LAND-COVER CHANGE PREDICTION FROM LANDSAT DATA USING MARKOV CHAIN ANALYSIS

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Abstract: Urbanization has brought socioeconomic benefits to people. It has also caused several impacts on the environment problems, loss of agricultural land, pollution and habitat destruction. Understanding dynamic mechanism of these changes in landscape from a spatio-temporal perspective is important for urban policy making. This study analyzes the land-cover change and predicts the urban development using Landsat 30 m data in the Guatemala during the five periods (1993-1994, 1996-1998, 2000-2004, 2006-2009, and 2011-2012). The methodology includes four main steps: (i) geometric correction of Landsat images; (ii) image classification to create land cover maps; (iii) validation of the classification results; (iv) employ Markov transition probability matrixes to recognize various land use; and (v) land-cover change prediction using Markov chain. The study is based on Markov chain to simulate the space distribution situation of future urban growth. The results demonstrate the contribution of using Markov chain analysis for monitoring and predicting the urban land-cover change in Guatemela. The methods used in this study could be extended to other regions for urbanization monitoring and landscapes planning.

Keywords: Urban growth, Markov chain, Land cover change.