

## **Investigation of the Effectiveness of Upparu Saltwater Barrage in Jaffna Peninsula, Sri Lanka (4th Stage)**

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Groundwater is the prime source of water for the people in Jaffna Peninsula. Saltwater intrusion into aquifers has been a persistent issue caused by excessive extraction of freshwater. In order to overcome the groundwater scarcity and quality issues, a barrage has been constructed as a saltwater exclusion bund expecting to convert the saltwater lagoon into a freshwater lake. Major aims of this study are to evaluate the effectiveness of the barrage by delineating the salt water intrusion patterns in groundwater and to study the variation of groundwater types recorded after the barrage construction. Electrical conductivity (EC) and water level of the wells were measured in the field. Groundwater samples were collected from 66 wells during the wet season. Water samples were analysed using Atomic Absorption Spectrometer (AAS) and Spectrophotometer to determine the concentrations of sodium, magnesium, calcium, potassium, chloride, sulphate and bicarbonate. Results indicate that EC of groundwater varies between 403 — 20760 tS/cm. Chloride, sodium, calcium, potassium, magnesium and bicarbonate concentrations are between 7 — 497 ppm, 0.09 — 986 ppm, 0.6 371 ppm. 0.86 —125 ppm, 0.52 —167 ppm and 10 — 1464 ppm respectively. Spatial distribution of the groundwater composition shows that the fringe of the Upparu lagoon which is far from the barrage is having better quality water than the groundwater close to the barrage. Availability of groundwater has significantly increased after barrage construction. It has been noted that if barrage function properly the groundwater in the fringe of the lagoon will become freshwater soon. Comparing with the results of past analyses it can be concluded that barrage system is slowly recovering to produce freshwater.

**Keywords:** Saltwater barrage, Upparu Lagoon, Saltwater intrusion