**Estimation of the Deforestation Through the Forest Canopy Density Model Derived From Remote Sensing**

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***ABSTRACT***

Forest degradation and deforestation are major concerns for governments worldwide. In Sri Lanka, the topic of deforestation, particularly concerning the Wilpattu Forest Complex, has been a significant point of discussion among environmentalists and the general public. This study offers a scientific perspective on this issue by assessing periodic changes in land cover within the controversial area of Wilpattu Forest using satellite data. Forest canopy changes in the Wilpattu Forest area from 1988 to 2023 were identified by developing Forest Canopy Density (FCD) models. These models were generated for the years 1988, 1992, 2001, 2010, 2015, 2018, 2020, and 2023. The FCD models were created using Vegetation Density and Scale Shadow Indexes. Vegetation Density was determined using the Advanced Vegetation Index (AVI) and Bare Soil Index (BSI), while the Scale Shadow Index was derived from the Shadow Index and Thermal Index. The FCD models were classified into five categories: High FCD, Low FCD, scrub, grassland, and bare land. A comparative analysis of these categories across different years provided insights into land cover changes. Further analysis at the Divisional Secretariat (DS) and Grama Niladhari (GN) division levels was conducted by overlaying their shapefiles onto the FCD models. The results revealed significant land use changes between 2010 and 2018, including the conversion of forest areas into residential, road, or farmland purposes. This indicates that land use changes were driven not only by deforestation but also by forest degradation. However, from 2018 to 2020, the forest showed resilience with no evidence of deforestation. In conclusion, the study highlights that land use changes in the Wilpattu Forest Complex result from both deforestation and forest degradation. The observed resilience from 2018 to 2020 underscores the dynamic nature of the forest ecosystem, providing essential insights for informed discussions and policymaking on forest conservation in Sri Lanka.

**Keywords:** Forest Canopy Density models, Deforestation, Wilpattu Forest