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Hydrochemical Approach for Irrigation Suitability of Groundwater in Krishkindapalem of Krishna Delta, Andhra Pradesh

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Abstract

Assessment of irrigation suitability of groundwater in Krishkindapalem of Krishna delta, Andhra Pradesh was carried out by hydrochemical approach. Total 21 groundwater samples were collected and analyzed using the standard methods. The results indicate that the groundwater is mildly alkaline in nature; electrical conductivity (EC) varies from 652 to 5310 $\mu\text{S}/\text{cm}$. More than 67% of the groundwater samples have TDS value of $< 2000\text{mg}/\text{L}$, which is within permissible limit of potable water. Groundwater of this area is mainly classified as mixed and Na-Cl types. The high percentage of mixed-type waters indicates the possibility of dilution of groundwater and comparatively Na-Cl water type, where maximum nitrate content of 287mg/L and fluoride (F) concentration of 0.45mg/L is observed. This indicates that the agricultural activity and small scale urbanization have its impact on the groundwater quality.

Various parameter such as soluble sodium percentage (SSP), sodium adsorption ratio (SAR), residual sodium carbonate (RSC), Kelley's ratio (KR), permeability index (PI), residual sodium bicarbonate (RSB) and magnesium absorption ratio (MAR) of the groundwater samples show that overall 62% of the samples are suitable for irrigation, which counts for only 10% of the samples in terms of salinity. The chloro-alkaline indices (CAI) were used for distinguishing regional recharge and discharge zones. The corrosivity ratio (CR) was utilised for demarcating areas where non-corrosive pipes are to be used for groundwater supply for irrigation.

Keywords: Groundwater quality, Irrigation suitability, Recharge and discharge zones, Krishkindapalem, Krishna delta, Andhra Pradesh