



An integrated hydro-economic modeling for agricultural water management in the Lake Urmia basin

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Policymakers in arid and semi-arid basins face hard choices on water policies needed to agricultural and environmental water demand. In northwest Iran, Lake Urmia has been shrinking dramatically due to large water use in agriculture which has led to environmental and social conflicts in the region. Subsequently, lake restoration plans have been established. The successful restoration will require integration of technical, economic, environmental, and social aspects into a coherent analytical framework. Here, hydro-economic modeling is used as an approach to analyze the problem and guide the design and implementation of restoration and recreation plans in the basin. This study presents an integrated modeling framework and applies it for agricultural water management in the Lake Urmia basin. In order to achieve to the restoration goals and sustainable agricultural water management, a framework for decision support is developed. The proposed framework is based on a dynamic model capable of analyzing the cumulative, long-term effects of the proposed policies and strategies on the system. The long-term decisions include irrigation and drainage infrastructure improvements, and changes in irrigated area and crop patterns. The regulation policies include limitations of the irrigated area and the amount of water allocated to agriculture. The role of economic instruments such as water pricing to support reduction in water use will be also considered. For ecological purposes, the target lake level is defined at 1274.1 masl. Crop patterns and cropland areas are set for each of the proposed policies, and the effect of those changes in the system are simulated. The aim is to support a better design of policies taking into account the complex environmental and economic tradeoffs.