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Factors Affecting Farmers' Satisfaction from Water Users Association in the Harran Plain-GAP Region, Turkey

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ABSTRACT

The purpose of this paper was to determine the factors affecting farmers' satisfaction from Water Users Associations (WUAs) in the Harran Plain-Turkey. The data used in this study come from a sample of 378 farmers among 23,204 in the Şanlıurfa-Harran Plain. They were chosen via simple random sampling method and interviewed face to face. Sampling was conducted in 52% of the settlements. To analyze the collected survey data, SPSS 15 was used together with Kruskal Wallis, Mann-Whitney, Pearson *Chi*-square and the correlation tests. The results indicated the existence of relationship between satisfaction and education levels, knowledge level about WUA, and status of ownership, land area, age, farming experiences, income, and service quality given by WUAs. These factors significantly explained satisfaction of farmers. The average of variables' highest satisfaction was calculated as 47.4%. The highest satisfaction was 68.5% and belonged to the status of ownership; the lowest one was 28.3% in the case of farming experiences. The managers of WUAs should be concentrating on these factors in order to increase satisfaction and provide training and information for farmers.

Keywords: Agricultural irrigations, Participation, Sustainability status of ownership, Water management, WUA.

INTRODUCTION

The rapid population increase, increasing urbanization rates, expansion of agricultural irrigation, and industrialization and development activities throughout the world necessitates the control of natural water resources from a quality and quantity perspective (Thatte, 2002; Aydogdu, 2012). Total global water consumption by sectors is presented in Table 1.

Total water consumption in Turkey increased by 372% from 1980 to 2012 (DSI, 2013). In the future, as it is assumed that the water consumption will increase and, furthermore, droughts are assumed to be experienced due to global warming, serious problems regarding water is expected. Therefore, higher efficient irrigation systems and better management and operation are further required.

Irrigation management first emerged in the beginning of the 19th century in USA. Due to several drought and flood experiences, irregular precipitation, WUAs in various regions in the USA were established because of needs and demands in order to make a more orderly irrigation and production (Aydogdu, 2009; Anonymous, 2010). Korkuteli WUA, the first one in Turkey, was established by the district governorship because of the conflicts between the farmers, in 1942 (Aydogdu, 2009). Around the world, different models are being implemented in the management of irrigation systems (Kıral, 1995).

In Turkey, the state is the authority in irrigation investment and management. This

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Table 1. Total global water consumption by sectors (%) (UNESCO-WWAP, 2003).

Sector	World	Developed countries	Underdeveloped countries	Europe	Turkey
Agriculture	70	30	82	33	74
Industry	22	59	10	51	11
Drinking and usage	8	11	8	16	15

authorized body is the State Hydraulic Works (DSI, in its Turkish acronym). The management manner in the world to ensure right water usage and its safety became important for the decision makers. The global efforts towards efficient water usage and irrigation methods in order to ensure sustainable agricultural development were implemented through the transfer of irrigation management since the 1950's (Erdoğan, 2000). This process became a national strategy in Chile, Peru, Mexico, Brazil, Senegal, Sudan, Somali, Pakistan, India, Turkey and many other countries in the 1980's and 1990's and was developed as participatory irrigation management (Erdoğan, 2000).

In state irrigation networks, high cost burden of management, repair, and maintenance services and the inability to fully collect the irrigation fees guided the public towards new searches. DSI began to transfer irrigation works to certain units, led by WUAs created by the union of local management units, through the participatory irrigation management. DSI largely withdrew from the irrigation management. The transfer of irrigation networks management to the users by DSI reached 97% (DSI, 2013). In order to ensure that the management, repair, and maintenance work for state built irrigation systems are made and owned by the beneficiaries of the system, the irrigation facilities can be transferred to WUAs established in accordance with different laws which were not directly related with WUAs. Law on WUAs No. 6172 which came into effect in 2011 is the first in this regard. The WUAs that were operating in connection with the relevant ministries in accordance with regulations and instructions up to 2011 are now within the scope of this law. The purpose of this law is to use and manage the water resources in a rational way, to conduct the responsibilities regarding the repair, maintenance, and management of these facilities, implementing or having new projects towards developing the facilities implemented and renewing the facilities, and to regulate the establishment of WUAs as well as their duties and responsibilities. The WUAs established in 1994 have been conducting operations, repairs, maintenance, and management activities under the supervision and inspection of DSI. Ever since WUAs became operational, however, they have been unable to provide services at the desired level of productivity for various reasons. Also, according to the literature review, there is no detailed study on the farmers' satisfaction level with the WUAs in Turkey.

Orne-Gliemann (2008) studied WUAs and researched the people's actions and perceptions of local water management as a fundamental factor to understanding small farmers' interactions with these newly established institutions. He analyzed the scheme's difficulties and, without providing a representative image of smallholder irrigation schemes in South Africa, attempted to determine reflections of small farmers' perceptions of water management and local water management institutions. Gorton *et al.* (2009) studied the farmers from Bregalnica region of Macedonia regarding their opinion towards water societies (unions), their expectations, and payment habits and concluded that membership satisfaction, union's attitude towards the farmers, the farm size,

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Reimbursement rate, water fees, transparency, and trusts were the determinants.

Due to the increasing demand for the limitted available water throughout the world, it is an extremely important matter in water management to make serious attempts in determining its true economic value. As Keramatzadeh *et al*. (2011) said, the optimal allocation of water to agriculture in northern Iran can be achieved by managing the allocation of water based on optimal models and charging water prices close to its true economic value to motivate the farmers to economize in the applied water. Irrigation water management is crucial for agricultural production in the world. According to Storm *et al*. (2011), to implement an effective water management, knowledge about farmers' demand for irrigation water is important to assess reactions to water policy, and to determine the optimal water allocation to different users. Veettil *et al*. (2011) analyzed the tools for irrigation water demand management and farmers' acceptance of these in the Krishna river basin, India. Their results indicated that under conditions of improved water rights and using an appropriate combination of water demand management tools considerably increases farmers' attitudes.

Omid *et al*. (2012) studied the problems and success factors among members of WUAs in three areas in northern Iran. Problems common in all three regions were: dissatisfaction of farmers, network ineffectiveness, inequitable distribution of water, lack of trust towards managers, lack of government support, and incoherence of the group. According to Khatoon-Abadi (2011), diversity, accessibility and reliability are the three main factors governing the adoption of information sources by farmers in rural areas. The research concluded that the existing knowledge and information delivery system in the agricultural sector functions far below the ever changing nature and tangible needs of existing farming systems in Iran.

Many studies regarding WUA, water management and farmer views can be given as follows: Lopez-Gunn (2003) about the role of collective action in water governance in Spain, Cakmak *et al*. (2004) about irrigation water pricing in WUAs in Turkey, Cullen *et al*. (2006) about the performance of three agencies responsible for management of freshwater resources in New Zealand, Kanyoka *et al*. (2008) about financing of multiple use water services as an important ingredient to ensure improved water access in South Africa, Cakmak (2010) about agricultural water pricing in Turkey, Yenigun and Aydogdu (2010) about evaluation of irrigation and drainage systems of GAP in Turkey, Uysal and Atış (2010) about assessing the performance of participatory irrigation management over time in Turkey, Karkacier and Goktolga (2011) about investigation farmers' view regarding soil analysis, Alomran *et al*. (2012) about management of irrigation water salinity, Soto-Garcia *et al*. (2013) about the role of information and communication technologies in the modernization of WUAs' management, Zorica and Bojan (2013), about social participation concept in water management in Serbia, Nie *et al*. (2014) about applied closed-end furrow irrigation optimized design, and Khatam *et al*. (2014) about perceived effect of farmers field school approach on capacity building.

In a country like Turkey where agriculture has a significant importance in the economy, rational and sustainable management of irrigation facilities is very important to develop water and soil resources and increasing their contribution to the national economy. In this regard, efficient and productive management of irrigation facilities is very important.

MATERIALS AND METHODS

Study Area

Southeastern Anatolian Project (GAP, in its Turkish acronym) is a multi-sectoral and

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integrated regional development project. GAP is an important project which aims at utilizing the Southeastern Anatolian Region's resources at hand to increase the income level and quality of life for this region's population, to eliminate inter-regional developing inequality and to contribute to economic development and social stability targets on the national level. Within the project's scope, there are 22 dams, 19 hydroelectric power plants and irrigation of 1,822 million hectares of agricultural land. The total investment cost is 32 billion USD (GAP, 2013). Şanlıurfa has a continental climate in that summers are dry and very hot; the winters are rainy and moderate. Average annual precipitation is approximately 442 mm from 1975 to 2010. Annual average number of days with precipitation is 81.3 and average temperature is 18.4°C (DMİ, 2011). Harran Plain was the study field, at elevation of 375 m, which is among the lowest altitude locations in the GAP (Figure 1). Average precipitation is between 300-365 mms. Annual evaporation is 1,848 mms. Harran Plain is located within the borders of Eyyübiye, Haliliye, and Harran and Akçakale districts of Şanlıurfa.

Agricultural irrigation in Harran Plains within the scope of GAP began in 1994 in an area of 30,000 ha, and today it covers approximately 150,000 ha (DSI, 2013).

Material

The data used in this study come from a sample of 378 farmers among 23,204 in the Harran Plain. The farmers were chosen via simple random sampling method and interviewed face to face in irrigation season of 2011 and 2012. There are 22 WUAs and 363 settlements in the Harran Plain. The farmers residing in 188 of these settlements were interviewed face to face and were given questionnaires. Sampling was conducted in 52% of the settlements.

The sample size was determined using Equation (1), (Yamane, 2001):

$$n = \frac{Nt^2 pq}{d^2(N-1) + t^2 pq} \quad (1)$$

Where, n= Sample size, N= The farmers in the main population, which was 23,204, t= The sample size, which was larger than 30, Z= Table value with 5% error margin is 1.96 in normal distribution table, p= The probability of farmers accepting the suggested proposals and is 50%, i.e. 0.50, q= The probability of farmers not accepting the suggested proposals, 1-p= 0.50, and "d" was taken as 0.05 with 95% confidence interval.

These values indicated that conducting

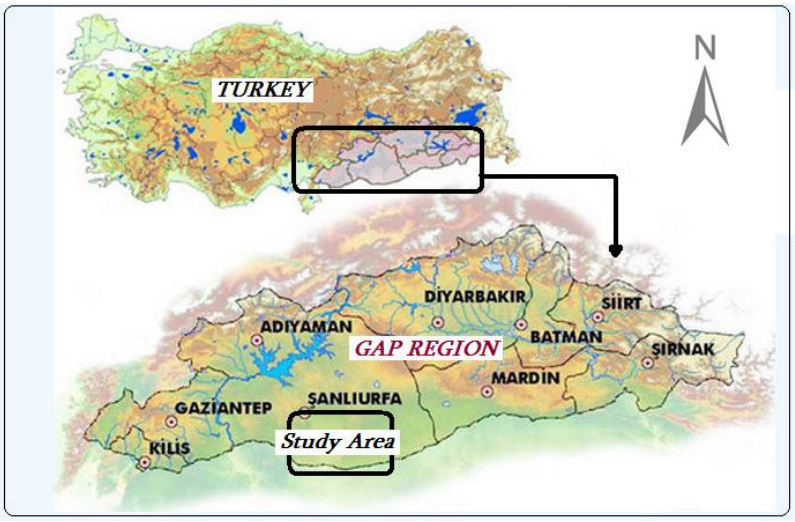

Figure 1. Study Area: Harran Plain in GAP Region of Turkey (from GAP Administration).

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378 questionnaires would be appropriate. The data was increased to 1,050 by conducting weight case for *Chi*-square test and, later on, to 1,563 for different knowledge level factors. All the WUAs in the Harran Plain were visited. To maximize the reliability of the results, villages that represented every WUAs field were intentionally selected.

Methods

The education level, ownership status, land area, age, farming experience, income, knowledge level, and service level given by WUA were selected as variables and tested by hypotheses given below for the existence of a relationship between farmers' satisfaction with WUAs:

H_1: Relationship between satisfaction and the educational levels of farmers. H_2: Relationship between satisfaction and the ownership statuses of farmers. H_3: Relationship between satisfaction and the land holding area of farmers. H_4: Relationship between satisfaction and the age of farmers. H_5: Relationship between satisfaction and the farming experience of farmers. H_6: Relationship between satisfaction and the income of farmers. H_7: Relationship between satisfaction and the fulfill duties of WUAs and knowledge level of farmers. H_8: Relationship between satisfaction and the service level given by WUAs.

Likert attitude scale was used in the research. In the questionnaires, various questions to determine the farmers' satisfaction to WUAs. Generally 85% of confidence level is accepted in Likert scale (Aydogdu, 2012). SPSS is a well known software package used by researchers for statistical analysis in social science. It was used together with Kruskal Wallis, Mann-Whitney, Pearson Chi-square and the correlation tests for analysis of sampling distribution and any observed difference between the sets arose, testing whether samples originate from the same distribution, comparing more than two samples that are independent, or not related and the specific sample pairs for significant differences (Anonymous, 2014).

Reliability Statistics

Reliability statistics are measured by Cronbach's Alpha coefficient (Özdamar, 1999; Tavşancıl, 2002). The obtained Cronbach's Alpha coefficient from data set indicates that this study is reliable (Table 2).

On the other hand, intraclass (in-group) correlation coefficient calculation was done for the data set to test the reliability of estimators, which are farmers. Calculation of these coefficients can be made by different formulas and methods. It was intended to find the proportion of variance of an observation with the actual rating of the observed variability between factors. Accordingly interclass correlation coefficient values may range from 0.0 to 1.0. If interclass correlation value is closer to 1, it indicates that farmers give the same or very close grades to the factors. The data and relationships between factors was significant (Table 3).

RESULTS AND DISCUSSION

The questionnaires were applied to 24% in Akçakale, 37% in Harran, 23% in Eyyübiye and 16% in Haliliye settlements. According to the results, 93% of the participants were married, 5% single, and 2% widowed. Their average age was 44.35 years. The farmers' education was as follows: 11.9% were literate without being graduated from any schools, 48.2% graduated from primary school, 16.4% secondary school, 16.2% high school and 7.3% university graduates. The average household size was 7.2. The total area of cultivated land, including the second crop, was 8,226 ha and 59.2% of the farms were 10 ha or smaller. The average land size was 13.6 ha, with cotton as the main crop in the area; wheat and corn were the second,

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where the survey was conducted. The farmers had an average of 18.4 years of farming activity experience.

To test the hypotheses, knowledge level and duty were divided into three factors. The reliability of the data has been checked again on the group that consisted of ten factors from knowledge, service, and duty which is used in the analysis. Accordingly, Cronbach's Alpha coefficient was found to be 0.817. Then, knowledge, service, and duty were done triple factor set for the determination of the relationship between them, and Cronbach's Alpha coefficient was found to be 0.702. This group (knowledge, services, and duties) was subjected to the Kruskal-Wallis test for unrelated measurements in terms of a continuous variables which were land area, farming experience, income, education level, ownership status, and age for checking of either indicate significant differences or not. Percent rates belonging to these continuous variables frequency are given in Table 4.

Depending upon the results of the mean rank values of Kruskal-Wallis test, there was a significant relationship between the level of knowledge and education level. Furthermore, binary comparison was done by means of the Mann-Whitney test and differences arising from the high school education level were identified. A significant relationship between education and services could not be identified But there is a close relationship. Differences arising from the secondary school education level were identified in this group according to binary comparison.

A significant relationship between ownership status and services together with

Table 2. Reliability coefficient.

Cronbach's Alpha coefficient	Cronbach's Alpha based on standardized items	N[a] of items
0,806	0,810	20

[a] Number.

Table 3. Intraclass correlation coefficients.

Parameters	Intraclass correlation coefficient	95% Confidence interval		*F* test with true value 0			
		Lower bound	Upper bound	Value	df1	df2	Sig
Average measures	0,806	0,792	0,820	5,157	1557,0	29583	0,000

Table 4. Frequency percent rate of continuous variables.

Land amount (ha)	5 and below	Between 5.1-10	Between 10.1-30	30.1 and above
Percent	25.9	33.3	34.3	6.5
Farming experience (Year)	10 and below	Between 11-20	Between 21-30	31 and above
Percent	21.4	38.0	24	16.6
Income (Turkish Lira)	10000 and below	Between 10001-20000	Between 20001-40000	40001 and above
Percent	20.1	47.1	18.8	14.0
Education (Graduated school)	Literate and primary	Secondary	High school	University
Percent	60.1	16.4	16.2	7.3
Ownership	Own property	Rent	Share holder	Others
Percent	41	12	5	42
Age	29 and below	Between 30-40	Between 41-55	56 and above
Percent	8.6	31.5	44.3	15.6

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knowledge level could not be identified. There was a significant relationship between ownership status and duties. Furthermore, binary comparison was done by means of the Mann-Whitney test and differences arising from the property ownership were identified. Land owners had more negativeopinions toward WUAs fulfilling their duties, compared to other groups.

A significant relationship between land areas and services together with knowledge level could not be identified. There was a significant relationship between land areas and duties. Furthermore, binary comparison was done by means of the Mann-Whitney test and differences arising from the ownership of 30 ha and above were identified.

A significant relationship between age, farming experience, income, and services, duties together with knowledge level could not be identified. Knowledge increased with increasing age; differences occurred in the 41-55 age groups. On the other hand, the attitudes to services were reduced. When farming experience increased, knowledge level increased too. And attitudes to services were decreasing; the difference arise from 21-30 years of farming experience in this group. When income increased, attitudes to knowledge levels and services increased positively. On the other hand, the attitudes to duties decreased. In this group, differences arising from the highest income level, which is 40001TL and above.

Weight case is applied to the data set in order to provide more accurate results, because of application of *Chi*-square tests on factors.

Results of Tests of Hypotheses

H_1: There is a relationship between farmers' satisfaction with WUAs and education levels. A relationship exists between educational level and satisfaction (Table 5). The satisfaction level is decreasing with increasing levels of education. The relations between them are significant according to Pearson's *Chi*-square and likelihood ratio tests. Accordingly, the hypothesis is accepted. Satisfaction and dissatisfaction have a significant relationship with the level of education. When education level of farmers increases, dissatisfaction increases too. (Figure 2)

H_2: There is a relationship between farmers' satisfaction from WUAs and status of ownership. The relations between them are significant according to Pearson's *Chi*-square and likelihood ratio tests (Table 6). What are decisive here are the property owners, who are permanent ones in WUAs. Accordingly, the hypothesis is accepted. H_3: There is a relationship between farmers' satisfaction from WUAs and land area. The relations between them are significant according to Pearson's *Chi*-square and likelihood ratio tests (Table 7). When the land area increases, the satisfaction decreases, because of linear relation between income and land area that affects welfare of farmers. Therefore, large landowners have more expectations as compared with the smaller ones. Accordingly, the hypothesis is accepted. H_4: There is a relationship between farmers' satisfaction from WUAs and age of farmers.

The relations between them are significant according to Pearson's *Chi*-square and likelihood ratio tests (Table 8). Satisfaction rate increased with increasing age, and decreased by over- 56 years of age. This was an unexpected result; because this age group made farming under arid conditions for many years and had enough experience. In order to determine the reasons of this outcome, this age group was visited again and interviewed face to face. It was determined that this result mainly arises from mismanagements of water, and consequently soil, by WUAs. They were worried about future use of these resources. This age group knows the real value and meaning of water and soil for farming activities. Accordingly, as an overall conclusion, the hypothesis is accepted.

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Table 5. Relationship between satisfaction and educational levels.

	Satisfaction	Education level (School)					Total
		Literate	Primary	Secondary	High	University	
Yes	Count	29	143	50	43	14	279
	Expected count	37,7	128,9	45,2	46,2	21,0	279,0
	% Within satisfaction	10,4%	51,3%	17,9%	15,4%	5,0%	100,0%
	% Within education	20,4%	29,5%	29,4%	24,7%	17,7%	26,6%
Partially	Count	54	225	69	75	39	462
	Expected count	62,5	213,4	74,8	76,6	34,8	462,0
	% Within satisfaction	11,7%	48,7%	14,9%	16,2%	8,4%	100,0%
	% Within education	38,0%	46,4%	40,6%	43,1%	49,4%	44,0%
No	Count	59	117	51	56	26	309
	Expected count	41,8	142,7	50,0	51,2	23,2	309,0
	% Within satisfaction	19,1%	37,9%	16,5%	18,1%	8,4%	100,0%
	% Within education	41,5%	24,1%	30,0%	32,2%	32,9%	29,4%
Total	Count	142	485	170	174	79	1050
	Expected count	142,0	485,0	170,0	174,0	79,0	1050,0
	% Within satisfaction	13,5%	46,2%	16,2%	16,6%	7,5%	100,0%
	% Within education	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%
	Pearson *Chi*-square: 21,941			*df*: 8		Asymp. sig. (2-sided): 0,005	
	Likelihood ratio: 21,871			*df*: 8		Asymp. sig. (2-sided): 0,005	

Table 6. Relationship between satisfaction and status of ownership.

	Satisfaction	Status of ownership				Total
		Own property	Rent	Share holder	Others	
Yes	Count	191	18	9	61	279
	Expected count	164,7	24,7	18,1	71,5	279,0
	% Within satisfaction	68,5%	6,5%	3,2%	21,9%	100,0%
	% Within ownership	30,8%	19,4%	13,2%	22,7%	26,6%
Partially	Count	260	43	37	122	462
	Expected count	272,8	40,9	29,9	118,4	462,0
	% Within satisfaction	56,3%	9,3%	8,0%	26,4%	100,0%
	% Within ownership	41,9%	46,2%	54,4%	45,4%	44,0%
No	Count	169	32	22	86	309
	Expected count	182,5	27,4	20,0	79,2	309,0
	% Within satisfaction	54,7%	10,4%	7,1%	27,8%	100,0%
	% Within ownership	27,3%	34,4%	32,4%	32,0%	29,4%
Total	Count	620	93	68	269	1050
	Expected count	620,0	93,0	68,0	269,0	1050,0
	% Within satisfaction	59,0%	8,9%	6,5%	25,6%	100,0%
	% Within ownership	100,0%	100,0%	100,0%	100,0%	100,0%
	Pearson *Chi*-square: 17,153		*df:* 6		Asymp. sig. (2-sided): 0,009	
	Likelihood ratio: 18,111		*df:* 6		Asymp. sig. (2-sided): 0,006	

H_5: There is a relationship between farmers' satisfaction from WUAs and farming experience.

The relations between them are significant according to Pearson's *Chi*-square and likelihood ratio tests (Table 9). Satisfaction rate increased with increase in experience, and decreased in the group with over 31 years of experience. Again, that is an unexpected result and similar to that explained in H_4. Accordingly, for overall, the hypothesis is accepted.

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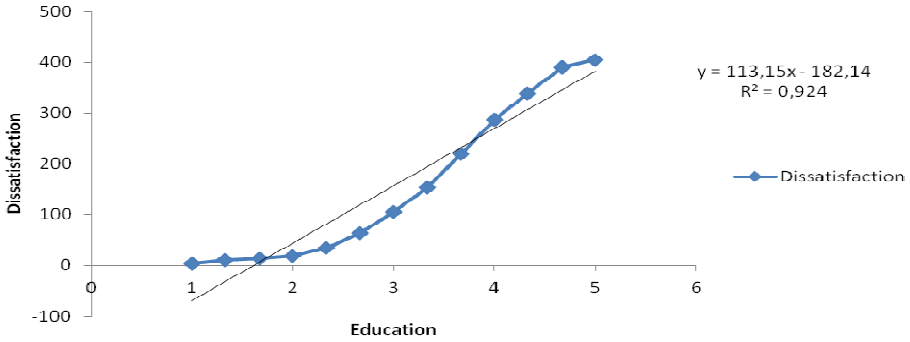

Figure 2. Relationship between dissatisfaction and educational levels as defined in Table 7.

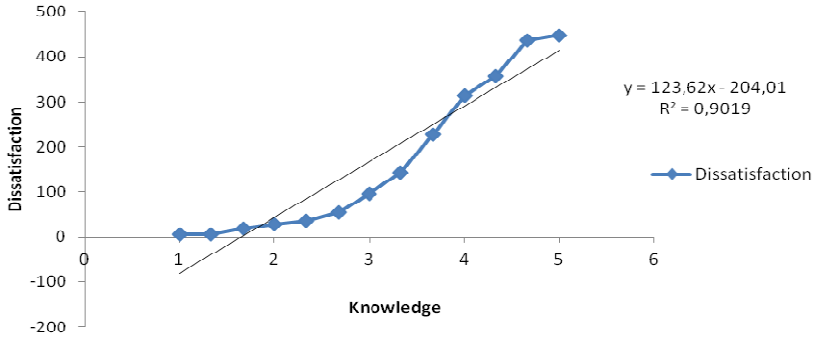

Figure 3. Relationship between knowledge level and dissatisfaction.

Table 7. Relationship between satisfaction and land size.

	Satisfaction	Land amount (ha)				Total
		5 and below	Between 5.1-10	Between 10.1-30	30.1 and above	
Yes	Count	54	82	127	16	279
	Expected count	46,5	82,9	122,8	26,8	279,0
	% Within satisfaction	19,4%	29,4%	45,5%	5,7%	100,0%
	% Within land	30,9%	26,3%	27,5%	15,8%	26,6%
Partially	Count	82	146	177	57	462
	Expected count	77,0	137,3	203,3	44,4	462,0
	% Within satisfaction	17,7%	31,6%	38,3%	12,3%	100,0%
	% Within land	46,9%	46,8%	38,3%	56,4%	44,0%
No	Count	39	84	158	28	309
	Expected count	51,5	91,8	136,0	29,7	309,0
	% Within satisfaction	12,6%	27,2%	51,1%	9,1%	100,0%
	% Within land	22,3%	26,9%	34,2%	27,7%	29,4%
Total	Count	175	312	462	101	1050
	Expected count	175,0	312,0	462,0	101,0	1050,0
	% Within satisfaction	16,7%	29,7%	44,0%	9,6%	100,0%
	% Within land	100,0%	100,0%	100,0%	100,0%	100,0%
	Pearson *Chi*-square: 20,940		*df:* 6		Asymp. sig. (2-sided): 0,002	
	Likelihood ratio: 21,594		*df:* 6		Asymp. sig. (2-sided): 0,001	

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Table 8. Relationship between satisfaction and age of farmers.

	Satisfaction	Age of farmers				Total
		29 and below	Between 30-40	Between 41-55	56 and above	
Yes	Count	23	64	133	59	279
	Expected count	22,9	82,9	122,5	50,8	279,0
	% Within satisfaction	8,2%	22,9%	47,7%	21,1%	100,0%
	% Within age	26,7%	20,5%	28,9%	30,9%	26,6%
Partially	Count	36	162	191	73	462
	Expected count	37,8	137,3	202,8	84,0	462,0
	% Within satisfaction	7,8%	35,1%	41,3%	15,8%	100,0%
	% Within age	41,9%	51,9%	41,4%	38,2%	44,0%
No	Count	27	86	137	59	309
	Expected count	25,3	91,8	135,7	56,2	309,0
	% Within satisfaction	8,7%	27,8%	44,3%	19,1%	100,0%
	% Within age	31,4%	27,6%	29,7%	30,9%	29,4%
Total	Count	86	312	461	191	1050
	Expected count	86,0	312,0	461,0	191,0	1050,0
	% Within satisfaction	8,2%	29,7%	43,9%	18,2%	100,0%
	% Within age	100,0%	100,0%	100,0%	100,0%	100,0%
	Pearson *Chi*-square: 13,868		*df:* 6		Asymp. sig. (2-sided): 0,031	
	Likelihood ratio: 13,988		*df:* 6		Asymp. sig. (2-sided): 0,030	

Table 9. Relationship between satisfaction and farming experience.

	Satisfaction	Farming experience				Total
		10 and below	Between 11-20	Between 21-30	31 and above	
Yes	Count	61	76	79	63	279
	Expected count	52,6	104,4	69,6	52,3	279,0
	% Within satisfaction	21,9%	27,2%	28,3%	22,6%	100,0%
	% Within experience	30,8%	19,3%	30,2%	32,0%	26,6%
Partially	Count	76	195	114	77	462
	Expected count	87,1	172,9	115,3	86,7	462,0
	% Within satisfaction	16,5%	42,2%	24,7%	16,7%	100,0%
	% Within experience	38,4%	49,6%	43,5%	39,1%	44,0%
No	Count	61	122	69	57	309
	Expected count	58,3	115,7	77,1	58,0	309,0
	% Within satisfaction	19,7%	39,5%	22,3%	18,4%	100,0%
	% Within experience	30,8%	31,0%	26,3%	28,9%	29,4%
Total	Count	198	393	262	197	1050
	Expected count	198,0	393,0	262,0	197,0	1050,0
	% Within satisfaction	18,9%	37,4%	25,0%	18,8%	100,0%
	% Within experience	100,0%	100,0%	100,0%	100,0%	100,0%
	Pearson *Chi*-square: 19,187		*df*: 6		Asymp. sig. (2-sided): 0,004	
	Likelihood ratio: 19,768		*df*: 6		Asymp. sig. (2-sided): 0,003	

[DOR: 20.1001.1.16807073.2015.17.7.5.8]

H_6: There is a relationship between farmers' satisfaction from WUAs and income. The relations between them were significant according to Pearson's *Chi*-square and likelihood ratio tests (Table 10). Satisfaction rate increased as increase in income, which is an expected result. Accordingly, the hypothesis is accepted. **H_7:** There is a relationship between farmers' satisfaction from WUAs and knowledge factors levels. Here, knowledge was evaluated as three factors. The relationship between knowledge-1, which is to have sufficient knowledge regarding the purpose, duty and function of WAU, and satisfaction, is given in Table 11. The relationship between the two is significant based on Pearson's *Chi*-square and likelihood ratio tests. As knowledge-1 increased, the satisfaction rate decreased. Accordingly, the hypothesis is accepted.

The relationship between knowledge-2, which refers to reading official documents about WUA's such as regulations and instructions, and satisfaction, is given in Table 12. The relationship between the two is significant based on Pearson's *Chi*-square and likelihood ratio tests. As knowledge-2 increased, the satisfaction rate decreased. Accordingly, the hypothesis is accepted.

The relationship between knowledge-3, which is the knowledge levels of farmers on the organization as well as technical and financial structure of the WUAs, is given in Table 13. The relationship between the two is significant based on Pearson's *Chi*-square and likelihood ratio tests. As knowledge-3 increased, the satisfaction rate decreased. Accordingly, the hypothesis is accepted.

Accordingly, the knowledge levels of farmers on the organization as well as technical and financial structure of the WUAs

was much more effective than to just reading official documents about WUA's such as agreements, regulations and instructions. These three knowledge factors have been

Table 10. Relationship between satisfaction and income of farmers.

	Satisfaction	Income of farmers (Turkish Lira)				Total
		10000 and below	Between 10001-20000	Between 20001-40000	40001 and above	
Yes	Count	21	120	66	72	279
	Expected count	24,7	115,9	69,4	69,1	279,0
	% Within satisfaction	7,5%	43,0%	23,7%	25,8%	100,0%
	% Within income	22,6%	27,5%	25,3%	27,7%	26,6%
Partially	Count	48	204	114	96	462
	Expected count	40,9	191,8	114,8	114,4	462,0
	% Within satisfaction	10,4%	44,2%	24,7%	20,8%	100,0%
	% Within income	51,6%	46,8%	43,7%	36,9%	44,0%
No	Count	24	112	81	92	309
	Expected count	27,4	128,3	76,8	76,5	309,0
	% Within satisfaction	7,8%	36,2%	26,2%	29,8%	100,0%
	% Within income	25,8%	25,7%	31,0%	35,4%	29,4%
Total	Count	93	436	261	260	1050
	Expected count	93,0	436,0	261,0	260,0	1050,0
	% Within satisfaction	8,9%	41,5%	24,9%	24,8%	100,0%
	% Within income	100,0%	100,0%	100,0%	100,0%	100,0%
	Pearson *Chi*-square: 11,803		*df:* 6	Asymp. sig. (2-sided): 0,067		
	Likelihood ratio: 11,840		*df:* 6	Asymp. sig. (2-sided): 0,066		

[DOR: 20.1001.1.16807073.2015.17.7.5.8]

Table 11. Relationship between knowledge-1 and satisfaction.

Knowledge-1	Satisfaction			Total
	Yes	Partially	No	
No	20 (20.4%)	40 (40.8%)	38 (38.8%)	98
Less	48 (25.3%)	102 (53.6%)	40 (21.1%)	190
Fair	159 (25.6%)	288 (46.3%)	175 (28.1%)	622
Mostly	147 (24.4%)	272 (45.1%)	184 (30.5%)	603
Certainly	32(64%)	8 (16%)	10 (20%)	50
Total	406	710	447	1563
Pearson *Chi*-square: 52,076		*df:* 8	Asymp. sig. (2-sided):0,000	
Likelihood ratio: 47,257		*df:* 8	Asymp. sig. (2-sided):0,000	

Table 12. Relationship between knowledge-2 and satisfaction.

Knowledge-2	Satisfaction			Total
	Yes	Partially	No	
No	12 (35.3%)	12 (35.3%)	10 (29.4%)	34
Less	15(23.8%)	31 (49.2%)	17 (27%)	63
Fair	89 (27.1%)	150 (45.8%)	89 (27.1%)	328
Mostly	89 (28.6%)	154 (49.5%)	68 (21.9%)	311
Certainly	200 (24.1%)	363 (43.9%)	264 (32%)	827
Total	405	710	448	1563
Pearson *Chi*-square: 14,110	*df*: 8	Asymp. sig. (2-sided):0,079		
Likelihood ratio: 14,363	*df*: 8	Asymp. sig. (2-sided):0,073		

Table 13. Relationship between knowledge-3 and satisfaction.

Knowledge-3	Satisfaction			Total
	Yes	Partially	No	
No	23 (35.9%)	28 (43.7%)	13 (20.4%)	64
Less	26 (18.1%)	77 (53.5%)	41 (28.4%)	144
Fair	178 (29%)	279 (45.5%)	156 (25.5%)	613
Mostly	70(20.5%)	183(53.6%)	88 (25.9%)	341
Certainly	108 (26.9%)	143 (35.7%)	150 (37.4%)	401
Total	405	710	448	1563
Pearson *Chi*-square: 42,689	*df:* 8	Asymp. sig. (2-sided):0,000		
Likelihood ratio: 42,696	*df*: 8	Asymp. sig. (2-sided):0,000		

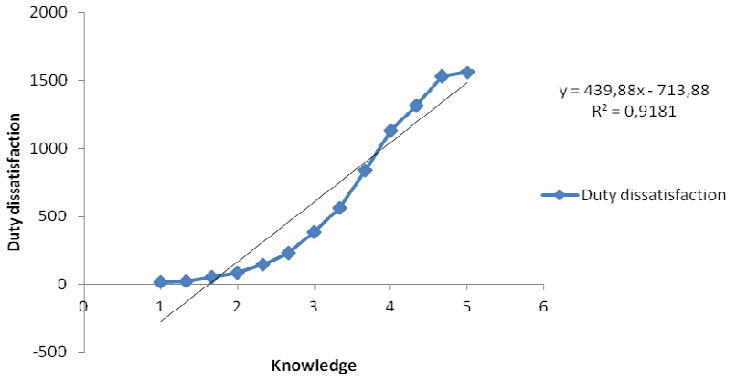

Figure 4. Relationship between knowledge levels and duty dissatisfaction.

[DOR: 20.1001.1.16807073.2015.17.7.5.8]

integrated as one factor and relationship between dissatisfaction is given in Figure 3. When the knowledge increased about WUAs, farmers realized about the real function of WUAs, which was not at expected level as written in the official documents; so, dissatisfaction increased, too. There is also a relationship between knowledge level and fulfilling duty by WUAs (Figure 4). As knowledge level increased, the dissatisfaction rate with fulfilling duties of WUAs increased, same reasons as explained for Figure 3. H_7: There is a relationship between farmers' satisfaction with WUAs and service quality levels.

The relations between them are significant according to Pearson's *Chi*-square, likelihood ratio and linear-by-linear association tests (Table 14). Satisfaction rate increased as service quality level increased. The symmetric measures between the two are given in Table 15. Accordingly, the hypothesis is accepted. The relation between satisfaction and service quality level is given in Figure 5. When the service quality level increased, satisfaction increased too.

CONCLUSIONS

Satisfaction of members towards their organization and its activities are important

Table 14. Tests results between satisfaction and service quality levels.

Methods	Value	*df*	Asymp. sig. (2-sided)
Pearson *Chi*-square	152,082	34	0,000
Likelihood ratio	157,719	34	0,000
Linear-by-linear Association	46,392	1	0,000
N of valid cases	1563		

Table 15. Symmetric measures between satisfaction and service quality levels.

Methods		Value	Asymp. std. error	Approx. T	Approx. sig.
Nominal by nominal	Contingency coefficient	0,298			0,000
Interval by interval	Pearson's R	0,173	0,025	6,913	0,000
Ordinal by ordinal	Spearman correlation	0,177	0,025	7,103	0,000
N of valid cases		1563			

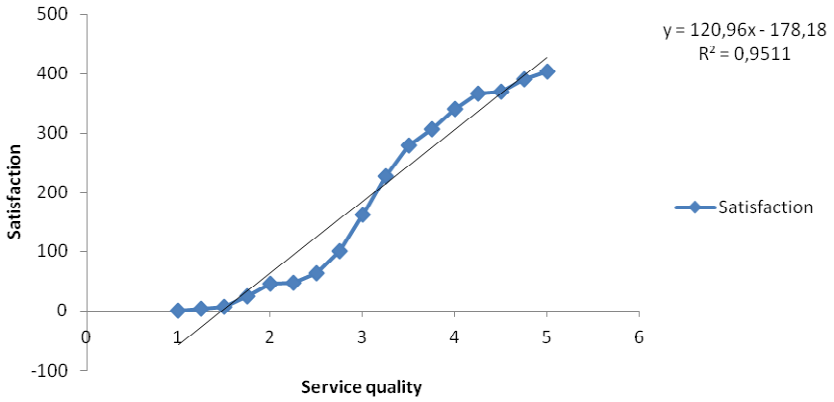

Figure 5. Relations between satisfaction and service quality levels.

[DOR: 20.1001.1.16807073.2015.17.7.5.8]

subjects for all organizations to ensure sustainability. Without farmers' satisfaction, WUAs cannot be successful in long run, because its function is to provide services to farmers. Considering the size of the research field, the specification and importance of the project area, the number of farmers participating in the interviews, the time of the study and the content and details of the questions asked made the obtained results and conclusions both valuable and made the data reliable to be used in a wide scale due to their outcomes for the optimal management of WUAs.

According to the research, farmers lacked sufficient knowledge regarding WUAs. Their knowledge was generally based on observations and conversations among farmers. There was a general opinion that WUAs did not fulfill their duties completely, which led to dissatisfaction at different levels based on education, status of ownership, land area, age, experience, and income. In fact, some of these dissatisfaction sources were not directly related to WUAs, rather, the cause was the uncertainties in the law about WUAs'. Consequently, the farmers need training and information about WUA and its activities. This information should be provided before the irrigation season and to meet farmers' needs and considerations based on communication rather than inappropriate "standardized" way. It might be in a dialog manner depending on different education levels, age, land size, experience, income, and farmers' status of ownership. WUAs should concentrate more on extension services with the support of the state institutions. The evaluations made *via* the research and the obtained results can constitute the basis for better management of WUAs. This study is the first of its type in the GAP region. The results are important for policymakers and contain useful information for Turkey and other countries with similar technical and socio-cultural characteristics.

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عوامل موثر در رضایت کشاورزان از اتحادیه کاربران آب در دشت هاران منطقه گپ در ترکیه

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چکیده

هدف پژوهش حاضر تعیین عوامل موثر در رضایت کشاورزان از اتحادیه کاربران آب (WUA) در دشت هارران ترکیه بود.. داده های این بررسی از ۳۷۸ کشاورز نمونه برداری شده از بین ۲۳۲۰۴ نفر در منطقه Şanlıurfa در دشت مزبور به دست آمد. کشاورزان بر مبنای نمونه برداری ساده تصادفی انتخاب شدند و با آنها به صورت رو در رو مصاحبه شد. نمونه برداری در ۵۲٪ از مناطق مسکونی انجام شد و برای تجزیه و تحلیل داده ها از SPSS.15همراه با آزمون های اKruskal Wallis ، Mann-Whitney ، Pearson *Chi*-squareو آزمون همبستگی(correlation) استفاده شد. نتایج حاکی از آن بود که رضایتمندی کشاورزان با سطح آموزش و تحصیلات، معلومات در باره WUA ، وضعیت مالکیت، اندازه و مساحت زمین، سن، تجربه در کشاورزی، درآمد، و کیفیت خدمات اتحادیه کاربران آب رابطه داشت. این عوامل به طور معنی داری رضایتمندی کشاورزان را توضیح می دادند. میانگین بیشترین رضایتمندی از این متغییرها در حد ۴۷/۴٪ محاسبه شد.. حد بیشینه رضایتمندی ۶۸/۵٪ بود که مربوط به وضعیت مالکیت بود.در حالیکه کمترین رضایتمندی در حد ۲۸/۳٪ به دست آمد و به تجربه کشاورزان تعلق داشت. بر پایه این نتایج، مدیران WUA می بایست روی این عوامل تمرکز کنند تا رضایتمندی افزایش یابد و برای کشاورزان برنامه های آموزشی و اطلاع رسانی برگزارنمایند.

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