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APPLICATION OF A MULTI-LAYER PERCEPTRON NEURAL NETWORK TO SIMULATE SPATIAL-TEMPORAL LAND USE AND LAND COVER CHANGE ANALYSIS BASED ON CELLULAR AUTOMATA IN BURIRAM PROVINCE, THAILAND

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Abstract

This study aimed to analyze the land use/land cover (LULC) changes of Mueang Buriram district, Buriram province, Thailand, using LULC data from 2011, 2016, and 2021. The transition potential model based on a multi-layer perceptron neural network and cellular automata was used to predict the LULC changes, taking into account the distance from the road, institutional land, forests, and elevation. The results showed that paddy fields (A1) were the dominant LULC class throughout the study period, and the transition potential model indicated that forests played a crucial role in determining LULC changes. The spatial-temporal change analysis predicted the LULC changes for 2021, 2026, and 2031, showing a slight increase and decrease in different LULC classes, with paddy fields (A1) increasing by 0.027% from 2021 to 2031. The findings of this study have theoretical and practical implications for understanding the spatial and temporal dynamics of LULC changes in Mueang Buriram district and could aid in developing sustainable land use policies and practices to address the challenges of urbanization and environmental conservation in the study area.

Key words: artificial neural network, cellular automata, land use land cover change model, transition potential modelling

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