

Feasibility Study of Constructed Wetlands for Wastewater Treatment and Reuse in Asmara, Eritrea

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Abstract : Asmara, the capital city of Eritrea, is facing a sanitation challenge because the city discharges its wastewater to the environment without any kind of treatment. The aim of this research is to conduct a pre-feasibility study of using constructed wetlands in the peri-urban areas of Asmara for wastewater treatment and reuse. It was found that around 15,000 m³ of wastewater is used daily for agricultural activities, and products are sold in the city's markets, which are claimed to cause some health effects. In this study, three potential sites were investigated around Mai-Bela and an optimum location was selected on the basis of land availability, topography, and geotechnical information. Some types of local microphytes that can be used in constructed wetlands have been identified and documented for further studies. It was found that subsurface constructed wetlands can provide a sufficient pollutant removal with careful planning and design. Following the feasibility study, a preliminary design of screening, grit chamber and subsurface constructed wetland was prepared and cost estimation was done. In the cost estimation part, the filter media was found to be the most expensive part and consists of around 30% percent of the overall cost. The city wastewater drainage runs in two directions and the selected site is located in the southern sub-system, which only carries sewage (separate system). The wastewater analysis conducted particularly around this area (Sembel) indicates high heavy metal levels and organic concentrations, which reveals that there is a high level of industrial pollution in addition to the domestic sewage.

Keywords : agriculture, constructed wetland, Mai-Bela, wastewater reuse

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