Country Cases

Irrigation Mangement Transfer in Turkey: Process and Outcomes

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Contents

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Glossary

articles of association the legal document establishing the formation of an Irrigation Association as a legal entity. It sets out all of the provisions for the membership,

	administration, and dissolution of the **Association. Also referred to as "Statutes".**
assembly	a group of elected representatives
branch office	a DSI office, below the Regional Office level, responsible for the administration of a number of irrigation schemes.
council	a group of elected representatives consisting of less than 10 people
decare	a tenth of a hectare
general assembly	the governing plebiscite of an irrigation management association. It is composed of members who represent the interests of their constituent irrigators.
gross irrigation area	the total area supplied with irrigation facilities
imece	a traditional form of communal labor.
irrigated area	the portion of the "irrigation area" actually irrigated in any given irrigation season.
irrigation area	the portion of the potential scheme command area which the irrigation network has the capacity to irrigate.
irrigation group	an institution formed by DSI to operate and maintain irrigation facilities at the village level. The muhtar or mayor is the designated head of an Irrigation Group.
irrigation association	an institution formed for the purposes of irrigation operation and maintenance on units covering more than one administrative unit (village or municipality). (the Turkish term is Sulama Birligi, which is sometimes translated as a "Water Users' Association" - WUA).
kanalet	an irrigation channel constructed out of u-shaped concrete segments joined together and sealed with bitumenized cord. The segments are of varying sizes depending on the water capacity required. They are often supported above the ground by concrete frames, but they may also be positioned at or below ground surface level.
management committee	a group composed of members selected from the General Assembly plus an appointed secretariat. Its function is to advise and support the Chairman in the matters related to the day-to-day administration of the IMA. Also referred to as a "Council".
mayor	the elected administrative head of a municipality or city.
muhtar	the headman of a village.
net irrigation area	the portion of the gross irrigation area remaining after deducting land under roads, water bodies, houses, etc DSI calculates net irrigation by multiplying gross irrigation area by a factor of 0.864.

region	a geographic area defined according to specified administrative, agroclimatic or other features. DSI-defined regions are different from agro-climatic regions.
scheme	an irrigation development sharing a common controlled water source (e.g. dam, regulator, or pumping station).
statutes	a term sometimes used as equivalent to Articles of Association.
unit	a hydrologic segment of an irrigation scheme (e.g. left bank, right bank)

List of Acronyms

ATP	Accelerated Transfer Program
D&C	Design and Construction
DSI	Devlet Su Isleri (General Directorate of State Hydraulic Works)
WBI	World Bank Institute (of the World Bank)
GDRS	General Directorate of Rural Services
GNP	Gross National Product
IA	Irrigation Association
IG	Irrigation Group
IMO	Irrigation Management Organization
MARA	Ministry of Agriculture and Rural Affairs
O&M	Operation and Maintenance
PIM	Participatory Irrigation Management
PSBR	Public Sector Borrowing Requirement
TGNA	Turkish Grand National Assembly
WB	World Bank
WUA	Water Users' Association

Executive Summary

Turkey began an accelerated program of transferring management responsibility for large irrigation systems to locally-controlled organizations in 1993. Within 3 years, 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. Additionally, World Bank pressure for improved cost recovery provided added impetus for change and Bank-funded study tours to Mexico and elsewhere gave DSI managers a vision of what could be accomplished through a program of management responsibility transfer to locally-controlled organizations.

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 the 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 efforts which preceded it, especially those applied in Southeast and South Asia.

Another characteristic of the program was the size of units transferred and the numbers of farmers served by each unit. Sizes of IA-managed units averaged 6,500 hectares -- much larger than the units organized to receive management responsibility in places like the Philippines, Indonesia, and Sri Lanka in the 1980s. The organizational structure employed was a unified one, not the federated type found in large indigenous systems such as those in Nepal. Organizational structures are similar, in some respects, to those of irrigation districts in the United States, Canada, Germany, New Zealand, and Australia, and drainage districts in the Netherlands. There are strong similarities to the modulo organizations in Mexico, which is unsurprising given the interactions which took place early in the program.

Initial results of the transfer included a doubling of irrigation fee collection rates and a shifting of O&M expenditures from the public to the private sector, an accumulation of reserves in some 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 fielded by DSI has fallen dramatically in the 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.

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.

Nascent 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 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.

The flexible and pragmatic conduct of the transfer program to date, and the enthusiasm and capability apparent in many association leaders, offers reason for hope 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 hand, presents a potential problem of major dimensions which will require upper-level action 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.

1 Introduction and Background

Since 1954 Turkey has had a legal framework allowing the transfer of management responsibility for publicly-constructed irrigation schemes to local control. Such transfers proceeded at a very modest 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. The purpose of the study on which this paper is based was to document the process of transferring management responsibility for state-run irrigation schemes from the state hydraulic agency, DSI, to local institutions, assess impacts, benefits, and costs, look ahead to potential future problems and challenges, and identify factors which have facilitated the transfer process

The study was commissioned by the World Bank Institute of the World Bank and carried out during a one month period in early 1996 by a team consisting of the two authors and three staff members of the DSI Operations and Maintenance Department . Following discussions in Ankara, the study team traveled to three of the four pilot transfer regions in the country visiting regional, branch, and scheme level DSI offices, 20 irrigation associations, an irrigation scheme transferred to a municipality, a groundwater irrigation scheme operated by a cooperative, and a private village irrigation scheme. Secondary data assembled by DSI was analyzed to provide quantitative time series assessments.

Paper Overview

The paper is organized in 7 sections.

- An introduction and background section which reviews selected features of geography, government, the economy, hydrology, agriculture, and irrigation in Turkey
- A discussion of the organizations involved in irrigation development and management, indigenous management practices, and the transfer process as developed and practiced in

Turkey

- A description of the structure and functions of a typical Irrigation Association
- A description of scheme operation, maintenance, and financing under Irrigation Association management
- An assessment of the results of transfer in terms of costs of providing service, cost recovery, farm income, quality of irrigation service, changes in DSI structure and functions, and conflict management.
- An assessment of the effectiveness and sustainability of the DSI transfer program.
- Conclusions and a discussion of emerging second -generation problems likely to impact DSI and Irrigation Associations in coming years.

Turkey

Geography and Climate

Turkey is located at the eastern end of the Mediterranean Sea between 35o and 42o north latitude, with a total area of 779,452 square kilometers. The country forms an elongated rectangle roughly 1,700 kilometers in an east-west direction and 1,000 kilometers north to south (Map 2.1).

Turkey's exposure to both maritime and continental weather patterns combines with a highly varied topography to produce several distinct climatic zones. The Mediterranean region is essentially sub-tropical, characterized by hot dry summers and mild, rainy winters. The Black Sea region receives rain throughout the year and enjoys both mild summers and mild winters The Aegean Region (Western Anatolia) has mountains which run roughly east to west (i.e. perpendicular to the coast) and which are interspersed with grassy flood-plains. Central Anatolia is a vast high plateau with an average altitude of 1,000 meters above sea level and a semi-arid continental climate.

Water is a limiting factor for agriculture over much of Turkey. Average annual precipitation is highest in the Black Sea Region (1,120 mm), and it exceeds 800 mm/year in some of the coastal areas. However in the remaining 70 percent of the country, which includes some coastal areas, Thrace and eastern Anatolia, precipitation averages less than 500 mm/year. In the highland plains of central Anatolia it averages less than 400 mm.

Government

Turkey is a parliamentary democracy The Turkish Grand National Assembly (TGNA) is elected by all citizens who are at least 18 years old. The TGNA is composed of 550 deputies elected by direct general ballot for a term of five years. The President of the Turkish Republic is elected for one seven-year term by the TGNA from among its members, and is the head of state. The prime minister is appointed by the president to form a government, and is generally the head of the majority party.

Turkey is administratively divided into 78 provinces (il) and 900 districts (ilce). Population

centers are designated as cities (sehir), district centers, towns (belde), or villages (koy), depending on their population size. Locally elected assemblies include the general provincial assembly (il genel meclisi), the municipal assembly (belediye meclisi), and the village council of elders (ihtiyar heyeti). Mayors of cities, district centers, and towns and village heads (muhtar) are also directly elected. The provincial governor (vali) and the district administrator (kaymakam) are civil servants appointed by the Ministry of the Interior. They represent the State at the provincial and district levels, where they coordinate and administer state policy. Cities, district centers, towns, and villages have attached to them an area of surrounding rural land, and so the sum of the areas lying within the boundaries of these four types of units equal the area of the province. Districts are administrative subdivisions of provinces

Demographics

The population of Turkey is approximately 63 million, based on an average annual population growth rate since the 1990 national census of 2.2 percent per annum. This brings the estimated current population density to about 80 inhabitants per square kilometer.

The high population growth has been associated with high rates of migration. Emigration abroad, particularly to Europe, has slowed considerably since the mid-1980s, and currently most of the migration takes place within Turkey itself, much of it to industrial cities including Izmir and Adana in the ATP pilot provinces. Although the number of people living in villages has changed little since 1980, remaining at just above 23 million, overall population growth has reduced the share of village residents from 75% of the population in 1950 to just 37% today. The three biggest cities (Istanbul, Ankara and Izmir) together contain about one-quarter of the nation's population.

The accelerating migration from rural areas to urban centers reflects recent developments in the agricultural sector, where mechanization and the loss of prime land near coastal regions to other land uses (hotels and other tourist facilities in particular) have led to more capital-intensive cultivation practices on pastures and grasslands previously devoted to extensive animal husbandry Urban migration, in turn, has increased the need for further mechanization. This same intensification and mechanization of agriculture has created environmental problems, such as erosion and salinization of the soil, and pollution of surface waters and aquifers.

Economy

At the beginning of the 1980s, Turkey's economic strategy switched from a policy of industrialization based on import substitution to a policy aimed at allowing a greater role for markets. Between 1979 and 1993 the Turkish economy expanded at an average rate of around 5% per year, with growth in recent years being even faster. The GNP per capita in 1994 was US$ 2,184, and in 1995, the provisional figure was US$ 2,200.

Turkey has experienced continuing problems with inflation. The average annual inflation rate between 1974 and 1993 was 50% (minimum 21 percent, maximum 113 percent) with a rate of 149.6 percent in 1994 and 64.9 percent in 1995.

An important contributor to inflation has been heavy state investment in several large-scale infrastructure projects. Between 1986 and 1987 the ratio of the public sector borrowing requirement (PSBR) to GNP rose from below 5 percent to almost 8 percent. In subsequent

years real increases in public sector wages and rising interest payments, mainly on debt owed by the central government and state-owned enterprises, brought the PSBR/GNP ratio to an estimated 16 percent in 1993.

During this period there have been significant structural shifts in the Turkish economy, with the share of agriculture in overall output and employment decreasing, while the share of the service sector has increased and the relative size of the industrial sector has remained about the same. In 1993 agriculture accounted for 16 percent of total output and 42 percent of employment.

The growth in economic activity overall has not been accompanied by a narrowing of the gap between rural and urban incomes. In fact the gap is probably remaining constant or widening. Agricultural incomes are estimated to be around one-fifth to one-quarter of those in non-agricultural sectors. Regional disparities in income and other measures of development remain significant.

Agriculture

Turkey's varied agricultural land and climate permit a diverse range of crops to be grown (Table 1.1).

Table 1.1. Regional variations in agricultural production patterns

Climatic Zone	Major Crops
MEDITERRANEAN	CITRUS, VEGETABLES, COTTON
BLACK SEA	TEA, HAZELNUTS, MAIZE
AEGEAN (WESTERN ANATOLIA)	OLIVES, COTTON, TOBACCO, HORTICULTURAL CROPS
CENTRAL ANATOLIA	WHEAT, WINE GRAPES, SUGAR BEETS

Yields for major grain crops, sugar beets, oilseeds, potatoes and cotton grown in Turkey have increased steadily (Table 1.2). There are often wide regional differences in yields, which for field crops are generally two or three times higher in the milder coastal regions of the Aegean and Mediterranean than in the colder and generally drier areas of central and eastern Turkey. On average, cereal yields in Turkey are half those of OECD Europe, but are the same or greater than those of Australia. Between 1979 and 1993 the overall volume of agricultural production increased on average by around 2 percent a year.

Table 1.2. Yields of major crops in Turkey [tons/hectare]

CROP	1979	1984	1989	1990	1991	1992	1993
WHEAT	16	17	16	19	19	20	21
BARLEY	16	18	12	20	21	20	22

MAIZE	21	25	36	39	40	42	45
RICE	30	26	30	26	30	30	30
CHICKPEAS	11	10	08	10	10	09	09
DRY BEANS	15	15	11	12	12	12	NA
LENTILS	10	09	05	09	08	08	10
TOBACCO	09	09	09	09	09	10	10
SUGAR BEETS	32 5	31 4	30 9	36 8	38 6	37 8	36 9
COTTON	08	08	09	10	90	90	10
SUNFLOWER	13	12	16	12	14	15	14
SOYBEANS	10	21	21	22	22	21	24
POTATOES	17 0	16 8	16 8	22 4	23 0	23 6	24 2

SOURCE OECD, 1994, and State Institute of Statistics, 1995

NOTE NA indicates *Not Available*

Farms in Turkey are characteristically family-owned, small and fragmented. The average holding size in 1990 was 5.8 hectares, with 68 percent of holdings being less than 5.0 hectares (Table 1.3). Ninety-five percent of holdings, with 63 percent of the land, were less than 20 hectares.

Table 1.3. Agricultural holdings in Turkey, by size of holding, 1990

SIZE CLASS	HOLDINGS [NUMBER]	AREA [HA]	NUMBER SHARE	AREA SHARE	AVERAGE SIZE [HA]	CUMULATIVE NUMBER SHARE	CUMULATIVE AREA SHARE
LANDLESS	101,610	0	2 50%	0 00%	0 0	2 50%	0 00%
<0 5	251,686	66,706	6 19%	0 28%	0 3	8 68%	0 28%
0 5 - 0 9	381,287	251,109	9 37%	1 07%	0 7	18 06%	1 36%
1 0 - 1 9	752,156	1,004,250	18 49%	4 28%	1 3	36 54%	5 64%
2 0 - 4 9	1,274,609	3,866,896	31 33%	16 49%	3 0	67 87%	22 13%
5 0 - 9 9	713,149	4,675,069	17 53%	19 94%	6 6	85 40%	42 06%
10 0- 19 9	383,323	4,921,663	9 42%	20 99%	12 8	94 82%	63 05%
20 0- 49 9	173,774	4,648,743	4 27%	19 82%	26 8	99 09%	82 87%
50 0- 99 9	24,201	1,498,249	0 59%	6 39%	61 9	99 69%	89 26%
100 0- 249 9	10,266	1,385,662	0 25%	5 91%	135 0	99 94%	95 17%
250 0- 499 9	1,930	653,808	0 05%	2 79%	338 8	99 99%	97 96%

500 +	441	478,943	0 01%	2 04%	1086 0	100 00%	100 00%
TOTAL	4,068,432	23,451,099	100 00%	100 00%	5 8		
SOURCE State Institute of Statistics, 1994							

No more than 15 percent of farm holdings are contained in one integrated piece (Table 1.4).

Table 1.4. Number of plots per farm holding in Turkey, 1990

PLOTS [No]	HOLDINGS ['000]	LAND SHARE
1	578	14 6%
2 - 3	1139	28 7%
4 - 5	904	22 8%
6 - 9	760	19 2%
10 - +	587	14 8%
TOTAL	3968	100 0%
SOURCE OECD, 1994		

Approximately 14 percent of the area sown in 1990 was irrigated. Around 20 percent of the irrigated area was in holdings of less than 5 hectares while a little more than 40 percent was in holdings of between 5 and 20 hectares (Table 1.5).

Table 1.5. Sown and irrigated areas in Turkey, by size of holding, 1990

SIZE CLASS	SOWN AREA [HA]	IRRIGATED AREA [HA]	SHARE OF SOWN AREA	SHARE OF IRR AREA	CUMULATIVE AREA SOWN	CUMULATIVE AREA IRR
<0 5	29,240	8,456	0 19%	0 37%	0 19%	0 37%
0 5 - 0 9	135,036	28,856	0 86%	1 27%	1 04%	1 65%
1 0 - 1 9	591,834	104,346	3 75%	4 61%	4 79%	6 26%
2 0 - 4 9	2,385,828	386,822	15 11%	17 09%	19 90%	23 34%
5 0 - 9 9	3,066,784	433,681	19 43%	19 16%	39 33%	42 50%
10 0- 19 9	3,411,167	504,308	21 61%	22 27%	60 94%	64 77%
20 0- 49 9	3,216,548	436,467	20 38%	19 28%	81 32%	84 05%
50 0- 99 9	1,076,758	138,087	6 82%	6 10%	88 14%	90 15%
100 0- 249 9	995,114	145,853	6 30%	6 44%	94 45%	96 59%
250 0- 499 9	526,696	42,660	3 34%	1 88%	97 78%	98 48%
500 +	349,844	34,495	2 22%	1 52%	100 00%	100 00%
TOTAL	15,784,847	2,264,032	100 00%	100 00%		

SHARE OF TOTAL AREA	14 34%				
SOURCE State Institute of Statistics, 1994					

Most farms rely on family labor. Tenant farming and share-cropping have played a role in a few regions, e.g. in the southeast, but are declining in importance. The effects on agriculture of the high degree of fragmentation of ownership may have been partly alleviated by the fact that some farmers are operating farms on behalf of absent family owners.

Between 1979 and 1993 the total work force in Turkish agriculture was unchanged. Participation rates among women and children in rural families are high. About 55 percent of rural women between the ages of 15 and 64 do agricultural work on a regular basis, mostly as field hands. Participation rates among the 12-14 age group in 1992 were 33 percent for males and 37 percent for females, compared with 19 percent and 4 percent, respectively, among children of urban families. The literacy rate in the agricultural sector was 69 percent in 1990 Illiteracy among female agricultural workers was twice as high as among males.

Irrigation

Definitions

Irrigation area is the term used in Turkey for commanded area. It is the area equipped with irrigation facilities, whether or not it is actually irrigated at any given time. It may be gross irrigation area, which is the raw area, unadjusted for the presence of non-agricultural land within its boundaries, or net irrigation area, which excludes the area occupied by roads, houses, cemeteries, and so on . Irrigated area is the area actually supplied with water in a given season

The term scheme is used here to denote a set of irrigation facilities with a common direct source of supply. This might be a pumping station or a diversion structure in a river, for example. An irrigation unit is a scheme, or a portion of a scheme, which is managed as a separate entity. Thus a scheme based on a diversion weir might consist of two separate units -- one managing the right bank and one the left.

Water Rights

The basic principal governing surface water use rights in Turkey provides that water is a public good which everyone is entitled to use, subject to the rights of prior uses. Surface water use is normally free of any obligation to obtain prior authorization. Conflicts are resolved first by referral to local customary rules and regulations. If the dispute cannot be resolved in this way, rights are settled by court decision. There is no registration system for water rights or water use. In large basins where impacts of new diversions are diffuse, this system is generally unable to resolve conflicts with claimed prior rights, and this is leading to serious problems of overallocation in some basins, such as the Gediz Basin in Izmir. This is a problem that has important implications for the future sustainability of transferred schemes.

Extent of irrigation

The gross irrigation potential in Turkey is estimated at 8.5 million hectares (Table 1.6). Of this amount, 93 percent is surface water potential. By 1993, while just under half of the total surface irrigation potential had been developed, more than 70 percent of the much smaller groundwater potential had been exploited. The most important future development possibilities in Turkey lie in the surface water sector. Current irrigation management issues also cluster here.

Table 1.6. Irrigation potential in Turkey

GROSS IRRIGATED AREA	AREA [M HA]	AREA [M HA]	SHARE	POTENTIAL DEVELOPED
POTENTIAL	8 500			
SURFACE		7 900	92 9%	
GROUND		0 600	7 1%	
DEVELOPED (1993)	4 156			48 9%
SURFACE		3 729	89 7%	47 2%
GROUND		0 427	10 3%	71 2%
SOURCE DSI, 1995				

Surface irrigation command has been developed through a variety of mechanisms in Turkey These include (a) private development by individual farmers and informal groups of farmers, (b) development by the General Directorate of Rural Services (GDRS), and (c) development by DSI The distribution of GDRS-developed irrigation by type is shown in Table 1.7.

Table 1.7. Schemes developed by GDRS, as of 1990

TYPE OF SCHEME	NUMBER	AREA [MILLION HA]	SHARE
GROUNDWATER	1,340	0 238	22 3%
SURFACE WATER	12,554	0 723	67 7%
SMALL DAMS	527	0 107	10 0%
TOTAL		1 068	100 0%
SOURCE WB, 1993, Annex 8			

The total net surface irrigation area developed to 1993 was about 3.22 million hectares . It is shown broken out by developer in Table 1.8. There are, however, various ongoing formal and informal policies which transfer management responsibility from constructing agencies to other organizations, and a more relevant breakout is one made in terms of the entities currently managing the schemes developed. Unfortunately this is more difficult to do. Little information exists on privately developed irrigation, though these schemes tend to be very small. The one such scheme visited was operated by the village government and this is said to be a common practice. GDRS has no O&M capacity and so the small surface schemes created by it are operated by others. Because of the difficulty of creating new cooperatives, it is assumed that the bulk of the GDRS-developed surface irrigation schemes are operated by local governments. This background leads to the breakout of net surface irrigation area by type of managing entity, shown in Table 1.8. Assumptions made are shown in the table.

Table 1.8. Turkey estimated net 1995 surface irrigation area, by builder, by manager

BUILT BY			MANAGED BY			
	AREA [M HA]		AREA [M HA]			
	TOTAL		DSI	IA	LOCAL GOVT	COOPS
DSI	1 467		0 572	0 850	0 036	0 009
PRIVATE	0 864				0 864	
GDRS	0 891				0 802	0 089
TOTAL	3 222		0 572	0 850	1 702	0 098
SHARES	100 0%		17 8%	26 4%	52 8%	3 0%
SOURCE DSI data						
NOTES (1) 10% of GDRS surface scheme area presumed shifted to coop management						
(2) DSI area allocated according to pilot region shares transferred to various managers						
(3) DSI irrigation area estimated on the basis of 36,000 Ha annual increments in net area, 1993-1995						
(4) Private and GDRS area assumed unchanged from 1993 to 1995						

From 1970 until 1993, when the accelerated transfer program (ATP) began reducing the DSI-

managed area substantially, the total commanded area of DSI-constructed schemes expanded from 0.521 million hectares to 1.341 million hectares, an expansion of around 36,000 hectares per year. As seen in the figure, however, the actual irrigated area was considerably less than the potential commanded area. Irrigation ratios (area irrigated over commanded area) resulting from this performance averaged just 0.66.

Irrigated Crops

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 1.9).

Table 1.9. Average cropping pattern in DSI irrigation schemes, 1991-1993

CROP	SHARE
COTTON	21 6%
CEREALS	19 1%
MAIZE	12 9%
SUGAR BEETS	9 9%
VEGETABLES	5 9%
FRUIT	3 4%
FORAGE	2 7%
CITRUS	2 4%
OTHER	22 0%

Pilot Regions

Background

Four of the twenty-five basin-based regions into which Turkey is divided by DSI for administrative purposes were selected as pilot regions for the ATP. All four are located in the southwestern quadrant of the country. Three of the regions, Antalya, Adana, and Konya, form a contiguous block extending from the southern Mediterranean coast inland to Central Anatolia. The fourth, Izmir, faces the Aegean coast to the west (Map 2 1). Together, these pilot regions comprise just under one-fifth of the country's land area (19.5 percent). They contain a slightly larger share of it's actual cropped area (22.4 percent), but only 13.3 percent of the population.

Some basic geographic and demographic data for the four pilot regions and for Turkey, are shown in Table 1.10. As seen, population densities in these regions are below the national average, except for Izmir, which is dominated by the city of Izmir, third largest in the country.

Population growth rates are above the national average in all four regions, with Antalya growing at nearly 5 percent per year due to in-migration. Antalya is a booming tourist destination, and is witnessing a rapid conversion of irrigated agricultural land to other uses.

Table 1.10. Area, population, literacy rate, and road density for pilot regions, 1993

	AREA			POPULATION				LITERACY	ROADS	
REGION	TOTAL [SQ KM]	CROPPED [SQ KM]	SHARE	1985	1990	GROWTH RATE	DENSITY [#/SQ KM]	RATE	LENGTH [KM]	DENSITY [KM/SQ KM]
ANTALYA	20,591	3,332	16 2%	891,149	1,132,211	4 90%	55 0	84 2%	3,362	0 16
IZMIR	30,581	9,368	30 6%	2,317,829	2,694,770	3 06%	88 1	87 1%	5,172	0 17
KONYA	61,909	15,880	25 7%	1,560,375	1,750,303	2 32%	28 3	84 2%	4,548	0 07
ADANA	38,580	10,436	27 1%	1,725,940	1,934,907	2 31%	50 2	79 4%	4,646	0 12
TURKEY	779,452	174,481	22 4%	50,664,458	56,473,035	2 19%	72 5	80 5%	59,770	0 08
SOURCE State Institute of Statistics, 1994										

Regional literacy rates are at or above the national average of 80.5 percent in all four regions However, the average masks male/female and rural/urban differences. Thus while the majority of farmers and agricultural workers in the 4 regions are literate, actual rates for this group as a whole will be somewhat lower than the averages shown in the table. For female agricultural workers it will be substantially lower.

Road density is above the national average in all regions but Konya, which is a large and sparsely populated region on the Anatolian plateau. It is regarded as more socially conservative than the three coastal regions.

Hydrology

Precipitation, average annual temperature, and pan evaporation for the four pilot regions are shown in Table 1.11. Regions vary considerably in all three factors, with Antalya being warm and relatively wet, while higher-elevation Konya exhibits cold winters and is relatively dry Monthly distribution of rainfall in the four regions is shown in Figure 1.2. All exhibit the Mediterranean pattern of wet winters and dry summers. Agricultural moisture deficits for the four regions are shown in Figure 1.3. All exhibit some degree of deficit in 8 months of the year, with deficits of more than 100 mm/month during the peak growing season. Surprisingly, high-rainfall Izmir also has the greatest need for irrigation, exhibiting an average moisture deficit of more than 6 mm/day during the months of June, July, and August.

Table 1.11. Hydromet data for pilot regions

REGION	PRECIPITATION	TEMPERATURE	PAN EVAPORATION
	[MM]	[C]	[mm]
IZMIR	691 5	17 6	1716 3
ANTALYA	1043 1	18 4	1446 0
KONYA	332 6	11 5	1173 1
ADANA	646 7	18 7	1299 4
SOURCE DSI data			
NOTE Average of 50 years of record			

Irrigation

It is estimated that at present, there are about 1.0 million hectares of irrigation area in the 4 pilot regions. Of this amount, about one-half is currently under IA management, about two-fifths is under village and municipal management, and the remainder is managed by DSI and cooperatives. However, the majority of this irrigation is based on surface water diversions. Groundwater use, especially private groundwater use, is locally important in all four regions.

Agriculture

The four pilot regions occupy three distinctly different agroclimatic zones. Cropping patterns for these four regions for the period 1991 to 1994 are shown in Annex Table A.1. DSI-constructed irrigation schemes in Konya, on the Central Anatolian Plateau, produce grains (69 percent) and sugar beets (16 percent) on their irrigated area. Izmir, in the Aegean zone, produces cotton (49 percent) and grapes , the principal component of the "other" category in this region (41 percent). Adana and Antalya represent the Mediterranean zone, growing varying proportions of cotton, maize, vegetables, citrus, and other crops, of which dry beans, melons, and sesame are major components. The particular cropping pattern of a region appears to have had little effect on the pace of its transfer program.

2 Management Institutions

General Directorate of State Hydraulic Works (DSI)

History and Mandate

The General Directorate of State Hydraulic Works (DSI) is the main executive agency of the Government of Turkey for the country's overall water resources planning, execution and operation. It was established in 1954. Until 1996, it was a part of the Ministry of Public Works and Settlement. In that year it was transferred to the Ministry of Energy and Natural Resources The mandate of the DSI is "to develop water and land resources in Turkey" (DSI, 1995b). It is responsible for major irrigation, flood control, drainage, hydropower development, and supplying water to cities with a population over 100,000. It also has responsibilities related to

river basin planning, water quality monitoring and improvement, outdoor recreation, basic studies on stream gaging and soils classification, and research on water-related structural design and construction materials. DSI centralizes most of the state functions involved in planning and developing large scale water resources Until recently, DSI's policy has been to manage the schemes it designs and constructs.

Structure

DSI maintains offices for O&M at the following levels.

- General Directorate Office: this is the top level of management with offices in Ankara
- Regional Directorate Offices: there are 25 Regional Directorates in Turkey
- O&M Division Offices: these cover a number of schemes
- O&M Engineering Offices: these serve one or more of the schemes within a O&M Division

The General Directorate Office and the Regional Directorate Offices are divided into functional departments, of which O&M is one. The departments are, in turn, divided into divisions. Within the central O&M Department, the Planning and Coordination Division has had primary responsibility for developing and implementing the ATP. This division is comprised of 8 members -- 6 engineers, a director, and one training assistant. Within the Division, a three-person transfer team, headed by the division director, has taken the lead role in this process.

Staff

Each department at the General Directorate and Regional Directorate level is headed by a director who is supported by engineers, technicians, and clerical staff. At the O&M Division Office level, the Branch Chief Engineer is supported by Division Chief Engineers for operations, maintenance, pumping and electromechanics, and machinery operation and maintenance. Other staff include technicians, clerical staff, and skilled and unskilled laborers. Staff at the O&M Engineering Office level include the Chief Engineer, plus an Operations Engineer, a Maintenance Engineer, technicians, clerical staff, and skilled and unskilled laborers.

In December 1994, when the ATP began to gain momentum, the total number of staff employed by DSI was over 25,000. Of these about 10 percent were in Headquarters and 90 percent were in the regions. About one-quarter were employed as regular civil service employees and three-quarters were laborers or contract staff. Of the civil service employees, about two-thirds were technical staff and one-third were clerical and other support staff (Table 2.1).

Table 2.1. DSI staff, by location, by type of work, as of December 1994

	SERVICES	TOTAL CIVIL SERVICE	CONTRACT STAFF	PERM LABOR	GRAND TOTAL	REGIONAL SHARE

	GEN ADMIN	TECHNICAL	LEGAL	HEALTH	AUXILIARY					
HEADQUARTERS	581	697	10	21	90	1,399	4	807	2,210	8 7%
REGIONS	1,505	3,555	54	74	104	5,292	9	17,802	23,103	91 0%
REVOLVING FUND OPERATIONS	4	1	0	0	13	18	0	54	72	0 3%
TOTAL	2,090	4,253	64	95	207	6,709	13	18,663	25,385	100 0%
SHARE OF CIVIL SERVICE	31 2%	63 4%	1 0%	1 4%	3 1%	100 0%				
SHARE OF TOTAL	8 2%	16 8%	0 3%	0 4%	0 8%	26 4%	0 1%	73 5%	100 0%	
SOURCE DSI, 1995b										

General Directorate of Rural Services (GDRS)

The General Directorate of Rural Services (GDRS), a part of the Prime Ministry, is responsible for developing small-scale groundwater resources for irrigation, developing surface water sources with flows of less than 500 liters per second for irrigation, on-farm irrigation development, and the construction of rural roads and village water supplies. GDRS's minor irrigation schemes are transferred to farmers' cooperatives or local governments upon completion. GDRS does not have an operation and maintenance capacity.

Participatory Irrigation Management in Turkey

Terminology

The international literature on irrigation management has long used the terms "Water Users' Association" and "Irrigators' Group" in discussing irrigation management institutions. The term Water Users' Association (WUA) usually refers to a local-level organization based on the active involvement of water users who come together for the purpose of organizing and practicing irrigation system operation and maintenance. The term "Irrigators' Group" suggests a less formal grassroots collective effort aimed at operating and maintaining lower level facilities in an irrigation scheme.

In contrast with these concepts, the ATP in Turkey has been founded on a downward reaching link between DSI and local administrations, rather than through the bottom-up organization of village-level associations of irrigators. In order to avoid misunderstandings regarding the social and institutional characteristics of the organizations involved, this paper will therefore use the term Irrigation Association (IA) to refer to the organizations which have been formed for the purposes of managing irrigation units covering more than one village or municipality The term Irrigation Group (IG) , which correlates literally with the corresponding Turkish term, will be retained but given a somewhat special meaning, referring to a sub-unit of a local administration which participated in an earlier DSI program to promote village level involvement in irrigation system operation and maintenance. The term Irrigation Management

Organization (IMO) is used to refer generically to the different organizational forms which are serving as receptors of responsibility in Turkey's transfer program.

Indigenous Management Practices

About one-quarter of the irrigated area in Turkey has been created independently of central government support. This irrigation may have been developed by individuals (particularly for groundwater irrigation or pumping from natural watercourses) or by village groups.

In village-based schemes, the muhtar operates as the coordinator of operation and maintenance activities. When requested by farmers in the village, or when he thinks the time is appropriate, he informs the irrigators that preparations for the irrigation season are to start. Necessary activities, such as construction of diversion structures and canal reconstruction and cleaning, have traditionally been done on the basis of imece, a form of communal exchange labor. Most structures are built with local materials contributed by the irrigators. For example, weirs might be made from woven sticks, mud and matting. These structures frequently need reconstruction in the course of the irrigation season. Irrigation schedules are agreed upon informally by the irrigators who share an irrigation channel, with the muhtar acting as mediator if required.

The increase in migration from rural to urban areas is weakening the traditional arrangements for village-based irrigation. Contributions in labor and in kind are being replaced with payment in cash. As younger people are often away at critical times for system maintenance and operation, older residents are faced with heavy tasks which they find difficult to do in a timely fashion. A muhtar interviewed by the Case Study Team foresaw the death of his village irrigation scheme, at least in its current form, within the next ten years.

Still there is a clear tradition in Turkey of joint action to provide a common good. This tradition is also reflected in the cooperative form of management discussed below.

Schemes Developed by GDRS

Approximately one-quarter of the irrigation area in Turkey has been developed by the General Directorate of Rural Services (GDRS) or by GDRS in conjunction with DSI. GDRS has had a long-standing policy for its groundwater schemes of requiring the formation of a cooperative before the construction of the irrigation project begins. In 1992 this policy was extended to new surface water schemes as well.

A cooperative is a legally constituted economic entity formed under the aegis of the Department of Cooperation and Maximization of the Ministry of Agriculture and Rural Affairs It is owned and operated by its members who share its profits or benefits.

For surface schemes established before 1992, O&M responsibility is transferred informally to the village muhtar. An effort has also been made to transfer older GDRS-constructed surface water schemes from GDRS to cooperatives.

The absence of an O&M capacity in GDRS, combined with the ambiguity of the informal transfer arrangements between GDRS and the village administration on older surface schemes, has sometimes led to poor scheme maintenance. When surface schemes have cut across lands of more than one villages, difficulties have also arisen over such issues as irrigation schedules and assessment and collection of water tariffs.

Under the GDRS procedure for establishing cooperative-based schemes, the first step is a petition from interested farmers. If the proposed development is found to be technically feasible, 15 people must join to form a cooperative under the provisions of national cooperative legislation. The original founders elect a cooperative board of directors. During construction, the board of directors recruits additional members, all of whom then comprise the general assembly of the cooperative. After construction the cooperative employs a staff and takes over full responsibility for scheme operation and maintenance.

In the case of groundwater schemes, the cooperative is accountable for 100 percent of O&M costs and must repay the initial capital cost of DSI-installed wells, pumps and electrification. It is given a 5-year grace period and a loan with a 30-year maturity and no interest for this purpose. GDRS investments, such as canal construction and on-farm drainage, are free of charge. For GDRS surface schemes, as for groundwater schemes, the village which will operate the scheme is responsible for 100 percent of the O&M costs. There is no capital repayment obligation.

The Irrigation Group Program

Since the early 1960s DSI has had a program to transfer O&M responsibility for secondary and tertiary distribution networks to Irrigation Groups (IGs). Under this program village headmen (muhtars) or mayors of municipalities, designated as heads of Irrigation Groups, enter into a contractual arrangement with DSI to take administrative responsibility for tasks such as collecting and submitting farmer water demand application forms to DSI, managing water distribution below the secondary canal, and cleaning and minor repair of canals, siphons, and kanalets . The muhtar or mayor is responsible for hiring laborers for maintenance work and ditch riders for water distribution. In exchange, DSI agrees to give farmers a discount of between 20 percent and 40 percent on the DSI irrigation fees due. The local administration then has the right to collect the value of this discount from farmers itself in order to finance the costs incurred in irrigation O&M. The local administration is allowed to keep any savings from the difference between fees collected and actual O&M expenditure as a contribution to the local administration budget.

Some observers have considered the IG system more cost efficient than the DSI in implementing O&M tasks, with local administration seen to use less labor at lower cost. It is also claimed that the system improves the effectiveness of water use. For example, in 1990 IGs were found to have achieved an irrigation ratio of 77 percent, compared with 60 percent on the schemes run entirely by DSI (WB, 1993).

However, the IG program has had only a limited effect on overall scheme O&M costs, on cost recovery rates, and on DSI staff levels and personnel costs. Several fundamental problems weaken the program. Among these are lack of direct farmer involvement in IG establishment and operation, reluctance by some IGs to take management responsibility, and variations in DSI staff commitment to the IG program. IGs have also faced difficulties associated with the fact that IG boundaries are based on settlement areas rather than irrigation boundaries, complicating operation and maintenance of canals that cut across village boundaries. Perhaps the most serious constraint, however, has been the absence of any mechanism for articulating local units into a structure which could manage entire schemes or hydrologic units. Without such a mechanism, the potential impact on public O&M expenditures, staff levels, and cost recovery rates is extremely limited, even if IGs work effectively and efficiently.

Nevertheless, the presence of IGs has provided an important foundation for Turkey's irrigation management transfer process. In 1994, at the outset of the ATP, approximately 600,000 hectares, or about 40 percent of the DSI-developed area, were partly managed by Irrigation Groups. This has generated widespread experience within village and municipal administrations with irrigation management tasks and has created sizeable cadres of local workers familiar with operation and maintenance practices. DSI Regions have utilized this experience in different ways in developing Irrigation Associations, as discussed below.

The Accelerated Irrigation Transfer Program

Origins

Initiation and Rate of Expansion

DSI has had the policy of transferring O&M responsibility of smaller and more remote projects to local administrations since the 1950s. However, until 1993 the pace of this transfer activity was slow The average area transferred for the first 40 years of the program was only about 2,000 hectares per year. Transfer rates accelerated dramatically from 1993 onward, as shown in Figure 2.1.

Motives for Initiating the ATP

The impetus for this dramatic change was the combined effect of a national budgetary crisis and rapid growth in the wage costs of unionized labor in the early 1990s. The budgetary crisis led to a squeeze on financial allocations to DSI in general and to the O&M Department in particular. The growth of wage costs raised the proportion of expenditure on operation and maintenance personnel while reducing the funds available for materials and equipment. This brought on the prospect of an approaching need for widespread rehabilitation of large-scale irrigation schemes caused by deferred maintenance resulting from the underfunding of O&M.

The existing cost recovery system offered no help in this regard. In the first instance, collections were taken up and retained by the Ministry of Finance, and amounts collected bore no relationship to the DSI budget. In the second, the fee collection rate was low -- averaging 37.2 percent of collectibles in the period 1990 to 1993. Moreover the charging system which was designed to collect fees two-years after the year in which expenditures were incurred and minimal late payment penalties, coupled with inflation rates in excess of 50 percent per year, meant that by the time farmers did pay fees, the real value of the payments had decreased substantially. It was estimated in 1993 that there was a shortfall between O&M allocations to DSI and collected tariffs of 83 percent (WB, 1993, 38).

There were also national restrictions on agency growth. Since the mid 1980s the State has had a policy of restricting new hiring in state agencies. The last general examination for government service was held in 1983 This restriction applies to DSI and restricts even replacement of retiring workers, though there are several minor pathways for new entrants. Internal DSI policy had stopped entirely any new assignments to the O&M Department. New hires are typically assigned to construction-related departments.

A program devolving responsibility for irrigation system O&M to the local level was also highly consistent with more general national policies promoting privatization. This may have encouraged DSI to undertake a transfer program and helped convince farmers and local

officials of the correctness, and perhaps the inevitability, of such a change.

During the early 1990s, the World Bank was supporting a Drainage and On-Farm Development Project in Turkey. World Bank supervision missions for this project participated in discussions on the crisis facing the irrigation sector and they encouraged DSI to explore new ways to put O&M financing on a sounder footing. Turkey's previous experience with the transfer of O&M responsibilities to IGs, IAs and cooperatives was seen as a valuable precedent. Funds available from the Drainage and On-Farm Development Project were made available to broaden the experience of DSI staff by supporting study tours to other countries with experience with devolution of authority. Ultimately, more than 50 DSI personnel participated in these tours. Most of these tours focused on Mexico, where a very similar program of establishing locally controlled irrigation districts had been underway for several years . These visits turned out to be extremely influential in helping create, among the Turkish participants, a vision of what was possible and providing examples of how to undertake such a program

Preparatory stage

Approach

Inspired by what they had observed abroad, senior DSI managers developed a program for the accelerated transfer of O&M responsibilities to local management. The program was initiated in 4 pilot regions, Adana, Antalya, Izmir and Konya. The initial intention was to start with smaller schemes (i.e. those less than 3,000 hectares) and to gradually expand the area covered

In practice the transfer process rapidly gathered momentum and far exceeded the originally anticipated rate of transfer. As illustrated in Table 2.2, by 1995 the area transferred was more than three times the area planned for transfer by that year. The areas projected to be transferred by 1996 and 2000 have now been significantly increased by the DSI. It is anticipated that by the end of the century 1,500,000 hectares will have been transferred, virtually the entire current stock of DSI-developed irrigation in the country.

Table 2.2. Planned and actual cumulative area transferred, Turkey, 1994-2000

		YEAR		
	1994	1995	1996	1997-2000
ORIGINALLY PLANNED [HA]	176,000	316,000	436,000	916,000
ACHIEVED [HA]	267,362	978,576		
REVISED PLAN [HA]			1,200,000	1,500,000
SOURCE DSI data				

Mode of implementation

On the government side, the transfer program has been implemented entirely by DSI O&M staff. It has been organized and coordinated by the three-person transfer team of the DSI O&M Department. The lead role in the pilot regions has been played by the heads of the Regional O&M Departments. In some cases, as in Izmir, the head of the Regional O&M Department has assigned an officer on his staff to take responsibility for the transfer program. In other cases, the department head himself has been the prime mover. The heads of Branch Offices and operations engineers for each of the schemes have also been involved in promoting and implementing the program. The operations engineers and their supporting technical staff have then provided follow-up support to the newly-formed IMOs.

Creating DSI capacity to implement

The study tours funded by the World Bank provided an important learning experience for DSI staff and an incentive to promote the transfer program. In addition, the transfer team of the DSI O&M Department embarked on a full program of staff orientation meetings and seminars for DSI headquarters and regional personnel and for IA Chairmen. Between October 1993 and October 1995 the team organized 41 in-country meetings and seminars each lasting between one day and one week. Most of these were held in the regions for technical staff and IA representatives. But they also include a number of World Bank missions and programs for visiting delegations from Bulgaria, Macedonia and Egypt (Table 2.3).

Table 2.3. Summary of IMT information and training activities, October 1993 to October 1995

TYPE OF ACTIVITY	NATIONAL PARTICIPANTS		FOREIGN VISITORS	
	PARTICIPANTS	ACTIVITIES	PARTICIPANTS	ACTIVITIES
TRAINING	209	12	137	6
INFORMATION	1135	16	15	7
TOTAL	1344	28	152	13
SOURCE DSI Transfer Team				
NOTE (1) Participants in national training programs DSI staff and IA representatives and staff Participants in national information programs local administrators, mayors, muhtars, farmers (2) Participants in foreign visitor training programs from Egypt, Macedonia, Bulgaria, Turkmenistan, and Albania Participants in foreign visitor information programs World Bank Missions				

DSI indicates that the following considerations were applied in the selection of the pilot regions for the ATP.

- **A range of experience with Irrigation Groups:** Adana and Izmir had wide coverage (80 to 90 percent), Antalya about 50 percent coverage and Konya 17 percent coverage of total irrigation area by IGs.

- **Representation of coastal regions and Central Anatolia:** Konya is in Central Anatolia, the other 3 regions are coastal.

- **A range of experience with small scale transfer:** Adana, Antalya and Konya had transfer experience dating back to the 1960s, and by 1990 they had transferred between 5,000 and 10,000 hectares to local management (Annex Table A.2). There had been very little transfer activity in Izmir prior to the 1990s.

- **Active and receptive staff:** this was characteristic of all four regions.

- **Irrigation ratios:** out of the 22 DSI regions reporting in 1994, Adana ranked 5th, Konya 10th, Antalya 15th, and Izmir 16th in the fraction of irrigation area irrigated (Table 2.4).

Table 2.4. Irrigation ratios in DSI pilot regions, 1994

REGION	IRRIGATION AREA [HA]	IRRIGATION RATIO	NATIONAL RANK
ADANA	265,297	68	5
KONYA	159,325	53	10
ANTALYA	58,545	49	15
IZMIR	114,243	45	16
REGIONAL TOTAL	597,410		
TURKEY	1,359,906	56	

SOURCE DSI, 1995g

NOTE Rank is out of 22 regions reported

The selected pilot regions were also 4 of the 5 largest DSI regions, in terms of irrigation area

Transfer experience in the pilot regions

The earliest experience with transfer to Irrigation Associations can be observed in Adana and Antalya. By the end of the 1970s, each had transferred two schemes to IAs, but the area this represented was very small, totaling only 3,000 hectares in Antalya and 3,340 hectares in Adana. In the 1980s Antalya transferred irrigation units to four additional IAs, covering a total area of 5,550 hectares, but there was no additional IA formation in the other three pilot regions. However, Konya did become more active in the transfer of schemes to municipalities and villages. It was in the 1990's, particularly after the start of the ATP in 1993, that the transfer of schemes really took off (Annex Table A.2). ***Types of management organizations***

There are four forms of local irrigation organizations which act as recipients of O&M

responsibility in the transfer program: cooperatives, villages, municipalities, and Irrigation Associations. As described earlier, cooperative management is most common among schemes developed by GDRS, though GDRS also engages in informal transfers to local public administrations. 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.

- **Village management:** where the irrigation scheme serves only a single village, the transfer of the scheme is undersigned by DSI and the muhtar, with the approval of the village council of elders. The transfer requires the approval of the Minister of Public Works and Settlement. The responsibility for scheme operation and maintenance then passes to the village administration, with the muhtar functioning as the executive officer for irrigation management. The muhtar may select one or two people to assist him with O&M administration.

- **Municipal management:** where the irrigation scheme serves only a single municipality, the transfer of the scheme is undersigned by the DSI and the mayor of the municipality, with the approval of the municipal assembly. As with transfer to the village administration, transfer requires the approval of the Minister of Public Works and Settlement. The responsibility for scheme operation and maintenance then passes to the municipal administration, with the mayor functioning as chairman and the municipal assembly functioning as the "general assembly" for irrigation management. The mayor usually appoints several existing staff members to assist him with O&M administration. Alternatively, he may hire new staff for this purpose.

- **Irrigation association management:** this is the form of transfer used where the irrigation scheme covers more than one local administrative unit (village or municipality). In this case, a new institution is created under municipal law. The transfer agreement and the "statutes" or articles of association are the legal basis for the creation The transfer agreement requires the approval of the Minister of Public Works and Settlement while the articles of association require the approval of the Cabinet of Ministers. In large schemes composed of two or more hydrological units (e.g. left and right main canals) a separate association is often formed for each segment.

The general assembly of the IA is made up of muhtars and mayors of participating villages and municipalities plus additional members. Selection procedures for additional members differ among regions. They can be selected by muhtars and mayors or directly elected by irrigators. Elected members may be from local assemblies, representatives of farmers' organizations such as the Union of Farmers or the Farmer Protection Organization, or members of the community In most cases, additional members appear to be selected by muhtars or mayors from among the members of local assemblies.

As would be expected, units managed by villages, municipalities, and cooperatives tend to be small. In the four pilot regions the average irrigation area of these three types of units is less than 700 hectares, with a range of from 10 to 2,210 hectares. In contrast, the average size of an irrigation unit managed by an Irrigation Association is approximately 6,500 hectares, with a very wide range of from 60 to 34,782 hectares. Irrigation Associations are the most important management form, both in terms of area (95 percent of the total irrigation area transferred) and

of number (58 percent of the total number of organizations). There is some variation among the regions, with Konya having the largest IA-managed unit (34,782 hectares). The average size of a transferred irrigation unit is smallest in Antalya (1,980 hectares), and of the four pilot regions, village and municipally managed units are most significant in terms of area and number in Antalya (Annex Table A.3).

The Transfer Process Steps in the transfer

There are five basic steps in the transfer of irrigation management from DSI to a local IMO. The steps, and the individuals and agencies involved in each step, are summarized for each of the forms of local irrigation management in Annex Table A.4. The transfer process generally takes 6 to 9 months from initiation to implementation

1. **Initiation:** the first step is to create the interest or willingness of the receiving group to participate in the transfer process. DSI takes the initiative in informing local administration representatives of the need for, and possible benefits from, participating in the transfer. Initial information meetings initiated by DSI are followed by internal meetings and discussions involving the relevant local administration representatives and irrigators. Initial approaches have often been met with suspicion which must be allayed through additional discussion.

- Each IA must be legally established with the approval of the Council of Ministers The Articles of Association for the IA spell out the method of formation and selection of the governing bodies, the qualifications for membership on the governing bodies, the obligations and authorities of the governing bodies, staff requirements and conditions for staff appointment, required provisions for financial management and reporting, and provisions for the liquidation of the association. This step is not necessary for transfers to village or municipal administration.

- Once the IA has been formally constituted, a general assembly meeting is called. The chairman and the management committee (also referred to as a "council") are elected by the general assembly.

2. **Transfer agreement:** this document sets out the rights and responsibilities of the new IMO and of DSI. This agreement is developed by DSI with the approval of the association chairman and the management committee of the IMO. It is signed by the chairman and the DSI regional director. The transfer becomes effective with the approved of the Minister of Public Works and Settlement after all other steps are accomplished.

3. **Transfer protocol:** after the transfer agreement is approved, the regional director of DSI and the chairman of the IMO sign the transfer protocol. This catalogs and describes all of the characteristics and facilities of the irrigation unit being transferred (e g. principal components, type of irrigation, electrical and mechanical components of pumping stations, and so on), and includes a map of all irrigable lands. Special instructions concerning the operation and maintenance of the transferred unit are attached as appropriate.

4. **Preparation of operation and maintenance plans:** once the transfer agreement is

cleared and the transfer protocol is prepared and signed, DSI staff work with representatives and staff of the IMO in preparing operation and maintenance plans and budgets for the first post-transfer irrigation season.

5. **Implementation:** the IMO begins unit operation with help from DSI.

Variations

There are some variations between regions, and indeed between branch and scheme offices, in the extent of DSI involvement with irrigator consultation prior to the transfer. In some cases DSI staff appear to work almost exclusively with local administration representatives, leaving it to these representatives to inform and consult with local irrigators. In other cases, DSI staff have more direct contact with the irrigators in promoting the transfer, though formal transactions are made with local government leaders.

What is transferred

Under the transfer agreement, the IMO becomes responsible for providing all services related to the operation and maintenance of the specified irrigation facilities and for bearing the costs of providing these services. Neither water rights nor ownership of facilities are transferred to the IMO but remain with the state.

The Transition Phase

During the transition phase the IMO takes a progressively greater financial and management responsibility for operating and maintaining the unit below the main canal. DSI provides on-the-job training to field and administrative staff, backstops their work and operates and maintains various portions of the unit, above the main canal. The level and pace of the transition varies and the "endpoint" sharing relationship is still undefined.

DSI Regions and branches are given freedom to be flexible in reaching agreements with the IMOs regarding the amount of support that DSI will provide at different stages in the transfer process. The main variation can be observed in the extent of material and service support provided free of charge by DSI to the IMO. For example some IMOs have paid for fuel costs on DSI-operated heavy equipment from the outset whereas other IMOs have not had to pay in the first year. In general both DSI and IAs have been remarkably pragmatic in developing and refining the transfer process. This has contributed importantly to its successes.

Farmers and the ATP Program

This program gives little appearance of being driven by farmer demand. It is a program that is driven by pressing national budgetary and programmatic needs, reinforced by the support, advice, and encouragement of an international body. Farmers have often responded skeptically to the idea at the outset and many are still adopting a wait and see attitude.

The main incentive to participate in the program appears to be that it represents a way of avoiding the terminal deterioration of schemes and the quality of irrigation services they provide which many irrigators felt they were facing. In the early 1990s financial constraints led to the curtailment of overtime work by DSI field staff . This served as a convincing example of the need for local groups to take over scheme management. Other incentives include the

material, service, and technical support that DSI promised and is providing to IMOs to set them off on a firm footing.

The response of farmers interviewed by the study team in coffee houses (non-members of the IMO assembly or committee) to the transfer program can be characterized as guarded acceptance. The transfer appears to have been presented to them as an accomplished fact Their principal concerns relate to fee payment (after years of very relaxed treatment of obligations), to the quality of service which can be provided by the smaller IMO staff, to the technical competence of the IMO staff relative to that of DSI, and to the accountability and fairness of Association management to farmers' needs and wishes.

That said, the leadership of most Associations visited have embraced the concept enthusiastically and are taking vigorous steps to implement it. If this results in high quality irrigation services at a reasonable cost, then the farmers will be satisfied.

Current status of program

By the end of 1995 the cumulative irrigation area transferred nationwide represented 61.0 percent of the total irrigation area developed by DSI (Annex Table A.5). This is a very impressive accomplishment. The 61 percent of the area transferred was contained in 70.2 percent of the total number of schemes, suggesting that, as planned, smaller schemes have been transferred first. In the pilot regions, however, larger schemes were transferred first and it is the smaller schemes which remain to be transferred. Here the transfer program has reached 86.3 percent of the schemes which comprise 91.1 percent of the total area of DSI schemes. The task of transfer in the pilot regions is thus largely complete. What remains there is to continue the transition process, providing a declining level of support to newly formed IAs, while identifying long-term support needs which DSI must organize to supply on a continuing basis and identifying emergent second generation problems. In the other regions of the country, DSI must continue to extract the lessons learned from its experience in the pilot regions and intensify the programs there.

3 The Irrigation Association

Governance

Governance functions for IAs are exercised by (a) a 30 to 70 person general assembly made up of representatives of the component local administration units and others, (b) DSI and (c) the Ministry of Interior. Note that the general assembly is composed principally of representatives of various local administration bodies, and is not a general meeting of scheme water users. Moreover, the members of the Association are local administrations and not individual water users. Individual water users generally participate through participation in the general electoral process for local administration officials. The general assembly is responsible for electing from among its members every 5 years the chairman of the association, who functions as its chief executive officer. It also elects annually four members of the IA management committee, which works with the chairman to plan and implement the Association's activities

The general assembly typically meets twice a year and can be called together by the chairman for extraordinary meetings. Its actions include electing the Association chairman and approving the annual budget.

DSI is responsible for technical oversight of IA activities. Its governance-related responsibilities, according to the model agreement, are (a) to conduct an annual maintenance review of unit facilities, (b) to review and approve annually the maintenance and repair budget of the IA, (c) to approve annually the tariff rate for irrigation service, and (d) to repossess scheme facilities upon failure of the IA to adequately operate and maintain them.

The Ministry of the Interior is responsible for (a) reviewing and approving the entire annual budget of the IA and (b) for periodic reviews of financial accounts submitted by the Association.

Legal Standing

Irrigation Associations are formed under the Municipality Law, No 1580, which allows for associations made up of local government entities to be established. Once established, IAs are treated under the law as municipalities and various provisions of a number of other laws apply to their operation. Municipal legislation and implementing regulations were obviously not written with Irrigation Associations in mind, however, and questions related to the appropriateness of municipal law as applied to IAs have arisen. A number of IA chairmen interviewed expressed a desire for a separate legal base for IAs, through the passage of a national Irrigation Association law.

One concern underlying this sentiment relates to the uncertainties involved in interpreting and applying municipal law to this new organizational form. Association chairmen seek out advice from municipal authorities but complain authorities are unable to give clear interpretations and guidance. Also, advice varies from one municipality to another, resulting in a variety of interpretations of the law. One chairman in Antalya has established contact with counterparts in Adana who have successfully resolved the question of the tax status of associations in purchasing vehicles. Other jurisdictions have rejected the contention of tax-free status. The question of whether or not heavy equipment purchased by Associations will be taxed is another outstanding issue in some locations.

Another example is the recent unilateral change by the provincial administration of the dates for IA general assembly meetings in Antalya shifting them from May and September to June and December, so that they match routines used by the provincial administration. The new dates, however, do not fit well with the agricultural calendar or with IA's needs. In the words of one DSI official, "Its not practical, but its legal."

The larger question raised by this uncertain status relates to the public versus private stature of IAs. This can have implications for taxation, hiring and firing of staff, and the ability to engage in non-irrigation related functions and enterprises in the future.

The DSI is taking a hands-off stance with regard to new legislation, not opposing it, but preferring to let the Associations take the lead in advocating it. Ironically, the present law apparently does not allow Associations to federate into higher-level bodies, thus limiting, to some extent, their ability to promote this position. It appears, however, that many of the difficulties being experienced at present do not reflect fundamental deficiencies in the law itself, but rather a failure of the administration to provide timely and authoritative interpretations and guidance on applying existing law. It would be useful for the Ministry of the Interior and DSI to establish a small task force in Ankara to clarify issues such as the tax status of IAs and to respond definitively and consistently to questions posed to it by IAs.

Structure and Staff

Management Committee

The management committee forms a link between the association general assembly and the operating staff. The committee is made up of the chairman of the Association, the general secretary, the accountant, and 4 members selected by the general assembly. It is required to meet at least once in 15 days and serves as an executive committee to discuss budgets and plans and provide advice to the chairman. One very important additional function is to act on behalf of the general assembly in matters reserved for it between its scheduled meetings. Decisions made on behalf of the assembly in this way must be ratified by it during its next session.

Chairman and Staff

The chairman is elected by the assembly, as indicated above, and holds his position for 5 years. In almost all cases, the chairman is concurrently a village head or mayor of a member municipality. He is the key figure in the association and provides leadership, direction, and executive action. His responsibilities include representing the IA; preparing and submitting annual budgets, financial plans, and reports; implementing the decisions of the general assembly; executing the Association's work program, and ensuring collection of revenues. Duties and obligations are detailed in the Articles of Association.

The general secretary serves as the chief operating officer of the association. It is generally remarked by DSI officials that this position must be filled by an engineer, but this is not so stated in the Articles of Association or in the Model Transfer Agreement. Most general secretaries met were, in fact, agricultural engineers. The specific duties of the general secretary are determined by the chairman and assigned to him. He can thus be given a widely varying range of responsibilities relating to O&M, fee collection, and other aspects of the IA's work The one responsibility specifically assigned to him in the Articles of Association is the supervision of Association staff.

The accountant is responsible for preparing budgets, collecting income, keeping accounts, and submitting accounts for review and approval by "competent authority." The accountant must abide by the provisions of the Municipal Accountancy Statute.

Additional employees are hired by associations at their discretion. Both permanent full-time and temporary technical personnel and laborers are hired to operate and maintain scheme facilities. Other common positions in IAs are secretaries, additional accountants, drivers, and office helpers.

One chairman, who was also a municipal mayor, draws on the staff of the municipality to provide a number of supporting services, including, office remodeling. Payments were not always rendered for these services and the interactions between the IA and the municipality were numerous and blurred. This association had also spent little on maintenance and repairs for the previous year and had apparently accumulated a large unprogrammed cash surplus This case suggests the need for clearer rules on contracting and accounting relationships between an IA and its member municipalities and villages and stricter oversight of the budgets and financial transactions of Associations, particularly during their formative stages.

Women's Roles

Women's roles in the structures and processes described above are distinctly limited. In the three regions visited, there is just one case where the general assembly of an association includes a female member. One small association, of 20 visited, employed a female general secretary. Several Associations employed female accountants and many hired female office assistants and secretaries . It would appear that politics is largely closed to women's participation at the local level, at least in these regions, leading automatically to their exclusion from IA general assemblies and chairmanships under current selection practices.

Facilities and Equipment

Offices

All associations visited have established offices in borrowed (from DSI), rented, or purchased quarters and equipped them with standard office furniture, typewriters, calculators, a portrait of the founder of the republic, and a tea kitchen. Decor varies from extremely lavish in one case to quite basic in others, but most appeared very comfortable and functional. Many have hand-colored scheme layout blueprints on the walls, obtained from DSI. Usually offices are located in central towns, in part, perhaps, because of the dual roles played by the chairmen.

Computers and Communications

Virtually every IA visited in Konya and Izmir regions has purchased and set up a personal computer. The usual set up is a generic brand machine based on a 486 processor, color monitor, uninterruptable power supply, and a dot matrix printer. In Antalya region, by contrast, only one IA has so far purchased a computer, though others have plans to do so. This difference probably reflects priorities contained in advice given by regional DSI O&M staff. Computers are used for a number of functions. The most common application is budgeting and accounting, which is done on computer by most if not all associations possessing one. A related application of tracking irrigation fee payments is also common, as is managing the employee payroll. Another application encountered in Antalya is use of software developed by DSI to update and rationalize lists of farmers and owners of parcels served by an irrigation unit. Other software is purchased commercially and sometimes customized under contract with private software consultants.

Many IAs also have acquired two-way radio systems based on small hand-held units and an unmanned repeater station. These are usually linked with local DSI networks, at least on the unit used by the chairman, and may be linked with the radio nets of neighboring associations as well.

Vehicles and Heavy Equipment

Early capital purchases by newly-formed IAs include automobiles for use by the chairman and possibly the general secretary, and motorcycles for use by field staff. The DSI regional office in Antalya advises IAs to purchase these items first and rent maintenance equipment. One association in Izmir avoided the purchase of motorcycles by requiring that applicants for jobs as field technicians already have a motorcycle. The IA then simply provides the fuel.

A universal desire is to acquire heavy equipment for canal maintenance. This is particularly

important for the majority of schemes which were constructed using the Italian system of raised concrete kanalets for distributing water, especially at the secondary and tertiary levels. Precast kanalet sections are heavy and require machines for lifting and transport. The machine of choice for most IAs is a tractor with backhoe and front-end loader, which can also be used to raise and place kanalet sections. Alternatively, the tractor can be equipped with a crane for raising kanalet sections. Several of the Associations have acquired one or two tractors so equipped during their first year of operation and most others have plans to do so. Equipment purchase plans by one 17,000 hectare IA in Antalya, which has already purchased 2 tractors with accessories, include 2 trucks, a grader, and a wheeled excavator within the next two years.

DSI branch and scheme offices have a considerable amount of serviceable maintenance equipment which has now become redundant with the transfer of most of the large schemes in the four pilot regions to IAs. The DSI branch office in Manisa, Izmir Region, for example, has an extensive inventory of 67 pieces of heavy equipment, in addition to personal transport vehicles, but now operates only 4,790 hectares of irrigation (as well as several dams and barrages and some main canals and drains). Under present regulations, however, none of this equipment can be sold or transferred to IAs. This is an obvious problem which needs to be remedied through directive or legislation .

Some of the equipment in DSI inventories is specialized or is too large to be economically owned and operated by a single IA. There are several options available to IAs and DSI for dealing with this scale issue.

1. DSI can continue to provide services requiring this equipment to IAs, either on a cost-shared or a payment for service basis.

2. IAs can rent such equipment services from other administration or private entities.

3. Several associations can jointly purchase and operate such equipment. There is an existing contractual protocol for this which specifies in advance the responsibilities and rights of participating IAs with respect to the purchased equipment, though there can be only one purchase invoice in the name of one association which will then own the equipment.

4. Associations in a given area or basin can form a higher-level federation which could then purchase equipment and provide certain large-scale services to member IAs. It is DSI's opinion that present law does not allow the formation of such a federation, however.

4 Operation, Maintenance, and Finances

Background

This section describes the post-transfer operation of irrigation units managed by IAs. The time frame is one to two years after handing over. It thus captures a transition phase in which neither the IA nor DSI is fully responsible The intended ultimate situation, as described in the Model Transfer Agreement, is that the IAs be fully responsible for all operation, maintenance, repair, and administration required for sustainable unit operation.

Although the ATP is a national program, there are differences in the way it has been

implemented in different DSI regions. Moreover, IAs have responded in individualized ways to problems and local conditions. As a result, functions are performed somewhat differently in different IAs. There are strong common themes in these responses, however, and this section attempts to describe these. Where there are significant variations, or noteworthy local innovations, these are described also. Unless otherwise noted, practices described are common to most or all of the 20 IAs visited in Konya, Izmir, and Antalya regions.

Objectives

The Model Transfer Agreement defines the service delivery objective of IAs as the "delivery of water to farm terminals and distribution and utilization of it in an equitable manner." Most IA chairmen are also concerned about the timing of deliveries, as are the farmers themselves Many of the articles in the Model Transfer Agreement also stress the sustainable provision of irrigation service, which becomes an additional aspect of the objective set.

In addition to these service provision objectives, the transfer agreement and interviews with chairmen also suggest objectives related to administration and financial management. These include containing operating costs, maximizing fee collection rates, and acquisition of maintenance equipment. An implicit general objective set for IAs, based on these observations, is given in Box 2.

Standard DSI Practices

Operation

In untransferred schemes, DSI operates all irrigation structures and canals down to the level of the village using both permanent and temporary workers. If IGs are involved, DSI operational responsibility ceases at the village. If IGs are not involved, then DSI staff operate structures and deliver water down to the level of the individual farm. Operation involves the development of general irrigation plans based on expected cropping pattern, available water supply, and system capacity; preparation of operations maps, and operation of control structures and pumping facilities. Water delivery programs are based on daily, weekly, 10-day, monthly, or seasonal allocations. For scheduling farm-level deliveries, water demand requests are submitted by farmers to the office of the scheme Operations Engineer three days before water is required. The daily water allocation for each tertiary canal is based on the crops and crop areas shown on farmers' request forms Flow rates and total water use are measured and recorded at each major canal branch.

Maintenance

DSI maintenance and repair activities are guided by a "Maintenance and Repair Manual" adapted from a United States Bureau of Reclamation manual. Maintenance requirements are assessed annually by DSI inspection teams. These teams inspect irrigation and drainage facilities and prepare a costed list of maintenance and repair requirements for each scheme. Maintenance reports are submitted to the national DSI O&M Department through regional offices for evaluation and approval. Because of budget constraints, actual financial allocations are usually substantially less than the requests.

DSI undertakes most maintenance and repair work under force account with its own machinery and personnel. This work consists mainly of maintenance and repair of canals, kanalets,

sediment removal and weed control along waterways, and grading of roads. Only large and complicated work is awarded to private contractors.

Association Practices

Operation

Association operations practices are largely variations on 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. This list is used as a guide for planning water deliveries and levying fees. This list may require extensive updating by the IA before being used. This has been the case in Antalya where rapid tourism-based growth is changing land use patterns, in terms both of tenure practices within agriculture and between agriculture and other land uses. As a result, the Koprucay Right Bank IA invested 8 months of effort in updating the parcel areas shown on the list used by DSI in 1994 and the list of names of farmer operating the parcels. The IA also added the name of the owner of each parcel .

In May or June of each year, farmers fill out 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 to report on water availability and to decide on the starting and ending dates of the irrigation season. This is done, for example, in the important Gediz River Basin in Izmir Region. Previously DSI would calculate estimated water demands based on assumed cropping patterns, aggregate these, and compare with reservoir supply availability. Now, IAs and DSI cooperate to perform this function. DSI will then make an allocation of available supply among the units sharing the supply in proportion to their scheduled irrigated area. DSI then makes reservoir releases or river diversions in accordance with the planned schedule. IA technical staff distribute the water delivered to their main canal according to the IA's distributional plan.

At this point practices become quite diverse. Differences among DSI branches and scheme units were already present. IAs have now tailored operational plans to their own particular circumstances, increasing the variety. Some units operate a strict rotation at the secondary canal level. Some operate a continuous flow regime at secondary and tertiary levels. Although gravity schemes usually operate 24 hours/day, some pump schemes, which used to operate only during daylight hours, now operate at night as well. Units which have retained IGs in their operating structure (principally those in Izmir Region) continue to hand over lower-level operating responsibility to village muhtars or municipal mayors. Almost all schemes employ a large number of temporary workers during the irrigating season to manage water distribution. The number of workers hired is somewhat less when villages assume lower-level distribution responsibility, though the total number of workers is not necessarily smaller, since villages also hire temporary workers for this purpose.

At present, operating responsibilities in virtually all larger schemes are shared between DSI and IAs. DSI operates all dams and barrages and the larger 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

During the transitional phase DSI plays some additional roles. They provide on and off the job training to IA pump operators and other technicians and pay irrigation pumping electricity bills for the first post-transfer year. They also pay all drainage pumping bills. There are no specific plans for transferring this responsibility to IAs.

Maintenance

Routine maintenance and repair is carried out in the spring, prior to the start of the irrigating season. It is based on a joint maintenance review carried out the previous fall as described above under Standard DSI Practices. This inspection is required under the terms of the transfer agreement. Included in maintenance are cleaning of canals, kanalets, and syphons; replacement of broken kanalet sections; repair and replacement of seals between kanalet 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, kanalets, 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 kanalets. During the second year, the IA may assume limited responsibility for kanalet repair, perhaps using DSI machinery while supplying labor and fuel. As an IA acquires lifting and transport equipment of its own, more kanalet repair responsibility will devolve to the IA, until transfer of maintenance and repair responsibility within the IA unit is complete.

Kanalet sections themselves are sometimes supplied to IAs at a subsidized price, as in Izmir Region, or gratis as in Antalya. This is possible in Antalya because as land conversion to non-agricultural uses continues, kanalets are being removed, and the salvaged sections given to IAs for use as replacements.

Finances

Data on the finances of 12 IAs in Konya, Izmir and Antalya was obtained from monitoring reports for 1995 prepared for the DSI O&M Department. Background data on the 12 IAs is presented in Annex Table A.6. This was the first year that IA have used this report format, and they varied in their understanding of how to fill it in and in the thoroughness with which they did so . Nevertheless, the data provide useful insights into the way IAs are managing their finances.

Sources of Income

IA obtain income from four main sources (1) irrigation fees, (2) membership ("attendance") fees, (3) revenues from the supply of goods and services such as contract machinery hire, and (4) fines. On average, fee income represented 92 percent of total income (Table 4.1).

Table 4.1. Sources of income for selected IAs, 1995, in million Turkish Lira

REGION	IRRIGATION ASSOCIATION	SERVICE FEES	MEMBER FEES	GOODS & SERVICES	FINES	OTHER	TOTAL
IZMIR	GOKKAYA PUMP	1,797	209	0	72	384	2,461
IZMIR	GEDIZ	9,169	0	52	0	8	9,228
IZMIR	MESIR	11,000	0	272	4	0	11,276
IZMIR	SARIKIZ	17,111	0	105	0	0	17,217
IZMIR	MENEMEN SAG	10,245	185	0	50	6	10,486
IZMIR	MENEMEN SOL	24,436	500	247	90	133	25,406
KONYA	CUMRA	13,713	2,050	0	20	0	15,783
KONYA	CUMRA OVA	17,298	0	0	0	0	17,298
KONYA	IVRIZ SAG	10,485	1,489	0	110	5	12,089
KONYA	IVRIZ AKHUYUK CILLER	3,403	425	0	110	69	4,008
KONYA	IVRIZ SOL	11,751	1,200	1,476	2,121	716	17,264
ANTALYA	ALARA SAG	1,909	0	0	0	0	1,909
	TOTAL	132,317	6,057	2,152	2,576	1,322	144,424
	SHARE	91 6%	4 2%	1 5%	1 8%	0 9%	100 0%
	IAs REPORTING SOURCE	12	7	5	8	8	
SOURCE DSI O&M Reports							

Setting fees

DSI updates a nationwide fee schedule every spring for use in the schemes it manages. The schedule includes six different classes of charges, grouped according to level of provincial economic development, services provided (e.g. gravity irrigation, pumped irrigation, drainage, both irrigation and drainage), and so on. The theoretical basis for the assessment is that the fee should equal 5 percent of value added to crop output by irrigation. In practice, fee levels are based on the previous year's O&M expenditures, allocated over the assumed irrigated area, estimated at 85 percent of the irrigation area. Within each of the six categories there are separate fee rates for 29 crops, differentiated by their water demands and assumed profitability. The complete schedule is thus made up of 174 different fee rates. All assessments are made on a per unit area basis. The fee rates proposed by DSI are modified, and usually reduced, by the Cabinet of Ministers before being issued.

An unusual aspect of the fee setting process is that fees are assessed not for the current year but for the year past. Collections are then made in the year after the fees are set. The result is that fees collected in a given year actually relate to expenditures of two years previous. In a climate of low inflation, this might have an advantage of precision, since actual costs would be known when levels were set. In Turkey with its raging inflation rate, the result is the collection of only a small fraction, in real terms, of the amounts expended, even if all farmers actually paid their fees.

IAs have adopted an improved version of this system, 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 management 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. Many IAs also consult neighboring IAs in the process of determining appropriate fee levels. Sometimes adjacent IAs, for example left bank and right bank schemes sharing a diversion, will want their fee levels to be identical. However if cost structures are different, many will quite readily set lower or higher fees than a neighbor. The review by the general assembly may simply be a formality, or it may generate intense discussion. Discussions with IA chairmen indicated that they were keenly aware of the need to satisfy their irrigator constituency when setting the fee levels and payment conditions. A common strategy was to wait for DSI fee rates to be issued and then undercut them to demonstrate to irrigators the advantages of the new management .

Fee rates reported by the 12 IAs ranged from TL 500,000 (US$ 7.81) per hectare, for nursery crops in Ivriz (Konya Region) to TL 4,000,000 (US$ 62.50) per hectare for vegetables in the Gokkaya Pump Scheme (Izmir Region) (Annex Table A.7). The weighted average fee assessment per hectare irrigated ranged from TL 668,958 (US$ 10.45) to TL 2,960,652 (US$ 46 26) (Table 4 2).

Table 4.2. Average fee assessments per hectare for selected IAs, 1995

REGION	IRRIGATION ASSOCIATION	IRRIGATED AREA [HA]	TOTAL FEE ASSESSMENT [MILLION TL]	AVERAGE FEE ASSESSMENT [MILLION TL/HA]	AVERAGE FEE ASSESSMENT [US$/HA]
IZMIR	GOKKAYA PUMP	607	1,797	2 960	$46 26
IZMIR	GEDIZ	4,807	9,169	1 907	$29 80
IZMIR	MESIR	5,820	11,000	1 890	$29 53
IZMIR	SARIKIZ	8,808	17,111	1 943	$30 35
IZMIR	MENEMEN SAG	4,818	10,245	2 126	$33 22
IZMIR	MENEMEN SOL	13,018	24,436	1 877	$29 33
KONYA	CUMRA	20,499	13,713	0 669	$10 45
KONYA	CUMRA OVA	24,922	17,298	0 694	$10 85
KONYA	IVRIZ SAG	12,878	10,485	0 814	$12 72
KONYA	IVRIZ AKHUYUK CILLER	3,942	3,403	0 863	$13 49
KONYA	IVRIZ SOL	9,589	11,750	1 225	$19 15
ANTALYA	ALARA SAG	905	1,909	2 109	$32 96
AVERAGE					$24 84

		9,218		1 590	
HIGHEST				2 960	$46 26
LOWEST				0 669	$10 45
RATIO OF HIGH LOW IA				4 425	
SOURCE DSI O&M REPORTS					
NOTE TL INDICATES TURKISH LIRA, EXCHANGE RATE US$1 00 = TL 64,000					

Collecting fees

In DSI-managed schemes, the first installment of fees are due on the first of 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-off 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. This penalty rate is legally sanctioned by the administration and for 1996 will be increased to 15 percent per month

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.

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. In IAs that use the services of Irrigation Groups, the IG may make some or all of the collections at the village level. All money

collected is turned over to the IA, however, which then remits to the IGs any portion due to them.

Capital Costs

Administration policy with respect to investment cost recovery has been inconsistent. Nominally, full repayment is expected with a repayment period of 50 years. Interest on this amount could be charged, with the approval of the government, but in practice a zero rate of interest is applied. However, for political reasons, no schemes built after 1985 have been added to the repayment list and so schemes built during the past 10 years currently make no amortization payments.

For schemes built before 1985, the policy mentioned above applies. However, because no inflation adjustment is applied to the rates fixed at the time of completion, and because the rate of inflation in Turkey has been very high, recovery of investment in real terms is negligible. The current capital amortization rates have remained unchanged since 1985, during which period, wholesale prices have increased by a factor of 58. Schemes where amortization charges are applied are classified into categories based on geographic location, socioeconomic conditions, the amount of the investment, and the year in which the scheme was built. Rates currently charged range from TL 7,500 (US$ 0.12) per hectare to TL 3,000 (US$ 0.05) per hectare.

Amortization charges are not affected by transfer, though under the transfer agreement, IAs become responsible for collecting and forwarding amounts due to the Ministry of Finance. Six of the 12 IAs reviewed were collecting amortization charges.

Expenditure Patterns Across IAs

Recurrent

Recurrent expenditures are reported on the O&M monitoring forms used by DSI under headings for personnel, travel, services, goods and materials, maintenance and repair, taxes and other. Of total expenditures, the largest share went toward personnel (22 percent). Approximately 15 percent was allocated for maintenance and repair (Annex Table A.8).

Approximately 48 percent of maintenance and repair costs were for cleaning, with the next two most important categories being kanalet repairs (19 percent) and concrete repairs (14 percent) (Annex Table A.9).

Capital

Capital expenditures are reported under headings for office furniture and equipment, and vehicles, machinery and equipment. The simple average expenditure on capital goods (28 7 percent) was about a quarter of total first year expenditure, while 71.3 percent of the total, on average, was recurrent expenditure The range in the proportion allocated to capital costs was from 2 percent to 63 percent (Annex Table A.10).

Reserves

The difference between total expected income (assuming 100 percent fee collection) and

expenditure on recurrent and capital costs was used to assess the expected level of reserves. On average, IA reserves represented 34 percent of total expected income, with an average value of TL 3.645 billion (US$ 56,949) (Annex Table A.11). Proportions of total budgets ranged from -2 percent to 81 percent. It is likely that in most cases, reserves are being accumulated for capital goods purchases. Summing capital expenditures and reserves, gives an average of 51.3 percent of total budgets. The accumulation of reserves and the extensive capital goods purchases being made are largely consequences of the fact that IAs are charging full fees for services but are still receiving DSI assistance with maintenance during the transition period. This is a reasonable strategy to follow, allowing IAs to generate start-up surpluses for capital purchases. IAs will need to reassess their financial positions once the transition period is ended to determine needs for funds for additional capital purchases and to create sinking funds f

Inflation and Interest Rates

Inflation

The rate of inflation in Turkey is high and accelerating. Average annual changes in the official general wholesale price index and the DSI construction index are shown in Figure 4.1. As seen, the current wholesale price inflation rate is around 90 percent. Such a high rate of inflation creates a powerful incentive to delay any payment due as long as possible, and has resulted in the IA imposing the maximum allowable penalty of 10 percent per month for overdue payments (rising to 15 percent per month in 1996). The 1996 rate should act as a genuine inducement for timely payment. Under the DSI policy of charging a one-time penalty of 10 percent on overdue fee assessments, the incentive to delay is undiminished.

Another implication of such a high rate of inflation is that prices must be constantly raised to keep pace, and rises must be anticipated in, for example, setting irrigation fee rates 6 months in advance. Because of general uncertainty about the true rate of inflation, it is also difficult for irrigators' to judge the validity of rate increases, at least over the short run, hampering accountability.

Lending rates

A pair of IA chairmen in Antalya District each suggested that the cost to their Association of a commercial equipment purchase loan would be 130 to 140 percent per annum. This is consistent with the commercial bank loan rate quoted in Antalya on 19 February 1996 of 140 percent for a secured loan, but extremely high in the face of savings interest rates which averaged about 63 percent per annum for 1 month time deposits, and 91 percent per annum for 1 year time deposits . A subsidized lending program for agriculture is available from the state-owned agricultural bank at an interest rate of about 50 percent per annum for both short-term production and capital loans, which is a negative real rate of interest. For tractors and harvesting machines, the current rate is 55 percent, and for other capital items the rate is 43 percent. Loans from this window have been discussed as a possible source of credit for equipment purchases by Associations, though to date, no such loans have been made. There may thus be some justification for a below-market-rate lending program for equipment purchase, given the very high commercial rates prevailing, but in no event should this rate be lower than the interest rate on savings available to the Associations, in light of the substantial reserves which many are accumulating.

5 Results of IMT

Costs of Irrigation Service Provision

Although IAs have generally set their fees below those set by DSI, the fact that IA are actually collecting the fees, whereas the government frequently did not, has meant an increase in the cost of irrigation service for many farmers. If it is assumed that DSI and IA fee rates are about equal, then an increase in average repayment rate from 38 percent to 72 percent suggests that the amount paid by farmers has roughly doubled as a result of the transfers.

DSI's operating costs, after falling in the late 1980s, rose, in real terms, to a level 26 percent higher in 1993 than in 1985 (Table 5.1). Because actual irrigated area expanded by 13 percent over this period, however, O&M expenditures in DSI operated systems on a per hectare basis increased from 1.915 million TL in 1985 to 2.142 million TL in 1993 in real terms, a rise of 12 percent.

This overall increase masks significant internal distortions, however, and separating expenditures by operations and maintenance, and disaggregating further by expenditure category is revealing. Over the 10-year period, 1985 to 1994, while operations expenditures rose by 81 percent, maintenance expenditures fell by 32 percent. Within the operations category, personnel expenditures were the largest single category, accounting for 53 percent of total O&M expenditures, on average, over the period. Moreover, increases in personnel expenditures clearly drove the increases in operations expenditures. The share of personnel expenditures rose from about one-quarter of total operations expenditures in 1985 to about two-thirds of the total in 1993. Between 1993 and 1994 there was a modest reduction in personnel costs, and in their share of total operational expenditures, to which IMT may have contributed. Nevertheless, total operating expenses also rose between 1993 and 1994. With certain constraints though, DSI personnel expenses can be expected to continue to decline as more schemes are transferred. It is reasonable also to expect total O&M personnel expenditures (IA and DSI together) to decline as IA-employed laborers replace much more costly DSI-employed staff.

A general decline in both the absolute maintenance expenditure and in its share of total O&M expenditure is evident over the 10-year period. In 1985, the split between operations and maintenance expenditures was about even. However, by 1994, the share of maintenance in the total had decreased from 47 percent to 25 percent. This trend has contributed to a worrisome decline in the condition of many systems (WB, 1993: Annex 7, 5) and may mean that IA maintenance expenditures will need to go up post-transfer if the deterioration is to be arrested and scheme performance is maintained or improved.

It was not possible to assess the effect of IMT on the overall cost of service provision. Aside from the lack of complete O&M cost data for 1995, the IAs reviewed took up O&M responsibilities on different dates in 1995. Furthermore, costs during initial years are probably not representative of long term average costs because of some duplication of O&M capacity by DSI and the IAs and the added costs of training and skill transfer.

Cost Recovery

O&M Costs

Fee collection

IA O&M fee collection takes place against a background of government laxness in the pursuit of irrigation fees. Political and administrative factors have contributed to government O&M fee collection rates averaging only 38% between 1989 and 1994 (Table 5.2). Consequently IA rigor in fee collection has come as a shock to many farmers.

Table 5.2. O&M cost recovery for DSI-operated systems, in thousand Turkish Lira

YEAR	COLLECTABLE	COLLECTED	COLLECTION RATE [%]
	(1)	(2)	(2/1)
1989	44,181,651	16,964,181	38 4%
1990	65,786,896	24,276,843	36 9%
1991	109,408,941	35,860,343	32 8%
1992	175,676,514	58,319,017	33 2%
1993	255,342,818	107,295,687	42 0%
1994	435,598,165	183,280,193	42 1%
AVERAGE			37 6%
SOURCE DSI O&M Reports			
NOTE Collected amounts do not include penalties paid			

In this light, the average collection rate of 72% as of the end of 1995, for the IAs reviewed by the team, can be seen as a significant achievement (Table 5.3). Furthermore, chairmen and general secretaries of a number of the IA visited indicated that collections for 1995 had continued after the monitoring reports were prepared. Most IA were confident of collecting at least 90% of the fees due.

Table 5.3. 1995 season fee collection rates for selected IAs as of the end of 1995.

REGION	IA NAME	FEES ASSESSED	FEES COLLECTED	COLLECTION RATE
		THOUSAND TL	THOUSAND TL	%
IZMIR	GOKKAYA	1,797,116	1,260,517	70 1%
IZMIR	GEDIZ	9,168,600	8,370,456	91 3%
IZMIR	MESIR	11,000,000	9,400,000	85 5%
IZMIR	SARIKIZ	17,111,443	15,156,867	88 6%
IZMIR	MENEMEN SAG	10,244,748	5,072,610	49 5%
IZMIR	MENEMEN SOL	24,435,727	17,507,652	71 6%
KONYA	CUMRA	13,713,118	8,348,065	60 9%
KONYA	CUMRA OVA	17,298,124	9,500,000	54 9%

KONYA	IVRIZ SAG	10,485,210	7,334,433	70 0%
KONYA	IVRIZ AKHUYUK CILLER	3,403,359	3,119,678	91 7%
KONYA	IVRIZ SOL	11,750,972	9,156,839	77 9%
ANTALYA	ALARA SAG	1,908,883	1,352,726	70 9%
AVERAGE				72 2%
LOWEST				49 5%
HIGHEST				91 7%
SOURCE DSI O&M Reports				

IA fee collection thus appears to be off to a good start. Key issues for the future will be. 1) how IAs handle non-payment and, 2) whether they will be able to maintain their credibility and commitment to fee collection. Independence from political interference and populist "relaxation" of financial discipline will also be critical.

Fee levels

As described earlier, IAs generally set their fee rates at or below DSI rates. In principle fee rates set by DSI are to cover 100% of O&M costs. In practice, a combination of factors, including fee structures set to recover less than actually incurred O&M cost , fee collection two years after O&M costs are incurred, high inflation, and an overestimated irrigation ratio , has meant that even if collection rates were high, DSI fee rates could only recover a fraction of DSI's O&M costs. This suggests that even with strong collection performance, so long as IAs model their O&M fees on DSI's rates, they may be unable to cover their full O&M costs.

The extent to which maintenance expenditures continue to be shared during the transition to IA management is illustrated in Table 5.4.

Table 5.4. Allocation of estimated maintenance expenditures for 1996

IRRIGATION SCHEME	NET IRRIGATION AREA [HA]	ESTIMATED MAINTENANCE EXPENDITURE		
		[MILLION TL]	SHARE [%]	[TL/HECTARE]
IZMIR REGION				
AHMETLI	54,717			
IA		21,059	44 8%	384,871

	DSI		26,000	55 3%	475,172
	TOTAL		47,059	100 0%	860,043
	SARIGOL	1,927			
	IA		544	5 4%	282,304
	DSI		9,576	94 6%	4,969,382
	TOTAL		10,120	100 0%	5,251,686
	ALASEHIR	11,807			
	IA		7,691	23 3%	651,393
	DSI		25,353	76 7%	2,147,286
	TOTAL		33,044	100 0%	2,798,679
KONYA REGION					
	IVRIZ	32,253			
	IA		11,276	33 0%	349,600
	DSI		22,895	67 0%	709,834
	TOTAL		34,171	100 0%	1,059,434
	CUMRA	59,704			
	IA		7,841	19 5%	131,331
	DSI		32,380	80 5%	542,342

	TOTAL		40,221	100 0%	673,673
SOURCE DSI regional offices					

The table shows that, in the selected schemes, the contribution of IAs to anticipated 1996 maintenance expenditures ranges from 5% to 45%, with DSI making up the balance . Table 5 5 shows 1995 per hectare irrigation fees for selected IAs as a percent of total per hectare maintenance expenditures. At current fee rates, some IAs could not cover even the full cost of system maintenance, much less the combined cost of operation and maintenance.

Table 5.5. Estimated 1996 maintenance expenditures and 1995 fee assessments for selected IAs

IRRIGATION SCHEME	IRRIGATION ASSOCIATION	1996 MAINTENANCE EXPENDITURE [TL/HA]	AVERAGE 1995 FEE ASSESSMENT [TL/HA]	(2) AS SHARE OF (1) [%]
		(1)	(2)	
IZMIR REGION				
AHMETLI		860,043		
	MESIR		1,890,034	220%
	GEDIZ		1,907,343	222%
	SARIKIZ		1,942,716	226%
	GOKKAYA		2,960,652	344%
KONYA REGION				
IVRIZ		1,059,434		
	AKHUYUK-CILLER		863,358	81%
	SOL VE YILDIZLI		1,225,464	116%

		SAG		814,196	77%
	CUMRA		673,673		
		CUMRA		668,965	99%
		OVA		694,091	103%
SOURCE Tables 3 2 and 4 3 and DSI data					

Table 5.4 also shows the variation in total estimated per hectare maintenance cost among schemes. Total annual maintenance expenditures range from TL 673,573/hectare (US$ 10.52) to TL 5,251,687/hectare (US$ 82.06). Presumably this variation can be attributed to the specific characteristics of the scheme (e.g. age, design, water source, condition, climate, sediment loads, and so on). Currently fee rates are free to vary among schemes and even among IAs within a particular scheme. This is appropriate from an economic efficiency point of view. It may be, however, that as fees increase to cover IAs' increasing share of total O&M costs, there will be calls from farmers for cross subsidization or equalization of fee levels Such calls would create very difficult questions for public policy and mandating subsidies would open the door to more wide-ranging political interference in irrigation system management.

Nevertheless, the improvement in the rate of O&M cost recovery under the IA management is clear and commendable. The challenge will be to maintain current levels of fee collection in the face of the rising real fee levels which will be required in some systems in the future.

Capital costs

As indicated earlier, the IA contribution to capital cost recovery takes the form of collecting the official amortization charge which is then turned over to the government. So long as the government continues to attempt to recover only a small portion of total irrigation investment cost, this amount will remain insignificant compared to O&M related charges. Assuming that capital charges are collected along with O&M fees, rates of recovery for the two fees are likely to be similar.

The larger question is whether farmers should bear all or part of the capital costs of new system construction and rehabilitation costs in the future. Although there is a precedent to build on, government laxness in undertaking any sort of capital cost recovery over the past decade may make the reintroduction of such recovery difficult. Ultimately the answer hinges on general public policy with respect to the irrigated agriculture sector and of farmers ability to pay. However, while the recovery of O&M costs is an essential integral feature of a successful management transfer program, the question of capital cost recovery is separable and should not be allowed to interfere with the promising transfer efforts underway. **Farm Income and Ability to Pay**

Assuming that quality of irrigation service and extent of irrigation coverage both hold constant before and after transfer, any increase in the irrigation fee collection rate will result in a corresponding decrease in farm income. However, at present, farmers pay only a small fraction of their total variable costs for irrigation service and the great majority of farmers, at least those farmers growing cash crops, should be able to afford to bear the full cost of O&M. It was estimated in 1991 that irrigation in Turkey increases the tonnage production per hectare by a factor of 7.4 and increases the value added per hectare by a factor of 2.6. It was estimated that an irrigation fee which would allow for recovery of the total cost of O&M would represent only 7.6% of the average increment in net farm income as a result of irrigation development (WB, 1993, 16). The ability of farmers to afford to cover O&M costs is further supported by data for two of the major crops in Izmir Region, seedless raisins and cotton. Association irrigation fees for these two crops represented just 3% of the total variable costs of production in 1995 (Table 5.6).

Table 5.6. Irrigation fees in relation to 1995 cotton and raisin variable costs of production and gross margins, Manisa, Izmir

	SEEDLESS RAISINS			COTTON	
	[TL/DECARE]	FEE SHARE [%]		[TL/DECARE]	FEE SHARE[%]
IRRIGATION FEE	200,000			300,000	
VALUE OF PRODUCTION	12,012,000	1 7%		14,280,000	2 1%
TOTAL VARIABLE COSTS	6,295,000	3 2%		8,930,000	3 4%
GROSS MARGIN	5,717,000	3 5%		5,350,000	5 6%
SOURCE Manisa Farmers' Union					
NOTE Seedless grapes yield 260 kg/decare @ TL 46,200/KG Cotton yields 280 KG/decare @ TL 51,000/KG One decare equals 0 1 hectare					

However, the coastal provinces in which cash crops predominate may not be representative of the situation elsewhere in Turkey. Cotton yields in Izmir, for example, are nearly 3 times the national average. Regional variations must be considered in setting repayment policies.

Quality of Irrigation Service

The purpose of any irrigation system is to provide high quality irrigation service to farmers for growing crops. The effects of any program which modifies the organizational arrangements for providing this service must therefore be evaluated in terms of the quality of that service There are several basic dimensions in which quality can be defined and evaluated. These include the amount of water supplied, its distribution over the command area, and its distribution over time. Related measures include the area provided with acceptable irrigation service and the

duration of the irrigation season.

This review comes at too early a point in the ATP to be able to assess changes in the quality of irrigation service provided by the associations relative to that of DSI provided service. In many locations, data for 1995, the first year of IA operation in most cases, were not yet available Even were they were available, a single year of post transfer data does not allow for a valid before and after comparison. There are too many intervening factors to confound the comparison.

The data in Table 5.7 are only illustrative. They describe the area actually served by three irrigation schemes in Antalya region which were operated in 1993 and 1994 by DSI, and in 1995 by 6 IAs, and show increases in the area served after the transfer of from 20 to 40 percent. Figures describing the amount of water available to each scheme in the respective years are not available. Annual precipitation figures for a nearby gaging station do show that rainfall was above the long term average of 1,069 mm in 1993 and 1994, and slightly below average in 1995, which should, by itself, produce a change in irrigated area opposite of the one observed. Nevertheless, if the change is in response to management transfer, it is in the expected direction and suggests a performance hypothesis for further testing when additional data are available. That hypothesis is that management transfer increases performance of Turkish irrigation systems by significantly expanding the area under irrigation with a fixed water supply, while yields hold constant. We repeat that this is an hypothesis and not a conclusion.

Table 5.7. Actual irrigated area, in hectares, in three irrigation schemes, 1993-95

SCHEME	1993 AREA [HA]	1994 AREA [HA]	1995 AREA [HA]	INCREASE OF 1995 OVER 1993-94 AVERAGE
KOPRUCAY				
LEFT BANK	NA	NA	11,517	
RIGHT BANK	NA	NA	4,754	
TOTAL	14,123	12,761	16,271	21%
MANAVGAT				
LEFT BANK	2,418	2,268	3,460	
RIGHT BANK	937	912	1,175	
TOTAL	3,355	3,180	4,635	42%

ALARE					
	LEFT BANK	563	634	782	
	RIGHT BANK	403	410	475	
	TOTAL	966	1,044	1,257	25%
ANNUAL PRECIPITATION [MM]					
SERIK, ANTALYA		1,145	1,381	1,027	(19)%
NOTE NA indicates data not available					

DSI Staff Levels, Structure, and Functions

DSI employs about 25,000 people in carrying out its functions, which include project planning, design, and construction as well as operations and maintenance (Annex Table A.12). Permanent laborers constitute nearly three-quarters of the total. Other significant fractions are technical services (17 percent) and general administrative services (8 percent). Overall staff levels have declined steadily in recent years, falling by 9 percent between 1990 and 1995. The largest share of this decline results from shrinkage in the number of permanent laborers (-12 8 percent) and, to a lesser extent, administrative personnel (-2.8 percent). Professional technical staff numbers have actually increased by 8.5 percent over this period (Figure 5.1)

Total staff levels do not appear to respond to the transfer program, since staff levels in 1994 and 1995 are virtually identical. Rather the overall reduction, which has taken place over 5 or 6 years, appears to be a result of broader government policies which have generally prohibited the hiring of new staff since 1983. However, it may be unrealistic to look impacts of the ATP in terms of significant reductions in overall DSI staff levels, since these levels include personnel working on a vigorous ongoing irrigation development program as well as O&M staff.

Field O&M staff levels have shown a roughly similar decline of 10 percent between 1990 and 1994, a reduction of about 1,000 staff members (Annex Table A.13). However, here the reductions have taken place across the board (Annex Table A.14). If skilled and unskilled laborers are pooled, the largest reduction has taken place in numbers of technicians (18 percent) and support staff (20 percent). Engineer and senior technician levels have declined by a more modest 7 percent, and labor by just 3 percent. Interestingly, there has been a major shift in the division between skilled and unskilled laborer, with the former increasing by 35 percent, while the latter declined by 30 percent. It is not known if this shift represents a major staff turnover, or whether it is simply an upgrading of staff from a lower category to a higher one. Given the strength of trade unions among non-professional staff, the later scenario seems more likely. The connection between this shift and the transfer program, if any, is unknown. Because 1995 figures were unavailable, the possible effect of the ATP on O&M staff levels can not be evaluated, though the overall reduction since 1990 is consistent with the policy prohibition on new hiring noted above.

Within the 4 pilot regions, where the most significant impacts of the ATP should be felt, a

reduction in staff numbers of 11 percent between 1990 and 1994 is observed (Annex Table A.15), roughly the same reduction observed in O&M staff nationwide, and in total DSI staff numbers. Interestingly, however, between 1994 and 1995, there was an additional decline in staff numbers in three of the four pilot regions of 10 percentage points . If this trend holds for Adana and other regions as transfer progresses, it could lead to significant reductions in the cost to the government of system operations and maintenance.

Across the four pilot regions the deepest cuts were in numbers of technicians and laborers, especially unskilled laborers. Again there was an increase in the number of skilled workers, which was more than offset by the halving of the number of unskilled laborers, resulting in a net reduction of the combined labor force of about 27 percent. The number of engineers and senior technicians held nearly constant, although in Konya and Antalya the number of engineers and senior technicians actually increased. There were modest reductions in most of the pilot regions in the number of other support staff. This pattern is consistent with a transfer of responsibility for operations and light maintenance from DSI to IAs. The need for engineers and senior technicians would be expected to remain constant, at least during initial phases of the program, to manage the transfer process and to manage DSI operations. At the same time, the need for technicians and unskilled laborers responsible for carrying out O&M would decline sharply. Skilled laborers would presumably still be needed for main system maintenance and repair of kanalets, though not in increased numbers. The reason for this increase is thus unclear. The timing of the reductions is also consistent with the requirements of the transfer process, with major reductions occurring mainly in 1994 and 1995.

Due to the strength of employee unions, DSI has not been able to make the kind of cuts in the number of civil service staff that it might like. Staff redeployment and retrenchment has been the subject of intense negotiation between DSI management and the unions, and the overall reduction in the number of O&M staff in pilot regions has been achieved mainly through internal transfers. The initial expectation of program planners was that O&M staff made redundant by the transfer program could be reassigned to newly developed systems. However, the speed with which the program proceeded reduced staff needs at a much faster pace than growth elsewhere could absorb, leading to excess staff levels in many schemes.

At the same time, the job security enjoyed by the technical staff may have contributed to the speed and effectiveness of the transfer program. Since the technical staff responsible for implementing the IMT program would not feel threatened by it, they may have been more enthusiastic in promoting it.

As transfer progresses, DSI O&M staff responsibilities will shift from O&M implementation to advisory and regulatory functions, plus the continuing operation and maintenance of main system structures. The transfer of main system management responsibilities is likely to be a longer term activity.

Another ongoing responsibility will be the monitoring and evaluation of the technical and financial status of the IA operations. The DSI transfer team has introduced a monitoring report which will be an extremely useful tool for assessing the ongoing performance of IAs. The experience with the first year of reporting needs to be reviewed, the reporting format refined, especially in relation to the financial information which has been recorded, and a training program for both DSI regional and field staff and for IAs implemented.

In addition to evaluating the data provided by the monitoring protocols, in the next year or two

independent studies on the quality of irrigation service, agricultural and financial performance, and irrigator experience under the transfer program should be conducted to evaluate the impacts of the program and it's sustainability.

Conflict and Conflict Management

Prior to transfer, DSI O&M staff are the focus of complaints and resolution of conflicts related to the irrigation system operation. Farmers' principle complaints include dissatisfaction with the quantity and timing of water delivery, unhappiness with bills resulting in refusal to pay fees (particularly when it is claimed that water came from a private well rather than from the DSI system), demands for repairs to system structures, and dissatisfaction regarding the location of irrigation canals. Complaints are made in face-to-face meetings with DSI staff or local politicians and through letters to DSI Farmer-to-farmer disputes, e.g. disputes regarding taking water out of turn or head-tail problems, which cannot be resolved by the disputants are taken up by the muhtar and the council of elders or through the courts.

After transfer, complaints regarding system operation are usually directed to the IA chairman and staff, and sometimes to the village representative on the General Assembly (e.g. the muhtar). This has reduced the demands on DSI staff to deal with farmer complaints. The DSI transfer team reported that they have received only a handful of complaints from farmers on schemes which have been transferred (compared with approximately 200 per year pre-transfer).

6 Effectiveness and Sustainability of the Transfer Program

Effectiveness

Having presented the preliminary evidence available relating to the operational results of transferring system management responsibility, this chapter summarizes the results of that analysis in terms of the objectives of both government and Associations. It also examines two other dimensions of program success. The first is the effectiveness with which the transfer process itself has been implemented. The second comprises the set of longer-term problems and constraints which may emerge to make it difficult or impossible for the new management set-up to function as intended.

Outcomes and Impacts

National Objectives

Three objectives can be inferred from the earlier analysis of the government's motives in initiating a program of management transfer. These are (1) to reduce public costs of operating and maintaining public irrigation schemes, (2) to improve the quality of irrigation service in public irrigation schemes, and (3) to free DSI staff for construction-related work.

Reducing Costs

Reducing public irrigation O&M costs is an alternative to increasing cost recovery from farmers. In Turkey, this appears to have been a more feasible course than enhancing cost recovery directly. There are several ways in which costs are reduced by a successful transfer

program. (1) O&M staff levels can be reduced, saving the cost of salary and benefit payments. (2) Certain variable operating costs, such as the cost of fuel, spare parts, casual hired labor, supplies and materials, and specialized contracted services can be eliminated. (3) Equipment replacement costs can be eliminated by transferring responsibility for procurement directly to irrigators. (4) Certain fixed costs, such as building maintenance and replacement, can be reduced over the longer term.

Quantitative evidence gives a tentative indication that the ATP is beginning to have an effect in reducing O&M staff levels, though there is no apparent effect on overall DSI staff levels as yet. Reduction is hampered by restrictive union work rules and the political strength of employee unions. So far, O&M staff reductions have been confined largely to supporting positions. Reduction of variable costs is almost certain, given the nature of the agreements between the IAs and DSI. Because of the phased nature of the transfer, such reductions in DSI expenditures will occur gradually. Data to evaluate the magnitude of this change were not available to the study team. Although the mechanism for equipment purchase by, or transfer to, IAs has yet to be worked out, it seems likely that DSI's equipment-related responsibilities will be diminished, though not eliminated. DSI will continue to require equipment to operate and maintain storage dams, major regulators, some main canals, buildings, and other facilities. The disposition of surplus DSI building space has apparently not been thoroughly considered. Currently DSI does provide office space (usually free of charge) to some IAs. Whether it will continue to do so is unknown. Presumably over time, DSI will reduce the building space which it must service and maintain.

Some DSI facilities, such as equipment maintenance facilities, will be overscaled for its new operational level, but may be difficult to downsize. At the same time, IAs will require new maintenance facilities as they acquire their own equipment. Arrangements should be explored for keeping such facilities intact and either transferring them to IAs, or groups of IAs, or contracting with IAs to provide equipment maintenance services on a cost-competitive basis. Plans for disposing of other DSI resources which have or will become surplus, such as heavy maintenance equipment, vehicles, and buildings, should also be developed, in conjunction with IAs.

Improving Service Quality

It is too early to draw conclusions about the quality of irrigation services provided by IAs compared to those previously provided by DSI. It might be expected that service would become more flexible and responsive to farmer's demands, that the extent of coverage with a given amount of water would expand, and that the timing of deliveries might become more closely matched with farmer and crop demand patterns. At present there is little information with which to evaluate these hypotheses. It will be extremely important for IAs and DSI to collect flow and area data over the next several years which will allow before and after comparisons to assess the effect of IMT on irrigation service quality. Limited evidence from three irrigation schemes in Antalya suggests that transferred systems may be able to significantly increase their effective service area with a fixed amount of water.

Releasing O&M Staff for Construction Activities

Because it has a major water resource development program underway, in the Southeastern Anatolian region and elsewhere, one DSI objective is said to be making more staff available for design and construction (D&C) related tasks. This process can take place by direct transfers

of staff, or by reallocating vacant O&M positions to D&C. Underlying this process are three important constraints. The first is the pressure the unionized workforce exerts against layoffs and transfers. This limits severely the ability of DSI to release or reassign redundant staff. The second is the need for different skills in the design and construction field which may limit direct reassignment. The third is the general freeze on hiring by DSI and other government agencies which has been in place since the early 1980s. Although there are some exceptions to the freeze, it has served to limit the size of the DSI staff and has been a powerful motivating force behind both the introduction of the ATP and the modest reduction in DSI staff levels which has occurred in recent years. The small number of recent new-hire staff have been assigned to D&C tasks.

There is another possible dimension to the relationship between D&C staff assignments and the ATP. The World Bank has been advocating improved cost recovery in Turkey for many years, with very limited results. The World Bank is also an important financier of water resource development in Turkey. Because management transfer is a partial substitute for improved cost recovery, its implementation may be seen by both the government and the Bank as a more realistic way of satisfying Bank concerns over cost recovery, thereby facilitating additional irrigation lending to the country. There is thus an added complementarity between the ATP and the national water resource development program. ***Association Objectives***

As inferred from the Model Transfer Agreement, objectives of IA are (1) to provide high quality irrigation service to all association members, (2) to do this reliably and sustainably, (3) to contain costs, (4) to collect fees effectively, and (5) to develop the capability for self-reliant O&M. As indicted above, it is premature to assess the quality of service delivery, however, collecting data to allow this to be done in several years time is extremely important. The ability of the IA to contain costs is also somewhat speculative at this point. However, in light of the relative salary levels of DSI and IA employees, it should be very possible to sharply reduce this important budgetary expenditure. It should be remembered that more than half of DSI operating costs consisted of personnel expenses. On the other hand, IAs, especially the smaller ones, lack certain economies of scale enjoyed by DSI, such as bulk purchase discounts and the ability to spread lumpy capital good expenditures across a number of schemes. This is a problem that must be addressed. IAs are clearly better at fee collection than is the government This is shown by first-year collection percentages which, even though incomplete at the time of the review, were already approximately double those of the Ministry of Finance for DSI-operated schemes. With respect to developing the capacity for self-reliant O&M, most associations in the pilot regions have succeeded in hiring capable technical staff to perform O&M functions. Several have begun to acquire heavy equipment or to accumulate funds to purchase heavy equipment. As noted above, however, the scale problem remains to be addressed. Sustainability is discussed in a subsequent section. **ATP Program Implementation**

Execution

The Accelerated Transfer Program (ATP) in being effectively implemented by a dedicated group of DSI professionals. Execution has been characterized by a number of important features.

The first is flexibility and experimentation in execution. The program has given appropriate guidance through model transfer agreements and articles of transfer, but has allowed individual IAs and DSI regions sufficient flexibility to adapt to local conditions and constraints.

Second, the approach has been evolutionary, with transfer taking place in phases and with succeeding phases defined in general terms so that learning can be incorporated before implementation. For example, the phased transfer of maintenance responsibility is being carried out flexibly, but with a clear commitment to the IA that support will be available during the transition period. Moreover, the endpoint, or "steady-state" sharing of responsibilities is still only loosely defined, but a clear target of eventual handing over of most responsibilities is widely understood and accepted.

Third, DSI appears to have avoided taking too active a role in the affairs of the fledgling IAs. This is important to maximize learning and to communicate the value of and need for self-reliance on the parts of IAs.

Fourth, DSI has make extensive and effective use of national and regional training sessions and workshops to acquaint a wide spectrum of DSI field O&M staff with the purpose and approach of the ATP. This is responsible for giving the program coherence and direction, and for transferring necessary skills to DSI field staff for implementing the program.

Fifth, DSI has made effective use of the support made available by the World Bank for acquiring and transferring skills and ideas from other countries to a substantial number of DSI implementors and policymakers. Program managers have cleverly used these opportunities simultaneously as rewards for creative behavior and energetic execution by field staff.

Coverage

The expansion of the ATP has been impressively rapid. The program currently covers nearly a million hectares representing 61 percent of the area of DSI-developed irrigation in the country This expansion has been driven by government privatization policy, financial stringencies, and hiring freezes, though not, in any major way, by farmer demand.

Pilot regions selected generally comprise regions with large DSI-irrigated areas and with cash crop economies. Implementation began there with larger schemes with some smaller schemes remaining to be transferred. Transferring the remaining schemes in other areas may prove somewhat more difficult. Monitoring implementation in these regions would provide valuable information for other countries regarding management transfer in less favorable situations

Sustainability

Sustainable operation requires that a system

- provide a useful service
- have a secure source of revenue
- have a stable natural resource base
- have access to an adequate array of supporting services.
- have a congenial policy environment

Usefulness

In areas of rapid growth where irrigated agricultural land is being converted to other uses, such

as the coastal plain south of Antalya, irrigation service can lose its utility. In this case, irrigation can become superfluous and the system unsustainable, though the water resource itself will certainly have value. There is a larger public policy question here of whether such land conversions should be allowed to take place. But once conversion has taken place, the situation is largely beyond the control of the irrigation managers and the utility of the irrigation system will have been greatly diminished. In general, however, it seems clear that irrigation water supply is a useful service and remain so throughout Turkey for the foreseeable future.

Adequate Revenue

IAs in Turkey have shown a strong ability to collect irrigation fees. However current fee levels, adjusted for inflation, may not be high enough to cover the full cost of O&M once DSI support is scaled back. This will probably result in the need to raise fee levels above those set in a given year by DSI which may lead to farmer resistance. Good communication with farmers and transparency in the tariff setting process will be essential in "selling" such increases.

It would also be appropriate to examine new structures for irrigation charges. The present form, based on area irrigated and crop type, provides little incentive to irrigators to conserve water. Neither does it compensate the IA for making irrigation service available to irrigators who choose instead to use own well water. A new fee structure might consist of several parts, (1) an area-based connection charge assessed on all farmers whose land could be served by a functional IA channel whether or not they actually use water in a given year, (2) a volumetric charge for water used, perhaps levied jointly on small groups of irrigators sharing a channel, and (3) an energy surcharge levied on farmers who irrigation supplies require pumping. Some associations already do the latter. Such a charging system would provide much stronger incentives to farmers to use IA water and to use it efficiently. Many IAs already have in place most elements of the information system needed to implement such a charging system, especially for groups of farmers within the system.

Secure Water Rights

There is presently no system of registering and securing water rights in Turkey. The right of prior appropriation is recognized, but existing users can be forced into expensive judicial procedures to protect such informal rights. This was less a problem when DSI operated schemes. When Irrigation Associations take over, it is a potentially serious and financially draining problem in regions where water supplies are already extensively allocated. This is a important problem which requires resolution and efforts should be begun immediately to put a new water rights system in place. Over the short run, DSI can monitor uses and act as a guarantor of existing irrigation water rights on behalf of IAs.

IA Support Services Requirements

Local irrigation management organizations will not be able to produce themselves all of the goods and services they need to manage irrigation effectively. In fact, one implication of a more general national privatization program is that IAs will rely increasingly on outside providers of specialized goods and services as the sector pursues comparative advantage and economies of scale.

In this context, it is important to distinguish between supporting conditions and supporting services .

- Supporting conditions, such as the existence of firm property rights, or a law mandating strict annual financial audits, characterize the policy and procedural environment in which an IA operates.

- Support services are external services which are routinely available to an IA and can be procured and utilized as needed to enable or enhance an IA's actions in carrying out its mandate. The conduct of a financial audit or installation of a financial management software package and training in its use are examples of support services.

Support services may be accessed by target institutions through purchase or contract from private businesses or be provided by a public agency. The appropriate mix of public and privately supplied services in a given location depends, naturally, on the availability of particular services in the private sector (and competition to keep prices reasonable), and the ability and willingness of the government to provide particular services. It will necessarily be country (and perhaps regional) specific. In general the goal should be for IAs to secure as many of the services it requires as possible from private entities.

It is also important to distinguish supporting services provided to the irrigation system and those provided to irrigated agriculture. Both are necessary, but the two types of services are quite different. Support services provided to irrigated agriculture are generally supplied to individual farmers, while irrigation system support services are supplied to the organizations providing irrigation service. There is a small area of potential overlap between the two in terms of on-farm and in-field water application practices, but generally the two sets of services are quite distinct.

Key support services potentially required by an irrigation system are listed in Table 6.1. These supporting services are supplemental to the activities of the irrigation service provider itself. The following discussion focuses on the requirements for sustaining the principal new irrigation management configuration in Turkey -- management by Irrigation Association.

Table 6.1. Categories of potential support service needs by non-government managing organizations

TYPES OF IRRIGATION SYSTEM SUPPORT SERVICES
FINANCIAL SUPPORT
1 Accounting systems, software, and advice
2 Independent external audits
3 A local banking system
4 Short-term credit to even cash flow
5 Long-term credit for capital purchases
6 Annual and multi-year planning and budgeting advice

7 Subsidies
MANAGERIAL SUPPORT
1 Basic management training
2 Strategic and operational planning training, assistance, and software
3 Personnel management training
4 Human resource development services
5 Resource allocation training, software, and advice
TECHNICAL AND OPERATIONAL SUPPORT
1 Equipment maintenance and repair facilities and services
2 Facilities design, construction, and repair training and services
3 Water measurement and demand estimation training, software, and equipment
4 Equipment (machinery, computers, water measurement devices, ratios)
5 Dispute mediation and adjudication
6 Maintenance monitoring (on behalf of the facilities owner)

A number of external support service needs for transferred irrigation systems in Turkey appear clear at present. These are services which IAs cannot or should not generate internally, and include the following.

Training

IAs must attract capable and motivated technical staff and provide opportunities for continuous upgrading of skills. Regular technical training courses should be available to IAs. In addition to technical training, training is required in other skill areas, including budgeting, financial management, database management and maintenance, computer applications development and use, and relations with users. There is scope for public sector involvement here, as DSI should have a comparative advantage in providing technical training. However, there is also ample scope for outside organizations to be involved, as in the area of management training, computer consulting, and human resource development, though such services are probably not available in all regions.

Technical Advice

DSI has been providing technical advice to IAs during the transition phase. This need will continue for the foreseeable future, especially as regards system upgrading and improvements undertaken by IAs. However the overall need for technical advice will decline as IAs gain experience in managing their systems.

Legal and Procedural Guidance

Because the legal basis for IAs has been adapted from another purpose, puzzling questions of interpretation arise regularly. Many of these questions revolve around the public versus private status of IAs and relate to issues such as whether or not IAs must pay taxes on vehicles and equipment. A central and authoritative source of guidance on such matters is needed, as IAs are currently receiving conflicting advice from a variety of sources. This should be a joint undertaking by DSI and the Ministry of the Interior.

Maintenance Oversight

Because an IA holds only the right to manage an irrigation scheme, or a portion of an irrigation scheme, and not the ownership of the scheme's physical facilities, the government has a right and a responsibility to monitor the quality of maintenance and upkeep of the facilities. It does this currently through an annual joint DSI/IA maintenance inspection. This practice seems to be working well and should be maintained.

Disaster Assistance

When natural disasters, such as flooding, earthquakes, or major landslides affect an irrigation scheme, there remains a need for public assistance and support, as there would be for other sectors affected by such calamities. This might include assistance in rebuilding damaged structures and facilities and in replacing destroyed maintenance equipment.

Rehabilitation

At some point, irrigation facilities will require rehabilitation. When this point is reached depends on a number of situational factors as well as the quality of maintenance which has been provided by the IAs. DSI is a natural choice to provide such rehabilitation services, however the question of repayment must then be confronted. This will be a difficult issue to address, given the partial dependence of the need for rehabilitation on the quality of IA maintenance. The absence of effective repayment requirements for comparable new system construction also raises equity questions. A fractional cost sharing arrangement would be an appropriate way to deal with this problem. Requiring IAs to pay a certain share of the costs of a rehabilitation would offset the incentive to defer maintenance, while remaining within irrigators' ability to pay. A similar arrangement should apply to the cost of new system construction.

Auditing

The accounts of each IA should undergo an annual audit by a chartered professional accounting firm. Auditors should insist on IAs' use of standard professional practices and procedures. The audit report should be reviewed and discussed by the association general assembly and filed with an appropriate public agency.

Equipment Financing

Because of difficult private credit conditions in Turkey, steps should be taken to open a financing window for IAs, providing medium-term credit for equipment purchases at moderate positive real interest rates. An important goal of many IAs is to acquire the

equipment needed to provide a complete range of operations and maintenance services to facilities under their management. Many have already acquired computers, radio communications systems, and vehicles. Some have also purchased pieces of heavy maintenance equipment. At present, because they are not bearing the full cost of O&M, many IAs are accumulating budgetary surpluses which can be used for such purchases. As more maintenance responsibilities are transferred to individual IAs, however, these surpluses will diminish or disappear. Moreover the equipment is needed now, while accumulation of surpluses will take some associations a considerable time. These factors support the need for a credit facility to provide financing for equipment purchases. Such credit should be subject to standard evaluations of creditworthiness, but because the equipment itself collateralizes the loan, such lending should not be particularly risky. Moreover IAs should be definitively accorded the same tax-free status that DSI enjoys relative to duties on such equipment.

Joint Procurement of Services

Another need is to develop ways to deal with "lumpy" goods such as road graders and maintenance shops. Economical sizes of such items may be too large for a single IA to afford and make use of effectively. Alternatives are (a) joint procurement and use by neighboring IAs and (b) contracting in such services from DSI or other suppliers. Because of DSI's high cost structure, it may be most appropriate to consider ways in which groups of IAs could jointly provide such items for themselves.

Policy and Procedural Change

There are several general things a government must do to promote the sustainable operation of transferred irrigation systems. These include (1) maintaining a stable policy environment, (2) avoiding politically expedient populist subsidies that would undermine the commitment and financial discipline of the associations, and (3) monitoring closely the development and operation of new local management entities and providing necessary support. Having embarked on the course of transferring management responsibility to the local level, the government's commitment to it must remain clear and unequivocal. Flip flops in policy on the fundamental point of IA self-governance and financial autonomy will erode the financial discipline and willingness to pay higher fees required to make it work. The government must also watch closely the evolution of the IAs as they acquire more responsibility and experience to identify evolving support needs. Though DSI is giving up a number of operational responsibilities, a number of new support needs are currently evident and others will emerge in the future. Some of these needs can be met by the private sector, while others will have to be supplied by DSI, the Ministry of Interior, and other public agencies. The need for public sector support may vary from region to region, depending of the local availability of services in the private sector.

The foregoing discussion suggests a number of areas where policy or procedural change should be considered by the national government. These include the following.

Water Rights

There is a critical need to review and revise the current informal approach to water resource allocation, use, and reallocation. Current practices result in insecure water

rights for IAs which could be very costly for them to protect and defend. Potential costs to other water users are also significant. Needed is a regular system of registration of existing water rights, permitting for new users, and simple adjudication of disputes.

Disposal of Surplus Equipment and Facilities

An increasing share of DSI's O&M equipment and other support facilities is becoming redundant as a result of the success of the ATP. Yet current policy prohibits the sale or transfer of this equipment to IAs. This policy should be revised and the sale of surplus items allowed. This would be a useful complement to the proposed World Bank loan, which will provide for the modestly subsidized sale of new equipment to IAs.

Federation of IAs

The municipality law under which IAs are organized does not allow for higher level federations of IAs. This policy should be reconsidered in light of the likely future need for such federations to achieve economies of scale in equipment purchase and operation, equipment maintenance, and political representation.

A Dedicated IA Law

Although existing municipality law appears to be providing a workable initial basis for the formation of IAs, development and evolution of IAs may make an establishment law specifically for IAs increasingly appropriate. The IAs themselves should take the lead in formulating and advocating such a law as they feel the need for it, a need many have already expressed informally. For this purpose, some representational body linking IAs nationwide would be useful. Again, IAs themselves must provide the initiative and leadership in establishing such a body.

Water Supply Charges

IAs currently pay nothing for the water supplied to them by DSI. The introduction of a modest volumetric charge for such bulk supply services would help to defray DSI's expenses in providing the water and would create a financial incentive for economical use by the IA.

Broaden IA Base

The strategy followed by the government of utilizing local political office-holders as a nucleus in forming IAs has succeeded in creating a large number of functioning associations in a short period of time. The trade-off has been somewhat limited involvement of local farmers in the process. This appears to have been a wise and effective strategy. As IAs mature, however, it will be important to consciously broaden the governance base of the Associations. Currently, in most cases, governance is in the hands of local political leaders. Farmer involvement in governance is accomplished indirectly, through their role in electing leaders to local administrative positions in general elections. Securing a greater sense of farmer ownership of the IAs and improving the accountability of IA leadership to association membership requires future broadening the base of the general assembly through changes in the member selection process. These include selecting assembly members at large rather than from the ranks of existing

village or municipal council members, considering a system of proportional representation based on number of farmers or commanded area, and possibly shortening the current 5-year term of assembly members. Ultimately, the goal should be to separate IA leadership from any necessary connection with local public administration and providing for direct rather than indirect election of association leaders by irrigators.

Future Roles for DSI

DSI is becoming more predominantly a design and construction agency. At the same time, it has acquired a new set of supporting responsibilities for IAs, as outlined above, which are still incompletely defined. In addition there are other major needs related to water resources development and management in which DSI could play a larger role.

Chief among these is basin level water resource planning and management. Although a strengthened role here may require legislative action as a prerequisite, there is a strong need to document and record current water usage patterns, preparatory to developing a more formal system of water rights in the country. This will be particularly important to IAs in heavily allocated basins as pressure on limited supplies from urban and industrial users intensifies.

A related need is for a uniform and rationalized inventory and database of irrigation systems, irrigated area, and water used in the country. At present, DSI is concerned principally with irrigation systems created by itself. Systems developed by GDRS are much less carefully documented by DSI, and privately developed schemes, which together constitute a significant fraction of the national irrigation capacity, are virtually ignored. DSI should develop and maintain a database of all irrigation in the country, perhaps recording who constructed it, but more importantly who currently manages it and how productive and efficient it is. This step leads naturally to a new role for DSI in providing technical advice, training, and monitoring support to all types of irrigation schemes in the country, not just DSI-constructed ones.

DSI currently has two centrally-managed monitoring programs for IAs. These two programs should be coordinated and possibly combined to minimize the reporting burden on IAs. The first year of post-transfer experience with the newest and most extensive of the monitoring programs should also be carefully reviewed, in collaboration with IAs, to revise, refine, and simplify the data collection protocols. This should follow a careful analysis and reporting of the current year's data so that a clear use can be identified for each item of data requested (or the item eliminated). The performance monitoring program is an extremely important exercise which can evaluate the outcomes and impacts of the ATP, identify emerging generic problems and needed program modifications, and identify public support needs.

7 Conclusions

Context

Turkey is a literate, middle income country with a diversified and growing economy. Agriculture employs a significant segment of the population but is a relatively small component of the national economy. Much of the agriculture is commercially oriented, particularly in the pilot regions for implementing the transfer program. Land holdings

are moderately sized -- but on the large side compared with most South and Southeast Asian countries. Turkey has a tradition of strong but democratically elected government, a major ongoing water resource development program, and a large, competent, and highly professional national irrigation agency.

Of course there are many other features which characterize the context of IMT in Turkey. Those mentioned above are basic ones which are not subject to policy-led change over the short run. Some may be significant enabling conditions for a successful IMT program and others probably are not. Nevertheless they constitute the context in which the IMT is taking place in Turkey. Through comparison of these conditions with those in other countries where successful programs have been mounted, a picture will emerge of those conditions which seem to predispose success and those which are irrelevant to it.

Process

Transfer of government built and operated irrigation systems in Turkey to local control has proceeded at an astonishingly rapid pace. Characterizing the transfer program itself are a remarkably small group of capable people within the irrigation agency who are committed to the program and who have worked energetically to implement it. Implementation has been characterized by flexibility, experimentation, and a "learning process" approach. It relies heavily on an extensive series of workshops and seminars to communicate values and skills to O&M staff in the field who are implementing the transfer program. At the same time there is a strong emphasis on action.

Turkey acknowledges the important role played by the World Bank in IMT process. That role included a long preliminary period of pressure to reform cost recovery procedures and rates, flexible financial assistance to allow a number of DSI staff members to visit Mexico, the United States and other places where promising transfer programs were underway, the energetic promotion of the IMT idea by a particular Bank staff member during regular repeated visits to Turkey, and the promise of assistance for IA equipment purchases through a new World Bank credit.

Despite the dedication and hard work of a small group of committed people within DSI, the birth of the program was neither automatic nor easy. As is always the case with a new and somewhat radical idea, it was characterized by argument, cajolery, incentives, and pressure. The importance of "champions" for the idea at the various stages of its development should not be underestimated.

Impacts

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 evidence in three systems suggests

that IA may, in some cases, be able to expand the irrigated area 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 both by the government and by local associations.

Second Generation Problems

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.

Nascent 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 hand, 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.

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