

## SUBSURFACE FLOW CONSTRUCTED WETLANDS FOR POLLUTION CONTROL IN TROPICS

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The present study was carried out for a contaminated small stream runs through a cluster of line-houses at a tea estate in beautiful countryside of Sri Lanka, to evaluate the applicability of constructed wetland systems for pollution control. After examining the quality of water in the stream, the use of subsurface flow constructed wetland systems for stream water purification was evaluated by diverting a part of stream water to a Vertical Subsurface Flow (VSSF) and a Horizontal Subsurface Flow (HSSF) constructed wetland models of size 8 m x 1 m x 0.6 m (Length x Width x Depth). Both wetland units had 10 – 20 mm gravel as the wetland media and narrow leaf Cattail (*Typha angustifolia*) as the wetland vegetation. In order to assess the nitrogen removal capacity of the wetland systems, a nitrogen spike was conducted and performance of the wetlands was compared at one and two days of Hydraulic Retention Times (HRT). Samples were collected from influent and effluent of each wetland system at one week interval over a twelve weeks period and Total Coliform (TC), Faecal Coliform (FC), Five-day Biochemical Oxygen Demand (BOD<sub>5</sub>), NO<sub>3</sub><sup>-</sup> - N and NH<sub>4</sub><sup>+</sup> were analyzed according to the standard methods of water and wastewater analysis. Results show that average removal efficiencies of TC, FC, BOD<sub>5</sub>, NO<sub>3</sub><sup>-</sup> - N, NH<sub>4</sub><sup>+</sup> were 86 %, 92 %, 73 %, 52 %, 76 % and 94 %, 89 %, 77 %, 79 %, 48 % for VSSF and HSSF wetland systems respectively at two days HRT and 71 %, 82 %, 65 %, 58 %, 54 % and 79 %, 76 %, 76 %, 78 %, 54 % for VSSF and HSSF wetland systems respectively at one day HRT, indicating a decrease in removal efficiencies from two days to one day HRT. Even though statistical analyses of the results show that there is no significant treatment difference between VSSF and HSSF wetland systems at both two days and one day HRTs for most of the wastewater parameters, from overall results it is noted that HSSF wetland systems are more effective in pollutant removal even at one day HRT.

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