SAJTH, January 2017, Vol. 10, No. 1

Identification of Tourism Sites and a Study on Geographical Features of Visakhapatnam District using Remote Sensing and GIS Techniques

L. NARENDRA KUMAR* and CH. RAMESH NAIDU**

*L. Narendra Kumar, PG Student, Gayatri Vidya Parishad College of Engineering, Visakhapatnam-
** Ch. Ramesh Naidu, Professor, Department of Civil Engineering, Gayatri Vidya Parishad College of Engineering, Visakhapatnam

ABSTRACT

Tourism industry development is one of the best ways to increase the economy from a small region to country. The development should be possible if the existing tourist spots are identified. Geographical features are one of the important factor to identify and proposal for new tourism spots. Remote Sensing (RS) integrated with Geographical Information System (GIS) is an effective tool for the tourism applications. GIS technology is an efficient one for generating inputs for tourism development. Visakhapatnam district is selected for the present study. Using various GIS tools, image processing techniques tourism sites are identified. Geographical features are digitized using TOPO sheets and satellite images with the help of GIS. Thematic maps are generated which are useful for new tourism site development.

KEYWORDS: *Tourism, GIS, Remote Sensing, Thematic Maps*

Introduction

All the human beings in the world are very much interested to enjoy the nature's beauty and they appreciate the nature's beauty from the bottom of their heart. This is the reason why since from olden time's travelers and discoverers took the journeys all over the world to find the new spots. This has given a birth to the new type of industry called tourism. Their job is to find the new places and makes the people closer to the nature for recreation providing every facility and comfort. This natural scenery, cultural heritage helps for the development of area though promotion of tourism. Now around the world tourism has become a major aspect for the growth of the any country economy. In India special importance has given for tourism industry. Government of India encourages finding and developing new tourism spots which are very much helpful to the people for the recreation and the government to increase the revenue generation which leads to growth in the economy of country.

As the technology keeps on changing in every aspect different tools are used in different disciplines for different applications. RS and GIS is one among them. This tool is used in many disciplines like urban planning, watershed management, coastal zone management etc. But it is limited and rare one in tourism applications as compare to other. So an attempt was made by identifying sites and geographical

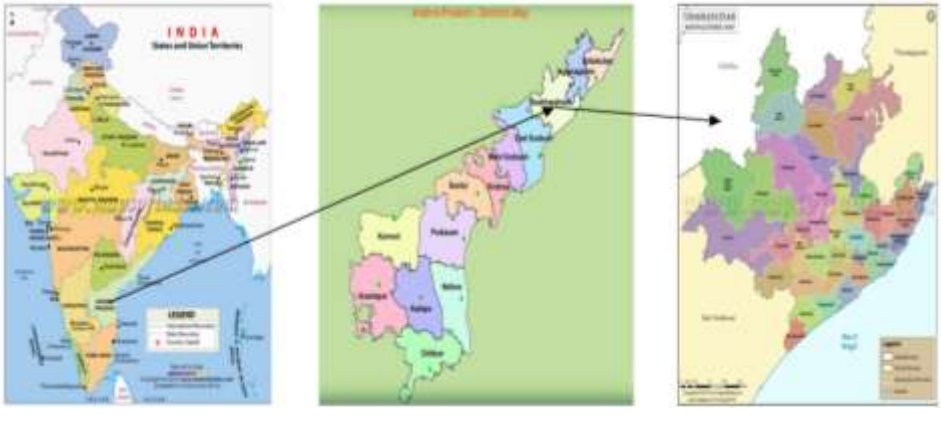
features of the Visakhapatnam district using RS and GIS technique for the tourism development.

Study area

Study area is Visakhapatnam district. It is one of the coastal districts in Andhra Pradesh state, India. The district lies in between 17°-15' and 18°-32'in Northern latitudes and 81°-54' and 83°-30' Eastern longitudes.

Visakhapatnam city is the one of the biggest industrial city in Andhra Pradesh after Hyderabad. After the bifurcation of the Andhra Pradesh state Visakhapatnam city is the main source of revenue generation for the state. The district is famous for tourism, because it has the coastline of 132 kilometers. It covers with Eastern Ghats from north-east to south-west direction, hills are spread over the district in north side and plains are from east to south. Geographical boundaries of the district are Bay of Bengal in the East, Orissa state in the west, some part of Orissa state and some part of Vizianagaram district in North side and East Godavari district is in South. Total area of the district is 11,161 square kilometers.

Figure 1: Study area (Visakhapatnam District)



Methodology

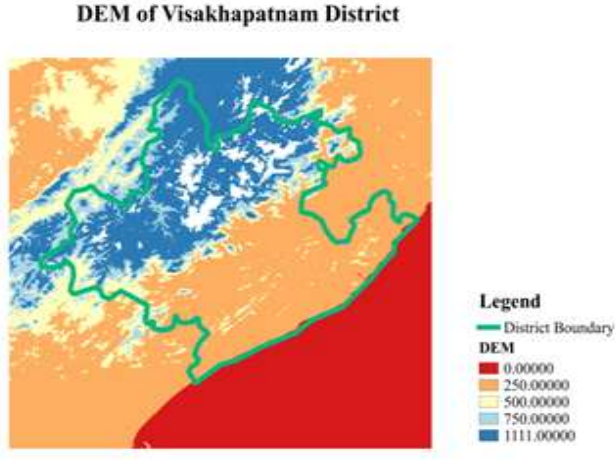
The Topographic sheets of open series are collected from the Survey of India (SOI), related to the study area, which is of scale 1:50000. A sample Topographic map is shown in figure 2. All the Topographic sheets are geo-referenced and clipped using ERDAS software. Geo-referencing process was done with chosen projection as Geographic (Lat/Lon). Inquire box method is used for clipping (sub-setting) the topographic sheets. Mosaic operation is performed for merging the Topographic sheets. Digitization process is carried out for boundary creation and geographical features like roads, rivers, water bodies and settlements using Q GIS with a tolerance of 10 pixels.

Digital Elevation Model (DEM) was downloaded from the website http://srtm.csi.cgiar.org which is shown in the figure 3, with the District Boundary and Elevations. Elevations of an area play a key role in development of a new tourism spot. So Digital Elevation Model (DEM) is much needed one for the study. By using Digital Elevation Model (DEM) contours are generated in Q GIS with an

interval of 10 metres. Slope of the study area was also generated using the DEM in Q GIS.

Figure 2: Sample Topographical Sheet of study area

Figure 3: Digital Elevation Model (DEM) of Visakhapatnam District

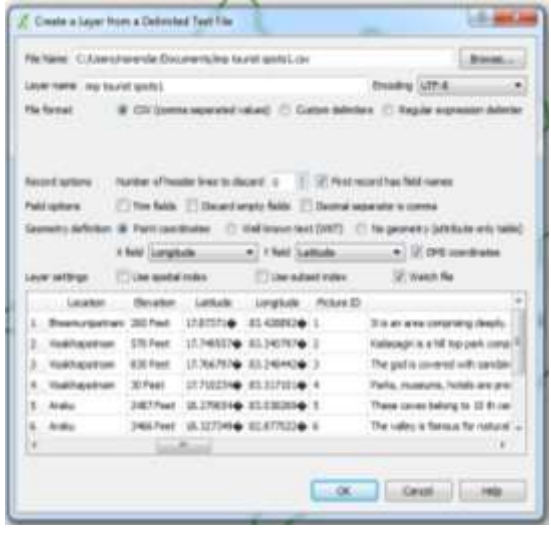


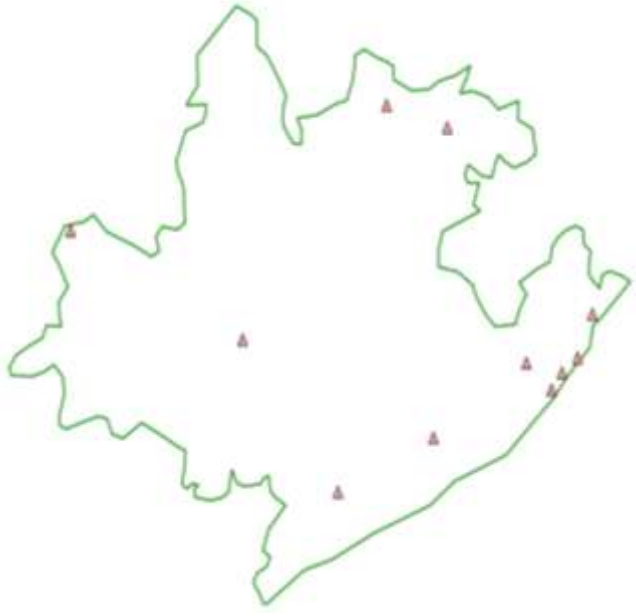
Tourism information was collected from Andhra Pradesh Tourism Development corporation limited (APTDC) and other departments in the district. All the tourist spot information is also collected by ground visit using hand held Global Positioning System (GPS). The location information was recorded the GPS instrument including latitude, longitude and elevation. Photographs and history of the tourist spots were taken by the maintaining bodies and from local people. The locational information recorded in GPS was imported into Q GIS (shown in figure 4) which is useful for identifying tourist spots and it is converted into kml format to verify on Google map. An example of tabular form with important tourist spot details in the district is shown in Table 1.

Table 1: Some of the important Tourist spots in the Visakhapatnam District

Sl.no	Name of the Tourist spot	Location	Elevation	Latitude	Longitude	Picture ID	About the Tourist Spot
1	Red Sand Hills	Bheemunipatnam	260 Feet	17.873710°	83.428892°	1	It is an area comprising deeply. gullied red sand dunes along the sea coast
2	Kailasagiri Hill	Visakhapatnam	570 Feet	17.749557°	83.340797°	2	Kailasagiri is a hill top park comprising 380 acres which overlooks beach and city
3	Laxmi Narasimha Swamy Temple	Visakhapatnam	830 Feet	17.766790°	83.248442°	3	The god is covered with sandalwood paste throughout a year and can be seen without paste for only 12 hours per year.
4	Rama Krishna Beach	Visakhapatnam	30 Feet	17.710234°	83.317101°	4	Parks, museums, hotels are present across the beach.
5	Borra Caves	Araku	2487 Feet	18.279654°	83.038269°	5	These caves belong to 10 th centuries and water drops fallen from top of the cave, and R. Gosthani flows down the caves.
6	Araku Valley	Araku	3466 Feet	18.327349°	82.877522°	6	The valley is famous for natural beauty with waterfalls, caves and coffee plantations.
7	Etikoppaka	Etikoppaka	83 Feet	17.486844°	82.747030°	7	Famous for Wooden Dolls
8	Kondakarla ava	Kondakarla	103 Feet	17.605000°	83.000833°	8	It is a natural lake which attract birds from far places
9	Lambasingi	Lambasingi	2748 Feet	17.818596°	82.492196°	9	Temperature touches 1^{0} during winter season.
10	Sileru Dam	Sileru	1368 Feet	18.054293°	82.035136°	10	Very good for botanical tour .the journey is through thick forests and hills.

Figure 4: Identification of tourism spots in the district on a district boundary using Q GIS





Results

In this study contour map is generated with an elevation of 10 metres is shown in figure 5, a total of 153870 elevation features were generated, the maximum elevation is 1460 metres. Slope map was categorized into 3 classes for the study area i.e Plain, gentle and steep slope shown in figure 6. Digitization of roads, settlements, rivers and water bodies is shown in figure 7. NH – 16 is the National Highway which runs in the district of 135 kilometers. Machkhund, Tandava, Varaha and Gosthani are the major rivers flows in the district.

Figure 5: Contours of the study area

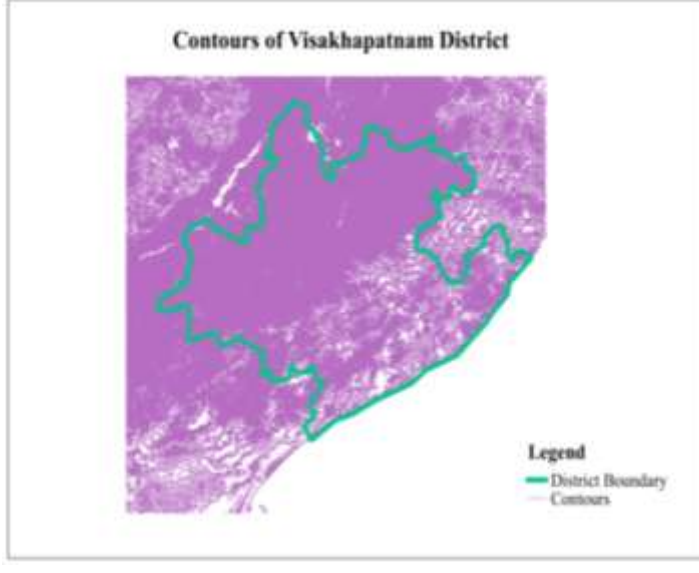


Figure 6: Slope map of the study area

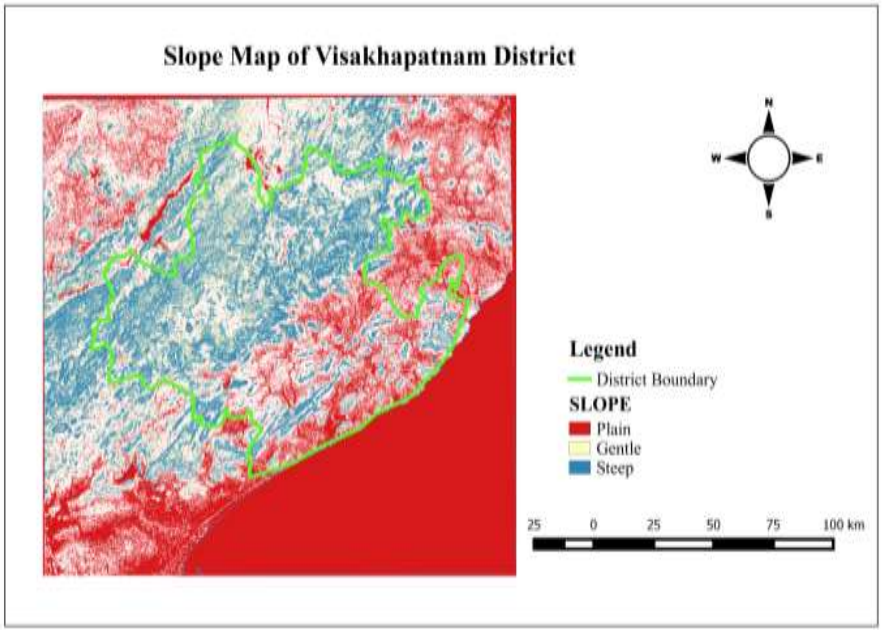
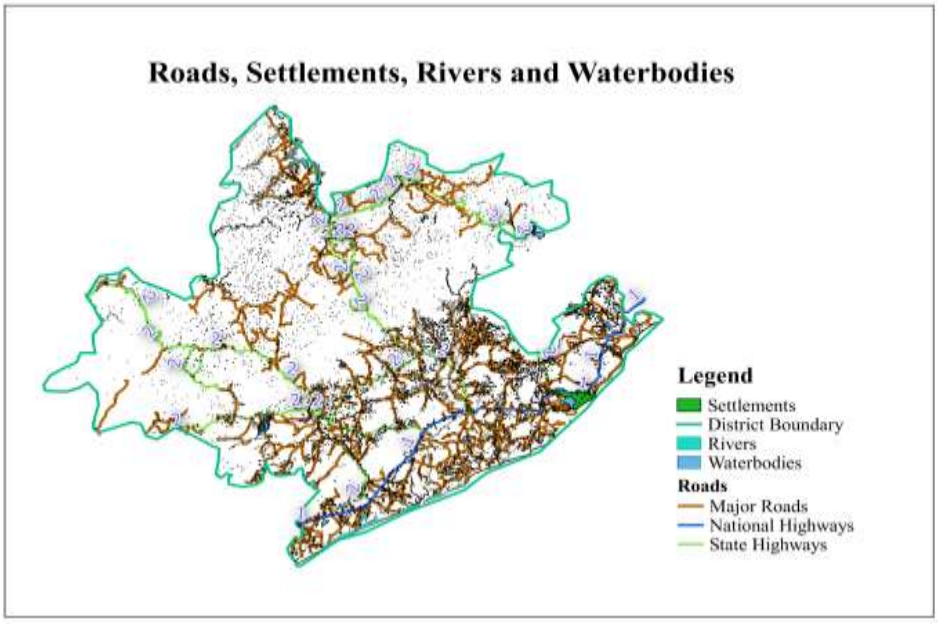
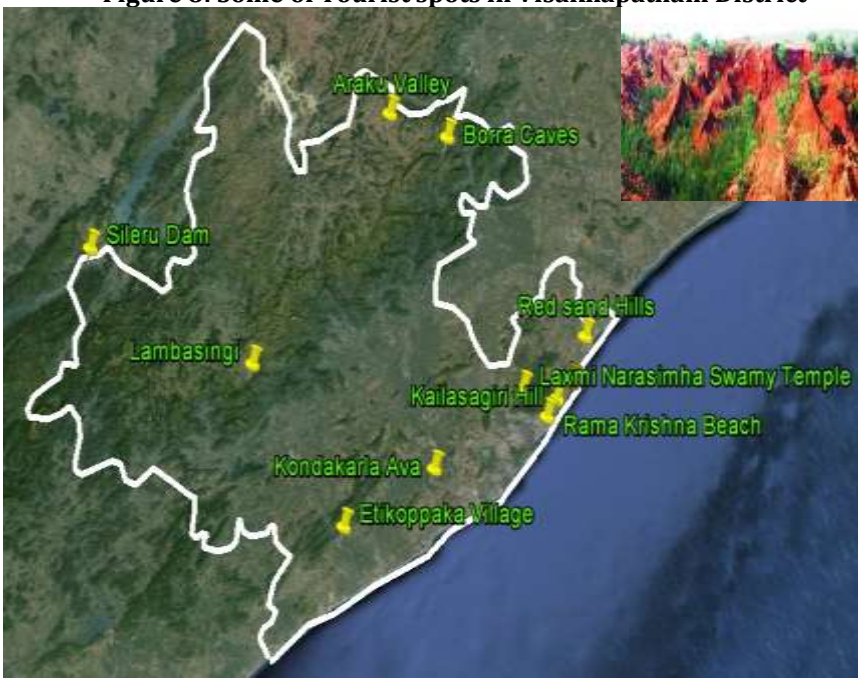


Figure 7: Roads, settlements, rivers and water bodies of the study area



Identification of various tourism spots of Visakhapatnam district are done on satellite imagery by using Q GIS with the details of Global Positioning System (GPS), of which some of them including a picture of one tourist spot are shown in figure 8.

Figure 8: Some of Tourist spots in Visakhapatnam District



A total of 150 Tourism sites are identified in the Visakhapatnam district which includes temples, hotels, restaurants, beaches, museums, waterfalls, valleys, parks, archaeological sites, natural sceneries etc…

Conclusions

All the sites identified are not developed, but they are existed in the district as a popular site for the recreation of the local people. If better facilities like accommodation, accessibility etc. were provided than the existing one more tourists can be attracted towards spot. This helps in increase in revenue generation. The geographical features like road network, rivers, water bodies and settlements helps to identify new tourism sites in the district. Terrain details (Elevation, slope, contours) which is also the part of geographical feature helps in proposal of new tourism site developments like riverfront development, reservoir shoreline development, coastal area development, public parks, restaurants, museums, archeological sites, valley development etc..

References

Ekpo Effiong, Felix Iyiola (et.al) (2013) " Inventory of tourism in cross River state , Nigeria, using Geographical Information System" pp 54-56

Dr. Kuldeep Preta (2013) "Remote Sensing and GIS site suitability analysis for Tourism development" *International Journal of Advanced Research in Engineering and Applied Sciences pp 34-36*

V. Mallikarjuna, M. Sai Lakshmi (2014) "A study on Geographical Characteristics of the Krishna Water Delta using GIS and Remote sensing techniques"

International Journal of Research in Engineering and Technology. pp 67-70

N. Gill, B.D. Bharath (2013) "Identification of optimum path for tourist places using GIS based network analysis: A case study of New Delhi" *International Journal of Advancement in Remote Sensing, GIS and Geography. p32*

B.V. Sridhar, B.L. Sujatha (2006) "Information of Visakhapatnam District" *Om Art Print.* p. 56