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TEMPORAL AND SPATIAL DYNAMICS OF LAND USE AND ITS DRIVERS IN THE DONGTING LAKE REGION (2000-2020)

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Abstract

Land use change is a complex process driven by a range of socio-economic and environmental factors. This study investigates the temporal and spatial dynamics of land use change in the Dongting Lake Region of China from 2000 to 2020. Using remote sensing data and advanced modeling techniques, including binary-logistic regression and cellular automaton (CA)-Markov models, the patterns and drivers of land use change in the region were analyzed. It was found that construction land expanded rapidly at the expense of agricultural land, while forest and grassland areas experienced moderate declines. These changes are primarily driven by topographic factors such as slope and elevation, as well as socio-economic factors such as population density and gross domestic product (GDP). Based on these findings, an optimized spatial configuration of land use, derived through an overlay analysis, was obtained under the ecological security framework. This configuration was informed by the simulation results of land use under the CA-Markov model and the optimized zoning results formed by the minimum cumulative resistance (MCR) model. This study projects future land use patterns in the region up to 2035 and identifies key areas for ecological conservation and sustainable land management. The results of this study provide valuable insights for policymakers and planners seeking to balance economic development with environmental protection in this important region.

Key words: Dongting Lake Region; driving factors; land use dynamics

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