

EARTH OBSERVATION SYMPOSIUM (B1)
Earth Observation Applications and Economic Benefits (5)

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PERFORMANCE EVALUATION OF REMOTE SENSING BASED URBAN INDICES AND
ASSESSMENT OF URBANIZATION DYNAMICS IN BANGALORE-INDIA

Abstract

Erstwhile garden city Bangalore is now the Silicon city of India and is one of the fastest growing cities of Asia. Rapid urbanisation has led dynamic land use land cover changes subsequent to human intervention in terms of modernization. Estimation of the urban built-up areas is essential as their existence can be used as an indicator of urban development and environmental quality. Remote Sensing Satellite imagery can play a significant role in investigation, dynamic monitoring and planning of fast growing urbanization. Landsat-7 ETM+ imagery has encouraging features such as high spatial, temporal and multispectral resolution and hence provides reliable and accurate data to detect change in extent of vegetation. In this paper, a study has been conducted to detect the progress in urban and built-up area extent during the period of 2002-2014 using several methods namely Normalised Difference Built-up Index (NDBI), Index based Built-up index (IBI), Enhanced Built-up and Bareness Index (EBBI), Urban Index (UI), Normalised Difference Bareness Index (NDBaI), New Built-up index (NBI), Normalised Difference Impervious Surface Index (NDISI) and supervised classification.

The study was done over the level 1 Landsat-7 ETM+ images of Bangalore region for April 2002 and April 2014. In order to avoid seasonal and cloud effects the month of April was specifically chosen. Bruhat Bangalore Mahanagara Palike (BBMP) administrative boundary was applied as a mask to extract the study area corresponding to urban Bangalore. Subsequently, each of the mentioned urban area extraction indices was applied to detect temporal variations in terms of built-up area. Performance of these indices was also evaluated based on consistency with the field observed data. Results also highlight the spatial characteristics of intensity of urban expansion. This study indicates a significant escalation in urbanization of the city over a span of 12 years.