

**EFFICIENCY OF CONSTRUCTED WETLAND IN
TREATING SMALL SCALE REVERSE OSMOSIS
REJECTS**

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by

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ABSTRACT

Natural ecosystems like water and soil in developing countries are frequently vulnerable to potential health hazardous due to contamination by human waste and other industrial pollutants. Improper waste disposal plays major role and are commonly due to lack of awareness of the proper waste disposal techniques. This is noted specially in small or rural scales related to waste water and water supply systems. Reverse Osmosis have been used as a major treatment technology in small scale treatment plants to remove hardness in ground water in the CKDu vulnerable villages. Unfortunately, treatment of RO rejects has not been implemented yet.

The present study was carried out in the premises of pioneer Reverse Osmosis (RO) plant at Madukantha which related to Regional Support Centre (North), NWSDB Vavuniya, Sri Lanka to treat the RO plant rejects using constructed wetland systems. As the first step of this study, a constructed wetland model was created with dimensions of 2m x 0.5m x 0.5m (Length x Width x Depth) and using Typha (*Typha Latifolia*) as vegetation. Following this the applicability of constructed wetlands for the treatment of the RO rejects was evaluated by diverting part of the RO rejects to the wetland model and water quality examinations were carried out in the inlet and the out let of constructed wetland model to quantify the nutrient removal efficiency.

The wetland model was arranged as Horizontal Sub-surface Flow (HSSF) system to evaluate the performance at the Hydraulic Retention Time (HRT) of 4 days. Samples were collected from influent and effluents of constructed wetland system at once in four days over one month period and hardness, Calcium, electric conductivity, Fluoride, Manganese, alkalinity, Total Dissolved Solids (T.D.S), nitrates, phosphates and shulphates were measured. Results shows that average removal efficiencies of hardness, Calcium, electric conductivity, Fluoride, Manganese alkalinity, T.D.S, nitrates, phosphates and shulphates were up to 31.20%, 35.03%, 38.13%, 28.35% , 25.37%, 25.30%, 38.13%, 18.60%, 12.90% and 19.35% respectively. Results indicate the removal efficiencies increasing with the plant growth.