

Modeling land-cover change in the Amazon using historical pathways of land cover change and Markov chains. A case study of Rondônia, Brazil.

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ABSTRACT

The present dissertation research has three purposes: the first one is to predict anthropogenic deforestation caused by small farmers firstly using only pathways of past land cover change and secondly using demographic, socioeconomic and land cover data at the farm level. The second purpose is to compare the explanatory and predictive capacity of both approaches at identifying areas at high risk of deforestation among small farms in Rondônia, Brazil. The third purpose is to test the assumptions of stationary probabilities and homogeneous subjects, both commonly used assumptions in predictive stochastic models applied to small farmers' deforestation decisions. This study uses the following data: household surveys, maps, satellite images and their land cover classification at the pixel level, and pathways of past land cover change for each farm. These data are available for a panel sample of farms in three municípios in Rondônia, Brazil (Alto Paraiso, Nova União, and Rolim de Moura) and cover a ten-year period of study (1992-2002). Pathways of past land cover change are graphic representations in the form of flow charts that depict Land Cover Change (LCC) in each farm during the ten-year period of study. Pathways were constructed using satellite images, survey data and maps, and a set of interviews performed on a sub-sample of 70 farms. A panel data analysis of the estimated empirical probabilities was conducted to test for subject and time effects using a Fixed Group Effects Model (FGEM), specifically the Least Square Dummy Variable (LSDV1) fixed effects technique.