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Full Length Research Article

EVALUATING THE NORMALIZED DIFFERENCE VEGETATION INDEX USING LANDSAT DATA BY ENVI IN SALEM DISTRICT, TAMILNADU, INDIA

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ABSTRACT

The present study provides the Normalized Difference Vegetation Index of the study area. The main aim of this study is to evaluate the vegetation index using Lands at image. NDVI map prepared by using ENVI Image processing software. The study area NDVI map gives the Maximum value of 0.7 and Minimum Value of-0.06. The result depicts following types of vegetation index like Water bodies, Barren and Rocks, Shrub and Grass land, Moderate Green, Very green area, dense forests, Temperature and Tropical Rainforests. The NDVI cover type of water bodies are very less at the same time the Barren areas, Rock surface, shrub and Grass land are mostly occupying the Eastern part of the study area. Remaining cover types are occupying the highly elevated areas.

INTRODUCTION

The usage of Normalized Difference Vegetation Index study is numerous. But it is frequently used for monitoring drought, monitor and predict the agricultural production, vegetation monitoring from year-to-year and predicting hazardous fire zones. The present study deals about the vegetation index assessment for predicting the status of vegetation in salem district. The red and infrared bands enable to monitor density and intensity of green vegetation growth using spectral reflectivity of solar radiation. Greenness of the leaves generally illustrates better reflection in the NIR wavelength range than in visible wavelength ranges. When the leaves affected by water scarcity, diseases and dead, they turn into yellowish color, and it reflect less in the NIR range. The NDVI mapped depicts the single band data set for greenery. Peter H *et al*. (2004) revealed that NDVI method support to the Land-use change modeling. Daman Winter (2003) stated that a relative method of using NDVI has been developed for monitoring the presence and spread of cheat grass. Bran (1996) revealed that the NDVI illustrates the patterns of plant growth from green-up to senescence by indicating the quantity of actively photosynthesizing biomass on a landscape.

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Study Area

The study area bounded at north side of Nagaramalai hill, South side of Jarugumalai Hill, West side of Kanjamalai Hill, East side of Godumalai Hill,North East side of Shervaroy Hills and South West side of Kariyaperumal Hills. It is located in between Latitude 11°39’52” and Longitude 78°8’45” and total area covered by 5234km^2 (Figure 1). The average elevation is 278m (912ft). B.Gurugnanam *et al*. (2010) stated that the average rainfall of Salem district was less than 200 mm during 1998-2007. It was very less than actual rainfall. The actual rainfall of Salem districts is South West Monsoon545.8 mm and North East monsoon 564.2.

MATERIALS AND METHODS

Map preparation

Satellite data were collected from USGS website, this data has taken into the ENVI 5.1 Image processing software. Data were analyzed by using band matching techniques. The following formula used for the band matching techniques.

NDVI= (NIR- RED)/ (NIR+RED)

Or

Band 4 - Band 3 / Band4+Band 3

After the band matching process the data were compressed into a single band which is the NDVI band and it shows the NDVI values in-between -1 to +1.

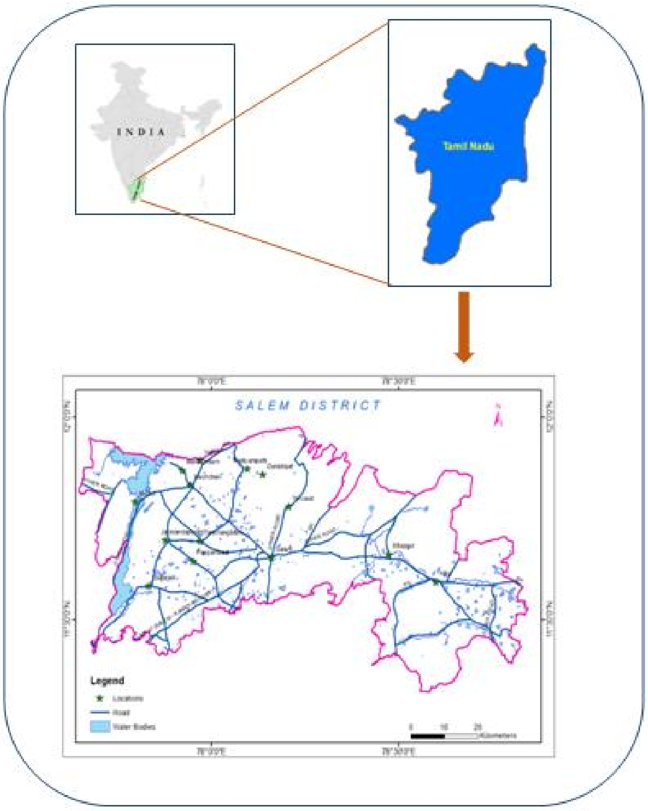
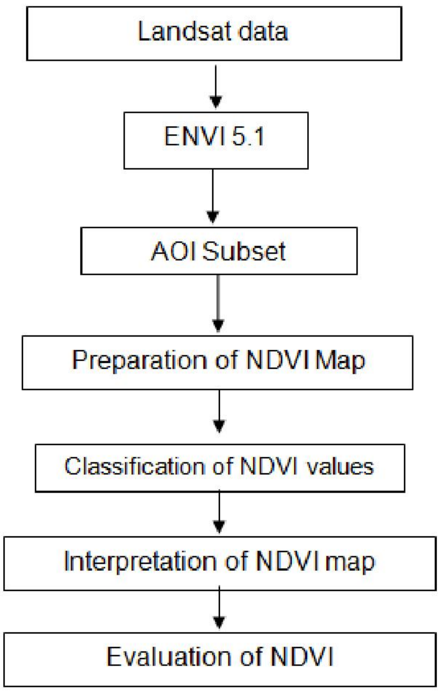


Fig. 1. Study Area

Normalized Difference Vegetation Index



RESULTS AND DISCUSSION

The NDVI attribute compare to the USGS value classification (Table -1) and (Holben, 1986). (Table -2)

The present study area gives the Maximum value of 0.7 and Minimum Value of – 0.06. According to the USGS NDVI values and (Holben, 1986) the study area covered the following types of vegetation index like water bodies, barren areas and rock surface, Shrub and Grass land, Moderate Green Areas, Very green areas, Dense forests, Temperature and Tropical forests.

Table 1.

s.no	Cover type	value
1.	Barren rock, sand, snow, water	0.1 or Less
2.	Shrubs and grasslands	0.2 to 0.5
3.	Dense vegetation	0.6 to 0.9

Table 2. Typical NDVI values for various cover types (Holben, 1986)

S.No.	Cover type	NDVI
1	Dense vegetation	0.7
2.	Dry bare soil	0.025
3.	Clouds	0.002
4.	Snow and ice	-0.046
5.	Water	-0.257

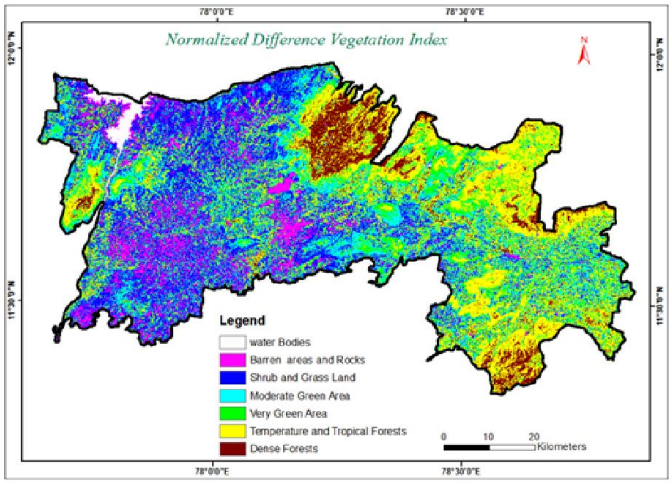


Fig. 2. Normalized Difference Vegetation Index

Table 3. Salem –NDVI Values and Cover type

S.No	Cover type	value
1	Water bodies	-0.06 to -0.35
2	Barren areas and Rocksurface	-0.35 to 0.078
3	Shrub and grass land	0.078 to 0.15
4	Moderate Green	0.15 to 0.22
5	Very Green Area	0.22 to 0.28
6	Temperature and tropical forests	0.28 to 0.45
7	Dense Forests	0.45 to 0.7

Conclusion

NDVI map is successfully prepared and Interpreted by using ENVI5.1 image processing software. In the NDVI map Water bodies (-0.06 to -0.35) in White tone, Amethyst tone is showing the Barren area and Rock surface (-0.35 to 0.078), Dark Blue tone is showing the shrub and grass land (0.078 to 0.15), Tourmaline Green tone is showing the Moderate Green area (0.15 to 0.22),Green tone is showing the Very Green (0.22 to 0.28), Yellow tone is showing the Temperature and Tropical Forests (0.28 to 0.45) and the Brown tone is showing the Dense Forests. Compare among the seven features of cover type water bodies are very less and the Barren areas, Rock surface, shrub and grass land are mostly occupying Eastern Side of the study area. Remaining cover types are occupying the highly elevated areas in Nagaramalai hill, Jarugumalai Hill, Shervaroy Hills, Kanjamalai Hill, Godumalai Hill, Kariyaperumal Hills. Based on this NDVI map we can identify the vegetation cover of the particular study area.

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