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RESEARCH ARTICLE

GEOMATIC BASED SOIL AND GEOMORPHOLOGICAL CLASSIFICATION OF KUMBAKONAM TOWN, THANJAVUR DISTRICT, TAMILNADU

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ABSTRACT

In the present study, an attempt has been made to classify the different soil and geomorphic units of Kumbakonam town Thanjavur district, Tamilnadu. The drainage, contour and delineated geological units have been overlaid on IRS-ID LISS III satellite imagery (bands 2, 3 and 4) the system to delineate and characterize different geomorphological units and analysis of their processes based on the field observations. The study area is basically of sedimentary in origin with different geomorphological formations and is influenced by the various processes. Based on the satellite data analysis, the distinct geomorphological units viz., alluvial plain and deltaic plain fills have been delineated and characterized. The information generated from satellite data in the form of vector layers has been used in GIS to generate soil and geomorphological maps of the study area. The present study demonstrates that IRS-ID LISS-III data in conjunction with geomorphology, soil, river and drainage and parameters to enable detailed evaluation of different geomorphological units and analysis of their processes based on the field observations. The delineated geomorphological units can be utilized for evaluation and management of natural resources and geo-environment on sustainable basis at river catchment level.

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INTRODUCTION

The soil and geomorphological pattern using Remote Sensing has been attempted in a number of previous investigations. Roy and Raina (1973) studied hydrogeomorphology of Kotepalli Catchment area of Hyderabad. Chatarjee et al., (1978) studied the geomorphology of central Luni Basin of Western Rajasthan. Raju and Vaidyanadhan (1984) also used Remote Sensing techniques in the study of Sarada River Basin. Similar investigations were also attempted by some more workers (Raviprakash and Mishra 1993, Mangrukar et al., 1993; Thomas et al., 1995, Saini and Nathawat, 1996). Recently Jaisankar et al., (2001) have under taken hydromorphogeological and Remote Sensing studies for groundwater exploration in Agnigundala area, Andhra Pradesh. In this investigation, geomorphology and land use pattern of Visakhapatnam urban industrial area has been taken up using IRS-IB and SPOT imageries with subsequent field checks.

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Study Area: Kumbakonam is a special grade Municipal Town and second biggest town in terms of administrative status to Thanjavur District. It is situated 10°57' North Latitudes and 79°23' East Longitude Kumbakonam is located 313 km away from Chennai on the South, 90 km away from Trichy on the East and 40 Km away from Thanjavur on the North- East. The town is bound by River "Cauvery" on the North and "Aresalar" on the South with a gentle slope from north to south. Civil Administration was looked by a town level committee (Municipal Committee) which was formed in 1866 with an extent of 7.68 Sq.km. At present, the Kumbakoardnam town extends over an area of 12.58 Sq.km and the local planning area extends over an area of 64.02 Sq.Km.

Soil; The town is not having any commercially exploitable minerals. The Alluvium and Regur are the major type of soils found in the region. More than 65% of the areas are covered by alluvium soil due to the presence of Cauvery delta. This is fertile and suited for agricultural purpose. Rice is the principle crop: Coconut, Mango and Tamarind are the major types of trees found in the region. The Adanur soil type mostly found in the western part and the Alattur soil type found in the eastern part of the study area. The Padugai soil type mostly found in the northern part along the edges.

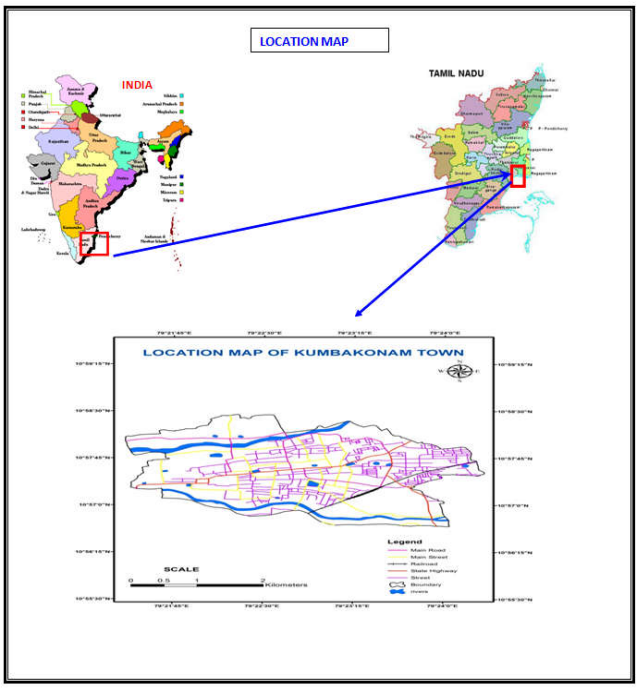

Fig. 1. Location of the study area

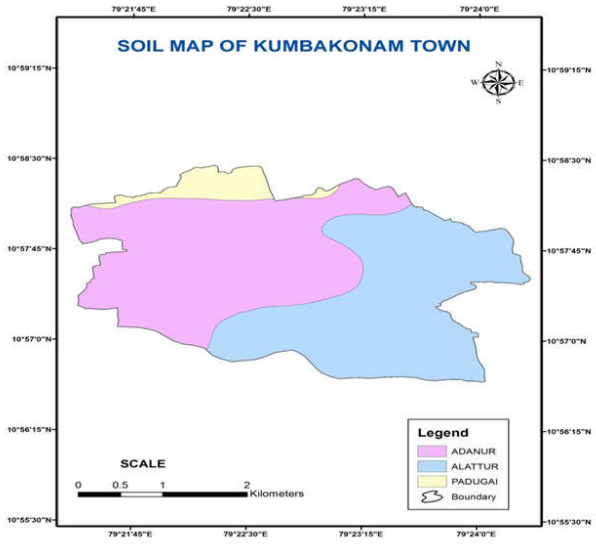

Fig. 2. Soil map of the study area

Geomorphology: In the study area has been divided into two major classes like alluvial plain and deltaic plain. An alluvial plain is a largely flat landform created by the deposition of sediment over a long period of time by one or more rivers coming from highland regions, from which lluvial soil forms. The alluvial plain is found in the eastern part of the study area in crescent like structure. A deltaic plain consists of active or abandoned deltas, which are either overlapping or contiguous to one another. A delta is a relatively flat area at the mouth of a river or a river system in which sediment load is deposited and distributed. The deltaic plain mostly found in the western part of the study area.

River: The town is mainly bounded by two Rivers, namely Cauvery River and it tributary of Arasalar River. The Cauvery river flow from west to east direction in the northern sided of Kumbakonam Town. Arasalaru River flow from west to east direction in the southern side of Kumbakonam town. Cauvery originate in Karnataka at Talakaveri in kodagu and flow down through kushainaga, srirangapatna,

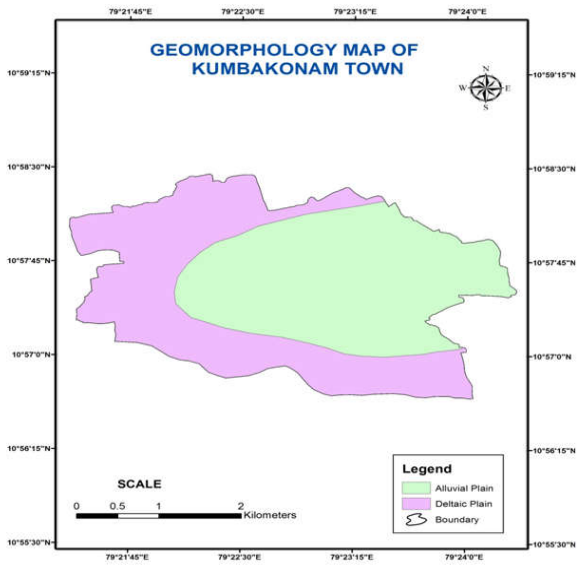

Fig. 3. Geomorphology map of the study area

Shisanasamudram before reaching hogenikal and Srirangam in Tamil Nadu. Erode in Tamil Nadu two tributary Join it Noyyal and Amaravathi. Thiruchirappalli it branches out into cloeroon and Cauvery. Cauvery again divided into Arasalar and over at Papanasam near Kumbakonam.

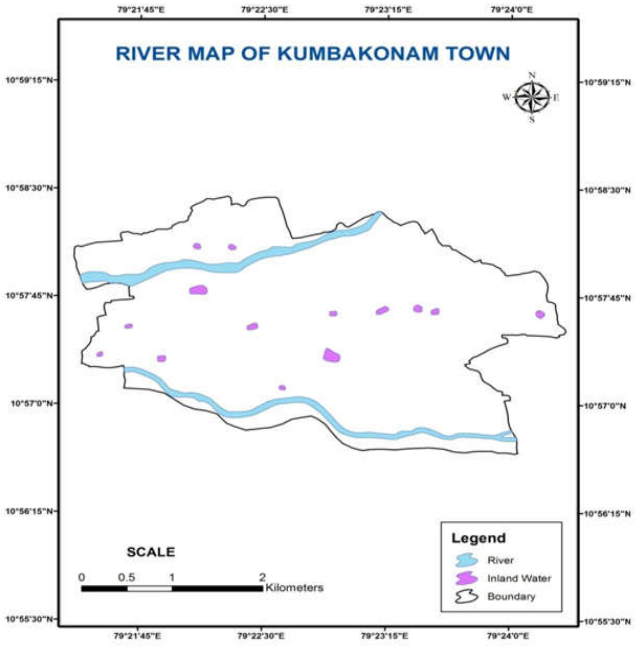

Fig. 4. River map of the study area

Drainage: Water supply is provided by the Kumbakonam Municipality form Cauvery River and Coleroon river, the distribution is managed through head works located at Valayapettai and Kudithangi, Supplying 3,265 km of water to the town. Kumbakonam Municipality has spatial underground drainage connectivity and the municipality is implementing the underground drainage to the uncovered areas. The major sewerage system for disposal of sullage is through septic tanks and public convenience. Roadside drains carry untreated sewage for disposal of sullage is through septic tanks and public conveniences. Roadsides drains carry untreated sewage out to the town to let out raw into the sea or accumulated in low lying area.

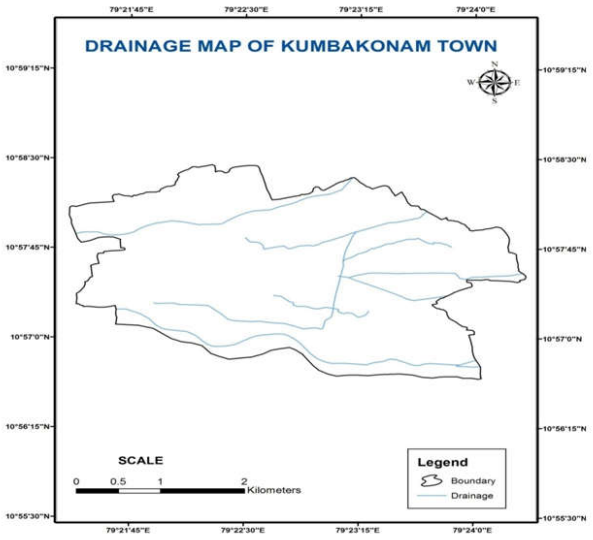

Fig. 5. Drainage map of the study area

Conclusion

Remote Sensing technology has been found useful in generating geomorphology and soil map units are classified under sedimentary formation, was produced in alluvial and deltaic deposits. The soil landform units include Adanur soil type, Alattur soil type, Padugai soil type. The remote sensing and GIS approach helps in effective mapping, characterization and classification of the soils. These properties of soils show variations due to its position on the landscape. The study shows that the application of remotely sensed data and GIS are very helpful in soil and geomorphology resources appraisal.

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