

Evaluation of a performance index for municipal wastewater treatment plants using mcdm – topsis

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Abstrak

Deciding which are the best performing wastewater treatment plants can be complicated, as their operations comprise different parameters which are either dependent or non-dependent on each other, and are important when deciding the type of treatment. The relative importance of these parameters in terms of weight indicates the priority assigned by decision-makers to the criteria when ranking the alternatives. These weights are calculated by statistical relativity and Saaty's nine point scale. The sensitivity of both of these approaches is analyzed. The performance of six municipal wastewater treatment plants is evaluated using the Multi-criteria Decision Making (MCDM) Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS). Efficiency is monitored on the basis of nine wastewater characteristics and compared with the limits established by the Central Pollution Control Board of India. The analysis uses both qualitative and quantitative approaches, which result in differential rankings; accordingly, plants with maximum organic loading removal efficiency were found to be most efficient when weights were applied as per Saaty's scale. The study proposes a field base approach with regard to the suitability of the weight allocation method for respective utilization of the fuzzy approach in environmental monitoring systems.