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المستودع الرقمي للمدرسة العليا للري



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Spatial analysis and mapping of the groundwater quality index for drinking and irrigation purpose in the alluvial aquifers of upper and middle Cheliff basin (north-west Algeria)

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Abstract : The proposed study aims to assess groundwater quality and suitability of the Upper and Middle Cheliff plains (northwest of Algeria) for irrigation and drinking. Here the groundwater is the main source for domestic, agricultural and industrial activities similarly to any other region of the world. The suitability for drinking and for irrigation was evaluated on the basis of water quality index, salinity risk, hardness risk, sodium risk, magnesium risk, permeability index, water infiltration rate, Kelly index and Wilcox and Richards diagrams. The aquifer system is mainly composed of alluvium (gravel, sand, silt, clay, ...) from the Mio-Plio-Quaternary. The results of this study highlighted that the majority of the chemical elements analyzed exceed the WHO's drinking water standards and FAO's irrigation water standards. Based on the GroundWater Quality Index (GWQI) results, the Upper and Middle Cheliff groundwater plains shows Doubtful class in most of the plains. In addition, the GroundWater Quality Index for Irrigation (GWQII) shows the predominance of the Good/Permissible groundwater quality class in most of the plains. According to these results, drinking water can cause health problems (a danger) for the human consumption making necessary a proper treatment be able to use it. As for irrigation water, it does not present a danger for irrigating for the vast fields of the region, with the exception of sensitive crops such as: garlic, onion, beans and strawberry. The proposed approach demonstrated to be appropriate in assessing the groundwater quality for irrigation and drinking water supply since it can be easy applicable and suitable in humid, arid or semi-arid regions around the world.

Key words : GIS ; groundwater ; GWQI ; GWQII ; Semi-arid region

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