

Evaluating performance of vertical flow constructed wetland under various hydraulic loading rates in effluent polishing

The discharge of untreated wastewater or partially treated effluent and runoff from agricultural fields into water bodies is a major source of surface water pollution worldwide. To mitigate this problem, wastewater treatment using wastewater stabilization ponds and constructed wetlands have been promoted. The performance of such wastewater treatment systems is strongly dependent on their hydraulics, which if not properly considered during design or operation, may result in the partially treated effluent being discharged into water bodies. This paper presents results from a study that was carried out to evaluate the performance of a vertical flow constructed wetland system under varying hydraulic loading regimes. The influent and effluent samples from the constructed wetland were collected and analysed for physical, chemical and biological parameters of importance to water quality based on recommended standard laboratory methods. The data collected was useful in determining the treatment efficiency of the wetland. The hydraulic loading rate applied ranged between 0.014 and 0.174 m/day. Phosphorus reduction for the different hydraulic loading rates ranged between 92 and 47% for lowest and highest loading rates applied respectively. However, ammonium nitrogen reduction was not significantly affected by the different hydraulic loading rates, since the reduction ranged between 97 and 94%.