Disengagement policy of the state in water resources management

Tekinel O., Doorenbos J.

in

Dupuy B. (ed.).
Aspects économiques de la gestion de l'eau dans le bassin méditerranéen

Bari : CIHEAM
Options Méditerranéennes : Série A. Séminaires Méditerranéens; n. 31

1997
pages 421-436

Disengagement policy of the state in water resources management

O. Tekinel
Kahramanmaras University
Kahramanmaras, Türkiye.
and
J. Doorenbos
Representative of FAO
Ankara, Türkiye.

ABSTRACT - In this study, disengagement policy of the state in water resources management, farmers' participation in operation and maintenance of the public irrigation schemes and turning over them to the farmers have been evaluated.

The cause and reason for disengagement policy of the state in water resources management, and institutional structure of water management have been discussed at the first two parts of the presentation.

Information were provided about soil and water resources of Türkiye, and agricultural production potential and present production level have been explained at the third section of the study. Problems associated with operation and maintenance and possibilities of privatisation of the public irrigation schemes have been stated and possible and viable solutions have been also suggested in section 4. As a case study, Türkiye's experience with users' participation and full transfer of irrigation systems to users has been presented in section 5.

RESUME - *La présente communication procède à une évaluation de la politique de désengagement de l'Etat en matière de gestion des ressources hydriques, de la participation des exploitants dans l'exploitation et la maintenance des projets d'irrigation publics et le transfert de ces derniers aux exploitants.*

La cause et la raison pour cette politique de désengagement de l'Etat en matière de ressources en eau, ainsi que la structure institutionnelle de la gestion de l'eau, sont examinées dans les deux premières parties de la présentation.

Des informations sont fournies sur les ressources pédologiques et hydriques de la Turquie, et le potentiel de production agricole ainsi que le niveau actuel de production sont expliqués dans la troisième section de cette étude. Les problèmes liés à l'exploitation et à la maintenance ainsi que les possibilités de privatisation des projets publics d'irrigation sont présentés. La 4ème section porpose également des solutions possibles et viables. En tant qu'étude de cas, la 5ème section présente l'expérience de la Turquie en matière de participation de l'utilisateur et transfert global de systèmes d'irrigation aux utilisateurs.

INTRODUCTION

Irrigation has played a pertinent role in the Mediterranean Region since the earliest times, ancient civilisations, such as of Mesopotamia, relied on irrigation. A wealth of historic structures found in the region, demonstrates the high level of professionalism in the art of water conveyance systems. In older times irrigation made crop production more secure. Contribution of irrigation is now directed to reduce the effect of climatic conditions in achieving high quality, varied crop production for competitive markets, fresh and processed, in and out of the growing season. Socio-economic benefits, in terms of rural income, employment and the returns from export, are an important, if not an overriding consideration. The 1992 Dublin Statement on Water and Sustainable Development concludes that "scarcity and misuse of fresh water pose a serious and growing threat to sustainable development " and urges as a principle that " water has an economic value in all its competing uses and should be recognised as an economic good." The Earth Summit document, Agenda 21, reflects these principles and adds that "sustainability of food production increasingly depends on sound and effective water use, including water management." High valued crop production thus depends on good and responsible water management.

According to old traditions, imposed by the religious laws, water is considered as a gift of nature and is a public property, has no ownership right, but provide for strict priority of use. No one can misuse the water. Farmers organisations for the management of water have been an centuries-old tradition in many places. Because of prevention of conflicts in modern society, later legislation opted for central administrative control with separation between ownership and rights of use. This often through a permit system subject to state control and enforceable legal frameworks were instituted. Planning and development of water resources became a state responsibility, which also extended to the design, implementation and operation of water distribution systems in rural development projects. Strong commitments to leadership at the state institutions, being often single line agencies, once performed their tasks adequately so standard. Irrigation systems were under the domain of the public sector and bureaucracy at times, has given rise to institutional conflicts and rivalries between agriculture and the water institutions, with cost of water being high, operational efficiency and reliability of water supplies often questionable and budgetary means for further investment, for operation and maintenance discouraging. Two main options for improvement frequently quoted are that, although expensive wastage can be improved by better technology and adapting the socio-economic and institutional aspects.

Adequate water management by the farmers themselves is now often seen as the best cure for irrigation waste. Many countries in the Region are handing over the management and operation of irrigation schemes to water user associations, with encouraging results. Disengagement policies of the state have become at places a magic charm. Undoubtedly, a smaller state involvement will lead to the smaller state apparatus, loosing part of its steering and controlling functions, which is considered by some, an easy escape route for solving organisational, financial and personnel problems. The question remains to be answered whether disposal of, contracting out or privatisation of the state functions lead to higher efficiency and more flexibility at lower cost, which in itself has already aroused a storm of controversy. But equally, the experiences in the change towards giving user organisations more responsibility in the management of water resources suggest that progress in the process towards improvement can be significant, provided that the diversity of human, social and physical conditions is realised, the need for monitoring and evaluation is persistently visualised and lessons are learned, the transfer process is constantly refined, the policy is consequently adapted, the legal and administrative provisions are timely provided and the incentive and support environment are rightly placed.

1. CAUSE AND REASON FOR DISENGAGEMENT

The motivations for reduced involvement of governments are varied and cause and reason can be many. One of the most evident and major cause is the present tendency in policy pursued by governments towards an open-market economy with free play of market forces. Less institutionalised interference in the economy cannot bypass sector-specific demands. Water for irrigation carries a high

value and has an appreciable cost. Like the other sectors, the heavy government involvement and period of large subsidies may have passed. The future role of government in irrigation consequently is subject to change. Transition from a centralised and institutionalised support system to a more open democratic approach, with the direct involvement of the wider public will bring profound changes in the manner irrigated agriculture will be managed in future. Beside policy considerations, disengagement of government in irrigation by implementing transfer programmes can be considered in terms of economic efficiency, with reduced inputs by expensive institutions and considerable savings in public expenditures. A supportive reasoning can be that in accordance with government privatisation orientation, independent Irrigation Management Agencies, under the jurisdiction of government, could be charged with operation and management of supply systems and farmer water association or irrigation cooperatives could be charged with water distribution at the field level and this in a more efficient and cost effective manner at a real cost. This would suggest transforming present public irrigation departments from an engineering and operation culture to an institution assigned in future primarily with policy formulation and strategic management, without executive functions. Their existence would not be questioned since they also have a place in the newly created institutional framework.

Establishing a 'disengaged' institutional structure for allocating water entails a fundamental choice as well as a compromise in respect to physical nature of the resource, social and economic objectives, competing interests and human reactions to change. Ensuring political support and full acceptance by those directly involved are preconditions when choosing a structure for water allocation. A favourable environment should be created where by the end users, the farmers, become powerful in expressing their interests as well as being a partner of government in developing and managing irrigation. Responsibilities of different partners in implementation should be defined, together with the conditions and modalities for transfer. A support mechanism, such as an Irrigation extension service, will need to be established and the financial resource, including credit, be provided. Monitoring, using well defined indicators and adaptation of procedures based on lessons learned will be required priority, during and after the process of change. There are also the issues related to the project layout and operation modules. In schemes with a supply system based on upstream control only, the distribution of water among farms may be complicated and call for a redesign. Schemes were water is delivered already on demand to the farms, the formulation of Association will be much more easy. Over and above, clarity in irrigation related legislation covering inter alia water law on ownership, institutions involved, water resources management, utilisation water quality and environmental concerns, demands enforcement and equally, acceptance.

2. INSTITUTIONAL STRUCTURE OF WATER MANAGEMENT

Not less than 20 countries are implementing disengagement policies in water resource management, in developed and developing countries. In the United Kingdom during the last decade the Law on Natural Resources was fully reformed to new concepts; in the Netherlands the centuries-old Water Management Boards were recently adapted forced to by new demands from society; in Egypt the National Irrigation Improvement Programme promotes processes for irrigation management turnover of improved systems with already initial positive results claimed; in Morocco with centuries old traditions in farmers organisations for the management of irrigation schemes, the Law on Water Users Associations was promulgated in December 1990; in Bulgaria water resources are dealt with in the Constitution of 1991 and contains important provisions concerning irrigation infrastructure and a new water law is in the process of being submitted to Parliament. Critical decisions were taken and key lessons are being learned, on the failures but also the successes. There is much in common, but there are also large differences, in concepts and mechanism used, in contradictions that arise, there is resistance to change and there is no magic wand. In brief, the following general picture evolves.

Strong political support is demanded for implementing far-reaching institutional changes in delegating direct government involvement and control and in privatising executive functions in water resources development, management and use. Commitment and political resolve must be assured with decision-making often guided by a National Water Council, placed under the Council of Ministers. The Council would encompass all aspects of water management and include the formulation of the national

water resource policy, drafting of legislation, preparation of national and regional programmes and budgets and exercising control on investment in water resource development. To enhance investment transparency, an all inclusive Fund for Water Resources could form part of the national budget. The Council would be supported by a secretariat and draw on the knowledge and experience from the existing institutions. A policy document, endorsed by Parliament, would be drawn up to ensure most effective and timely implementation. The National Council would promote the change from a project to project orientation to policy formulation and it would decentralise responsibilities for the implementation of policy.

Regional bodies, possibly River Basin Boards, would support the Council in formulating basin-wide plans and related investments. The regional bodies would co-ordinate and represent the different interests, with membership derived from provincial government and public and private waters users associations. Granting of water use permits on the basis of contracts, with quantity and duration according to established norms should be delegated to these bodies, with the National Council keeping overall supervision and settlement of disputes.

In accordance with the disengagement policy and the delegation and privatisation of government executive functions, the formation of semi-independent Irrigation Management Agencies with local branches in irrigation projects would be charged with the operation and maintenance of the main supply systems, according to authorisation granted and directives received from the National Council. The operational cost would be financially guaranteed by government, but would be borne by levies charged to the users of water. Government institutions would thus be relived from complex administrative and financial functions, including the collection of water charges.

Legislation should empower the setting up of Water Users Organisations, with a clearly spelled out legal status, structure and function, with control and supervision mechanisms. Payment of water charges can be effected by the Associations. A General Assembly comprising all water users should be the decision-making body with resolutions binding to members with right of appeal. Rights and duties of the members, including payment of dues, should be clearly spelled out. The General Assembly should decide on the hire of technical and administrative personnel. The Associations should be enabled to form Water User Unions to become powerful in expressing their views and defending their interests. Public administration should hold the right to supervise the delegated authority to the Associations.

The structure, conceptualised in brief, will need to be based on a legal text of the law to be prepared preceding the transfer. There are far-reaching consequences for most existing institutions with inherent resistance to change. Division of responsibilities between public control, private management and farmer associations must be defined and entail a real role and power and capacity of decision-making. Farmers may put forward conditions for transfer, particular in case of delayed maintenance and when financial viability of the schemes is questionable. Training of farmer leaders in operational matters must be addressed. The impact of change must closely be monitored. The success of the new arrangements would be the degree in which the value of water and the full cost of providing a reliable supply of adequate quality in future is appreciated. Otherwise, different sectors of economy are subsidising irrigation water, at present up to 90 percent, or at whatever cost and effort the government feels politically right.

3. GENERAL INFORMATION ON TÜRKIYE

3.1 General Information

The population of Türkiye is 60 million and is growing at an annual rate of 2.2 % and is expected to exceed 91 million by the year 2025. There is rapid urbanisation of the population, from 34 % in 1965 to 61 % in 1990 and heading for 75 %. Improving education and standard of living are reflected in an increase in per capita demand for food around 1.2 % per annum. So the minimum annual growth of agricultural production is about 3.5 %. If export targets are also to be met this figure becomes 4 %. The long-term growth rate in the agricultural sector has been 3 %, but has considerable potential for improvement. Crop yields in Türkiye average only 0.9 tonnes of grain equivalent per hectare, mainly due to the semi-arid climate. With irrigation and other modern inputs this has a potential of 5 t/ha.

This situation is recognised by the Government, which has embarked on an ambitious programme of

irrigation development, which now absorbs some 35 % of the budget for agriculture. With this scale of investment the question of sustainability is of great importance. Broadly, the two main aspects of the problem are the preservation of the water resources and the use of that resource in agriculture in a manner which is both environmentally sound and efficient. Water use efficiency is crucial. At present, irrigation consumes 75 % of water used in the country.

Irrigation development potential in Türkiye is estimated at about 8.5 million hectares, with nearly 4 million ha already operational. At present particular attention is being given to the South East Anatolia Project (GAP) where 1.7 million ha will be irrigated by waters from the Euphrates and Tigris basins. The rate of project implementation by the General Directorate of State Hydraulic Works (DSI) is of the order of 100.000 ha per annum, but projects take much longer to complete than is foreseen because of interruptions caused by budgetary constraints. Also, on-farm development, which is carried out by the General Directorate of Rural Services (GDRS), is often not synchronised with construction upstream.

Operation and maintenance (O&M) services are chronically underfunded. Although officially water users should cover all O&M costs, in practice less than 40 % of dues are caused by such operational problems.

The general questions of the financing of irrigation is extremely complex, involving economic, social, political and technical factors. Whether other sectors of the economy can continue to subsidise irrigated agriculture to the order of 90 % of costs is a policy matter that has to be addressed. Shifting of responsibilities from state to beneficiaries has to be seriously considered.

The purpose of second part of this study is to evaluate the possibilities of turning over the public irrigation schemes to farmers and farmers' participation in the operation and maintenance of the irrigation schemes in Türkiye. Thus, to change the agricultural sector from the traditional structure to a much modern sector so that it can be adapted to changes that will occur in the future and to provide basic information on this issue for decision and law makers.

3.2 Land and Water Resources in Türkiye

The total surface area of Türkiye is about 78 million hectares. Of this total, almost one-third of 27.7 million hectares can be classified as arable land.

Although Türkiye generally has an abundance of water, it is not always in the right place, at the right time to meet the real needs. Hydrologically Türkiye is divided into 26 drainage basins. The river flow regimes are irregular and con not be taken directly as usable resources. Average annual precipitation, evaporation and surface runoff vary greatly. The average annual runoff of the country is 186 km3. It is estimated that 95 km3 of surface runoff could be technically developed for economic use. The actual yearly consumption from surface waters is 25.2 km3 or 26.5 % of the potential. Table 1 shows Türkiye's total estimated water requirements at present and in the future.

Table 1 *- Water requirement estimated for Türkiye (km3)*

Use	**1990**	**1995**	**2000**
Drinking and utility	5.9	7.4	9.0
Irrigation	32.3	37.0	41.8
Industrial	5.1	6.2	7.3
TOTAL	**43.3**	**50.6**	**58.1**

The total safe yield of groundwater resources is estimated to be 11.6 km3. DSI and GDRS have developed groundwater resources for irrigation on 556.000 ha by the and of 1991. With the farmers' utilisation of groundwater for supplemental irrigation the total area irrigated from groundwater resources is estimated to be about 580.000 ha. In general, groundwater utilisation in irrigation is efficient, with about 5000 m3/ha/season being applied. The total amount of groundwater used for irrigation is approximately 3.25 km3 per year, for municipal purposes it is 2.15 km3, giving a total of 5.4 km3.

3.3 Food and Agricultural Production in Türkiye

Although Türkiye has maintained a long-term growth rate of 3 % in the agricultural sector, the Government has placed emphasis on agriculture under the new development strategy and has assigned top priority to agricultural development through increased public investments particularly in irrigation and drainage.

Of Türkiye's arable land area of 276 370 km2, 20 % is usually lying fallow at any given time. A certain amount of marginal land, either infertile or excessively steep is cultivated, the sustainability of which is highly questionable.

Land tenure patterns vary across the country. Basically there are three types of ownership. Most villages, particularly in western and central Anatolia and the Black Sea region are inhabited by small farmers. In eastern Türkiye, there are still large feudal states in the hands of absentee landowners who may control many villages and employee the local peasantry as share croppers. In areas such as the Cukurova Plain around Adana and in parts of the Aegean coastal region, there are large commercial farms. Some state farms are scattered throughout the country, which have helped to pioneer new techniques and to supply seed for the farmers.

3.4. Institutional Framework

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

3.4.1 Ministry of Agriculture and Rural Affairs (MARA)

According to the establishment law and subsequent revisions, the Ministry of Agriculture and Rural Affairs is responsible for the development of agriculture, stock-breeding, various socio-economic services and the establishment of certain sub-surface facilities, within rural development plants.

Major responsibilities, covered in the laws concerned and to some extent related to the promotion, completion, operation and maintenance of irrigation projects.

The Ministry of Agriculture and Rural Affairs consists of 12 General Directorates, of which the General Directorate of Rural Services (GDRS) is also responsible for On-farm Development (OFD), while the General Directorate of Organisation and Supply is responsible for agricultural extension services.

3.4.2 General Directorate of Rural Services (GDRS)

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

3.4.3 State Hydraulic Works (DSI)

The law establishing DSI (Law no.6200) and subsequent amendments include a number of items relevant to the planning, design, construction and operation and maintenance of irrigation and drainage systems.

While the legal basis for the O&M and On-farm Development activities needs to be better defined and perhaps broadened, existing laws appear to provide ample scope for the Authorities to take action in such cases as formation of Water Users' Groups, wilful damage to DSI systems etc.

3.4.4 Agricultural Reform

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

Its main responsibilities are:

- After investigations and surveys, determining the priority of the areas to be considered for land reform.
- In the land reform areas:
  - To distribute land registered under Government authority, which is not required for public services, to farmers in need of land.
  - To provide the equipment, support and training for these farmers and to encourage them to establish farmers' organisations.
  - To consolidate the land, into more economic units.

3.5. Irrigation Development

Government-supported irrigation has been pursued since the middle of the century, and continues to receive firm governmental attention, it has contributed substantially to agricultural growth. It is expected that in the period 1992-2001 an additional area of about 1.2 million ha will be brought under irrigation by State Hydraulic Works (DSI). A limited area is also expected to be developed for irrigation by the General Directorate of rural Services (GDRS) and the farmers themselves.
The reasons for devoting substantial investments to irrigation lie mainly in the nature of existing ecological conditions and the potential gains in production and employment which can be realised in irrigated agriculture. The critical growing period for most of the crops is during the months of June, July and August when most of the rivers carry base flows only. Water storage, therefore, is indispensable. About 70 % of major irrigation projects are fed with water from reservoirs or lakes. Studies of river basins to determine development possibilities started in 1954 and have now been completed on a master plan level. By the end of 1992, irrigation development was as follows:

***Table 2** - Areas developed for Irrigation*

Developed by	***Area developed for irrigation***
DSI	1.8 Million ha
GDRS	1.1 Million ha
Farmers	1.1 Million ha
Total Area Irrigated	***4.0 Million ha***

3.5.1 Small-Scale Irrigation Projects

The total small-scale irrigated area developed by GDRS reached 1.100.000 ha with the completion of the 1992 investments programme, which covers 13.385 ha from small earth dams. GDRS completed more than 500 such dams, irrigating 115.000 ha by the end of 1992. GDRS has also completed about 1.700 earth dams for animal watering.

***Table 3** - Small-Scale irrigation projects completed by GDRS by the end of 1992*

From surface water (Diversion, pumping)	745.000 ha
From groundwater	240.000 ha
From Small earth dams	115.000 ha
Total	***1.100.000 ha***

3.5.2 large-scale Irrigation Projects

By the end of 1992, construction of 150 large dams have been completed and put into service for single purpose or multi-purpose demands such as irrigation, energy, flood control and domestic water supply. Most of them are earthfill or rockfill dams, having a total storage capacity of 78.000 million m3. Also 53 dams are under construction having a total storage capacity of 59.000 million m^3.

In Türkiye, large scale irrigation projects are carried out by DSI. The main irrigation works such as dams, pumping stations and main canal systems are constructed under the supervision of DSI, who have developed 1.27 million ha for irrigation by the end of 1992. It is expected that in the period 1992/2001 an additional irrigated area of 1.13 million ha will be developed by DSI. The rate of development of large irrigation is shown in Table 4.

***Table 4** - Rate of Large Scale Irrigation Development*

Year	*Area Developed (1000 ha)*
1950	143
1960	185
1970	521
1980	847
1990	1180
1992	1270
2001	2390 (estimate)

3.5.3 The GAP Project

The South East Anatolian Project (GAP) is a regional agriculture-based development project in the lower Euphrates river and Tigris river basins within the boundaries of Türkiye, covering an area of about 74.000 km2. The project involves integrated development of irrigated agriculture and agro-industry and supporting services, including communications, health and education.

GAP envisages structural changes in the Region's socio- economic life and these will alter not only the region's position in the country but also the development of Türkiye's economy by its contribution to the national overall production.

3.6. On -Farm Water Management

In Türkiye about 95 % of the total area is irrigated by surface irrigation methods (such as furrow, basin, border or flooding). The remaining 5 % is irrigated mostly by hand-move sprinklers and some micro-irrigation mainly in the Aegean and Mediterranean Regions. The aims of the farmers in irrigation area: firstly to irrigate the land in the shortest possible time; and secondly to supply the plant with sufficient water on time. In order to achieve these goals they do land levelling and grading and they divide their fields into smaller basins by temporary furrows and ridges. These measures help them to irrigate faster and more efficiently.

In the last ten years, more sophisticated irrigation methods have been adopted to increase the irrigation efficiency. Drip or trickle irrigation and other micro-irrigation systems are becoming more popular especially in Western Türkiye and Mediterranean regions, where the climate is suitable for vegetable and flower production in greenhouse and also for more valuable crops such as bananas, citrus, grapes. It is estimated that approximately 2000 ha of land is irrigated by micro-irrigation systems in these regions. On the other hand, conventional (hand-move) sprinkler irrigation is very common all over Türkiye among the farmers. According to the 1990 figures, the number of the sprinkler sets is 96 183 and it is estimated that about 200 000 ha of land is irrigated by sprinkler.

On-farm development, which for financial or technical reasons con not be carried out by the farmers, is mainly the responsibility of GDRS. Although TOPRAKSU-GDRS have carried out quite a lot of on-farm water development works during the last three decades. The average irrigation efficiency obtained in 1990 comes to no more than 41% (with a wide variation from 10% to 70%).

Considering the fact that almost the entire canal network (90%) is concrete lined, the low irrigation efficiencies are caused by improper matching of supply and demands during the seasons, inaccurately executed water management programmes, insufficient density of the tertiary/quaternary canal systems, poor field conditions (non-uniform slopes, poor levelling) and the reluctance of the farmers to irrigate at night.

Although the area under irrigation has increased steadily, production benefits have been below expectations mainly due to constraints at farm level. Even in areas where on-farm development works have been completed the expected rise in efficiency has not been achieved. Inadequate maintenance of the irrigation and drainage works has affected water utilisation, the lack of an effective extension service for irrigation water management and the absence of farming systems development are contributory factors to under-performance.

3.6.1 Project Implementation

Two governmental organisations DSI and GDRS, which are dealing with implementation of irrigation projects, prepare the project investment budget within the limits set by the State Planning Organisation (SPO) allocations. The budget proposals are then submitted to the Parliament through the Ministry of Finance.

Although the completion dates of the works are specified, the funds allocated are usually inadequate and limit the volume of work that can be undertaken in any given fiscal year. Contractors arrange to carry out the works that can be covered by the funds allocated. This slow down the rate of construction. Increase in the volume of work due to design changes is another factor which prolongs the period of construction.

3.6.2 Financing of Irrigation

The true economic cost of irrigation water can be established without much difficulty.

One returns to the fact that implicitly in any benefit/cost analysis is the assumption that someone will benefit from the costs incurred. This leads to the feeling that those who benefit should contribute to the costs through some form of water charges. If these do not cover the whole project cost, then it is clear that other sectors of society are subsidising irrigation farmers (in Türkiye up to as much as 90 %). Whether this is right or wrong is a socio-political questions. Since inadequate management of the irrigation water supply is often linked to lack of funds for operation and maintenance, it is useful, if only conceptually, to separate the two issues in the following scenario. The irrigation water is supplied to the state by a utility company which charges the state the full cost of providing a reliable and sustained service; the state then sells the water to the user at whatever price it feels is politically right, but realising that the amount of any subsidy is public knowledge. Sometimes the problem is complicated by subsides on farm inputs being offset by low farm-gate prices, which are not helped by subsidised agricultural surpluses.

Once a decision has been made on the extent of subsidy to irrigated agriculture society as a whole is prepared to offer, equitable systems of setting user contribution to the financing of irrigation must be established. It has been convenient in the past to separate the capital costs and O&M costs when confronting this problem. But this is complicated by the fact that schemes supplied with water under gravity have low O&M costs, while pumped water schemes incur energy costs and regular replacement of equipment. Even within a project, conjunctive use of surface and groundwater can be of advantage. The existence of many private tubewell irrigation projects indicates that, when the user has control over the water delivery, there is willingness to pay for the whole cost of the water used. Government policies on irrigation financing affect the relationship between the providers of the water and the beneficiaries and strongly influence their behaviour.

4. THE POSSIBILITIES OF PRIVATISATION OF THE IRRIGATION PROJECTS IN TURKIYE

4.1 Turnover to Self-Management

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

4.2 Operation and Maintenance

The success of operation of irrigation schemes should be evaluated on the basis of farmer satisfaction. In 25 % of the irrigation schemes, covering 10 % of the irrigable area of Türkiye serious water shortages occur. Such water shortages are generally the result of system deficiencies and limited water availability, but are always aggravated in the absence of proper water management practices.

Basically, two methods available for water distribution; the on-demand and the supply method. Although in Türkiye officially the on-demand method is practised, in actual fact the supply method is applied in most projects. Irrigation schemes are designed according to the cropping pattern arrived at in the Feasibility Report. But in practice cropping patterns change yearly, creating big problems during operation. In mono-culture areas peak water demands often occur at the same time creating water scarcity, when the supply method is applied, i.e. DSI decides when to release water.

Another problem is that irrigation projects are designed for 24 hour irrigation, but farmers irrigate during daylight hours only. So most of the water delivered at night goes to the drainage system. Because of the on-demand water distribution with the manual upstream water control in main systems, the upstream farmers have big advantages, they use more water than their needs, in fact they use the downstream farmers right.

Maintenance of canals and drains consist of silt removal, weed control and repair of structures. The canals receive silt from irrigation water and storm water runoff entering the irrigation system from adjoining areas. If properly constructed and managed, no silt should enter drains. Silt deposit in drains, however, is much higher than in canals, originating mainly from the embankments, because the protective vegetation has been destroyed by repeated application of herbicides and by grazing of goats and sheep. Continuing erosion of side slopes and repeated silt removal from the bottom, results in wider drains, with steeper and unstable side slopes.

In the present situation, weeds are killed with chemicals and removed by mechanical means, which is a far cheaper method than cutting and removing weeds with machinery. It is proposed gradually to eliminate the use of herbicides, for technical and environmental reasons. The costs of mechanical weed control are in the longer run about the same as those of chemical control.

Thus, to improve water management system the following measures should be taken.

- For saving water during the nigh, some night storage reservoirs should be designed in the scheme.
- The main system management and on-farm water management should be reviewed and alternative water distribution methods should be promoted where appropriate.
- Land consolidation is the most important part of the irrigation scheme, hence for improving irrigation efficiency, project design should be based on land consolidation.
- Existing discharge measurement facilities should be repaired when necessary and their number increased.
- Illegal opening and wilful destruction of gates by users should be brought under control; farmers participation would be a helpful factor here.

4.3 Cost Recovery

The pricing approaches selected will have effects on both the distribution of income and allocation of resources. Higher prices for water should encourage consumers to use less water. Since price will influence total usage it will tend to reduce the level of investment.

Irrigation capital costs and operation and maintenance expenditures incurred by State Hydraulic Works (DSI) are subject to repayment in accordance with its Establishment Law. Complying with this law, repayment schedules are prepared by DSI.

Water charges include: the actual cost of operating and maintaining irrigation facilities; and amount required for recovery of capital cost of such facilities, amortised over a period not exceeding fifty years. Although, certain amounts of interest (subject to approval of the Government) could be applied, in practice no interest is charged. Furthermore amortisation charges, once they have been established, are not indexed to inflation. Only when the charges become very low some adjustments are made, the latest in 1985.

In principle, O&M charges are set by DSI. For a given year the payment consists of 100 % of actual O&M costs of previous year (not indexed to inflation). Water rates are charged on a cropped-area basis (with different rates for different crops) for the current year.

In Table 5 irrigated areas, O&M costs and collection rate of water charges are shown. As shown in the table, the actual amount collected falls far short of the assessed amount. This is due to the inadequate penalty for late payment. Recently, amendments have been proposed to the Establishment Law in relation to late payment of water charges.

***Table 5** - O&M Cost and Receipts in DSI-operated Schemes Year*

Year	*Area operated by DSI (ha)*	*Area irrigated (ha)*	*O&M Costs millionTL (1992)*	*Receipts Collected (%)*
1975	671.242	420.003	115.510	43.3
1980	755.459	493.604	169.705	41.3
1985	1.060.440	794.850	312.840	51.3
1990	1.251.251	847.920	303.600	37.9

Irrigation cost recovery system could be evaluated in terms of increasing the government revenues, improving the efficiency of irrigation schemes and providing more equitable income distribution. Since 1989 the O&M charges have been set to recover full costs. The present system is considered to be suitable to meet this objective and since 1988 substantial progress use of water, as farmers are not charged in proportion to the actual consumption.

4.3.1. Future Prospects of Financing and Cost Recovery

The general question of the financing of irrigation is extremely complex, involving economic, social, political and technical considerations. As such it can often become a highly sensitive and charged issue. In a brief note it is difficult to avoid some generalities.

The first is that it is usually unrealistic to expect the user repay both the capital and the O&M costs of project. Government subsidies towards the costs of capital works can be justified, especially if the letter are environmentally sound and well maintained and thus remain a national asset. But a project will not provide a reliable supply of water to the user if the O&M cost are not secure. It should therefore be the policy to have such costs covered by the users. Project based on pumped water (notably groundwater) could be an exception due to high energy costs in O&M).

The second generality is that users tend to be more willing to pay for a service directly rather than simply contributing to the general revenue of the government. Hence it is more useful to refer to financing of irrigation rather than cost recovery.

As the users (i.e. farmers) become more educated and hence more articulate in their demands from the irrigation service, they will increasingly want to have voice in how that service operates. Accountability to the user will then follow. But the users must be encouraged to organise themselves into effective Water User's Groups (WUG). It may be a good strategy to make the WUG's responsible for O&M services, some of which could be carried out directly by the users and some purchased at market prices from the agency providing the water. Then agency could then be financially autonomous, while the WUG's could buy the water in bulk and collect fees from members.

By this process the DSI could shed some of its responsibilities at the downstream and of the projects.

4.4. User Participation in Operation and Maintenance

4.4.1. GDRS Groundwater Co-operatives (co-ops)

Groundwater projects are executed jointly by GDRS and DSI, but their O&M is arranged by GDRS, who have adopted a policy of establishing user group co-ops before project construction begins. The co-ops are responsible for all O&M costs and pay back the capital cost of the DSI wells and pumps on very advantageous terms. The official Water User co-op is established by the Department of Co-ordination and Maximisation of MARA.

4.4.2 GDRS Surface Water Co-ops

Originally on completion of the project, GDRS performed the O&M function, eventually transferring it to the local village head. That worked when only one village was involved: not always the case with surface water schemes. As a result, GDRS began to experiment with adopting the Groundwater Co-op model on an unofficial basis. These proved to work well, so in 1992 the formation of co-ops before beginning of construction became a prerequisite. A great effort is being made to transfer to co-op O&M older GDRS schemes.

4.4.3 DSI Irrigation Groups (IG)

Although DSI takes responsibility for the O&M of their large projects, on 46 % of the area the responsibility for the tertiary distribution network has been transferred to Irrigation Groups (IG) headed by the local village head. If the IG organises O&M at tertiary level the IG collects that portion of the water tariff, reduced by 12 %. As the O&M thus carried out is much more cost-effective, savings are made and can be put to other social uses. This works well for small schemes, but as soon as several villages are involved conflicts arise. This points to the weakness of relating a water-flow dominated system to demographic boundaries. It is interesting to note that good IGs collect 100 % of their portion of the water tariff, while DSI can recover only about 30 % of the remaining, much larger (84 %), portion. In the IG system, neither DSI nor the farmers, who over the years have depended on government services, can develop a feeling and pride of ownership for the infrastructure.

4.4.4 Overall Picture

Much useful experience and expertise has been gained by GDRS in setting up their co-ops ahead of construction. Transfer of this to older projects must be encouraged. The DSI experience in this area is much less coherent and little can be done without reviewing the function of DSI in project O&M. In-country lessons from GDRS projects can be applied nationally, but remembering that the smaller the grouping, the easier the transfer of O&M responsibilities is.

4.5 Farmer's participation in Operation and Maintenance for Irrigation Project:

A draft regulation for the turnover the public irrigation schemes to farmers and farmer's participation in the maintenance and operation has been prepared and submitted to responsible organisations in order to overcome the problems of encountered in state regulated projects.

In the draft regulation consisting of 39 items, establishment of independent irrigation groups or associations are foreseen. The most distinctive characteristic of irrigation associations is that they are the organisation of the people, for the benefit of the people.

The basic, idea is that farmers must finance most of the irrigation improvement works themselves and where possible, participate in actual execution of the work. Irrigation groups consist of associations general assembly, executive committee and head of association.

The responsibility and tasks of each branch are described in detail in the draft regulations. The following changes have been foreseen in the regulations prepared in order for solving problems faced in the public irrigation schemes:

4.5.1. Cost recovery and collection of water fees

* Cost recovery from the investments made by GDRS can be realised by a similar method used by DSI. For this purpose a simple legal act can be passed.
* All the expenses made both by the GDRS and DSI to the same project could be summed by the Ministry of Finance and that amount can be collected as repayment.
* For the projects that have completed its repayment period, if new investments are to be made for improving the scheme's performance, the repayment due to these new investments should be collected from the beneficiaries after the completion of the renovations.
* Legal measures should be taken for collecting water fees due within the same year.

4.5.2. Turnover of Irrigation Projects

* Irrigation schemes must be completed and operated in an effective way before turnover to farmers.
* Irrigation schemes must be turned over to beneficiaries or users of the system.
* Drainage facilities should be turned over right after the complete development stage.
* Large irrigation schemes could be turned over to private sector. However, for this purpose a through survey is required. In addition, extremely high profit margins and high water fees should not be overlooked if privatisation is realised.

4.5.3. Irrigation Association (Users Groups)

In order to establish independent, democratic users groups and provide an effective working environment, instead of village act no 1442, municipality act no 1580 and town administration no 5442, DSI act no 6200 which mandates establishment of users groups should be modified.

* Thus, a responsible organisation for farmers could be realised.
* Participation shares should be based on area instead of population.
* During establishment of user's association, waste of time should be avoided.

5. A CASE STUDY

This case study on Türkiye's experience with users' participation and gradual as well as accelerated full transfer of irrigation systems to users has been prepared to give an idea about this concept. This case study highlights the recent achievements of DSI since 1993 in accelerating the process of transfer of irrigation systems to users and pursuing a plan to complete the transfer of additional area of close to one million ha by the end of year 2.000.

This case study has been carried out, without realisation of the draft regulations as a legal act, instead, by using the existing DSI act no 6200.

5.1. Transfer of Irrigation Systems to Users

Progress: The table below shows DSI's (the main agency responsible for irrigation and water resources development) major progress in large-scale transfer of irrigation full management (full O&M responsibility) to users, both in terms of actual achievement and preparing a sound transfer plan until year 2.000.

5.2. Main Results.

(a) ***Transfer of each ha of*** irrigated land to users ***reduces the need for the government O&M expenditures and the related cost recovery*** by ***about US $100/year. This means that the government will save each year about US $10-16 million until year 2000, when the cumulative annual savings will reach about US $90 million per year;***

(b) Water User Organisations (WOUs) have generally demonstrated the ability to operate and maintain the systems satisfactorily through recruiting required staff, buying urgently needed transformation and communication equipment, assessing and collecting water fees, equipping their offices and substantially improving water delivery at cost generally less than that incurred by DSI as shown in the following comparison of the cost of Antalya Region, which is one of the efficient regions, with a Water User Association (WUA) in the same region (Table 6).

Table 6 *- Comparison of Water Delivery Costs by Government and WUA Managed Irrigation Projects.*

ITEMS	**FOR ANTALYA Region (Gov. Managed)**	**FOR KORKUTELI (WUA)**
Average O&M Cost TL per ha	1,898,052	949,130
Average Maintenance TL per ha	259,682	217,391
Average Operation TL per ha	1,638,370	731,739
Average Canalet meters replaced per ha per year	0.36	0.03
Persons recruited/ha	0.01	0.01
Personnel expenditure TL/ha	1,366,000	804,347

5.3. Sustainability

A general assessment of performance of transferred schemes shows that the transferred schemes continue to perform satisfactorily and contribute to increased production in irrigated areas, provided that they continue receiving required support from the Government, mainly DSI, particularly in the following areas:

(a) required O&M equipment on a cost sharing basis:
(b) assistance for on-farm improvements, based on participatory cost sharing; and
(c) not abandoning WUOs after transfer and maintaining close liaison with and providing them with required advice, guidance and training related to management, organisation, investment in irrigation improvement, etc. A number of DSI O&M staff have demonstrated the ability and preparedness to work closely with WUOs and provide them with required advice and assistance. DSI recognised the above needs and is making possible efforts in this respect.

5.4. Türkiye Becoming a Model Country for Transfer

Despite the need for improvements, considering its relatively long and generally successful experience with participatory management of irrigation and transfer of full management responsibility to users, both in gradual and accelerated manner. Türkiye can be considered as a model for transfer in the region and in Asia. Some of the important features of transfer in Türkiye are:

(a) transfer is not restricted to a single type of user organisation. Based on the users' preference and size of the related scheme, irrigation systems have been transferred to WUAs, municipality Water Users Organisations, Village Water User Organisations and Co-operatives, and all these organisations are found to be generally successful;

(b) to avoid duplication of efforts and weakening users responsibility for managing the systems, transfer of schemes is not restricted to the tertiary units or only the lower end canals. Already schemes with all related irrigation primary, secondary and tertiary networks, covering areas as large as 15,040 ha have been transferred;

(c) DSI managed to carry out the above accelerated transfer without expanding its organisation; and;

(d) most of the basic preparations for such accelerated transfer, including the initial observational training were done in a period of less than six months, while the transfer was making progress.

Before 1993, DSI focus was on transferring only small and isolated schemes. This policy on transferring irrigation schemes was guided primarily by the concern that it was difficult and uneconomical for DSI to manage such schemes. However, since 1993 in view of the following reasons, and with persuasion of the World Bank's staff and its co-operation in getting DSI's staff, at various levels, more exposed to accelerated transfer of irrigation systems in the Latin American countries, especially Mexico, DSI's policy shifted from transferring only the above small and isolated schemes to an accelerated approach of transferring small and large schemes. As shown in Table 7 of the above information's such a policy was put to action without delay.

***Table 7** - DSI's Transfer Plan and Achievement*

		Planned		*Achieved*	
	Years	***Annual (ha)***	***Cumulative (ha)***	***Annual (ha)***	***Cumulative (ha)***
1	1988	-	-	1,789	55,034
2	1989	-	-	3,386	58,420
3	1990	-	-	2,391	60,811
4	1991	-	-	257	61,068
5	1992	-	-	1,552	62,620
6	1993		72,042	9,442[1]	72,042
7	Jan 1-Nov. 15 1994			158,204[1]	230,246
		103,958	**176,000**		
8	Nov. 16-Dec.31 1994			41,796	272,042 (estimated)
9	1995	140,000	316,000		
10	1996	160,000	476,000		
11	1997	140,000	616,000		
12					
12	1998	100,000	716,000		
13	1999	100,000	816,000		
14	2000	100,000	916,000		

In 1993 and 1994 DSI has sent more than 50 high level officials USA and particularly to Mexico. These visits had substantial effect in further encouraging DSI's staff to pursue accelerated transfer. To promote accelerated transfer in, for areas of Antalya, Adana, Konya and Izmir, where DSI officials had shown a high level of preparedness and dedication and farmers were more receptive, pilot program of accelerated transfer started. Considerable internal training, including seminars and workshops significantly contributed to the process. A friendly competition among various regions in promoting successful transfer is another contributing factor. The policy that O&M engineers will not loose their jobs as a result of transfer and knowing that they will have important role to play after transfer, kept their moral high and role of promoters was played entirely by DSI engineers who interacted very closely with the village and municipality councils and chairmen.

The main underlying reason for accelerating transfer program has been the O&M financial burden for DSI and the Government, which was getting unbearable and unsustainable. The O&M cost recovery, largely due to political reasons, has been unsatisfactory (about 30 %). Considerable increase in the cost of O&M due to the role of unionised labor further aggravated the situation. The present Government's general policy of promoting privatisation was also a contributing factor. Positive results from generally satisfactory O&M of transferred schemes was another important contributing factor, which substantially alleviated the concern that the systems will rapidly deteriorate after transfer.

CONCLUSIONS

It is now universally recognised that water has an economic value in its many uses. In agriculture its potential as an input of value can be realised only if it is well managed from the point of abstraction to the crop root zone. Part of that management is in the hands of highly-trained professionals and part in the hands of the farmers. Traditionally, the latter limited their sphere of interest to their farms, but increasingly this is being extended upstream to give the user more influence over the provision of the water input. The ability of farmers to make rational management decisions has tended to be under-estimated. Farming, after all, is an activity (unlike most work in factories) which demands decision making every day. With better education and an expectation of better returns, farmers will be increasingly looking to the professional teams upstream as adequately rewarded providers of a reliable service.

The record of water resources and agricultural development in Türkiye has demonstrated that the country has impressive cadres of highly trained and experienced professionals to carry out the task ahead. It may be that the manner in which they are now grouped institutionally is not always best suited for this task, with too much emphasis being placed on the implementing rather than the enabling processes of development.

Türkiye's experience, in participatory management of irrigation through establishing numerous WUGs and transfer of full management of irrigation systems to users, can offer useful information and examples for those countries that are interested in promoting participatory management and its complete transfer. Thus, Türkiye can be considered as a model with a relatively management and its generally successful experience in the above areas. Despite the visible success in these areas, DSI is keen on seeking possible improvements to sustain the success of the transfer program in the best interest of the country and of the users.

REFERENCES

- **Doorenbos, J.** 1994 "The Green Fields of Tension", 305. in print, FAOR, ANKARA
- **FAO,** 1993 State of Food and Agriculture 1993; Part III Water Polices and Agriculture, p. 228-305.
- **Halcrow-Dolsar-RWC,** 1995 South-eastern Anatolia Project; Management, Operation and Maintenance of GAP Irrigation Systems, Monitoring and Evaluation Manual; 2 vol.

- **Kodal, S.and Benli, E.** 1993 "Research and Development on Irrigation and Drainage Technologies in TURKIYE", ANKARA.
- **Le Moigne, G., Barghouti, S., Feder, G., Garbus, L., and Mei Xie,** 1992 "Country Experiences with Water Resources Management" World Bank Technical Paper No.175 Washington DC,
- **Mohamadi, J.** at all 1994 "Successful Experience with Irrigation Management Through participation and Full Transfer of management to users in a Gradual and an Intensive Manner", Türkiye case study, Seminar on Participatory Management of Irrigation Systems, Sofia, Bulgaria.
- **Lyle, W. M. and Bordovsky, J.P.** 1991 "LEPA: Low Energy Precision Application", Irrigation Journal, April 1991.
- **Ostrom, E.** 1992 "Crafting Institutions for self-governing Irrigation Systems" ICS Press, San Fransisco, USA.
- **Please, S.** 1986 "From Project Cycle to Policy Cycle, Rural Development for Poverty Alleviation", Royal Tropical Institute, Amsterdam p.54.
- **Rydzewski, J.,** 1994 Out of Eden Came a River, Ceres no. 146, vol. 26, no.2.
- **Sagardoy, J.A.,** 1994 Lessons Learned from Irrigation Management Transfer Programmes, FAO.
- **Tekinel, O.; Yazar, A., Kanber, R.** 1994 "For an Efficient Water Resource Management, Possibilities of Farmers' Participation in Operation and Maintenance of Irrigation Projects in Türkiye. International Conference on Land and water Resources Management in the Mediterranean Region, 4-8 September, Institutio Agronomico Mediterraneo, BARI-ITALY.
- **Vermillion, D.L.** 1991 "The Turnover and Self Management of Irrigation Institutions in Developing Countries, IIMI, Colombo, Sri Lanka.
- **Van Tuu Nguyen and H. Plusquellec,** 1994 Morocco, Experience with Water User Associations in Large Scale Irrigation, LSII 2 project.
- -----, 1993 Bulgaria: Irrigation Management and Investment Review, Annex 3: Legal and Institutional Matters, World Bank.