LAND-COVER CHANGE ANALYSIS USING MULTITEMPORAL LANDSAT SATELLITE DATA
(CASE: GUNUNG WAYANG)

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Abstract : Transformation of forest land into other forms is the major threat for the existence of forests in Indonesia. Land use changes have triggered fragmentation that transformed continous forest lands into smaller forest patches among cultivation areas such agricultural fieldsand settlements. Land changes that occur continuously can adversely affect the ecological functions. GunungWayang Region is a protected forest in Java located in the upper part of Citarum watershed. Despite its status as protection forest, this area has undergone forest conversion that has reduced the extent of forest since 1990s. This study aims to analyze the dynamics of land cover changes that occurred in the area of Mount Wayang using four Landsat satellite image data (1991, 2001, 2005, and 2010). The analysis was conducted based on several landscape metrics, i.e. number, area, and shape of the forest patches and use a transition matrix model to predict the distribution of land cover of the study area in 2015. The landcape mectrics were calculated using ArcGIS, meanwhile modelling for predicting fiture land cover was done in IDRISI Taiga. For analysis, the forest patches were grouped into sixclasses based on the area : 0-16 Ha, 16-40 Ha, 40-100 Ha, 100-300 Ha, 300-500 Ha and 500-1000 Ha. In general, the forest cover were reduced dramatically between 1991-2001 from an area of 1234,17 Ha to 729,36 Ha. The reduction of forest area was followed by an increase in area classified as dry-field/garden/grassland and bareland/settlement. Analysis of patch dynamics showed that the largest patch was subjected into deforestation on the edge so that the size transformed into smaller size (shrinkage). The results also indicates that when forest has trasformed into small patches, they tended to dissapear due to conversion into other land cover typer, i.e. patch attrition. In terms of patch shape, Each class patch tend to be stable, except for significant change from 1991-2001 from 1,13 to 8,73 due to high rate of land changes, but in 2005 its patches form become simpler and has a value of 1,13. Assuming previous change rate (2005 and 2010), using Markov Chain approach, it could be predicted that soil conditions in the area of Mount Wayang 2015 with a decrease in forest area of 237,97 hectares, followed by an increase in area to the fields/gardens/lawns and open land/housing classes area.

Keywords: Landscape, forest patch, Markov Chain