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**FROM WASTE TO WORTH: INDIA'S  
POTENTIAL FOR REUSING TREATED  
WASTEWATER**

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## FROM WASTE TO WORTH: INDIA'S POTENTIAL FOR REUSING TREATED WASTEWATER

### Context

- Recently, the Centre for Science and Environment (CSE), in collaboration with the National Mission for Clean Ganga (NMCG) presented a report titled as, '*Waste to Worth: Managing India's Urban Water Crisis through Wastewater Reuse*' underscores the potential of treated wastewater as a resource for irrigation, industry, and urban greening.

### Status In India

- India treats **only about 28% of its urban wastewater**, while generating approximately 72,000 million litres of wastewater daily.
- India faces a significant challenge with its urban water crisis, exacerbated by rapid urbanization, industrial growth, and climate change.
- The **two most important challenges** are the **significant gap in existing treatment capacity**, and the **less penetration of advanced treatment technology**.

### Current Challenges

- Managing wastewater is quite challenging in India on account of a **variety of reasons** including **mixing up of all kinds of used water**, lack of sewage networks, issues related to improper/lack of maintenance, giving less importance than it deserves, and misconception on abundance on freshwater availability and many more.
- Infrastructure Deficit:** The lack of adequate treatment facilities means a large volume of wastewater remains untreated, polluting water bodies and soil.
- Regulatory and Policy Gaps:** Although policies exist, such as the mandate for cities to recycle at least 20% of their water consumption **mandated by Union Ministry of Jal Shakti**, enforcement and implementation are inconsistent.
- Public Perception:** There is often resistance to using treated wastewater due to concerns about health and safety, which can hinder its acceptance and use.

### Implications of Reusing Wastewater

- Socio-Economic Implications:** Reusing treated wastewater can reduce the demand for freshwater, lowering costs for industries and municipalities. It creates opportunities for new businesses in the water treatment sector.
  - It also can generate employment opportunities, particularly in urban and peri-urban areas.
  - Ensuring equitable access to treated wastewater can help address water scarcity in underserved communities, promoting **social equity**.
- Environmental Implications:** Reusing treated wastewater can significantly reduce the extraction of freshwater from rivers and aquifers, helping to preserve these vital ecosystems.
  - Proper treatment and reuse of wastewater can prevent the contamination of natural water bodies, improving overall environmental health.
  - By integrating wastewater reuse into water management strategies, India can enhance its **resilience to climate change impacts**, such as **droughts and water shortages**.

### Concerns of Using Waste-Water

- Impact on Soil:** Wastewater irrigation could lead to **temporal and long-term salinization** due to its salts (cations and anions) content. It can cause an adverse impact on soil structure.
  - Wastewater has a relatively high **Sodium Adsorption Ratio (SAR)** in comparison with fresh water. High SAR of irrigation water could have adverse impacts on crops and soil.
- Return Water From Farm Fields:** Since the quality of treated wastewater is dependent on the source of the water, type of usage and the treatment technology, the treated wastewater may still contain some pollutants or contaminants.
  - It has the potential of polluting surface/ground water sources while flowing back from the farm fields.

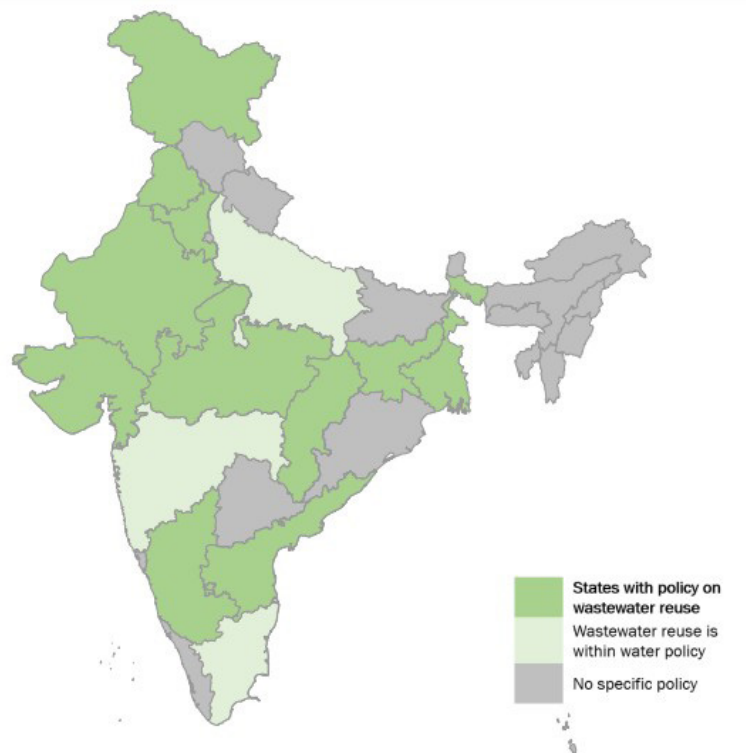
- **Risk of Pathogen Exposure:** There are possibilities of pathogens being present even after treatment of waste water, if disinfection or advanced filtration treatment such as membranes are not part of the treatment system.
- **Bio Accumulation:** Heavy metals present in the waste water can accumulate in the environment and enter the food chain.
  - ♦ Even at the low concentration levels, long term irrigation can pose risk for the environment and human health.
- **Weeds & Mosquitoes:** A rise in weeds is observed in fields using wastewater for agriculture, thereby, increasing the amount of pesticide applied.
  - ♦ The practice of storing the wastewater before applying to the fields creates breeding grounds for the disease carrying mosquitoes.

### Technologies and Innovations Involved

- Innovations such as *membrane bioreactors*, *advanced oxidation processes*, and *constructed wetlands* are improving the efficiency and effectiveness of wastewater treatment.
  - ♦ **Sequential Batch Reactor (SBR) and Activated Sludge Process (ASP)** are the prevalent and adopted technologies all across the country.
- **Decentralized Treatment Systems:** These systems are becoming more popular as they are cost-effective and can be implemented at the community level, reducing the burden on centralized infrastructure.
- **Integration with Existing Programs:** Programs like the **Jal Jeevan Mission and Atal Bhujal Yojana** are incorporating wastewater reuse strategies to enhance water security.
- **Incentives and Funding:** Offering financial incentives and funding for infrastructure development is essential. It includes support for setting up wastewater treatment facilities and **advanced technologies like zero liquid discharge systems.**

### Key Government Initiatives & Policies

- **Namami Gange Program:** Under the **Arth Ganga model**, this program focuses on the monetization and reuse of treated wastewater and sludge. It aims to integrate people in the Ganga basin with Ganga rejuvenation efforts.
- **Jal Jeevan Mission:** It aims to provide safe and adequate drinking water through individual household tap connections. It also integrates wastewater reuse to ensure water sustainability.
- **Atal Bhujal Yojana:** It focuses on sustainable groundwater management, including the reuse of treated wastewater to recharge aquifers.
- **AMRUT (Atal Mission for Rejuvenation and Urban Transformation):** It includes provisions for wastewater treatment and reuse to improve urban water management.
- **National Framework for Safe Reuse of Treated Waste Water:** Published by the National Mission for Clean Ganga (NMCG), this framework provides guidelines for state-level policies on the reuse of treated wastewater.
- **Regulatory & Policy Support:** Policies that ease financial constraints and provide regulatory support can drive widespread adoption of reuse practices.



States having policy on reuse of treated water

- ♦ For example, the Ministry of Housing and Urban Affairs, in collaboration with the Japan International Cooperation Agency (JICA), has developed guidelines on wastewater recycle and reuse.

### State Having Policies On Reuse of Treated Wastewater

- States like Andhra Pradesh, Gujarat, Haryana, Karnataka, Tamil Nadu, and West Bengal have specific policies and action plans for wastewater reuse.
- These policies aim to promote the reuse of treated wastewater for various purposes such as agriculture, landscaping, groundwater recharge, and industrial use.

### Successful Examples and Initiatives

- Several Indian cities have already made strides in reusing treated wastewater.
- For instance, **Maharashtra** has implemented policies requiring industries in urban areas to use treated wastewater, while **Gujarat** aims for 100% reuse in agriculture and industry. These examples highlight the feasibility and benefits of wastewater reuse.

### Public Awareness

- **Education and Communication:** Effective communication strategies are needed to educate the public about the benefits and safety of using treated wastewater. This can help overcome socio-cultural barriers and increase acceptance.
- **Community Engagement:** Involving local communities in planning and decision-making processes can foster a sense of ownership and responsibility towards sustainable water management practices.

### Conclusion

- Reusing treated wastewater is not just a necessity but a sustainable strategy for India's future. By turning waste into worth, India can address its urban water crisis, reduce environmental pollution, and promote a circular economy.
- The cumulative efforts of all stakeholders involved and various state governments provide a roadmap to ensure water security for all.

Source: DTE

### Mains Practice Question

Critically analyze the potential for reusing treated wastewater in India, considering the current challenges, technological advancements, and the socio-economic and environmental implications. Discuss the role of government policies and public awareness in achieving sustainable wastewater reuse practices.