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A multicriteria analysis application for evaluating the possibility of reusing wastewater for irrigation purposes in a Greek region

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ABSTRACT

The objective of the present study was the evaluation of the possibility that the use of reclaimed municipal wastewater for irrigation purposes in a Greek region is sustainable. The irrigation uses that were examined included agricultural as well as landscape irrigation ones. Thus, a model aiming at evaluating the procedure of wastewater reuse in Greece was constructed. This model incorporates the necessary economic parameters as well as the most important social and environmental ones. The main goal was the integrated evaluation of wastewater reuse procedure in a Greek region or area. The methodology that was used for our model construction was a multicriteria decision making one (PROMETHEE II). More specifically, six alternative scenarios of wastewater advanced treatment and disinfection were fixed and, were afterwards evaluated on the basis of their scores in specific economic, social and environmental criteria. The scores were fixed considering literature data as well as data collected from surveys and experiments taking place mainly in Thessaly region, Greece. The main results of our evaluation showed that wastewater reuse for irrigation purposes in the above region could be sustainable, when considering not only the necessary economic parameters but also the most important social and environmental ones. Indeed, the use of a simple advanced treatment (i.e. filtration or coagulation–filtration) in comparison with ozone use as disinfectant was the best secondary effluent treatment scenario for the cases of both agricultural and landscape irrigation.

Keywords: Wastewater reuse; Irrigation; Integrated evaluation; Multicriteria analysis; Thessaly region

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