Maximizing Water Efficiency: Making Every Drop Count in Delhi

Introduction

Delhi, a sprawling metropolis with a population exceeding 20 million, grapples with severe water-related challenges arising from rapid urbanization, population growth, and climate change. These challenges jeopardize public health, hinder economic growth, and strain environmental resources. Addressing Delhi's water crisis demands a multifaceted approach combining policy, technology, and community engagement.

Current State of Water Issues in Delhi

1. **Water Scarcity:**
    - Delhi has a daily water demand of 1,290 MGD, of which the DJB currently produces 1,000 MGD
2. **Groundwater Depletion:**
    - Unregulated groundwater extraction has led to critical depletion levels.
    - Central Ground Water Board classifies several areas as over-exploited.
3. **Water Pollution:**
    - The Yamuna River, Delhi's primary water source, is heavily polluted by industrial discharge, untreated sewage, and agricultural runoff.
    - High ammonia levels (more than 2.5 ppm) in the Yamuna
4. **Flooding and Waterlogging:**
    - Intense monsoon rains often lead to urban flooding due to inadequate drainage infrastructure.
5. **Inefficient Water Management:**
    - Water distribution faces high levels of leakage and theft.
    - Non-revenue water accounts for over 40% of total supply in some areas.
6. **Data Gaps:** Limited real-time data collection and analysis hinders effective planning.

Policy Interventions Already in Place

1. **Yamuna Action Plan:**
    - Aimed at reducing river pollution through sewage treatment and public awareness.

2. **Delhi Jal Board (DJB) Initiatives:**
    - Programs for water harvesting, wastewater treatment, and groundwater recharge.
3. **Rainwater Harvesting Mandate:**
    - Mandatory rainwater harvesting systems in large buildings and complexes.
4. **National Mission for Clean Ganga (NMCG):**
    - Though focused on the Ganga, NMCG has indirect benefits for the Yamuna.
5. **Sewage Management and Treatment:**
    - Sewage Treatment Plants (STPs)
    - Sewerage network expansion
6. **Jal Jeevan Mission: Har Ghar Jal Initiative**: Aims to provide piped water to all households, though urban areas like Delhi lag in implementation.
7. **Atal Bhujal Yojana:** Focuses on community-led groundwater management, involving local stakeholders in sustainable water extraction practices.

Call for Innovation

Despite these initiatives, Delhi's water challenges persist due to gaps in policy implementation, technological limitations, and public engagement. Innovative, tech-driven, and scalable solutions are needed in the following areas:

1. **Smart Water Management:**
    - Use of IoT devices and AI for water distribution, leak detection, and demand forecasting.
2. **Advanced Wastewater Treatment:**
    - Development of decentralized and cost-effective water treatment systems.
3. **Sustainable Urban Water Design:**
    - Integration of water-sensitive urban designs like bioswales, permeable pavements, and green roofs.
4. **Community Engagement Platforms:**
    - Gamified apps for water conservation awareness and incentive programs.
5. **Data-Driven Water Governance:**
    - Creation of real-time water quality monitoring systems and public dashboards.

Problem Statement

"What innovative, scalable, and sustainable solutions can be designed and integrated with existing policies to enhance water security, improve water use efficiency, and ensure water quality?"

Additional resources:

1. **Important Government Department/Institution website links:**
    a. Ministry of Jal Shakti- Link
    b. Delhi Jal Board- Link
    c. Central Ground Water Board- Link
    d. CGWB-Delhi profile- Link
    e. NIUA- Link
    f. Department of Environment Delhi- Link
2. **Best practices:**
    a. N-Treat IITB-IP - Link
3. **Public sources for data and insights:**
    a. Ground water year book, Delhi 2022-23- Link
    b. CPCB- Delhi's critically polluted areas- Link
    c. ORF- Link