What is covered by water fees, prices and costs? Examples of water policies in Turkey

Demir H., Zahir Erkan A., Karaca Bilgen G.

in

Junier S. (ed.), El Moujabber M. (ed.), Trisorio-Liuzzi G. (ed.), Tigrek S. (ed.), Serneguet M. (ed.), Choukr-Allah R. (ed.), Shatanawi M. (ed.), Rodríguez R. (ed.).
Dialogues on Mediterranean water challenges: Rational water use, water price versus value and lessons learned from the European Water Framework Directive

Bari : CIHEAM
Options Méditerranéennes : Série A. Séminaires Méditerranéens; n. 98

2011
pages 119-128

What is covered by water fees, prices and costs?
Examples of water policies in Turkey

Hüseyin Demir, Ahmet Zahir Erkan, Gonca Karaca Bilgen

Southeastern Anatolia Project Regional Development Administration, Türkiye

Abstract. The paper discusses what is understood as water price in Turkey, the components it comprises of, the methods of pricing and the advantages and disadvantages of these methods. The methods used for pricing drinking and irrigation water in Turkey are explained with examples. The structure of financing, construction, operation and maintenance is described. The question is raised whether the price for water should always cover all the costs. International organizations promote full cost recovery, but the paper demonstrates that economic, social and geographic conditions should be taken into account when setting the price. Full cost recovery can severely hinder public access to clean drinking water, specifically for the poor, because the water price may be too high compared to their income. In irrigated agriculture it can lead to the abandonment of irrigation when the water is too expensive compared to the value of the crops produced. Therefore the use of a socio-economical development index is proposed. This index helps in determining what share of the full costs can reasonably be included in the price. In addition the price may include a stimulus for water saving by using tiered pricing: the price increases with the amount of water used.

Keywords: Water – Price fixing – Costs – Turkey

Que couvrent les redevances, les tarifs et les coûts de l'eau? Exemples de pratiques de tarification de l'eau en Turquie

Résumé. *Ce document de réflexion porte sur la notion du tarif de l'eau en Turquie, sur les composants de ce tarif, sur les méthodes de tarification et sur les avantages et inconvénients de ces méthodes. Il décrit l'organisation du financement, de la construction, du fonctionnement et de l'entretien. La question posée est de savoir si le tarif de l'eau doit toujours couvrir tous les coûts. Les organisations internationales recommandent un recouvrement intégral des coûts, mais ce document de réflexion entend démontrer que la tarification doit prendre en compte les conditions économiques, sociales et géographiques. Le recouvrement intégral des coûts peut gravement entraver l'accès à l'eau potable, en particulier pour les plus démunis, si le prix de l'eau est trop élevé par rapport aux revenus. Dans l'agriculture irriguée, il peut entraîner l'abandon de l'irrigation si l'eau devient trop chère en comparaison avec la valeur des récoltes. L'instauration d'un indice de développement socio-économique est par conséquent proposée. Cet indice aide à déterminer la part des coûts réels pouvant être raisonnablement incluse dans le tarif. En outre, le prix peut servir d'outil d'économie de consommation d'eau au moyen d'une différenciation de la tarification : le prix monte au fur et à mesure que la consommation augmente.*

Mots-clés: *Eau – Formation de prix – Coûts – Turquie*

I – Introduction

The value given to water, which is indispensable for life, is demonstrated with the sentence 'Water is life'. In Turkey, a commonly used sentence when receiving a glass of water: 'may you be holy like water', emphasizes the value of water. It is also emphasized in many documents of the United Nations and allied organizations.

Turhan Çakar, in his study called "Access to Clean Water", has summarized the international rights accepted by the UN (Çakar, 2009). Article 3 of the Universal Declaration of Human Rights states: 'Everyone has the right to life, liberty and security of person'. In our view, this also includes the right of access to water. The 1999 United Nations General Assembly Decree (53/175) states 'access to clean water is one of the basic human rights'. Again according to the United Nations,

in the Guidelines on Consumers Protection, accepted on April 9, 1985, reference 39/248: 'The governments should constitute and strengthen their national policies to improve drinking water transmission, distribution and quality according to the aims determined for International Drinking Water Transmission and Cleanness for Ten Years'. Alternatives such as proper service, quality, needs for technology and educational programs should be taken into account.'

According to the general declaration of the UN Economical, Social and Cultural Rights Committee in 2002, water right being a social and economical right, covers the right to access of each individual to water that can be demanded from the state directly. The World Health Organization (WHO) also stated that clean water is a health service that must be transmitted to individuals independent of all conditions. Also in international consumer rights access to sufficient and healthy water is referred to as one of the main rights of consumers. It is understood from these regulations that, 'access right to healthy and sufficient water' has a place in human rights concepts which are basic principles to build national legislation on. This right to water infers that the state is responsible for the provision of secure drinking water to the public. The state is obligated to develop policies and strategies to create social and political conditions to realize access to water for everyone.

The importance of water, vital part of human life and ecosystems, increases day by day. Water is one of the basic needs of humankind and is a main resource for agriculture, power production, industry, tourism and transportation. Today, 18% of the agricultural area in the world is irrigated. In these areas more than 40% of total agricultural production is produced (Johansson, 2000; FAO, 2002). Water is the indispensable input for food, fodder and fiber production.

As demonstrated by the two paragraphs above, water is an imortant input as well as a basic right. Although providing healthy drinking water is a service the state is required to supply, the state is not expected to cover all costs for exploitation, purification, transport, distribution and waste water treatment. These aspects are considered a public service and the continuity of the service is valorized by charging for maintenance and management. In this case the charge is called a fee (DSI, General Directorate of State Hydraulic Works,) 1954; Cornish *et al.*, 2004.). However, for agriculture and industry, water is used as an input and is considered a commodity to which a price can be attached. Opportunity costs of water and financing are considered (interest costs of investment and costs for forgone alternative usages of water) and water is commoditized like an automobile or a television.

In this study, conceptual approaches that balance price and costs to valorize water are investigated. The following aspects are elaborated: the concept of water price in Turkey, the components included, the methods of pricing used and the advantages and disadvantages of these methods. Some examples of irrigation water pricing in Turkey are given and some suggestions are developed specifically for Turkey.

II – Conceptual approaches to water value

Worldwide, in the last quarter of 20th century, it has been accepted that water has economical value in addition to its socio-cultural, historical, environmental and religious values. This has been confirmed in the 1992 Dublin (Dinar and Submarinian, 1997; Rogers *et al.,* 1998; Bilen, 2000; Thatte, 2002.). Evaluation of the economic value of water is important not only for determining priorities in allocation to sectors, but also to ensure continuity of water supply investments (drinking, domestic, industrial, and treatment), sustainability of present institutions, protection of water and minimizing effects on environment (Abu-Zeid, 2001). Water price should cover management, operation and maintenance (MOM) costs for the sustainability of the present institutions, investment costs for the continuity of water supply investments and treatment, drainage and environmental costs to eliminate environmental effects. It should be a payable rate and this rate should be determined according to the local social, institutional and political situation (Rogers *et al.,* 1998; Johansson, 2000 and Abu-Zeid, 2001).

Özal (1966) (Korkut Özal, former associate professor at Middle East Technical University , former minister for 'Agriculture and Rural development' and former minister for 'Internal Affairs') emphasized the fact that recovery of irrigation investments by users should be viewed as a requirement to achieve irrigation development objectives. He states that, recovery i) results in fair distribution of investment costs, ii) strongly stimulates the efficient use of the water in the project and iii) provides important finances for the continuation of investments.

Until the last quarter of the last century, water pricing was not applied in undeveloped and developing countries, especially for irrigation water where water is used as an input. The increase in water demand, reduced interest in irrigation investments, low water usage efficiency, profit opportunity by sector share and the pressure applied by credit co-operations in early '90s lead to the requirement to valorize irrigation water (FAO, 1996; Dinar 1997; Rogers *et al.,* 1998. Johansson 2000).

Environmental cost of water pollution and opportunity cost of water should be added into the water price. Costs for water thus consist of three elements: water supply cost, opportunity cost and environmental cost. The addition of these costs is expressed as the sustainability value of water usage (Rogers *et al.,* 1998). Assimacopoulos (2003) studied the implementation of the Water Framework Directive (2000/60/EC; WFD) in his country, Greece. The WFD states that the principle of 'the polluter pays' is required for sustainability and emphasizes that water is a part of the water ecosystem, is a natural source and has socio-economical relevance (Assimacopoulos, 2003) In summary, from the references we infer that many international organizations try to stimulate the use of the principle 'who uses pays- who pollutes pays' in the whole world.

III – Applicability of conceptual approaches

40 years ago opinions on valorizing water were more concerned with social and political issues. Özal (1966) stated that the state's irrigation projects can satisfy one or more of the following objectives:

i) social objectives, such as increased living standards of farmers, settlement of the nomadic population and satisfying the need for agricultural land villagers for villagers,

ii): economic objectives, such as meeting interior and exterior demand, and stabilization and development of agricultural industry,

iii) political objectives, such as stabilization of the population living near the boundaries, social stability and security. Not all costs should be covered by users in projects with social and political objectives, costs of indirect benefits should be met by the ones benefiting indirectly.

Abu-Zeid (2000) also refers to this socio-political dimension: 'cost recovery and payment of MOM costs by users is important for the continuity of the system by providing continuity of water supply investments (and constructing new water supply facilities), sustainability of present ones, protection of water and decreasing environmental effects. The poor users should be supported in a transparent way'.

Dinar and Subramanian (1997), in their study evaluated the experiences with water pricing in 22 different countries. They concluded that, generally, countries perceive the water price as a charge including MOM and renewal costs for the continuation of system and the service. Water users pay from 20% to 75% of total costs depending on the country's social and economical conditions.

Water prices can be determined in different ways: volume-based, depending on real consumed water amount or not based on volume but based on irrigated area, area-product, input or output, or market-based, depending on the income opportunities. The applicability of the methods depends on the physical, social, institutional and political conditions of each location (Johansson, 20002).

Demir, in his study that combines the conceptual approaches above and the cost/expense components of Rogers *et al.* (1998) and Assimacopoulos (2003), states that it would be beneficial to determine the contribution of water users to cost recovery according to a socio-economical development index (Demir, 2005).

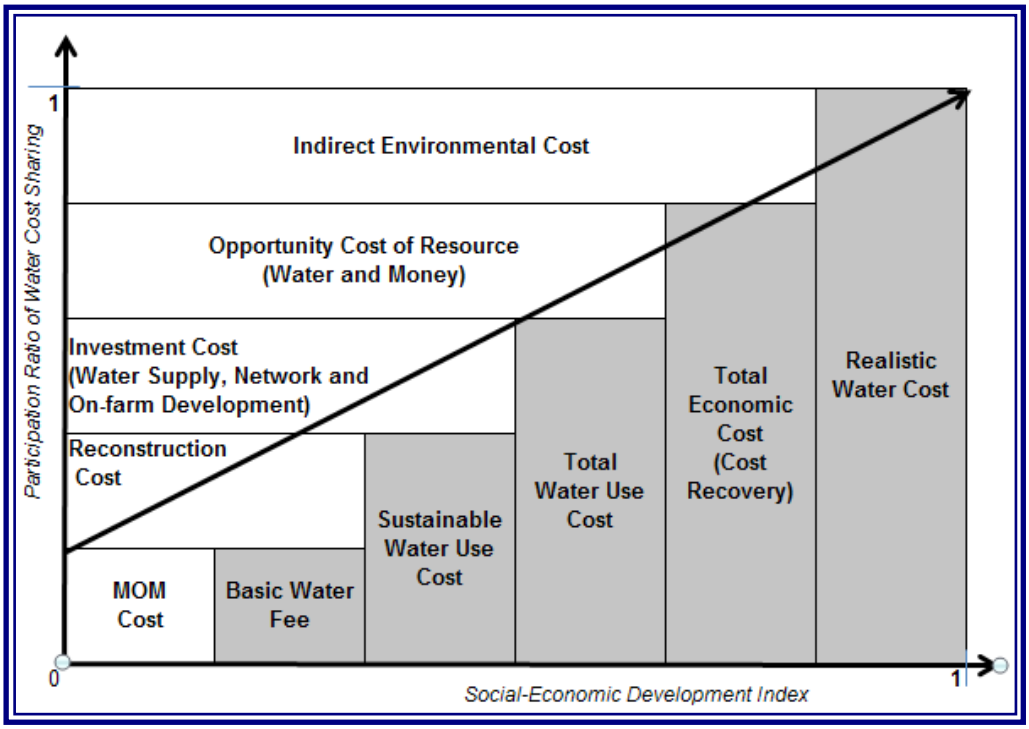

Figure 1: Social-economic development index in water cost composition and level of participation in cost sharing *(modification from Demir, 2005)*

Figure 1 illustrates the five tiers of water valorization that Demir proposes. The basic water fee corresponds with recovery only of MOM (Management, Operation and Maintenance) cost of water system, the sustainable water use fee includes both MOM and reconstruction cost of the network. When these costs are covered, the water system will serve for a long period. If investment costs are included into water fees, total water use fee is reached. A portion of financial need for the sustainability of water supply investments can be met by recovery of operational water system investments. If opportunity costs for money and water are added to the water fee, total economic water fee is reached. This is applied in California, USA. The real water fee is reached after indirect environmental costs are added total economic water cost. The participation ratio of water cost sharing indicates what portion of the real water fee is covered in the actual water price. The socio-economic development index is a measure of the standard of living. With a higher socio economic development index a higher participation ratio can be required.

Two extreme examples are discussed to explain Demir's suggestion more clearly, in the irrigated agriculture sector that is now using 75% of controlled water. The first case is the Van-Özalp-Dönerdere irrigation system on a high plateau at 2200 m. The annual total temperature is 2200 oC. An arid and cold climate is present. Dönerdere is a region at the border with Iran that was resettled because of the1967 flood in the Black Sea region (15). The second case is an

irrigation system with the same irrigated area and comparable properties which is in Dönerdere. The Antalya- Kumluca irrigation system is situated at 100-200 meters and has an annual total temperature of 5000 oC.

In Dönerdere, at most three types of clovers or 1.5-2.0 ton/ha wheat or corn can be produced. The product is mostly used for domestic needs and for feeding animals. There is no product processing organization. It is far away from big markets. The level of education is low. Public services are insufficient and access to these services is inadequate. The private sector shows no interest in the area. Therefore the socio-economic development index is low. In contrast, in Antalya Kumluca flowers are grown in greenhouses for the market and two or three types of vegetables and fruits are grown on open ground. Public services are sufficient, access of people to these services are well developed. Marketing and product processing opportunities are high and big markets are near. The education level is high. The private sector has an intense interest in the area. So the socio-economic development index is high.

Even if in both irrigation systems, investment costs were the same (Dönerdere irrigation development cost is higher because of the limited construction period); the benefits of irrigation are not the same because of the ecological, social, economical and technical reasons mentioned above. Gross production values per unit of water that we calculated using State Hydraulic Works General Directorate (DSI) irrigation monitoring data, (DSI, 2005) are presented in the figure below (Figure 2).

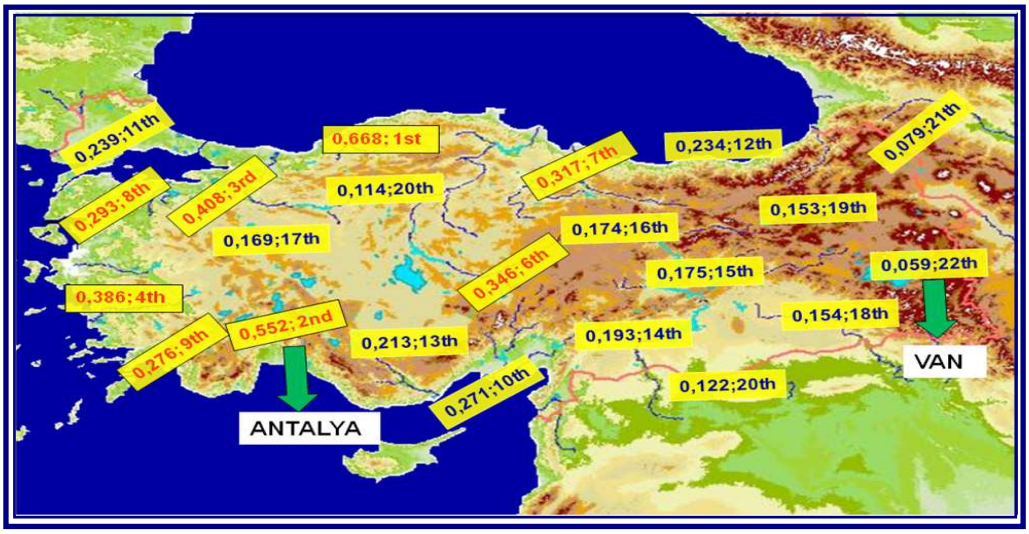

Figure 2: Gross production values in Turkey irrigation (WUE €/m3) for year 2004 and order in the country.

The gross production value of water, also referred to as water usage efficiency, is 0.06 £/m3 in Van region, whereas it reaches 0.55 £/m3, so up to 9 times as much in Antalya region. The expenses are the same in both cases, but in Dönerdere irrigated production can not even cover the basic water fee. However, in Kumluca irrigation reconstructions can be made and cost recovery of public investments is possible. Since farmers' payment power differ from one another, the willingness to pay for water also varies. The farmers in Kumluca earn a lot more than the farmers in Özalp from the same acreage.

Periodically, an 'Investigation on Socio-economical Development Rank of Districts' study of the State Planning Organization (DPT) is prepared considering income, education, health, availability

of public services and transportation, etc. In 1996, Özalp district was rated 831th out of 858 districts and Kumluca was rated 272 (DPT, 1997). In seven years, while the number of districts increased from 858 to 872, the rating of Özalp decreased to 865 and Kumluca has risen to 250th place (DPT, 2004).

The two examples above expose the disadvantages of cost based water pricing. Pricing mechanisms should therefore consider social, cultural and ecological conditions. In addition, Dönerdere irrigation system serves political objectives, such as border security and social objectives such as avoiding migration from the area. Economic commitments based on social and political objectives must be paid for by the government.

IV – Water pricing in Turkey

Supplying and pricing drinking water

In Turkey, the institutions responsible for supply, operation and maintenance, and management of drinking water vary according to the size of settlement units. For villages with a population below 2,000 people, drinking water supply is the responsibility of Special City Management and investment costs are covered by the state. Drinking water management is carried out by the chief of the village. Water is priced on the basis of costs for maintenance and power supply, without profit. If water is transported through a network, the pricing is based on volume. If no network exists and villagers use water from a communal source, the costs are divided according to the number of people the source provides water for.

For districts and cities with a population of less than 100,000 inhabitants, water is supplied by İller Bankası on behalf of the municipalities in these settlements. MOM and renewal works are carried out by municipalities. Investments and other expenses are paid by water users. In this case, profit can be considered.

DSI is responsible for water supply to settlements with a population greater than 100,000 inhabitants. MOM and renewal works are carried out by the municipalities. Investments and other expenses are paid by water users. Profit can be considered too, in this case.

Settlements with a population greater than 1,000,000 inhabitants are called metropolitans. In metropolitans public organizations are established as General Directorates to carry out water and wastewater services. In these settlements water is supplied by State Hydraulic Works (DSI). All expenses are paid by the users. According to metropolitan water management law, this service should have a least a 10% profit margin. Metropolitan water managements apply this law and had on average a 29% profit. Profit ratio has reached up to 285% in Samsun Metropolitan Municipality and this service has become a source of income there (Tamer, 2006). This ratio must decrease.

If the municipality has the economical and technical capabilities, it can supply water without applying to DSI or İller Bankası. In addition to this, if the settlement has a sanitary system, additional payments are included up to 50% of water price.

In municipal regions, volume based tiered pricing is used to encourage economical usage of water. Usually, tiers in monthly water consumptions are 0-10 m^3/month, 11-20 m^3/month and more than 20 m^3/month.

In none of the municipalities pricing is done according to people's incomes. The ratio of monthly water expenses to the income of poor families is much higher than this ratio for rich families. For this reason, access to healthy water for poor people is restricted.

As most of the municipalities do not apply enough sanitation and purification is not of high quality, consumers use bottled spring water as drinking water at a considerable expense.

Supplying and pricing irrigation water

For irrigation systems that use groundwater, the constructing of wells, the installation of motor pumps and electrification works are carried out by DSI. These costs have to be paid back in 15 years, but in the first 3 years they are not charged (Türker and Kaya; 2000). Other infrastructural investments for irrigation (constructing the irrigation and drainage network, constructing field roads, leveling) are done by Provincial Private Management and are free. MOM activities in the irrigation systems are done by irrigation cooperatives, formed by water consumers. Pricing is determined according to the amount of hours of operation of the well, or product irrigation number (the number refers to how many times that crop is irrigated) and an annual payback per unit area for the investment is added to this amount.

Provincial Private Management is responsible for the construction of irrigation systems that make use of surface water, and have a discharge of less than 500 l/sec and a dam crest level lower than 15m. Investment costs are covered by the state. MOM activities are carried out by the village chiefs or Village Servicing Unions present in districts. Water consumers only pay a water fee for MOM activities and pricing is done based on product per area.

DSI is responsible for the construction of large irrigation systems that make use of surface water and have a discharge greater than 500 l/sec and have a dam crest level higher than 15m. The cost of the investment is divided equally between the water consumers and paid without interest in 20-30 years after the completion of the irrigation system, depending on the decree of Cabinet. Most of DSI irrigation systems are transferred to irrigation unions. MOM activities are carried out by these irrigation unions. Pricing of water is based on the irrigated area and the product produced. In areas with water scarcity such as in Aegean Region irrigation unions determine the water price according to irrigation water amount used. When irrigation exceeds the determined amount of water the price increases.

Irrigation systems not transferred to irrigation unions are managed by DSİ and irrigational water pricing is done according to the properties of irrigation (pumping, gravity), geographical location (coastal and interior parts and East Anatolia) and irrigation method. DSI's pricing policy is closer to the socio-economical development index Demir suggests. Payments to DSI for irrigation are transferred to the National Treasury (Demir, 2005).

Especially for irrigation system that use pumps, individual water users and irrigation unions can be in debt because of high power costs. Because of these debts, irrigation unions may postpone operation and maintenance services.

V – Financial sources for developing water resources in Turkey

National Financing

Funds for drinking water supply to villages and smaller settlements are allocated from the national budget. Between 2005 and 2008, the Village Support Project (KÖYDES), has supplied more than 90% of the villages with healthy drinking water and has constructed village roads. As part of the same project, studies on waste water have also been started. Peasants only pay for MOM costs. Rural infrastructure investments are made by the government. The villagers can not pay these charges that are made to keep the population in rural areas.

Financing is provided by the sources of Iller Bankası (the bank founded for development of infrastructure in urban areas of Turkey) from the national budget for settlements having municipalities. Each municipality gets a share from İller Bankası according to its population. Iller Bankası gives loans for water supply projects requiring large investments, supplementing municipal funds. Municipalities collect all water fees, except for opportunity cost.

Metropolitans can use externally sourced, treasury warranted loans for large scale water supply and distribution projects. European Union Initial Participation Aid (IPA) donations can be used for improving water services. Metropolitan Municipalities collect the realistic water fees with a profit margin.

Financing by Privilege-Privatization and Built-Operate-Transfer

In the past some privileges were given or privatization to multinational companies for drinking water supply, network construction and servicing, took place. In 1880s 3 French companies were given privileges for water service management in Istanbul. These privileges were ended in 1938. In the year 1995, irrigation services in Antalya Metropolitan area were privatized and granted to a French company in compensation for a 100 million $ loan, to have 100% of the system later on. As they have raised water prices in an unacceptable way and have not fulfilled the commitment of developing infrastructure for water services, the contract was cancelled after 5 years. The international court case concerning this issue still continues. Yuvacık Dam, that would supply water to Istanbul, but could not be finished, was given to a Turkish-English partnered company, under warranty of the treasury, in order to complete the construction and subsequently for operation. However, an insufficient amount of water was stored in the reservoir, so unit-cost exceeded 1.5 $/m^3. Istanbul Municipality refused to buy such expensive water. The National Treasury pays the related companies every year because of the warranty (Güler, 2006).

For power production, privileges are given to Turkish companies to construct dams and hydro-electric power plants. Yet, no Built-Operate-Transfer model exists in our country for drinking water supply and irrigation construction projects. Especially for irrigation constructions, this kind of methods is sought. For power production, a consortium formed by four companies, one of which is a Turkish partner, is commissioned to construct and operate Birecik Dam, located on the Euphrates river, for 20 years.

VI – Conclusions

Turkey has not got specific policy on water investments and pricing. In particular the lack of a policy of water pricing has led to a lot of problems. Poor people in cities and rural small farm owners have to pay the same fee as others. This causes economic hardship. These people must be supported in a transparent manner such as using the socio-economic development index. The water investments in Turkey are funded by the central budget and the recovery of cost from investments go directly to the central budget. There is not any special fund for water investments. Therefore, some administrations attribute great importance to water investments whereas others may not care about water investments at all.

VII – Recommendations

1. Water is a human right and should be seen as a public service.
2. Common properties of ‘public services’, such as electricity, natural gas, pipelines, railways, telecommunication, postal services, water, irrigation and wastewater, have a concentrated capital, have high sunk cost, have multiple effects on the economy by being inputs to many other areas and need to be used by the consumers for common wealth. It should never be forgotten that components of these have natural monopoly properties when their scales and conceptual costs are considered (Suiçmez, 2006).
3. As profit can not be sought in these services, the privatization and/or giving privileges to international companies can never be considered.

4. Non-governmental organizations comprising end users should share the management and responsibility in all stages starting from the development of water resources. In this way expensive investments as seen in public services may be eliminated and water can be cheaper.
5. It should be remembered that the quality of water services is measured by its sustainable and economical accessibility and by sufficient quantity and quality.
6. Water is a requirement for food security. It is compulsory to increase agricultural productivity to provide food security and sustainable development in agriculture in parallel with population increase. The very first way of increasing production and productivity is using new technologies in agriculture and increasing irrigated areas.
7. Realistic pricing should be sustained in water services to develop new water resources, to use water rationally and to protect environment. Savings should be rewarded in addition to the principle of 'who uses pays and who pollutes pays'.
8. Socio-economical development indices should be considered when pricing water and people that have difficulties paying should be subsidized using transparent principles.

References

Abu-Zeid M. (2001). Water Pricing in Irrigated Agriculture. *Water Resources Development*, Vol.17 No:4 http://ınweb18.worldbank-zeid.pdf

Assimacopoulos D. (2003). Recovery of Full Cost and Pricing of Water in the Water Framework Directive. http://www.environ.chemeng.ntua.gr/wsm/Uploads /Publications/ Recovery

Bilen Ö. (2000). *Turkey &Water Issues in the Middle East.* 2 nd Edition, GAP-RDA, 257 pp., Ankara.

Çakar T. (2009). Temiz Suya Erişim Hakkı. http://www.tuketicihaklari.org.tr .

Cornish G., Bosworth B., Perry C., Burke J. (2004). FAO Water Reports 28: Water charging in irrigated agriculture. Rome,

Demir H. (2005). Farklı İşletme Büyüklüklerinde Optimum Bitki Deseni ile Çiftçilerin Sulama Yatırımı ve Su Ücreti Ödeme Gücünün Belirlenmesi A.Ü. Fen Bilimleri Enstitüsü Doktora Tezi (basılmamış-Türkçe)

Demir H., Gündoğdu Ş., Aydoğdu F. (2000). Van-Özalp-Dorutay Köyken projesinin Değerlendirilmesi. Rapor. GAP-RDA, Şanlıurfa (basılmamış-Türkçe)

DPT (1997). İllerin Sosyo-Ekonomik Gelişmişlik Sıralaması Araştırması. 1996 http://ekutup.dpt.gov.tr/bolgesel/dincerb/il/15.pdf

DPT (2004). İlçelerin Sosyo-Ekonomik Gelişmişlik Sıralaması Araştırması. 2003 http://ekutup.dpt.gov.tr/bolgesel/gosterge/2004/ilce.pdf

DSI (2005). 2004 Yılı Mahsul Sayım Sonuçları, Ankara.

DSI (1954). Devlet Su İşlerinin 6200 sayılı Kuruluş Kanunu. http://www.dsi.gov.tr/duyuru/mevzuat/kanun/6200kanun.pdf (Law no: 6200 for establishment of State Hydraulic Works)

Dinar A., Subramanian A. (1997). 'Water Pricing Experiences: An International Perspective'. World Bank Technical Paper No: 386, 161p., Washington D.C.

FAO (1996). Guidelines for Planning Irrigation and Drainage Investment Projects. FAO, Investment Centre Technical Paper Series No:11, 24 p., http://www.fao.org/tc/tci/sectors/sec11txt.httm

FAO (2002). The salt of the Earth: Hazardous for Food Production. http://www.fao.org/worldfoodsummit/english/newsroom/focus/focus1.htm

Güler B.A. (2006). TMMOB Su Politikaları Kongresi: Çağrılı Konuşmacılar http://www.e-kutuphane.imo.org.tr/pdf/9081.pdf

Johansson R.C. (2000). Pricing Irrigation Water: A Literature Survey. World Bank, Policy Research Working Paper: 2449, 82p. Washington D.C.

Özal K. (1966). Sulama Projelerinde Geri Ödeme Problemi. ODTÜ, Teknik Yayınlar Serisi:19. Güneş Matbaacılık, 26 p., Ankara .

Rogers P., Bhatia R., Huber A. (1998). Water as a Social and Economic Good: How to Put the Principle into Practice. Global Water Partnership, 35p., Stockholm, Sweden.

Suiçmez B.R. (2006). TMMOB Su Politikaları Kongresi: Çağrılı Konuşmacılar http://www.e-kutuphane.imo.org.tr/pdf/9081.pdf

Tamer N.G. (2006). Dünyada ve Türkiye'de Su Hizmetleri Yönetim Politikalarının Değerlendirilmesi, TMMOB Su Politikaları Kongresi, http://www.e-kutuphane.imo.org.tr

Thatte C.D. (2002). Water and Food Security-How the Poor Will get Their Food. *Water Resources Management: Crosscutting Issues*, 3-34pp.

Türker M., Kaya A. (2000). Türkiye'de Yeraltısuyu Sulama Kooperatiflerinin Kuruluşu, Yatırım ve Devir İşlemleri, DSİ, Ankara.