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MULTI-CRITERIA DECISION MAKING METHODS IN SOLID WASTE MANAGEMENT: A CASE STUDY

Abstract:

Due to the increase in environmental problems caused by solid wastes in recent years, it is mandatory to dispose these wastes in an environmentally and economically effective manner. Therefore, authorities should develop the most effective strategy for disposing solid wastes. In developing a solution to the solid wastes, different criteria such as economic, cultural, social and technical criteria related to this important problem should be taken into consideration together. These criteria might lead to different alternatives and the problem on hand becomes a multi-criteria decision making (MCDM) problem. In this study, a number of disposal techniques have been analyzed that could be applicable to Ankara, the capital city of Turkey. 8 different solid waste disposal systems and 15 criteria have been determined via the interviews of the experts from the field. To evaluate 8 disposal systems, three different multi-criteria decision making approaches have been used. Firstly, the problem has been dealt with two popular MCDM approaches, namely, Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) and Preference Ranking Organization Method for Enrichment Evaluations (PROMETHEE). As the third method, Best-Worst Method has been used for the first time in literature to evaluate the alternatives. The results obtained have been compared and evaluated.

Keywords:

Solid waste management, multi-criteria decision making, TOPSIS, PROMETHEE, Best-Worst method.