Analyzing of Salpan Incrementation in Tuticorin District by Using Remote Sensing and GIS

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Abstract- **The project is based on "ANALYZING SUITABLE SITE FOR SALTPAN INCREMENTATION IN COASTAL AREA OF TUTICORIN DISTRICT BY USING REMOTE SENSING AND GIS TECHNOLOGY". The state's coastal stretches have become a pressure point for indiscriminate and unsuitable development pressures. This project aims at incrementing more suitable sites of saltpan. The district is located at south eastern part of Tamil Nadu and is bound between the latitude of 8081'00" from north and longitudes of 78014'00" from east. The Tuticorin district covers an area of 4621 km2.The thematic maps are prepared from satellite image using visual image interpretation keys. The thematic maps are analyzed to use overlay analysis method by Arc GIS 9.3.1. Satellite data and Geographic information system provide an enviable tool of huge potential. A GIS database was built up while incorporated environmental layers such as Geology, Geomorphology, Soil, Land use, Slope and water pH value. Remote sensing techniques coupled with GIS are gainfully used for such a comprehensive analysis which leads to identification of suitable saltpan sites.**

1. INTRODUCTION

India is the second most populous country in the world. Agriculture, Fisheries and saltpan dominates the Indian economy. It plays a vital role in government plans to achieve poverty reduction and production of natural resources. Gujarat is the first largest salt producing state in India, accounting for around 80 to 85 lakh metric tones. Tuticorin is the second largest salt producing state in India. The main salt production is behinds in the month of November and upto June month. The landless people belonging to socially and economically backward caste and communities were compelled to work on saltpans as seasonal labours in the absence of better income generation opportunities, and then to improve the income of the coastal area people. Use of Remote sensing and GIS is time and cost effective, which will help in achieving a more comprehensive and integrated pattern of saltpan development. The Remote sensing and GIS are inevitable tools will provide information about, location, quantity and spatial spread of each type of resources. Remote sensing and GIS data analysis gives to accurate spatial and quantifiable information on the saltpan area estimation.

2. NEED FOR STUDY

Tuticorin is one of the coastal areas which is famous for its maritime activity and pearl culture. This area receives rainfall during the northeast monsoon season, which is active during the months of October–December. There may be not enough rain to support any crop cultivation. Therefore, the lands are utilized for production of salt by constructing pans.

3. ANALYSIS

DATABASE CREATION

The data collected from various thematic maps and topo sheets are used to create data base. The constructing of new datasets involves field work of many kinds. Features are created and elements such as ground water potential zone, temperature, etc., are gathered to create the data base.

WEIGHTAGE ASSESSMENT

The technical parameters are soil, temperature and pH. Assigning the parameter weightage as per International standard units. The most suitable soil condition of saltpan is alluvial soil, red soil, clay and loamy.

OVERLAY ANALYSIS

Map overlay is an important technique for integrating data derived from various sources and perhaps is the

basic key function in GIS data analysis and modeling surfaces. It is a process by which it is possible to take two or more different thematic map layers of the same area and overlay them on top of the other to form a composite new layer. This technique is used for the overlay of vector data on a raster background image overlay where new spatial data sets are created involving the merger of data from two or more input data layers to create a new output data layer. There are some fundamental differences in operations and analyses in the way map overlays are performed between the raster and vector worlds. In vector-based systems map overlay is time-consuming, complex and computationally expensive. In raster-based system it is just quick, straightforward and efficient. One of the most important benefits of an overlay analysis of GIS data is the ability to spatially interrelate multiple types of information stemming from a range of sources.

STUDY AREA CHARACTERISTICS

Tuticorin is a port town situated in the Gulf of Mannar about 125 km (78 miles) north of Cape commorin. Tuticorin is located as latitude of 8.53° N and longitude of 78.36° E. The study area covers geographical area of 154 sq.km. It is located south India on the Gulf of Mannar. It has the maximum temperature of 39°C (102°F) and minimum temperature of 32° C (90°F). It has more than 20,000 acres of saltpans across tuticorin district. Tuticorin is one of the coastal areas which are famous for its maritime activity and pearl culture. This area receives rainfall during the northeast monsoon season, which is active during the months of October–December. There may be not enough rain to support any crop cultivation. Therefore, the lands are utilized for production of salt by constructing pans.

FIGURE 1 Study area

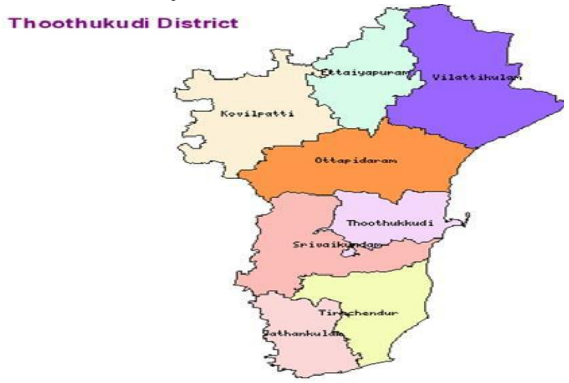


FIGURE 2 Geology Map

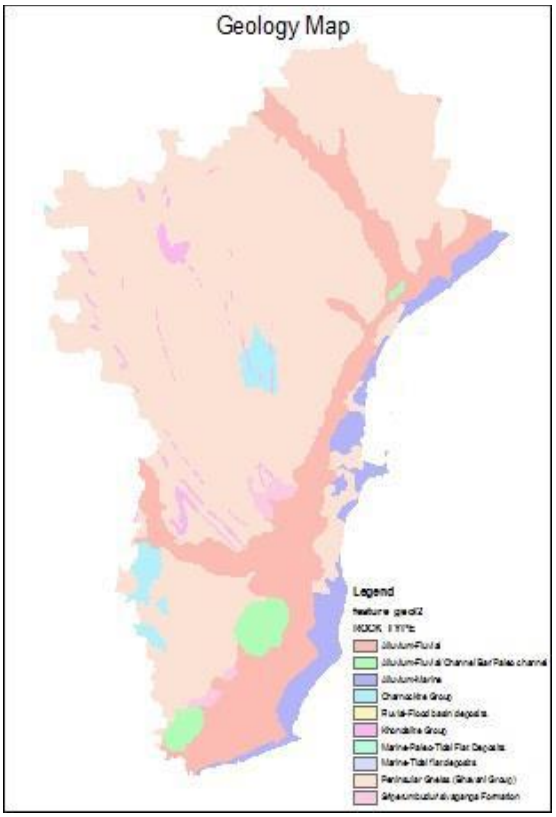


Table 1 Rank lists for geology map

S.No	Rock Type	Rank
1.	Fluvial-Flood basin deposits	1
2.	Alluvium-Fluvial	2
3.	Alluvium-Fluvial (or) Channel bar (or) Paleo channel	2
4.	Alluvium-marine	3
5.	Marine-Tidal flat deposits	4
6.	Marine-Paleo-Tidal flat deposit	4
7.	Peninsular Gneiss	5
8.	Charnockite group	5
9.	Khondalite group	5

GEOMORPHOLOGICAL MAP

The area is occupied by denudation landforms like shallow buried pediment, deep buried pediment and pediments. The prominent geomorphic units identified in the district are Fluvial, Marine, Fluvio-marine, Aeolian and Erosional landforms depending on the environment of formation. In tuticorin area, is characterized by sedimentary high ground limestone of Tertiary age. Coastal areas are having older and younger flood plains and also beach landform at places. The ground slope is gentle towards coast.

FIGURE 3 Geomorphology Map

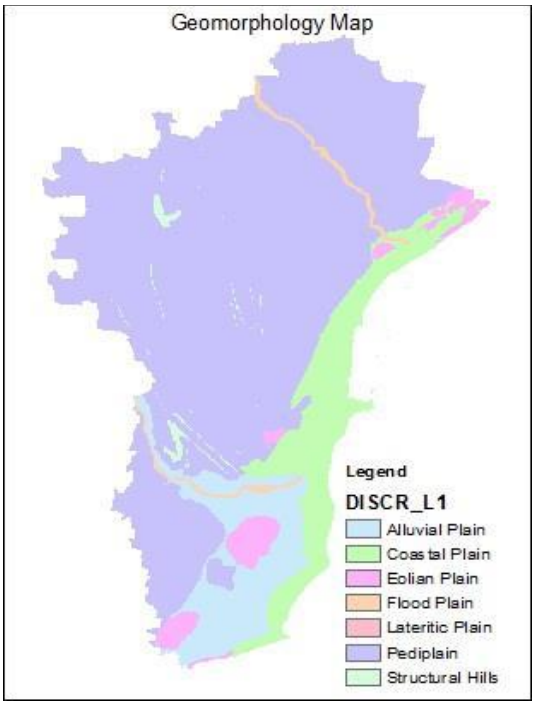


Table 2 Rank lists for Geomorphological map

S.NO	FEATURES	RANK
1.	Coastal plain	1
2.	Flood plain	2
3.	Lateritic plain	2
4.	Alluvial plain	3
5.	Pedi plain	4
6.	Aeolian plain	5

FIGURE 4 Soil Map

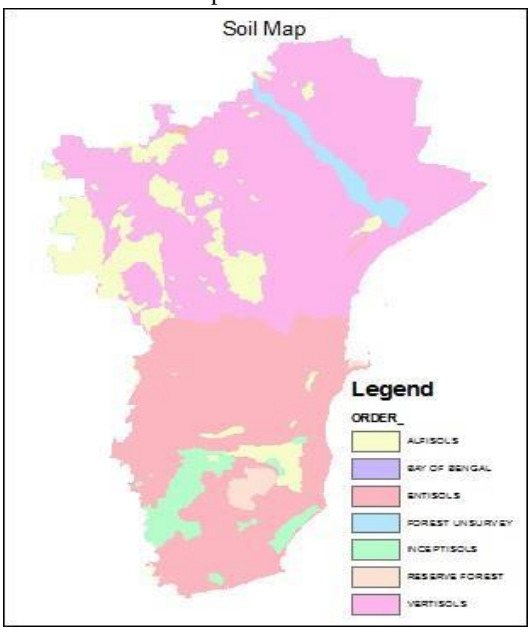


FIGURE 5 Land Use/Land Cover Map

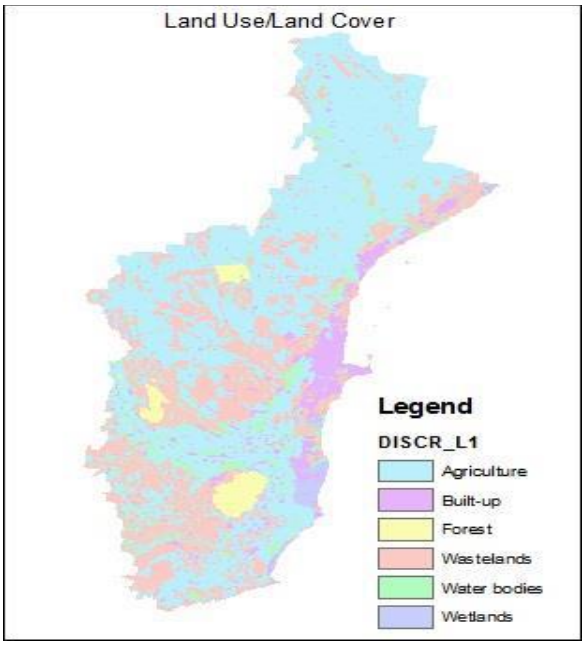


FIGURE 6 Slope Map

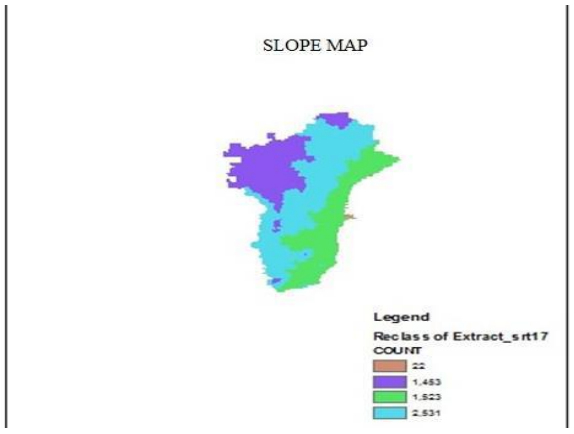


FIGURE 7 Water Quality Map

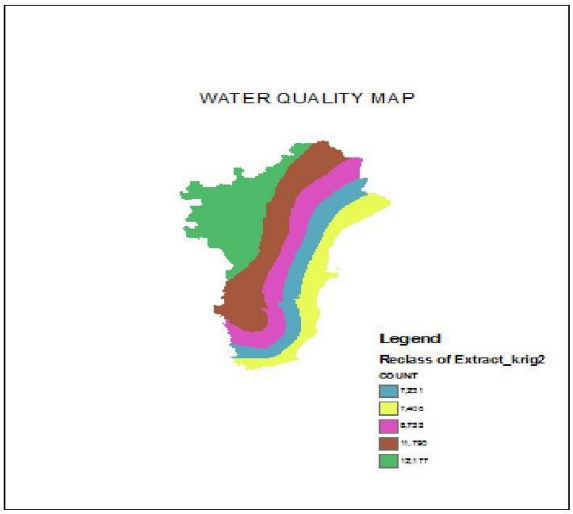
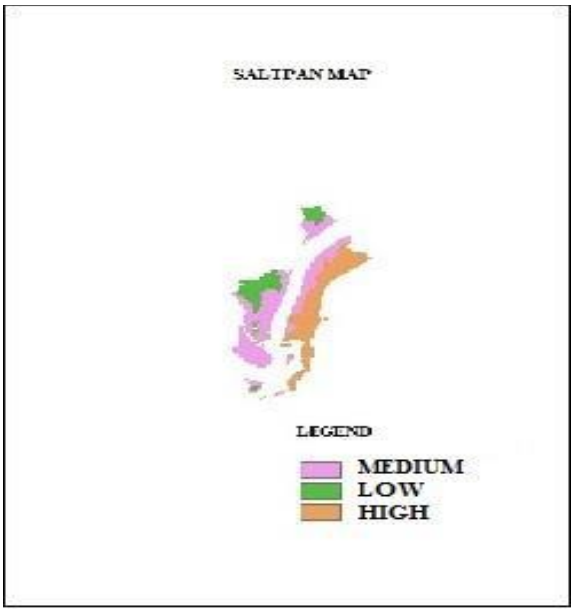


FIGURE 8 Suitable Area Map



CONCLUSION

The present study has revealed that satellite data has the unique capability to detect the suitable site for saltpan. From the analysis, it has been found that the satellite data is very useful and effective for getting the result of suitable site. The total area is estimated by considering the weighted parameters. The overlay analysis is given by three suitable sites high, medium and low. Tuticorin district lies in the eastern coast of Tamilnadu. Saltpan is responsible for the economic growth. Hence saltpan increment is monitored. Using IRS P6, LISS IV satellite image, the thematic maps are prepared. Thus the analysis helps to visualize the suitable sites for saltpans, which act as an aid for increasing the commercial production in the area. The highly suitable site of saltpan covered an area about 22150 Sq.km. The moderately suitable site occupied an area about 3566 Sq.km. Low suitable site covered an area about 1177 Sq.km. By using this analysis we can increment the saltpan sites in this area. So we can give a more job for the people and by this their economic level will be raised.

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