

SPATIAL ANALYSIS TO PREDICT INDONESIA'S FORESTS 22th CENTURY

Theresia Retno Wulan ¹⁾

Turmudi ²⁾

Agus Hermawan Atmadilaga ²⁾

Murdaningsih ⁴⁾

National Coordinating Agency for Surveys and Mapping

Abstract

Forest assessments the use of natural resource management. The spatial data presents information about the availability of forest cover in the past and existing. Forests change happens in certain period of time due to monitoring success of forests management. Therefore, forest assessment is one of vital information for local even tough national government as a reference in forest management in behalf of regional planning.

The prediction of Indonesia's forests on 22th century was count from the assumption forest assessment year 2002 and year 2006. The forests assessments illustrate increasing and decreasing of forest cover in the forest territorial. The data was derived from Forest Cover Map which interpreted from Landsat Imagery.

Indonesia's Land Forest Coverage year 2002 is 124,473,021 hectares meanwhile, in year 2006, the land forest coverage was decreased to be 116,920,122 hectares. During the period of four years, the forest cover is decreased a large amount of 7,552,899 hectares. It means one years Indonesia's forest was changed to non forest area more than two million hectares within one day Indonesia's forest is getting lost more or less 5,000 hectares. From that argument, we can predict that Indonesia's forest completely gone to 60 years in the future and in 22th century, Indonesia do not have forest anymore. This condition to be absolute horrible fact, not just make negative impact for Indonesia but also to the world.

Keywords : *forest assessment, geography information system, spatial analysis, forest coverage prediction*

I. INTRODUCTION

Indonesia's forest is worrying decreasing in the last few years. Until now, Indonesia has lost of virgin forest around 72% [World Resource Institute, 1997]. Rapid forest destruction period 1985-1997 was 1.6 million hectares per year, whereas in the period 1997-2000 to be 3.8 million hectares per year. This makes Indonesia one of the countries with the highest level of damage to forests in the world. Based on the results of Landsat Imagery of 2000 there were 101.73 million hectares of forest land was damaged, it means forest degradation reached 2.8 million ha/year, so in a period of 15 years Indonesia will lost it forest.

One tool for monitoring of the management of forest resources is the Balance of Resources Forest. Forest Resource balance is the balance of natural resources that provide data and spatial information about the changes and includes the area of coverage in the area of forest land from two different time periods.

II. METHODOLOGY

1. Data Sources

- a. Baseline (Rupabumi Indonesia/RBI) Maps scale 1:1,000,000.

The baseline (RBI) maps in the scale of 1:1,000,000 were used as working map, reference for geometric correction, and base maps. Geometric correction is part of pre-processing of satellite remotely sensed data that needs some control points (GCP). The GCP selected in some places that can be identified clearly both in the reference maps as well as in the images, such as river junction, road junction, river bank, shape of coastline, lake, and dam. Projection and coordinate systems used in the final maps refers to the RBI map projection and coordinate.

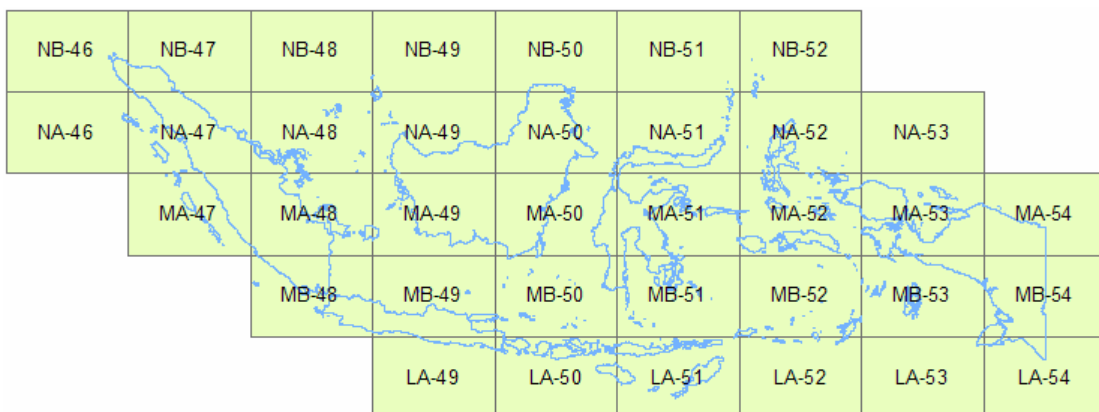


Fig 1.. Number of RBI BAKOSURTANAL map sheets

- b. Map of Forest Resource Balance Year 2000 - 2002
Map of Forest Resource Balance Year 2000 - 2002 period data is used as the initial data reclassification of forest imprisonment in 2002, which was then reclassification to Scale 1:1.000.000.
- c. Coverage Map Regional Scale Land 1:1.000.000 Year 2006
Land Coverage Map Scale 1:1.000.000 Year 2006 would be generated according to the class that is used in the balance forest resources.

The classification which using for this map is:

- Dry Forest Land
- Wet Forest Land
- Non Forest

2. Steps of Activities

The flow diagram below shows activities steps applied for mapping forest resource balance.

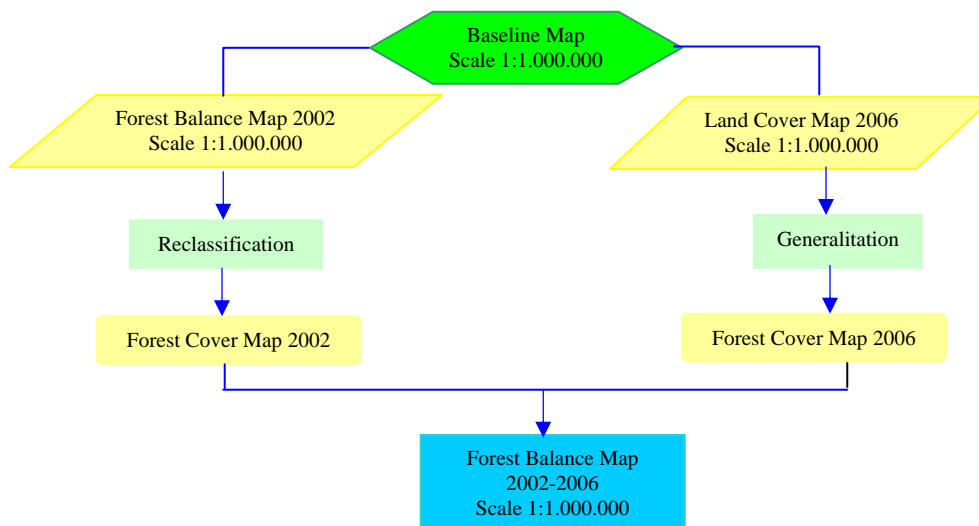


Fig 2. Flow Diagram

III. Result and Discussion

In 2002, the forest cover area is 124,473,021 hectares and decreases to 116,920,122 hectares in 2006. It means that there has been a decrease in broad national forest land in a period of 4 year of 7,552,899 hectares. This means that in a year, Indonesia forest land changed to non-forest area of more than 2 million hectares, and in the reduction of one day going wide forest of approximately 5.000 hectares. So that it can be in a period of 60 years, could have predicted that Indonesia will not have a forest again. Prediction of course this will not become a reality when seen from now on, sustainable forest

management into the national government's attention, especially from the Ministry of Forestry.

The largest reduction occurred in the forest production is declining at 2%. Reduction in this forest due to the activities of forest exploitation by companies of Forest Rights (HPH) or changes the function into non-forest.

Table 1. Recapitulation Balance Forest Resource 2002 – 2006

Forest Type	Forest Area 2002 (Hectares)	Forest Area 2006 (Hectares)	+/- (Hectares)
Wet Forest Land (WF)	37,592,566	34,513,996	-3,078,570
Dry Forest Land (DF)	86,880,454	82,406,126	-4,474,328
Non Forest(NF)	44,035,992	51,588,890	7,552,898
Summarize	168,509,013	168,509,013	0

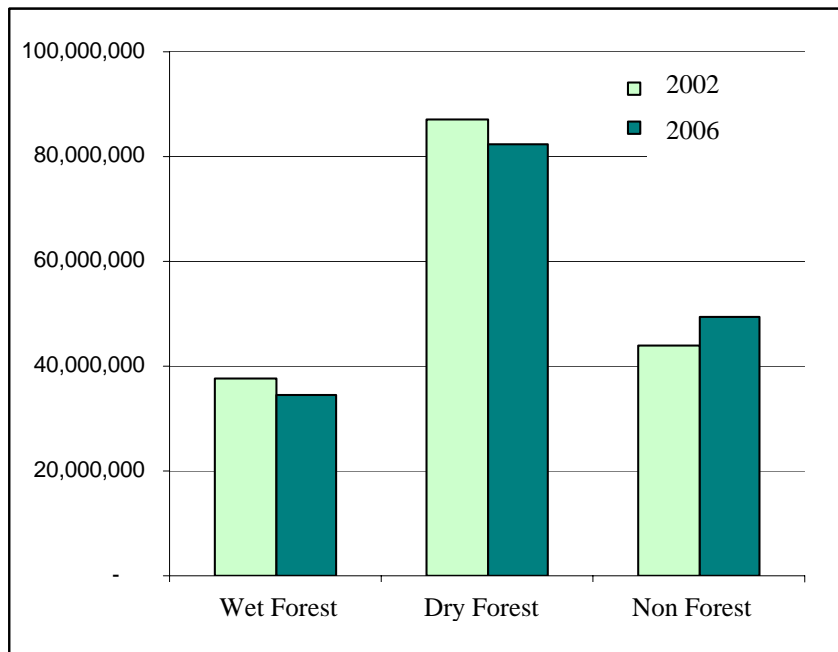


Fig 3. Diagram of Forest Balance Resource 2002-2006

With the assumption of a reduction in the rate of 2 million forest hectares a year, then predicted in the year 2066 is there will be no more forest in Indonesia, as described in the table and graph below:

Tabel 2. Prediction of Indonesia's Forest Land Cover 2076

Forest Type	2002	2006	2016	2026	2036
Wet Forest Land	37,592,566	34,513,997	14,513,997	4,513,997	
Dry Forest Land	86,880,455	82,406,126	62,406,126	52,406,126	42,406,126
Non Forest	44,035,992	49,439,485	59,439,485	69,439,485	79,439,485

Forest Type	2046	2056	2066	2076
Wet Forest Land				
Dry Forest Land	32,406,126	22,406,126	12,406,126	2,406,126
Non Forest	89,439,485	99,439,485	109,439,485	119,439,485

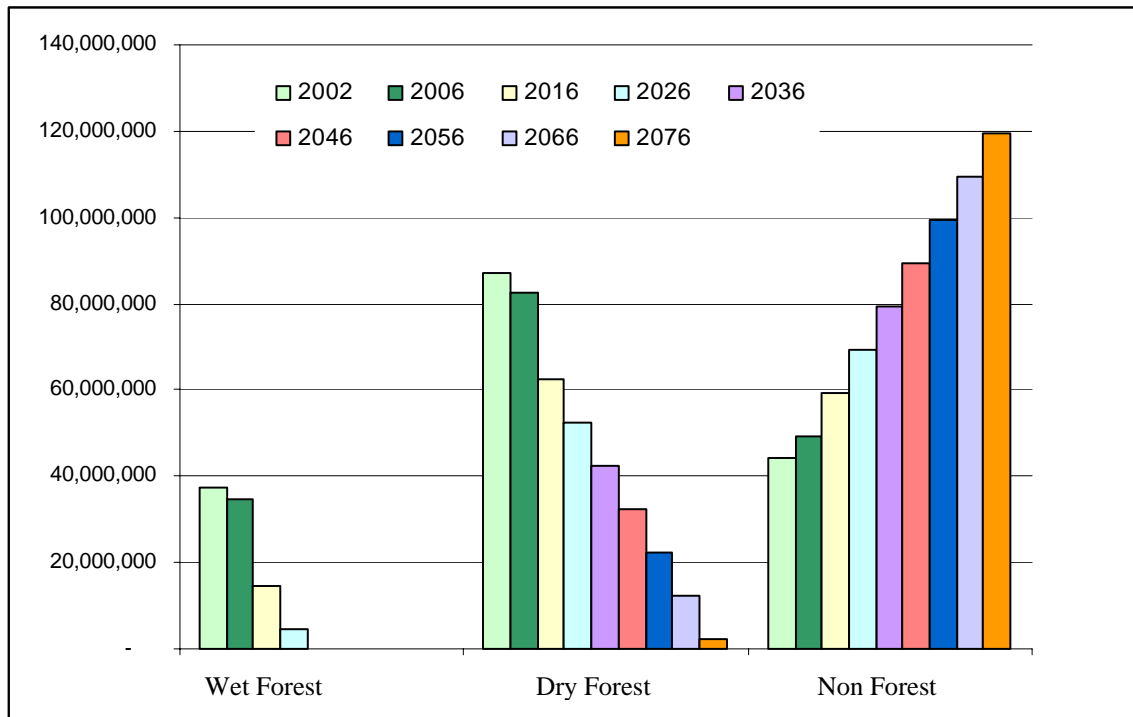


Fig 4. Diagram of Forest Area Prediction

Assuming there is a reduction in forest about 5 million hectares per year-that can be counted wet forest land will expire in the year 2036 while the dry forest land will expire in the year 2076.

IV. Summarize

Indonesia is covered by forest 124,473,021 hectares in 2002, in the period between 2002 and 2006, forest area was decreased to be 116,920,122 hectares, its mean there has been a changed of forest area to be a non-forest area about 7,552,899 hectares in four years. Assuming of the forest degradation on that period about 5 million hectares per-year, the Indonesia forest will be lost in 2076. According that general counted, the Indonesia government need more attention to sustainable a forest management start from now, so the predicted lost of forest in Indonesia 22th century will never come reality.