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PROBLEMS AND SOLUTIONS FOR WATER USER ASSOCIATIONS IN THE GEDİZ BASIN

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SUMMARY - This study was carried out in Water User Associations (WUAs) in İzmir and Manisa provinces, located in the Gediz Basin in western of Turkey. In this paper, technical, economical, social and training problems faced by WUAs were examined and as a result practicable suggestions were recommended. 172 farmers from 23 villages from 5 selected WUAs were the participants of this study. The data collected in the study were obtained by a questionnaire from interview among the farmers and the WUAs, field observations, and from members of staff at the irrigation schemes. As a result of the questionnaire, the major problems faced by the farmers and WUAs managers in the region are presented. These problems consist mainly of lack of funds for the rehabilitation of the irrigation schemes and related activities and lack of technical organizational training of farmers and technical staff of WUAs, inadequate qualified personnel, employment insecurity of the personnel, uncertain duty and authority among the WUAs managers and inattentiveness of the farmers to the meetings organized, poor contribution level to protect the schemes, privileged attitudes of the WUAs' chairman's and insufficient administration management skills.
The identified problems shows that the WUAs managers and the farmers have to assume full responsibility for managing and maintaining the irrigation schemes for the sustainability of transferred irrigation schemes, In addition, government could play an essential role through technical guidance to Water User Associations.

Key words: Irrigation, Participation irrigation management, Irrigation management transfer, Problems of water user associations, Gediz Basin,

INTRODUCTION

Irrigation has been a key factor for food security and rural development. Since 1950's, the total irrigated area in the world has expanded rapidly. At present, irrigated area in the world accounts for 15% of total area, but around 40% of the worlds food crops are produced by irrigated agriculture. The performance of irrigation and drainage is critical to food supply and to farmers' incomes as well as to the environment. The ultimate goals in managing irrigation water are efficiency, equity and sustainability (Sun, 2000). In recent years, water security issue became a major concern and many efforts have been made to manage and ensure efficient use of water for sustainable agricultural development (Döker et al, 2001).

In most developing countries, irrigation development projects and their operation and management (O&M) are executed by the government. Recently, transfer of O&M responsibility and irrigation schemes from the State to Water User Organizations (WUOs) was needed due to the failure of public sector to finance or recover the water fees from farmers, the desire of governments to reduce cost and reallocate incomes and insufficient investment on irrigation and drainage systems. Participatory irrigation management in Turkey was adopted as a national policy in the early 1950s, but these policies took on real importance only after 1993, when the Accelerated Transfer Program (ATP) was launched (INPIM, 2004). The World Bank played an important catalytic role in this acceleration and since that time, the program has successfully transferred about one million hectares to local management. The main underlying reason for ATP has been the O&M financial burden for the State Hydraulics Works (DSI) and the government, which was getting unbearable and sustainable. The O&M cost recovery, largely due to political reasons, has been unsatisfactory (Tekinel and Doorenbos, 1995).

According to the data of DSI, the amount of irrigation land transferred was 1,860,969 hectares to different water user organizations. As of today, approximately 91% of the whole transfer has been realized to the WUAs. In order to overcome the financial problems on O&M of irrigation schemes and hence decrease the financial burden on the Government's allocations, and improve the system performances, the transferring of irrigation schemes has played an important role. *Table 1* below shows the distribution of Irrigation Units Based on Transferring Water User Organizations (WUOs).

Table 1. The distribution of Irrigation Units Based on Transferring Water User Organizations

Transferring/ WUOs	Number	Distribution (%)	Area (ha)	Distribution (%)
Village Head	225	28.9	38,061	2.0
Municipality	143	18.3	58,348	3.1
Water User Associations	330	42.4	1,685,5	90.6
Cooperatives	77	9.9	77,999	4.2
Other	4	0.5	1,032	0.1
Total	779	100	1,860,969	100

Source:(http://www.dsi.gov.tr)

Tekinel and Aksu (1996) determined that in Turkey, the impacts of transfer on quality of irrigation service are not assessable yet and important issues of future sustainability still remain. The water rights situation, however, presents potential problems of major dimensions that will require upper-level action and time to remedy. Other constraints will require concerted action by the State Hydraulics Works (DSI), the WUAs, and other organizations. The real danger is that of complacency, in which the government washes its hands off irrigation management entirely and fails to apprehend its ongoing role in monitoring and addressing emerging problems in the area of policy, finance, regulation, oversight, and supporting services (Svendsen *et al.*, 1997; Svendsen and Nott, 1997).

Svendsen *et al.* (1997) and Hamdy *et al.* (1998) reported that the major problems common all over the world for WUAs are insecurity of water rights, financial problems and shortfall, rehabilitation and modernization of irrigation systems and shortage of financial and administrative management skills, environmental impact, leadership and management support of WUAs.

In our country , there are many studies related to irrigation management and water user associations including management forms of irrigation schemes, difficulties and turnover activities of the government (Tekinel 1994; Erdoğan, 1995); studies of farmer participation to agricultural investment and operation-maintenance activities (Sayın at al., 1993); facilities participation of farmers to operation and maintenance of irrigation projects for management water resources affectingly (Tekinel at al., 1994); evaluation of comparison indicators of irrigation systems (Girgin at al., 1999; Değirmenci, 2001); evaluation of the irrigation management transfer (İnce at al., 2001; Değirmenci and Demir, 2002); evaluation of performance of irrigation systems (Beyribey at al., 1997; Çakmak, 1997, Atış and Karahan, 1999; Kıymaz, 2001; Ul and Dorsan, 2002). However scientific studies concerning the problems of water user associations were insufficient. Thus, it is needed to look at this situation further.

This study was carried out in Water User Associations (WUAs) in İzmir and Manisa provinces, located in the Gediz River Basin. In this paper, technical, economical, training and social problems faced by the WUAs were examined and as a result practicable suggestions were recommended.

MATERIAL AND DATA

The study area is located in the Gediz River Basin in the Aegean region in western Turkey. It is one of the most important agricultural lands in Turkey. It is about 275 km long, drains an area of 17,200 km^2 and flows from east to west into the Aegean Sea just north of İzmir. Fig.1 shows the location of Gediz River Basin in western Turkey (Anonymous, 2005). This study was carried out in

Water User Associations (WUAs) in İzmir and Manisa provinces, which is located in the Gediz River Basin. *Table 2* gives the description of the selected WUAs in the study area. 172 farmers from 23 villages of selected 5 WUAs, namely Üzüm, Salihli Right Bank, Gediz, Sarıkız, and Menemen Left Bank *(Table 3)* were sampled. The data collected in the study was obtained by a questionnaire from interview among the farmers and the WUAs, field observations, and from some members of staff at the irrigation schemes. The questionnaire was carried out in the months of June, July and August of 2003. The questionnaire forms are given in *(Tables 4 and 6).*

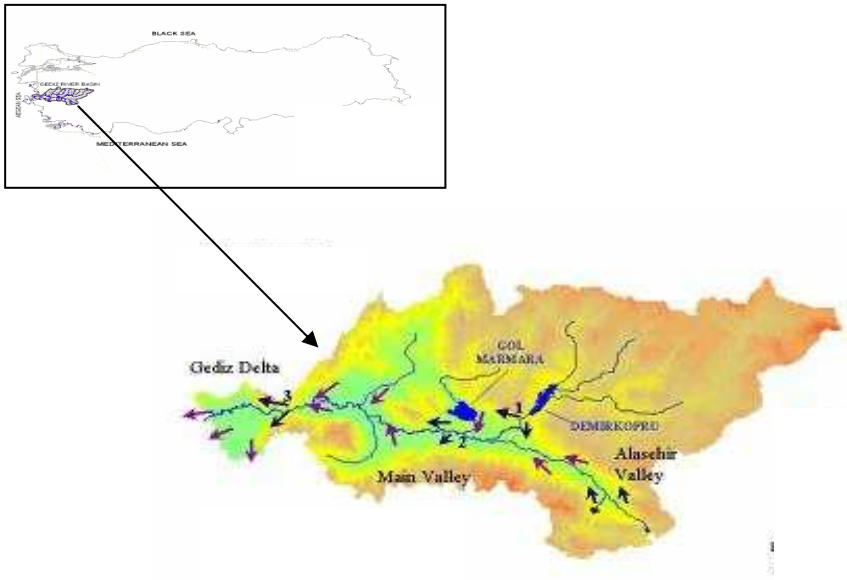

Fig. 1. The Location of Gediz River Basin in western Turkey (Anonymous, 2005)

Table 2. The description of the selected WUAs in the study area

Name of WUAs	Place		Opening Year to Operation	Establishment Year	Net Irrigation Area (ha)
	Province	City			
Üzüm	Manisa	Alaşehir	1944	1995	16,500
Salihli Right Bank	Manisa	Salihli	1944	1994	9,101
Gediz	Manisa	Merkez	1965-1975	1995	10,962
Sarıkız	Manisa	Saruhanlı	1965	1995	13,702
Menemen Left Bank	İzmir	Menemen	1944	1995	16,500

Source: WUAs Bulletin, 2000

METHODOLOGY

The questionnaire was arranged to determine the problems faced by the farmers of selected WUAs and all WUAs managers. The following factors, distance to down town, the different operation systems of WUAs which have the same irrigation schemes, and distance to water resources have all been considered in the selection of villages.

To determine the sample size of farmer, numbers of the total water users were accepted. The sampling method is given as below (Newbold, 1995).

$$n = \frac{Np(1-p)}{(N-1)\sigma^2_{px} + p(1-p)} \quad (1)$$

where *n* is the sample size, N, is the total water user size, σ^2_{px},variance; p, farmers ratio; 10% margin of error and 99% confidence interval; p =0.50, (1-p)=0.50.

According to this formula, the maximum sample size was calculated as 172. *Table 3* shows the distribution of the sample size of farmers in selected WUAs.

Table 3. The distribution of the sample size of farmer selected WUAs

Name of WUAs	Name of Villages and Towns	Sample Size of Farmer	%
Üzüm	Baklacı, Belenyaka, Alaşehir, Yeşilyurt	34	19.8
Salihli Right Bank	Durasılı, Taytan, Pazarköy, Eldelek, Karayaşlı	31	18.0
Gediz	Tepecik, Çamköy, Tilkiköy, Tekeliler	20	11.6
Sarıkız	Koldere, Nuriye, Mütevelli, Yeşilköy, Hacırahmanlı	32	18.6
Menemen Left Bank	Kesikköy, Seyrekköy, Tuzçullu, Kaklıç, Çavuşköy	55	32.0
Total	23	172	100.0

The questions of questionnaire are prepared as multiple choices. The data collected in the study are obtained by a questionnaire from interview among the farmers and the WUAs managers, field observations, and some members of staff at the irrigation schemes. The questionnaire tackles issues such as water management, technical, economical social issues and education level and occupation of the WUAs' chairmen.

The data was analyzed using Statistical Package for the Social Sciences (SPSS) programmer, including Analyze-Descriptive Statistic-Cross tabs and Analyze-Compare Means-Means.

RESULTS AND DISCUSSION

The questionnaire was applied to determine the problems faced by the water user (farmer) and the WUAs. The results are presented in *Tables 4 and 6* which were evaluated altogether.

Results showed that 70.9% of farmers have received satisfactory water amount, and 62.8% farmers have received water in due time. Uncontrolled and unconscious water delivery to farmers by irrigation workers and inadequate water diverted to canals due to daily water demand are the main reasons for inadequate water supply. Rotation time change with supply and demand, farmers not obeying the rotation order, and interrupted water flow in the canal by grasses and weeds are the major reasons for not receiving water in time. Sagorday (2003) reported that 64% of the farmers received satisfactory water amount and 79% of farmers in the study received water in due time. In the other hand, Güvercin and Boz (2003) explained that 79.6% of farmers in the Düziçi District of Osmaniye Province had troubles with water supply. This case could arise from issues such as the deficient water resources, seepage and sedimentation losses from the channels and uncontrolled water delivery. The largest part of the problems faced are in the water delivery, which includes 52.2% interrupted water flow by grasses and weeds and 48.3% seepage and sedimentation losses from the canal; 31.4% are interference of irrigation flow by farmers and 28.6% is the defective layout of canal. Sagorday (2003) reported that 84% of farmers received improved water distribution after transfer. Güvercin and Boz (2003) identified that inequality of water distributions due to privileged management and policy manner in the Düziçi District of Osmaniye Province. In our study area, we determined that problems generally are deteriorated infrastructure of irrigation schemes and weak managerial arrangements. Mentioned problems affect directly and indirectly the farmers and WUAs managers in different levels. The reasons for this is the fairly old and worn out irrigation schemes. Rehabilitation is urgently needed in this area. Most WUAs were determined to have insufficient machinery to do

maintain works in time. Several WUAs purchased machine with World Bank credit. In general, they are using DSI machinery while supplying labor and fuel. 85.7% of WUAs managers couldn't allocate funds for maintenance of the schemes because of the financial shortages. Irrigation water fees collected from farmers are inadequate for maintenance and keeping up the system. In addition, 57.1% of the farmers do not participate directly in the irrigation activities, such as decision-making, design, planning, operation and maintenance of the system. Direct farmer participation is needed in WUAs governance. On the other hand, WUAs managers could increase the water cost, and farmers should share their own costs in real terms. The government should also give technical support and guide the WUAs for maintaining the schemes. In addition to this, legal arrangement should be undertaken to form WUAs federations for jointly purchasing and supplying such equipment for maintenance works.

Results also showed that all farmers were not given training course in irrigation topics, such as irrigation methods, irrigation scheduling, water saving, new irrigation methods, environmental issues and also have not joined the Assembly meetings. Insufficient education and lack of irrigation issues were clearly detected. 74.4% of farmers didn't know how much water was diverted to their fields. Güvercin and Boz (2003) determined that 96% of farmers did not participate in any related training course. Hamdy, et al (1997) reported that in order to achieve maximum benefits from training for development of WUAs, governments should be involved in training programms for a better understanding and true cooperation links between WUAs and Governmental Agencies and Institutions. In Italy, this was the case in the past few years where Government supported and promoted training programmers of variable levels to technicians, administrators and farm owners. On the other hand, only the chairman's of WUAs and the general secretary are given technical and organizational training by DSI. These courses are organized twice a year. Insufficient education and lack of irrigation topics, including weak organizational relationship among the institutions, insufficient dissemination at research results and activities of related institutions, and poor participation level of farmers to training activities are important issues which should be tackled. The training course should be provided surely by DSI, research institutes, and universities as well. The training of farmers and the technical staff that will have responsibility for the management of the system should be initiated at once. The farmers expectations of the WUAs administrators are honesty (58.1%), and 30.2% of farmers said that the WUAs should do operation and maintenance works from the collected water fees. Güvercin and Boz (2003) reported that approximately 82% of farmers said that WUA managers should be honest. Both results show the similar findings 81.4% of farmers have replied that the executive committee should be chosen among farmers in the villages or municipalities using the system. According to new legal regulations, the number of members should be determined by considering the irrigated area.

The most important technical problem faced by the WUAs managers is the lack of permanent staff (57.1% of surveyed). 85.7% of WUA managers complained about the lack of coordination with other local and governmental agencies. Most WUA managers (64.3%) said that farmers are not penalized for stealing water.

The most important limitation (55.6%) is the privileged manner of the chairman's of WUAs. In our country and in the other developing countries the common problems identified are the personnel issues, privileged policy manner of WUAs (Anonymous, 2002). The influence of WUA chairmen should be reduced in order to stop their interference. However under present conditions this seems to be almost impossible. Most of the WUA chairmen are primary school graduates and they also occupy political positions such as village headman (35.7%) and mayor (42.9%). The village headman and mayor within the region the natural members of the WUAs(in accordance with law 1580 article 144). Since they occupy other positions they are far off from technical topics as required by irrigation. DSI should urgently train them in these topics. In the other hand, 52.9% of the technical staff were agricultural engineers from the different disciplines of the agricultural faculty. The large portion is irrigation engineers (55.6%). This is of utmost importance since irrigation engineers are very familiar with topics such as crop, water and soil, water requirement of crops, growing periods of crops, planned water distribution programming, and irrigation scheduling. In the other hand, 35.3% of WUAs do not have agricultural engineers despite the law which requires that the general secretaries should be agricultural engineer. It is observed that DSI helps some of WUAs which do not have agricultural engineers in irrigation issues. DSI should also control the WUAs that do not employ agricultural engineers as general secretaries.

Table 4. The opinions of farmers about the irrigation services received after transfer

Topic		
1. Water management		
Do you receive the amount of water satisfactory?	**Number**	**%**
Yes	122	70.9
No	35	20.4
Sometimes	15	8.7
What are the limitations to receiving the amount of water satisfactory?		
Farmer fields are at the end of canal	8	22.9
Uncontrolled and unconscious of water delivery by irrigation workers	14	40.0
Adequate water amount isn't diverted to canals due to missing daily water demand	13	37.1
Water losses due to seepage and breaks in the canal	2	5.7
Do you receive the water timely?		
Yes	108	62.8
No	39	22.7
Sometimes	25	14.5
What problems are faced in the water delivery?		
Miscalculation of crop water consumption	9	5.2
Conflicts among the individual farmers or on the rotation	20	11.6
Seepage and sedimentation from the canal	83	48.3
Interrupted water flow of the canal with grasses and weeds	95	55.2
Other	35	20.3
What are the other problems faced in the water delivery?		
Inadequate flow in delivery canal	5	14.3
Disobedience of the order of rotation by the farmers	7	20.0
Uncontrollable interference to flow by the farmers	11	31.4
Closed traffic due to poor service roads	2	5.7
The defective layout of canal	10	28.6
What features are expected from WUAs?		
WUAs should be honest	100	58.1
WUAs should do operation and maintenance works from collected fees	52	30.2
WUAs should be apolitical	25	14.5
The government should assist in improvement of irrigation systems	23	13.4
The agricultural engineers should manage the associations	37	21.5
Are irrigation schemes controlled by WUAs		
Yes	92	53.5
No	33	19.2
Sometimes	25	14.5
Undecided	16	9.3
Is there any technical training course about irrigation topics by DSI or research institutions as well?		
Yes	-	-
No	172	100
Do you know the amount of water diverted to your field		
Yes	10	5.8
No	128	74.4
Partly	34	19.8
How should the executive committee be chosen?		
Village headman	41	23.8
Mayor	16	9.3
Among farmers in the villages or municipalities using the schemes	140	81.4

Table 5. Water User Associations' opinion about irrigation services after the transfer

Topics		
1. Technical Issues		
What are your personnel problems?	**Number**	**%**
Do not have permanent staff who constitutes the main staff of WUAs	8	57.1
Permanent and temporary staff have not been given permission and in the efficient number of staff by the local government	5	35.7
The qualified personnel is hard to find	4	28.6
Frequent staff change depending on management	7	50.0
What are the other technical problems faced?		
No job guarantee (managers worry about losing their jobs)	3	100.0
Limited authority of the general secretary except on irrigation topics	2	66.7
Insufficient number of technical staff	2	66.7
Staff salaries are very much dependent on the WUAs' chairmen	1	33.3
The privileged management of the WUAs' chairmen	3	100.0
What is the duty-authority limitations with other local governments?		
Lack of information among WUAs and the other local government	12	85.7
The determined personnel number is limited by governor	11	78.6
The difficulties related to tax administration, work machinery, worker contract and purchasing of vehicle due to in accordance with municipal law 1580	4	28.6
2. Economical Issues		
Do you have appropriate funds for maintenance of irrigation schemes?		
Yes	2	14.3
No	12	85.7
What are the limitations to appropriating funds for maintenance?		
Can not determine high water tariff due to low farmer revenues	4	33.3
No government assistance or subsidies	6	50.0
Collected water fees barely covers O&M	4	33.3
Do not have any revenues except for water fees	1	8.33
Do you have sufficient machinery park for O&M ?(See table 6)		
3. Social Issues		
What happens if farmers divert water illegally?		
Yes they pay a penalty	2	14.3
No they do not pay a penalty	9	64.3
Sometimes they do pay a penalty	3	21.4
What are the limitations for paying penalty?		
Inadequate controls	3	33.3
Irrigation frequency causes chaos	2	22.2
Penalties are waived by the chairman of WUAs	5	55.6
What are farmers' contribution to protection of the irrigation schemes?		
None at all (such as in design, planning, and decision making)	8	57.1
Doing maintenance repair in the tertiary canals	2	14.3
Cleaning of the canals	2	14.3
Warning other farmers who break the canals	4	28.6

Table 5. Continued

Topics		
Who attends to Assembly meetings?	**Number**	**%**
Only assembly member	11	78.6
Authorized personnel of DSI	4	28.6
Farmer members of WUAs	0	0.0
3. Social Issues		
How do you determine the number of Assembly members?		
According to place (settlement, i.e. village or town)	11	78.6
According to irrigated area	3	21.4
Is there any irrigation course to improve the WUAs staff by DSI or other?		
Yes	14	100
No	-	-
Who attends this course?		
The chairman	9	52.9
The general secretary	2	11.8
The Assembly members	-	-
The farmers members of WUAs	-	-
4. Education Issues and Personnel Staff		
What is the education level of chairman's of WUAs?		
Primary school	10	71.4
Secondary school	1	7.1
High school	2	14.3
University	1	7.1
What is the occupation of chairman's of WUAs?		
Farmer	3	21.4
Village headman	5	35.7
Mayor	6	42.9
What is the job of technical staff?		
Agricultural engineer	9	52.9
Agricultural technician	2	11.8
Other (Farmer)	6	35.3
Which discipline do the agricultural engineers belong?		
Plant protection	1	11.1
Field crops	2	22.2
Irrigation engineering	5	55.6
Horticulture	1	11.1

Table 6. The types and the numbers of machinery park

Name of WUAs	Truck	Backhoe	Grader	Pick-up	Tractor	Crane Tractor	Motorcycle
Menemen Right Bank	0	1	0	1	1	1	7
Menemen Left Bank	2	2	1	2	1	0	11
Bergama Kestel	0	0	0	1	0	0	0
Gediz	0	1	1	1	0	1	2
Mesir	1	3	1	3	0	1	15
Sarıkız	3	3	1	2	1	0	40
Turgutlu	0	1	1	1	1	1	9
Gökkaya and Çevre Villages	0	0	0	0	0	0	1
Ahmetli	1	1	0	0	0	0	3
Salihli Right Bank	1	1	1	2	1	1	0
Salihli Left Bank	0	1	1	2	1	0	6
Üzüm	0	1	0	1	0	1	2
Bağ	0	0	0	1	0	1	4
Sarıgöl	0	1	0	0	0	0	2
Mean	**0.57**	**1.14**	**0.5**	**1.21**	**0.43**	**0.5**	**7.29**

CONCLUSIONS

The questionnaire showed that the irrigation management transfer also had positive results, main ones being improvement of water distribution, satisfactory water amount and timely supply, improvement of maintenance, and reduction of conflicts among farmers. On the other hand, there are also on-going problems such as lack of funds for the rehabilitation of the irrigation schemes and related activities and insufficient technical organizational training of farmers and technical staff of WUAs, inadequacy of qualified personnel, job insecurity for the personnel, unclear duty and authority among the WUAs managers, lack of coordination with local government, farmers lack of attention to the meetings and activities, poor contribution level in protecting existing schemes, privileged manner of the WUAs' chairmen to kin and friends, and insufficient administrative management skills. Some of WUAs do not even have agricultural engineers as required by the law.

Both the WUAs and the farmers have to assume full responsibility for designing, planning, managing and maintaining existing irrigation systems to solve these identified problems. When choosing the WUAs staff quality and quantity should be the main driving force. DSI should take the necessary precautions in WUAs that do not have agricultural engineers as their general secretaries. Technical support and sufficient training to WUAs should be provided by DSI and research institutes, university and other related organizations. In addition, governments should play an essential role through technical guidance to Water User Associations. WUAs matters, including the number of Assembly members, election of the executive committee, regulations for the personnel staff have been legalized in accordance with local law 5355 at 26 May 2005. A supportive policy and legal regulations are crucial to the sustainability of WUAs. These regulations should be provided to adaptation to the WUAs.

REFERENCES

Anonymous, (2000). WUAs Bulletin. İzmir, Turkey.

Anonymous, (2002). Water User Association. http:// www.yerelnet.org.tr.

Anonymous, (2005). The Location Gediz River Basin in western Turkey. http://www.ess.co.at

Atış, E., Karahan, Ö., (1999). Performance of Irrigation Associations in terms of irrigation management. TMMOB Agriculture Engineers Organization. İzmir, Turkey.

Beyribey, M., Çakmak, B., Sönmez, F.K., and Oğuz, M., (1997). Evaluation of system performance in irrigation schemes. University of Ankara, Faculty of Agriculture Publication No: 1480, Scientific Research and Investigation 813, Ankara, Turkey. 88s.

Çakmak, B., (1997). Assessment of irrigation system performance of the transferred irrigation schemes. A.Ü. Faculty of Agriculture Journal 3(1):79-86.

Değirmenci, H., (2001). Assessment of performance of Bursa-Uluabat irrigation. Atatürk University, Faculty of Agriculture Journal 32(1):277-283.

Değirmenci, H., Demir, A.O., (2002). Evaluation and Assessment of the Irrigation management transfer. The symposium of protection, development and management of soil and water resources. Antakya, Hatay, Turkey p. 38.

Döker, E., Özlü, H., and Seren, A., (2001). Participatory Irrigation Management (PIM) Activities in Turkey. Advanced Training Course on Capacity Building for PIM. Valenzona, Bari, Italy. Country Overviews of PIM. v. 2. p.201.

Erdoğan, F.C. (1995). Studies related irrigation and maintenance services transferred to water users in the schemes The symposium of farmer participation to water management in agriculture. Kahramanmaraş, Turkey.

Girgin, A., Geçgel, G., and Gül, S., (1999). Performance situations in terms of irrigation management in the Gediz Basin irrigations. İzmir Irrigation Conference Paper. Sabancı Culture Center Merkezi, İzmir, Turkey.

Güvercin, Ö., and Boz, İ., (2003). Farmer's experiences on irrigated agriculture and their view of Irrigation Associations: A case study for Düziçi. KSU Science and Engineering Journal 6(2):80-90.

Hamdy, A., Lacirignola, C., and Trisorio, Liuzzi G., 1997. Participatory Irrigation Management: Gaining Benefits and Rising Problems: Case Study of Italy. International Workshop on Participatory Irrigation Management: Second Generations Problems, Cali, Colombia.

Hamdy, A., Trisorio Liazzi, G., and Lacirignola, C., (1998). Participatory Irrigation Management: Gaining Benefits and Rising Problems. Advanced Short Course on Capacity Building for PIM. Valenzano, Bari, Italy.

Hamdy, A., Trisorio Liuzzi, G., and Lacirignola, C., (2001). Participatory Irrigation Management: Gaining Benefits and Rising Problems Participatory Irrigation Management. vol.3. PIM in the Mediterranean Countries. Advanced Short Course on Capacity Building for PIM. Valenzano, Bari, Italy.

Inpim, (2004). Turkey's Transfer Program. htpp://www.inpim.org

İnce, O., Demir, G., Yorulmaz, O., Erdoğan, F.C. (2001). Monitoring and Evaluation at Irrigation Systems Developed By DSI and Transferred to WUOs. 1th. National Water Conference, Antalya, Turkey. p. 125-132.

Kıymaz, S., (2001). Performance Evaluation of Lower Seyhan Irrigation Project After Turnover Of Management to Irrigation Association. CIHEAM-IAMB. Valenzano, Bari, Italy. Thesis Master of Science no, 239, 68p.

Kıymaz, (2006). The problems and solutions of Water User Associations in the Gediz Basin. University of Çukurova, Faculty of Agriculture, Dep. of Irrigation and Agricultural Structures, Ph.D. Thesis (not published) Adana, Turkey, (in Turkish).

Newbold, P., (1995). Statistics for Business and Economics. 4th Edition (Prentice Hall International Editions).

Sagorday, J.A., (2003). Assessment and Monitoring of Participatory Irrigation Management. Wasamed Workshop on Participatory Water Management. Şanlıurfa, Turkey.

Sayın, S., Döker, E., Çevikbaş, R., Bal, M., 1993. Irrigated agriculture investment in Turkey and farmer participation of operation and maintenance activities. National Working Report. Ankara, 38s.

Sun, P.P.C., (2000). Policy Issues in Managing Irrigation and Drainage. Extension Bulletin No. 490.

Svendsen, M., and Nott, G., 1997. Irrigation Management Transfer in Turkey: Process and Outcomes. Case Studies in Participatory Irrigation Management, WBI Learning Resources Series. P.27.

Svendsen, M., Trava, J., And Johnson III, S.H., (1997). A Synthesis of Benefits and Second Generation Problems. Case Studies in Participatory Irrigation Management (PIM), World Bank Instite (WBI) Learning Resources Series, p.139.

Tekinel, O., (1994). Turkish Experience Of Farm Water Management Techniques. CIHEAM-IAM Publication No:104, Rabat, Morocco.

Tekinel, O., and Aksu, M.L. (1996). Turkish Experiences on Participatory Irrigation Management. CIHEAM/IAM, World Bank, Valenzona, Bari,Italy.

Tekinel, O., and Doorenbos, J., Disengagement policy of the state in Water Resources Management, Economic Aspects of Water Management in the Mediterranean Area, Option Mediterranean, Series A. Number 31.

Tekinel, O., Yazar, A., Kanber, R., (1994). For an Efficient Water Resource Management Possibilities of Farmers Participation Operation and Maintenance of Irrigation Projects in Turkey. International Conference on Land and Water Resources Management in the Mediterranean Region, Institute Agronomic Mediterranean, Bari, Italy.

Ul, M.L., and Dorsan, F., (2002). Development of the irrigation schemes after transfer to water user organizations operated by the public İzmir province Ege University, Faculty of Agriculture Journal 39 (2):135-142.