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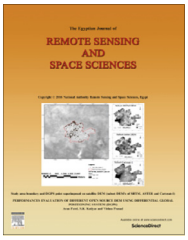

RESEARCH PAPER

Identification of land cover changes in the coastal area of Dakshina Kannada district, South India during the year 2004–2008

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KEYWORDS

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Abstract This study investigates land cover (LC) changes in the coastal area of Dakshina Kannada district in the state of Karnataka, South India, during the years 2004–2008 as a case study. IRS P-6, Linear Imaging Self Scanning sensor (LISS-IV) satellite images were used in the present work. Classification was carried out using artificial bee colony algorithm and support vector machine (SVM) which gave a better result compared to other traditional classification techniques. The best overall classification accuracy for the study area was achieved with an ABC classifier with an OCA of 80.35% for 2004 year data and OCA of 80.40% for 2008 year data, whereas the OCA in SVM, for the same training set is 71.42% for 2004 data and 71.38% for 2008 data on study area 1 and the results were optimised with respect to multispectral data. In study area 2, ABC algorithm achieved an OCA of 78.17% and MLC of 62.63% which was used to check the universality of the classifier. The classification results with post-classification technique for study area 1 indicate that urbanisation in the study area has almost increased twice. During the same time there is an increase in the forest plantation, agricultural plantation and a decrease in crop land and land without scrubs, indicates rapid changes in the coastal environment.

1. Introduction

Remote sensing (RS) data, with its ability for a synoptic view, repetitive coverage with calibrated sensors to detect changes, observations at different resolutions, provides a better alternative for the monitoring, modelling and management of natural resources and cultural processes as compared to the traditional methods (Bedawi and Kamel, 2010). Hence, in the above

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context, accurate image classification results are a prerequisite. The evolution of high end computing systems and the availability of data of higher resolution (spatial, spectral, radiometric and temporal) have made analysts to constantly explore the image processing and data mining techniques to exploit their potential in extracting the desired information efficiently from the RS data to improve classification accuracy. Moreover, obtaining satisfactory classification accuracy over urban/ semi urban land use/land cover (LU/LC) classes, particularly in high spatial resolution images, is a present day challenge.

Land cover change has become a central and important component in current strategies for managing natural resources and monitoring environmental changes. Land cover is defined by the attributes of the earth's land surface captured in the distribution of vegetation, water, desert and ice and the immediate subsurface, including biota, soil, topography, surface and groundwater and it also includes those structures created solely by human activities such as mine exposures and settlement (Lambin et al., 2003).

Land cover change is a dynamic process taking place on the bio-physical surfaces that have taken place over a period of time and space is of enormous importance in natural resource studies. Land cover change dynamics are important elements for monitoring, evaluating, protecting and planning of earth resources. Land cover changes are the major issues and challenges for the eco-friendly and sustainable development for the economic growth of any area. With the population explosion, human activities such as deforestation, soil erosion, global warming and pollution are very harmful to the environment. This causes land use/cover changes with the demand and supply of land in different activities. Change detection in land use and land cover can be performed on a temporal scale such as a decade to assess landscape change caused due to anthropogenic activities on the land. Land use/cover change is influenced by various natural and human activity processes. In order to improve the economic condition of the area without further deteriorating the bio-environment, every bit of the available land has to be used in the most rational way. This

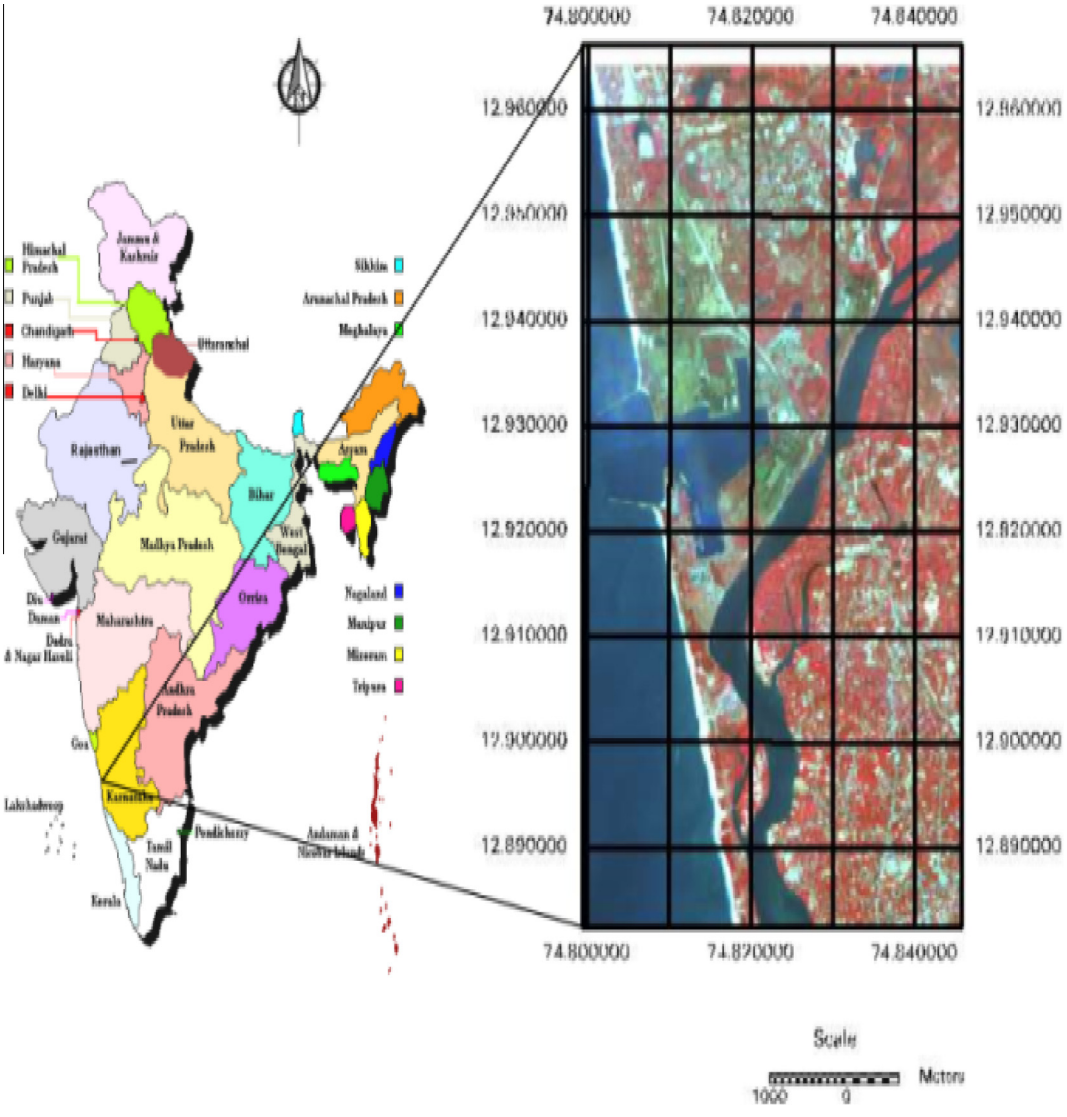

Figure 1 Study area: Mangalore coastal area, Karnataka, India.