The title (العنوان):

Hybridization of GALDIT method to assess actual and future coastal vulnerability to seawater intrusion

APA Citation (توثيق APA):

Boufekane Abdelmadjid; Maizi Djamel; Madene Elaid; and other (2022). *Hybridization of GALDIT method to assess actual and future coastal vulnerability to seawater intrusion.* Journal of Environmental Management, vol318, p.539-556. DOI ou URL : https://www.sciencedirect.com/science/article/pii/S0301479722011537

Abstract : In the recent years, the coastal aquifer of Jijel plain (North Algeria) located on the south of the Mediterranean Sea was utilized for cities growth and agricultural development of the region. Consequently, overexploitation and seawater intrusion were identified as major risks to the groundwater resource. In this work, a new approach integrating groundwater vulnerability method and numerical model for predicting the actual and future seawater is proposed. The groundwater vulnerability assessment has been performed by applying the GALDIT method using GIS and the MODFLOW model was used to simulate the actual and future groundwater level of the aquifer over the period 2020–2050. Three scenarios were simulated under water demand and climate conditions (drought, recharge) to obtain the changes in the groundwater level variation. The results of the GALDIT model application to the actual conditions (year 2020) showed that the high class of groundwater vulnerability is located in the coastal fringe and the terminal stretches of wadis where the seawater intrusion limit is located at a distance range between 840 and 1420 m from the shoreline. However, the results for predicting future groundwater vulnerability showed that the scenario which proposed the artificial recharge basins, although predicting a worrying situation compared to the actual condition, has the best figure of the groundwater vulnerability assessment and seawater intrusion despite the other two scenarios. In this case the limit in the year 2050 is located between distances of 850–1640 m from the shoreline with a forward speed of seawater intrusion of 1–8 m/year, compared to the reference year 2020. This showed that groundwater level variation and recharge were the key factors in controlling groundwater vulnerability to seawater intrusion. The presented new approach can be used to mapping the actual and future groundwater vulnerability assessment to seawater intrusion and groundwater resources management in any coastal areas worldwide.

Key words : Coastal aquifer vulnerability ;Seawater intrusion ; GALDIT method ;Piezometric level ; Recharge ; Numerical model