THE INFLUENCE OF CENTRAL HIGHWAY ON URBAN HEAT ISLAND INTENSITY: A CASE OF MIRIGAMA DIVISIONAL SECRETARIAT DIVISION

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The urban heat island (UHI) effect is where urban areas exhibit higher temperatures than their surrounding rural regions. This study investigates how the Central Highway has impacted the intensity of the UHI in the Mirigama area. Landsat satellite image-based analysis detected the UHI for 1997, 2010, and 2023. Further, land use and land cover (LULC) changes were analyzed and classified through the Random Forest algorithm, an advanced machine learning method. The results indicated that with the introduction of the Central Highway, urban thermal conditions have intensified, correlating with an increase in built-up areas detected through LULC changes. Maximum and surface temperatures (LST) in the area were 26℃, 27℃, and 28℃ in 1997,2010, and 2023 respectively. This is a 2℃ increase from 1997 to 2013. These changes have resulted in urban areas becoming more heated than rural ones, with areas containing more buildings experiencing greater heat. In the meantime, the LST has increased along the central highway and its surroundings. Specifically, over the years, the forest area has reduced significantly. It covered 101.9 km² in 1997, decreased to 98 km² in 2010, and dropped to 57.8 km² in 2023. The total reduction is 44.1 km². This deforestation is closely linked to infrastructure expansion, including the Central Highway, which has contributed to both the UHI effect and ecosystem degradation by increasing LST. It highlights the need for better planning to minimize environmental impacts, connecting to the Sustainable Development Goals (SDG) 11 - Sustainable Cities and Communities and 13 - Climate Action. Addressing these challenges could also mitigate adverse effects on local ecosystems and public health. Overall, this research contributes to understanding the UHI effects of the area, and LULC changes that urban planners and policymaking authorities in the country should consider in their development initiatives.

***Keywords*:** UHI, SDG, remote sensing, urbanization