Participatory irrigation management (PIM) in Turkey: a case study in the Lower Seyhan Irrigation Project

Yazar A.

in

Hamdy A. (ed.), Lacirignola C. (ed.), Lamaddalena N. (ed.).
Water valuation and cost recovery mechanisms in the developing countries of the Mediterranean region

Bari : CIHEAM
Options Méditerranéennes : Série A. Séminaires Méditerranéens; n. 49

2002
pages 191-210

Participatory Irrigation Management (PIM) in Turkey: a Case Study in the Lower Seyhan Irrigation Project

Attila Yazar[1]

ABSTRACT

Turkey began an accelerated program of transferring management responsibility for large irrigation systems to locally controlled organizations in 1993. Within 3 year, the national irrigation agency, State Hydraulic Works (DSI), had succeeded in transferring nearly one million hectares, or 61 % of the publicly-managed irrigation in the country, to local government units or to special-purpose Irrigation Associations (IAs) created at the local level. Important motives driving this fast-paced implementation were (a) rapidly escalating labor costs, (b) a hiring freeze on government agencies, and (c) consequent concern over the agency's ability to operate and maintain systems serving the expanding irrigated area for which it was responsible. Initial results of the transfer included a doubling of irrigation fee collection rates and shifting of O&M expenditures from the public to the private sector, an accumulation of reserves in some Irrigation Associations (IAs) for future capital purchases, a reduced wage bill for system O&M personnel.

This study analyzes the impact of management turnover on irrigation management and irrigated agriculture in selected IAs in the Lower Seyhan Irrigation Project in Adana, Turkey.

Introduction

Since 1954 Turkey has had a legal framework allowing the transfer of management proceeded at a very modes pace until 1993, when the program received new impetus and the rate of transfers accelerated sharply. 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 (Sevendsen *et al*., 1998).

[1] *Çukurova University, Irrigation and Agricultural Structures Department, Adana-Turkey*

Turkey began an accelerated program of transferring management responsibility for large irrigation systems to locally controlled organizations in 1993. Within 3 year, the national irrigation agency, DSI, had succeeded in transferring nearly one million hectares, or 61 % of the publicly-managed irrigation in the country, to local government units or to special-purpose Irrigation Associations (IAs) created at the local level. Important motives driving this fast-paced implementation were (a) rapidly escalating labor costs, (b) a hiring freeze on government agencies, and (c) consequent concern over the agency's ability to operate and maintain systems serving the expanding irrigated area for which it was responsible.

The transfer program was undertaken entirely with existing DSI staff, and was implemented in the field by regional DSI O&M Division personnel. Extensive training and orientation programs were held to acquaint field personnel with the program and approach to be used. A defining feature of the program was the approach of initiating action through existing local government structures and leaders rather than through a campaign of grass-roots organization of farmers. In this respect it differs sharply from many of the management transfer effort which preceded it, especially those applied in Southeast and South Asia (Sevendsen and Nott, 1998).

Initial results of the transfer included a doubling of irrigation fee collection rates and shifting of O&M expenditures from the public to the private sector, an accumulation of reserves in some Irrigation Associations (IAs) for future capital purchases, a reduced wage bill for system O&M personnel, and indications of expansions of irrigated area in some transferred schemes. DSI personnel levels have been strongly resistant to reduction, even with the diminished need for staff as a result of the transfer program, limiting the actual cost savings to the government. There are indications, however, that O&M staff levels are beginning to decline, and significant financial savings by the government may lie ahead. The number of farmer complaints filed by DSI has fallen dramatically in wake of the transfer program. Although it is not known if the number of total complaints has declined, complaints are being handled at a local level rather than by higher level offices of DSI. The transfer program in Turkey is still young and time is required before its true impacts will be known (Svendsen and Nott, 1998).

Second-generation problems and challenges are emerging, though, in the wake of the early successes of this initiative. These can be categorized in terms of the party on which they have their primary effect. Challenges for DSI include (1) the difficulty in reducing overall staff levels in general, and

O&M staff levels in particular, following transfer, (2) the absence of a charging mechanism for bulk water supply to IAs, and the consequent absence of an economic restraint on demands for water and (3) the indistinct vision of a new role for the agency in supporting existing irrigation in the post-transfer era (Svendsen and Nott, 1998).

Emerging problems for IAs include (1) the undefined nature of water rights in Turkey, and the consequent insecurity of their claim on irrigation water, (2) restricted options for obtaining heavy maintenance equipment, (3) the lack of a legal basis for forming federations for IAs for joint purchasing and supplying "lumpy" services such as equipment maintenance, (4) the lack of a clear de *facto policy* on capital cost sharing for rehabilitation (and new system construction), (5) the need to increase direct farmer participation in IA governance and reduce dependence on village and municipal leaders in filling IA leadership roles, and (6) weak support service systems for IAs in some areas and regions (Svendsen and Nott, 1998).

This study analyzes the impact of management turnover on irrigation management and irrigated agriculture in selected IAs in the Lower Seyhan Irrigation Project in Adana. Impacts measured include costs of irrigation to the government and the farmers, quality of irrigation operations and maintenance, agricultural productivity, financial and economic viability of irrigation systems, and social implications of management turnover.

Participatory irrigation management in Turkey

In Turkey, like all over the world, there is two way to operate the irrigation schemes developed by Government;

1. Irrigation management by the Government
2. Irrigation management by local authorities and Water Users Organization (WUOs).

Irrigation management by the Government was the preferred model till the near past. At the beginning of 1960s some small scale irrigation projects, which were isolated and far from the O&M units of the State Hyraulic Work (DSI) had initially transferred to users with in the different approach from the Participatory Irrigation Management (PIM) concept we perceived today. However these studies, that even if they were at a slow pace, gave great contribution to be set up PIM concept. Besides this, major contribution has been provided by the Water User Groups (WUGs) which have actively participated since the same years. Before the accelerated transfer program was commenced, WUGs had been working at DSI

managed irrigation schemes which was accounted for 40 % of command area (Unal *et al*., 1998).

The main underlying reason for accelerating transfer program has been the O&M financial burden for DSI and the Government, which was getting unbearable and unsustainable. The O&M cost recovery (rate of collection of water fees), has been unsaticfactory (about 41%). Considerable increase in the cost of O&M due to the role of unionized labor further aggravated the sitution. The present Government's general policy of promoting privatization was also a contributing factor. Positive results from generally satisfactory O&M of transferred schemes was another important contributing factor, which substantially alleviated the concern that the systems will rapidly deteriorate after transfer (Unal *et al*., 1998).

A pilot program of accelerated transfer was commenced to promote accelerated transfer for the Directorates of Antalya, Adana, Konya and Izmir in Turkey, where DSI officials had shown a higher level of preparation and dedication and farmers were more receptive, considerable internal training, including seminars and workshops significantly contributed to the process. A friendly competition among various regions in promoting successful transfer is another contributing factor. The policy that O&M engineers will not loose their jobs as a result of transfer and knowing that they will play important role after transfer, kept their moral high and promoter's role was played entirely by DSI engineers who interacted very closely with the village and municipality councils and chairmen (Unal *et al*., 1998).

As of end of 1997, a total of 4.05 million ha (net) have been equipped with irrigation infrastructure in Turkey. Of this, DSI has developed 1.74 million ha, mainly under large schemes, General Directorate of Rural Service (GDRS) has developed 0.92 million ha as minor schemes, DSI and GDRS have jointly developed 0.32 million ha served from grounwater supply, and farmers individually have developed 1.07 million ha. As of end of 1997, DSI has transferred about 1.28 million ha area which corresponds to 74 % of the total area (1.74 million ha) developed by itself. That figure reached 1.42 million ha at the end of July 1998 (Unal *et al*., 1998).

Tekinel and Aksu (1999) provided a discussion on PIM practices in Turkey. In this paper titled as “Participatory Approach in Planning and Management of Irrigation Schemes” they explained Turkish experiences with users' participation and the full transfer of irrigation systems to user and highlighted the recent achievements of the State Hyraulics Works (DSI) since 1993 in the process of transfer of irrigation systems to users and pursuing a plan to be completed the transfer of a total area of

approximately 2.5 millions ha by the end of the year 2 000. Beyond all expectations, DSI has shown a remarkable success and has transferred areas, which have already reached over 1 483 931 ha at the beginning of January 1999. Transfer of irrigation systems to users was started at a slow pace in the early 1950s and until 1993, small schemes were gradually transferred to users every year with an annual average total area of about 2 000 ha. DSI was also encouraging participatory approach through establishing Irrigation Groups (IGs) or Water Users Groups (WUGs) with limited responsibility for O&M. Considerable increase in the cost of O&M due to the role of ununionized labor further aggravated the situation. The general policy of the present Government for promoting privatization is also a contributing factor and the positive results of transferred schemes with generally satisfactory O&M encourage future schemes.

Impact of Irrigation Management Transfer

The principal reason for promoting transfer programs is to reduce the cost of irrigation management for the government. There is little evidence however, to suggest that irrigation management transfer policies affect overall government expenditure in the water or agriculture sectors of developing countries. Consequently there needs to be a more detailed examination of the sector-level impacts of transfer policies to ascertain if transfer actually reduces the cost of irrigation to the government (Vermillion, 1997).

Where significant government subsidies existed before transfer, increases in the cost of irrigation to farmers are recorded after transfer. Following transfer, there are usually reductions in the numbers of government irrigation agency staff at system and administrative levels. The preferred method of reducing staff is to wait until employees retire. When governments reduce staff at the same time as transfer, staff may be released or relocated to other government system.

No time series trend analyses or simple "before and after" comparisons of fee collection rates following transfer can be found in the literature. In the few instances where fee collection studies are recorded, substantial increases -over 50 percent- in water fee collection rates are reported (Vermillion, 1997; Tekinel *et al.*, 1999; Unal *et al.*, 1998).

Institutional Framework for Irrigation in Turkey

The institutional framework for Government and other public responsibility for irrigation and drainage is summarized below:

Ministry of Agriculture and Rural Affairs (MARA)

According to the establishment law and subsequent revisions, the Ministry of Agriculture and Rural Affairs is responsible for the development of agriculture, stockbreeding, various socioeconomic services and the establishment of certain sub-surface facilities, within rural development plans.

The major responsibilities covered in the laws concerned are related to the promotion, completion, input supply and the extension of all aspects of agriculture including irrigation and drainage, operation and maintenance of irrigation projects for the farmers.

General Directorate of Rural Services (GDRS)

The General Directorate of Rural Service (GDRS) was establishment in 1984 by incorporating the following existing organizations: the Soil Conservation and Irrigation Organization (TOPRAKSU), the Rural Settlement Organization, the Rural Roads and Water and Electricity. New laws are urgently required, especially in relation to on-farm development (land consolidation included).

State Hydraulic Works (DSI)

The law establishment DSI (Law no 6200) and subsequent amendments include a number of items relevant to the panning, design, construction, operation and maintenance of irrigation and drainage systems. While the legal basis for the O&M and On-farm Development activities needs to be better defined and perhaps broadened. Existing laws appear to provide enough power for the Authorities to take action in cases such as formation of Irrigation Associations (IAs), protecting from damaging of DSI systems and etc.

The General Directorate of Agricultural Reform (GDAR)

The General Directorate of Agricultural Reform, which is a General Directorate of the Ministry of Agriculture and Rural Affairs is involved indirectly in irrigation and drainage. Its main responsibilities are:

- Determining the priority areas for the land after detail investigations and surveys,
- In the land reforms areas, to distribute registered land to farmers in need under the Government authority, not required for public services,

- To provide the equipment, support and training for these farmers and encourage them to establish farmers organizations,
- To consolidate the land into more economic units (Tekinel and Aksu, 1999).

Forms of Organizations for Transfer of Irrigation Projects

DSI's transfer program is based on shifting O&M responsibilities to local administrations, to Irrigation Associations which are based on local administrations, and, occasionally, to cooperatives. Irrigation Associations differ from villages and municipalities, though, in that the IA constitutes a new institution with a legal personality that is distinct from any existing government body.

Transfer to Village Organization

This is a form of transfer where the irrigation scheme serves only a single village:Village Head (Muhtar) is the natural chairman of this organization and the transfer agreement is undersigned by DSI and Muhtar and submitted to the Minister of Public Works and Settlement for approval.

Transfer to Municipal Organization

This is form of transfer where the irrigation scheme serves only a single municipal unit. In this organization Mayor is the natural charman of the IA and the agrement of transfer is undersigned by DSI and Mayor and submitted to the Minister and Public Works and Settlement for the approval.

Transfer to Irrigation Association

An irrigation scheme can be transfer to an Irrigation Association where there are more than one local administrative units (village, legal entities, municipalities) within one irrigation scheme.These Irrigation Associations are established under a state which has to be approved by the Council Of Ministers. For large areas, this is considered to be the most appropriate organization.

Transfer to Cooperatives

These organizations are established under the Cooperatives Law and it is mandatory that a legal cooperative to be formed at the request of a minimum of 15 farmers before a scheme is undertaken.

Description of Irrigation Associations in the Lower Seyhan Irrigation Project

The project is located in the Mediterrenean Region in the south of Turkey. The area is bounded by the Ceyhan River on the east, Berdan River on the West, The Taurus Mountains on the north (limited by the 61-m countour line) and by the Mediterrenean sea on the south. The plain is divided into two sections by the Seyhan River, the western part is called as Tarsus Plain, the eastern part is called as Yuregir Plain.

Most of Irrigation Associations (IAs) were set up in 1994. Other Irrigation Associations completed their establishment in 1995 and 1996. Command area of IAs varied from 1864 ha to 16890 ha. The number of farmers varied from 205 to 4149. The number of plots ranged from 348 to 9805. Table 1 summarizes description of Irrigation Associations in the Lower Seyhan Irrigation Project.

Operation and Maintenance by Irrigation Associations

Association operations practices are largely variations of the practices employed by DSI prior to transfer. Operations begins with the list of water users in the unit, which was supplied by DSI at the time of transfer. In May or June of each year, farmers fill out water demand forms for the coming season, which show the area to be irrigated, the crop to be grown, and the name of the farmer. The farmer must countersign this form and is given a copy as a receipt. In the IA office, these are consolidated into a billing record for the season. If there are several IA units sharing a water source, DSI will usually call a meeting of all involved IAs in the spring.

At present, operating responsibilities in virtually all larger schemes are shared between DSI and IAs. DSI operates all dams and barrages and the supply canals which serve several different IA units. They take the lead in planning, with IAs, the irrigation calendar for the year. They measure flows at major diversion points under their control and solicit monitoring information from the IAs at the close of the season. DSI also operates any drainage pumping works which may be present in the scheme, both vertical and horizontal drainage. For their part, IAs schedule and deliver water to water users within their service units, collect monitoring information for their own purposes and as requested by DSI, monitor water deliveries day and night, and resolve disputes.

Table 1. Description of Irrigation Associations in the Lower Seyhan Irrigation Project

Name of IA	Establishment Year	Main Canal	Irrigation Area(ha)	Number of Municipalities	Number of IA council	Number of Farmers	Number of Plots
Cumhuriyet	1994	YSO-8	2655	5	17	795	1277
K.Yüregir	1994	YS1	4860	9	35	1290	1362
Akarsu	1994	YS2	8943	10	51	2423	1359
Cotlu	1994	YS4	2425	9	29	820	399
G. Yuregir	1994	YS3-YS5	16890	23	69	1812	3776
Gokova	1994	YS6	4289	10	30	540	913
Gazi	1994	YS7	6394	13	39	600	1154
Kadikoy	1994	YS8	9808	19	57	913	1571
Yenigok	1994	YS9	1864	7	21	205	348
Toroslar	1995	TS1-TS2	13700	22	56	4149	9805
Yesilova	1994	TS3	3740	4	20	427	680
Cukurova	1996	TS3	6847	12	83	1701	3113
Y. Seyhan	1996	TS3	4895	8	34	723	1554
Seyhan	1994	TS3	3610	7	19	626	872
Altinova	1995	TS5	6150	10	27	684	1147
Pamukova	1995	TS6-TS7	12037	18	51	2044	4862
Onkoy	1994	TS8-TS10	11983	10	36	1667	2790

Routine maintenance and repair is carried out in the spring, prior to the start of the irrigating season. Included in maintenance are cleaning of canals, canalets, and syphons; replacement of broken canalet sections; repairing cracks in canal linings; clearing grass and weeds; grading roads; and repairing and maintaining gates.During the transition phase, there is a gradual shift in responsibility from DSI to the IA, with the pace dependent on the rapidity with which the IA develops the capacity to carry out various maintenance tasks. Capacity is, in turn, dependent on employment of technical staff, staff training, acquiring equipment, and generating financial resources to cover variable maintenance costs.

These shifting responsibilities are best described in terms of scheme levels. During the first post-transfer year, an IA typically takes on responsibility for cleaning secondary and tertiary lined and unlined canals, canalets, syphons, and drains within the IA unit; cutting grass and weeds; and repairing minor cracks in canal linings. DSI maintains water storage and diversion structures, shared main canals and main drains, and repairs all levels of canalets. During the second year, the IA may assume limited responsibility for canalet repair, perhaps using DSI machinery while supplying labor and fuel. As an IA acquires lifting and transport equipment of its own, more *canalet* repair responsibility will devolve to the IA, until transfer of maintenance and repair responsibility within the IA unit is complete.

Finances

Data on the finances of 17 IAs in the Lower Seyhan Irrigation Project was obtained from monitoring reports for 1998 prepared for the DSI O&M Department. This data provide useful insights into the way IAs are managing their finances. Irrigation Associations (IAs) obtain income from six main sources. These are given as follows:1) Irrigation fees, 2) Membership fees, 3) Revenues from the supply of goods and services such as contract machinery hire, 4) Fines, 5) Interest revenue, 6) Donations.

Setting and collecting fees

In the Lower Seyhan Irrigation Project, water charges are based on the type of crop grown and area to be irrigated. This practice also encourages farmers to over irrigate their fields. If water taxes are charged to farmers on the basis of volume of water used, then farmers would have been very careful about not using excess amount of water. However, structures exist at farm outlets on tertiary canals.

IAs have adopted an improved version of the previously used system, by DSI with different fee rates charged for different crops or groups of

crops. Rates are set annually at a general assembly meeting held in May or June for the current irrigation season. Prior to the meeting, the chairman and the executive committee prepare a proposed set of fees, based on expected expenditures, which is presented to the general assembly for its approval. This proposal is developed in consultation with DSI staff. Irrigation fees ranges from 14 000 000 TL to 40 000 000 TL per hectare in most of the IAs except Cumhuriyet IA. In Cumhuriyet IA, due to the pumped irrigation, irrigation water fees are set higher than those in other IAs.In additional the average fee assessment per hectare for selected IAs from 1998 to 1999 are given in table 3. The weighted average fee assessment per hectare irrigated ranged for TL 8,819 million (US$ 33,91) and TL 33,586 (US$ 80,43).

In DSI-managed schemes, the first installment of fees are due on the first in March, 19 months after the harvest for which the fees have been assessed. The second installment is due 2 months later. Payments not received by that date are subject to a once-of penalty of 10 percent of the fees due. Fees are collected by Ministry of Finance collection agents attached to DSI's regional offices.

IA have generally been significantly more stringent in setting payment timetables, in their insistence on payment, and in charging substantive penalties for late payment. Timetables set by IA vary widely, from requiring full payment before the first irrigation, to payment in two or three installments during the course of the irrigation season, to payment within 3 or 4 months of harvest. Some IAs say that they will refuse water delivery to anyone who has not paid their fees.

Others say they will continue to supply water but will pursue payment in court if necessary. A number of court cases against non-payers have already been brought by IAs. All IAs charge a penalty for late payment of 10 percent per month (not compounded) which generally matches or exceeds the rate of consumer price inflation.

The determination of fees due is made by first preparing a map of all the irrigated parcels in the schemes and then registering the name of the irrigator (owner or tenant), the area, and the crop for each parcel. Prior to the beginning of the irrigation season, farmers fill out a demand form (also called an irrigator information form) giving details about their planned cropping pattern, area to be irrigated, and location within the channel system. During the season, farmers submit irrigation request slips indicating when they would like water to be delivered and for what area and crop. These forms and slips are used for scheduling water deliveries and for creating a record of irrigators who are liable to pay irrigation fees.

Table 3. Average Fee Assessments per hectare for Selected IAs, for1998 and 1999

Name of IA	1998				1999			
	Irrigated Area (ha)	T.Fee Assess. Mil. TL	A.Fee Assess. Mil.TL/ha	A.Fee Assess US$/ha	Irrigated Area (ha)	T.Fee Assess. Mil. TL	A. Fee Assess. Mil. TL/ha	A. Fee Assess. US$/ha
Cumhuriyet	2030	36000	17,734	68,20	1812	45000	24,834	59,47
K. Yuregir	3635	42000	11,554	44,43	3278	69000	21,049	50,41
Akarsu	8031	83000	10,335	39,74	7062	109000	15,435	36,96
Cotlu	1900	39000	20,526	78,93	1846	62000	33,586	80,43
G. Yuregir	16480	165000	10,012	38,50	14595	228000	15,622	37,41
Gokova	4366	46000	10,536	40,52	4081	54000	13,232	31,69
Gazi	5694	65000	11,416	43,90	5606	86000	15,341	36,74
Kadikoy	9045	87000	9,619	36,99	8536	121000	14,175	33,95
Yenigok	1846	53000	28,711	110,41	1681	43000	25,580	61,26
Toroslar	13903	146000	10,501	40,38	12727	239000	18,779	44,97
Yesilova	2889	32000	11,076	42,59	2415	46000	19,048	45,61
Çukurova	5591	52000	9,301	35,77	5554	101000	18,185	43,55
Y. Seyhan	4151	40000	9,636	37,06	3722	62000	16,658	39,89
Seyhan	3307	32000	9,676	37,21	3112	49000	15,746	37,71
Altinova	5307	49000	9,233	35,51	5068	73000	14,404	34,49
Pamukova	11566	102000	8,819	33,91	10342	144000	13,924	33,34
Tarsus Onkoy	9364	95000	10,145	39,01	8358	124000	14,836	35,53

NOTE : TL Indicates Turkish Lira ; Exchange Rate : US$ 1.00 = TL 260 039 (for 1998) ; US$ 1.00 = TL 417 580 (for 1999)

Fee collection may take place in the village, with IA staff making a collection round at the time payments are due, or at the IA office. All payments are in cash (as opposed to collection in-kind). Sheets listing the amount due from each irrigator are posted in commonly frequented meeting places such as coffee houses and mosques.

Expenditure Patterns Across IAs

Recurrent expenditures are reported on the O&M monitoring forms used by DSI under headings for personnel, machinery and equipment, maintenance and repair, taxes and other. Table 4 shows distribution of capital and operating costs for selected Irrigation Associations, in 1999. Of total expenditures, the largest share went toward personnel (46,4 percent) and (19 percent) are allocated for maintenance and repair. Table 4 shows the allocation of O&M expenditures for selected Irrigation Associations in 1999 of the total maintenance and repair cost 36,5 percent are for concrete repairs, with the next two most important categories being cleaning (34 percent) and service road repair (13,8 percent). Irrigation Associations should allocate 40 % of their annual budget for repair and maintenance; 30 % of it for personnel expenditures. In table 4, an average of 46.4 % of their budget were spend for personnel, and 19 % for repair and maintenance. Thus, budget allocated for repair and maintenance was well below that should be allcated (40 %). The reason for this could be the number of personnel hired by IAs were higher than required. Political desicions are also effective in this situation.

Results of Irrigation Management Transfer

O&M Costs

Operation and maintenance expenditures insured by State Hydraulic Works (DSI) were subject to repayment in accordance with its Establishment Law (No : 6200). Complying with this law, repayment schedules are prepared by DSI. In principle, O&M charges were set by DSI. For a given year the payment consists of 100 % of actual O&M costs of previous year (not indexed to inflation). Water rates were charged on cropped-area basis (with different rates). O&M costs and collection rate of water charges by DSI prior to transfer are shown in Table 5. As shown in table, the actual amount collected falls far short of the asseessed amount. This was due to the inadequate penalty for late payment. Recently, amendments have been proposed to the Establishment Law in relation to

Table 4. Distribution of Capital and Operating Costs for Selected IAs, in 1999 (Million Turkish Lira)

Name of IA	Personnel	Energy	Machine & Equip.	Other Operation	Maint. & Repair	Furniture & Equipmen	Vehicle	Work Machine	Taxes	Other	Total
Cumhuriyet	16360	6250	2641	540	4610	829	-	-	-	27	31257
K. Yuregir	39180	-	7409	3230	5313	-	-	-	-	2460	57592
Akarsu	53484	53484	13143	4155	13674	29	-	-	550	-	138519
Cotlu	20610	-	2278	4491	2798	-	1163	-	-	3022	34362
G. Yuregir	90400	-	9581	141	36250	461	-	75000	-	-	211833
Gokova	25222	-	5000	3850	13898	5750	-	-	-	-	53720
Gazi	35283	-	10672	2082	10398	852	-	13150	-	7258	79695
Kadikoy	59262	-	9178	3206	26162	3726	-	-	190	5149	106873
Yenigok	20621	-	1811	1365	4868	-	-	-	-	2626	31291
Toroslar	100717	5269	34494	7363	33685	122	-	-	-	5220	186870
Yesilova	29659	1075	2029	1867	7316	1234	-	-	144	395	43719
Çukurova	51908	450	27650	1725	92355	2090	7300	1300	1008	8540	194326
Y. Seyhan	23670	-	6966	2482	8320	320	1480	51175	3600	3000	101013
Seyhan	24013	100	62560	6028	8537	66	5669	-	-	-	106973
Altinova	33260	-	3668	1350	4663	250	-		-	1400	44591
Pamukova	72745	-	19600	2500	21672	52	-	-	-	8	116577
Onkoy	69549	3605	13804	2976	18866	236		-	787	1219	111042
Total	765943	70233	232484	49351	313385	16017	15612	140625	6279	40324	1650253
Share (%)	46,4	4,3	14,1	3,0	19,0	1,0	0,9	8,5	0,4	2,4	100,0

late payment of water charges. Political and administrative factors have contributed to government O&M fee collection rates average only 37,6 % between 1989 and 1994 in table 5.

Irrigation Association (IA) O&M fee collection takes place against a background of government laxness in the pursuit of irrigation fees. Thus, O&M fee collection rates for selected Irrigation Associations (IAs) averaged 85.6 % between 1994 and 1998 as shown in table 5. The numbers over 100 %, includes penalties for late payment of irrigation fee are monthly 10 % penalty is applied for the late payments. IAs are established according to Municipality law (Number :1580, article 133 and 148), Village Law (Number : 442, article 47 and 48) and Provincial Administration Law (Number : 5442, article 56). So that all IAs, charge a penalty for late payment of 10 percent per month, generally matches or exceeds the rate of consumer price inflation.

Table 5. O&M Cost Recovery for DSI-Operated Systems, (in thousand Turkish Lira)

Year	Collectable	Collected	Collection Percentage (%)
1989	44181	16964	38,4
1990	65786	24276	36,9
1991	109408	35860	32,8
1992	175676	58319	33,2
1993	255342	107295	42,0
1994	435598	183280	42,1
Average			37,6

Irrigation Performance

Irrigation ratio is defined as the ratio of actually irrigated area to command area in each IA. The lowest irrigation ratio is 48,8 percent in Tarsus Onköy IA and the highest irrigation ratio is 98 percent in Gökova IA in 1996. Also, in 1997, irrigation ratios changed between 68,5 and 93,9 percent. Irrigation ratios varied from the lowest ratio of 74,8 % to the highest ratio 101,8 % in 1998. Irrigation ratios ranged from 64,6 % to 95,2 % in 1999. Last year, the lowest irrigation ratio was 50,3 % and the highest one was 97 % (Table 6 and 7).

Cropping Patterns

Crops grown under DSI developed irrigation in Turkey are dominated by cotton, cereals, maize, and sugar beets, which together comprise nearly two- thirds of the mix. Table 9 shows average cropping pattern in DSI irrigation schemes, 1991-1995.

Table 6. Irrigated Area and Irrigation Ratio, by years

Name of IA	Irrigation Area(ha)	1996		1997		1998		1999		2000	
		AIA (ha)	IR (%)	AIA (ha)	IR (%)	AIA (ha)	IR (%)	AIA (ha)	IR (%)	AIA (ha)	IR (%)
Cumhuriyet	2655	1471	55,4	1819	68,5	2030	76,5	1812	68,2	1874	70,6
K. Yuregir	4860	3750,5	77,2	4129	85,0	3635	74,8	3278	67,4	3365	69,2
Akarsu	8943	8141	91,0	8015	89,6	8031	89,8	7062	79,0	6631	74,1
Cotlu	2425	2128	87,8	2092	86,3	1900	78,4	1846	76,1	1698	70,0
G. Yuregir	16890	14683	86,9	15402	91,2	16480	97,6	14595	86,4	14914	88,3
Gokova	4289	4205	98,0	4009	93,5	4366	101,8	4081	95,2	3834	89,4
Gazi	6394	5813,3	90,9	5749	89,9	5694	89,1	5606	87,7	5648	88,3
Kadikoy	9808	9118	93,0	8954	91,3	9045	92,2	8536	87,0	8273	84,3
Yenigok	1864	1774,5	95,2	1751	93,9	1846	99,0	1681	90,2	1821	97,7
Toroslar	13700	12894	94,1	10486	76,5	13903	101,5	12727	92,9	6893	50,3
Yesilova	3740	2666	71,3	2786,9	74,5	2889	77,2	2415	64,6	2599	69,5
Çukurova	6847	5848,9	85,4	5887,9	86,0	5591	81,7	5554	81,1	5601	81,8
Y. Seyhan	4895	4221,7	86,2	3988,6	81,5	4151	84,8	3722	76,0	3613	73,8
Seyhan	3610	3199,9	88,6	3272	90,6	3307	91,6	3112	86,2	3042	84,3
Altinova	6150	5431	88,3	5219,5	84,9	5307	86,3	5068	82,4	5178	84,2
Pamukova	12037	10555	87,7	10736,4	89,2	11566	96,1	10342	85,9	10498	87,2
Onköy	11983	5849	48,8	11026,9	92,0	9364	78,1	8358	69,7	7929	66,2

AIA : Actually irrigated area ; IR : Irrigation ratio
SOURCE : The Lower Seyhan Irrigation Associations Data, 2000

Table 7. Irrigation Performance in the Selected IAs for 1999

Name of IA	Irr. Eff (%)	Req.Ratio	N.I.R*	G.I.R*	W.S.I*
Cumhuriyet	35.6	1.55	9.494	17.184	26.657
Kuzey Yuregir	47	1.18	20.552	37.199	44.031
Yuregir Akarsu	49	1.12	37.651	68.147	76.719
Cotlu	43.8	1.26	10.009	18.115	22.846
Guney Yuregir	36.1	1.53	95.104	172.134	263.575
Gokova	45	1.23	20.180	36.530	44.821
Gazi	29.7	1.85	36.608	66.259	123.189
Kadikoy	55	1.01	54.074	97.871	98.918
Yenigok	53	1.04	21.170	38.317	39.893

SOURCE : The Lower Seyhan Irrigations Associations Data, 2000

In the cropping pattern prior to turnover of management to IAs, maize and cotton were two major crops grown in the LSP area. Percentages of each crop changes due to price and marketing conditions.

Table 8. Irrigated Areas and Cropping Pattern in DSI Area Between 1991-1995

Type of Crop	Area planted (ha)					Cropping pattern (%)				
	1991	1992	1993	1994	1995	1991	1992	1993	1994	1995
Soybean	27528	18264	18274	25821	26752	13	7	8	16	11
Melons	16421	13719	4605	6866	9235	8	6	2	4	4
Cotton	52215	53874	26716	344586	87906	24	22	11	21	36
Peanut	8236	6776	6951	8326	11518	4	3	3	5	5
Maize	61031	77112	121770	50696	62309	29	31	51	30	26
Vegatables	10646	10724	10215	7082	8758	5	4	4	4	3
Citrus	16998	17558	18607	18311	22230	7	7	8	11	9
Other	20262	46936	29930	13893	15727	10	20	13	9	6
Total	213337	244963	237068	165581	244435	100	100	100	100	100

Table 9. Fee Collection Rates for Selected IAs by Years

Years	1998			1999		
Name of IA	Collectable	Fee Collected	Collection Percentage (%)	Collectable	Fee Collected	Collection Percentage (%)
Cumhur	36683	28769	78,4	45407	38242	84,2
K. Yuregir	52217	34422	65,9	68761	42847	62,3
Akarsu	84592	65601	77,5	109427	76626	70,0
Cotlu	29877	22255	74,5	61631	33044	53,6
G. Yuregir	165715	86469	52,2	228534	186000	81,4
Gokova	46454	36167	77,9	53777	54984	102,2
Gazi	64946	57260	88,2	86150	76571	88,9
Kadikoy	85109	65278	76,7	121262	102254	84,3
Yenigok	25499	41438	162,5	42513	79140	186,2
Toroslar	106214	123923	116,7	239145	186433	78,0
Yesilova	31434	24708	78,6	46500	40620	87,4
Çukurova	48395	74574	154,1	101000	83386	82,6
Y. Seyhan	38703	34720	89,7	61706	54087	87,7
Seyhan	32036	25792	80,5	49150	37201	75,7
Altinova	48684	46499	95,5	73378	71991	98,1
Pamukova	105533	88700	84,0	144469	95079	65,8
Onkoy	80432	69182	86,0	155000	95364	61,5
Average			90,5			85,3

NOTE : TL Indicates Turkish Lira ; Exchange Rate : US$ 1.00 = TL 81 137 (for 1996)
US$ 1.00 = TL 151 428 (for 1997) ; US$ 1.00 = TL 260 039 (for 1998); US$ 1.00 = TL 417 580 (for 1999)

Summary and conclusion

Some outcomes of the transfer program are evident at this early stage, while others will not be assessable yet for several years. Public costs of O&M have begun to fall and will very likely continue to do so over the next few years. Private costs have increased and will likely continue to increase as more and more responsibility is transferred to local agencies. Cost recovery has improved dramatically. DSI O&M staff levels have fallen marginally, though more dramatic declines will depend on resolving issues of transfer and termination with the powerful unions representing DSI support staff. Associations have gained control over many operational decisions and secured the opportunity to stabilize and improve system performance. The impacts of transfer on quality of irrigation service are not yet assessable, though early of the system they manage beyond previous averages. And important issues of future sustainability remain. Still, in comparison with efforts in other countries, the early achievements of the ATP in Turkey show considerable promise for achieving objectives held bold by the government and by local associations.

Second-generation problems and challenges are already emerging in the wake of the early successes of this initiative. These can be categorized in terms of the party on which they have their primary effect. Challenges for DSI include (1) the difficulty in reducing overall staff levels in general, and O&M staff levels in particular, in the wake of transfer, (2) the absence of a charging mechanism for bulk water supply to IAs, and the consequent absence of an economic restraint on demands for water, and (3) the indistinct vision of a new role for the agency in supporting existing irrigation the post-transfer era.

Emerging problems for IAs include (1) the undefined nature of water rights in Turkey, and the consequent insecurity of their claim on irrigation water, (2) restricted options for obtaining heavy maintenance equipment, (3) the lack of a legal basis for forming federations of IAs for joint purchasing and supplying "lumpy" services such as equipment maintenance, (4) the *de facto* lack of a clear policy on capital cost sharing for rehabilitation (and new system construction), (5) the need to increase direct farmer participation in IA governance and reduce dependence on village and municipal leaders in filling IA leadership roles, and (6) weak support service systems for IAs in some areas and regions.

The flexible and pragmatic conduct of the transfer program to date, and the enthusiasm and capability apparent in many association leaders, offers reason for confidence that problems will be met and addressed. In some areas action is already underway. A World Bank loan currently being

appraised will help to ease the equipment constraint with subsidized purchase arrangements for IAs. The water rights situation, on the other land, presents a potential problem of major dimensions which will require upper-level action, and time, to remedy. Other constraints will require concerted action by DSI, IAs, and other organizations. The real danger is that of complacency, in which the government washes its hands of 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.

The main benefit to the state from transfer is to remove the O&M financial burden from DSI and thus from the Government. Transfer of each ha of irrigated land to users substantially reduces the need for the government O&M expenditures and the related cost recovery.

Farmers' feeling a sense of ownership in transferred schemes has resulted in a better protection of the irrigation infrastructure which eventually leads to reduced maintenance and repair requirements.

Water User Organizations (WUOs) have generally demonstrated the ability to operate and maintain the systems satisfactorily through recruiting required staff, buying urgently needed transportation and communication equipment, assessing and collecting water fees, equipping their offices and substantially improving water delivery at cost generally less than that incurred by DSI.

In calculating the water requirements of crops, growing periods of crops should be followed very closely and water use programs are to be reorganized accordingly. In the irrigated area, water is overused. This problem related with management is farmers unwillingness toward night irrigation. Farmers traditionally have practised only day time irrigation. As a result of this practise, water in the irrigation channels is directly dumped to drain ways during night hours and approximately one-third of released water from the dam is wasted. Farmers should be trained on the optimum use of water.

The effficient coordination has to be established among related agencies to increase in the rate of irrigation. Some restrictions and criteria should be established on the amount of land and number of personnel to be employed in order to enhance productivity. Great importance should be given to the training of farmers. Especially, irrigated land should be prevented to use non-farm purposes.

References

DSI, (2000). Monitoring and evaluation report for transferred schemes. Adana : DSI 6th Regional Directorate. Transfer Section (Turkish).

Svendsen, M., Trava, J. and Johnson Iii. S. H. (1997). Participatory Irrigation Management: Benefits and Second Generation Problems. Lessons from an International Workshop held at Centre International de Agricultural Tropical (CIAT) Cali, Colombia 9-15 February, 1997.

Svendsen, M, and Nott, G. (1998). Irrigation Management Transfer in Turkey: Process and Outcomes. Advanced Short Course on: Capacity Building for Participatory Irrigation Management (PIM). Valenzano, BA (Italy) 7-23 September 1998. PIM- Case Studies, v. 2 p. 59-60.

Tekinel, 0., Yazar, A. and Kanber, R., (1994). For an Efficient Water Resource Management Possibilities of Farmers' Participation in Operation and Maintenance of Irrigation Project in Turkey. International Conference on Land and Water Resources Management in the Mediterranean Region v. 4. Bari,(Italy). 4-8 September 1994.

Tekinel, 0. (1999). Participatory Approach in Planning and Management of Irrigation Schemes. Advanced Short Course on Integrated Rural Water Management; Agricultural Water Demands. September 20-October 2, 1999, Adana, Turkey.

Unal, A. A., Ince, 0. and Sahin, L. (1998). Participatory Irrigation Management (PIM) Activities in Turkey. Advanced Short Course on: Capacity Building for Participatory Irrigation Management (PIM). Valenzano, BA (Italy) 7-23 September 1998. PIM in the Mediterranean Countries, v. 3 p. 29-31.

Vermillion, D. L. (1997). Impact of Irrigation Management Transfer. Research Report 11. Colombo, Sri Lanka: IIMI.