REMOTE SENSING APPLICATION FOR COASTAL ZONE MANAGEMENT: IDENTIFICATION OF SALTWATER INTRUSION ZONE IN PENNAR RIVER BASIN, INDIA

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The present study deals with the application of Remote sensing and Geographical Information Systems (GIS) technologies for the identification of salt-water intrusion zones in the Pennar river basin in the East Coast of India. In southern part of India there are three deltas formed by the rivers Godavari, Krishna and Pennar. Pennar delta has one of the largest irrigation systems of canals and distributes. A significant proportion of fresh water resources is used for agricultural and aquaculture purposes. Owing to the limited fresh water resources and increase in demand for irrigation water the base flow discharge to the sea has been reduced significantly in the delta. The water management practice in coastal region with high emphasis on increasing the agricultural yield and least concerned for the environmental implications has disturbed the groundwater travel path in regions near Bay of Bengal.

The aim of the study is to determine the water quality and to identify the saltwater intrusion zones using Remote sensing and GIS techniques. An assessment has been made to quantify the level of seawater intrusion by analyzing the water quality data, remote sensing data, GIS and field studies. Two types of database, attribute and spatial database were created for the study. A total number of 100 ground water samples were collected and analyzed for physico-chemical parameters like pH, alkalinity, hardness, total dissolved solids, sodium, potassium, sulphates, nitrates etc. Maps showing spatial distribution of various parameters was then prepared using curve-fitting technique of ARC/INFO and ARCVIEW GIS software. Remote sensing satellite data is used for the preparation of various thematic layers like land use/land cover, soil, geomorphology, drainage and slope using visual interpretation technique.

Methodology for the identification of saline water intrusion zones was then developed by integrating the water quality data, Remote sensing and GIS. A final map showing the spatial distribution of salinity was then prepared based on the concentrations of total dissolved solids in the ground water. From the results obtained, total area is classified into fresh, slightly saline and moderately saline zones. Moderately saline zone was observed near brackish water and in areas with poor drainage. Slightly saline zones are observed in areas where aquaculture is in practice and fresh water zone was observed in the remaining parts of the study area.