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Building Bureaucrats Since 2006

6. Water Budgeting – Environment

Water budgeting has emerged as an important tool for improving rural water governance amid rising water stress, groundwater depletion, and increasing agricultural demand in India. With 17.5% of global population and 11.6% of global livestock, India faces tremendous water pressure. Evidence-based water budgeting enables sustainable management balancing supply with demand.

1.What is Water Budgeting?

Definition and Methodology

1. Water budgeting involves a systematic assessment of water availability and demand within a defined geographical unit such as a village, watershed, block, or district.
2. Objective – Balancing water use with renewable availability ensuring long-term sustainability.
3. It estimates all sources of water availability including rainfall, surface water, and groundwater recharge.
4. Total demand from agriculture, households, livestock, and industry is compared against availability.

Key Components

1. Water availability assessment quantifies all sources including precipitation, runoff, and aquifer recharge.
2. Water demand analysis identifies usage across all sectors determining total requirements.
3. Gap analysis identifies surplus or deficit areas requiring policy interventions.
4. Sustainability evaluation ensures planned extraction does not exceed renewable availability.

2.Why India Needs Water Budgeting

Governance Support

1. Water budgeting supports informed and evidence-based decision-making preventing ad hoc policy.
2. It helps identify surplus and deficit areas enabling targeted interventions.
3. Ensures efficient water allocation across sectors prioritizing critical needs.

Population and Livestock Pressure

1. India has 17.5% of global population and 11.6% of global livestock creating massive water demand.
2. Agriculture accounts for 80 to 90% of water use in rural areas often using inefficient irrigation.
3. This concentration of water use in agriculture creates sustainability concerns.

3.Government Initiatives for Water Management

Jal Jeevan Mission (JJM)

1. Launched in 2019 to provide Functional Household Tap Connections (FHTCs) to rural households.
2. Has brought tap water to nearly 8 out of every 10 rural households enabling universal water access.
3. Improves health and sanitation reducing waterborne diseases.
4. Reduces burden on women eliminating need for water fetching.
5. Strengthens decentralized water management through local ownership.
6. Has been extended till 2028 reflecting long-term commitment.

Atal Bhujal Yojana (ATAL JAL)

1. Focuses on sustainable groundwater management in water-stressed regions.

2. Key features include community participation enabling local stakeholders in management decisions.
3. Water budgeting forms the foundation of planning and allocation.
4. Aquifer mapping enables understanding of groundwater reserves and recharge patterns.
5. Behavioural change campaigns encourage water conservation.
6. Marks shift from supply-side to demand-side management philosophy.

National Water Mission (NWM)

1. Recognizes water budgeting as foundational element of Integrated Water Resources Management (IWRM).
2. IWRM approach integrates management of surface water, groundwater, and quality considerations.

Pradhan Mantri Krishi Sinchayee Yojana (PMKSY)

1. Objective is 'Per Drop More Crop' maximizing agricultural output with minimal water.
2. Components include micro-irrigation enabling precise water application.
3. Drip and sprinkler systems reduce losses compared to flood irrigation.
4. Water-efficient agriculture practices maximize productivity per unit water.

Atal Mission for Rejuvenation and Urban Transformation (AMRUT) Mission

1. Aims to improve urban water supply ensuring universal access to safe water.
2. Develops sewage treatment systems protecting water quality.
3. Promotes wastewater reuse for non-potable purposes conserving freshwater.
4. Addresses increasing pressure from rapid urbanization and pollution.

Namami Gange Programme

1. Integrated river rejuvenation programme focusing on pollution control reducing sewage inflow.
2. Sewage treatment infrastructure enables clean discharge.
3. Biodiversity conservation protects aquatic ecosystems.
4. Riverfront development supports livelihood improvement for communities.
5. Basin-based approach to river governance ensures integrated management.

Varuni Web Application

1. Digital platform supporting block-level water budgeting using data-driven assessments.
2. Helps local authorities identify water surplus and deficit areas enabling targeted intervention.
3. Technology enables evidence-based decision-making at decentralized levels.

Jalyukt Shivar Abhiyan (JSA)

1. Launched in 2014 aiming to drought-proof villages through groundwater recharge and water conservation.
2. Has helped make over 11,000 villages drought-free transforming livelihoods.
3. Increased groundwater levels by 1.5-2 metres improving water availability.
4. Improved agricultural productivity by 30-50% through enhanced water supply.

4.Challenges in Water Management

Institutional Fragmentation

1. Multiple agencies handle irrigation, drinking water, groundwater, sanitation, and urban water supply.
2. Creates policy overlaps, coordination failures, and weak accountability.
3. Fragmented responsibility prevents integrated approach.

Interstate Water Disputes

1. Conflicts including Cauvery dispute, Krishna water dispute, and Ravi-Beas conflict show limitations of cooperative federalism.
2. Water sharing disputes remain unresolved creating tensions between states.

3. Interstate cooperation is essential for shared river management.

Engineering-Centric Approach

1. Water management policies historically focused on large-scale infrastructure including dams, canals, and irrigation systems.
2. This supply-augmentation approach neglects ecological sustainability and demand management.
3. Infrastructure-focused approach often exacerbates problems through unintended environmental consequences.

Weak Data Systems

1. Lack of reliable, comprehensive, and accessible water data across the country.
2. Poor planning and inefficient allocation result from data inadequacy.
3. Unregulated extraction of water resources occurs without monitoring.

Agricultural Policy Issues

1. Policies promoting water-intensive crops including rice and wheat lead to excessive groundwater extraction.
2. Crop diversification toward less water-intensive options is resisted by farmers dependent on subsidies.
3. Agricultural economics often incentivizes unsustainable water use.

Climate Change Impacts

1. Changing rainfall patterns increase floods, droughts, and extreme weather events.
2. Climate variability necessitates climate-resilient water governance adapting to uncertainty.
3. Unpredictable water availability complicates long-term planning.

Pollution and Water Quality

1. According to CPCB reports, rivers are heavily polluted due to untreated sewage and industrial discharge.
2. Groundwater contamination by arsenic and fluoride affects several States limiting usable water.
3. Water quality degradation reduces availability of safe water.

5.Way Forward

Institutionalize Water Budgeting

1. States should institutionalize water budgeting at Gram Panchayat and watershed levels as water is a state subject.
2. Decentralized water governance strengthens participatory and evidence-based management.

Promote Crop Diversification

1. Encourage diversification and reduce cultivation of water-intensive crops in water-stressed regions.
2. Alternative crops adapted to local conditions reduce unsustainable water demand.

Strengthen Groundwater Regulation

1. Implement aquifer mapping enabling understanding of recharge rates and extraction limits.
2. Recharge measures restore groundwater levels.
3. Community participation in groundwater management ensures local buy-in and sustainability.

Improve Water Data Systems

1. Collect real-time water data enabling responsive management.
2. Digital monitoring and GIS-based planning tools enable evidence-based decisions.
3. Open data systems enable accountability and stakeholder engagement.

Build Climate-Resilient Infrastructure

1. Develop water infrastructure addressing floods, droughts, and rainfall variability.

2. Flexible management systems adapt to changing water availability.

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