%) and the third consists of 41 farmers (20.5%). The cluster profile, as regards the five factors, is presented in Table 4. According to the determination coefficient  $R^2$ , the relative significance of the variables used for the cluster formation is, by descending order, F<sub>3</sub>, F<sub>4</sub>, F<sub>2</sub> and F<sub>1</sub>.

**Table 3: Structural analysis of satisfaction coefficients**

Satisfaction coefficients		Mean	Std. Deviation
<b>1<sup>st</sup> coefficient (F<sub>1</sub>):</b> “financial terms of insurance and the amount of insurance coverage”			
Q <sub>1</sub>	cost of insurance	3.4	1.2
Q <sub>2</sub>	amount of insurance coverage	3.5	1.3
Q <sub>11</sub>	sense of transaction security	3.2	1.1
Q <sub>13</sub>	flexibility of the insurance system	3.1	1.2
		<b>4</b>	
<b>2<sup>nd</sup> coefficient (F<sub>2</sub>):</b> “human aspect of service, facilities and equipment”			
Q <sub>3</sub>	geographical distance from administrative services	3.6	0.9
Q <sub>5</sub>	friendly attitude of staff	3.8	0.8
Q <sub>7</sub>	service provided by staff	3.5	0.9
Q <sub>8</sub>	technical knowledge of staff	3.1	1.1
		<b>3.5</b>	
<b>3<sup>rd</sup> coefficient (F<sub>3</sub>):</b> “options for insurance coverage”			
Q <sub>4</sub>	flexibility of insurance terms	3.2	0.7
Q <sub>9</sub>	level of insurance coverage	2.8	0.6
Q <sub>12</sub>	fair distribution of resources	3.3	0.8
Q <sub>14</sub>	inclusion level of new insurance risks	3.1	0.8
		<b>3.1</b>	
<b>4<sup>th</sup> coefficient (F<sub>4</sub>):</b> “properties of agricultural insurance”			
Q <sub>6</sub>	improved competitiveness	3.3	0.6
Q <sub>10</sub>	quick and timely loss estimation	3.2	1.2
Q <sub>15</sub>	adjustment to modern risk management tools	3.1	0.8
Q <sub>16</sub>	substantial protection of agricultural income	2.4	0.6
		<b>3</b>	

Based on the data in Table 4, we can observe that cluster S<sub>3</sub> has the highest values for satisfaction coefficients F<sub>1</sub>, F<sub>2</sub>, F<sub>3</sub> and F<sub>4</sub>.

**Table 4: Cluster Profile**

Clusters		F <sub>1</sub>	F <sub>2</sub>	F <sub>3</sub>	F <sub>4</sub>
S <sub>1</sub>	Mean	4.4 <sup>a</sup>	3.3 <sup>b</sup>	2.7 <sup>b</sup>	3.1 <sup>a</sup>
	N	92	92	92	92
S <sub>2</sub>	Mean	3.5 <sup>b</sup>	3.4 <sup>b</sup>	3.1 <sup>b</sup>	2.6 <sup>b</sup>
	N	67	67	67	67
S <sub>3</sub>	Mean	4.0 <sup>ab</sup>	4.1 <sup>a</sup>	3.9 <sup>a</sup>	3.4 <sup>a</sup>
	N	41	41	41	41
	R <sup>2</sup>	0.312	0.423	0.478	0.432
		P<0.001	P<0.001	P<0.001	P<0.001

For each factor, mean values followed by a different letter present a statistically significant difference at  $P<0.05$ , according to Tukey's test.

More specifically, this cluster consists of farmers who express a high satisfaction level with financial issues and the insurance coverage terms, the human aspect of service, facilities and equipment, and also a high level of satisfaction with the insurance coverage options. In addition, this cluster is composed of farmers who express a relatively neutral level of satisfaction as regards the particular properties of the agricultural insurance system. Cluster S<sub>2</sub> has the lowest values for satisfaction coefficients F<sub>1</sub>, F<sub>2</sub>, F<sub>3</sub> and F<sub>4</sub>. More specifically, this cluster includes farmers who express a relatively neutral level of satisfaction with financial issues and the insurance coverage terms, the human aspect of service, facilities and equipment, and the insurance coverage options. Furthermore, the farmers in this cluster express disagreement as regards their satisfaction with the particular properties of agricultural insurance. Cluster S<sub>1</sub> consists of farmers who give a high value to coefficients F<sub>1</sub> and F<sub>4</sub>. Moreover, they give low values to satisfaction coefficients F<sub>2</sub> and F<sub>3</sub>. More specifically, this cluster consists of farmers who express a high level of satisfaction with financial issues and the insurance coverage terms, and a relatively neutral level of satisfaction with the particular properties of agricultural insurance. Furthermore, they

present a neutral level of satisfaction with the human aspect of service, facilities and equipment, and express disagreement as to their satisfaction with the agricultural insurance options.

### 3. CONCLUSIONS - PROPOSALS

The satisfaction of farmers, viewed as “customers” of the protection and insurance system for agricultural activities in Greece, is considered a prerequisite for customer loyalty and customer commitment, which in turn form a requirement for achieving financial objectives, such as the protection of agricultural income. Customer satisfaction is the most important resource for the development of a competitive advantage, and has a decisive impact on the establishment of organisational priorities and practices. Farmer satisfaction with the agricultural insurance system is particularly important, since it is related to the farmers’ continued involvement with the agricultural profession, by providing security to their agricultural income, and therefore supporting the growth of the agricultural sector in Greece.

The present paper examined the level of farmer satisfaction with the existing structures and services involving agricultural insurance, as provided in Greece. Principal Axis Factoring pointed at four satisfaction factors. The first factor was identified as the satisfaction coefficient which expresses the “financial terms of insurance and the amount of insurance coverage”. The second factor is the satisfaction coefficient that focuses on the “human aspect of service, facilities and equipment”. The third factor refers to farmer satisfaction with the “insurance coverage options”, while the fourth factor expresses the satisfaction coefficient, which centres on the general “properties of agricultural insurance”.

Through the application of Data Analysis methods and based on their satisfaction structures, a farmer typology was developed. More specifically, the typology includes three farmer clusters. Cluster  $S_3$  consists of farmers who express a high level of satisfaction with financial issues and the insurance coverage terms, the human aspect of service, facilities and equipment, as well as the insurance coverage options. Furthermore, this cluster comprises farmers who express a relatively neutral satisfaction level as regards the particular properties of the agricultural insurance system.

Cluster  $S_2$  includes farmers who express a relatively neutral satisfaction level with financial issues and the insurance coverage terms, the human aspect of service, facilities and equipment, and the insurance coverage options. The farmers in this cluster express disagreement as regards their satisfaction with the particular properties of agricultural insurance.

Cluster  $S_1$  consists of farmers who express a high level of satisfaction with financial issues and the insurance coverage terms, and a relatively neutral satisfaction level concerning the particular properties of agricultural insurance. Moreover, they present a neutral satisfaction level as regards the human aspect of service, facilities and equipment, and disagreement as to their satisfaction with the options for agricultural coverage.

Generally speaking, the farmers in the sample are presented as being quite satisfied with the formulation of their insurance contributions, and the financial terms of the insurance coverage. The farmers in cluster  $S_1$  express discontent with the agricultural insurance options, and more specifically, with the inclusion of new insurance risks, the flexibility of insurance terms, the distribution of resources and the level of insurance coverage. The farmers in cluster  $S_2$  express discontent as to the particular properties of agricultural insurance, such as the contribution of the system to improved competitiveness for farms, timely loss estimation, adjustment to modern risk management tools, and the substantial protection of agricultural income. From the results of the study, we can conclude that the farmers are quite satisfied with the formulation of their insurance contributions and the financial terms of the insurance coverage. However, they are quite reserved as regards the socially just distribution of resources through the existing insurance system, as regards the flexibility of insurance terms, the inclusion level of new insurance risks, the adjustment to modern risk management tools, and the contribution of the existing agricultural insurance system to the improved competitiveness of Greek farming. More specifically, the rationalisation of the agricultural insurance system is required and recommended, through the creation of a modern, effective and socially just system. To this aim, the agricultural insurance system could be restructured by using a diversified range of contributions, depending on the level of risk, so that justice is reinstated, and each farmer is compensated according to their individual contribution level.

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