Assessment of wastewater treatment alternatives for small communities: an analytic network process approach

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Abstract

The selection of the most appropriate wastewater treatment (WWT) technology is a complex problem since many alternatives are available and many criteria are involved in the decision-making process. To deal with this challenge, the analytic network process (ANP) is applied for the first time to rank a set of seven WWT technology set-ups for secondary treatment in small communities. A major advantage of ANP is that it incorporates interdependent relationships between elements. Results illustrated that extensive technologies, constructed wetlands and pond systems are the most preferred alternatives by WWT experts. The sensitivity analysis performed verified that the ranking of WWT alternatives is very stable since constructed wetlands are almost always placed in the first position. This paper showed that ANP analysis is suitable to deal with complex decision-making problems, such as the selection of the most appropriate WWT system contributing to better understand the multiple interdependences among elements involved in the assessment.