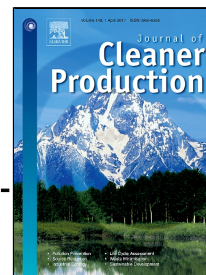


# Accepted Manuscript



Design of a multiplexed system for domestic wastewater of Happy Farmer's Home (HFH) and environmental evaluation using the emergy analysis (No.: **JCLEPRO-D-16-04725R2**)

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Keywords: domestic wastewater constructed wetland design emergy analysis Happy Farmer's Home

Abstract: Sewage management of Happy Farmer's Home (HFH) in remote rural and mountain areas constituted a challenge because of the lack of adequate infrastructure and economic capability. The biogas system (BS) was a simple wastewater treatment way and could promise reusable fuel, but lots of them had low adoptive rate and obsolescence with unsuitable management, so they also would become a pollution source when tourist peak emerged and brought about huge amounts wastewater. This paper designed a multiplexed system (BSCB), component of septic tank (ST), constructed wetland (CW) and bio-pond (BP), to share responsibility of wastewater treatment from the biogas system and surroundings and was recognized as a robust and economical ecotechnology capable of meeting these challenges. This study examined and evaluated, by means of the emergy analysis, the use of environmental resources for wastewater treatment in HFH. The purpose of the analysis was to determine whether or not the installation of the BSCB system on HFH wastewater treatment might result in monetary savings and benefit the environment. The analysis done here showed that the proposed design not only resulted in sharing the load of wastewater treatment in HFH, but also reduced pressure on the local environment by providing the option of recycling clean water. Furthermore, the emergy analysis which used inputs both from natural ecosystems and the human economy, allowed a quantitative evaluation of the environmental savings due to water reused as well as the environmental impact due to the wastewater treatment process. It was demonstrated that BSCW system planted with a polyculture of ornamental plant species, besides the water treatment function, possessed several additional benefits including aesthetics and biodiversity enhancement.

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