

## Multi-Criteria Decision-Making in Ranking Drinking Water Supply Options (Case Study: Tehran City)

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**Abstract :** Considering the increasing demand for water and limited resources, there is a possibility of a water crisis in the not-so-distant future. Therefore, to prevent this crisis, other options for drinking water supply should be examined. In this regard, the application of multi-criteria decision-making methods in various aspects of water resource management and planning has always been of great interest to researchers. In this report, six options for supplying drinking water to Tehran City were considered. Then, experts' opinions were collected through matrices and questionnaires, and using the TOPSIS method, which is one of the types of multi-criteria decision-making methods, they were calculated and analyzed. In the TOPSIS method, the options were ranked by calculating their proximity to the ideal (Ci). The closer the numerical value of Ci is to one, the more desirable the option is. Based on this, the option with the optimization pattern of water consumption, with  $C_i = 0.9787$ , is the best option among the proposed options for supplying drinking water to Tehran City. The other options, in order of priority, are rainwater harvesting, wastewater reuse, increasing current water supply sources, desalination and its transfer, and transferring water from freshwater sources between basins. In conclusion, the findings of this study highlight the importance of exploring alternative drinking water supply options and utilizing multi-criteria decision-making approaches to address the potential water crisis.

**Keywords :** multi-criteria decision, sustainable development, topsis, water supply

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