Change Detection of Land Use and Land Cover by Normalized Difference Vegetation Index Differencing in the City of Chiang Mai, THAILAND

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Abstract: This study of change detection of land use and land cover by normalized difference vegetation index (NDVI) differencing in the city of Chiang Mai, THAILAND aimed to 1) analyze patterns of land use and land cover by NDVI and image classification in the city of Chiang Mai and 2) analyze changes in land use and land cover in the city of Chiang Mai from the year 2000 to 2015. The study of change detection used normalized difference vegetation index differencing and maximum likelihood classification from Landsat 7 ETM+ in year 2000 and Landsat 8 OLI in year 2015. The accuracy assessment used confusion matrix and the changes of land use was based on geographic information systems (GIS).

The study found that land use can be classified into 7 types which were urban areas, paddy field, horticulture, evergreen forest, deciduous forest, forest plantation and water bodies. The greatest change in land use and land cover from 2000 – 2015 was an increase of NDVI of less than 10 percent. The accuracy assessment used total accuracy and kappa statistics. In 2000, the results show total accuracy and kappa statistics of 68.29 percent and 58.74 percent, while in 2015 they were 67.14 and 57.42 percent, respectively. The study found that urban areas and horticultural area increased by 15.21 percent and 2.55 percent. Meanwhile, paddy field, deciduous forest, evergreen forest, forest plantation and water bodies decreased by 10.41, 2.81, 2.58, 0.73 and 0.22 percent, respectively. The most changed areas were paddy fields and deciduous forests which had become urban areas with the outward expansion from the center of Chiang Mai city to the surrounding areas.

KEYWORD: Change detection, Normalized Difference Vegetation Index, Land use, Land cover