

M.Sc Degree in Environmental Science

IMPACT OF SEAWATER INTRUSION BUND ON SOIL & WATER  
CONSERVATION IN COASTAL LINE OF POONAKARY

A dissertation submitted

by

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## Abstract

Seawater intrusion occurs in many coastal and deltaic areas around the world. When saltwater travels inland to production wells, underground water supplies become useless. Intrusion of saltwater is the most common contamination occurrence in coastal aquifers. Salt water intrusion into coastal aquifers is reported in the coastal region of Poonakary, Kilinochchi district, is under a serious threat concerning the deterioration of groundwater. Thus groundwater has become unfit for domestic uses and irrigation purpose. It is well known that seawater intrusion is affected by both natural and anthropogenic processes. In particular, sea-level rise associated with climate change and groundwater pumping are potentially significant processes that are expected to play a role in seawater intrusion. The water resource mainly the underground water at Poonakary is entirely polluted due to prolonged negligence and improper management of water resource. As a result, people are facing problem in getting good quality water in their wells and cultivable lands are in abandon stage. The current study aimed to assess the variation of soil salinity and pH of soil before and just after and three years after the construction of bund and to identify the contribution of seawater intrusion bund on soil, water quality improvement and crop improvement. With regard to this, a study was conducted during July to September period in 2018, in three selected Grama Niladari Divisions namely Kiranchi, Pallavarayankattu, and Kariyalainagapaduvan, which were reported as most sensitive locations at Poonakary division. Soil samples were collected at different sampling depths (15cm, 30cm, 45cm and 60cm) to measure EC and pH level of 30 farmer fields and the locations were recorded by using GPS. Water samples were collected from available water resources to measure EC, pH, TDS and Hardness level of 15 locations. Analysis of soil samples showed that, after the construction of the seawater intrusion bund in 2015, the significant improvement of soil pH and EC were observed in the three selected locations. At the soil depths of 15 cm, 30 cm, 45cm and 60 cm significant improvement in soil pH was observed and at 15cm, 30cm and 60cm depths significant improvement of EC observed. But at 45 cm depth, the improvement is not significant due to hardpan formation, which restricts the leaching out of salts from soil. Considerable improvement in the water quality of open dug well and surface water ponds was observed at Kiranchi, Pallavarayankattu and Kariyalanagapaduvan. But during the survey period, seawater intrusion was observed in most of the tube wells and some of the open dug wells, which were closer to the newly constructed tube wells. Yield improvement of crops especially paddy also reported in the selected locations. The study underlines, even though the initial costs are very high, the seawater intrusion bund or the subsurface barrier method often a potential permanent solution to the seawater intrusion problem in coastal groundwater aquifers and it also enhances deep percolation of rainwater and considerable groundwater recharge. Rain water harvesting and artificial recharge techniques are more useful as a tool in remediation of seawater intrusion. Continuous monitoring and continuation of the recommendations suggested in this area should be followed for five to ten years to have actual impact on the reclamation of soil salinity problem and water quality improvement.