Nitrogen Contamination in Groundwater

Why in News?

An assessment of India's groundwater by the Central Ground Water Board (CGWB) found that several States are grappling with a serious problem of nitrate contamination.

- **Concerns** – The number of districts with excessive nitrate in their groundwater *rose from 359 in 2017 to 440 in 2023*.
- Nearly *56% of India's districts having excessive nitrate* in ground water, defined as having ***more than 45 mg/l (milligram per litre***).
- **Nitrogen in groundwater** – Although nitrate is the main form in which nitrogen occurs in groundwater, dissolved nitrogen also occurs in the form of
  - Ammonium (NH4+)
  - Ammonia (NH3)
  - Nitrite (NO2-)
  - Nitrogen (N2)
  - Nitrous oxide (N2O)
  - Organic nitrogen.
- **Vulnerable areas** - *Rajasthan, Karnataka and Tamil Nadu.*
- Maharashtra, Telangana, Andhra Pradesh and Madhya Pradesh also show notable levels of nitrate contamination.
- **Impact human health** – It leads to ***methemoglobinemia***, or a reduced ability of red blood cells to carry oxygen.
- **Impact environment** – Once the nitrates in the groundwater rise to the surface and become part of lakes & ponds, *algal blooms emerge.*

Other Major chemical contaminants of Groundwater
• **Contaminants** – Arsenic, iron, fluoride and uranium. • **Fluoride** – It exceeds the permissible limit in Rajasthan, Haryana, Karnataka, Andhra Pradesh and Telangana. • **Uranium** – It exceeds 100 ppb (parts per billion) in Rajasthan and Punjab.

> *India's degree of groundwater extraction is 60.4%, or roughly the same as it has been through the years since 2009. About 73% of the blocks are in the 'safe' zone, meaning that they are replenished enough to compensate for water drawn out.*
>
> ***Piezometers*** *measure groundwater levels and transmit the information digitally to a centralised location.*

Reference

[The Hindu| Assessment of Groundwater Contamination in India]

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