

**INVESTIGATION ON THE GROUNDWATER SALINITY  
PROBLEM IN THE MADUKKARAI RESETTLEMENT  
VILLAGE AT MANNAR DISTRICT**



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## ABSTRACT

Groundwater is an important resource for drinking water supplies and for irrigation. The significance of groundwater for supplementary irrigation is being realized increasingly. To make the optimum use of available groundwater resources, it has to be managed efficiently. To be able to take correct management decision it is important that the groundwater systems are properly understood.

There are many instances in Sri Lanka of wells yielding poor quality groundwater or wells with good quality groundwater deteriorating in quality when used for some time. This is due to water being drawn from regions of poor quality. Since it is very difficult to reverse the flow of poor quality water to a well, it is of extreme importance water to continuously monitor the quality of groundwater from well and take appropriate measures if the quality is suspected to be deteriorating. If groundwater with excessive salinity is used for irrigation purposes, it may lead to build up of salinity on the ground surface making it unsuitable for agriculture. In the case of drinking water, steps could be taken to remove some kinds of impurities such as fluorides, iron and manganese. Removal of chlorides is very difficult and expensive. Intrusion of sea/river water into wells in coastal aquifers is a phenomenon that can seriously affect the quality of such aquifers. Careful monitoring of the quality of water from wells in coastal regions is essential in order to take timely precautions against such occurrence.

This study focuses on the groundwater salinity problem in the Madukkari resettlement village in Mannar district. The village is located about 30 km South-East from Mannar town. At present more than 250 families (mostly resettled internally displaced peoples of on-going conflict) are living in the village. Since, for many

villagers, groundwater-irrigated agriculture is the major source of income, groundwater salinity is seen as a threat to their livelihood.

This project was carried out to ensure the livelihood of the settlers by investigating the problem of groundwater salinity in the Madukkarai village and developing strategies to manage the land and water resources appropriately.

Secondary data on EC and pH were used in this study to evaluate the quality and condition of ground water in Madukkarai Resettlement Village. These data were originally measured by ZOA Refuge Care Sri Lanka in an ongoing project regarding this ground water salinity problem in Madukkarai Resettlement Village during the period from 05-04-2007 to 06-03-2008. In these measurements, initial monitoring of Electrical Conductivity (EC) and pH of all the wells were done from 05-04-2007 to 26-04-2007. EC of selected wells and temperature of each selected agro-well's water was monitored using portable pH meter for a period of 09 months at monthly interval from 10-07-2007 to 06-03-2008. Further EC, pH and river water levels at three selected locations in the river (Aruvi Aru) - at head, middle and tail was also measured. Monthly average rainfall data for the period from 1994-2007 was also obtained from Meteorological department, Mannar. GIS based database and map of EC were also developed for the project boundaries, locations of wells and sampling locations. Past experiences of selected farmers in relation to water quality, crop management, and information on soil layers (soil profile) were also gathered through a questionnaire survey. Further, soil samples were collected from critical locations of the study area and analysed for soil texture, soil pH, cation exchange capacity, base saturation, acid saturation, electrical conductivity, organic matter, active acidity,

calcium, magnesium, sodium, potassium, Ca:Mg, Mg:K, nitrogen, phosphorus, boron, copper, iron, manganese and zinc.

The results from findings show that the best quality water of the study area is present in agro-wells those are far away from the river. The intermediate quality water is present in the areas which are in intermediate distance from river. As expected, the poor quality water is found in wells which are situated very proximity to the river. This could be done to the back flow of sea water into the river during the dry period. To conclude, at present there is no evidence of a build up in the higher concentration of solutes in the agro-well waters and it could be reasoned that the quantity of the "Maha" seasonal rains and of the total annual rains received in this region are sufficiently adequate to leach out and dilute solutes that have built up in the soil during the dry season.

Key words: Groundwater, Salinity, Electrical Conductivity (EC)

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