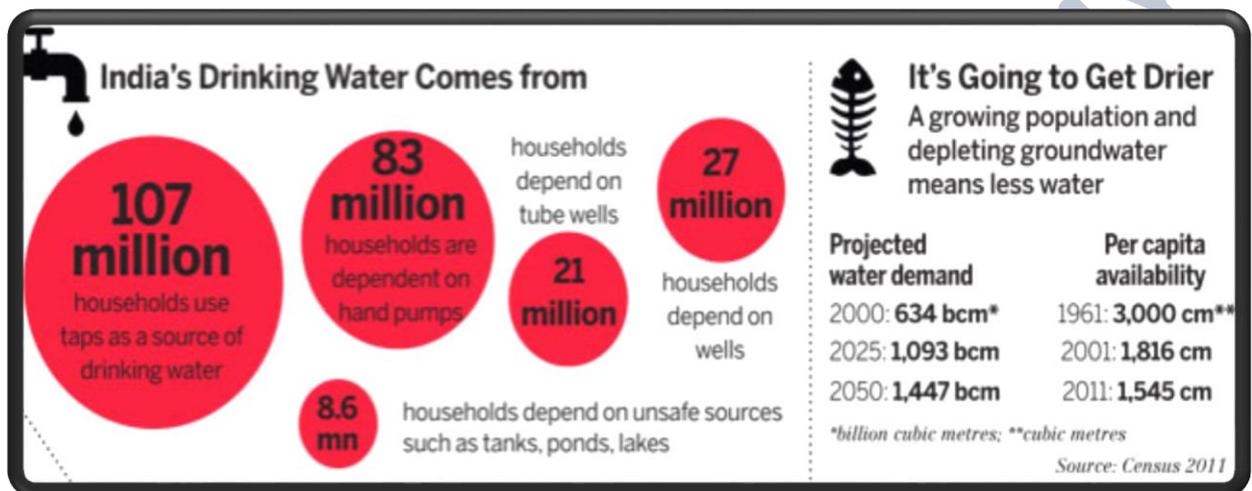


Environment and Ecology: Groundwater depletion – a national crisis.

GS Paper 3: Biodiversity – Conservation, environmental pollution and degradation, environmental impact assessment.



Groundwater, aquifer, water table

Groundwater is the water present beneath Earth's surface in soil pore spaces and in the fractures of rock formations. A unit of rock or an unconsolidated deposit is called an aquifer when it can yield a usable quantity of water. The depth at which soil pore spaces or fractures and voids in rock become completely saturated with water is called the water table.

Water in the aquifers

Aquifers are typically made up of gravel, sand, sandstone, or fractured rock, like limestone. Water can move through these materials because they have large connected spaces that make them permeable. The speed at which groundwater flows depends on the size of the spaces in the soil or rock and how well the spaces are connected. Water in aquifers is brought to the surface naturally through a spring or can be discharged into lakes and streams. Groundwater can also be extracted through a well drilled into the aquifer.

REASONS FOR GROUNDWATER CRISIS

We continuously pump groundwater from aquifers and it does not have enough time to replenish itself.

It accounts for 63% of all irrigation water & over 80% of rural & urban domestic supplies.

Unmetered, non-volumetric & highly subsidised tariff for groundwater pump resulting in overuse.

Government encourages farmers to produce water-intensive crops like sugarcane & rice through MSP.

More and more bore wells is being dug every day and there is no regulation regarding it.

Uncertain climate reliant recharge and indiscriminate land uses with increasing urbanisation.

Trans - boundary upstream water resources and archaic irrigation method aggravates the problem.

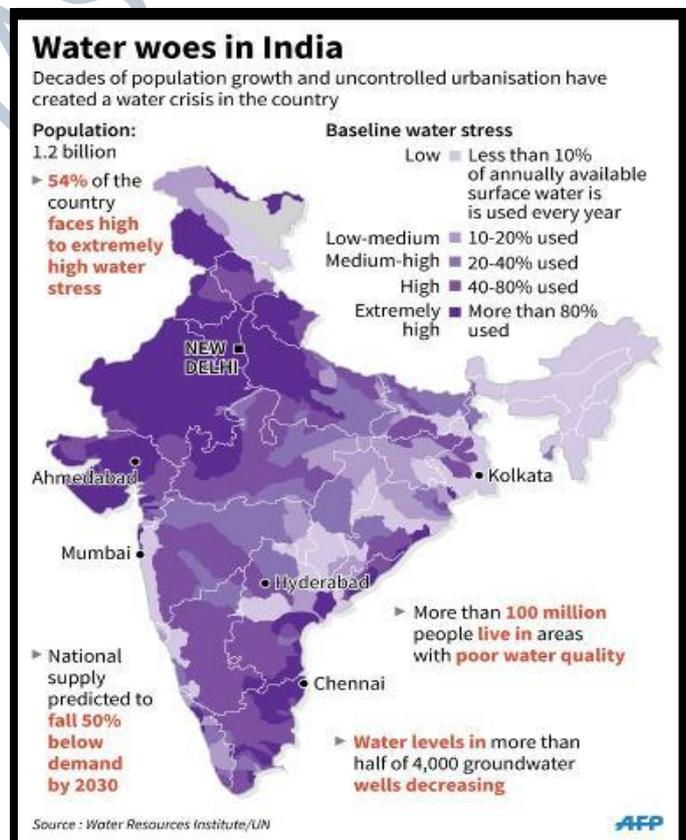
Groundwater in India

Groundwater is one of the most important water sources in India accounting for 63% of all irrigation water and over 80% of the rural and urban domestic water supplies. 54 percent of India's groundwater wells have declined over the past seven years and 21 major cities are expected to run out of groundwater by 2020.

Statistics about India's groundwater depletion are depressing. The growing dependence on groundwater has taken the form of unsustainable over-extraction, which is lowering the water table and adversely impacting drinking water security. India extracts more groundwater than any other country in the world. India accounts for 25 percent of the world's extracted groundwater, more than the next two countries, China and the United States, combined.

Solving the problem

- One of the proposed ways to reduce groundwater extraction is by reducing electricity subsidies. An analysis of panel data across



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370 districts in India found that a reduction in electricity subsidy was correlated with a decrease in groundwater extraction. On average, a 10% reduction in electricity subsidy generated a 6.7% decrease in groundwater extraction.

- Another way of efficiently using groundwater is by encouraging farmers to adopt micro-irrigation techniques such as drip irrigation and micro-sprinklers. According to the CWMI report, adopting micro-irrigation techniques can save roughly 20% of the groundwater used annually on irrigation in India.
- Creating sustainable change would require a bottom-up approach by empowering the local community to become active participants in managing groundwater. In line with this, the central government in its 12th five-year plan proposed a policy of participatory groundwater management (PGM), which involves a collaborative approach among government departments, researchers, NGOs and community members. The plan involves training community workers to carry out aquifer mapping and implement innovative ways to use groundwater conservatively with the local community.

Questions

1. What would be the impacts of growing crisis of groundwater in India?
2. Enumerate viable solutions for tackling the growing problem of groundwater depletion in India.