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Water Transfer, A Solution for Water Shortage?

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Managers of water resources are faced with challenges with regard to the growing threat of undesirable water demand and the growing need for sustainable economic social development of water-deficient areas [1, 2].

Inter-basin water transfer (IBWT) project is a beneficial engineering counteraction to diminish the water shortage problems in water-deficient areas. Moreover, IBWT balances the uneven distribution of water resources by artificially re-allocating the water resources [2]. Various large-scale inter-basin water transfer projects were implemented; for instance, the North American Water and Power Alliance [2], the Canadian James Bay Project [3], the Lake Chenghai water diversion projects, [4] and the Chinese South-to-North Water Transfer Project (SNWT) [5,6]. They transferred part of the water from water-abundant basins to water-deficient basins, in 20 countries and regions including the USA, Canada, the former Soviet Union, India, Pakistan, China, etc.[3]. All of these 160 projects allocated over 80 percent of the total water transfer quantity [3].

In Iran, some water transfer projects were also implemented; Kuhrang Tunnel, Cheshmeh-Langan, Goukan Tunnel, Beheshtabad Tunnel, and Zayandeh-Rud River Basin.

According to the International Commission on Irrigation and Dams, about 14 percent of the global water withdrawal is supplied by inter-basin water transfer projects; this portion is expected to rise to 25 percent by 2025 [7]. The implementation of these inter-basin water transfer projects affects environmental and socio-economic systems and causes widespread concern in society (both the donor and receiving). So, it is very important to determine the potential impacts of inter-basin water transfer projects [3].

In this regard, many problems are attributed to the planning phase of these projects. Lack of comprehensive environmental impact assessments and lack of proportionality between environmental assessments and other aspects of IWT planning, such as the economic and technical studies have led to submission of environmental impact assessments to the technical and economic aspects of IWTs [8]. To determine the impacts of IWT

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projects on optimal water resource allocation, a comprehensive water resources management model was proposed, which incorporated water demand projection, multi-objective water resource allocation model and evaluation criteria and process-based hydrodynamic ecological model in order to simulate the flow diversions' effects on water quality in reservoir [3].

The study conclusions include:

Water transfer projects play an important role in enhancing the economic and social aspects in regions that receive water. All inter-basin water transfer systems can have complex implications, such as negative long-term social, economic, and environmental effects that raise concerns about water scarcity. Due to the human demand for water resources, the need for additional water supply has increased dramatically in water-deficient regions. In addition, it has created a contradiction between water supply and demand. So, water-using sectors started a competition that has become increasingly serious with regard to the water resources [7]. Although the IBWT projects have helped to reduce the intensity of water shortage in the water-deficient areas, no integrated approach has been implemented to manage these projects in Iran.

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