Forest Cover Change Analysis on a Protected Area in Southern Myanmar using Remote Sensing and GIS Technique: Applications to Forest Conservation

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SUMMARY

As the human population increases in Southern Myanmar, forest area is gradually shrinking and being transformed into other land cover types. This study investigated the forest cover dynamics in the protected area (PA), named as Tanintharyii Nature Reserve (TNR). It has 5 critically endangered species and 5 endangered species, dominated by tropical rainforests. TNR was declared as a PA in 2005 under the management of the Myanmar Forest Department (FD), by the financial support of three International Gas Pipeline Companies as compensation for the pipelines' passing through the reserve forest. Firstly, land use/land cover (LULC) maps of the study area for the years 1990, 2006, and 2017 were prepared using Landsat data, with eight classes by supervised maximum likelihood classification. The management effectiveness of the PA and a 10-km buffer zone that was created in it were also examined. To acquire the higher accuracy, Google Earth Pro and field validation was conducted during November and December 2017. The results observed that dense forest decreased from 80% in 1990 to 50% in 2017 due to the population increase, settlement encroachment, agricultural land expansion like massive rubber and oil palm plantation, and fruits orchard. Forest degradation increased from −0.41% yr-1 before PA(1990-2006) to −0.72% yr-1 after PA(2006-2017), and the deforestation rate increased from −0.12% yr-1 before protection(1990-2006) to −0.52% yr-1 after protection (2006-2017) as a result of illegal extraction of natural resources by the local community. When we study within TNR, the average annual forest degradation rate was seriously higher than deforestation. The overall accuracy of the TNR LULC 1990, 2006, and 2017 maps presented 82.6%, 85.2%, and 88.2% and Kappa accuracy in the 2017 LULC map was the highest, 84.3%. This study clearly discovered that forest conservation as a protected area can minimize the rate of deforestation than forest degradation rate. The future management of the TNR should emphasize efficient land use planning, raising the local awareness, initiation the eco-development long-term projects, the establishing of village-owned tree plantations, law enforcement, and designation as an eco-tourism site.

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