Land Use and Land Cover Change Detection for Urban Sprawl Analysis of Mumbai Metropolitan Region (MMR)

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Abstract: The rapid growth of urban population in metro cities has introduced serious environmental challenges in many cities hindering the goals of sustainable development which includes natural resource management, maintenance of infrastructure facilities , sanitation etc. and is a cause of concern for Urban and town planners for efficient urban planning. The Land Use and Land cover is important for Urban growth analysis and because of Urban growth the city is sprawling in an haphazard manner (Population growth from 12.5 million to 23.5 million in 2017 is seen). The metropolitan area has experienced an explosion in growth over the past 27 years, a common occurrence with metropolitan areas in India. The rapid population growth is attributed to migration from other regions in the country, with migrants seeking business and employment opportunities.

Like many megacities in the developing countries, Mumbai the financial capital of India.The population of Mumbai has more than doubled since 1991, when the census showed that there were approximately 12.5 million people living in the area. The rapid expansion has led to serious health issues that have to be addressed by the government, and a large percentage of residents live in the city's slums

Here Mumbai City in Maharashtra, India is considered as case to study urban expansion and Land use, Land Change that took place over a span of 27 years. LANDSAT images of TM and ETM+ of Mumbai metropolitan region are used in this study. Satellite images have been used to identify different changes from 1990 to 2017. The study focuses on spatial aspect of Urban sprawl in Mumbai metropolitan region(MMR).

In this study, an attempt was made to understand the changing dynamics of land cover and land use in Mumbai city . CA Markov is used for modelling and predicting future urban growth in the region. Remote sensing data and GIS techniques were used as major tools in the study for extraction, monitoring and modelling the dynamics of rapid urbanization.

After Image processing classification has been performed to classify images in different Land

Use categories. The classification of image shows major change in residential areas. The information on urban sprawl, land use land cover change study is extremely useful to local government and urban planners for the betterment for future plans of sustainable progress of the city.

The paper examines urban growth pattern of Mumbai metropolitan area that includes Mumbai city. Urban growth analysis is carried out with modeling future growth pattern considering the current growth pattern and sprawl in the city.

Results show the change in land from 1990 to 2017 and mainly sprawling outward. Modelling using CA-Markov pointed out that urban growth to increase by 2030. The notable observation of our study is that urban growth would have an infill growth in the city completely and then starts sprawling outward and emphasises need for policy planners and urban managers to provide immediate interventions for infrastructure development necessary for sustainable growth of Indian urban agglomerations.

Keywords: Remote Sensing, LULC, Urban Sprawl , CA-Markov Model