المجلة الجزائرية للمناطق الجافة
Journal Algérien des Régions Arides (JARA)
Algerian Journal of Arid Regions
CRSTRA
Scientific and Technical Research Centre for Arid Areas

Research Paper

Apport du SIG à l'établissement de la carte de vulnérabilité intrinsèque de la nappe d'Inféro-flux de l'Oued M'zab, Algérie

Contribution of the GIS to the establishment of the intrinsic map vulnerability of the water-table aquifer of the wadi M'zab, Algeria

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Received: 10 November 2019 ; Accepted: 08 December 2019; Published: December 2019

Abstract

Groundwater in arid zones is the main source of exploitable water. Due to their scarcity and the multiplication of pollution sources in certain regions (wastewater and industrial, raw dumps, chemical fertilizers, etc.), these resources require adequate protection. To this end, the establishment of vulnerability maps of groundwater to surface pollution is a decision-making tool of primary importance for the safeguarding of local resources. The method applied for this purpose was the GOD method. This parametric method, numerically rated and filing system, remains relatively simple and convenient use does not require the provision of many parameters difficult to acquire in this context. According to the requirements of the method, the integration and the combination of raster-mode hydrogeological index maps, in a GIS under ArcGIS environment, made it possible to elaborate the map of intrinsic vulnerability indices of the aquifer water-table of Oued M'zab. The results reveal the predominance of four classes of vulnerability indices : zero vulnerability class, located on the peripherals of the study area, moderate vulnerability class which mainly coincides with areas of high oasis activity, high vulnerability class, which extends over the entire surface of the M'zab valley from upstream to downstream (45%), but the fourth very high vulnerability class, was located in the central part along the minor bed of the M'zab wadi represents 2% of the study area. An analysis campaign of potentially polluting elements was carried out on about twenty wells (BOD_5, DCO, nitrates and dissolved oxygen) in order to validate the vulnerability map established. The results of the analysis are almost perfectly in line with the vulnerability classes; high concentration values in sectors with high and very high vulnerability levels, on the other hand, low concentrations of pollutants are located in sectors with low vulnerability levels.

Key words: Intrinsic vulnerability, GIS, Oued M'zab, Pollution, Water-table aquifer.

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e-ISSN: 2676-2226, Published by: Scientific and Technical Research Centre for Arid Areas (CRSTRA)