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Use of Landsat ETM+ Data for Delineation of Vegetation Cover Area in Akole Thasil

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***Abstract**: Increasing population and urbanization have reason significant impact on earth resources and Environment. One of the important characteristic at present intimidating the Vegetation land-use systems in Akole Thasil or regions is the expansion of urban with the rural areas in distribution of Vegetation lands and the connected organization problems of uncontrolled agricultural change. Population growth and huge migration from rural to urban areas has produced the loss of highly fertile agricultural lands. This paper converse a vegetation mapping methodology, applied to an optical sensors satellite Imagery (Landsat 7& 8 ETM+), using a hybrid approach in classifying vegetation class diversity of a study area. Even if there are the spectral limitations of satellite imagery, the power of this technology in analytical mapping can be completed more effectual using suitable ground data. A first step of this methodology is to decide the attendance and the vigor of vegetation by NDVI (Normalized Difference Vegetation Index). Finally, a hybrid approach based on included unsupervised, supervised classifications and expert knowledge is accepted.*

Key words: Landsat ETM+ data, Vegetation, GIS and Remote Sensing, Operational Land Imager, and Thermal Infrared Sensor, NDVI.

Introduction:

Land cover uses a large force on heaps of essential ecological series and as a result any change in it may have a visible impact on the environment al local to global scales, for example it form the highest danger to biodiversity[3]. One of the most general purposed of Remote Sensing is image classification for produced land use and land cover maps . LULC is a significant feature of the earth as it reflects the accessibility of resources at human removal. Because long land use and land cover classification methods simply relied on image interpretation of satellite imagery by specialist. But of late mechanical classification methods have changed. Mechanical classification algorithms with superior correctness have befallen more attractive to reduce the expenses of photo-interpretation. Hybrid classification is one such algorithm that combines the unsupervised and supervised techniques to classify an image. It combines the benefits of - unsupervised (Iterative Self Organizing Data Analysis Technique) being non-biased, statistical method to separate clusters. Followed by supervised this used the analyst's knowledge of area. There are more than one ways to perform a Hybrid classification. The current study aimed at mapping the land use and land cover in Vegetation's of the Akole Thasil Dist- Ahmednagar, M.S, India during an complete image classification technique to check the local natural resources (Vegetation's with general land used). Such a try appear to be sparse in the area chosen for this exacting study. Land use in primary indicator of the extent and degree to which man has modified the land resources. Land cover refers to natural vegetation water bodies rock and soil etc. the land use/land cover pattern of a region is dynamic. The general land use of a country at any particular time is determined by the physical economic and institutional frame work taken together. The land use and land cover change has become an important component in current strategies for managing natural resources and monitoring environmental changes. RS and GIS techniques are applied for data acquiring mapping and assessing the land use and land cover changes to the proper planning and sustainable development .

Study area :

Geographically Ahmednagar district is the largest district in the state of Maharashtra, divided into 14 Tahsil. One of the Akole Tahsil which is on the western Hilly region of Ahmednagar district, it is divided into 191 villages. Surrounded by Sangamner tahasil from East side, to the West side Thane district, to the North side Nashik district and in to the South direction Pune district. Well surrounded with the mountains range of Sahyadri in Western side. Akole Tahsil is located in $19^0$15' 14'' N to 19^0 44' 59'' N latitude and 73^0 37' 00''to 74^0 07' 24'' E longitudes (Map. No 2.1). Total Geographical area is 1, 49,990.31 hector

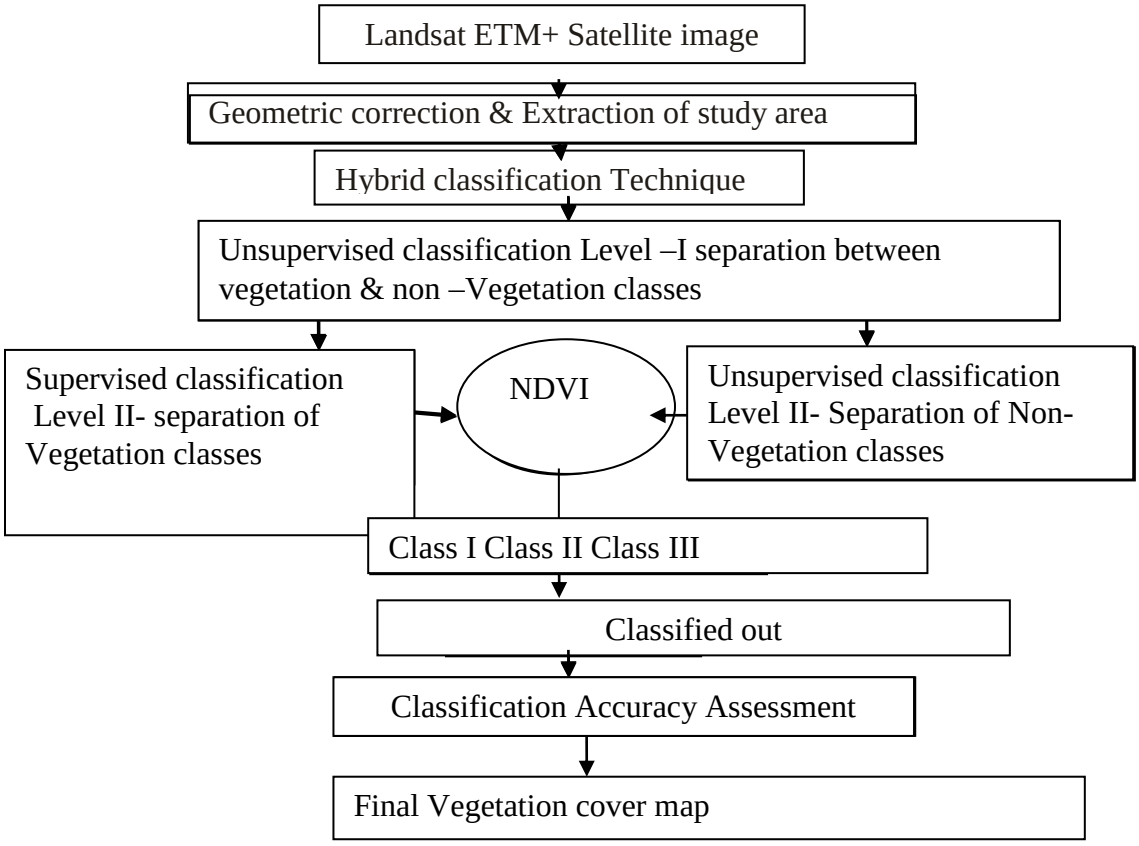
(1499sq.K.M). Total population of this Tahsil is, 2, 7, 7 1, 71 in 2011 Census year, out of 1, 01,966 (ST) Tribal population is in this study area show in map no 01.

Amis and objective:

The present paper is aimed at implementing the change detection method for understanding the land use/land cover change with the Spatial distribution of vegetation in Akole tahsil taken place over the period of first thirteen years of present century in period was 2001 to 2013. This has been achieved with the help of following objectives. First to a create land use/land cove mapping from satellite images. And second to find out the change spatial cover of Resourceful vegetation/Forest in the study area.

Data and Methodology: Satellite images of landsat are classified by using hybrid classification method and to check the accuracy of the land use/ land cover class with ground truth data before it can be used in scientific investigation and decision making polices (Jensen 2005)[7]. The accuracy of image classification was assessed using referenced and classified data. A random sampling technique was applied for collecting the ground truth data for accuracy assessment. Sample data, pixels collected for two ways, one for training base and the other for testing. The present study, a very detailed hybrid image classification system is benign adopted for mapping landsat data. The DEM based map depend on the SOI toposheets and create the change analysis and dispensation of the study area two images from the Satellite data (ETM+). Relationship of images and calculation of area under different land use/land cover categories with spatial a Vegetation cover area in the help of different images was done. In view of understanding the change in land use/land cover with the Vegetation in the study area, two satellite images viz. **LANDSAT 7:** Enhanced Thematic Mapper Plus images consist of eight spectral bands with a spatial resolution of 30 * 30 meters for Bands 1 to 7 he dated since Jan.2001. and **LANDSAT 8:** Operational Land Imager and Thermal Infrared Sensor images consist of nine spectral bands with a spatial resolution of 30*30 meters for Bands 1 to 7 and 9 he dated is Dec.2013 were compared with each other. The data base and Methodology display in chart no 01.

Chart No: 01 Methodology



DENSE VEGETATION/ FOREST:

Evergreen forest is high contrition with the distributed in this study area. Due to high rainfall distribution whereas the western part. But eastern part deciduous type forest is distributed due to less distribution of rainfall. In this study area 32.7784596 sq.km areas under forest in 2001. The density of forest is more in the especially Western, northwest and southwest. In 2013 had 181.5750667 sq. K.M forest areas was increased period of 2001-2013 **(**148.7966071sq.K.m**)**. Because the western, north, south, parts under the tribal area and hilly area as well as the good governmental polices apply and good defense of forest area in local with forest officers. And large amount of contribution to the local peoples, Forest department for increased forest area.

SHRUBS OR LOW VEGETATION/FOREST:

In 2001 low forest covered is only 561.7124692 sq.km area. But in 2013 covered area is (289.2114066sq.K.m) this ratio is negative changed of area from2001 to 2013 because of vegetation cutting down the so much purposes like agricultural, forest industries, Settlements etc. this types forest covered area is in side of Pravara river of eastern parts.

SPARSE VEGETATION/ FOREST:

In 2001 sparse forest covered only 55.2951092 sq. k.m areas the western, north and southern part of study area is covered by sparse forest types. But in 2013 covered areas is 83.15466667 sq. k.m but this ratio is positive change between the 2001 to 2013 periods (27.85955745aq. K.M**),** because of good contribution of forest departments, local people and apply government policies in this area. Above all detail in formation shows in the table no 01 and map no3, 4, 5.

DEM AND VEGTAION/ FOREST

The digital elevation model (DEM) he used the spatial relationship between sea level height and vegetation distribution with relation in rainfall. The western, North and south part of area more than 1210 meters elevation thus this said a dense vegetation area because of high rainfall destruction . The eastern side declining heights due to lowest vegetation cover area. And another side of pravar river vegetation is available. 400-435 meter elevation height this area well agricultural activity development in eastern side of study area. Low forest is maximum covered area is Mula and Pravar river side with low level of elevation because of good conduction of agricultural activity with the settlement development. This all information related show in map number 2 to 4.

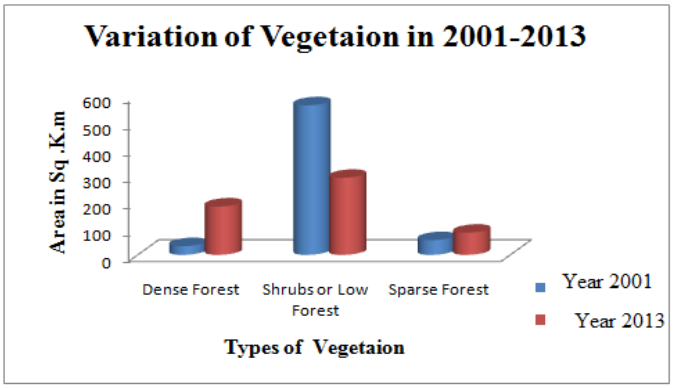
Out of total geographical area of 149942.43 hectare in 2001 and 2013, about 43.33 % (dense forest 2.18, sparse forest 3.69 and shrubs or low forest area is 37.46%) and 36.94 % (dense forest 12.11, sparse forest 5.54 and shrubs or low forest area is 19.29%) under forest respectively. The zones of forest area stretch in mostly North West and south direction (Table no. 1 and Graph. no 1). Owing to low rainfall, forests are rarely found in the east of Tahasil. Comparatively 2001 to 2013, dense (9.92%) and sparse forest (1.86%) area is increase but shrubs and low forest area (-18.18%) is decrease in the Tahasil. Important variety of forest is 'sag' (Teak) trees. Some villages are directly depends on the forest for their livelihood. People collect forest leaves (Sal leaves), honey and other products and sustain their livelihood. Recently it is observed that, some villages have new man made forest (eucalyptus). The ecologically sensitive resource has been decreased due to conversion of agricultural lands for settlements and new roads. Forest cover decrease from 2001 (43.33 %) to 2013 (36.94 %) are shows in the table 1, and map 2 to 4.

Table No: 01Types of vegetation with area

Sr.no	Types of vegetation	Area in 2001 In Sq. KM	Area in 2013 In Sq. KM	Change in 2001 to 2013 (Sq. KM)
01	Dense Forest	32.7784596	181.5750667	148.7966071
02	Shrubs or Low Forest	561.7124692	289.2114066	-272.5010626
03	Sparse Forest	55.2951092	83.15466667	27.85955745

(Source: Satellite Data 2001 and 2013)

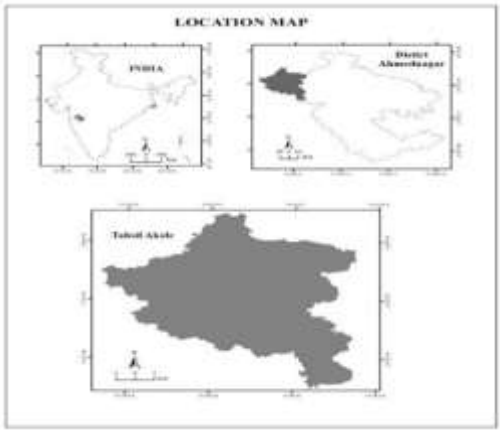
Graph No: 01 Variation of Vegetation



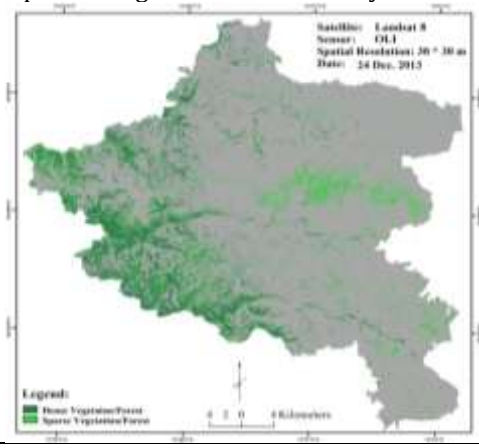
Conclusion:

The positive growth is observed in built up land, Water bodies, pasture and agriculture land. Barren Land and Shrubs or Low Forest land is decreased and positive position of Dense, Sparse Vegetation cover area in during the span of thirteen years. Good environment conduction or level for the dense and sparse vegetation. The first positive growth is agriculture land and second rank is dense forest. This study show a vegetation cover mapping methodology that tell the reflectance information controlled in ETM+ multispectral imagery to usually established ecological classifications. Remote sensing has established an important donation to vegetation mapping and to understanding of terrestrial ecosystem function, primarily during relationships between reflectance and vegetation structure.

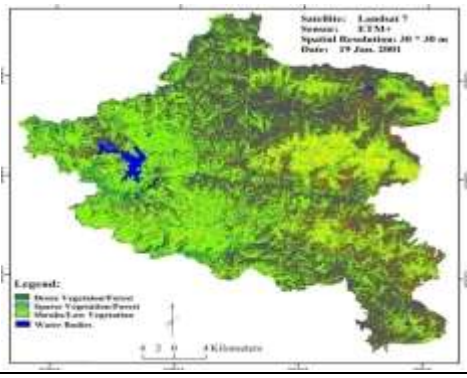
Map no 1: Location map



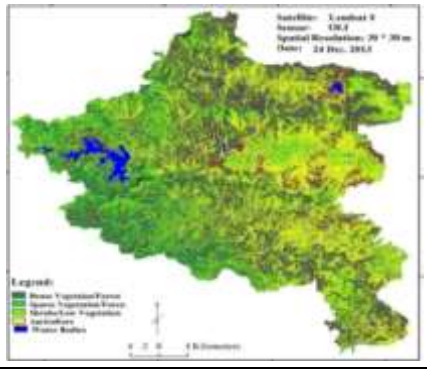
Map no 2: Vegetation area in study area



Map no 03



Map no 04



REFERENCES:

1. Aditi Sarkar, et al.,.(2014) Natural resource mapping using hybrid classification approach: Case study of Cooch Behar District, West Bengal" international journal of Geomatics and geosciences. Volume 4, No 3, Pp 499-507
2. Caprioli M., Leone A., Ripa M.N., Tarantino E (2003) A hybrid land cover classification of lands at 7 ETM+ data for an efficient vegetation mapping."Pp451-460
3. Chapin F.S. III., Zavaleta E.S., Eviner V.T. et al., (2000), Consequences of changing biodiversity, Nature, 405, pp. 234-242.
4. Gadekar Deepak Janardhan (2016) A Hybrid Land Cover Classification of Landsat-7 & 8 (OLI) ETM+ Data for Resourceful Vegetation Mapping - Akole Thasil Dist- Ahmednagar, M.S, India, American International Journal of Research in Humanities, Arts and Social Sciences, vol.13, Issue 03 Pp217-221.
5. Gadekar Deepak Janardhan (2019) A Micro Level Study of Sex Ratio in The Akole tahsil of Ahmednagar District, Maharashtra., Research Journey International E- Research Journal, Issue 100, Pp 143-147.
6. Gadekar Deepak Janardhan (2015), Application of RS and GIS in Land use / Land cover Pattern, Akole Tahsil of Ahmednagar District, MS., India, Global Academic Research Journal International, vol.2,Issue5,Pp 4-11.
7. Gadekar Deepak Janardhan (2016) A Temporal Study of Human Resources Development in the Akole Tahasil, International Journal of Research, Volume 3, Issue 5, Pp 273-280.
8. Gadekar Deepak Janardhan (2018) Level of Human Resources Development in the Akole Tahsil District- Ahmednagra Maharashtra" Unpublished Ph.D thesis, Savitribai Phule Pune University.
9. Gadekar Deepak Janardhan (2019) Regional Disparities of Woman Resources in the Akole Tahsil, District Ahemdnagr Maharashtra State, India. Online International Interdisciplinary Research Journal, Volume-09, Special Issue 02, Pp94-99.
10. Gadekar Deepak Janardhan (2020), A Study of Chemical Characteristic of Pravara River, In Different Sites – Ahmednagar District, Maharastra , India, Our Heritage, Vol.68 Isuue.1 Pp 4977-4988.
11. Hangaragi(2011) Assessment of land use and land cover change in Bagalkot district of Karnataka. The Goa Geographer Vol.III,No.1.P/p 20-27.
12. Jadhav and Nagarale (2014) Application of RS and GIS in land use/ Land Cover pattern of pati Circle, Khed Taahsil , Pune District, Maharashtra.
13. Kale N.P & More J.C (2015) "Hybrid classification of land use land covers in change detection of upper ghod basin in pune (Maharashtra) using remote sensing techniques " MBSP-Vol32No-01 Pp 09-16.
14. Narayanakumar Rand Kumaraswamy K.(2006)Land use and Land cover in Oussudu lake environs a remote sensing based study. The Deccan Geographer.Vol.44 No.1 Pp 43.
15. Gadekar Deepak Janardhan (2019), A Micro Level Study of Sex Ratio in The Akole tahsil of Ahmednagar District, Maharashtra. Research Journey International E- Research Journal, Issue 100,Pp 143-147.