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TURKISH EXPERIENCES ON PARTICIPATORY IRRIGATION MANAGEMENT

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SUMMARY - This paper deals with Turkish experiences with users' participation and the full transfer of irrigation systems to users and highlights the recent achievements by the end the of year 2001. Transfer of irrigation systems to users had 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. General Directorate of State Hydraulic Works (DSI) was also encouraging participatory approach through establishment of Irrigation Groups (IGs) or Water User Groups (WUGs) with limited responsibility for operation and maintenance (O&M). The main reason for accelerating transfer program has been the financial burden of O&M for DSI and the Government, which became unbearable and unsustainable. The O&M cost recovery rate of collection of water fees has also been unsatisfactory (about 42%). Considerable increase in the cost of O&M due to the role of un-unionized 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.

Key words: irrigation systems transfer, operation and maintenance, Turkey.

INTRODUCTION

There has been a substantial development and improvement, both in terms of expansion of arable land and increased agricultural production in the agricultural sector since the foundation of the Republic of Turkey in 1923. During this period, agricultural land increased from 11.7 million ha up to 28.5 million hectares, which reflects a 2.5 times increase in the total arable land. The population of the country on the other hand, has reached to about 65 millions from 10.5 millions in early 1920s marking an increase of 6.5 times. Furthermore, the productivity and the net income per hectare have gone up 2-10 and 10- 20 times respectively, depending on the variety of agricultural products. Turkey has become one of the 7 or 8 countries in the world, which was self sufficient for food and agricultural products till the last 5 years. Detailed soil surveys, selection of alternate land utilization patterns and maintenance of the most suitable patterns in every stage of irrigation projects, skilled soil management, accurate determination of water supply and size of the project area, efficient application of irrigation water, efficient and durable drainage systems, effective extension services and the other necessary technical amendment are necessary for the realization of high yielding, persistent and successful irrigated farming. Irrigation has a vital role in increasing and stabilizing agricultural production in Turkey because of scarcity and unreliability of rainfall conditions prevailing during growing season in most part of the country. The annual potential of rivers is calculated as 186 billion cubic meters and a certain level of runoff is to be allocated for water requirements of neighboring countries. The amount of flow that can be used for consumptive purposes is estimated to be around 95 billion cubic meters.

Together with the 13.66 billion cubic meters of useable ground water resources total available water resource of Turkey is around 108.66 billion cubic meters. At present 36.5% of the total land in Turkey is suitable for agriculture 27.6% meadows and pasture-lands and 25.9% is forest. Of the total irrigable area 35% is under irrigation. Only 16% of total water resources is used for irrigation and other purposes. Economically viable irrigation is possible for only 8.5 million hectares (Table 1). Prime attention must be given for appropriate irrigation, since heavily irrigated lands may become salty and unsuitable for agriculture (Table 2).

Table 1. Land and water resources of Turkey at January 1st, 2003 (Source: DSI, 2003)

Land resources	
Total Area	77.95 million ha
Arable Land	28.05 million ha
Irrigable Land	25.85 million ha
Economically Irrigable Land	8.50 million ha
Water resources	
Average Annual Precipitation	642.6 mm
Total Precipitation	501.0 km^3
Total Run-off	186.05 km^3
Run-off Coefficient	37 %
Usable Surface Run-off	95.0 km^3
Safe Yield of Groundwater	13.66 km^3
Total Usable Potential	108.66 km^3

Table 2. Irrigation Development at January 1st, 2003 (Source: DSI, 2003)

2,340,197 ha	developed by DSI
1,002,238 ha	developed by GDRS
1,000,000 ha	developed by farmers and others
4,342,435 ha	total irrigated area

INSTITUTIONAL FRAMEWORK FOR IRRIGATION IN TURKEY

The institutional framework for Government and other public responsibility for irrigation and drainage in Turkey includes several institutions as 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 established 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 establishing DSI (Law no 6200) and subsequent amendments include a number of items relevant to the planning, 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 Water Users Groups (WUGs), 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 reform after detail investigations and surveys;
- in the land reform 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; and
- to consolidate the land into more economic units.

IRRIGATION DEVELOPMENT

Government Supported Irrigation

Government-supported irrigation, which has been pursued since the middle of the century and still continues to receive firm governmental attention, has contributed substantially to agricultural growth. The reasons for devoting substantial investments to irrigation lie mainly in the nature of existing ecological conditions and the potential gains in production and employment which can be realized in irrigated agriculture. The critical growing period for most of the crops is between June and August when most of the rivers carry base flows only. Water storage is therefore indispensable and almost 70% of major irrigation projects are fed with water from reservoirs or lakes.

Operation and maintenance of irrigation projects

The success of operation of irrigation schemes should be evaluated on the basis of farmer satisfaction. In 25% of the irrigation schemes, covering 10% of the irrigable area of Turkey serious water shortages occur. Such water shortages are generally the result of deficiencies in irrigation system and limited water availability. However, they are aggravated when of proper water management is not practiced.

Basically, two methods are available for water distribution; the on-demand method and the supply method. Although in Turkey officially the on-demand method is practiced, in actual fact the supply method is adapted in most projects. Irrigation schemes are designed according to the cropping pattern established in the Feasibility Reports. However, in practice cropping patterns show annual variations, creating big problems during the operation. In monoculture areas peak water demands often occur at the very same time which creates water scarcity, when the supply method is applied, i.e. DSI decides when to release water.

Another problem is that irrigation projects are normally designed for 24 hour irrigation, however, most farmers prefer to irrigate during daylight hours only causing most of the water delivered at nights go to the drainage system. Because of the on-demand water distribution with the manual upstream water control in main systems, the upstream farmers gain big advantage using more water than their needs and violating the downstream farmers rights.

The rate of project implementation by the General Directorate of State Hydraulic Works (DSI) is of the order of 100,000 ha per annum, but projects take much longer to complete than predicted time due to interruptions caused by budgetary constraints. Also, on-farm development, which is carried out by the General Directorate of Rural Services (GDRS), is often not synchronized with construction upstream. Operation and maintenance (O&M) services are chronically under-funded. Although officially water users cover all O&M costs, in practice less than 40% of the cost are caused by such operational problems. The general question of the financing of irrigation is extremely complex, involving economic, social, political and technical factors. Whether other sectors of the economy can continue to subsidize irrigated agriculture to the order of 90% of cost is a policy matter to be addressed. Shifting the responsibilities from state beneficiaries has to be seriously considered.

POSSIBILITIES FOR TRANSFERING MANAGEMENT RESPONSIBILITIES OF IRRIGATION PROJECTS TO THE FARMERS

Turnover to Self Management

In many parts of the world it became apparent that bureaucracies, with staff trained as administrators, were not best suited for management tasks. Various approaches have been made to hand over the management of irrigation projects and even of larger water resources development entities to organizations of the users.

Forms of Organizations for Transfer of Irrigation Projects

1. Transfer to Water User Associations (WUAs)

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

2. Transfer to Municipal Organizations

This is a form of transfer where the scheme serves only single municipal unit. In this organization Mayor is the natural chairman of the WUA and the agreement of transfer is undersigned by the DSI and the Mayor and submitted to the Minister of Energy and Natural Resources (the DSI Minister) for the approval

3. Transfer to Village Organization

This is a form of transfer where the scheme serves only 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 DSI Minister for approval.

4. 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.

There are two means of Transfer to Cooperatives as follows:

a. Transfer of DSI irrigation schemes to cooperatives - DSI transfers its scheme (excluding groundwater schemes) to cooperatives for only irrigation purpose.
b. Transfer of DSI and GDRS developed irrigation schemes to cooperatives - this is a form of transfer to groundwater cooperatives where an irrigation scheme is provided by DSI with wells and pumps and irrigation distribution network by GDRS. After the establishment of these co-operatives transfer is realized following the same legal procedure applicable to other organizations.

The main rule in the process of transferring irrigation projects to the users is not the ownership of irrigation, but the transfer of operational maintenance and management responsibility. In each region, the type of the association or institution whose services are to be transferred is determined by farmers according to the region. These organizations have been carrying out the main rules of DSI. Transferring organizations receive payments from farmers for their services on the agreement made every year determined according to the price tariff.

Informal Transfer to Users

Most of the surface irrigation schemes developed by GDRS have been turned over (or transferred) to users in an informal manner. One of the factors contributed to such transfer is that GDRS does not have an O&M organization and transfer or turnover the schemes to users becomes a feasible

alternative. Although these schemes are operational, a recent general review of their performance revealed that the results would have been much better had the transfers taken place in a more formal manner with clear designation of responsibilities for GDRS and the users.

Description of Irrigation or Water User Groups

WUGs or IGs are considered to be highly appropriate transitional (intermediate) organizations for gradual establishment of successful WUAs. DSI has transferred O&M responsibility for the tertiary distribution network to so-called irrigation Groups (IGs) headed by the Muhtar (Village Head).

FACTS ON THE REALIZATION OF TRANSFER OF RESPONSIBILITY OF OPERATION AND MAINTENANCE OF IRRIGATION SCHEMES

The Facts on Realization of the Transfer

A. Cost Recovery

Irrigation capital cost and operation and maintenance expenditures insured by State Hydraulic Works (DSI) are subject to repayment in accordance with its Establishment Law. Complying with this law, repayment schedules are prepared by DSI. Water charges include: the actual cost of operating and maintaining irrigation facilities and the amount required for recovery of capital costs of facilities such as amortization not exceeding over a period. In principle, O&M charges are 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 are charged on o cropped-area basis (with different rates). In Table 3 irrigated areas, and collection rate of water charges by DSI are shown. As shown in the table, the actual amount collected falls far short of the assessed amount. This is due to the inadequate penalty for late payment. Recently, amendments have been proposed to the Establishment Law in relation to late payment of water charges.

Table 3. Area Operated and Irrigated by DSI and Receipts in DSI-Operated Schemes (Source: DSI, 2003)

Year	Area operated by DSI (ha)	Area irrigated (ha)	Receipts collected by DSİ (%)	Receipts collected by WUAS (%)
1975	838,015	524,597	43.3	-
1980	1,000,574	652,928	41.3	-
1985	1,370,870	1,027,500	51.3	-
1990	1,626,170	1,114,436	37.9	-
1995	1,897,850	1,240,275	41.9	90.0
2000	2,296,350	1,377,810	40.1	95.3

B. Comparison of Water Delivery Cost by Government and WUA managed Irrigation Projects

Water User Organization (WUOs) have generally demonstrated the ability to operate and maintain the systems satisfactorily through recruiting required staff, buying urgently needed transformation and communication equipment, assessing and collecting water fees, equipping their offices and substantially improving water delivery at cost generally their offices and substantially improving water delivery at cost generally less than that insured by DSI as shown in the following comparison of the cost of Antalya Region, which is one of the efficient regions, with a Water User Association (WUA) in the same region (Table4).

Table 4 Comparison of Water Delivery Cost by Government and WUA Managed Irrigation Projects (Source: Tekinel, O. and Doorenbos, J. 1995; Mohamadi, J. e*t. al,.* 1994)

Items	For Antalya region (Government managed)	For Korkuteli (WUA managed)
Average O&M Cost TL /ha.	1,898,052	56,450,000
Average Maintenance TL /ha	259,682	5,722,500
Average Operation TL /ha.	1,638,370	50,727,500
Average Canal meters replaced /ha/year	0.36	0.03
Persons recruited /ha	0.01	0.01
Personnel expenditure TL /ha	1,366,000	128,375,000

C. Facts on Realization

According to the law 6200 upon which DSI was established, DSI builds systems for the improvement of land sources and carries out the administration operation and maintenance of those related with irrigation. By January 1st, 2003, the total area opened to irrigated agriculture by DSI was 2,340,197 ha. In the last five years, approximately 50,000 ha of land has been opened to irrigated agriculture every year. The numbers of dams and artificial lakes opened for use in January 1st, 1999 were 195 and 329 respectively. However, the increase in personnel equipment and financial sources do not keep pace with this increase in responsibility. In spite of all these shortcomings, DSI works with full responsibility and enthusiasm, since it is against the policy of DSI to make any sacrifices in administrative and maintenance services. It seems not feasible to carry out these services with this quality without the improvement of financial sources. Before 1993, DSI focused on transferring only small and isolated schemes. The policy on transferring irrigation schemes, which were difficult and uneconomical for DSI to manage, was guided by the law. With persuasions of the World Bank staff and its cooperation with DSI staff at various levels, more land has been exposed to accelerated transfer of irrigation systems. The policy of DSI has been shifted from transferring only small and isolated schemes to an accelerated approach of transferring small and large schemes. As it can be observed in Tables 5 and 6, such a policy was put into action without delay.

Table 5. Facilities put to operation, areas operated by State Hydraulic Work (DSI) and areas transferred at January 1st, .2003*

Year	Facilities put to operation (ha)	Area operated by State Hydraulic Works(DSİ) (ha)	Transferred Area	
			Area (ha)	(%)
1992	1,478,608	1,415,988	62,620	4.2
1993	1,527,239	1,455,197	72,042	4.7
1994	1,561,841	1,294,479	267,362	17.1
1995	1,619,070	640,495	978,575	60.4
1996	1,688,861	498,527	1,190,334	70.5
1997	1,740,223	461,184	1,279,039	73.5
1998	1,809,687	325,756	1,483,931	82.0
1999	1,842,906	313,452	1,529,454	83.0
2000	1,875,104	256,435	1,618,669	86.3
2001	1,908,854	245,124	1,663,730	87.2
2002	1,942,201	247,465	1,694,736	87.3

* Excludes areas constructed upon payment and groundwater irrigation cooperatives

Table 6. The Distribution of Irrigation Units based on transferring organizations at January 1st, 2003 (Source: DSI, 2003)

Transferring/Organization	Number	Distribution (%)	Area (ha)	Distribution (%)
Village Head	209	30.0	34,205	2.0
Municipality	133	19.1	56,588	3.3
WUAs	297	42.6	1,543,462	91.1
Cooperatives	54	7.7	59,449	3.5
The Other	4	1.6	1,032	0.1
Total	697	100	1,694,736	100

In 1993 and 1994, with the support from the World Bank, the DSI has sent more than 50 senior officials to USA and particularly to Mexico. These visits have had substantial effect on encouraging further DSI staff to pursue accelerated transfer. In areas of Antalya, Adana, Konya and İzmir, where DSI officials have shown a higher level of readiness and dedication and the farmers, were more receptive to the pilot program of accelerated transfer initiated. Extensive internal training, including seminars and workshops have significantly contributed to the process. A friendly competition among various DSI regions in promoting successful transfers is an another contributing factor. The policy, that O&M engineers will not loose their jobs as a result of transfer and knowing that they would have even an important role to play after the transfer, keep their moral high. DSI engineers who have established a very close interaction with the village, municipality and councils. Their chairmen have played a very important role in this promotion process. In 1994, the studies to transfer irrigation systems to the users accelerated. The amount of irrigation land transferred in that year was 267,362 ha which was well above the amount suggested by the action plan. It is the fact that farmers have shown great interest to the transfer process. It was appreciated by the World Bank and they decided to show Turkey as a model country. This has caused many experts from various countries such as Bulgaria, Pakistan, Egypt, Albania, and Macedonia to be interested in to visit Adana and Antalya regions in Turkey in order to see the applications of the systems in place. In this pretext two members of DSI staff have worked in the World Bank project for Bulgaria. In 1995, the amount of irrigation land transferred to the users passed well over the amount suggested in the action plan and reached to 978,575 ha. At the date of January 1st, 2003, the amount of irrigation land transfer was 1,694,736 ha. The main principle followed in this process is to transfer the responsibility of the system for operation and maintenance, but not the whole property. In the irrigation units to which 91% of the institutions were transferred, 37% of the administrators are farmers, 31% are Village Headmen (Muhtar), 25% are Mayors are considered as farmers - approximately three-fourths of the irrigation scheme administrators are those who deal with farming. When the state of literacy of the administrators are studied, the situation is as follows: 45% have Primary School, 37% have Secondary School and High School and 18% have University Graduates.

Considering 1997, the number of total personnel working in establishment/organizations transferring irrigation systems is 3273 where 35% of them are permanent and 65% are temporary personnel. The great majority of temporary personnel is irrigation workers who work for 4 to 8 months in the seasons demanding intensive labor. The number of general secretaries working as technical staff is 140, 119 of whom (85%) are agricultural engineers. Various economic indications pertaining transferring establishment/organizations are given below (Table 7).

As the payment dates shifts to the next fiscal year depending on the product selling date in some water consuming organizations, the amount appears to be lower than the actual amount. The real values are shown in the total receipts collected column. Sixty-four percent of this total income is spent on operation and maintenance services. As the transferring organizations have allocated some part of the credit obtained from the World Bank, which is explained in detail below, to purchase tools, machines and equipment, it is seen that 36% of the total budget is not spent. When the expenditure is examined, the highest rate is on the personnel expenditure with 39%. The expenditure on construction machines and vehicle purchases is 13%, maintenance and repair is 12%, vehicle expenses are 11%, and others is 15%. The cost of energy (electricity used to run irrigation pumps) is

11% of the total expenditure. Nearly 2% of the total expenditure is spent on the various vehicles rented for operation and maintenance. Expenditure for maintenance and repair is 7.8% of the total income and 12% of the total expenditure in 1997. However, when expenditure on maintenance and repair which is included in the cost for personnel, vehicle rents and gas are taken into account, the share in the total expenditure goes up to 26%.

Table 7. Distribution of the amounts of water cost payment, realization and receipts collected regarding transferring establishment/organizations (in million TL at January 1st, 2003)

Transferring Organization	Realization	Receipts Collected	%	Total Receipts Collected*	%
WUAs	53,020,325	37,729,235	60	53,020,325	84
Municipality	2,490,649	1,681,482	68	2,295,007	92
WUG	594,911	332,375	55	594	99
Cooperative	7,111,539	4,343,293	61	5,128,121	72
Total	*73,220,396*	*44,086,385*	*60*	*61,038,368*	*83*

*****The amount from the previous year has been included in this column

Legal Situation

There is no legal problem in transferring the irrigation systems owned by DSI to Governmental organizations (municipal authorities) and non governmental organizations (cooperatives or WUAs). The process is initiated upon the demand of the related body. The organization and the body to which the responsibility of operation and maintenance of the irrigation system is to be transferred is determined based upon criteria such as its representative capacity of the farmers, and its capacity to carry out the responsibilities. If the irrigation system is to be transferred to a cooperative or a WUAs then these organizations are supposed to complete their organizational structures in accordance with the related commercial laws and they are supposed to take the decision of taking the responsibility of the operation and maintenance of irrigation schemes in their respective executive organs. If the system is to be turned over to municipal bodies, it is sufficient that they take the related decisions in their authoritative organs. All these organization are assessed as regards to their representation capacity of the farmers and their ability to carry out the necessary services, when the decision to transfer the irrigation systems is made.

Water User Associations (WUAs)

These organizations are supposed to carry out the related services in accordance with the protocol signed between related parties and DSI. The organization which accepts the responsibility of operation and maintaining irrigation systems charges farmers certain fees for their services. The charges can be based on the amount of plantation per unit area, the number of irrigation disregarding the plant type or simply m^3 of water used.

By January 1st 2003, the total irrigation land transferred was 1,694,736 ha and 1,543,462 ha of this land was transferred to WUAs which are incorporated in accordance with municipal law 1580 articles 133-148. The WUA is established after the municipal authorities take a decision in that effect and its constitution is approved by the Council of Ministers. Each WUA can make certain amendments in their constitution when necessary after discussing it in their executive organs. If an irrigation system serves more than one region or village, it is generally transferred to the WUAs formed by the municipalities of these villages.

A WUA is composed of natural members (heads of municipalities and village leaders within the region which the irrigation system serves in accordance with the law 1580 art.144) and democratically elected members within these municipal authorities. They then elect a chairman (for 1 to 4 years) and four executive committee members (for 1 year). This committee, with five members with an assigned general secretary and an accountant, forms a seven members "executive committee".

The DSI with the support from the World Bank mainly focuses on the quality of management of the transferred schemes and their sustainability. DSI recognizes the need for a continuous monitoring of the transferred schemes, identifying required improvements and providing assistance to users in all related aspects, including:

a. Assistance in acquiring and maintaining required skills and consulting and technical support when needed;
b. Regular technical training of the staff of WUAs on different aspects of irrigation (the outline of a training course on irrigation organized in November 1996 is given in Box 1);
c. Assistance in obtaining essential O&M equipment and handling urgently needed repair or rehabilitation works on the basis of reasonable repayment or cost sharing arrangements and
d. Legal procedural and organizational changes concerning both the WUAs and relevant Government agencies and taking appropriate action.

Box 1 - Outline of a Training Course for the Technical Staff of the Water Users Associations

Training Course for the Technical Staff of the Water Users Associations.	
1st Week	
Day	Subject
1st day	Opening Irrigation and Importance Soil-Water Relations
2nd day	Determination of irrigation water needs Irrigation timing Water measurements and Related Equipment Irrigation Methods Surface Irrigation Methods
3rd day	Irrigation Methods Pressurized Irrigation Water – Yield Relationships
4th day	Trickle Irrigation Tensiometers, Neutronmeters, Infrared Thermometers Field Exercise
5th day	Water Quality and Salinity problems in irrigation Water and soil sampling and analyses
2nd Week	
1st day	Excessive Irrigation and high ground water as a result salinity Possibilities for Improvement of Saline Soils
2nd day	Irrigation of individual crops Sugar Beet – Wheat - Cotton Citrus, Grape, Alfalfa
3rd day	Management of Irrigation Systems
4th day	IGs, WUAs, WUGs Water Users Associations,
5th day	Participatory Irrigation, Achievements Face to Face talk to technical Staff of the Irrigation Groups

Turkish experience in PIM through establishing numerous WUAs and transfer of full management of irrigation systems to users can offer useful information and examples for those countries interested in promoting participatory management and the complete transfer. As a result of the success in transferring irrigation systems to the users, the World Bank authorities offered to hold the second "international joint irrigation conference" in Turkey. The conference to which 58 people from 16 countries including ministers and high ranking officials, 12 people from related institutions, 16 people from the World Bank, 25 people from DSI and 13 people as representatives of the people who took over the irrigation systems was attended, held in Antalya in April 10-17, 1996.

Problems in application of Participatory Irrigation

A general summary of the recommendations related to the problems in application and maintenance of participatory approach irrigation is summarized below.

Technical Issues

It is the utmost importance for the performance of WUAs that the WUA personnel should be trained properly in order to make them to realize the significance of the subject and the general secretaries to be competent in the field they deal with. It is important that the physical features of the irrigation plant be taken into account when considering their machine and equipment demand. The equipment should be chosen by taking the criteria such as fuel effectiveness, abundance of spare parts, suitability for the purpose into account. Large, expensive and sophisticated equipment should be avoided as much as possible. The needs of the WUA for large excavators and bulldozers should be met by purchasing them from DSI machine park. According to protocols the jobs supposed to be completed by WUAs, but not has carried out due to various reasons, shall be completed by DSI and the costs involved shall be charged to WUAs. However, the lack of cash allocated to WUAs makes the completion of the job by DSI impossible as well.

Legal and Administrative Subjects

- The administrative and maintenance costs of the joint project should be taken from the users in proportion with the extend of their usage. It is natural that the users should be charged for the operational and maintenance costs. However, they should be charged on the based on certain principles, such as, the need for maintenance should be determined together with DSI and WUAs and the WUAs should pay their share in accordance with the account determined jointly.
- DSI should be the final authority in the selection of the WUAs staff and deciding on their numbers and quality.
- WUAs should be obliged to establish the operational and maintenance units within their framework.
- WUAs budged should be ratified by DSI before being submitted to the Government.
- It should be stated that additional protocols can be made in order to solve the problems which may arise during the period of original protocol.
- The executive committee should be chosen among farmers in the villages or municipalities using the system.
- There are no specific solution which can be commonly applied to all regions.
- WUAs are already participating in small scale rehabilitation works. However the participation of farmers into the large scale rehabilitation is something else. Because the prospective participants were initially assured that the project was going to be transferred in fully operable condition and the parts which were in need of rehabilitation was going to be rehabilitated as much as possible before the transfer talks to erase their worries. The rehabilitation of the systems is a very costly procedure and not possible to be financed by the farmers.
- The way and the body who will meet the maintenance and rehabilitation costs of the project in need for urgent repair should be clearly stated in the transfer protocol. WUAs in some regions were assured that they were ready to contribute the rehabilitation works on the condition that DSI provides the necessary equipment.
- The rehabilitation of the system should be financed by the participation of the farmers. However, it is essential that WUAs should become financially capable before that. This may be achieved by urging WUAs to go into commercial activity or by providing them with low interest credits.

The Relations Between DSI and WUAs to which the Irrigation Schemes are to be transferred

- Since most of the staff had been trained only on the distribution of water and since maintenance teams are yet to established, we have to be dependent on DSI for these services.
- There is a provision in the transfer protocol that DSI should approve the fees charged for the services. However, the regional authorities refrain from exercising this right and avoid interfering with the fee policies of WUAs.

- The neighboring WUAs are generally act together for determining the fees for the services provided. This joint action has recently extended to purchasing and renting expensive machines or equipment.
- The relations between the WUAs and other governmental organizations are yet to be established. DSI remains to be the major body to consult for administrative, technical and legal problems.
- All the precautions should be taken to prevent the workers and their rights after the transfer procedure. The staff who are not able to work in their normal jobs after the irrigation schemes are transferred should be shifted to other positions within the organization. All the necessary legal procedures in that effect should be completed before hand.
- WUAs personnel should be accepted as DSI staff and given regional and central training.
- In some regions the amount of irrigation land is so low and the land is mostly irrigated by pumps. Therefore, it may not be possible to meet irrigation costs.
- Farmers are worried that the services would come to stop when the State dissociates itself from these services. Their self confidence is low, in that they think that they would not be able to carry out the services while the State cannot manage.

A draft regulation for the turnover the public irrigation schemes to farmers and farmers participation in the maintenance and operation in Turkey have been prepared and submitted to responsible organizations in order to overcome the problems of encountered in State regulated projects.

The basic idea is that farmers must finance most of the irrigation improvement works themselves and where possible, participate in actual execution of the work. The overall question of financing of irrigation will have to be addressed at the national level. With uneven distribution of economical activity, attempts to help less developed regions through well-targeted subsidies can be a good policy. However, this has to be done in a transparent manner acceptable to society as a whole.

For the sustainability of the transferred schemes, the following most important steps have to be taken:

a) Revisions of current late payment penalty provision of DSI Law, which encourages delay in payment of water charges and makes the transfer alternative less attractive to users;
b) Provision of assistance to WUAs for on-farm improvements based on their participation and cost sharing and
c) Not abandoning WUAs after transfer and maintaining close liaison to them and providing them with required advice, guidance and training related to management, organization and investment in irrigation improvement. DSI and O&M department and other concerned agencies will be available to provide such services.

CONCLUSIONS

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. Cost recovery has improved dramatically. DSI and O&M staff levels have fallen marginally, though more dramatic declines will depend on resolving issues of transfer arid termination with the powerful unions representing DSI supported 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 assessable, and yet important issues of future sustainability remain. Still, in comparison with efforts in other countries, the early achievements of the Participatory Irrigated Management in Turkey show considerable promise in achieving objectives held both by the Government and by local associations.

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ANNEX 1 – List of abbreviations used in the text

Abbreviation	Description
DS	State Hydraulic works in Water Works Organization with major responsibility for irrigation
GDRS	General Directorate Rural Services
IGs	Irrigation Groups (Same as WUGs)
WUAGs	Water User Associations
WUGs	Water User Groups
WUAs	Water User Associations
WUOs	Water User Organizations