

(90)

**Identifying Forest Fires and their Impact on Forest Cover in Anuradhapura District
Using GIS and Remote Sensing**

De Zoysa, J.B.L.* , Jayasinghe, K.D.P.P.

*Department of Geography, Faculty of Humanities and Social Sciences, University of Sri
Jayewardenepura, Nugegoda, Sri Lanka.*

**bumindulalanath@gmail.com*

Abstract

Forest fires pose significant threats to forest ecosystems, particularly in regions prone to anthropogenic fires, such as dry-zone forests in the Anuradhapura District of Sri Lanka. These fires result in detrimental impacts on forest health, leading to loss of biodiversity and altering landscape dynamics. This study focuses on assessing the spatio-temporal patterns of forest fires in Anuradhapura District between 2017 and 2022 and quantifying their impact on forest cover. The study utilized Landsat 08 OLI/TIRS Collection 2 Level 2 satellite images and the GPS locations of forest fires were gained from NASA's Fire Information for Resource Management System (FIRMS). Normalized Difference Vegetation Index (NDVI) and Normalized Burn Ratio (NBR) analyses were performed to evaluate forest health and burn severity over the study period and were also employed to monitor fire hotspots and track fire intensity and distribution across the region. The analysis revealed that areas with high-severity fires experienced a considerable reduction in forest cover, while lower-severity fire regions showed signs of vegetation recovery. NDVI indicated substantial declines in vegetation health in post-fire areas, whereas dNBR was instrumental in identifying zones of significant ecological damage. The study applied Geographic Information Systems (GIS) and Remote Sensing (RS) techniques to map these changes accurately, demonstrating their effectiveness in tracking forest disturbances caused by fire. The use of geospatial tools allowed the precise monitoring of fire impacts and helped in identifying areas that are at higher risk of future fire occurrences. The results highlighted the critical need for focused conservation and reforestation efforts in high-risk zones to mitigate the adverse effects of fires on forest ecosystems. Key findings from the study emphasize the utility of integrating GIS and RS in forest fire analysis, supporting the development of targeted fire prevention strategies and improved forest management practices. Ultimately, this research underscores the importance of advancing fire mitigation techniques and promoting robust conservation policies to safeguard the biodiversity and forest cover of the Anuradhapura District.

Keywords: *Forest fires, GIS, Remote Sensing, NDVI, Burn severity.*