

# Modeling Spatial Changes in Suburban Areas of Istanbul Using Landsat 5 TM Data

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**Key words:** Remote sensing; spatial changes

## SUMMARY

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**ABSTRACT**

Population of Turkey has been steadily increasing with a yearly average rate of 2.2 %. Urban population in different cities of Turkey is comparatively higher than suburban population like several other countries in the world. While the population in the urbanized areas was %24 in 1945, it increased to %58 in 1985 and reached to % 77 in 2012. According to the statistical studies realized between 1990 and 2010 the population increase was 2.9 % in urban areas whereas -0.75 % in rural areas. These population changes could not be described by only using birth and death rates since there is an important issue of rural exodus to larger metropolitans in Turkey. This migration has been causing abrupt land use/cover changes in the surroundings of metropolitans. It is not easy to solve this rapid urban spatial growth problem because of socio economic reasons. Istanbul, selected as the study area, is the biggest metropolitan city of Turkey covering a total area of ~ 57 500 km<sup>2</sup> and having a population of about 13.8 million according to the population census of 2012. It is among the most populated metropolitan cities of the world as well. Population of Istanbul was only 4.7 Million in the year of 1980. As a result of the rapid population growth and urbanization, the urbanized area has extremely expanded causing significant changes in land use/cover. City planners and policy maker's have been working on to evolve better strategic plans related to protection environment, infrastructure development and maintenance, and land development. Thus, they need to access to up-to-date base maps and systematic information on the land use patterns, environmental problems and infrastructure facilities. Multi-temporal remotely sensed data has been commonly used to determine land use/cover changes and their impact to environment. In this study, district based suburban land cover changes in Istanbul were determined and analyzed using Landsat 5 TM data obtained in 1987 and 2011. After conducting geometric correction, Landsat 5 TM images were classified into four major classes namely water, vegetation, urban and soil using supervised classification technique. The results of the study pointed out the land cover changes within 24 year period. Beside the highly urbanized areas, especially changes in the suburban areas have led to the establishment of new suburban areas. Impervious areas for each district were analyzed and distributions were calculated using spatial weight rate for Istanbul metropolitan.