

MSc Degree in Environmental Science

**STUDY ON THE EFFICIENCY OF NEWLY CONSTRUCTED
WASTEWATER TREATMENT POND SYSTEM ASSOCIATED
WITH VAVUNIYA TANK**

A dissertation submitted

by

MOHAMED SANOON RINOOS

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ABSTRACT

Vavuniya tank is located in between N8°45'13.75-53.21" E80°30'7.50-59.23" geometrically lies within the Urban Council limits. It is one of the main irrigation tanks supplying water for irrigation and domestic purposes including inland fisheries. Waste water from Vavuniya Township is discharged into the storm water drainage canals. Consequently discharge of waste water, into the irrigation tank has become an unresolved environmental issue and it was discussed and as a solution an oxidation pond was constructed by GTZ in the year 1995 for the purpose of primary treatment of polluted water. It was abandoned due to improper design and mismanagement of wastewater, lack of maintenance and insufficient capacity. Thereafter in 2014 it was decided by UNOPS and Urban Council that existing oxidation pond to be modified to mechanically aerated lagoons. This treated water finally is discharged into the tank which will be sufficiently purified for domestic, irrigation and inland fisheries. It was implemented by UNOPS in collaboration with the Ministry of Economic Development, the Vavuniya District Secretariat, Local Authorities, and financed by the European Union. The data generated from the study will provide useful information on the state of wastewater treatment works and whether the various stages meet treatment discharge standards, management of wastewater treatment works in Vavuniya. Main objective of the study to assess the water quality parameters of influent and effluent to evaluate the overall efficiency of renovated oxidation pond system. Composite wastewater samples were taken from each collection tank and retention tank from May to September 2018 for physicochemical analysis. Collected water samples were analyzed at the laboratory of the National Water Supply and Drainage Board, Vavuniya using APHA international standards. The data were statistically analyzed by using MS Excel 2010. The color concentration of wastewater from collection tank was showing an increasing trend while retention tank showed a decreasing trend, the turbidity content in collection tank indicated an increasing trend. Rainy months recorded high conductivity values as compared to dry months and the plant reduced EC level to the tolerance limit value (2250 μ S/cm). The wet months exhibited high pH values as compared to dry months. This treatment plant stabilized the pH range to the tolerance limit value. This treatment plant reduced the Nitrate to a permissible tolerance limit (18mg/L) and removal efficiency of nitrate was nearly 71%. This treatment plant removed dissolved Phosphate to the tolerance limit value (5mg/L) and removal efficiency of dissolved Phosphate was 95%. This treatment plant removed BOD₅ to the tolerance limit value (30mg/L) and removal efficiency of BOD₅ was 82.50%. This treatment plant removed total coliform efficiently. This study concluded that the renovated oxidation pond system was efficient enough to remove the pollutants of Nitrate, dissolved phosphate, EC, pH and BOD₅ to the recommended level. Industries should be under strict regulations to treat wastes to considerable levels before disposal, de-sludging the system at appropriate time, repairing outlet pipes, screening system to exclude floatable materials, removal of grit from blocking the pipelines and existing wetland should be reconstructed to stabilize organic matter were the suggestions drawn from this study.

Key words: Aerated oxidation pond, waste water treatment, water quality parameters.