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AGRICULTURAL ENTERPRISES' CHARACTERISTICS AFFECTING THE SELECTION OF INFORMATION SOURCES ON LAND USE: A CASE STUDY OF ŞANLIURFA

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ABSTRACT

Globally, declining farmland is a cause for concern. Şanlıurfa has the third-highest amount of agricultural land among the 81 provinces in Turkey. This research aims to determine the factors that affect the selection of information sources that agricultural enterprises in Şanlıurfa use in solving problems of agricultural land use and the agricultural enterprises' willingness to pay for sustainable agricultural land use in their knowledge and innovation system. The main data for the research was obtained via face-to-face surveys of agricultural enterprises selected by a simple random sampling method in Şanlıurfa in 2018. The sampling volume was determined at a 95% confidence limit and a 5% error margin. A chi-squared test was used in the analyses. According to the results, 15.1% of the agricultural enterprises used farmer organizations, 5.3% research institutions, 33.9% public agricultural organizations, 25.7% consultancy, and 20% used a combination of the above as sources of information for solving problems. The age, education level, land amount, commercial livestock, and income of the agricultural enterprises were determined as statistically effective factors in selecting information sources. To ensure optimal agricultural land use, extension and education activities need to be developed under public control, with understandable and applicable methods under agricultural enterprises conditions. Of the participants, 39% showed a willingness to pay for agricultural land use that would provide better income which can be used to co-finance the land use and increase its efficiency. The obtained results provide useful data for agricultural policy-makers and decision-makers both in the research field and in regions with similar socio-economic characteristics.

Keywords: Agricultural enterprises' characteristics, agricultural land use, information sources, willingness to pay, Şanlıurfa-Turkey

INTRODUCTION

A large part of the terrestrial areas on earth is not suitable for human settlement and, therefore, agricultural activities due to poles, deserts, forests, high mountainous areas, and swamps (Elmastaş, 2008). Approximately 12% of the areas in the ice-free world correspond to agricultural lands (Licker et al., 2010). Globally, existing agricultural land is becoming increasingly insufficient to meet the food needs of the growing population (FAO, 2021). Today, the world population has exceeded 7.81 billion; 845.8 million people are hungry and the daily starvation rate is estimated to be over 20 thousand. While the annual average amount of soil lost due to erosion globally is 4.79 million hectares (ha), the amount of decertified land is around 8.21 million ha (Worldometer, 2020). On the other hand, the misuse of agricultural lands has become widespread due to sectoral competition such as urbanization based on population growth, industrialization, and tourism. Agriculture has strategic importance for all countries mainly due to the increasingly diverse food security of the growing population, its status as the major source of raw materials to other sectors, and the wide range of direct and indirect employment it provides (Aydoğdu, Cançelik, et al., 2021; Aydoğdu, Sevinç, et al., 2021; Boyles et al., 2011; Jones & Ejeta, 2016). The deterioration of the soil structure and vegetation has started to occur more rapidly due to floods and droughts resulting from climate changes that arise mostly due to global warming. On the other hand, most farmers in developing countries lack sufficient information on sustainable use of agricultural land, leading to reduced agricultural production and income in arid and semiarid regions. In the last 20 years, many countries have started to take measures for sustainable agriculture and the protection of agricultural lands, to provide sufficient food to their nations (Bousbaine et al., 2017).

A study using panel data between 1961 and 2011 at the country level determined that agricultural land-use change reached 65% for many reasons (Alexander et al., 2015). Competition over land-use decisions between different sectors has led to ecological structure change and social inequalities in rural areas (Sikor et al., 2013). Land use is a holistic system consisting of many interconnected and interactive components, and usage decisions, continuity, and optimization are of primary importance (Vershinin et al., 2016). Globally, the interest in and importance of problems arising from land-use decisions and improper land use based on a lack of information have been gradually increasing. More studies have begun to focus on the links between social and ecological systems that differ geographically, from local to national scale, to promote sustainable land use (Meyfroidt et al., 2013). Therefore, new approaches to land use and the protection of agricultural land have become more common and increasingly important, to ensure the utilization of agricultural lands at an optimum, sustainable level without disturbing the agricultural ecological balance (Aydoğdu et al., 2020; Gibbs et al., 2010; Strassburg et al., 2014). Due to the inhomogeneity and complexity of usage decisions, quantitative and qualitative analyses are required. This approach also ideally requires the integration of agricultural enterprises as actors and participants in the process (Bousbaine et al., 2017).

Agriculture is the most disadvantaged sector in terms of income and living conditions in Turkey. The basis of the agricultural structure problems in Turkey is the small size and fragmentation of agricultural enterprises, as well as the large population working in agriculture. Small-scale Turkish agricultural enterprises have low

productivity and high costs. There are 3.1 million agricultural enterprises in Turkey; 64.8% of these enterprises have land assets under 5 ha, 29.4% have 5–19 ha, 5.1% have 20–49 ha, and 0.7% have 50 ha or more (Uzundumlu, 2013). According to a study conducted within the scope of Analysis of Household Consumption Expenditures in Turkey, the average consumption tendency was 91.3% and the average saving tendency was 8.7% (Çalmaşur and Kılıç, 2018). While 6.34% of the disposable income of rural households in 2010, 4.3% consisted of agricultural entrepreneurial income in 2018 (TURKSTAT, 2020; 2021a). According to a research on income and living conditions based on 2020 data, 71% of individuals in Turkey make installments or debt payments. While the highest average annual job income was in the services sector at 46034 TL, the lowest annual job income was in the agriculture sector at 25263 TL (TURKSTAT, 2021a). There was a reduction of farmlands by 3.22 million ha between the years 2001–2020 in Turkey (TURKSTAT, 2021b). On the other hand, due to heritage and rural population growth, farmlands have been fragmented, and most pasture and meadowland have been transformed for crop cultivation (Tanrıvermis, 2003). Shrinking lands, pastures and meadows have become mostly unable to meet the need of even subsistence agriculture and livestock production. Approximately 2 million producers have quit agricultural production in the last two decades in Turkey (Ataseven, 2016; Sevinç et al., 2019). Considering that the population is gradually increasing while the fertile lands are decreasing, it becomes even more important to use agricultural lands in a planned and rational manner, to protect the natural environment while ensuring economic growth and sustainability for future generations. This requires the appropriate distribution of land among various uses for the benefit of society. Protection, balanced use, and development of agricultural land are only possible by making the necessary plans and implementing policies to take advantage of developing science and technology opportunities (Topçu, 2012).

In Turkey, the new version of Soil Conservation and Land Use Law No. 5403 was published in 2005 and revised in 2007, 2014, and 2018. This law aims to determine the procedures and principles that will ensure the planned use of agricultural land and the generation of sufficient income under the environmental priority of the sustainable development principle (Law of the Republic of Turkey, 2021). The law aims to prepare agricultural land use plans, evaluate the social, economic, and environmental dimensions of conservation and development with participatory methods, prevent misuse, and create methods to ensure protection. According to Article 6 of the Law, the aim in all activities is to carry out an examination, evaluation, and monitoring for the protection, development, and efficient use of land, determine emerging problems, take measures to eliminate the problems related to soil conservation, and develop and direct initiatives to ensure their implementation.

In 2020, Şanlıurfa, which is part of the Southeastern Anatolia Project region (GAP in Turkish), had a population of 2.155 million people (TURKSTAT, 2021b). The GAP project, which is the most comprehensive regional development project of the Republic of Turkey, is concerned with water and land resources (GAP, 2021). Şanlıurfa is located in a semi-arid climate zone where drought has been increasingly experienced recently (Aydoğdu and Yenigün, 2016). Şanlıurfa has 1.054 million ha of arable agricultural land (GAP, 2020), which is the largest amount of arable land in GAP and the third largest in Turkey (Sevinç et al., 2019). The main source

of livelihood in Şanlıurfa is agriculture and agriculture-based industry (Aydoğdu, 2017). Şanlıurfa has various problems in agricultural land use (Republic of Turkey Ministry of Development, 2014). The location of Şanlıurfa in the GAP region and Turkey is given in Figure 1.

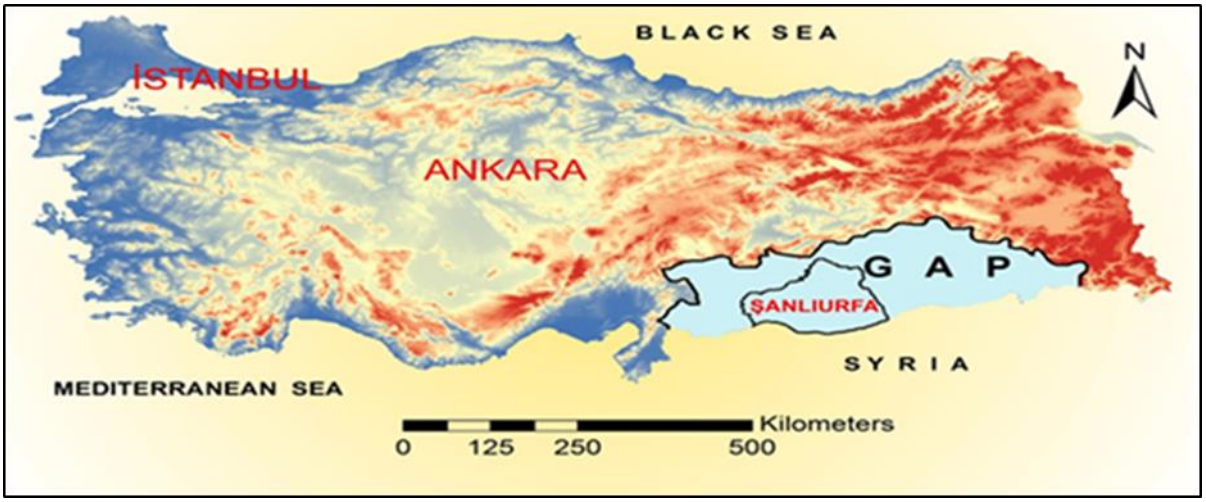

Figure 1. The Location of Şanlıurfa in the GAP Region and Turkey (Doğan et al., 2020)**.**

This research aims to determine the factors that affect the selection of sources of information by agricultural enterprises in Şanlıurfa for solving problems of agricultural land use and their willingness to pay for sustainable land use.

METHOD

Research model

The main material of the research is the data obtained from face-to-face surveys of agricultural enterprises engaged in agricultural production in Şanlıurfa; these agricultural enterprises, who voluntarily participated, were selected by a simple random sampling method. The surveys were conducted with only male farmers as representatives of agricultural enterprises for cultural reasons specific to the research area. Simple random sampling is one of the sub-methods of probability sampling. In this method, participants are randomly selected, each individual has an equal chance of being selected from the population, and the analysis of the data is relatively easy (Acharya, Prakash, et al., 2013; Yazıcıoğlu & Erdoğan, 2014).

Population-sample

In 2018, the number of agricultural enterprises registered in the farmer registration system in Şanlıurfa was 59195. The sampling volume was found to be 245 by taking a 95% confidence limit (p = 0.8 and q = 0.2) and 5% error margin from the sample size table (Lorcu, 2015; Yazıcıoğlu & Erdoğan, 2014).

Data Analysis

The data obtained from the surveys were transferred to Excel based on a specific code plan and analyzed on SPSS. A chi-squared test was used in the analyses to determine the relationship between two or more variable groups. Both of these variables could be qualitative or quantitative, or one could be quantitative and the other qualitative. Besides, a chi-squared test can be used to examine the difference between continuous and discrete numeric data that would later be converted to qualitative data (Lorcu, 2015). Eighty percent (80%) of the counted value should be greater than 5 in a chi-squared analysis (Field, 2013; Karagöz, 2019). When this condition is fulfilled, the importance level is determined by the asymptotic method. In cases where this requirement is not fulfilled, one of the recommended effective methods is the Fischer exact test, which correctly calculates the exact probability of the chi-squared statistic for a small sampling volume (Elliott and Woodward, 2006). This test is also called the Fisher Freeman test (Akgün and Papatya, 2018). In the present study, the method of comparing column proportions with the z-test application was used to determine which group caused the difference as a result of chi-squared analysis. In this method, a letter is assigned to each counted value. While there was no significant difference between values with the same letters, there was a statistical difference at the 0.05 significance level between values with different letters.

FINDINGS

The average age of the farmers as representatives of agricultural enterprises that participated in the survey was 45.4 years, with 92.7% of them married. The average amount of land cultivated by the participants was 11.5 ha, and their average farming experience was 23.1 years. About 56.7% of the participants were members of a farmers' organization. While 14.7% of the participants did not benefit from agricultural supports, 76.7% of them benefited from supports regularly every year, and 8.6% of them benefited less frequently. While 46.1% of the participants did not use agricultural loans at all, 21.2% of them used loans every year, and 32.7% of them used less frequently. The average annual agricultural income of the participants was 38 697 Turkish Lira (TL) (8082.42 $/year), and the average agricultural income was 3 362 TL/ha (697.51 $/ha). On average, 1 USD was equivalent to 4.788 TL in 2018 (Central Bank of The Turkish Republic, 2021). Thirty-nine percent (39%) of the farmers surveyed showed a willingness to pay for agricultural land use to generate sustainable income. The descriptive statistics of the participants in the present study are given in Table 1.

Table 1. Descriptive Statistics of Farmers That Participated In the Study

Variable	Definition	Mean	Std. Dev
Age (year)	The farmers' age: 1 for between 18–34 (14.8%), 2 for between 35–44 (32.2%), 3 for between 45–54 (31.4%), and 4 for 55 and over (21.6%).	2.60	0.985
Household Size	The farmer' household number: (min. 2 and max. 18)	6.97	2.694
Education Level	The farmers' education level: 1 for primary school graduates and less (41.2%), 2 for secondary school graduates (27.4%), and 3 for high school graduates and more education (31.4%).	1.90	0.848
Land Amount (ha)	The farmers' cultivated land amount: 1 for 5 ha and less (22.1%), 2 for between 5.1–10 ha (35.1%), 3 for between 10.1–20 ha (31.0%), and 4 for 20.1 ha and over (11.8%).	2.33	0.949
Crop Pattern	1 for cultivating only cotton (25.3%), 2 for only wheat (12.7%), 3 for only corn (2.9%), 4 for cotton, wheat, and corn cultivation (41.6%), and 5 for not cultivating any of cotton, wheat or corn (17.6%).	3.13	1.499

Commercial Livestock	1 if the farmer was involved in commercial livestock (23.7%), 0 otherwise (76.3%).	0.24	0.426
Property Type	1 if the land he cultivated was his property (72.7%), 2 otherwise (shareholder, renter, partnership, etc.) (27.3%).	1.27	0.447
Income (TL per year)	Farmers' annual agricultural income: 1 for below 25 000 TL (39.6%), 2 for between 25 001–49 999 TL (40.0%), and 3 for 50 000 TL and over (20.4%).	1.81	0.752
WTP	1 if the farmer wanted to pay for agricultural land use to generate more sustainable income, 0 if they did not	0.39	0.488

There are various institutions and organizations that agricultural enterprises can get help from to solve the problems they encounter in agricultural production. These were taken as dependent variables, as they are sources of information for solving problems of agricultural land use. The dependent variables were sub-grouped into farmers' organizations (chamber of agriculture, agricultural cooperatives, unions, etc.), research institutions (universities, research institutes, etc.), agricultural directorates (provincial and district agricultural directorates), consultancies (these are mostly free support provided by companies from which farmers purchase inputs for agricultural production), and a combination of the above. Many factors affect the choice of sources of information for the solution of agricultural enterprises' problems to varying degrees of importance. In this research, age, education level, amount of land, income, and commercial livestock were selected as independent variables based on the author's field experience.

There was statistical significance at a level of p<1% between age and agricultural information source, which was the dependent variable. The cross-tabulation and chi-squared test results are given in Table 2.

Table 2. The Cross Tabulation and Chi-Squared Test Results of the Age Variable

Sources of Information		Age				Total
		18-34	35-44	45-54	55 and more	
Farmer Organizations	Count	$7_{a.\,b.\,c}$	7_{c}	21_{b}	$2_{a.\,c}$	37
	% within age	19.4%	8.9%	27.3%	3.8%	15.1%
Research Institutions	Count	$1_{a.\,b}$	11_{b}	1_{a}	$0_{a.}$	13
	% within age	2.8%	13.9%	1.3%	0.0%	5.3%
Public Agriculture Directorates	Count	$9_{a.}$	41_{b}	22_{a}	11_{a}	83
	% within age	25.0%	51.9%	28.6%	20.8%	33.9%
Consultants	Count	$8_{a.\,b}$	14_{b}	17_{b}	24_{a}	63
	% within age	22.2%	17.7%	22.1%	45.3%	25.7%
A few of the above	Count	11_{a}	6_{b}	$16_{a.\,b}$	16_{a}	49
	% within age	30.6%	7.6%	20.8%	30.2%	20.0%
Total	Count	36	79	77	53	245
	% within age	100.0%	100.0%	100.0%	100.0%	100.0%

[a,b,c] Each subscript letter denotes a subset of age categories whose column proportions do not differ significantly from each other at the 0.05 level. In other words, while there is no significant difference between subgroups in the same letter group, those with different letter groups are statistically significant within the group.

Chi-Squared Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Squared	64.203	12	**0.000* (p<1%)**
Likelihood Ratio	65.021	12	0.000
Linear-by-Linear Association	6.635	1	0.010
N of Valid Cases	245		

According to the test results, farmers in the 45–54 age group considered farmer organizations as a source of information at a higher rate than those in the 35–44 and 55 and above age groups. Farmers in the 35–44 age

group considered research institutions as a source of information more than participants in the 45–54 and 55 and above age groups. Again, this age group considered public agriculture directorates as a source of information more than all other age groups. Farmers aged 55 and above considered consultancies as a source of information more than participants in all other age groups. Participants in the 18-34 age group, on the other hand, consider a combination of the above as a source of information.

The test results between the education level variable and the dependent variable are given in Table 3. According to Table 3, there was a statistically significant relationship between this independent variable and the dependent variable at a p<1% significance level.

Table 3. The Cross Tabulation and Chi-Squared Tests Results of the Education Level Variable

Sources of Information		Education Level			Total
		Primary school and less	Secondary school	High school and above	
Farmer Organizations	Count	12 [a]	5 [a]	20 [b]	37
	% within education	11.9%	7.5%	26.0%	15.1%
Research Institutions	Count	1 [a]	1 [a]	11 [b]	13
	% within education	1.0%	1.5%	14.3%	5.3%
Public Agriculture Directorates	Count	30 [a]	31 [a]	22 [a]	83
	% within education	29.7%	46.3%	28.6%	33.9%
Consultants	Count	37 [a]	13 [a. b]	13 [b]	63
	% within education	36.6%	19.4%	16.9%	25.7%
A few of the above	Count	21 [a]	17 [a]	11 [a]	49
	% within education	20.8%	25.4%	14.3%	20.0%
Total	Count	101	67	77	245
	% within education	100.0%	100.0%	100.0%	100.0%

[a,b] Each subscript letter denotes a subset of education level categories whose column proportions do not differ significantly from each other at the 0.05 level. In other words, while there is no significant difference between subgroups in the same letter group, those with different letter groups are statistically significant within the group.

Chi-Squared Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	40.901	8	**0.000* (p<1%)**
Likelihood Ratio	38.968	8	0.000
Linear-by-Linear Association	13.756	1	0.000
N of Valid Cases	245		

Farmers with an education level of high school and above considered farmer organizations and research institutions as the most informative source, while secondary school graduates preferred public agriculture directorates and a combination of the given sources of information as the most informative source. Those with primary school and lower education levels chose consultancies as the most informative source. As the education level increased, the need for information increased.

The test results between the land amount variable and the dependent variable are given in Table 4. According to Table 4, there was a statistically significant relationship between this independent variable and the dependent variable at a p<1% significance level.

Table 4. The Cross Tabulation and Chi-Squared Tests Results of the Land Amount Variable

Sources of Information		Land Amount (hectares)				Total
		1-5	5.1-10	10.1-20	20.1 and above	
Farmer Organizations	Count	10 [a]	15 [a]	10 [a]	2 [a]	37
	% within land	18.5%	17.4%	13.2%	6.9%	15.1%
Research Institutions	Count	11 [a]	0 [b]	0 [b]	2 [a. b]	13
	% within land	20.4%	0.0%	0.0%	6.9%	5.3%
Public Agriculture Directorates	Count	18 [a]	28 [a]	30 [a]	7 [a]	83
	% within land	33.3%	32.6%	39.5%	24.1%	33.9%
Consultants	Count	8 [a]	25 [a. b]	28 [b]	2 [a]	63
	% within land	14.8%	29.1%	36.8%	6.9%	25.7%
A few of the above	Count	7 [a]	18 [a]	8 [a]	16 [b]	49
	% within land	13.0%	20.9%	10.5%	55.2%	20.0%
Total	Count	54	86	76	29	245
	% within land	100.0%	100.0%	100.0%	100.0%	100.0%

[a,b] Each subscript letter denotes a subset of land amount categories whose column proportions do not differ significantly from each other at the 0.05 level. In other words, while there is no significant difference between subgroups in the same letter group, those with different letter groups are statistically significant within the group.

Chi-Squared Tests

	Value	df	Asymp. Sig. (2-sided)	Monte Carlo Sig. (2-sided)		
				Sig.	99% Confidence Interval	
					Lower Bound	Upper Bound
Pearson Chi-Square	68.852	12	0.000	0.000*	0.000	0.000
Likelihood Ratio	64.723	12	0.000	0.000*	0.000	0.000
Fisher's Exact Test	57.938			**0.000***	0.000	0.000
Linear-by-Linear Association	11.731	1	0.001	0.001*	0.000	0.001
N of Valid Cases	245					

* indicates the importance of p<1%.

Among all land amount subgroups, farmers who cultivated 1–5 ha of land considered farmer organizations and research institutes as the most informative source. Farmers in this group mostly engaged in subsistence agriculture. They preferred organizations that are either easily accessible or can bring about high-income growth. Farmers whose land amount was between 5.1 and 10 ha preferred public agriculture directorates as their source of information. Respondents who cultivated 10.1 and 20 ha of land preferred consultancies as their information source more than other respondents. Farmers with a land amount of 20.1 ha and above preferred a combination of the given sources as their information source. This was the subgroup with the largest amount of agricultural land, and so they preferred various alternatives as sources of information to generate high agricultural income.

The test results between the income variable and the dependent variable are given in Table 5. There was a statistically significant relationship between them at a level of p <1%. Farmers in the 1–25 000 TL/year income group preferred public agriculture directorates as a source of information due to the benefits of public agricultural land use supports; they also considered farmer organizations as a good source of information due to their easy accessibility. Farmers whose incomes were between 25 001 and 49 999 TL/year preferred public agriculture directorates as their information source. Farmers with an income of 50 000 TL/year and above

preferred a combination of the given sources as the best informative source. Since this group earned the highest income, they preferred to use various information sources on agricultural land use.

Table 5. The Cross Tabulation and Chi-Squared Tests Results of the İncome Variable

Sources of Information		Income (TL/year)			Total
		1-25 000	25 001-49 999	50 000 and above	
Farmer Organizations	Count	20 [a]	12 [a]	5 [a]	37
	% within income	20.6%	12.2%	10.0%	15.1%
Research Institutions	Count	11 [a]	0 [b]	2 [a. b]	13
	% within income	11.3%	0.0%	4.0%	5.3%
Public Agriculture Directorates	Count	29 [a]	40 [a]	14 [a]	83
	% within income	29.9%	40.8%	28.0%	33.9%
Consultants	Count	23 [a]	29 [a]	11 [a]	63
	% within income	23.7%	29.6%	22.0%	25.7%
A few of the above	Count	14 [a]	17 [a]	18 [b]	49
	% within income	14.4%	17.3%	36.0%	20.0%
Total	Count	97	98	50	245
	% within income	100.0%	100.0%	100.0%	100.0%

[a,b] Each subscript letter denotes a subset of education level categories whose column proportions do not differ significantly from each other at the 0.05 level. In other words, while there is no significant difference between subgroups in the same letter group, those with different letter groups are statistically significant within the group.

Chi-Squared Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	26.960	8	**0.001* (p<1%)**
Likelihood Ratio	29.370	8	0.000
Linear-by-Linear Association	10.763	1	0.001
N of Valid Cases	245		

The test results between the commercial livestock variable and the dependent variable are given in Table 6. There was a statistically significant relationship between them at a level of p<5%. One of the most important inputs for commercial livestock breeding in Şanlıurfa-Turkey is feed (Aydoğdu and Küçük, 2018; Aydoğdu et al., 2020). Commercial livestock farmers preferred a combination of the given sources of information on agricultural land use compared to farmers who did not deal in livestock.

Table 6. The Cross Tabulation and Chi-Squared Tests Results of Commercial Livestock Variable

Sources of Information		Commercial Livestock		Total
		No	Yes	
Farmer Organizations	Count	25 [a]	12 [a]	37
	% within C. Livestock	13.4%	20.7%	15.1%
Research Institutions	Count	12 [a]	1 [a]	13
	% within C. Livestock	6.4%	1.7%	5.3%
Public Agriculture Directorates	Count	68 [a]	15 [a]	83
	% within C. Livestock	36.4%	25.9%	33.9%
Consultants	Count	52 [a]	11 [a]	63
	% within C. Livestock	27.8%	19.0%	25.7%
A few of the above	Count	30 [a]	19 [b]	49
	% within C. Livestock	16.0%	32.8%	20.0%
Total	Count	187	58	245
	% within C. Livestock	100.0%	100.0%	100.0%

[a,b] Each subscript letter denotes a subset of commercial livestock categories whose column proportions do not differ significantly from each other at the 0.05 level. In other words, while there is no significant difference between subgroups in the same letter group, those with different letter groups are statistically significant within the group.

Chi-Squared Tests			
	Value	**df**	**Asymp. Sig. (2-sided)**
Pearson Chi-Square	12.380	4	**0.015* (p<5%)**
Likelihood Ratio	12.270	4	0.015
Linear-by-Linear Association	0.582	1	0.445
N of Valid Cases	245		

CONCLUSION and DISCUSSION

Age was an effective factor in the selection of information sources. As a farmer became older, he tended to turn to sources of information he could access more easily. In studies on farmer views on agricultural land use and conservation in Bangladesh (Islam et al., 2020), sustainable ecosystem-based income in China (Ning et al., 2019), and the influence of demographic factors on-farm management by New Zealand farmers (Corner-Thomas et al., 2015), age was also determined to be an effective factor. In studies conducted in GAP-Şanlıurfa, it was determined that farmers were willing to pay a consultancy fee that would be beneficial to them and increase their income (Aydoğdu, 2017; Aydoğdu and Altun, 2019). While farmers with a low education level preferred less and more easily accessible sources of information, those with higher education tended to turn to all the resources they could access for more information. In studies on farmers' views of agricultural land use in Bangladesh (Islam et al., 2020), factors affecting rural land-use decisions in China (Yang and Xu, 2019), the role of land use consolidation among farmers in Rwanda (Nilsson, 2019), and the influence of demographic factors on-farm management by New Zealand farmers (Corner-Thomas et al., 2015), the level of education were determined as an influential factor.

The amount of land was determined as an effective factor in studies on factors affecting rural land-use decisions (Yang and Xu, 2019) and willingness to pay for agricultural land protection in China (Yang et al., 2019), perspectives on agricultural land use conversion in rural Ghana (Appiah et al., 2019), the role of land use consolidation among farmers in Rwanda (Nilsson, 2019), and the influence of demographic factors on-farm management by New Zealand farmers (Corner-Thomas et al., 2015). On the other hand, it was determined that the amount of land was not an effective factor in farmers' views on agricultural land use in Bangladesh (Islam et al., 2020). Income was also determined as an effective factor in studies on farmers' views of agricultural land use in Bangladesh (Islam et al., 2020), the role of land use consolidation among farmers in Rwanda (Nilsson, 2019), factors affecting rural land-use decisions in China (Yang and Xu, 2019), and land-use change and income inequality in rural Indonesia (Bou Dib et al., 2018). Commercial livestock was determined as an effective factor affecting land use in studies on farmers' preferences for future agricultural land use in Australia (Pröbstl-Haider et al., 2016), the land use pattern of settlers in the central Ecuadorian Amazon (Vasco et al., 2018), and the role of land use consolidation among farmers in Rwanda (Nilsson, 2019).

About 15.1% of the agricultural enterprises that participated in this research preferred farmers' organizations as a source of information to solve their problems, 5.3% preferred research institutions, 33.9% preferred public agricultural organizations, 25.7% preferred free consultancy provided by private sector companies, and 20% preferred a combination of the available sources of information. Surprisingly, research institutions were

preferred as an information source by few farmers, although such institutions can be said to have the most reliable information. During the field researches, the agricultural enterprises were asked the reasons for this, and the answers were that it was difficult to reach these institutions, and the information received was complex and difficult to apply in field conditions due to its technical intensity. In other words, the information provided by research institutions is mostly scientifically based and not suited to the farmers' education levels. Another remarkable result is that 56.7% of the participants were members of a farmers' organization, while only 15.1% of them benefited from such organizations. This result shows that farmers' organizations are not efficient enough. The public agricultural organizations were preferred as the most informative source by 33.9% of the farmers. This might be associated with the benefits from public agricultural supports. In other words, agricultural enterprises apply to public agricultural organizations for public support rather than to get help for their agricultural problems. Although free consultancy was considered an important source of information by 25.7% of agricultural enterprises, the information is mostly made available by companies to sell fertilizers and pesticides. This might lead to farmers using an overdose of the chemicals. While this situation could result in an increase in production and income in the short term, it may cause deterioration of agricultural lands in the medium and long term.

Sustainable use of agricultural land is necessary for reasons such as improving the welfare of rural areas, employment, economic and social development, equality and fairness in the use of natural resources, as well as ensuring the food security of nations. Although agricultural land use problems arise for many reasons, the lack of accurate, applicable, timely, and adequate information needs in agricultural production is the most important reason. As a natural consequence of these problems, structural deterioration occurs in agricultural lands, leading to production and income losses. The welfare of farmers is adversely affected as income losses increase. Consequently, the farmers might abandon agriculture and migrate to cities or seek ways to earn more income by giving agricultural land for rent-based use. Both are undesirable and negatively affect social welfare.

RECOMMENDATIONS

The first condition of ensuring the sustainability of agricultural lands is to increase the income of agricultural enterprises and, thus, the welfare of rural areas by meeting the information needs of agricultural enterprises in a timely and practical manner. Public institutions, the private sector, and agricultural enterprises have responsibilities in increasing the sustainability and productivity of agricultural lands. It is crucial to expand agricultural extension and education activities under public control and develop methods applicable to agricultural enterprises conditions. About 39% of the participants showed a willingness to pay for sustainable agricultural land use to boost their income. This is an important percentage for the research area and it can be used for co-financing (sharing of finance by public and agricultural enterprises) in studies to increase the efficiency of agricultural land use. The results obtained from this research will make a positive contribute to the literature and provide useful data and results for agricultural policymakers and decision-makers. Further research on this subject in other regions of Turkey where the amount of agricultural land is considered important will contribute positively to the literature.

ETHICAL TEXT

In this article, the journal writing rules, publication principles, research and publication ethics, and journal ethical rules were followed. The responsibility belongs to the author for any violations that may arise regarding the article.

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