



## **Groundwater quality evaluation of Jabal Al-Hasawneh, Libya**

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Groundwater is an important water source for agricultural, drinking, and domestic uses in Libya. The aim of this study was to assess the quality of groundwater for agricultural use in Jabal Al-Hasawneh, Libya. Monitoring and evaluation of chemical water parameters was carried out in 466 observation wells. Chemical characteristics such as pH, electrical conductivity (EC), total hardness (TH), sodium adsorption ratio (SAR), cations ( $\text{Ca}^{2+}$ ,  $\text{Mg}^{2+}$ ,  $\text{Na}^{+}$ , and  $\text{K}^{+}$ ), anions ( $\text{Cl}^{-}$ ,  $\text{SO}_4^{2-}$ ,  $\text{HCO}_3^{-}$ ,  $\text{NO}_3^{-}$ ), and turbidity (TUR) were evaluated to assess the suitability of groundwater for irrigation purposes by comparing their current values with the permissible limits of these parameters that are recommended by FAO. Piper, Wilcox and multi-cation diagrams were used to evaluate the suitability of groundwater for irrigation. Results showed that  $\text{Ca}^{2+}$  and  $\text{Na}^{+}$  are the predominant cations while  $\text{Cl}^{-}$ ,  $\text{SO}_4^{2-}$  are predominant anions. Hydrochemical facies in Piper diagrams show that the dominance ions controlling the quality of groundwater were calcium ( $\text{Ca}^{2+}$ ) and chlorides ( $\text{Cl}^{-}$ ). According to Wilcox; about 90% of the water samples are classified as high salinity water. Continuous application of such water may increase soil salinity in the future. However, SAR values of all the samples are found to be less than 10 and classified as very good for irrigation. Wilcox or the US salinity (USSL) diagrams showed that all samples are grouped within C3S1 classes. Most of the groundwater samples are therefore considered suitable for irrigation. However, certain measures for salinity control have to be taken to secure safe use of irrigation water for soil health and sustainable crop production.