Strengthening Groundwater Management for India's Water Future

Mains: *GS-III – Ecology & Environment*

Why in News?

India has a multi-layered strategy to manage groundwater through monitoring infrastructure, regulatory frameworks, and community-driven initiatives, schemes like Atal Bhujal Yojana, Jal Shakti Abhiyan, etc in ensuring long-term water security and achieving SDG goals.

Why groundwater management matters?

- **Groundwater** – It is a freshwater that seeps into soil and rocks, where it is stored underground before naturally emerging or being drawn for human use.
- It maintains water levels in many rivers and streams, and it strongly influences the habitats of wetlands for plants and animals.
- The underground layer that can store and transmit ground water in sufficient quantities is called as Aquifer.
- **Groundwater's status on Earth** – It comprises ***nearly 99% of Earth's liquid freshwater*** and offers substantial social, economic, and environmental benefits, including climate resilience.
- **Status in India** – The groundwater serves as the primary foundation of agricultural activity and drinking water supply, meeting nearly 62% of irrigation needs, 85% of rural consumption, and 50% of urban demand.
- **Reasons for Pressures on Groundwater Systems** – Rapid population growth, agrarian intensification, industrial expansion, and urbanisation have collectively intensified pressure on groundwater systems in the country.

What are the key pillars and priorities of Groundwater Management?

3 pillars

- **Extraction/Usage** – Pumping for domestic, irrigation and industrial purposes
- **Problems/Usage** – Decline in groundwater levels, contamination/poor ground water quality
- **Management measures** – Demand side: Reduction in ground water withdrawal & Supply side: Artificial recharge/water conservation.

4 key priorities

- As per the United Nations Educational, Scientific and Cultural Organization (UNESCO), 4 key priorities includes

- Maintaining a dynamic water cycle to support natural recharge
- Balancing ecological and human needs to ensure environmental protection
- Preserving reserve supplies to safeguard against drought
- Aligning use with quality requirements so that groundwater quality matches its purpose.

What are the government initiatives to strengthen groundwater management?

- **Model Groundwater (Regulation and Control of Development and Management) Bill** – It focus on regulation & sustainable extraction of groundwater.
- **Adoption** – So far, 21 States/UTs (including Bihar, Punjab, Haryana, Himachal Pradesh) have adopted it.
- **Jal Shakti Abhiyan: Catch the Rain (JSA: CTR)** – Launched in 2021, coinciding with World Water Day, focuses on awareness, rainwater harvesting, afforestation, strengthening the message that every drop counts.
    - **Achievement** – Includes revitalisation of borewells, geo-tagging of water bodies, 1.64 billion afforestation activities, etc were carried out.
- **Jal Sanchay Jan Bhagidari (JSJB)** – It was launched under the JSA: CTR campaign on 6 September 2024.
- **Objective –** To improve groundwater recharge through measures such as rainwater harvesting, aquifer recharge, borewell recharge, and recharge shafts.
- **Achievements –** By 22 January 2026, the total number of artificial groundwater recharge and storage works completed cumulatively under JSJB 1.0 and JSJB 2.0 stands at 39,60,333.
- **National Aquifer Mapping and Management Programme (NAQUIM)** – To support effective groundwater management in the country.
- **NAQUIM 2.0 –** Implemented by Central Ground Water Board (CGWB), provides high-granularity data density on groundwater levels and quality and delivering issue-based scientific inputs up to the Panchayat level.
    - **Targets** – Water-stressed, coastal, urban, spring-shed, industrial and mining, command, deep aquifer, auto flow, and poor-quality groundwater areas, with area-specific and user-focused outputs.
- **Master Plan for Artificial Recharge to Groundwater-2020** – To promote terrain-specific recharge techniques based on water availability and aquifer storage capacity.
    - **Achievement** – The master plan targets 1.42 crore recharge structures to add 185 BCM groundwater using terrain-specific methods.
- **Atal Bhujal Yojana (Atal Jal)** – Launched on 25 December 2019, to focuses on community-led sustainable groundwater management.
    - **Implementation** – In 7 water-stressed states namely Gujarat, Haryana, Karnataka, Madhya Pradesh, Maharashtra, Rajasthan, and Uttar Pradesh.
- **Mission Amrit Sarovar –** Launched on 24 April 2022, to supports the creation of Amrit Sarovars (ponds) across all districts in the country.
- **Groundwater Infrastructure for Monitoring, Restoring, and Knowledge Support** – India has a network of 43,228 groundwater level monitoring stations,

comprising stations operated by the Central Ground Water Board (CGWB).
- **Jal Shakti Kendra (JSK)** – It functions as a district-level technical guidance centre, advising stakeholders on rainwater harvesting and serving as a knowledge hub for disseminating information and providing technical support on water conservation practices.
- As of 30 December 2025, a total of 712 Jal Shakti Kendras (JSKs) are operational across India.

What are the necessities for groundwater management in India?

- **Groundwater Reserves in India** – India possesses extensive groundwater reserves whose physical characteristics and availability vary widely across regions.
- **Rising pressure on groundwater systems** – Intensive and largely unregulated pumping has led to rapid declines in water tables across many parts of the country, signifying growing dependence on subsurface sources.
- **Degradation of water quality** – Contamination arising from mining, industrial effluents, and agricultural practices, combined with naturally occurring elements such as arsenic and fluoride, posing long-term environmental and public health risks.
- **Drivers of uncontrolled abstraction** – The sharp increase in groundwater extraction has been driven by the availability of affordable drilling techniques and pumping technologies, enabling even small farmers and low-income households to construct and operate private tube wells.
- **Government's Commitment** – The growing groundwater crisis has strengthened the Government's commitment to effective management, reaffirmed by India's COP 21 commitment to climate resilience and long-term growth.
- **Link to SDG –** Effective groundwater management is vital for achieving the Sustainable Development Goals, especially SDG 6, SDG 11, and SDG 12.

What lies ahead?

- **India's response** – India has embraced a comprehensive and multi-layered approach combining policy reform, scientific assessment, infrastructure creation, and community participation, led by the Ministry of Jal Shakti.
- Key initiatives taken by the government jointly reinforce recharge, monitoring, regulation, and demand side management.
- **Institutional Support** – Supported by an extensive network of groundwater monitoring stations, advanced data systems, and local knowledge centres for community engagement.
- **Transition Ahead** – These efforts mark a transition towards scientifically informed, participatory, and outcome-oriented groundwater governance, establishing a durable framework for long term sustainability, climate resilience, and the achievement of national development goals.

Reference

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