Irrigation Management and Water Pricing in Turkey

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ABSTRACT

Irrigated agriculture in Turkey currently consumes 75 percent of the total water consumption, which corresponds to about 30 percent of the renewable water supply. Unfavorable future global climate and economic conditions will increase the stress in the water sector. The operation and maintenance (O&M) of almost all large surface irrigation schemes developed by the state has been transferred to irrigation associations governed by the farmers. The purpose of this paper is to provide an overview of irrigation management practices and an evaluation of irrigation water pricing after the transfer using price data at the association level since 1999. Results indicate that both irrigation water charges and collection rates increased following the transfer. However, the recuperation of investment costs for irrigation development from the users has remained minimal. The price of the irrigation water continued to be on per hectare basis, and farmers using pumping water face 2.5 times higher water charge per hectare than the gravity water users. The uptake of more efficient water application technology accompanied by pricing mechanisms reflecting scarcity value of water will certainly ease the adjustment burden of the irrigation sector in the future.

Keywords: Agriculture, Irrigation, Operation and Maintenance, Water Application Technology, Water Consumption

1. INTRODUCTION

The irrigation sector is using 75 percent of total water consumption in Turkey. The average per capita availability of water is shrinking due to relatively high growth rate of population. The demand for water in the non-agricultural sectors is increasing at a fast rate as a result of high rate of urbanization and industrialization. The limit of arable land was reached in 1960’s, and one of the important factors to improve the production performance of the agriculture sector is to increase the area under irrigation. Most of the investments on irrigation infrastructure involve moving the surface water from natural bodies to the fields. Large capital investments necessary to expand the irrigated area have been undertaken by the government. This situation puts pressure not only on the consumptive use of water resources, but also on the allocation of public capital investments.

Regulations and pricing in the irrigation sector remain as the most controversial issues to tackle to achieve efficient use of water in agriculture and public investments. The approach to water pricing policy does not differ according to the sources of irrigation water. When the water is taken from the aquifers, most of the capital investments are undertaken by the users and the price paid for the water use covers both the capital and service charges.
Large infrastructural investments are necessary to convey surface water from the dams to the fields. Recuperation of investment costs from the irrigators arises as a major problem for the surface water. The price of irrigation water is also expected to reflect the possible competition from non-agricultural sectors and environmental externalities.

Turkey is one of the world leaders in the transfer of irrigation schemes to water users organizations. Transfer of almost all large surface irrigation schemes (half of the total irrigated area) developed by the state to water users associations has been completed. However, the price (fee) for the irrigation water is still based on operation and maintenance costs in all irrigation schemes and it is charged on per hectare basis.

The candidacy of Turkey to the EU adds another dimension to the issues prevailing in the irrigation sector. Under the EU Water Framework Directive (WFD) member states are required to move towards full cost recovery in their pricing policies of water including irrigation (OJEC, 2000). Membership process should pave the way for the adoption of the WFD.

Analyzing pricing practices in the irrigation sector requires the necessary data on the regional prices and water use, estimation of irrigation water costs including the capital costs, cost recovery and clear definition of irrigation water costs. State Hydraulic Works (DSI) collects data on pricing and water use on the irrigation schemes transferred to Water User Associations (WUA) as part of its monitoring and evaluation framework. Data on the rest of the currently irrigated area are scanty and not readily available.

The main objective of this study is to provide an empirical investigation of irrigation water pricing in Turkey, examining the recent trends in irrigation costs to the farmers, regional agricultural water price ranges and characteristics. The extent to which the price paid by irrigators for water recovers O&M and capital costs for water delivery to the farm will be discussed. It includes also institutional arrangements for water allocation and agricultural water pricing in Turkey.

2. OVERVIEW OF WATER SECTOR AND IRRIGATION

Irrigation development in Turkey has been remarkable during the last 40 years. Irrigated area increased by about 2.5 times since 1970s. The share of the area developed by public agencies is 80 percent. The rest is developed by the farmers themselves. The objective of State Hydraulic Works (DSI) is to increase the irrigated area from 5.2 to 8.5 million hectares of irrigated land by 2023 (DSI, 2008a).

Turkey’s climate is moderated by both the Mediterranean and continental weather patterns which displays geo-climatic diversity when combined with a highly varied topography. The annual average precipitation is 643mm, yet varies from 250mm in the central part to 3,000mm in the Eastern Black Sea region. Seventy-five percent of annual rain falls during the winter season. The diverse precipitation structure emphasizes the crucial importance of irrigation.

Generally, agricultural production is adversely affected by the shortage and inconsistency of rainfall during the growing season. Solar energy makes it possible to grow arid and semi-arid crops such as bananas and citrus. Moreover, it is possible to grow 2 to 3 different crops in irrigated areas that have crop growing seasons for a period of 270 days. Inevitably, the topographic features are main factors shaping the distribution (Kanber et al., 2005).

The average annual precipitation of the country corresponds to a water potential of 501 km$^3$ per year, of which 274 km$^3$ are lost to evapo-transpiration, 69 km$^3$ feed aquifers and 158 km$^3$ flow through the rivers to the sea or lakes. The gross total surface and ground water potential of Turkey amounts to 234 km$^3$ (Table 1).

The total potential available water resources from surface flow and groundwater amounts to 112 km$^3$ per year. The country’s surface runoff is unevenly distributed in both time and place, consistent with precipitation. Surface and ground water resources are limited in the Aegean, Thrace and Central Anatolia regions where the demand for water is higher than the rest of Turkey. The Aegean and Thrace Regions
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