Groundwater Recharge Challenges

Source: DTE

A recent study estimated **groundwater recharge rates** in Australia using the **Chloride Mass Balance (CMB) method,** indicating that climate and vegetation significantly influence recharge rates.

- The CMB is a tracer technique that is used to **quantify the recharge rates for groundwater wells** in a dry environment using the **chloride content** of both precipitation and groundwater.
- Researchers state that the groundwater recharge rate is influenced by **climate and vegetation factors.**
    - Climate-related variables include rainfall distribution and evapotranspiration, while vegetation-related factors include the health and density of vegetation.
    - Soil properties and geographic variation also influence the rate of groundwater recharge.
- The study emphasised the importance of **considering changes in land-use patterns,** especially in rapidly urbanising areas, to increase groundwater recharge rates.
- In India's context, **Bengaluru's rapid urbanisation has led to a drastic reduction in green spaces and waterbodies,** with built-up areas increasing from 8% in 1973 to 93% in 2020. This has resulted in a severe **groundwater crisis,** with declining levels each year.
- In India, few studies estimate groundwater recharge rates using CMB, and large-scale analyses of chloride deposition are yet to be attempted.
    - The **Water Table Fluctuation (WTF)** method is common in India, estimating groundwater recharge by monitoring water level changes in wells.
- It is crucial for Indian cities to accurately estimate groundwater recharge rates and explore scientific measurement methods.

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