

Vegetation response of Chennai City using Normalized difference vegetation index (NDVI) from Landsat images

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Abstract

Remote sensing can present an efficient and reliable means of collecting the information and with the multispectral sensors can provide information of about the health of the vegetation. The spectral reflectance of an area will vary with respect to changes in the crop type, health and growth. The study deals to calculate the NDVI (Normalized difference vegetation index) for the Chennai City using remote sensing technique by using open source Quantum GIS software. For this purpose Landsat ETM+ images of the year 1991 and 2006 was obtained for the study area. The NDVI values for the year 1991 vary from -0.31 to +0.42 and during 2006 it varies from -0.36 to +0.48.

Keywords: NDVI, GIS, ETM

1. Introduction

According to Wardlow et al., 2007 remotely sensed data are applicable, for practical purposes it is the temporal information been most useful for monitoring of major crop types. NDVI has been used extensively to measure vegetation cover characteristics, crop assessment studies (Bausch, 1993, Benedetti & Rossini, 1993, Hatfield et al., 1985). According to Rouse et al., 1974 the normalized difference vegetation index (NDVI) is a representative of the various spectral vegetation indices. According to Tucker, 1979 NDVI is the customary vegetation index used by many researchers for extracting vegetation abundance from remotely sensed data. According to Lillesand & Kiefer, 2004 and Wang et al, 2003, NDVI is a good indicator of the ability for vegetation to absorb photosynthetically active radiation and has been widely used by researchers to estimate green biomass.

2. Materials and Methods

For the present study Landsat ETM+ images of the year 1999 and 2006 was obtained for the study area from GLCF. The image was consists of seven band for this study the band 4 and 3 for year 1999 and 2006 were selected and analyzed according to the method adopted by Mariappan, 2010. These selective bands were imported to the Quantum GIS environment and by using simple raster calculator tool the spectral signatures were compared. The calculation of Normalized Difference Vegetation Index (NDVI) is done by using near-infrared (NIR) and visible (VIS) (Mariappan, 2010). The resultant obtained will be the single band dataset where the values will be ranging between -1.0 and 1.0 where lower values corresponds to built structures, barren areas of rock or sand, whereas moderate and high values represent sparse and dense vegetation (Esri, 2008).

3. Study area

Chennai is the capital city of the Indian state of Tamil Nadu. Located on the Coromandel Coast off the Bay of Bengal, it is a major commercial, cultural, economic and educational center in South India. It is also known as the "Cultural Capital of South India" (Kamath, R 2000).

4. Results and Discussion

The pixel values of the NDVI data layer range from -1 to +1. The higher NDVI values indicate increase in biomass per unit area and the layer is presented in Fig. 1. In this figure, the NDVI values for the year 1991 vary from -0.31 to +0.42. The NDVI values for the year 2006 vary from -0.36 to +0.48. The positive values represent different types of vegetation classes, whereas near zero and negative values indicate non-vegetation classes, such as water,

and barren land (Fig. 2). It has been noted that the values which are greater than 1 represent the low as well as the dense vegetation. In this data there is an

increase of vegetation cover during the year 2006 may be due the high rainfall in the study area.

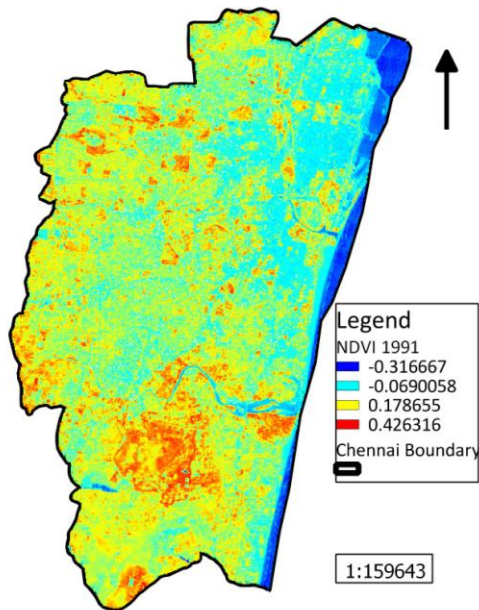


Figure 1. NDVI index during 1991

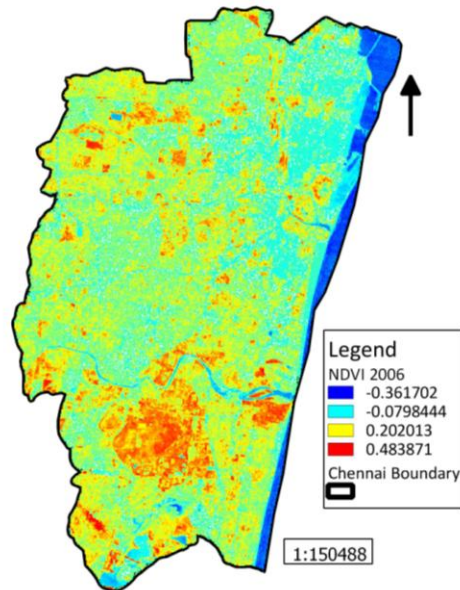


Figure 2. NDVI index during 2006

5. Conclusion

Remote sensing data are pretty good for classification of urban areas. An attempted has been made to classify the reflectance characteristics of remote sensing data by using open source Quantum GIS software. It has been noted that the values which are >1 represent the low as well as the dense vegetation. These data sets can provide base line details of the study area Therefore, the use of ancillary datasets in addition to remote sensing data has been recommended.

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