

Monitoring the Urban Sprawl in Colombo Metropolitan Area (CMA) Using Remotely Sensed Data

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The urbanization of Sri Lanka is mainly concentrated in the western part where the Colombo metropolitan area (CMA) is located. The CMA urban cluster is very dynamic and rapid due to its being the country's only metropolitan area. In such context, present study intends to measure the urban sprawl in the CMA over 20 years (from 1997 to 2017) using Landsat 5 and 8 images. Specifically, three land use/cover (LULC) classes, namely built, non-built, and water were classified for three time points (1997, 2007, and 2017) using pixel-based supervised classification technique. The study area was delineated employing the 40km buffer from the city center of Colombo where the zero-milestone located mainly covering CMA. The clustered random samples points were used to assess the accuracy of LULC. The accuracy assessment results revealed that overall accuracy of LULC classification is 98% in 1997, 98.9% in 2007, and 98.7% in 2017. The present study mainly focused on buildup change as a proxy to measure urban sprawl. The LULC change matrix of 1997-2007 shows buildup area gained around 5717 km² from non-built area with an annual average gain rate of 571.7 km² per year. According to the LULC change matrix of 2007-2017, the buildup gain was 7987 km² with an annual average gain rate of 798.7 km² per year. The results revealed that urban sprawl was more intense or faster during the period of 2007-2017 compared to the period of 1997-2007, coinciding with the trend of rapid population increase and economic growth which took place after the end of the 30-year civil war in 2009. These analysis results of the study are important in the context of urban planning and understanding the urban sprawl related issues in the CMA.

Keywords: Urban sprawl; Colombo metropolitan area; Land use/cover; Urban planning