

EDITORIAL

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Tackling Water Stress in India: Challenges, Policies, and the Road Ahead

Introduction:

- The **Global Commission on the Economics of Water** warns of a potential **global water crisis** by 2030, with demand exceeding supply by 40%, posing risks to food security and economies worldwide.
- For India, which is already grappling with **water disputes** and **conservation issues**, the report emphasizes the urgent need for effective **water management reforms**.

Current Water Availability and Stress Levels in India:

1. Declining Water Availability:

- India's per capita water availability dropped from **1,816 cubic meters in 2001** to **1,545 cubic meters in 2011**.
- The **Central Water Commission** predicts a further decline to **1,434 cubic meters by 2025** and **1,219 cubic meters by 2050**.

2. Water Stress Indicators:

- Water stress begins when per capita water availability falls below **1,700 cubic meters**, and **water scarcity** occurs when it is below **1,000 cubic meters**.
- Presently, India is under **water stress**, with regional disparities due to **climatic and geographic variability**.

3. Statistics on Water Stress:

- As per the **15th Finance Commission**, around **600 million Indians** faced high to extreme water stress in 2020.

Key Water-Related Challenges in India:

1. Groundwater Depletion:

- Over-extraction for irrigation has led to a **significant drop** in groundwater levels, particularly in agricultural regions.
- In states like **Punjab**, groundwater levels have dropped to **150-200 feet**, compared to the ideal **50-60 feet** depth.

2. Urban Water Scarcity:

- Rapid urbanization has worsened **water scarcity** in major Indian cities.
- According to **NITI Aayog's Composite Water Management Index**, nearly **600 million** people face high water stress.
- **Bengaluru's** water crisis in 2023, exacerbated by inadequate rainfall, exemplifies urban water challenges.

3. Irrigation Inefficiency:

- Agriculture consumes nearly **78% of India's water resources**. However, inefficient irrigation practices lead to significant water wastage.
- Indian farmers use **3-5 times more water** than their counterparts in the **US, China, or Israel** for similar crop yields.
- **Irrigation efficiency in India** stands at **38%**, below the global average of 50-60%.

4. Water Pollution:

- India's rivers are severely polluted, particularly by **untreated sewage and industrial effluents**.
- The **Central Pollution Control Board (CPCB)** identified **311 polluted river stretches** across **30 States/UTs**.
- Rivers like the **Yamuna** are heavily contaminated due to **biomedical waste**, construction debris, and untreated sewage.

5. Impact of Climate Change:

- **Climate change** intensifies water stress by causing erratic weather patterns, such as **frequent floods and droughts**.
- The 2023 monsoon saw **extreme rainfall variations**, contributing to both droughts and floods across different regions.

6. Fragmented Water Governance:

- Multiple authorities, with overlapping responsibilities, lead to **poor coordination** in water management.
- For example, **Delhi** has seven different agencies managing water, causing inefficiencies.

7. Inter-State Water Disputes:

- India faces numerous **inter-state water disputes** as water scarcity increases.
- The ongoing **Cauvery water dispute** between Karnataka and Tamil Nadu is a prime example.
- **Krishna-Godavari river disputes** further highlight the growing water-related tensions between states.

8. International Water Sharing Challenges:

- India's shared river basins with neighboring countries create complex **transboundary water issues**.
- Tensions with **Pakistan** over the **Indus Waters Treaty** and unresolved issues with **Bangladesh** regarding the **Teesta River** indicate the need for improved water-sharing agreements.

Key Government Initiatives for Water Conservation:

1. National Water Policy (2012):

- Advocates for **rainwater harvesting** and conservation efforts to increase water availability through **rainfall utilization**.

2. Jal Shakti Abhiyan (JSA):

- Launched in **2019**, this initiative aims to promote **water conservation and harvesting**.
- The 2024 phase, **Jal Shakti Abhiyan: Catch the Rain**, focuses on **constructing rainwater harvesting structures** across urban and rural areas.

3. Atal Bhujal Yojana:

- A community-led groundwater management program implemented in **80 districts** across **7 states**, focusing on **sustainable groundwater management**.

4. Pradhan Mantri Krishi Sinchai Yojana (PMKSY):

- Aims to improve **irrigation accessibility and efficiency** through various components like **water resource creation** and **micro-irrigation**.

5. Mission Amrit Sarovar:

- Focuses on creating and rejuvenating **75 water bodies** in every district to support **water harvesting** and conservation efforts.

6. National Aquifer Mapping (NAQUIM):

- A project by the **Central Ground Water Board** to map aquifers across India and develop **water conservation measures** through recharge structures.

Measures for More Effective Water Management in India:

1. Modernizing Irrigation Systems:

- Precision irrigation techniques like **drip** and **sprinkler systems** can enhance agricultural water efficiency.
- The "**Paani Bachao, Paisa Kamao**" scheme in Punjab incentivizes farmers to reduce groundwater usage.

2. Urban Water Management:

- Cities should focus on **reducing water losses**, implementing **water recycling**, and promoting **rainwater harvesting**.
- Chennai's initiative to recycle wastewater through **Tertiary Treatment Reverse Osmosis (TTRO)** plants is a successful model.

3. Community-Led Groundwater Management:

- Programs like **Atal Bhujal Yojana** encourage local communities to manage groundwater sustainably.
- **Aquifer mapping** and **awareness campaigns** can enhance local-level water management practices.

4. Water-Sensitive Infrastructure Design:

- Integrating **Blue-Green Infrastructure Models** into urban planning can improve water management.
- Reviving traditional water sources, like **Indore's well and bawdi restoration efforts**, has boosted urban water availability.

5. Enhancing Water Storage and Recharge:

- Small, decentralized **water storage structures** can enhance water availability.
- **Rajasthan's Jal Swavlamban Abhiyan** is a successful model for creating water harvesting structures in arid regions.

6. Data-Driven Water Management:

- Leveraging technology for **real-time monitoring** can improve water management efficiency.
- Systems introduced through the **National Hydrology Project** provide accurate, real-time data for reservoir management.

7. Smart Water Pricing Reforms:

- Dynamic water pricing based on availability and usage can be introduced, similar to **Singapore's tiered pricing model**.
- **Smart water meters** integrated with AI-driven analytics can help manage water pricing effectively.

Conclusion:

- Addressing India's water crisis requires a **holistic approach** that includes **technological advancements, community involvement, and effective governance**.
- By focusing on **modernizing irrigation, improving urban water management, and ensuring efficient water governance**, India can achieve sustainable water management practices in line with **Sustainable Development Goal 6 (SDG 6)**.

MAINS QUESTION

Climate change is exacerbating the water crisis in India by increasing the frequency of floods and droughts. How does climate change affect India's water resources, and what steps can be taken to build a climate-resilient water management system?