



Global Advanced Research Journal of Agricultural Science (ISSN: 2315-5094) Vol. 4(1) pp. 033-041, January, 2015.
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Full Length Research Paper

The farmers' views and expectations to the Water User Associations; GAP–Harran plain sampling, Turkey

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Accepted 21 January, 2015

The irrigation systems have been transferred to the water user associations (WUA) by the Government in order to ensure sustainability and increase efficiency in the systems and rate have reached to 96% in Turkey. The farmers are the determiners here. The views, senses, attitudes and expectations of the farmers have been loomed large and this has a direct effect on the systems. Yet, because of the various reasons the expected benefits from the transfers have not been fulfilled as it was supposed to be. At this research to reveal the reasons of these is aimed. In this case, face to face questionnaire studies with farmers have been done to determine views to the WUA, senses, attitudes and expectations at the fields of 22 WUAs in the GAP project in Harran plain. The farmers generally believe that the investment and management decisions are not effective, efficient, sufficient and coherent; they aren't accepted, paid attention and informed adequately, unable to benefit from the services equally. This study is a first kind in the GAP region; the results are having direct effect on farmers' relationship to WUAs.

Keywords: Farmer, Irrigation, Water User Associations, GAP Region, Harran Plain, Turkey

INTRODUCTION

Life cycle of eco-systems and human beings are based on water that is vital element for a sustainable life. Water; despite its renewable property, the amount of it decreasing day by day based on its usage. Because of its decreasing amount and quality, it started to be one of the main conflicts between countries, regions, nations, sectors even farmers who lived same areas and use same source of water. Water resources are under pressure and do not meet the demands because of many reasons such as population increase, urbanization, industrialization and agricultural irrigation. Each of them has negative effects on water resources in a different way. Farmer is a person who

owns, works on or operates on an agricultural area to sustain himself, his family and also make contribution to nation economy in many ways. Irrigation makes agriculture possible in arid and semi-arid areas where rainfall is not enough during the growing season of the crops. 33% of the world's population live in rural areas and 40% of the world food consumption is being grown in 237 million hectares (ha) irrigated areas that correspond to 18% of the total agricultural areas (Johannson, 2000; FAO, 2002; Thatte, 2002).

The biggest water usage ratio is belonging to agricultural irrigations in terms of water consumptions in Turkey by 72.7%. Total water consumption in Turkey increased by %373 between 1980 and 2012 years by all the sectors including irrigation, industry and potable usage. While irrigation water usage is increased by 356% within this

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period (Anonymous, 2013a). In the upcoming period, 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, the efficient irrigation systems, its management and operation are further increased.

Irrigation management first emerged in the beginning of the 19th century in USA. Due to several drought and flood experiences due to irregular precipitation, water user associations in various regions in the USA were established due to needs and demands in order to make a more orderly irrigation and production (Anonymous, 2010a; 2010b, 2010c). All over the world, different models are being implemented in the management of irrigation systems.

Water resources managements and investments are done by the state in Turkey and the main authority is the State Hydraulic Works (initial of "Devlet Su İşleri" in Turkish, DSI). The management of irrigation systems starts to change in globally in order to ensure sustainable agricultural development and the transfer of irrigation management to the users as a participatory irrigation management. One of the reasons for that is to increase the ownership of the irrigation systems by users and operate the systems efficiently and effectively. DSI began to transfer irrigation managements to water user associations (WUAs) created by the water users, farmers, under the guidance of DSI. The transfer rate by DSI is reached to 96% (Anonymous, 2012). The irrigation systems can be transferred to WUAs established in accordance with Law No: 1580 and 5442 and their purpose and scope was determined by Law No: 5355 and to irrigation cooperatives established in accordance with Law No: 1163, village legal entities and municipalities as well. Law on WUAs No: 6172 which came into effect after being published in 2011 is a first in this regard. The purpose of this law is to use and manage the water assets and resources in a rational way, to conduct the responsibilities regarding the repair, maintenance and management of irrigation systems.

Irrigation water management is crucial for agricultural production in the world. As Storm et al. (2011) said, for the implementation of an effective water management, knowledge about farmers' demand for irrigation water is crucial to assess reactions to water pricing policy, to establish a cost-benefit analysis of water supply investments or to determine the optimal water allocation between different users.

Cullen et al. (2006) analyzed to determine how New Zealanders assess the state of New Zealand lakes, rivers and streams, and aquifers, the performance of three agencies responsible for management of freshwater resources, and willingness to fund stream enhancement. They outlined the legislation, policy, and institutional contexts under which water is currently managed in New Zealand. And they listed the potential reasons for the

failures; and suggested some solutions to address the situation.

Orne-Gliemann (2008) 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. It presents the preliminary results of a community study conducted at Thabina irrigation scheme, Limpopo. The study offers an original approach to analyzing the scheme's difficulties and, without providing a representative image of smallholder irrigation schemes in South Africa, it allows for interesting preliminary reflections around small farmers' perceptions of water management and local water management institutions.

Kanyoka et al. (2008) identified the financing of multiple use water services as an important ingredient to ensure improved water access for rural poor and broaden livelihood options in South Africa. Integrated water resource management, efficient, equitable and sustainable investments in improved water services should be based on a thorough understanding of actual demand by consumers. In their study, they saw the comprehensive studies looking at multiple uses water services are not common in South African rural areas, where most of the economic analyses focus on either domestic or irrigation water demands. So, they aimed at filling this gap by assessing the household demand for multiple use water services in Sekororo-Letsoalo area in the Limpopo Province.

Gorton et al (2009), in their research on the farmers from Bregalnica region of Macedonia regarding their opinion towards water societies (unions), their expectations and payment habits, determined that membership satisfaction, union's attitude towards the farmers, the farm size, cost payback rate, water fees, transparency and trust are determinants of farmer's payment habits.

Veetil et al. (2011) analyzed the scope for combinations of 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, preference for volumetric pricing increases, whilst the presence of a WUA reduces this preference.

Many studies regarding WUAs and farmer views can be given for various fields like; Lopez-Gunn (2003), Cakmak et al. (2004), Cakmak, (2010), Soto-Garcia, M. et al., (2013), Zorica and Bojan, (2013), Prefol, et al., (2005), Yenigun and Aydogdu, (2010), Tang et al. (2013), Yazid et al. (2013), Uysal and Atiş (2010), Aydogdu et al. (2014a, 2014b, 2014c, 2014d).



Figure 1. Turkey, GAP-Harran Plain

MATERIAL AND METHOD

Study Area

Southeastern Anatolian Project (GAP) is a multi-sectorial and integrated regional development project which aims at utilizing the GAP's resources, mainly based on water and soil resources, to increase the income level and life standards of region's people, to eliminate regional disparities and to contribute to economic development and social stability. Within the GAP'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 and is given in Figure 1 (GAP, 2012). Harran Plain is the field of the study; semi-arid with high temperature, average precipitation amount is between 300-365 mms and annual evaporation is 1,848 mms (DMİ, 2011). Harran Plain is located within the borders of Central, Harran and Akçakale districts. Agricultural irrigation in Harran Plains within the scope of GAP began in 1994 in an area of 30,000 ha and today, reached to coverage of approximately 150,000 ha (Anonymous, 2013b).

The WUAs established in this period had been carrying out operations, repairs, maintenance and management activities under the supervision and inspection of DSI. Since the day WUAs became operational to this day, it was observed that they were not able to provide services at the desired level and productivity due to various reasons.

MATERIAL

The main material of this study is the data from farmers in the Şanlıurfa-Harran Plains that were chosen with simple random sampling method, and their number is 21,094. There are 22 WUA in the Şanlıurfa-Harran Plains which is the field of study. The farmers were interviewed face to face and were given questionnaires. The questionnaires and field work was done in 2011, during the irrigation season.

The sample volume was determined with the formula below (Yamane, 2001):

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

n= sample size,

N= this is the farmers in the main population, which is 21 094.

t= because the sample size is larger than 30, Z table value with 5% error margin is 1,96 in normal distribution table,

p= the positive possibility of farmers about the factors is 50% so 0.50

q= the negative possibility of farmers about the factors is, 1-p= 0.50

d= it was taken as 0.05 with 95% confidence interval.

With these values, it was specified that conducting 377 questionnaires would be appropriate. In the questionnaires, various questions to determine the farmers' view, perception and expectation from WUAs were asked. To determine their sensitivities, Likert type questions were used. Within this scope, all WAU's were visited. For the research to ensure reliable results, villages that can represent the union from every union's field were intentionally selected by purposeful sampling method.

METHOD

Likert attitude scale was used in the research which is developed by Rensis Likert in USA in the beginning of the 1930's, and while it has point scales of threes, fives, sevens and nines, the general usage is point scale of five. In this research, the five point scale was used as well. In this research, the principle is that participants assign their judgment in the researched topics ranging from "strongly agree" to "strongly disagree" and focusing on these judgments. There are two situations in the Likert scale: The wanted situation and the unwanted situation. Positive and negative situations are expressed with an equal number of statements. In order for the Likert measurements to fully provide the desired outcome, the statements should have certain primary characteristics. The judgment statements should have a single meaning and definite outcomes. The statements should not yield possibly varying results, they should not create doubt for the participant, and they should be clear and understandable. The Likert scales are applied in two ways, with single or double sided (controlled or uncontrolled).

While using this scale, judgment statements are given to persons in a certain order and each person is asked to select the option for each judgment statement which best reflects their agreement level. With the help of this scale, if a group's attitude towards a situation is wanted to be analyzed (in this research, the group is the farmers within the area of WUA's), all factors that affect the situation should be included within the scale's borders and at least one or two judgment statements for each factor should be used. At the end of the research, numerical distribution of the agreement level for individuals that create the group to each judgment statement is specified and the numerical value of the agreement options is multiplied with the option coefficient to calculate a numerical average based on the final value obtained. This average values are taken as the choice value of the group and it is compared with the calculated choice value to determine the effect of the judgment on the attitude. Considering the points relevant with the issue, adaptation to various attitude objects and situations, being able to measure both the direction and level of the measurable dimensions of attitude can be listed as the advantages of Likert type scale. Confidence is high

in Likert scales and generally 85% confidence level is acceptable (Anonymous, 2010d, 2010e).

In questionnaire applications, it is important to eliminate farmers' doubt and collecting reliable information. To collect reliable information, the questionnaires were carried out with the help of pollsters who are suitable with the field's tribal and ethnic structure, who knows the local languages that also reside in these areas, were used. Within the scope of the research; the questionnaire applied to the farmers, the data obtained from visits and interviews were transferred into Excel using a general coding plan to create a flexible database.

RESULTS AND DISCUSSIONS

Of the questionnaire work; 25% was applied in Akçakale, 35% was applied in Harran and 40% was applied Center district borders, to the settlement areas included in these areas. Of the participants of the questionnaire work; 95% is married, 4% is single, and 1% is widowed. Their average age is 43.85. All the questionnaires were conducted with male farmers, because of patriarchal family structure. Of the farmers; 12% is literate, 48% is primary school graduates, 17% is secondary school graduates, 16% is high school graduates and 7% is university graduates. The average number household of these farmers have to take care of is 7. The total area, including second drop, cultivated by the participants is 76,601 acres and the average size is 148.36 acres. Of the land the farmers process; 41% is own property, 12% is rented, 5% is partnered, shared and 42% is composed of land operated as property, rent, share and partnered. Of the farmer's lands; 88.5% is within gravity irrigation area and 11.5% is within pumping irrigation area. Of the irrigation methods used by the farmers; 82% uses traditional, furrow irrigation, 8% uses modern, pressurized and 10% uses both methods. The distribution of products raised in this field is; 58% cotton, 26% wheat, 14% corn and 2% other products such as barley, red lentil, vegetables, orchards, vineyards and gardens. The farmers in the field of study have an average of 21 years of farming activity experience.

Of the farmers here; 29% has good knowledge about the WUA, 38% has moderate and 33% does not have sufficient knowledge. This knowledge's mainly based on services given by WUAs. So, one of every 3 farmers does not have sufficient knowledge regarding the purpose, duty and function of WAU. 13% of the farmers read defining official documents about WUA's such as agreements, regulations and instructions. It was found out that 43% of the farmers have not read any of the documents about the WUA's that are members of and expect service from. On the other hand, the knowledge levels of farmers on the organization, technical and financial structure of the WUA's is as follows; 22% has knowledge, 39% has moderate

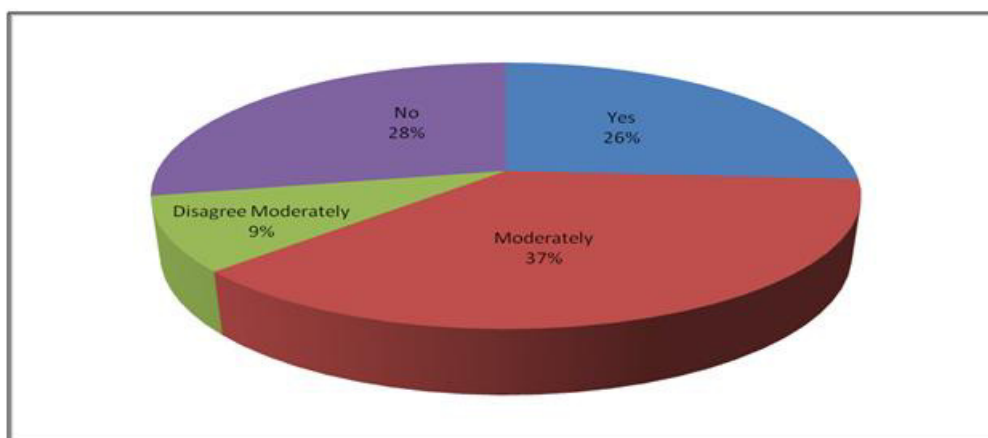


Figure 2. Farmers' view of satisfaction rate to water user association

knowledge and 39% has less or no knowledge at all. The farmers are generally having knowledge rather than reading the documents, but from observations on the provided services in the field and the conversations between the farmers themselves.

Of the farmers; 42% does not find the number of technical personnel such as engineers, technicians and operators working within the WUA body sufficient, 31% finds it to be moderate and 27% finds it to be sufficient. So, there is the opinion that there is no sufficient number of technical personnel to fulfill the duties in the WUA. The farmers believe that they are not sufficiently informed by the employees of the WUA's. Of these farmers; 28% stated that they are not informed at all, 25% stated that they are informed insufficiently, 25% stated that they are informed moderately, 17% stated that they are informed sufficiently and 6% stated that they are informed completely. Regarding the investment and management decisions of the WUA's; those who find them sufficient and coherent are 12%, those who find them moderate are 25% and those who find them insufficient or less than satisfactory are 63%. So, WUA's do not make rational and productive decisions according to the farmers. The farmers believe the economic power, financial structure and incomes of WUA's are enough to fulfill the services; those who find these to be sufficient are 41%, those who find these to be moderate are 28% and those who find these to be insufficient or less than sufficient are 31%. The quality of service provided by the WUA is considered to be insufficient by the farmers. One of the major perceptions in this discontent is the idea that although the WUA's have sufficient financial resources to carry out their duties and the services expected from them, they are not doing their best. In this aspect, the farmer's negative perception on the sufficiency and coherency of the WUA's investment and operational decisions is an important factor. The farmers

think that union managements cannot use the resources in an effective and efficient way.

The farmers believe that they have the least say, 1%, in the WUA. In fact, WUA's are farmers' unions and the management is being elected by the farmers among the farmers. Considering the management as a whole (the union president, the council and committee), the power to have the say by management is 88%. This group is followed by the union director and DSI with 4%, and by the Governorate with 3%. Of the farmers; 25% believes that the managements are fulfilling their duties completely, 26% considers these moderate and 49% thinks that they are less than satisfactory or not satisfactory at all in fulfilling their duties. The farmers' view on satisfactory duty fulfillment for union managers, engineers, technicians and field employees of WUA's is more positive than their views on union management. There is a widespread belief that the union management and their relatives benefit from WUA's services the most. In this research, this ratio was found to be as high as 52%. Those who believe all members get equal treatment is 23%, while those who believe that person applying to the WUA more benefit more is 25%.

In this scope, the question towards measuring the farmer's view on WUA's is "Are you satisfied with the WUA?" The responses to this question are shown in Figure 2. Generally speaking, those who say "a little" or "no" are those who believe they are not being accepted by the WUA's and cannot get sufficient water to their fields in the irrigation seasons, and these are farmers who are far from the main irrigation channels and/or are in the downstream parts. There is coherence between the questions that measure the farmers' view on WUA's and these responses.

Those who are content with the WUA's were asked for their reason of contentment, and were asked to specify these options with regards to their importance. According

to the received responses, the most important factors in satisfaction: constant and easy access to WUA's by farmers, acceptance and interest shown to them is the first factor with 62% rate, both in choices and in index based rating. The rests are equal and fair treatment of members 16%, sufficient irrigation services, repair-maintenance and distribution 10%, collection of water fees 7% and water prices 5%. Although an irrigation service is expected to be in the first place, this result is principally due to the social structure of the study field. In this region, personal acceptance is very important. The farmers who are not satisfied with the WUAs are asked for their reasons of being so. The reasons for being discontent are as follows: The WUA's lack of interest in them, except for the election periods, is the first factor with 43% rate, both in choices and in index based rating. Not treating every member in an equal and fair manner 21%, insufficient irrigation services, repair-maintenance and distribution, which is a highly important option for agricultural activities is in the third place with 16%, high water fees 15% and pressure to pay the fees 5%.

When the farmers are asked whether to get sufficient amounts of water; 53% stated that they receive sufficient water, 22% stated they receive a moderate amount, 18% stated that they receive less than moderate amount and 7% stated that they receive a very insufficient amount of water. The farmers who receive a less or very insufficient amounts of water are located at the ends of the main irrigation channel. Those who receive sufficient water are either right beside the main channel or are in the areas at the beginning of the irrigation field. When the farmers are asked of their participation and having a say in the services regarding irrigation, in making decisions and in issues such as preparing the water distribution plans, those who are said to be participants are 18%, those who find it moderate are 33% and those who said a less or not at all are 49%. The farmers believe that they do not have any say in irrigation related decisions. This response also validates the previous response to the question "who has the most say in the WUA". In technical issues such as irrigation period, the amount of water to be released and how much water does the product need; the rate of farmers seeking external help is 17%, and the rate of farmers not seeking external help is 83%. Of those who receive technical support in these topics; 49% goes and inquires at state institutions, 28% receives support from the private sector, 12% asks public servants when they come and 11% receives support from research institutions such as universities and research institutes.

The question was asked with choices to determine the farmer's contribution in preserving the irrigation facilities such as channels, water intake structures, drainage. Thus their level of owning up the system, and they are asked to specify with respect to priority and importance. Accordingly: 47% of the farmers prioritized choices stating preserve the irrigation systems; warn the nearby farmers

and report those who damage it, 25% stated that carry out small scale maintenance without too much cost, 17% stated that clean the channels and 9% said that don't do anything at all. Farmers generally believe that these services should be carried out by the state and they don't feel responsible. The choice for using modern irrigation methods to increase system productivity was selected the least with 2%. In any case, only 8% of the farmers use modern irrigation methods, thus validating this outcome. The situations observed during the field work are coherent with these results.

The question prepared to define the farmers' expectations from WUA's was asked with choices, and the participants were asked to define their choices in priority and importance order. The choices created distributions, index-based rankings and percentages. Accordingly; the most important expectation is to receive irrigation water when the farmer needs it, with 22%, treating farmers equally and fairly is expected by 21%, this outcome is meaningful, followed by easy access to WUA with 19%, having low irrigation fees with 19%, and this outcome is meaningful as well. The farmers do not find irrigation water fees to be too high. On the other hand, providing information and consulting services is chosen with 12%, as another meaningful outcome. Generally, the farmers think that they are not accepted in WUAs, difficult to access and the authorities' lack of interest and sufficiency. As an outcome of this, there is the idea that receiving information and consulting services are difficult, or the services to be obtained will be below the expected level. In the others choice, rather more personal preferences emerge, such as erasing water debt, creating employment etc., with 7%.

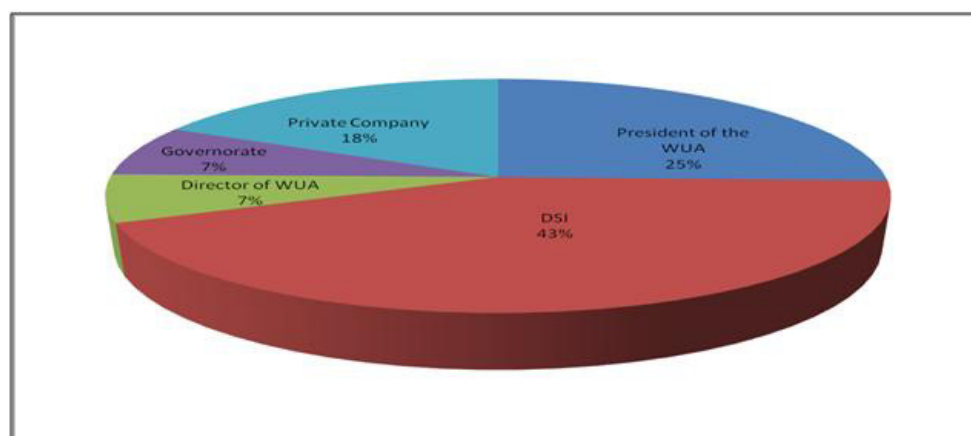
Furthermore, based on the field interviews, the farmers have expectations related out of irrigation from the WUAs, such as providing cheap and quality input provision for agricultural activities, support in processing and marketing the products and provision of suitable credits for agricultural activities.

The question prepared to determine the farmers' opinion regarding WUAs' activities was asked with choices, and the farmers were asked to state their views as agree, moderate and disagree. The choice distribution, index listing and ranking of the received responses are presented in Table 1. Accordingly, irrigation interval and water supply **ranked first** both in choices and in index based ranking. The farmers generally can obtain irrigation water from the unions when they need it. The collection time and method of fees **ranked second** both in choices and in index based ranking. Generally, there is flexibility offered to farmers in collection of fees and they are not being forced for making payments. Developing irrigation, training and extension choice **ranked last** both in choices and in index based ranking.

The responses given to the question "who would you rather manage the WUA" are very meaningful. The farmers

Table 1. Distribution of farmers' opinion on WUA activities

Subject About WUA Activities	Agree	Moderate	Disagree	Index	Ranking
Management activities	26%	51%	23%	958	4
Irrigation planning and its time interval	26%	55%	19%	974	3
Water supply and irrigation intervals	32%	52%	16%	1016	1
Irrigation fees	21%	44%	35%	875	6
Repair and maintenance of irrigation systems	20%	50%	30%	894	5
Time and method of collecting fees	31%	50%	19%	997	2
Irrigation development, extension and training	9%	29%	62%	699	9
Equipment and agricultural input supply	10%	37%	53%	738	8
To deal with the problems of farmers	18%	39%	43%	828	7

**Figure 3.** Distribution of the opinions regarding about who should manage the WUA

prefer DSI in managing the WUAs. The distributions regarding the subject are presented in Figure 3.

Among the reasons to prefer DSI include experience in this area, sufficient technical personnel and Machinery Park, and the trust that water management and requests will be finalized in an easier way. Among these results, the most striking one is the preference for private companies to manage the water, even though it is known that will lead to a price increase. In field visits, the farmers were observed to believe that a price increase in such situation will not be substantial, the resources will be used in an economic and productive way and favoritism towards people or person specific treatment will not be done. On the other hand, there is a view that such a situation will provide a more reliable irrigation. Generally, these farmers are close to the end of the irrigation channels and are with the downstream unions. These farmers are those who do not receive

sufficient water in the peak irrigation periods due to irrigation in the upstream unions, thus suffering product losses.

CONCLUSION

Considering the size of the research field, the specification and importance of the project field, the number of farmers participating in the questionnaire, the time of the study and the content and details of the questions asked made the obtained results and inspections both unique and made them data that can be used in a wide scale due to their outcomes.

According to the research; the farmers lack sufficient knowledge regarding WUAs. Their current knowledge is generally based on observations and conversations, and

they believe that they are not being informed sufficiently regarding technical irrigation subjects and WUAs investment-management decisions unsatisfactory. There is the general belief that WUAs have sufficient sources for the services to be provided, but they do not use these rationally and productively. There is the opinion that WUA management does not fulfill their duties completely. This opinion is more positive for the technical personnel working in the WUA's.

The farmers believe that they are not accepted in the WUAs and not sufficiently effective in the decision taking processes. There is a perception that union management and their relatives benefit the most from WUA services, and a discontent relevant to this perception. The most important factor in this is the opinion towards the lack of interest except for the election times. Furthermore, request for equality and fair treatment comprise the second most important reason. The wish is having the WUAs managed by DSI. Those wanting the continuity of the current system rank second. There is a high perception towards owning the irrigation systems due to the importance of irrigation and the benefits the systems yield.

The farmers' most important expectation from WUAs is to receive water when they need it. Besides this, there are requests to decrease water fees, easy access, equal and fair treatment, information and consulting service provisions, in this order. Furthermore, there are expectations towards provision of cheap inputs for agricultural activities, in processing and marketing the product. The farmers are generally content with the current irrigation frequency and provision, time and method of collecting the fees and the activities regarding the irrigation plan and time and management activities.

Consequently, the farmers need training and information in the issues stated above. This information should be provided before the irrigation season, either in WUAs or in central villages, by ensuring the participation of other farmers, in a language and manner they can understand, by making them feel accepted.

The evaluations made via the research and the obtained results can constitute the basis for all kinds of legislative and structural work regarding WUAs, and they have the characteristics to be an important data source both in the management of these systems, in pricing the water or in steps to be taken to adapt the farmers to the system.

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