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Land cover change in Kuningan District during 1994 - 2015

Iing Nasihin[a,]*, Lilik B. Prasetyo[b], Agus P. Kartono[b], Nandi Kosmaryandi[b]

[a]*Department of Tropical Biodiversity Conservation, Faculty of Forestry, Bogor Agricultural University, Kampus IPB Darmaga, Bogor 16680, Indonesia*

[b]*Department of Forest Resource Conservation & Ecotourism, Faculty of Forestry, Bogor Agricultural University, Kampus IPB Darmaga, Bogor 16680, Indonesia*

Abstract

Land cover is a physical appearance of land and represents its ecological status. It is dynamically changed due to human intervention, natural disturbance and succession. This research aims to monitor the land cover change in Kuningan Regency during the period of 1994 to 2015. Geographical Information System (GIS) and remote sensing were used to determine the changes based on date series of Landsat satellite imagery. The result showed that there was a high increase of 5 (five) land cover types, namely: dryland farming (10,12 %), settlement (384.04 %), rice field (118,95 %), shrubland (27.30 %), and bare land (4,277.68 %). Meanwhile, there was a decrease of 4 (four) land cover types, namely: natural forest (43.53 %), plantation forest (34.77 %), mixed garden (63.27 %), and water bodies (4.35 %).

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Keywords: land cover; kuningan; mixed garden; plantation forest; population.

1. Introduction

Rapid development and population increase of an area require more land and space. Thus, land cover change is unavoidable. Land cover is a combination of various factors created by natural and human beings, including vegetation, soil, glaciers, lakes, wetlands and a variety of buildings [1]. Land cover indicates an ecological status and physical appearance of the land surface, which may change due to human interventions, natural disasters and plant

* Corresponding author. Tel.: +62-813-2408-8139.
E-mail address: e03498033@yahoo.com.

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succession. In many cases, land use change may not significantly change the land cover condition. For example, allocation of degraded area as protection forest will not automatically change the land cover into forest area. Land cover change can be classified into two categories [2] namely a) conversion into different category b) modification within the same category for example from primary forest into secondary forest.

Estimation of land cover change at local scale from a global study is challenging, in fact a local study of a country often yield a different result due to different method and land classification [3]. Human activities have been the major cause of land cover change that will halt at a certain point when no possible change can be made in the landscape [4]. Kuningan district is an upstream area of Cirebon and Brebes district (Central Java). Therefore, this district provides natural resources for the surrounding areas in particular as water supply system. This study was aimed at identifying the land cover change in Kuningan district during the period of 1994 to 2015.

2. Methods

The study area encompasses the administrative area of Kuningan district geographically located at 108º23'- 108º47' E and 6º47'-7º12' S, and has an area of 119.571 hectares. This district is administratively surrounded by Cirebon district in the north, Majalengka in the West, Ciamis district in the south, and Brebes (Central Java) in the east, divided into 32 sub-districts, 366 villages and 15 urban villages (Fig. 1).

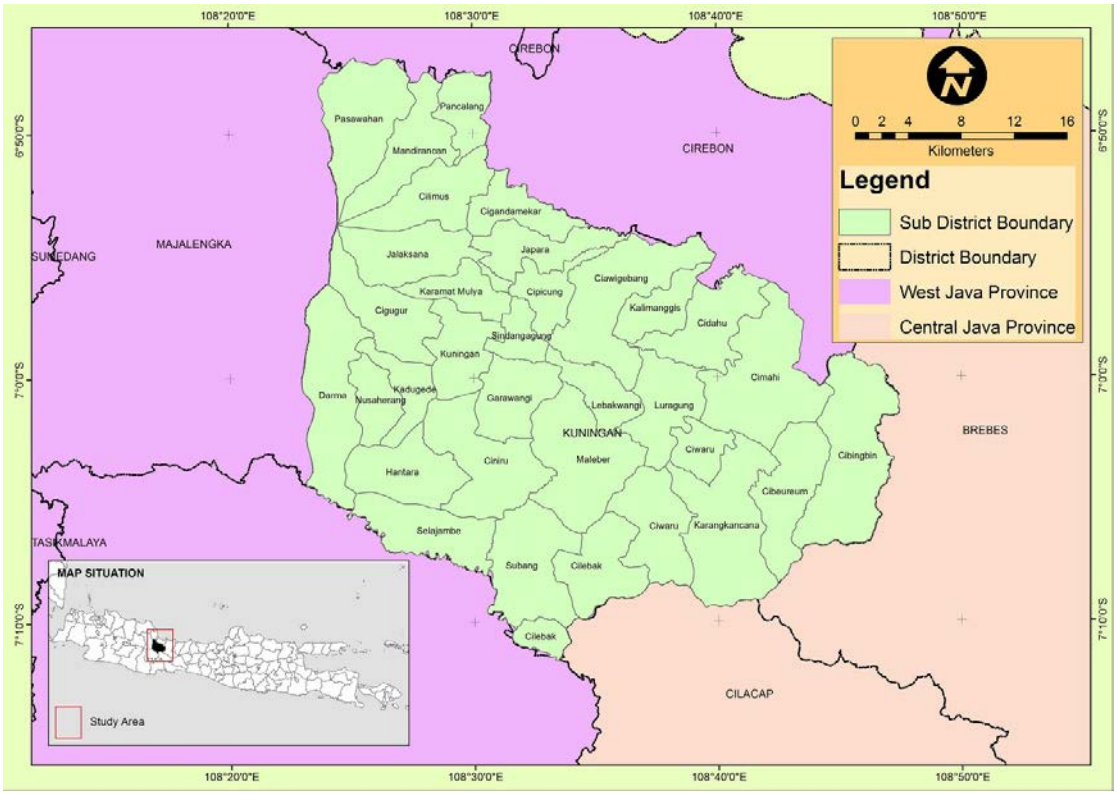

Fig. 1. Map of study area.

In this study we used a Landsat satellite imageries path/raw 121/65, acquired on April 8, 1994 and September 25, 2015, and the administrative map of Kuningan district. Images were analyzed using ENVI and ArcGIS Software. Supervised classification was applied due to a better result than that of unsupervised classification [5]. In addition we also used visual/manual technique to enhance the accuracy of interpretation result during corrections process. Descriptive analysis was used to examine factors influencing land cover change in Kuningan district.