IJRD International Journal of Research & Development Organisation

ISSN: 2455-7668

Journal of Agricultural and Research

THE ATTITUDES OF STAKEHOLDERS TO IRRIGATION WATER PRICING AND PAYMENT: GAP-HARRAN PLAIN SAMPLING-TURKEY

Mustafa H. AYDOGDU[1*], Murat AYDOGDU[2]

[1] Asist. Prof. Dr., Department of Agricultural Economics, Agricultural Faculty, Harran University, Şanlıurfa, Turkey.

[2]M.Sc. GAP Agricultural Research Institute, Şanlıurfa, Turkey.

e-mail:maydogdu@hotmail.com

*Corresponding author: Aydogdu, Mustafa H., e-mail: mhaydogdu@hotmail.com, mhaydogdu@harran.edu.tr

ABSTRACT

Agricultural irrigations have water use by 72.7% in Turkey. Southeastern Anatolian Project, GAP, is an integrated regional development project, mainly based on water and soil resources, where Harran plain is located. Agricultural irrigation is managed by water user associations (WUA) that have structural problems. It is aimed to determine the attitudes of the stakeholders' to irrigation water pricing and payment. The basic material comes from farmers, the chairman and the manager of WUAs and State Hydraulic Works, DSI, staffs that can be called as stakeholders. 470 questionnaires were conducted by face to face interviewed. Likert attitude scale is used. Positive attitudes towards to water charging is 54.8%, current water charges are found high by 35.6%. If the pricing will be based on volumetric, it is believed that farmers will be more careful and efficient in use of water by 66.8%. This study is first of its type in GAP-Harran plain.

Key words: Irrigation water pricing, Water user associations, GAP-Harran plain, Turkey

1. INTRODUCTION

Water is a strategic and non substituent element for life of the ecosystem. There is an increasing demand for water because of population growth, urbanizations, and industrialization and development activities for all over the world where as existing of limited water resources. Agricultural irrigations use the most water among the other sectors, globally. There is an increasing pressure on agricultural irrigations for efficient and effective use of water [1]. Agricultural irrigation is the largest water user groups in Turkey by 72.7% [2].

Southeastern Anatolian Project, GAP, is a multi-sectorial and integrated regional development project which is 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 [3]. Agriculture and irrigation are expected to have an accelerating effect for development of the GAP region. Harran Plain is located in GAP-Şanlıurfa, 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 [4]. Agricultural irrigation in Harran Plains within the scope of GAP began in 1994 and today, reached to approximately 150,000 ha [5]. Irrigations were previously under the authority of the State mainly by DSI, State Hydraulic Works. Later on irrigation management and operations were transferred to water user associations (WUA) since 1994 in Harran plain for sustainability of systems in order to ensure the rational use and rate of transferred reached to 96% [6]. WUAs are operating irrigation systems under the control and supervision of DSI.

Water saving has many sub-titles, such as training, awareness, regulations, management, operation, pricing, social, economic and political considerations. These sub-titles have different reactions and sensitiveness depending on region to region and country to country. These subjects are still under discussion for finding an optimal way to solve the problem [7]. The price of water may include different purposes such as reducing the amount of water used; financing of irrigation investments and reimbursement by those who benefit from the irrigation water. The price to be applied should not exceed the ability to pay of beneficiaries for the specified use [8]. Determination high rates of water charge will reduce the amount of water used. This may lead farmers to move away from irrigated agriculture and results to less amount of production. On the other hand, in determining low water charges may cause to excessive use and waste of the water and results to drainage and salinity problems under the high temperature.

There are some problems in irrigation management and drainage issues in the plain of Harran within the scope of GAP [9]. Imambakir WUA is located in the GAP-Harran Plain with an area of 7,464 hectares and, as a result of excessive water use, groundwater level increases; accordingly there has been production losses in a significant amount of results due to salinization [10]. In Akcakale district within the scope of GAP furrow irrigations, there has been loss of 1,840,625 kg of cotton products and $ 935,711 in income due to salinization of soil in 2009 [11].

It is aimed to determine the attitudes of the stakeholders' to water pricing. It is a first of its kind for the GAP-Harran plain. The results will be useful for decision-makers in water management policies in Turkey and also similar socio-cultural countries.

2. MATERIALS AND METHODS

The basic material of this study comes from four groups whose are farmers, the chairman and the manager of WUAs and DSI staffs. There are 22 WUAs and 21,094 farmers in the WUAs at Harran plain. 373 farmers who are chosen via a simple random sampling method, the chairman and managers of WUAs are assessed under the full enumeration that is 44. DSI staffs are selected who are involved in irrigation, management and operation divisions by randomly during interview that is 53. So 470 questionnaires were conducted by face to face interviewed. The sample size was determined using the below formula [12].

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

Where; n: sample size, N: farmers in the main population, which is 21,094, t: the sample size is larger than 30, Z table value with 5% error margin is 1.96 in normal distribution table, p: the possibility of farmers accepting the offered proposals is 50% so 0.50, q: the possibility of farmers not accepting the offered proposals, 1-p= 0.50, d: it was taken as 0.05 with 95% confidence interval.

Likert attitude five point scales were used in the 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. The judgment statements should have a single meaning and definite outcomes. 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, 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. Confidence level is accepted as 85% in general.

3. RESULTS AND DISCUSSIONS

The descriptive statistics of the participant is given in table 1 and 88.5% of them located in gravity irrigation and 11.5% of them in pumping irrigation areas. Cotton is the main crop in the surveyed area and 59% of the farms are 100 acres or smaller. Farmers have been paying 5.43% of their net income per acre for irrigation as a water charge [13].

Table 1. Descriptive statistics of the participants

Factor	Number of participant	Age	Education (year)	On duty experience (year)
Farmers	373	44.6	7.0	21.4
Chairmen	22	47.7	6.1	6.5
Managers	22	38.3	14.5	8.8
DSI Staffs	53	50.5	13.3	17.2
Weighted Average		45.1	8.1	19.6

Irrigation is the most important inputs to increase agricultural production and becoming more important in the potential conditions of drought and climate change. The answers of stakeholders to the question of water should be priced for the economic and efficient uses are given in table 2.

Table 2. The answers of stakeholders to water charging

Factor	Strongly Agree	Agree	Fair	Disagree	Strongly disagree
Farmers	25%	30%	23%	15%	7%
Chairmen	48%	48%	4%	0%	0%
Managers	75%	10%	5%	0%	10%
DSI staffs	62%	24%	8%	4%	2%
Average	52.5%	28%	10%	4.75%	4.75%
Weighted Average	32.6%	22.2%	19.6%	12.4%	13.2%

Accordingly, the rate of having positive attitudes towards to water charging is 54.8%, as oppose to this one 25.6% of stakeholders have negative attitudes to water charging. The result indicates that stakeholders beileved that water charging is necessary for the economic and efficient use. How do you evaluate the current water price is asked to the participants. The answers of stakeholders to this question are given in table 3.

Table 3. The answers of stakeholders to current water prices

Factor	High	Low	Fair
Farmers	41%	23%	36%
Chairmen	13%	70%	17%
Managers	5%	90%	5%
DSI staffs	20%	65%	15%
Average	19.75%	62%	18.25%
Weighted Average	35.6%	33.1%	31.3%

The results indicate that current water charges are not found high. Almost majority of the stakeholders, except farmers, were expressed that water charges are low. In any case only 1/3 of the stakeholders were found the rates high, those who find the rates high are located in pumping areas and paying almost 2.5 fold higher then gravity irrigation areas. In order to define stakeholders attitude to water pricing, the question of what should be the available water charges is asked. The answers of stakeholders to this question are given in table 4.

Table 4. The answers of stakeholders to current water charges

Factor	Should be less	Should be more	Should be actual cost
Farmers	35%	16%	49%
Chairmen	4%	39%	57%
Managers	10%	15%	75%
DSI staffs	4%	22%	76%
Average	13.25%	23%	63.75%
Weighted Average	28.9%	17.7%	53.4%

Accordingly, less than 1/3 of stakeholders' attitudes towards to lower water charges, mainly come from the farmers. The rest of the stakeholders consider that water charges should be more. These results are expected. Because lower water charges have positive effect on welfare of the farmers as opposed to this one have negative effect on income of the WUAs for service quality, operation, maintenance and management of WUAs. The vice versa is true for higher water charging, too. The most remarkable result here is actual cost of water by 53.4% that all parties agree on participating in the survey area for water pricing. This result is an unexpected one in terms of the farmers, mainly arises from detecting the actual value of the water that is quite different in the surveyed area.

In general, the real cost of water according to the farmers are operations of main irrigation canals that is opening and closing the gates by a few motorcycle staff, the cost is relatively low. Operation, maintenance, renovation, and repair works are perceived as a public service and there is a widespread opinion that it should be free. In general, the real value of water according to the WUAs chairman is corresponding to the amount which will cover the association's costs that can meet their needs. So staff salaries, supplies and equipment for minimum maintenance and repair costs, fuel for vehicles. The actual cost should cover all the costs related with water and structures starting from the water resources to the end users according to the WUAs director and DSI staff. That is supply, transmission, drainage; all maintenance including the operation and

management costs and also the reimbursement of investment costs. Naturally, quite significant differences will occur according to perceived real value of water between stakeholders.

The question; if the water fee is determined according to the number of irrigation and the amount of water used, farmers will be more careful and efficient in use of water is asked to stakeholders. The answers of stakeholders to this question are given in table 5.

Table 5. The answers of stakeholders to charges depends on amount of water used

Factor	Strongly Agree	Agree	Fair	Disagree	Strongly disagree
Farmers	30%	33%	17%	12%	8%
Chairmen	44%	35%	4%	4%	13%
Managers	55%	15%	10%	10%	10%
DSI staffs	57%	30%	7%	4%	2%
Average	46.5%	28.3%	9.5%	7.5%	8.2%
Weighted Average	34.9%	31.9%	15%	10.6%	7.6%

Accordingly, the rate of having a positive attitude towards to the question is 66.8%, as oppose to this one 18.2% of stakeholders have negative opinion. This results indicate that pricing based on furrow irrigation cause to waste of water in irrigation. On the other hand, the question of if water fees are increased, farmers use less water and more carefully is asked. The answers of stakeholders to this question are given in table 6.

Table 6. The answers of stakeholders to less water use in case of increased water fees

Factor	Strongly Agree	Agree	Fair	Disagree	Strongly disagree
Farmers	14%	20%	23%	21%	22%
Chairmen	13%	31%	22%	17%	17%
Managers	25%	30%	5%	15%	25%
DSI staffs	47%	28%	13%	6%	6%
Average	24.8%	27.3%	15.8%	14.8%	17.3%
Weighted Average	18.2%	21.9%	21%	18.8%	20.1%

Accordingly, the rate of having a positive attitude towards to the question is 40.1%, as oppose to this one 38.9% of stakeholders have negative opinion. There is important differences between the results of consecutive tables above located. One of the main reasons comes from the perceived of less concept that is considered as insufficiency. Farmers can use the water even they don't make payment for water, WUAs don't have a right not to give water for nonpayment farmers by the law. On the other hand, WUAs are not forced to farmers for payment because of farmers is being voter for elections and interest rate of nonpayment money is less.

There are some problems in the collection and payment of water charges already. Farmers are quite unwilling to pay as oppose to WUAs are not enough sufficient for collection. One of the reasons comes from the collection procedures by the law that takes long time; attorney and court costs bring additional expenditures, resulting in a significant proportion of the money that is collected goes to these issues. Also all know each other, mostly being relatives and are often problems arise because of court matters between WUAs staff and farmers. This situation has direct effect on service quality of WUAs. Less service quality cause more unwillingness to pay by farmers.

It is necessary to consider additional subjects to increase the willingness to pay of farmers by WUAs such as training, awareness, and support for agricultural activities, increasing service quality, transparency and acceptance of farmers besides election periods. If such conditions are provided by WUAs, there is a willingness to pay more 36% to 85% by farmers [13].

Another important issue is the price differences between gravity and pumping irrigations in the same field. Gravity irrigation charges are low as oppose to the pumping ones. The pumping irrigation area farmers' are paying much more then gravity

ones. In fact they are using same amount of water, getting same subsidization, and same costs for crop, but paying more because of their location for same goals. By applying subsidies on energy to the WUAs engaged in the pumped irrigation, so both farmers and WUAs may be provided equal opportunities. At present, pumped irrigation WUAs have electricity debt at very high rates, even if they receive all of irrigation water charges, it will not be enough to meet the electricity debt. Freezing of such debt in terms of contribution to solve the problem or should be evaluated as part of amnesty or ensuring the repayment over a long-term will greatly relieved the WUAs. However it has to be formed by the repetition of the kind will prevent the worst examples of this practice in the future.

4. CONCLUSION

There are structural problems in water management, pricing and collection of water charging in GAP-Harran plain irrigations. Water pricing is sensitive issue and should be in a level of ability to pay of farmers. In fact, mostly, farmers are unwillingness to pay rather than ability to pay in Harran plain. If the collection problem of WUAs cannot be solved, there is very limited capability to carry out their expected activities in an optimal manner. It is necessary to increase the willingness to pay of farmers by WUAs such as training, awareness, and technical support for agricultural activities, increasing service quality, transparency and acceptance. A common price may be created in the GAP-Harran plain for both gravity and pumping irrigations. This price can be used by WUAs and farmers in terms of price stability for payments and collections.

6. REFERENCES

[1] FAO, 2006. http://www.fao.org/ag/AGL/aglw/watermanagement/default.htm. 17.04.2006.

[2] ANONYMOUS, 2005. 1995–2004 50. Yılında DSI, DSI Genel Müdürlüğü 84s. Ankara, Turkey (In Turkish).

[3]. GAP, 2012. GAP'ta Son Durum, GAP BKI, Şanlıurfa, Turkey (In Turkish).

[4]. DMİ, 2011. http://www.dmi.gov.tr/veridegerlendirme/ilveilceleristatistik.aspx?m= Sanlıurfa (16.11.2011)

[5]. DSI, 2013. http://www2.dsi.gov.tr/bolge/dsi15/isletme.htm, (12.12. 2013)

[6]. AYDOGDU M.H., 2015. "Evaluation of the managers' views to water user associations in GAP-Harran Plain, Turkey". Basic Research Journal of Agricultural Science and Review. 4(2); 064-070

[7]. KOÇ, C., 1998. Büyük Menderes Havzası Sulama Şebekelerinde Organizasyon-Yönetim Sorunları ve Araştırmalar, İzmir, Turkey (In Turkish).

[8]. KARATABAN, A. Y., 1976. Su Kaynaklarının Planlama ve İdaresinde Ekonomik ve Mali Fizibilite, DSİ, Ankara, Turkey (In Turkish).

[9]. YENIGÜN, K. and AYDOĞDU, M.H., 2010. "Evaluation of Irrigation and Drainage Systems of GAP, the Turkey's Largest Integrated Water Resource Development Project", Scientific Research and Essays, 5 (21): 3237-3253.

[10]. AYDOGDU M, AYDOGDU M.H, CULLU M.A., 2014. The Impact Determination On Cotton Yields Of Soils Which Have Different Salt Levels And Its Relation With Satellite Data (Şanlıurfa İmambakır Harran Plain Irrigation Association) Turkish Studies, Volume 9/2 Winter 2014.

[11]. AYDOGDU M., AYDOGDU M. H., CULLU M. A., 2014. "The Determination of The Cotton Productivity and Losses Under the Effect of Salinity by Using Geographical Information System and Remote Sensing GAP Region, Akçakale Sampling, Turkey"

The Journal of Academic Social Science Studies, 24; 617-630, Doi number: http://dx.doi.org/10.9761/JASSS2167.

[12]. YAMANE, T., 2006. Çeviri: Esin, A., Bakır, M.A., Aydın, C., Gürbüzsel, E. Temel Örnekleme Yöntemleri, Literatur Publication, Istanbul, Turkey (In Turkish).

[13]. AYDOGDU M.H., 2012. Agricultural Water Management And Pricing In Şanlıurfa-Harran Plain, Problems And Solutions, Ph.D. Thesis, Harran University, Turkey.