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Investigating the possible measure to protect groundwater from polluted streams in Arid and Semi-Arid Regions: the Eastern Nile Delta case study

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Groundwater is the main source of drinking water in the Nile Delta. Unfortunately, it might be polluted by seepage from polluted streams. This study was carried out to investigate the possible measures to protect groundwater in the Nile delta aquifer using a numerical model (MT3DMS - Mass Transport 3-Dimension Multi-Species). The sources of groundwater contamination were identified and the total dissolved solids (TDS) was taken as an indicator for the contamination. Different strategies were investigated for mitigating the impact of polluted water: i) allocating polluted drains and canals in lower permeability layers; ii) installing cut-off walls in the polluted drains, and finally, iii) using lining materials in polluted drains and canals. Results indicated these measures effective to mitigate the groundwater pollution. In particular, the cut-off wall was effective for contamination reduction in shallow aquifers, whereas it had no effect in the deep aquifer, while lining materials in polluted drains and canals were able to prevent contamination and to protect the freshwater in the aquifers. It is worth mentioning that this study was partially supported by a bilateral project between ASRT (Egypt) and CNR (Italy).