ABSTRACT

Cikuhup Wildlife Reserve and Cibanteng Natural Reserve area were established in 1973 and 1925, respectively. They have been facing complex problem caused by land use change, deforestation, illegal hunting, forest, and fire. The study focused on what factors have affected deforestation by considering some common driving forces (altitude, slope, aspect, distance from river, road and coast, and population center), then the factors were analyzed using logistic regression. Independent variables are classified into two binary categories, namely 0 and 1 based on expert judgment. All variables of independent and dependent variables are filled in the squared-shape polygon (PFS) as one attribute, included calculation result of logistic regression.

The overall accuracy of spatial prediction is only 56%. It is lower than non-spatial accuracy which is 91%. The prediction result showed that deforestation at the area located within road distance less than 1 km tends to deforest 3 times compare the distance greater or equal to 1 km. The smallest possibility of deforestation occurrence was contributed by predictor distance 1 km from river, and almost has no effect to deforested occurrence. Regression logistic equation in this study could be used to predict deforestation significantly.

Materials and Method

Data sources: (1). Time series of Landsat TM (path/row : 122/65), acquisition date on Nov. 9, 1990, July 28, 1997, May12th 2001 (2). Topographic Map, from SRTM (Shuttle Radar Topographic Mission) (http://glcf.umiacs.umd.edu/index.shtml) with acquisition data 2000 (3). Digital Map in the form of Shape file from Center for Environmental Research & Planning Agency of Forestry Department (4). Demographic and socio-economic data, which is collected from BPS (Bureau of Statistical Center) Sukabumi Province and Head Office Jakarta Software: ERDAS Imagine and CART, Sees (CS), ArcView 3.3., Statistic Program

Data development: a. Land-use change analysis 1990 – 2001 (Fig. 2) b. Categorization and develop binary maps of each factors (Table 1) & presented in map (Fig. 3) c. Running the model (Equation 1) & create the prediction map (Fig.4)

Results and Discussion

Based on the prediction model of about 18.4% of deforested pixel and 86.1% of unchanged pixels are classified correctly. However the overall accuracy is only 56.8%. This is due to the fact that road distribution was not completely available, especially road within the reserve. Further analysis showed that center of population (LogR_CP), shore line (LogR_SL) less than 1 km, distance from river less than 1 km (LogR_Riv), and distance from existing road less than 1 km (LogR_road) contribution to deforestation is approximately 7.4 %, 25%, 38.9% and 2.7%, respectively.

Regardless the spatial distribution, the magnitude of deforestation can be predicted accurately. During the period 1990 – 1997 the actual forest loss is about 1434 ha compare to the prediction model is 1314 ha. It can be said that the prediction model has non spatial accuracy of about 91.63%.

As conclusion, all independent variables except altitude can be used to predict deforestation, and have a good fit for the model of logistic regression and its equation.

Conclusion

— Deforestation of Cikuhup wildlife reserve and Cibanteng natural reserve area during the period of 1990-1997 and 1997 – 2001 is about 2071 ha and 1314 ha, respectively

— The spatial and non spatial accuracy of the model is 56.8% and 91.63 %, respectively.

— Variables of distance from population center, distance from river, distance from shore line, distance from road and slope can be used for deforestation prediction

— Odd ratio, in this study is showing that distance less than 1 km tends to deforested occurrence 3 times than distance greater or equal 1 km from existing road. The smallest possibility of deforestation occurrence was predicted by predictor distance 1 km from river.