

**STUDY ON SEA WATER INTRUSION USING ELECTRICAL
RESISTIVITY SCANNING NEAR THIRUCHENDUR
AREA OF THOOTHUKUDI DISTRICT,
TAMILNADU**

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Abstract

An attempt on sea water intrusion has made using electrical resistivity scanning technique near Thiruchendur of Thoothukudi District, Tamilnadu. Geologically, this area comprises recent age sandstone with shells and clayey sand. Beach terrace is the major geomorphologic unit and soil type is sandy. To evaluate the sea water intrusion, multi electrode electrical resistivity scanning was carried out at Valasubramaniapuram, Nagakannipuram, Adaikalapuram, Sennkuli and Muthukrishnapuram villages near Thiruchendur using SSR-MP-AT-ME model multi electrode resistivity meter. The maximum spreading of 100 m was fixed using 50 electrodes by electrode spacing of 2m. The obtained data were interpreted in ipi2win software. The interpreted output of scanning data showed very low resistivity value of less than 10 ohm m in locations Valasubramaniapuram and Nagakannipuram at shallow levels of 7m and in locations Adaikalapuram, Sennkuli and Muthukrishnapuram at deeper levels of below 15m.

In order to substantiate the scanning results, groundwater samples were collected and analyzed for major elements. The pH and EC vary from 7.50 to 7.90 and 320 μ mohs/cm to 7250 μ mohs/cm. The TDS and Total Hardness vary from 215.0 mg/l to 4850.0 mg/l and 111.0 mg/l to 1414.0 mg/l. The maximum and minimum of Ca²⁺, Na⁺, Mg²⁺ and Cl⁻, SO₄²⁻ are 30.0 to 380.0 mg/l, 50.9 to 540.0 mg/l, 9.0 to 111.0 mg/l and 8.0 to 1708.0 mg/l, 13.0 to 900.0 mg/l, respectively. Higher concentration of sodium and chloride is observed at Nagakannipuram and Muthukrishnapuram whereas in other locations the concentrations are not high.

It is observed that high resistivity was noted at very shallow levels near to coast and it is low below the top layer. This indicates the presence saline water in sandstone formation which is beneath the top layer of coarse sand. Similarly, moving away from the coast, low resistivity was observed at shallow levels due to saline water in weathered sand stone with shells and high at deeper level could be compact sandstone with shells. The study reveals that multi electrode resistivity scanning is one of the effective tools to map sea water intruded zone and damage of groundwater system.

Keywords: *Sea water intrusion, Electrical resistivity, SSR-MP-AT-ME model, Saline water.*

