Urban sprawl prediction using ca-markov model: A case study of Melaka River basin, Malaysia

ABSTRACT

Population settlements lead to fast growing urban area throughout worldwide which is required to be monitored to maintain sustainability. Considering Remote Sensing (RS) and Geographic Information System (GIS) techniques in Melaka River basin, Malaysia, both methods are effective to monitor and to support decision-making in urban planning. Land Use Land Cover (LULC) was effectively used to study the urban sprawl, apart from that Cellular Automata-Markov (CA-Markov) chain model was applied to predict the urban scenarios for sustainable growth. The results clearly suggested that major land use changes are built-up area and water bodies. Only vegetation classes decreased in land use. The kappa statistic for 1990, 2000, and 2010 are 0.88, 0.87, and 0.90, respectively. Meanwhile, the validation assessment of k-statistic is 0.9, which resulted the model is valid to predict the future land use. Modeling stated that land use classes trend and pattern is transformed especially due to the urban built up area expansion. As conclusion, RS and GIS techniques provide effective support tools in decision making for policy makers in designing more sustainable urban habitats.