The 2nd International Symposium on LAPAN-IPB Satellite for Food Security and Environmental Monitoring 2015, LISAT-FSEM 2015

Detection of mangrove distribution in Pongok Island

Umroh[a], Wahyu Adi[b], Suci Puspita Sari[c]*

aFaculty of Agriculture, University of Bangka Belitung, Kampus Terpadu Balunijuk Gedung Teladan, Balunijuk, 33172, Indonesia
bFaculty of Fisheries, University of Bangka Belitung, Kampus Terpadu Balunijuk Gedung Teladan, Balunijuk, 33172, Indonesia
c Faculty of Biology, University of Bangka Belitung, Kampus Terpadu Balunijuk Gedung Teladan, Balunijuk, 33172, Indonesia

Abstract

This paper describes the detection of mangrove density distribution in Pongok Island using remote sensing approach. The objective aim of this research is to map out the distribution of the mangrove density using Landsat imageries and GIS technique. Landsat imageries data Path/Row: 123/062 acquired in July 24th 2014 were used in this research. The mangrove and other land cover delineation was conducted with visual interpretation by using standard false color composite of Landsat band 564. The mangrove density was assessed using the vegetation index method, particularly through the NDVI formula with the range value from -1 to 1. The study found that the mangrove density could be classified into three classes i.e spares (NDVI range: -1 – 0.33; equal with <1,000 Trees/Ha), moderate (NDVI range: 0.33-0.42; equal with ≥1,000 to <1,500 Trees/Ha), and dense (NDVI range: 0.42-1; equal with ≥1,500 Trees/Ha). The study recognized by the types of mangrove identified in Pongok Island are dominated by *Rhizopora* sp, *Sonneratia* sp, *Avicennia* sp, and *Bruguiera* sp.

* Corresponding author. Tel.: +62-812-7826-932.
  E-mail address: sucipuspita1332@yahoo.com

1. Background

Mangroves are one of the productive and highly adaptive ecosystems on the Earth, and provide invaluable services to the coastal communities. Ecological and sustainable management of the mangrove ecosystem requires crucial knowledge of variability and dynamics over a time and space [1]. Mangrove forests grow near the big river estuary where the river delta gives a lot of sediment (sand and mud). Mangrove roots collect sediments and slow the water flow to protect the coastline and prevent the erosion [2]. Mangrove can only grow in areas away from direct waves [3] Mangroves protect shorelines from erosion by stabilizing sediments with their tangled root systems. They maintain water quality and clarity, filtering pollutants and trapping sediments originating from land. Mangroves function as nurseries for shrimp and recreational fisheries, exporters of organic matter to adjacent coastal food chains, and enormous sources of valuable nutrients [4]. Mangrove forests cover the intertidal area created by coastal accretion as a result of the interaction between river and sea [5]. Remote sensing has been used extensively to map and monitor mangrove environments over the past two decades. It offers some key advantages for mangrove studies, including indirect access to mangrove habitats that are usually hard to access [6, 7] . This research coverage area is Pongok Island, a small island that has mangrove ecosystems. Pongok Island is a sub-district in South Bangka, a regency of Bangka Belitung Province. Mangrove condition in this island has good density, because several areas have been designated as marine protection area. Remote Sensing and GIS techniques were used to evaluate, monitor and inform the distribution of mangrove density in this area.

2. Methodology

2.1. Study area

Pongok Island is located in South Bangka, one of regency in Bangka Belitung Province. Pongok is located geographically in 107°03'25"E and 02°51'52"S. Sampling stations of mangrove community structure are in 5 points of Island. Field study was conducted to collect the information about mangrove species, measure mangrove density and monitor the condition of mangrove area. Map location of study area in Pongok Island is shown in Fig. 1.
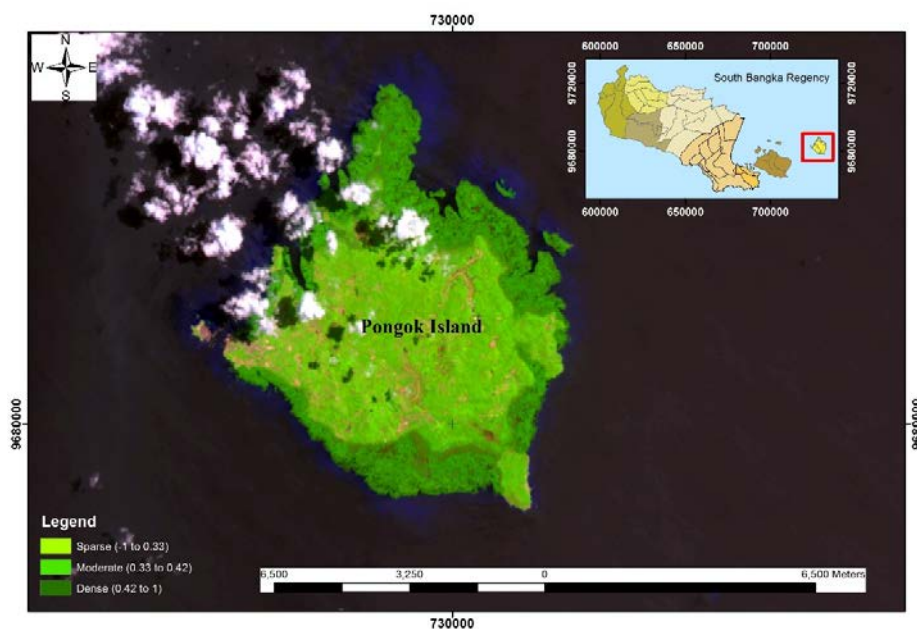

Fig. 1. Pongok Island.