

Assessment of the Groundwater Agricultural Pollution Risk: Case of the Semi-Arid Region (Batna-East Algeria)

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Abstract : The plain of Gadaïne - Ain Yaghout, located in the wilaya of Batna (Eastern Algeria), experiences intensive human activities, particularly in agricultural practices which are accompanied by an increasing use of chemical fertilizers and manure. These activities lead to a degradation of the quality of water resources. In order to protect the quality of groundwater in this plain and formulate effective strategies to mitigate or avoid any contamination of groundwater, a risk assessment using the European method known as "COSTE Action 620" was applied to the mio-plio-quaternary aquifer of this plain. Risk assessment requires the identification of existing dangers and their potential impact on groundwater by using a system of evaluation and weighting. In addition, it also requires the integration of the hydrogeological factors that influence the movement of contaminants by means of the intrinsic vulnerability maps of groundwater, which were produced according to the modified DRASTIC method. The overall danger on the plain ranges from very low to high. Farms containing stables, houses detached from the public sewer system, and sometimes manure piles were assigned a weighting factor expressing the highest degree of harmfulness; this created a medium to high danger index. Large areas for agricultural practice and grazing are characterized, successively, by low to very low danger. Therefore, the risks present at the study site are classified according to a range from medium to very high-risk intensity. These classes successively represent 3%, 49%, and 0.2% of the surface of the plain. Cultivated land and farms present a high to very high level of risk successively. In addition, with the exception of the salt mine, which presents a very high level of risk, the gas stations and cemeteries, as well as the railway line, represent a high level of risk.

Keywords : semi-arid, quality of water resources, risk assessment, vulnerability, contaminants

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