

Back water identification in the Thalaigayiru Block, Nagapattinam District, using Remote Sensing and GIS Technique

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ABSTRACT

The problems are also complex in the coastal area. Some of them are sea water intrusion, salinity from the aquifer (in situ) material, pollution, global warming and its impact on these aquifer systems. The hydrogeologic scenario of the coastal area is discussed briefly. This paper has provided methods to identified Back water using remote sensing and GIS technique.

Keywords : Landsat ETM⁺ Satellite imagery, remote sensing & GIS Technique and back water identification

I. INTRODUCTION

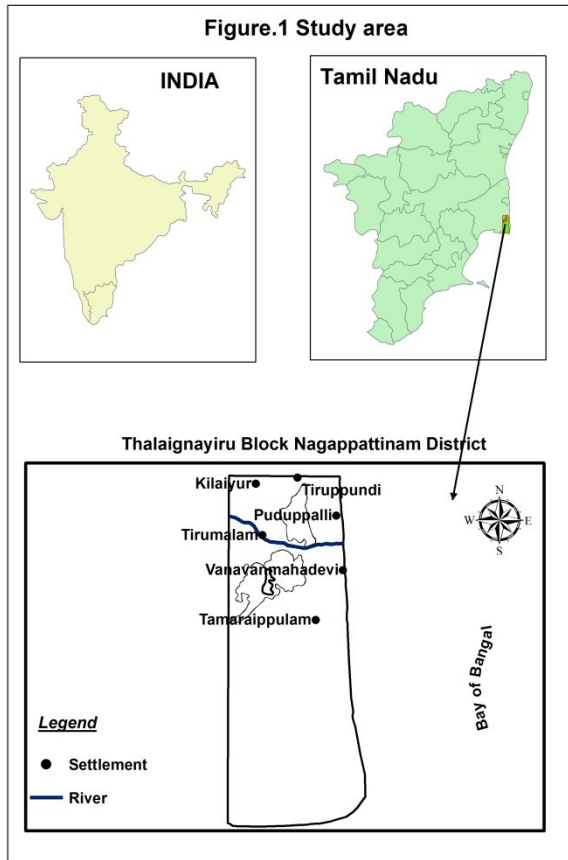
Seawater intrusion is widely occurring environmental problem, which concerns the majority of the coastal aquifers in the world, having large negative impacts – from an economic, developmental, environmental as well as social point of view – on the coastal local communities.

Coastal zones contain some of the most densely populated areas in the world as they generally present the best conditions for productivity. However, these regions face many hydrological problems like flooding due to cyclones and wave surge, and drinking fresh water scarcity due to problem of salt water intrusion. Coastal zones contain some of the most densely populated areas in the world as they generally present the best conditions for productivity. However, these regions face many hydrological problems like flooding due to cyclones and wave surge, and drinking fresh water scarcity due to problem of salt water intrusion (C. P. Kumar). Seawater intrusion is the movement of ocean water into fresh groundwater, causing contamination of the groundwater by salt. It is a

natural process that can be made worse by human activities.

II. STUDY AREA

Thalaigayiru Block is having administrative division of 24 Panchayats area and lies between 10°27'30"N and 10°62'10"N latitudes and 79°74'32"E and 79°88'18"E longitudes. The study area is drained by Vedaranyam canal and Harichandra Nadi in the southern part of the Nagapattinam district (Figure.1).



III. METHODOLOGY AND DATA

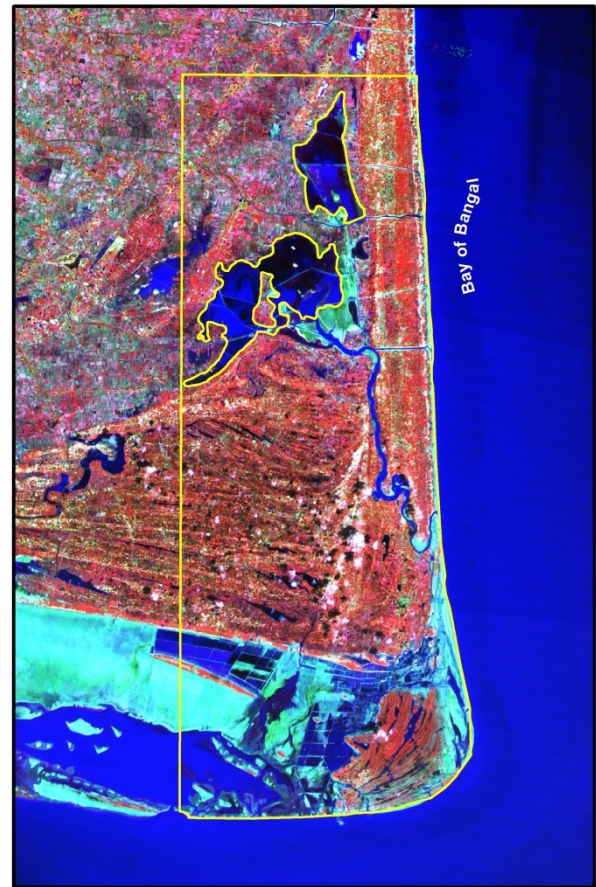
Landsat ETM+ satellite imagery is rectified geometrically (Figure.2) and registered with SOI topographical maps on 1:50000 scale using ArcGIS (software through map to image registration technique. The FCC generated from green, red and near infrared (NIR) spectral bands (2, 3, and 4). Linear, equalization and root enhancement techniques have been followed in enhancing the satellite imagery for better interpretation. ArcGIS software has been used for digitization, editing and topology creation. Information and delineation of sea water intrusion map generated in ArcGIS environment.

IV. EFFECT OF SEA WATER INTRUSION

One indicator of seawater intrusion is an increased chloride concentration in a freshwater aquifer, because chloride, a major constituent of seawater, is chemically stable and moves at about the same rate as intruding seawater. For the purposes of this study,

chloride concentrations of 100 milligrams per liter (mg/L) or more were assumed to indicate seawater intrusion.

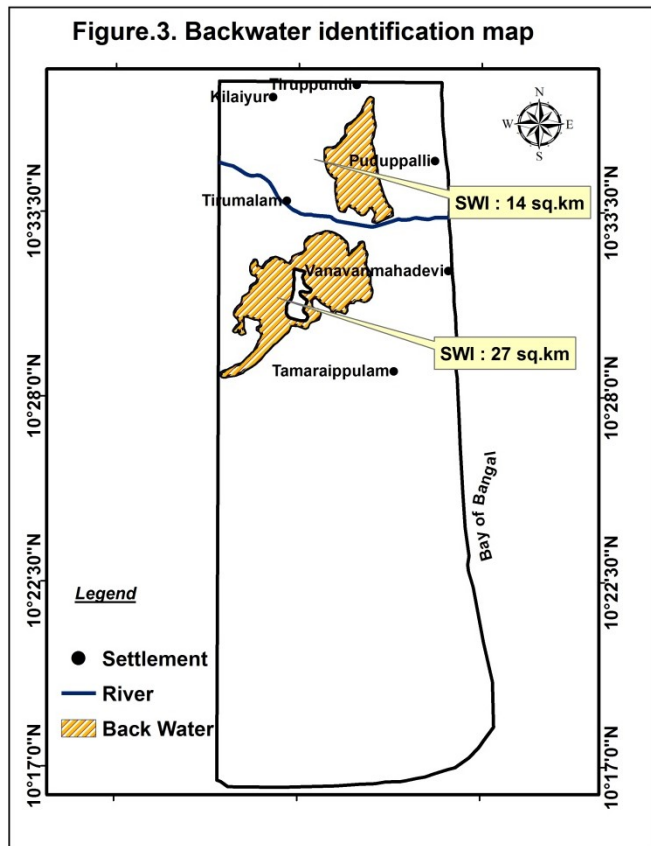
Figure.2 Landsat ETM + Satellite Imagery



V. BACK WATER INTRUSION STUDY THALAGNAYIRU BLOCK

When groundwater is pumped from aquifers that are in hydraulic connection with the sea, the gradients that are set up may induce a flow of salt water from the sea toward the well. The migration of salt water into freshwater aquifers under the influence of groundwater development is known as seawater intrusion. The salinity can be due to several reasons and mostly it can be due to the leaching out of the salts from the aquifer material. In order to avoid mistaken diagnoses of seawater intrusion as evidenced by temporary increases of total dissolved salts, recommended Chloride-Bicarbonate ratio as a criterion to evaluate intrusion. Thalaigayiru Block,

sea water intrusion is observed along the coastal areas. Sea water intrusion area covered in the study area 41 sq.km (Figure.3).



VI.CONCLUSION

The sea water intrusion is being disturbed every year due to results the lowering of water levels below mean sea level. The chloride bicarbonate ratio indicates that the flushing is insufficient. The coastal aquifers have to be managed carefully and cautiously to avoid problems like sea water intrusion and land subsidence. For this, detailed studies and regular monitoring are required.

VII. REFERENCES

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