

**Land suitability modeling for newly reclaimed area using GIS-based multi-criteria decision analysis.**

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**Abstract**

Selecting the appropriate land use is one of the most important steps toward achieving sustainable development. The main objective of this research is to develop a new method to overcome the contradiction occurring when using the conventional methods to evaluate land suitability for newly reclaimed areas. A spatial model was developed to assess land suitability for wheat in El-Minia Governorate, Egypt, using integration of modeling and geographic information systems–based multi-criteria decision analysis (GIS-MCDA). Land suitability for wheat was performed using two approaches, namely the proposed model (GIS-MCDA) and the parametric method (square root). According to the square root, 75.0% of the study area was classified as not suitable, while the proposed model revealed that 20.5% of the study area was classified as highly suitable and 61.5% as moderately suitable. In order to examine the validity of the proposed model, a comparison was made between the obtained results of both the proposed model and the square root method with the actual yield of the wheat. The correlation coefficient ( $r$ ) between actual yield and the estimated yield of the square root method was 0.46, while the proposed model gives higher value ( $r = 0.95$ ), which proves the validity of the proposed model in estimating land suitability for wheat cultivation. The findings of this research revealed that the integration of modeling and GIS-MCDA adopted by the proposed model provides an effective and flexible technique contributing to improve land suitability assessment for wheat in newly reclaimed areas to be more accurate and reliable.