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## Assessment of Groundwater Quality under Changing Climate in Ngorongoro Conservation Area, Tanzania

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### Abstract

Understanding the hydrochemical composition of water resources in the Ngorongoro Conservation Area (NCA, Dodoma, Tanzania) related to climate variability is essential for sustainable development. Thus, the current study used the HYDRUS-1D model to assess the groundwater quality change due to the leaching of hydrochemicals from surface water under the climate variability of the NCA. This study observed that the area's surface water had varying hydrochemical contaminants, whereas the groundwater is currently most suitable for drinking and domestic purposes. However, it is predicted that two anions ( $\text{Cl}^-$  and  $\text{PO}_4^{3-}$ ) and two cations ( $\text{Na}^+$  and  $\text{K}^+$ ) are expected to exceed the permissible limits from 2036 to 2050, considering the anticipated climatic conditions. Changes in groundwater quality for cations and anions are significantly correlated to evapotranspiration and temperature, with Pearson's coefficient of determinations  $r$

between 0.35 and 0.66. The findings of this study are necessary to benchmark better water resources management planning.