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# ASSESSMENT OF SURFACE WATER-QUALITY CRITERIA AND MANAGEMENT REMEDIES IN DRINKING WATER CATCHMENTS

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**Water quality fluctuation is an obstacle decision-makers facing in drinking water catchments. Maintaining and sustaining threshold values to different quantitative and qualitative criteria in drinking water catchments has been always the main objective of most national and international guidelines. Different Surface Water-Quality Management Remedies (SWMR) have different effectiveness toward different criteria to reduce contaminants. Accordingly, they can bring criteria measures closer to threshold values. Sufficient water supply considered as one of the most important factors for improving quality of life in every community. As pointed out by the United Nations (UN), one-third of the "Millennium Development Goals" depends on water quality (Phumpiu and Gustafsson 2009). UNESCO, The United Nations World Water Development Report 2 (2006) as the basis for effective catchment management, has recommended the initiatives of Water Resources Assessments (WRAs) guideline. Several researchers have developed different evaluation tools to achieve sustainable and healthy water catchments. However, a holistic and strategic framework is still required that adequately considers the uncertainty associated with various feasible surface water quality management remedies for improving drinking water reservoirs (as an example). In this study, a scientific applied framework using the Fuzzy Multiple Criteria Decision Analysis (FMCDA) approach was embedded into a strategic decision support tool to evaluate and rank proposed water quality remediation strategies within a typical fixed budget constraint faced by bulk water providers. The proposed evaluation framework consists of four core objectives, namely, water quality, environmental, economic, and social. Each objective includes a number of associated criteria and sub-criteria encompassing both quantitative and qualitative fuzzy sets for each performance category. The evaluation of considered drinking water catchment management strategies is completed using Fuzzy Decision Tree Analysis (FDTA) process following by strategy ranking achieved through the application of the Euclidean Distance by the Incentre of Centroids (EDIC). The framework has been designed for senior water authority managers seeking to efficiently identify the best strategy for improving drinking water reservoir water quality, in a holistic multi-criteria manner and within a constrained budget. Such a framework reduces the amount of redundant feasibility and design activities undertaken exploring remediation strategies that will not optimally address the water authorities' objectives and budget constraints.**

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