Markov–CA Model Using Analytical Hierarchy Process and Multi Regression Technique

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SUMMARY
The unprecedented increase in population and rapid rate of urbanisation lead to extensive land use changes. Cellular automata (CA) are increasingly used to simulate a variety of urban dynamics. This paper introduces a new CA based on an integration model built-in multi regression and multi-criteria evaluation to improve the representation of CA transition rules. This multi-criteria evaluation is implemented by utilising data relating to the environmental and socioeconomic factors in the study area in order to produce suitability maps (SMs) using an analytical hierarchical process, which is a well-known method. Before being integrated to generate suitability maps for periods 1984-2010 based on the different decision makings, which have become conditioned for the next step of CA generation. The suitability maps are compared in order to find the best maps based on the values of the root equation (R2). This comparison can help the stakeholders make better decisions. Thus, the resultant suitability map derives a predefined transition rule for the last step for CA model. The approach used in this study highlights a mechanism for monitoring and evaluating land-use and land-cover changes in Kirkuk owing to changes in the structures of governments, wars, and economic blockade over the past decades. The present study asserts the high applicability and flexibility of Markov-CA model. The results have shown that the model and its interrelated concepts are performing rather well.