

# **STUDY ON FOREST CANOPY DENSITY ESTIMATES OF THE SOUTHERN SIERRA MADRE MOUNTAIN RANGE, GENERAL NAKAR, QUEZON, PHILIPPINES USING OPTICAL IMAGES**

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**ABSTRACT.** Historical records characterize the Philippine archipelago as a continuous forest of different types. At present, the 2003 land cover classification conducted by the National Mapping and Resource Information Authority (NAMRIA) using satellite images indicated that the remaining forest area is estimated at 24.27% or 7.168 million hectares of the country's total land area. The rapid decline of these forests may be attributed to several factors which include illegal logging, swidden agriculture, forest conversion, mining, charcoal making, upland agriculture and climate change impacts. Forest canopy density is defined as the proportion of an area in the field/ground that is covered by the crown of trees and is expressed in percentage of the total area. These forest canopies serve as habitats to a number of different animal species and are the major constituents of the active foliage in photosynthesis and biomass in forest ecosystems. Forest canopy is an important factor that provides useful information about the present conditions of the forest and is a significant indicator of potential management and monitoring needs. Forest assessment and the development of a robust and efficient forest monitoring system is an urgent need to save the country's remaining forests.

To estimate the forest canopy density of the Southern Sierra Madre Mountain Range in General Nakar, Quezon, Philippines, the forest canopy density model used in the FCDMapper program was carried out using Landsat images for General Nakar, Quezon acquired in 2002 and 2006.. This method utilized four (4) indices to calculate forest canopy density, namely, Advance Vegetation Index (AVI), Bare Soil Index (BI), Shadow Index/Scaled Shadow Index (SI/SSI) and Thermal Index (TI). These indices followed an integration process in order to obtain an estimate of the forest canopy density. To further validate the efficiency of the FCDMapper model, the results were compared to NDVI and EVI information extracted from MODIS. The forest canopy density maps were characterized in 11 classes, from 0 to 100% canopy density.