ASSESSING THE RELATIONSHIP BETWEEN URBAN HEAT ISLAND EFFECT AND URBAN GREEN SPACES IN COLOMBO DISTRICT, SRI LANKA

Vithanage, H.
Department of Zoology & Environmental Management, Faculty of Science,
University of Kelaniya, Sri Lanka
heshanivithanage33@gmail.com

The Urban Heat Island (UHI) effect, which causes urban areas to experience higher temperatures than their rural surroundings, is a growing concern for sustainable urban development. This study examines the UHI effect in Colombo District over a 19-year period (2001–2019) using Land Surface Temperature (LST) and Normalized Difference Vegetation Index (NDVI) data. The research explores how land surface temperatures and vegetation cover have changed over time, the extent to which vegetation loss influences increasing urban temperatures and the potential role of green infrastructure strategies in mitigating UHI impacts. Satellite images from Landsat 5 and Landsat 8 were analyzed using Geographic Information System (GIS) techniques, Pearson's correlation analysis and temporal trend mapping. Results show that the average LST increased from 30.2°C in 2001 to 76.6°C in 2019, while NDVI values declined from 0.35 to 0.20, indicating significant vegetation loss. A strong negative correlation was found between NDVI and LST ($r = -0.8746$ in 2001, -0.8760 in 2009, and -0.9771 in 2019; $p < 0.05$), suggesting that vegetation cover plays a critical role in regulating urban surface temperatures. Urban areas such as Colombo, Dehiwala, and Moratuwa consistently recorded higher LST and lower NDVI compared to less urbanized locations like Padukka and Seethawaka. This study moves beyond general UHI solutions by providing Colombo-specific strategies. Key measures include achieving 20% tree canopy cover in heat-prone zones, integrating LST–NDVI mapping into environmental assessments and legally protecting wetlands and peri-urban forests as cooling buffers. Novel approaches such as green corridors along the Kelani River and community tree-planting with native species ensure ecologically and culturally relevant mitigation.

Keywords: *Green Infrastructure, Land Surface Temperature (LST), Normalized Difference, Urban Heat Island (UHI), Vegetation Index (NDVI)*