

## Geospatial analysis of deforestation factors in central Cambodia after 2000s

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Reducing emissions from deforestation and forest degradation; and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries (REDD-plus) have attracted interest in Southeast Asian countries where deforestation has been a serious issue. To estimate future deforestation, the REDD-plus requires analyses of trends in land cover changes and the effects of various factors including infrastructure development, national policies and natural environment such as topographic conditions. This study analyzed the spatial characteristics and important factors of recent deforestation by taking eastern Kompong Thom, central Cambodia as an example.

We used three periods (i.e., 2002, 2006, 2010) of forest cover maps produced by Cambodian Forestry Administration (FA) and an object-based image analysis map made from Landsat 8 imagery taken in January 2014. We examined three types of geographic factors, namely, (1) distances from roads, rivers/water bodies, settlements, and forest edges (2) terrain features, e.g., gradient and relative slope position generated from 90-m SRTM DEM, and (3) zoning categories such as forest concession, economic land concession (ELC), community forestry and protected forest, in order to clarify the trend and explanatory variables of deforestation. All the spatial data were converted into 90 m resolution raster. A generalized linear model (GLM) with logit link function (i.e., logistic regression) was then used to analyze the effect of each factor on deforestation.

Between 2002 and 2006, deforestation mainly occurred in canceled forest concessions. During the period 2006-2010, this trend of deforestation accelerated particularly in and around the newly designated ELCs for rubber plantation. After 2010, deforestation further increased due to the development of small-scale agriculture by local farmers in addition to the newly designated ELCs. Factors consistently selected during the study periods with negative effects were " forest concession " and " distance from forest edge " . These indicate that deforestation occurred more readily in the canceled forest concessions and closer to forest edges. The magnitude of the effect of " distance from roads " has become smaller, indicating that recent deforestation occurred more in the forest interior. Gradient had a negative effect, highlighting the difficulties in farming on slopes. Community forestry and the protected forest established by the FA from the late 2000s also had negative effects on deforestation, indicating that these zoning have their value for forest conservation.

Keywords: REDD-plus, land use/cover change, generalized linear model, GIS