

INVESTIGATION OF THE EFFECTIVENESS OF SALT BARRAGE IN JAFFNA PENINSULA

A dissertation submitted to the
Faculty of Science & Technology
Uva Wellassa University

In partial fulfillment of the requirements for the award of the
Degree of Bachelor of Technology

by

SUKANYA BALENDRAN

**Mineral Resources and Technology Degree Program
Uva Wellassa University, Sri Lanka**

2012

Abstract

To convert the internal salt water lagoon Upparu, to fresh water lake is expected to improve the water resources of the peninsula, both in recharging the underground storage with additional surface storage and desalinating the lands fringing the lagoons and making suitable for cultivation (K. Shanmugarajah, 1993) and fresh water prawn farming in the banks of the lagoon. Repair and replacement of these barrages were finished in the month of October 2009.

This research focus on the area from the fringe of the lagoon into the land extending for 2 km perpendicularly to evaluate the effectiveness of the barrage by delineating the salt water intrusion pattern and ground water flow pattern. Wells were selected in a profile perpendicular to the fringe of Uppu Aru and Jaffna lagoon. The areas coming under study are parts of Nallur, Kopay and Chavakachcheri D.S Divisions. Electrical conductivity (EC) values and water level were measured in situ for groundwater samples which were drawn from 97 wells in each month of January and July. Thirty shallow well samples were selected for chemical analysis out of 97 wells in which EC was measured. Water samples were analysed to determine Chloride and Sodium.

EC values for groundwater in the study areas vary between 324 $\mu\text{S}/\text{cm}$ and 16,550 $\mu\text{S}/\text{cm}$ in wet seasons between 614 $\mu\text{S}/\text{cm}$ and 19,310 $\mu\text{S}/\text{cm}$ in dry seasons. Chloride values vary in between 0.71mg/L and 8165 mg/L in wet seasons between 42 mg/L and 4356 mg/L in dry seasons. Sodium values vary in between 20 mg/L and 8492 mg/L in wet seasons and between 116 mg/L and 4021mg/L in dry seasons.

Groundwater in the fringe of the Upparu lagoon which is far from the barrage is having good quality water than the groundwater close to the barrage in both seasons. If the barrage works properly the groundwater in the fringe of the lagoon will become as fresh water in near future. Therefore, it can be concluded the effectiveness is less during both seasons. However, further continuation of this research would deliver a much better result.