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A GIS Based Approach in District Peshawar, Pakistan for Groundwater Vulnerability Assessment Using DRASTIC Model

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Abstract : In urban and rural areas groundwater is the most economic natural source of drinking. Groundwater resources of Pakistan are degraded due to high population growth and increased industrial development. A study was conducted in district Peshawar to assess groundwater vulnerable zones using GIS based DRASTIC model. Six input parameters (groundwater depth, groundwater recharge, aquifer material, soil type, slope and hydraulic conductivity) were used in the DRASTIC model to generate the groundwater vulnerable zones. Each parameter was divided into different ranges or media types and a subjective rating from 1-10 was assigned to each factor where 1 represented very low impact on pollution potential and 10 represented very high impact. Weight multiplier from 1-5 was used to balance and enhance the importance of each factor. The DRASTIC model scores obtained varied from 47 to 147. Using quantile classification scheme these values were reclassified into three zones i.e. low, moderate and high vulnerable zones. The areas of these zones were calculated. The final result indicated that about 400 km2, 506 km2, and 375 km2 were classified as low, moderate, and high vulnerable areas, respectively. It is recommended that the most vulnerable zones should be treated on first priority to facilitate the inhabitants for drinking purposes.

Keywords : DRASTIC model, groundwater vulnerability, GIS in groundwater, drinking sources
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