SPATIAL ANALYSIS
OF LAND USE/LAND COVER CHANGE
DYNAMICS USING REMOTE SENSING AND
GEOGRAPHIC INFORMATION SYTEMS:
A Case Study in the down stream and surroundings of the Ci Tarum watershed

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Abstract

This study is concerned with land use/land cover change detection, identification, analysis and prediction using remote sensing and GIS techniques in the downstream of the Citarum watershed and its surroundings in West Java, Indonesia. Supervised Maximum Likelihood classification of PCA and NDVI transformed images are used to classify and identify land use/land cover categories. A post-classification comparison approach was used to detect land use/land cover changes, and a Markov Cellular automata model is then used to predict possible future land use/land cover patterns in the study area. "Leaf on" and "leaf off" phenomena of the broad leaf vegetation cover have been recognised related to dry and wet season as well as rice field (planted) and rice field (unplanted) related to growing season in the study area. Forest and plantation area were extensive in wet season and less in dry season. Rice field (planted) area was large in harvesting time and less in planting time. Settlement has increased continuously and is not influenced by season or weather. Overall, the KIA of the classification was 0.89. Settlement and rice field are the main land use/land cover types that have been changed and this is related to factors such as proximity to roads and to urban and semi-urban centres. There is an indication that land use/land cover in the study area was converted from intensive agriculture land such as rice field to settlement, rather than from less intensive uses such as open/dry land, plantation or forest. Discriminant analysis as well as overlay and simple linear analysis support factors such as proximity to roads, urban and semi-urban centres, as well as slope, as being most influential in land use/land cover change in the study area. The Markov Cellular automata model affords a powerful descriptive and predictive model for land

use/land cover change and for future land use/land cover distribution in the study area, but it needs some adjustment in order to obtain suitable results. Markov transition, as well as suitability, maps of each land use/land cover category are created.

Contents

HAPTER THREE

CHAPTER FOUR

CHAPTER FIVE

CHAPTER SIX

CHAPTER SEVEN

REFERENCES

APENDICES