# EFFICIENCY OF CONSTRUCTED WETLANDS IN REMOVING POLLUTANTS FROM WASTEWATER- A REVIEW



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# ABSTRACT

Approximately, one-third of the drinking water requirement of the world is obtained from surface sources like rivers, dams, lakes, and canals. The release of raw and improperly treated wastewater onto such water sources has both short- and long-term effects on the environment and human health. The major concerns regarding water resources in Sri Lanka are resource depletion and degradation caused by numerous human activities. There was no proper system of wastewater disposal, and about 80% of used water is released as wastewater to the environment. Hence, the development of the wastewater treatment system would help to treat wastewater to specific discharge limits, to protect human health and the environment. The low success rate of such approaches can be related to the significant initial investment, the need for continuous replacement, and the high operational costs. In recent years, constructed wetlands (CWs) systems have emerged as a low-cost higher forming wastewater treatment technology compared to conventional systems. CWs are efficient systems in controlling sewerage pollutants. The efficiency of CWs in treating wastewater depends on several factors. There are numerous studies conducted to assess the efficiency of different types of CWs under different operational and environmental conditions. In the above context, the present study aimed to understand the pollutant removal efficiency of constructed wetlands and to document the efficiency of different types of vegetation and wetland treatment technologies in removing pollutants from the wastewater.

CWs are identified as the most efficient and effective wastewater treatment method. These systems are cost-effective and their discharges could be further re-used for agricultural purposes. A hybrid constructed wetland integrating horizontal (HF),

vertical (VF), and horizontal (HF) filter stages with polishing ponds and littoral zones are appropriate for treating concentrated wastewaters. Constructed wetlands are also able to remove 99.9% of *Eschrichia coli* and 94.8% of *Giardia lamblia*. Some research said that the wetland efficacy and behaviour were directly related to temperature, microorganism availability, influence feeding mode, surface loading rate, hydrology, and substrate and macrophyte composition. In addition to other environmental and operational factors, selection of vegetation type plays a crucial role in pollutant removal efficiency. The vegetation such as *Glyceria maxima*, *Iris pseudacorus*, *Phalaris arundinacea*, *Iris sibirica*, *Phragmites australis*, and *Lythrum salicaria* are effective in hybrid constructed wetlands. The percentage of phosphorus removed in comparable systems that the employed *Cyperus alternifolius* was found to be 83.2% in one research and less than 20 percent in another. *Typha latifolia* are most established successfully. They were able to support hydraulic conditions and are able to successful removal BOD and nitrogen uptake. Usage of some vegetation is limited as they require specific environmental conditions. A proper combination of vegetations shows higher pollutant removal efficiency. Hence, the selection of suitable vegetation type for a CW should be based on its removal efficiency and local climatic conditions. Constructed wetlands that would be the most efficient to get rid of suspended solids and organic solids, even though the removal of nitrogen would be low. To remove pollutant to meet the standard of irrigation reuse.

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