

ASSESSMENT OF CANOPY DIEBACK IN HORTON PLAINS NATIONAL PARK USING MULTISPECTRAL SATELLITE DATA

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Satellite data play an important role in investigating the relationships between the spatial patterns of vegetation and environmental variables. The aim of this study was to investigate spatial distribution of canopy dieback using remotely sensed data in conjunction with field collected data in the upper montane forest. The study was conducted in the Horton Plains National Park (HPNP) in the southern part of the central hills of Sri Lanka. Ten meter resolution cloud and haze free ALOS (acquired in September 2009) and ASTER Global Digital Elevation Model (DEM) with 30 m resolution were used. ASTER DEM was resampled to 10 m spatial resolution in order to match with ALOS data. One hundred and thirty (130) field sampling plots were established and information on vegetation structure and species composition was collected. The centre of each plot was determined using a GPS unit (Global Positioning System-Garmin 12).

ALOS image was classified into four categories as dieback area, forested area without dieback, grassland and water. Topographic Wetness Index (TWI), slope and aspect products were generated using DEM. Results showed that dieback is reduced with the decrease of slope of the terrain. More canopy dieback affected areas were observed at the south facing slopes and less dieback is observed on the north facing slopes. It was noted that when TWI increased, canopy dieback is significantly reduced. Further results of our study indicated that 27% (area of 9.5 km²) of the total forest reserve is subjected to the dieback.

Our findings showed that all the environmental variables considered, slope, aspect and TWI, have significant influence on the spatial distribution of forest dieback at HPNP. Furthermore, this study provides evidence that remote sensing and GIS based analyses are more capable and provide accurate results on investigating the tree mortality in forested areas.