

## Groundwater vulnerability assessment within the Dead Sea groundwater basin using GIS-based DRASTIC model and remote sensing data

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The assessment of groundwater vulnerability to contamination and the evaluation of human activity impact on the groundwater within the Dead Sea groundwater basin using DRASTIC model are the main two objectives of this study. DRASTIC model is composed of seven hydrogeologic parameters (Depth to water, net Recharge, Aquifer media, Soil media, Topography, Impact of vadose zone, and hydraulic Conductivity); however, the hydraulic conductivity was excluded due to the insufficient data. Three scenarios of GIS-based DRASTIC model were produced as a result of three scenarios of recharge parameter. The first scenario of recharge was estimated using rainfall, soil permeability, and slope parameters, while in the second scenario the fault system was added to the first scenario as considered a major source of recharge, and for the third scenario the fault system and the intersection locations between the fault system and the drainage system was added to the first scenario. Most of the study area was under low and moderate classes of vulnerability, whereas a small percentage of high class was existed in the study area, and the very high class was not appeared in the study area. Since the third scenario of DRASTIC model took into consideration all the possible factors of recharge (rainfall, soil permeability, slope, fault system and drainage system), it was considered the most suitable scenario. To evaluate the human activity impact (HAI) on the groundwater, land use/cover map was created using ASTER VNIR image acquired in 2004 and combined with scenario 3 of DRASTIC model. The HAI map revealed that there was a reduction in the percentages of very low, low and moderate classes, and an increase of the percentages of high and very high classes. Then, the HAI map compared with the average nitrate concentrations in each class which indicated that the groundwater is subjecting to pollution increases.