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GIS and MCDM analysis to evaluate and zoning of soil erosion in Junaghan drainage sub-basin in Karun , SW-Iran

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Problems involving the processing of spatial data such as soil erosion are multi-facetted challenges. Recently, absolute determination of sediment production with using quality and quantity data of drainage basins is one of the most important factors in soil protection management. In this research, we use MPSIAC method for calculating of annually sediment production and then we compare results with other methods. Results showed 21.93% difference with field observations. As there are many agents affecting on erosion and they depend on geographical location, soil, topography, climate, land use, geology and hydrology of selected area, solutions for these problems involve highly complex spatial data analysis processes and frequently require advanced means to address physical suitability conditions, while considering the multiple ecological and geological variables. Geographic Information Systems (GIS) and Multi-Criteria Decision-Making techniques (MCDM) are two common tools employed to solve these problems. However, each suffers from serious shortcomings. GIS, which deals mainly with physical suitability analysis, has very limited capability of incorporating the decision maker's preferences into the problem solving process. MCDM, which deals mainly with analyzing decision problems and evaluating the alternatives based on a decision maker's values and preferences, lacks the capability of handling spatial data (e. g., buffering and overlay) that are crucial to spatial analysis. The need for combining the strengths of these two techniques has prompted researchers to seek integration of GIS and MCDM. Also, in this research, MCDM methods have been integrated with a GIS to provide a map for soil erosion based upon a variety of different choice criteria (agent) and on the importance (weight) a decision maker might attach to these. This integration could benefit environmental, soil and water planners and decision makers.
Key words: soil erosion, MPSIAC, GIS, MCDM.