

Resource Recovery from Municipal Wastewater Treatment Plants: The Zimbabwean Perspective

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Abstract

Resource and water scarcity as a result of population growth and rapid urbanisation are on the increase. As such, there has been growing emphasis on the need to look into alternative sources of water supply and other scarce resources. Municipal wastewater treatment plants play a pivotal role in water recovery whilst simultaneously providing a source for the extraction of resources such as nutrients (phosphates and nitrogen), energy and other bi-products. This review paper discusses the current resource recovery practices from municipal wastewater treatment plants in Zimbabwe, identifying the gaps in literature and the barriers to resource recovery. Literature on municipal wastewater management and resource recovery in Zimbabwe highlights that direct land application is the major form of resource recovery from municipal wastewater plants. Literature also reveals that along the sewage sludge stream, the major form of resource recovery is biogas generation for energy recovery. The current barriers to enhanced resource recovery are financial and technical constraints, lack of expertise, public acceptance and the lack of planning and methodologies on how to effectively enhance resource recovery. To address these barriers, a framework to enhance resource recovery from municipal wastewater is proposed. The process emphasises on the need for an integrated approach incorporating research and collaboration for the development of engineering tools for modelling wastewater resource recovery systems, policy formulation and public awareness. There is a growing need to invest in enhanced resource recovery technologies to reap maximum benefits from municipal wastewater treatment plants in Zimbabwe.

Keywords: Municipal wastewater treatment, Resource recovery, Circular economy, Water reuse, Energy recovery, Nutrient recovery