India’s Water Success Story and Challenges

Mains: *GS III – Groundwater in India*

Why in News?

The Recently released NFHS data reveal a contrasting picture about the water security in India.

What is the status of water security and accessibility ion India?

- **Significant progress** – India has made remarkable progress in expanding access to drinking water over the last decade.
- The launch of the Jal Jeevan Mission (JJM) in 2019 marked a watershed moment in the country's efforts to provide safe and accessible drinking water to rural households.
- Millions of homes that previously depended on wells, hand pumps, public standposts and distant water sources now possess tap-water connections within their premises.
- This achievement has significantly reduced the burden on women and children, improved public health outcomes and enhanced the quality of life in rural India.
- **Existing challenge** - The existence of a tap connection does not necessarily guarantee the regular availability of water.
- As India transitions from addressing "access poverty" to ensuring dependable service delivery, a new concern has emerged: "reliability poverty."
- **NFHS findings** – The findings from the National Family Health Survey-5 (NFHS-5) suggest that while infrastructure coverage has expanded rapidly, reliable water supply remains uneven across regions. This paradox has important implications for India's future water governance and climate resilience strategies.
- Major disruption hotspots were identified in, *Western India, Rajasthan, Parts of the Western Ghats, Himalayan districts and Northeastern states.*
- In contrast, relatively lower levels of disruption were observed across sections of *the Indo-Gangetic Plain and eastern India*.

Why more pipes do not always mean more water?

- **Dependence on Complex Systems –** Households connected to centralized water networks depend on multiple interconnected components like, Reservoirs and dams, Groundwater sources, Water treatment plants, Pumping stations, Electricity supply, Distribution pipelines.
- A failure at any stage can disrupt water delivery to thousands of households simultaneously.
- **Growing Demand –** Urbanization, population growth and rising living standards have

significantly increased water demand.
- Existing systems often struggle to keep pace with this growing pressure.
- **Groundwater Stress –** Many regions depend heavily on groundwater extraction. Declining groundwater levels reduce the sustainability of supply systems and increase vulnerability during dry periods.
- **Infrastructure Maintenance Deficits –** While considerable investments have been made in infrastructure creation, maintenance and operational efficiency often receive less attention.
- Aging pipelines, leakages and equipment failures can compromise service reliability.
- Therefore, expanding infrastructure alone is insufficient unless accompanied by robust operation and maintenance systems.

How climate change acts as stress multiplier?

- **Heatwaves –** Rising temperatures increase water demand for domestic, agricultural and industrial purposes while simultaneously reducing available resources.
- **Erratic Rainfall –** Changes in monsoon patterns affect reservoir recharge and groundwater replenishment.
- **Droughts –** Prolonged droughts reduce water availability and strain supply systems.
- **Floods –** Extreme rainfall events can damage infrastructure, contaminate water sources and disrupt distribution networks.
- Many of the water disruption hotspots identified through NFHS-5 overlap with regions experiencing climatic stress, suggesting that climate change is amplifying existing vulnerabilities.

What are the lessons from different regions?

- **Karnataka and Bengaluru –** The water crisis experienced in Bengaluru during 2024 highlights the difference between infrastructure and reliability.
- Despite extensive network coverage, residents faced water rationing, dependence on tankers and uncertainty regarding supply.
- Weak monsoons, declining groundwater levels and reservoir stress exposed vulnerabilities in the city's water system.
- **Rajasthan and Gujarat –** Both states have invested heavily in dams, canals and groundwater development projects.
- Yet many districts continue to experience chronic water stress due to, Groundwater depletion, Recurring droughts, Ecological constraints.
- These examples demonstrate that engineering solutions alone cannot guarantee sustainable water security.
- **Northeastern States –** The Northeast receives abundant rainfall, yet cities such as Aizawl have experienced severe water disruptions.
- Power failures, pipeline damage and treatment challenges interrupted water supply despite the availability of water resources.
- This illustrates an important principle: water availability and water accessibility are not always the same.

Water scarcity & The Concept of Reliability Poverty

• India's water discourse has traditionally focused on "access poverty"—the absence of safe and convenient water sources.
• However, a new challenge is emerging: "reliability poverty."
• Reliability poverty occurs when, Households possess tap-water connections, and Infrastructure exists.
• Yet water supply remains irregular, intermittent or unpredictable.
• The causes include:
  - Groundwater depletion.
  - Climate variability.
  - Electricity disruptions.
  - Infrastructure failures.
  - Poor maintenance.
  - Weak governance mechanisms.
• As centralized water systems expand, reliability poverty may become a major dimension of water insecurity in India.

What are the policy implications for sustainable water security?

- **Strengthening Monitoring Frameworks –** Performance indicators should include, Frequency of water supply, Duration of service interruptions, Water quality, Infrastructure functionality, Source sustainability.
- **Climate-Resilient Infrastructure –** Water systems must be designed to withstand climate-related shocks and stresses.
- **Groundwater Recharge and Watershed Management –** Sustainable resource management is essential to maintain long-term water availability.
- **Improving Operations and Maintenance –** Adequate funding and institutional capacity for maintenance can significantly improve reliability.
- **Community Participation –** Local communities should play a greater role in monitoring service delivery and ensuring accountability.
- **Integrated Water Resource Management –** A holistic approach linking water supply, groundwater management, climate adaptation and ecosystem conservation is necessary.

What are the ethical dimensions involved?

- India's emerging challenge of "reliability poverty" raises several ethical concerns.
- **Equity and distributive justice** demand that all citizens receive not only water connections but also reliable access to water.
- **Environmental stewardship** requires sustainable groundwater use to safeguard resources for future generations (intergenerational equity).
- **Accountability and transparency** are essential in ensuring that public investments under schemes like Jal Jeevan Mission translate into actual service delivery.
- **Human dignity** and the right to water are compromised when households face intermittent supply despite having infrastructure.
- **Climate justice** requires protecting vulnerable communities disproportionately affected by water scarcity and climate-induced

disruptions.

What lies ahead?

- As climate variability intensifies, groundwater resources decline and dependence on centralized networks increases, India's water challenge is evolving.
- The focus must shift from merely providing connections to ensuring continuous, safe and dependable service.
- Ultimately, the success of India's water policies will not be measured solely by the number of taps installed but by whether water continues to flow reliably when households need it most.
- This transition from infrastructure provision to service assurance will define the next chapter of India's water security journey.

Reference

Down to Earth| Water Security in India

