**Abstract**

In recent decades, due to water crisis, more countries tend to adopt new policies on the demand management of water instead of its supply management. In current study, the effects of irrigation water price policy based on cultivated area and volume of water obtained, in the framework of modern and traditional irrigation methods were investigated. To this end, we used Positive Mathematical Programming methods, Maximum Entropy and Hierarchical analysis. The data were collected from Jihad agriculture organization of Hamedan province for crop year (2012-2013). Results showed that, by increasing the price of volume irrigation water, changes in cropping pattern in modern irrigation techniques,-wheat cultivated area increased and the amount of barely, cucumber, potato and garlic decreased. Farmers who were using the traditional irrigation method added potato and garlic in their cropping pattern and reduced cultivated area of barely, wheat and cucumber with the mentioned policy. Also, applying the increasing price of irrigation water based on the cultivation area showed that cropping pattern in both modern and traditional irrigation methods would have changed.─In modern irrigation method farmers increased cultivated area of potatoes and garlic, and decreased cultivated area of barely, wheat and cucumber. Farmers in traditional irrigation methods, increased cultivated area of cucumber, potato and garlic and their tendency to cultivate barley and wheat reduced. Finally, these policies were evaluated according to the criteria of economic, environmental and water consumption in the framework of hierarchical analysis. According to these criteria, the price of 9 million rials per hectare for traditional irrigation and 6 million rials per hectare for modern irrigation method were determined. In this regard, it was proposed to improving irrigation efficiency by developing methods to reduced irrigation water through the application of innovative technologies for irrigation instead of traditional irrigation methods.

**Keywords**: Modern and traditional irrigation water, Positive Mathematical Programming, Maximum Entropy, Multi Criteria Decision Making, Hamedan - Bahar plains

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# Selecting irrigation water pricing alternatives by incorporation of positive mathematical programming and multi-criteria decision making

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