

**Keywords:** Environmental implications; Socio-economic implications; Sustainability of water resources; Water demands; Water transfer

## Introduction

Achieving sustainable management of water resources towards the long-term health of both ecological and economic systems of a

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Domestic, Industrial  
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the calculation of per capita freshwater use potential in Turkey, only increasing water demand in Istanbul (Figure 4). Transferring water quantity has been taken into account without any considerations. supplies from other basins is projected to meet 70% of water demands of water quality. Unfortunately, municipal and industrial waste water discharges, and runoff laden with pollutants from agricultural lands are thus are restricting their current and future uses of water resources. Per capita annual water use will further decline when water quality is considered in the calculations.

Domestic, Industrial

#### Examples of water transfers schemes in Turkey

Turkey has 25 main watersheds with distinct characteristics of water potential, economy, culture, and demography (Figure 2). Since some watersheds do not have the potential to meet growing and conflicting water demands of socioeconomic systems, interbasin water transfer projects have been planned and implemented (Figure 3 and Table 1) recently for supply of water to watersheds where big cities, industries, and agricultural activities are intensely located.

Great Melen Project Total

#### Water transfer projects for Istanbul

Large-scale water transfer projects were put into practice to meet

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Istranca project: The aim of the Istranca Project is to meet water demand of Istanbul partly from Istranca streams discharged into the Black Sea. The project consisting of four stages whose first two stages are in operation will be able to transfer 280 million  $\text{m}^3 \text{yr}^{-1}$  to Istanbul when fully completed [15].

Yesilcay project: In the first phase of the project, 145 million  $\text{m}^3 \text{yr}^{-1}$  of water from Yesilcay stream is projected to be transferred to the supply system of drinking water for Istanbul. Total cost of the first phase is about USD 270 million. In the second phase, additional 190 million  $\text{m}^3 \text{yr}^{-1}$  of water will be transferred to Istanbul through the construction of Isakoy and Sungurlu dams. When the project is fully operated, 335 million  $\text{m}^3 \text{yr}^{-1}$  water will be transferred. The project will supply drinking and municipal water for an additional population of ca. 1.5 million people in Istanbul [16].

Great Melen Project: The project will transfer 268 million  $\text{m}^3 \text{yr}^{-1}$  in its first stage and 1.180 billion  $\text{m}^3 \text{yr}^{-1}$  in its final stage to Istanbul. The Great Melen Project will provide additional 268 million  $\text{m}^3 \text{yr}^{-1}$  of drinking and municipal water by transfer line of 185 km of which 25



projects for big cities have not been realized yet in Turkey due to their high energy costs.

#### Water right issues

There is no property right for water assigned to private individuals, and water resources are state-owned in Turkey. Central administration and its related institutions and establishments make public decisions