ISSN Print: 2394-7500
ISSN Online: 2394-5869
Impact Factor: 5.2
IJAR 2016; 2(3): 220-222
www.allresearchjournal.com
Received: 21-01-2016
Accepted: 23-02-2016

B Sridhar
Department of Geo-Engineering, Andhra University, Visakhapatnam, Andhra Pradesh, India.

E Srinivas
Department of Geo-Engineering, Andhra University, Visakhapatnam, Andhra Pradesh, India.

G Sakram
Department of Applied Geochemistry, Osmania University Hyderabad, Telangana, India

Correspondence
B Sridhar
Department of Geo-Engineering, Andhra University, Visakhapatnam, Andhra Pradesh, India.

Remote sensing and GIS for mapping and monitoring land use/ land cover in and around Hazira coastal area, Gujarat, India

B Sridhar, E Srinivas, G Sakram

Abstract
Coast is area where the Space, land and water meet. Coastal zone is dynamic in nature compare to other terrestrial areas. Because of natural resources, high productivity of its ecosystems and national and international trade route, it invites human induced developmental activities. Of Exploitation of limited and unique coastal resources for development, Pollution generated and vulnerability of the coast to the natural hazards require the use of coastal zone in integrated and sustainable manner. The developmental activities are varying spatially and temporally. Remote sensing because of synoptic, repetitive and multi – sensor capabilities, becomes an important tool for mapping and monitoring the natural and man – made changes. In the present study, Hazira region of Chorasi Taluka of Surat district in South Gujarat selected for preparing model for coastal landuse / land cover changes. This area witnessing very high growth rate because of off and on – shore developmental activities. IRS P6 Liss–III date remote sensing data is used for validation of this model. Validation of the model was carried out using satellite data of the year 2014. This model can be used for monitoring the landuse changes occurring during the developmental processes and it can be used for the development of any coastal area in sustainable, integrate manner.

Keywords: Hazira Coastal area, landuse/land cover, Liss III

1. Introduction
India has a coastline of about 7500 km including that of its islands territories. Coastal zone in India assumes its importance because of high productivity of its ecosystems, concentration of population, exploitation of natural resources, discharge of waste effluents, increasing load of harbour, spurt in recreational activities and above all petroleum exploration activities (Chauhan *et al*. 2004). Thus, there is a need to protect coastal environment while ensuring constant production and development. Coastal areas can be used for more than one use and many a times, interest conflicts with each other among user. Thus, activities listed above and other anthropogenic activities disturb the fragile ecosystems and jeopardize the sustainability of the coast. As coastal land is limited it should be used optimally and development should be done in integrated manner. To maintain the sustainability of the coast there should be some guiding and controlling mechanism for protection of coast. In addition to this, coast is also susceptible to natural hazards like cyclone, tidal storms, etc. These can cause the loss of human life and economic losses. Applying some guiding and controlling mechanism this also can avert. Thus moving from unplanned to plan sustainable coastal zone in integrated manner requires the present status of the development and history of the development. Remote sensing Analysing the remote sensing data of more than 20 years and integrating other non – spatial data industrial development stands as major driver of the landuse land cover information. Using this inputs predictive model has been attempted which gives the future scenario of the area spanning 5 to 10 years.

2. Location of the Study Area
Hazira is a town and a transshipment port in the Surat district in the Gujarat state in southwestern India. Hazira is one of the major ports of India and the most important element of Surat Metropolitan Region. It is known as the industrial hub of India. The town is located on the bank of the Tapti River, eight kilometres from the Arabian Sea. It is a centre for health tourism due to its natural springs, and a base for major industrial. The study area is between 21 5'0" and 21 15'0" of north latitude and between 72 35'00" and 72 45'00" of east longitude

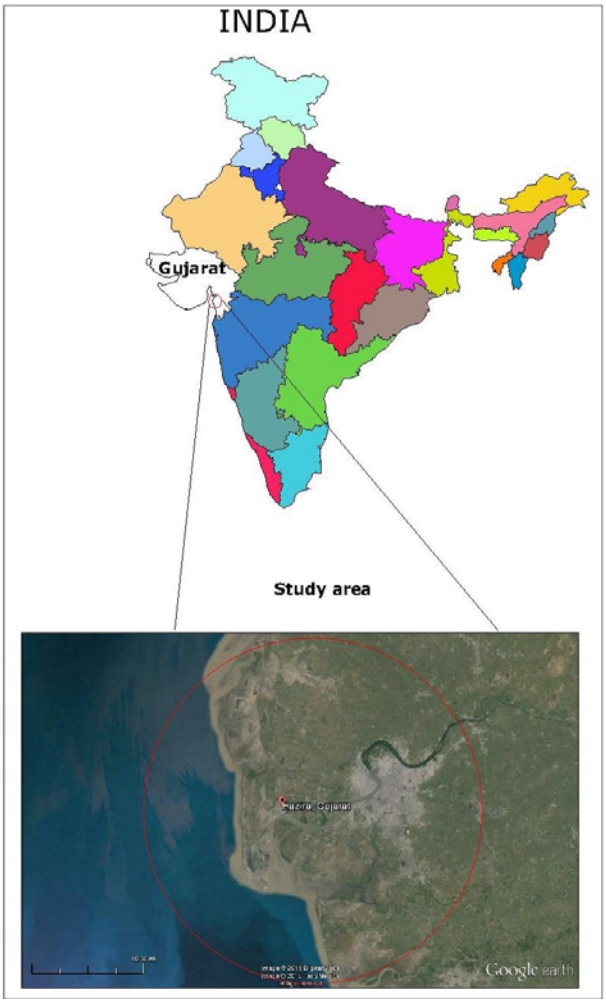

Fig 1.1: Location Map of the study area

3. Materials and Methods

The following materials were used for the present study IRS P6 LISS III digital data of May 2014 and Survey of India toposheets No: 46C/12and 46C/16. As the digital data did not have any real earth coordinates, data were geometrically corrected using ground control points viz. road-road intersection, road-rail intersection, canal-road intersection, etc. were taken from the toposheet using ERDAS IMAGINE 8.5 image processing package. False Colour Composite of the Hazira was generated with the band combinations of 3, 2, I in Red Green Blue LISS III data (Fig. I.2). the displayed image with the above classes was spectrally enhanced by histogram. Equalization method. Laud use land cover map of hazira was then prepared by on-screen visual interpretation method using ERDAS IMAGINE 85.

Different land use/land cover classes like agriculture, settlement with vegetation, fallow land, Mangroves, Water Body etc. were then identified using visual interpretation keys such as colour, tone, texture, pattern, size and shape Land/land cover map with the above classes was then transferred to base map of 1:50,000 scale, which was used for ground truth collection. Based on the ground truth data, land use/land cover map of Hazira and its surroundings were corrected and finalized.

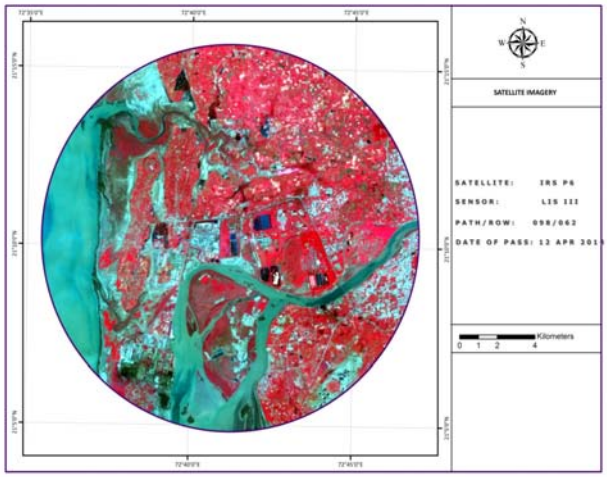

Fig 1.2: IRS P6 LISS III satellite imagery of the study are

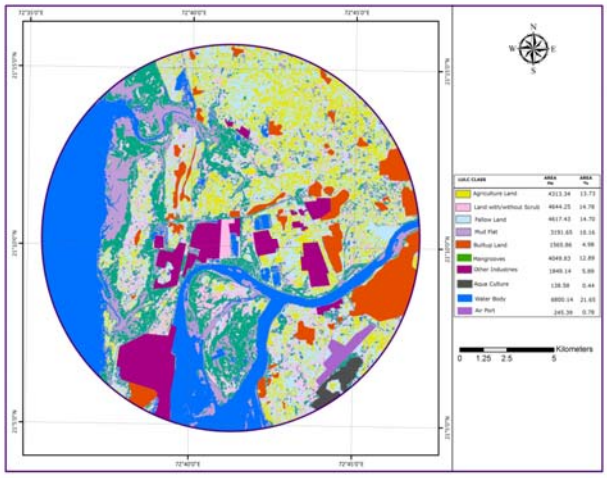

Fig 2: Classified Land use and land cover map of the Study Area

4. Results and Discussion

Land cover mapping serves as a basic inventory of land resource. For all levels of government, environmental agencies and private industry throughout the world [9] Hazira is being of the important industrial area in India and areas of rapid developments, there is a need for real time monitoring of the land based changes. In the present study, 31,415.61Ha area in and around Hazira was selected to delineate the present overlay of land use/land cover changes. The various features in the study area was depicted using the visual interpretation of the satellite imagery IRS P6 e and was described with the area coverage. Land use classes can be effectively delineated from the digital remote sensing data [10].

The study revealed that nearly 4313.34Ha of the area was covered by agriculture, 1565.86 Ha of the area covered with settlement, Fallow land 4617.43Ha, Mangroves 4049.83Ha, Land with/without Scrub 4644.25, Water body 6800.14Ha, Land use/ land cover map of the study area was shown in Fig. 2. The classified image map of the study area (In and around Hazira) showed that most of the lands were used for agricultural purposes.

Table 1: Areal extend of different land use/land cover features

Name of the features	Total area(Ha)	Area %
Agriculture land	4313.34	13.73
Mad Flat	3191.65	10.16
Mangroves	4049.83	12.89
Fallow land	4617.43	14.70
Land with/without Scrub	4644.25	14.78
Built up land	1565.86	4.98
Other industries	1849.14	5.89
Water body	6800.14	21.65
Aqua culture	138.58	0.44
Airport	245.39	0.78

5. Conclusion

The present study revealed using the satellite imagery confirm that Hazira and its surroundings up to10 km circle still retain more agricultural land when compared to all other land use/land cover features, though the rate of conversion of agricultural land for other purposes like industries and building construction were increased alarmingly for the past few years. The present study also found that remote sensing coupled with GIS can be effectively used for real time and long ten monitoring of the environment. The baseline information generated on land use/land cover pattern of the area would be of immense help in formulation of policies and programmes required for developmental planning.

6. Acknowledgments

The authors express gratitude to the Head, Department of Geo Engineering, Andhra University, and Visakhapatnam for providing necessary laboratory facilities.

7. Reference

1. Nagamani K, Ramachandran S. Land use Land Cover in Pondicheny using Remote Sensing and GIS. In the Proceedings of the Third International Conference on Environment and Health held Chennai, India, 2003, 300-305.
2. Bhat NK, Suleiman MK, Abdal M. Selection of Crops for Sustainable Utilization of Land and Water Resources in Kuwait. World Journal of Agricultural Sciences. 2009; 5(2):201-206.
3. Ram B, Kolarkar AS. Remote sensing application in monitoring land use changes in mid Rajasthan. International Journal of Remote Sensing, 1993; 14(17):3191-3200.
4. Kumaraswamy K, Narayanakumar R. Thrust areas of research and applications of remote sensing. In National Workshop on remote sensing for Environmental Studies, Bhararhidhasan University, Tamilnadu, 2005, 36-50.
5. Nagamani K, Ramachandran S. Land use Land Cover in Pondicheny using Remote Sensing and GIS. In the Proceedings of the Third International Conference on Environment and Health held Chennai, India, 2003, 300-305.
6. Navalgund RK, Jayaraman V, Roy PS. Remote sensing application: An overview. Current Science 2007; 93(12):1747-1766.
7. Chaurasia R, Closhali DC, Minakshi Shanna PK, Kudrar M, Tiwari AK. Land use change analysis for agricultural management- a case study of Tehsil Talwandi Sabo, Punjab. Journal of Indian Society of Remote Sensing. 1996; 24(2):115-123.
8. Kasturirangan KR, Aravamudan BL, Deekshatulu George Joseph, Cbandrasekhar MG. Indian remote sensing satellite (IRS)-1 C, the beginning of new era. Current Science, 1996; 70(7):495-500.
9. Vijith H, Satheesh R. Evaluation of Land use Pattern and Geomorphology of Parts of Westem Ghats using IRS P6 LISS III Data. IE (I) Joumal-AG, 2007; 88:14-18.
10. Ram B, Kolarkar AS. Remote sensing application in monitoring land use changes in mid Rajasthan. International Journal of Remote Sensing. 1993; 14(17):3191-3200.
11. Navalgund RK, Jayaraman V, Roy PS. Remote sensing application: An Overview. Current Science 2007; 93(12):1747-1766.
12. Navalgund RK, Jayaraman V, Roy PS. Remote sensing application: An Overview. Current Science, 2007; 93(12):1747-1766.
13. Navalgund RK, Jayaraman V, Roy PS. Remote sensing application: An Overview. Current Science 2007; 93(12):1747-1766.
14. Vijith H, Satheesh R. Evaluation of Land use Pattern and Geomorphology of Parts of Westem Ghats using IRS P6 LISS III Data. IE (I) Joumal-AG. 2007; 88:14-18.
15. Jayakumar S, Arockiasamy DL. Land use/Land Cover Mapping and Change Detection in Part of Eastern Ghats of Tamilnadu using Remote Sensing and GIS. Jourual of the Indian Society of Remote Sensing. 2003; 31(4):251-260.
16. Kachhwala TS. Temporal monitoring of forest land for change detection and forest cover mapping through satellite remote sensing. In the Proceedings of the 6th Asian Conference on remote sensing, Hyderabad 1985; 77-83:58.
17. Madan K, Usha Natesan M, Rajeudran S. A study on the dynamic changes of land use/land cover for Muthupet wetland using remote sensing and geographical information system. Groundwater Journal, 2006; 14(3):53-57.