

Controlling seawater intrusion by treated wastewater recharge. Numerical modelling and cost-benefit analysis (CBA) at Korba case study (Cap Bon, Tunisia)

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ABSTRACT

Treated wastewater (TWW) reuse for managed aquifer recharge (MAR) is becoming an important measure for integrated water management in areas with water scarcity. Among reuse applications, interest in aquifer recharge to control seawater intrusion in coastal aquifers is growing worldwide. At the Korba-Mida aquifer (Tunisia), local aquifer recharge with treated urban wastewater has taken place through three infiltration ponds since 2008. An *ex post* Cost-Benefit Analysis (CBA) is presented to assess the recharge impact at the groundwater level in a coastal aquifer after 3 years of recharge. A MODFLOW-based groundwater numerical model was developed to guide the impact assessment. The local model results showed that the recharged volume was slightly higher than extractions. The economic results indicated that the internal rate of returns accounted for 14.46%, while the discount rate of project investment was 4%. According to the sensitivity analysis, this project is feasible for the present wastewater treatment cost (0.1 TND per m³, Tunis Dinar) and up to 0.25 TND per m³. Possible effects on groundwater quality as an added influential final externality cost were not considered.

Keywords: Seawater intrusion; Artificial recharge; Treated wastewater reuse; Cost-benefit analysis

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