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Locally Managed Irrigation

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IRRIGATION MANAGEMENT TRANSFER IN TURKEY: EARLY EXPERIENCE WITH A NATIONAL PROGRAM UNDER RAPID IMPLEMENTATION

Mark Svendsen and Gladys Nott

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International Irrigation Management Institute

P O Box 2075, Colombo, Sri Lanka
Telephone: 94-1-867404, 94-1-869080/1; Telex: 22318 IIMIHQ CE
Facsimile: 94-1-866854 Email: IIMI@CGNET.COM

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Purpose of the Series

The *Short Report Series on Locally Managed Irrigation* is designed to disseminate concise information on the role of local management in irrigation and irrigation management transfer or turnover experiences and policies. The *Series* is distributed worldwide to a broad range of people—policy makers, planners, researchers, donors and officials in both public and nongovernmental organizations—who are concerned with the irrigated agriculture sector. IIMI's goal is not to promote policies such as irrigation management transfer, but to enhance the knowledge base available to decision makers and advisors as they face questions of policy adoption and strategies for implementation.

Locally managed irrigation can be of many types, such as traditional farmer-constructed diversion or tank schemes, indigenous and often new lift irrigation, government-constructed but farmer-managed irrigation systems and systems where management is or has been transferred from an outside agency to a local user organization.

By "irrigation management transfer" we mean some degree of transfer of responsibility and authority for irrigation management from the government to farmer groups or other nongovernmental entities. This generally involves contraction of the role of the state and expansion of the role of the private sector and water users in irrigation management. In other words, there is a shifting upstream of the point where management responsibility and control of the water supply are transferred from the irrigation authority to local management. This may involve changes in policies, procedures, practices and the performance of irrigated agriculture. It may or may not involve "privatization" of ownership of the assets of the irrigation system. The *Short Report Series* addresses questions such as the following:

What are the necessary conditions which support viable locally managed irrigation?

What socio-technical conditions, institutional arrangements and change processes lead to sustainable locally managed irrigation?

What is the range of different models that are being applied worldwide for turnover or transfer of responsibility for local management for recently developed irrigation?

What are the effects of management transfer on the productivity, profitability, financial viability, equity, efficiency and sustainability of irrigated agriculture?

What are the perspectives of farmers, managers, policy makers, urban consumers and other stakeholders in irrigated agriculture about irrigation management transfer?

What adjustments in government may be needed as a result of turnover to provide support to locally managed irrigation systems and to improve productivity in the public sector?

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Drs. Douglas L. Vermillion and Sam H. Johnson III
Program on Local Management, IIMI,
P O Box 2075, Colombo, Sri Lanka.
Fax: 94-1-866854; Telex: 22318 IIMIHQ CE
E-Mail: IIMI@CGNET.COM
Telephone: 94-1-867404, 94-1-869080/1

Editors' Note

Mark Svendsen and Gladys Nott have written an interesting and timely description of one of the most recent and interesting cases of irrigation management devolution. Part of what makes this case of management transfer so interesting is its distinctive nature. The transfer of management for irrigation systems throughout Turkey has been rapid. During 1995 alone, the General Directorate of State Hydraulic Works (DSI) transferred more than 750,000 hectares of service area to local management organizations. In most cases, management is transferred not to farmer associations but to local village or municipal governments or representative federations of villages or municipalities. Hence, it is a kind of decentralization, rather than privatization. And it involves little participation by water users in the process, if any. Locally elected public officials generally take over governance of the schemes, with management being supervised by local administrators.

Another distinctive feature is that, instead of resisting the reforms, the irrigation agency has vigorously pursued its implementation. The authors provide insights into the whys and hows of the reform and, although it is too early to assess its impacts, they provide some early evidence indicating that reform is likely to produce considerable cost savings for the government, local financial viability, and stable or improved productivity of land and water. However, two similarities which Turkey does have with other cases of management turnover are 1) the lack of a clear policy about responsibility for future rehabilitation of irrigation scheme infrastructure, and 2) indications that farmers may tend to underinvest in the long-term physical sustainability of infrastructure.

IRRIGATION MANAGEMENT TRANSFER IN TURKEY: EARLY EXPERIENCE WITH A NATIONAL PROGRAM UNDER RAPID IMPLEMENTATION

Mark Svendsen and Gladys Nott[1]

INTRODUCTION

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 transfer program received a 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 1 million hectares to local management. The purpose of this study is to document the process of transferring management responsibility for state-run irrigation schemes from the General Directorate of State Hydraulic Works (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, jointly funded by the Economic Development Institute of the World Bank and IIMI, was carried out in early 1996 by a team consisting of the two authors and three staff members of the DSI Operations and Maintenance Department.[2] The study team visited regional-, branch-, and scheme-level DSI offices, 20 irrigation associations, and a number of other managing entities in 3 of the 4 pilot transfer regions in the country. The results of the study were presented and discussed at international seminars in Antalya, Turkey in April 1996 and Cali, Colombia in February 1997, and the report has been critically reviewed by four senior experts in the area. This short report is an abridged version of the final report.

Background

Turkey is a rapidly growing country of approximately 63 million people and has an annual per capita income of about US$2,200. The population is largely urban, with only 37 percent residing in villages. The literacy rate is about 80 percent. The government invested heavily in public works projects, including irrigation projects, during the 1980s and 1990s, creating a well-developed basic infrastructure. However, inflation rates running at about 75 percent annually have created strong pressures for the government to reduce its budgets. Agriculture accounts for only about 16 percent of total economic output, but a hefty 42 percent of employment. About 14 percent of the sown area is irrigated, but this area accounts for a disproportionate share of total output. Cotton, cereals, maize, and sugar beets make up about 60 percent of the irrigated area under production, with sizeable irrigated areas also under vegetables, fruit, forage, and citrus crops. Farms are characteristically family-owned and of generally moderate sizes (though relatively large by the standards of many Asian countries). The average farm holding size in 1990 was 5.8 hectares, with 68 percent of holdings being less than 5.0 hectares. About 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.

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[1]Mark Svendsen, Kings Valley, OR, USA, 541-929-4811 (phone), 541-929-4824 (fax), msvendsen@compuserve.com (e-mail). Gladys Nott, Halstead, Essex, UK, 44-1787-269233 (phone), 44-1787-477657 (fax).

[2]Ergun Doker, Head of the Management Transfer Program, DSI; Faruk Erdogan, Deputy Head of the Management Transfer Program, DSI; and Gokhan Ozgen, Monitoring and Evaluation Specialist, DSI.

General Directorate of State Hydraulic Works (DSI)

The DSI is the main executive agency of the Government of Turkey for the country's water resources planning, execution, and operation. It was established in 1954 and is a part of the Ministry of Public Works and Settlement. DSI's mandate is "to develop water and land resources in Turkey." 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 gauging 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.

DSI maintains offices for operation and maintenance (O&M) at the following levels:

* *General Directorate Office* which is the top level of management with offices in Ankara,

* *Regional Directorate Offices* with 25 Regional Directorates in Turkey,

* *O&M Division Offices* each covering a number of schemes, and

* *O&M Engineering Offices* each serving one or more schemes within an O&M Division.

In December 1994, when the Accelerated Irrigation Transfer Program (AITP) began to gain momentum, the total number of staff employed by DSI was over 25,000. Of these, those at Headquarters comprised about 10 percent and those in the regions about 90 percent. Those in the civil service staff comprised about 25 percent and those who were laborers or members of the contract staff comprised about 75 percent. Of the civil service employees, the technical staff comprised about two-thirds and the clerical and other support staff comprised about one-third.

Participatory Irrigation Management in Turkey

The international literature on irrigation management has long used the term "Water Users' Association" to refer 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. In contrast with these concepts, the AITP 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. To avoid misunderstandings regarding the social and institutional characteristics of the organizations involved, this paper will use the term *Irrigation Associations* (IAs) 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 local *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.

About one-quarter of the irrigated area in Turkey has been created independently of central government support. This irrigation was developed by individuals (particularly for groundwater irrigation or pumping from natural watercourses) or by village groups. Management is typically in the hands of the local village administration, where the village head coordinates operation and

maintenance (O&M) activities. In larger schemes, the mayor of the municipality plays this role, or names a member of his staff to perform it.

Irrigation in Turkey

Another one-quarter of the irrigation in Turkey has been developed by the General Directorate at Rural Services (GDRS) or by GDRS in conjunction with DSI. For its groundwater schemes GDRS has had a long-standing policy of requiring the formation of a cooperative before the construction of the project begins. In 1992, this policy was extended to new surface water schemes as well. For surface schemes established before 1992, O&M responsibility is transferred informally to the village head. Cooperatives are accountable for all O&M costs. For groundwater schemes, the cooperative must repay, without interest, the capital cost of DSI-installed wells, pumps, and electrification. For GDRS surface schemes there is no capital repayment obligation.

Box 1. Organizations Managing Irrigation in Turkey

Of the approximately 3.3 million hectares of net surface irrigation command in Turkey:

* about half is managed by village and municipal governments.
* another quarter by irrigation associations, and
* most of the remainder by DSI.

Since the early 1960s, DSI has had a program to transfer O&M responsibility for secondary and tertiary distribution networks to local government units. Village headmen or mayors of municipalities enter into contracts with DSI to manage water distribution below the secondary canal and clean and repair canals and canal structures. The village head or town mayor hires laborers for maintenance work and ditch riders for water distribution. In exchange, DSI gives farmers within these villages and towns a discount of between 20 percent and 40 percent on the DSI irrigation fees due. The local administration itself has the right to collect the value of this discount from farmers 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. In 1994, at the outset of the Accelerated Transfer Program (ATP), approximately 600,000 hectares, or about 40 percent of the DSI-developed area, were partly managed in this way. This has generated widespread experience within village and municipal administrations with irrigation management tasks and has created sizeable cadres of local workers familiar with O&M practices.

There is thus a tradition in Turkey of joint action to provide a common good. There is also a precedent for local civil government administrations to take on management responsibilities for small schemes constructed by farmers or by a government agency.

THE ACCELERATED IRRIGATION TRANSFER PROGRAM

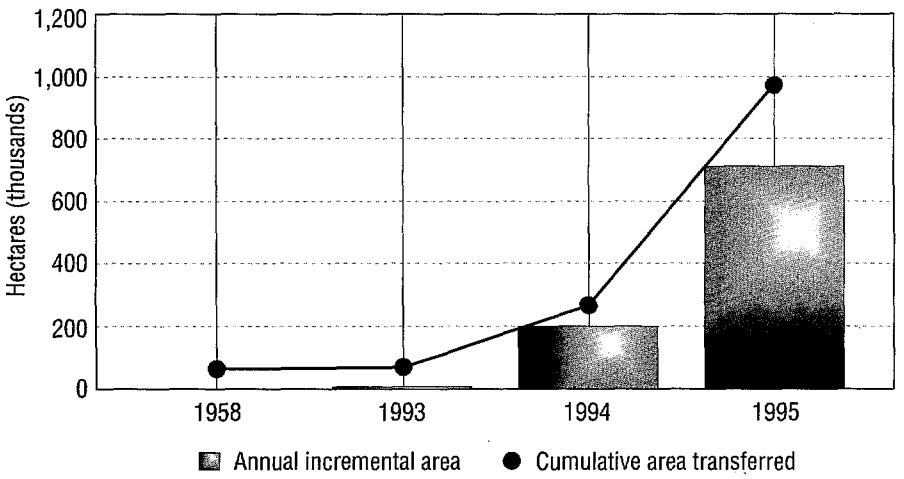
Program Development

DSI has had the policy of transferring O&M responsibility for 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. By 1995, nearly one million hectares of land had been transferred to local management, more than 700,000 ha being transferred in 1995 alone (figure 1). By 1995 the cumulative irrigation area transferred nationwide represented 61 percent of the total irrigation area developed by DSI. It is anticipated that by the end of the century 1.5 million hectares will have been transferred, virtually the entire current area under DSI irrigation.

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. Eventually, this brought on a need for widespread rehabilitation of large-scale irrigation schemes caused by deferred maintenance. Existing cost recovery methods were ineffective, recovering only 37.2 percent of collectibles from 1990 to 1993, and much of the value of the money collected was eroded by rampant inflation due to delayed collections.

Figure 1. Annual and cumulative irrigated area transferred.



Source: DSI, Turkey.

On the farmers' side, the main incentive to support 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 local IMOs to set them off on a firm footing. Acceptance of the Accelerated Transfer Program (ATP) was facilitated by national policies promoting privatization as an aspect of democratization. This creates among farmers a willingness to take on greater responsibilities for managing irrigation schemes. However, the program gives little appearance of being driven by farmer-demand and appears generally to have been presented to farmers as an accomplished fact. Farmers often responded skeptically to the idea at the outset and many adopted a "wait and see" attitude. 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 Irrigation Association (IA) management.

Nevertheless, the new leadership of most Irrigation Associations visited by this study team has embraced the concept enthusiastically and is taking vigorous steps to implement it. If this results in high quality irrigation services at a reasonable cost, then the farmers will probably be satisfied.

During the early 1990s, the World Bank supported a Drainage and On-Farm Development Project in Turkey. World Bank supervision missions for this project participated in discussions regarding the crisis facing the irrigation sector and encouraged DSI to explore new ways to put O&M financing on a sounder footing. Turkey's previous experience with local management 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 through study tours to Mexico, where a program of transferring management responsibility to large groups of farmers had begun several years earlier. Ultimately, more than 50 DSI personnel participated in these tours.

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 central DSI transfer team carried out 41 staff orientation meetings and seminars for DSI headquarters and regional personnel, chairmen of irrigation associations, and visiting international delegations between October 1993 and October 1995.

Inspired by what they had observed abroad, senior DSI managers developed a program for the accelerated transfer of O&M responsibilities to local management. Four of the twenty-five regions into which Turkey is divided by DSI for administrative purposes were selected as pilot regions for the ATP—Antalya, Adana, and Konya, and Izmir. Together, these pilot regions comprise just over one-fifth of the country's cropped area (22.4 percent). Cropping patterns are dominated by grains and sugar beets in Konya, cotton and grapes in Izmir, and cotton, maize, vegetables, and citrus in Adana and Antalya. The particular cropping pattern of a region appears to have had little effect on the pace of its transfer program.

The transfer program has been implemented entirely by DSI O&M staff. It is coordinated by the three-person transfer team of the DSI O&M Department and implemented in the field by the Regional O&M Departments.

Organizational Forms

There are four forms of local organizations which act as recipients of O&M responsibility in the transfer program: cooperatives, villages, municipalities, and Irrigation Associations.

* *Cooperatives.* Farmers may chose to form an organization which is independent of the local civil administration by establishing an irrigation cooperative under the national cooperative law. A board of directors is selected by the membership at large which then hires staff to operate the scheme. The formation process is somewhat cumbersome and time-consuming and this mechanism is seldom used in DSI transfers. It is used more frequently by the GDRS.

* *Village management.* Where the irrigation scheme serves only a single village, responsibility for scheme operation and maintenance generally passes to the village administration, with the village head functioning as the executive officer for irrigation management. The head may select one or two people to assist him with O&M administration. This is more common among small-scale projects transferred by the GDRS.

* *Municipal management.* Where the irrigation scheme serves only a single municipality, responsibility for scheme O&M normally 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 generally used where the irrigation scheme covers more than one local administrative unit (village or municipality). Irrigation associations are formed under the Municipality Law which allows for associations made up of local government entities to be established, and are treated under the law as municipalities. Although this legal basis has proved serviceable so far, some IA chairmen argue that a separate law written specifically for IAs is needed. 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 village heads and mayors of participating villages and municipalities who are "automatic members," plus additional members. Selection procedures for additional members differ among regions. They can be selected by village heads and mayors or directly elected by irrigators. Elected members may be from local assemblies, representatives of farmer 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 village heads or town mayors from among the members of local assemblies and ratified by a vote of farmers.

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. In contrast, the average size of an irrigation unit managed by an irrigation association is approximately 6,500 hectares. Irrigation associations are the most important management form, in terms of both area (95 percent of the total irrigation area transferred) and number (58 percent of the total number of organizations).

The Transfer Process

There are five basic steps in the transfer of irrigation management from DSI to local IMO. The transfer process generally takes 6 to 9 months from initiation to completion. Each step in the process is explained below.

(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. 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. 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 local IMO and DSI. This agreement is developed by DSI with the approval of the association chairman and the management committee of the local IMO. It is signed by the chairman and the DSI regional director and ultimately approved by the Minister of Public Works and Settlement.

(3) *Transfer protocol*: After the transfer agreement is approved, the regional director of DSI and the chairman of the new local IMO sign the transfer protocol which 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 which includes a map of all irrigable lands. Special instructions concerning the O&M of the transferred unit may be attached.

(4) *Preparation of the O&M plans.* Once the transfer agreement is cleared and the transfer protocol is prepared and signed, DSI staff work with representatives and staff of the local IMO to prepare the O&M plans and budgets for the first post-transfer irrigation season.

(5) *Implementation.* The local IMO begins unit operation with help from DSI.

Under the transfer agreement, the new local IMO becomes responsible for providing all services related to O&M of the specified irrigation facilities and for bearing the costs of providing these services. Neither ownership of facilities nor water rights are, under current arrangements, transferred to the local IMO, but remain vested in the national government.

The Transition Phase

During the transition phase the local IMO progressively takes 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. Regions and branches are given freedom to be flexible in reaching agreements with the local IMOs regarding the amount of support that DSI will provide at different stages in the transfer process. In general, both DSI and IAs have been remarkably pragmatic in developing and refining the transfer process. This has contributed importantly to its successes.

In the pilot regions, the transfer program has reached 86.3 percent of the schemes comprising 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 and provide a declining level of support to newly formed IAs, while identifying long-term needs for support which DSI could provide in the future. In the other regions of the country, DSI continues to extract the lessons learned from its experience in the pilot regions and enhances the programs there.

FUNCTIONS OF IRRIGATION ASSOCIATIONS

Most schemes, after 1 to 2 years of transfer, are currently in a stage in which neither the IA nor DSI is fully responsible. Ultimately it is intended that the IAs be fully responsible for all operation, maintenance, repair, and administration required for sustainable unit operation.

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. The general assembly is composed principally of representatives of various local administration bodies, and is not a general meeting of scheme water users.

Individual water users participate in the general electoral process for local administration officials and in ratification of officials proposed for election to the general assembly membership. The general assembly, which meets twice a year, is responsible for electing from among its members a chairman of the association, who functions as its chief executive officer. It also elects annually four members of the IA management committee. The committee works with the chairman to plan and implement the association's activities. Its actions include electing the association chairman and approving the annual budget. DSI and the Ministry of Interior both provide guidance and oversight.

Box 2. Key Governance Functions for the IA General Assembly

* elect the chairman
* elect four members to the management committee
* approve work plans and programs
* approve the annual budget and financial plan
* approve chairman's annual report
* approve capital purchases

Management Committee

The management committee serves as an executive committee for the IA and 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 to discuss budgets and plans and provide advice to the chairman. One important additional function is to act on behalf of the general assembly in matters reserved for it between its scheduled meetings.

Chairman and Staff

The *chairman* 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.

The *general secretary* serves as the chief operating officer of the association and is usually an engineer. He or she is the central figure in managing the day-to-day operations of the irrigation unit. The *accountant* is responsible for preparing budgets, collecting income, keeping accounts, and submitting accounts for review and approval by the "competent authority." The accountant must abide by the provisions of the Municipal Accountancy Statute. Additional employees are hired by associations at their discretion. Both 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.

Women's Roles

Women's roles in the structures and functions described above are rather limited. In the three regions visited, there is just one case where a general assembly for an association includes a female member. One small association (of 20 visited) employs a female general secretary. Several associations employ female accountants and many hire female office assistants and secretaries. It appears that politics is largely closed to women's participation at the local level in these regions, leading automatically to their exclusion from IA general assemblies and chairmanships, under current selection practices.

Equipment

All associations visited have established offices and equipped them with standard furniture, typewriters, calculators, a portrait of the founder of the republic, and a tea kitchen. Most appeared very comfortable and functional. Virtually every IA visited in Konya and Izmir regions has purchased and set up a personal computer; however in Antalya Region, this was not the case. The most common computer application is budgeting and accounting. Tracking irrigation fee payments is also common, as is managing the employee payroll. Many IAs also have acquired two-way radio systems usually linked with local DSI networks, and these may be linked with the radio nets of neighboring associations as well.

Early equipment purchases by newly formed IAs include automobiles for use by the chairman and possibly the general secretary and motorcycles for use by field staff. 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* (aquaducts) for distributing water. 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.

DSI branch and scheme offices have a considerable amount of serviceable maintenance equipment and these have now become redundant with the transfer of most of the large schemes in the four pilot regions to IAs. 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 are specialized or are 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 issue of scale:

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

(2) IAs can rent such equipment and services from other public 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. However, there can be only one purchase invoice in the name of one association which owns the equipment.

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

Operation and Maintenance

Although practices vary from scheme to scheme, they are generally little changed from those employed by DSI in managing the same schemes. Operational rules are generally a combination of rotational programs at the main and secondary level, and some form of demand-based allocation at the field channel level. However, there is now greater variety in operational practices as individual IAs tailor standard DSI practices to their circumstances. The annual maintenance inspections which DSI had carried out previously are still conducted, and are required by the transfer agreement between DSI and the IA.

Another difference is that where previously a single entity managed entire schemes from reservoir to farm, 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 IA units. Together with IAs they take the lead in planning the irrigation calendar for the year. They measure flows at major diversion points under their control and solicit monitoring information on irrigation unit operations 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 transition phase, there is a gradual shift in maintenance responsibility from DSI to the IAs. During the first post-transfer year, an IA typically takes on responsibility for cleaning secondary and tertiary lined and unlined canals, kanalets, siphons, and drains within the IA unit; cutting grass and weeds; and repairing minor cracks in canal linings. DSI maintains water storage and diversion structures, shares 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.

Finances

Data on the finances of 12 IAs in Konya, Izmir, and Antalya obtained from monitoring reports for 1995 submitted to DSI show that IAs obtain 92 percent of their income from irrigation fees. DSI updates a nationwide fee schedule every spring for use in the schemes it manages. The complete schedule is made up of 174 different fee rates. All assessments are made on a per unit area basis. 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 made two years previously. In Turkey, with its rampant inflation rate, the result is the recovery in real terms, of only a small fraction of the amounts expended, even if all farmers actually pay 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, often in consultation with DSI staff. Many IAs also consult neighboring IAs in the process of determining appropriate fee levels. When setting the fee levels and payment conditions, IA chairmen are keenly aware of the need to satisfy their irrigator constituency. A common strategy used by IA leadership is to wait for DSI fee rates to be issued and then undercut them for the current year 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 to TL 4,000,000 (US$ 62.50) per hectare, with the weighted average fee assessment per hectare in each scheme ranging from TL 668,958 (US$ 10.45) to TL 2,960,652 (US$ 46.26).

In DSI-managed schemes, the first installment of fees is 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 fee which is due. Fees are collected by agents of the Ministry of Finance who are attached to DSI's regional offices.

Generally, IAs have been significantly more stringent than DSI in setting payment timetables, in their insistence on payment, and in charging substantive penalties for late payment. Timetables set by IAs vary widely, but all collect for a given season, either before, during, or immediately following the season for which service is provided. All IAs charge a penalty for late payment of 10 percent per month (not compounded) which generally matches or exceeds the rate of consumer price inflation. The government currently has a capital cost recovery policy, but because of implementing rules and practices, recovery is effectively nil.

Of total recurrent expenditures in 1995, the largest share went toward personnel (22 percent), and 15 percent was allocated for maintenance and repair. 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) (table 1). The simple average expenditure on capital goods (28.7 percent) was about a quarter of the total first year expenditure, while 71.3 percent of the total, on average, was recurrent expenditure.

The difference between total expected income (assuming 100 percent fee collection) and expenditure on recurrent and capital costs was used to assess the potential level of reserves. On average, IA potential reserves would represent 34 percent of total expected income, with an average value of TL 3.645 billion (US$ 56,949) per IA. The proportion of reserves to total budgets ranged from 2 to 81 percent. It is likely that in most cases, reserves are being accumulated for capital goods purchases. Summing capital expenditures and potential 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 allows 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 for future equipment replacement.

RESULTS OF IMT

Costs of Irrigation

Although IAs have generally set their fees below those set by DSI, the facts that IAs are actually collecting the fees, whereas the government frequently did not, and collecting them in the year that costs are incurred, have meant an increase in the cost of irrigation service for most farmers. If it is assumed that DSI and IA fee rates are about equal, then an increase in average repayment

Table 1. O&M expendiure on DSI-operated schemes in 1995 in US dollars.

Year	Cost index	Operations expenditures					Maintenance expenditures					Total O&M
		Personnel	Electric and fuel	Transport	Other	Total	Regular	Occasional	Flood repairs	Weed control	Total	
1995	76.88	3,266,563	7,783,141	1,339,875	134,422	12,524,000	11,149,000	92,141	21,625	0	11,260,875	23,784,875
1986	56.53	3,387,828	8,117,438	1,204,531	153,344	12,863,141	11,026	95,922	73,672	0	11,195,328	24,058,469
1987	44.86	3,839,453	5,045,422	1,210,734	201,453	10,297,047	12,003,281	73,172	82,844	0	12,159,297	22,456,359
1988	30.11	3,562,625	3,758,109	1,556,922	223,422	9,101,078	10,141,188	96,016	61,438	0	10,298,656	19,399,734
1989	18.94	8,969,250	3,690,547	2,915,125	294,938	15,869,859	7,225,078	111,125	113,813	0	7,450,016	23,319,875
1990	11.99	10,380,547	2,745,375	2,379,766	450,469	15,956,156	6,983,938	59	40,938	658,734	7,742,453	23,698,609
1991	7.59	12,113,906	3,768,047	2,495,141	644,781	19,021,875	7,135,203	60,156	60,641	596,922	7,852,922	26,874,797
1992	4.49	10,727,781	3,224,344	2,227,313	448,250	16,627,688	6,411,797	29,766	62,922	331,500	6,835,953	23,463,656
1993	2.79	14,818,891	3,656,453	2,611,547	862,734	21,949,609	7,393,219	27,219	107,094	517,094	8,044,625	29,994,234
1994	1.70	12,720,922	6,315,047	2,756,344	873,438	22,665,766	7,310,781	25,016	7,766	314,625	7,658,203	30,323,969
Ratio 1994 to 1985		3.89	0.81	2.06	6.50	1.81	0.66	0.27	0.36	0.68	1.27	

Source: DSI data.

Note: Cost Index based on DSI General Construction Index 1995=1.00. This multiplier removes the effect of inflation and converts all values to 1995 US dollars.

rate from 38 percent to 72 percent suggests that the amount paid by farmers has roughly doubled as a result of the transfers. If inflation is considered, the increase becomes considerably larger.

DSI's per hectare operating expenditures, after falling in the late 1980s, rose, in real terms, to a level 12 percent higher in 1993 than in 1985. 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, the largest single category was personnel expenditures, accounting for 53 percent of total O&M expenditures 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 (table 1).

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. Within certain constraints, DSI personnel expenses can be expected to continue to decline as more schemes are transferred. It is reasonable to expect total O&M personnel expenditures (IA and DSI together) to decline as IA-employed laborers replace much more costly DSI-employed staff, though data are not yet available to support this supposition.

A general decline in both the absolute amount of maintenance expenditures and in their share of total O&M expenditures is evident over the 10-year period. In 1985, the split between O&M expenditures was about even. However, over the next 10 years, the share of maintenance in the total decreased from 47 to 25 percent in 1994. This trend has contributed to a worrisome decline in the condition of many systems and may mean that IA maintenance expenditures will need to increase after transfer if the deterioration is to be arrested and scheme performance is to be maintained or improved.

Cost Recovery

O&M fee collection rates for DSI schemes averaged just 38 percent between 1989 and 1994. Consequently IA rigor in fee collection has come as a shock to many farmers, and the average collection rate of 72 percent as at the end of 1995 can be seen as a significant achievement. The contribution of IAs to anticipated 1996 maintenance expenditures ranges from 5 to 45 percent, with DSI making up the balance. At current fee rates, however, some IAs could not cover even the full cost of system maintenance, much less the combined cost of O&M (table 2).

Table 2. Estimated 1996 maintenance expenditures and 1995 fee assessments for selected IAs.

Irrigation scheme	Irrigation association	1996 maintenance expenditure (US$/ha)	Average 1995 fee assessment (US$/ha)	(2) As share of (1) (%)
		(1)	(2)	
Izmir Region				
Ahmetli		13.44		
	Mesir		29.53	220
	Gediz		29.80	222
	Sarikiz		30.35	226
	Gokkaya		46.26	344
Konya Region				
Ivriz		16.55		
	Akhuyuk-Ciller		13.49	81
	Sol Ve Yildizli		19.15	116
	Sag		12.72	77
Cumra		10.53		
	Cumra		10.45	99
	Ova		10.85	103

Source: DSI data.

It is anticipated that real fee levels will have to be increased significantly in many IAs in future years.

Farmers' 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 majority of farmers, at least those growing cash crops for market, should be able to afford to bear the full cost of O&M. According to official DSI data in 1991, irrigation in Turkey increased the tonnage production per hectare by a factor of 7.4 and increased 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 percent of the average increment in net farm income as a result of irrigation development. 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 (table 3). Association irrigation fees for these two crops represented just over 3 percent of the total variable costs of production in 1995.

Table 3. Irrigation fees in relation to 1995 cotton and raisin value of production, variable costs of production, and gross margins, Manisa, Izmi.

	Seedless raisins		Cotton	
	US$/ha	Fee share %	US$/ha	Fee share %
Irrigation fee	31.25	46.87		
Value of production	1,876.87	1.7	2,231.25	2.1
Total variable costs	983.59	3.2	1,395.31	3.4
Gross margin	893.28	3.5	835.94	5.6

Source: Manisa Farmers' Union.

Notes: Seedless grapes yield 2.6 tons/ha @ US$0.72/kg.
Cotton yields 2.8 tons/ha @ US$0.80/kg.

Quality of Irrigation Service

It is too early to assess changes in the quality of irrigation service provided by the associations relative to DSI-provided service. Illustrative data reporting area served by three irrigation schemes in Antalya Region which were operated in 1993 and 1994 by DSI, and in 1995 by 6 IAs, show increases in area served after transfer of from 20 to 40 percent of schemes (table 4). The change is in the expected direction and suggests that evidence of increases in irrigated area should be sought and verified on a wider scale. Annual precipitation figures for a nearby gauging station show that rainfall was above the long-term average of 1,069 mm in both 1993 and 1994, and slightly below the average in 1995. This should, by itself, produce a change in irrigated area opposite the one observed.

Table 4. Actual irrigated area, in hectares, in three irrigation schemes, 1993–95.

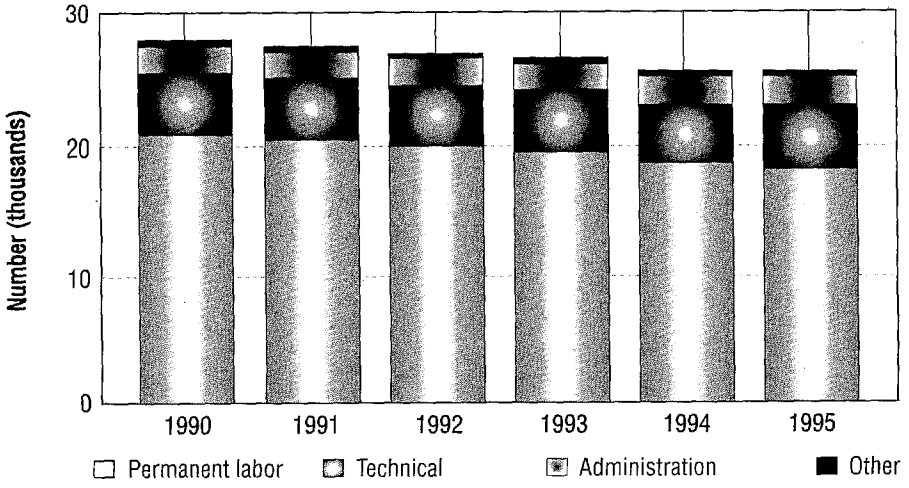
Scheme		1993 Area (ha)	1994 Area (ha)	1995 Area (ha)	Increase of 1995 over 1993–94 average (%)
Koprucay					
	Left bank	n.a.	n.a.	11,517	
	Right bank	n.a.	n.a.	4,754	
	Total	14,123	12,761	16,271	21
Manavgat					
	Left bank	2,418	2,268	3,460	
	Right bank	937	912	1,175	
	Total	3,355	3,180	4,635	42
Alare					
	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: n.a. 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 O&M. Overall staff levels have declined steadily in recent years, falling by 9 percent between 1990 and 1995 (figure 2). The largest share of this decline results from shrinkage in the number of permanent laborers (-12.8%) and, to a lesser extent, administrative personnel (-2.8%). Professional technical staff numbers have actually increased by 8.5 percent over this period. The change in total number of staff does not appear to be a response to the transfer program, since staff levels in 1994 and 1995 are virtually identical. Rather, the change appears to be a result of broader government policies which have generally prohibited the hiring of new staff since 1983. 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. However, these reductions have taken place among all categories of employees.

Figure 2. DSI staff levels, 1990–1995.



Source: DSI, Turkey.

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, roughly the same reduction observed in O&M staff nationwide, and in total DSI staff numbers. However, between 1994 and 1995 there was an additional decline in staff numbers in 3 of the 4 pilot regions of 10 percentage points. This suggests that cuts in other regions may be in the offing as well, as the transfer program proceeds.

Due to the strength of employee unions, DSI has not been able to make the kind of reductions in the number of civil service staff that it might like. Staff redeployment and retrenchment have constituted 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 the need for staff 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 did not feel threatened by it, they may have been more enthusiastic in promoting it, than otherwise might have been the case.

Conflicts and Conflict Management

Prior to transfer, DSI O&M staff were the focus of complaints and resolution of conflicts related to irrigation scheme operation. After transfer, complaints regarding system operation are now normally being directed to the IA chairman and staff, and sometimes to the village representative on the General Assembly (e.g., the village head). The DSI transfer team reported that in 1995 they received only a handful of complaints from farmers on schemes which had been transferred, compared with approximately 200 per year before transfer.

CONCLUSIONS

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 transfer regions. Landholdings are moderately sized—but are rather large 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 professional national irrigation agency.

Transfer of government-built and operated irrigation systems in Turkey to local control has proceeded at an astonishingly rapid pace. Managing 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.

The Government of Turkey acknowledges the important role played by the World Bank in the IMT process. That role included an extended period of pressure to reform cost recovery procedures and rates, flexible financial assistance allowing key 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 Bank staff during regular 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 the case with most dramatic reforms, it was characterized by argument, cajolery, incentives, and pressure. The importance of having "champions" for the idea at the various stages of its development should not be underestimated. State fiscal pressures motivated the reforms. And the continuing expansion program apparently facilitated it by absorbing otherwise displaced DSI staff into irrigation construction activities.

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 have secured the opportunity to stabilize and improve system performance. The impacts of transfer on quality of irrigation service are not yet assessable, though limited data from a few sites suggest that the new managers may be able to spread a given amount of water over a larger area than was previously the case. And important issues of future sustainability remain. Still, in comparison with rather partial and incomplete efforts in other countries, such as the Philippines and Sri Lanka, the early achievements of the Accelerated Irrigation Transfer Program in Turkey show considerable promise for achieving objectives held both by the government and local irrigation management organizations.