

# **Cause and Prediction of Deforestation in Java Island: Spatial Modeling Approach**

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Java is the most populated island in the world. About 70% of Indonesia population are living at the island. Having such situation, forest areas have been depleted from time to time, since converted to other land uses or degraded due to wood extraction. In 2000 forest area in Java covered of about 4.4 million hectare but in 2005 decreased to 2.4 million ha. Regardless the debate on the difference methodology of forest inventory in 2005 that resulted in under estimation figure, forest cover decrease in Java is obvious and need immediately respond. Forest area lost and its degradation have created environmental problem such as flooding, drought and landslide in many parts of Java. Spatial modeling of the deforestation will assist the policy makers to understand the process and take it into consideration when decisions are made.

Spatial modeling was done using Logistic regression. As dependent variable is percentage of forest cover and as independent variables are population density, percentage of population having agricultural sectors source of income, and percentage of population having non-agricultural sectors source of income, road density, elevation & slope. Data are drawn on thematic grid map with dimension 10 km x 10km, by using combination of ArcGIS and Erdas Imagine software. All of the thematic maps were classified into 1 or 0 based on certain criteria. Simulations then were made based on two scenarios namely increase of those independent variables as high as 2 % normal/moderate scenario) and 6% (extreme) using SPSS statistical software.

There are three factors that contribute to deforestation process, namely population, road density & percentage of having agricultural sectors as main source of income. Meanwhile, it seem that the existence of forest is due to high elevation & percentage of population having non-agricultural sectors source of income. Result of logistic regression showed that under the normal/moderate scenario in 2020 only one district/municipality of Banten will face deforestation problem, meanwhile West Java, Central Java, Jogjakarta and East Java are 7 districts, 22 districts, 4 districts and 6 districts, respectively.

Under the extreme scenarios, number deforested districts of Banten, West Java, Central Java, Jogjakarta and East Java are 2 districts, 11 districts, 18 districts, 5 districts, 26 districts, respectively. Regarding watershed boundary, in 2020 under the normal scenario there are 47 watersheds will face serious problem of deforestation and almost three times (123 watersheds) under extreme scenarios. Policy implication of the result model prediction is that the Government should take more attention to the population problem & have to create non-agricultural sectors jobs in order to reduce pressure on forest.)

The model will be validated & improved by resizing the grid to 5 km x 5km and added with some variables such as land tenure status, distance from road, and some socio-economics data which is unavailable right now (namely : income & level of literacy at village level).