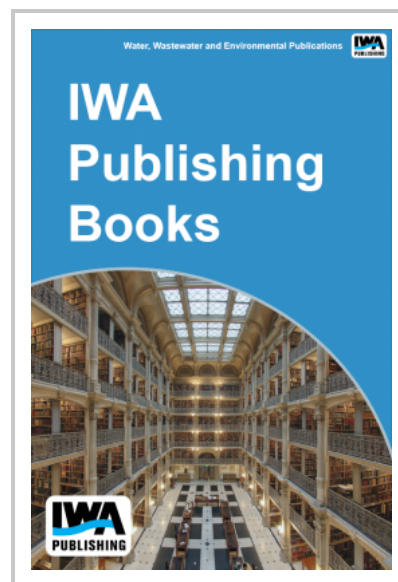


# Nitrogen Removal and Sustainability of Vertical Flow Constructed Wetlands for Small Scale Wastewater Treatment

The goals of environmental sustainability, through minimizing resource use, maximizing energy efficiency, reducing waste emissions, enabling recycling, and increasing resilience are becoming primary in wastewater treatment, along with traditional goals of protecting human health and water quality. Sustainable designs, defined as design of human/industrial systems to ensure that use of natural resources and cycles do not lead to diminished quality of life due to losses in future economic opportunities or to adverse impacts on social conditions, human health, and the environment (Mihelcic et al., 2003) are needed to provide or replace sanitation policy and technology to meet increasing demands. The challenge for wastewater professionals is to design and operate treatment processes which are environmentally sensitive throughout the life-cycle and support human well being. This research focused on one technology for small-scale wastewater treatment: the vertical flow constructed wetland (VFCW), which was investigated for the capacity to remove ammonium and nitrate nitrogen from wastewater.



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