

Identification of urban Green Cover Changes in Galle Municipal Council Area using the Geo-Informatics Techniques

J.N.D. Jayathunga¹, P. Kirishanthan¹

¹Department of Geography, University of Colombo, Sri Lanka.

Abstract

Galle city is one of the popular coastal cities in Sri Lanka. Since ancient times, the city has been the fourth largest municipal population and its administrative and commercial functions. Many researchers have highlighted that rapid urbanization has been occurred in Galle, particularly within Galle municipal area, for more than the last two decades. As a result of urban expansion, the city's land use and land cover (LULC) changed dramatically. The main objective of this study is to identify and map the spatial changes of green cover in Galle Municipality area for the last three decades (1988-2019), applying geo-informatics techniques. The analysis was done using multi-temporal Landsat TM images extracted from the United States Geological Survey (USGS) portal from 1988 to 2019. Spectral indices, namely, Normalized Difference Vegetation Index (NDVI), Normalized Difference Built-up Index (NDBI), and Built-up Index (BUI) generated from the satellite data. Built-up area, Homestead, Urban green cover, and Waterbodies were analyzed using these spectral variations. The analysis revealed that the built-up area in Galle municipality increased from 6% to 31% during 1988 – 2019. It indicates that approximately 25% of the current built-up area has grown during the last thirty years. The urban expansion has extended around a 5-kilometer radius from the city center towards Karapitiya suburbs, referred to as a satellite town. On the other hand, the urban green cover of the city has depicted a very significant decline from 86% to 15%. For instance, Magalle, Dewata, Thalapitiya, Kongaha, Dangedara, and Milidduwa have seen a drastically decline in green cover. Further, the study is one of the recent pieces of evidence indicating that the city's total green cover has been converted into the homestead and built up by 11.5 sq. km (60%) and 4.3 sq. km (22.6%), respectively, during the last three decades. Hence, Galle Municipal Council and the relevant stakeholders must integrate and implement sustainable green city concepts and approaches in city planning and policies to develop a resilient and sustainable city.

Keywords: Galle, LULC, NDVI, Urban green cover