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Detection of Shifting Cultivation Using Satellite Based Change Detection Techniques in the Nam Ton Watershed, Lao PDR

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Abstract

When looking for critical areas in the context of erosion and degradation in Lao PDR, the regions that are affected by shifting cultivation are prior and most distinct visual. Up to now these areas have not been assessed and their distribution is rarely described in literature. This makes it unclear whether this practice has a cause in the further depletion of the natural forest resources in Laos. The objective of this study was to test a methodology that can detect patterns of shifting cultivation and forest clearing inside the major watersheds of Laos. In order to find an optimal change detection technique, different Landsat image-to-image comparisons were used for detecting major landcover-changes over a three year period (1997, 2000, 2002). An unsupervised classification after a tasselled cap transformation had the best overall accuracy of 84.5%. Unsupervised classification after principal components analysis or vegetation indexing had overall accuracies which were respectively 81.9% and 71.4%. In general, the image-to image comparison technique showed a clear distinction between patterns related to shifting cultivation and changes which have different causes. It is concluded that the processing of the satellite remote sensing data is a very useful application in the monitoring of the shifting cultivation in Laos.

Keywords: Principal components analysis, shifting cultivation, tasselled cap transformation, vegetation indexing