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Monitoring the risk of nitrate and pesticides Pollution in Mnasra groundwater and soil under Field Condition–Morocco

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Agricultural activities are probably the most significant anthropogenic sources of nitrate an pesticides contamination in groundwater and soil. Irrigation system is among the causes behind leaching of nitrate and pesticides from soil surface to groundwater. Gharb plain is the largest agriculture irrigated zone in northwest of Morocco, well known for its intensive agricultural activities. The excessive use of fertilizers and manure under gravity irrigation system, presents a huge risk to groundwater quality especially for sandy-loam soils similar to those of the area. The purpose of the present study was the evaluation of the level of nitrate and pesticides contamination in groundwater and soil, and the attempt to relate it to the irrigation system adopted in Gharb area. A set of 108 water samples and 60 soil samples were collected from ten selected sites located in the area during agricultural seasons, from May 2010 to September 2012. The results reveal that 89.7% of water samples exceeded the standard limit of nitrate concentrations for groundwater (50 mg/L). These results could be explained by the prevailing sandy nature of the soil in the area, the frequency of fertilizer usage, and the shallow level of the water table, which favors the leaching of nitrate from field to groundwater. In contrast, the selected pesticide molecules were not detected in the analyzed soil and water samples; levels were below the quantification limit in all samples.). Attempts to focus on the main physical and chemical factors behind the magnitude of contamination are discussed