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Abstract: In a basin, the increase of the water demand in all sectors creates a giant problem of water scarcity. Precipitation is the only major source to mitigate this problem. However, groundwater recharge is an important hydrological parameter for the quantification of the water budgets quantification in order to achieve a better sustainable groundwater management. In the Macta basin (Western Algeria), the average annual precipitation is insufficient in most of the part especially during summer season. In this region, the recharge is a difficult parameter to calculate due to its variabilities: climatic, geological, hydrogeological, soil, etc. The aim of this study is to propose a new method of identifying potential recharge zone which is applicable to watersheds. For this study and in order to identify the potential groundwater recharge areas in the Macta watershed, a new method has been applied. In this approach, two considerations must be taken into account for the selection of potential recharge areas, remote sensing and GIS which allow the analysis of the water harvesting structure for extracting the information of various features such as lineament, land use/land cover, soil, slope, lithology, drainage, rainfall, etc. In order of importance, we have assigned weights for each feature. Slope and design discharge are parameters' key in site suitable analysis, so we assigned a maximum weight to this parameters. A possible suitable map site for water harvesting/conservation structures was derived following an analytical hierarchy process (AHP) and multi-criteria decision analysis (MCDA). The data are combined through a multi-criteria analysis to facilitate the spatial analysis and the identification of appropriate zones recharge areas. The results indicate that potential areas of high recharge account for about 32% of the total watershed area. They are mainly located in the south center and appear fragmented in the north of watershed, which mainly match to the permeable areas. These results depict the groundwater potential zones in the study area and provide the information for the proper planning and groundwater resources management.

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Key words: Watershed ; Macta ; Groundwater ; Recharge zone ; GIS ; Remote sensing

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