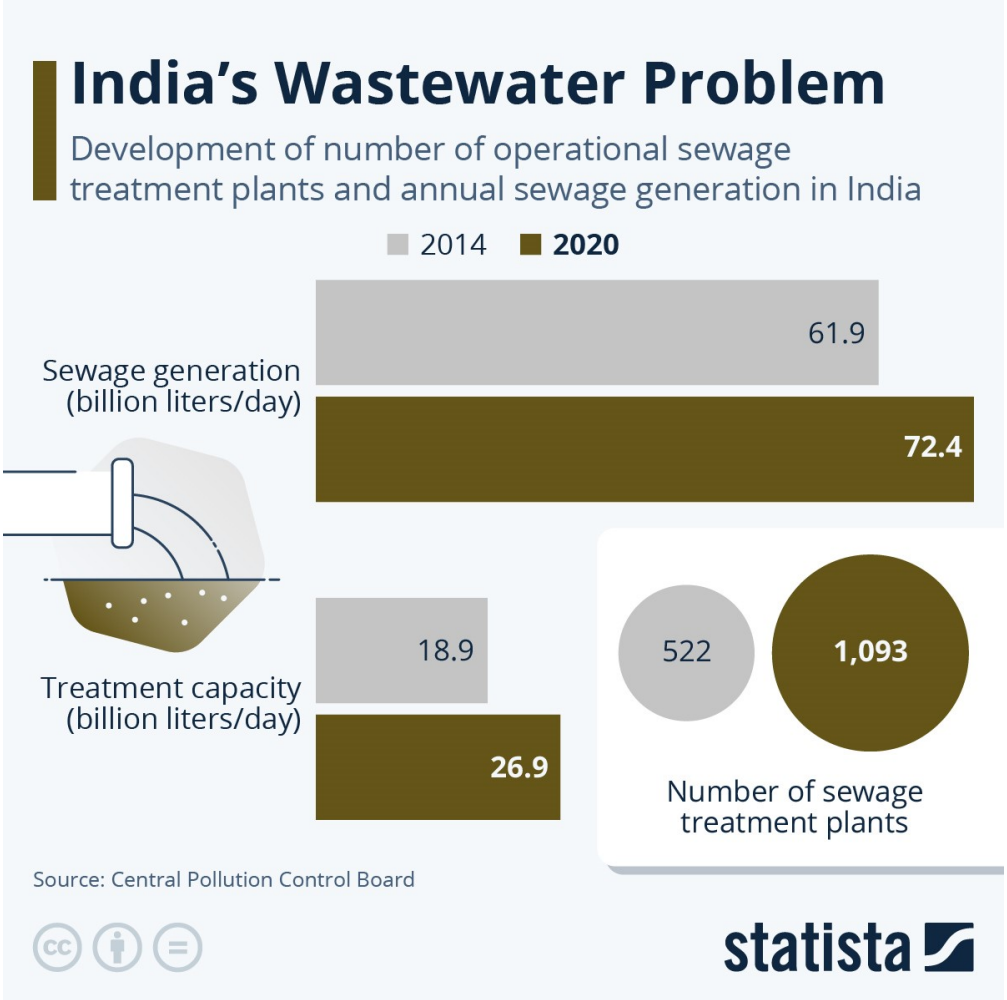
Waste Water Reuse

Why in News?

Depleting freshwater sources, erratic rainfall patterns and growing water scarcity underscores the need to adapt innovative water management solutions.

What are the needs for water reuse?



- **Depleting Freshwater Sources** - Surface water abstractions are reaching unsustainable levels leading to deterioration of the environment.
- **Water Pollution** - Disposal of domestic sewage from cities and towns is the biggest source of pollution of water bodies in India .
- **Erratic rainfall patterns** – Climate change is disrupting normal weather patterns, leading to droughts or excessive rainfall in different parts of India.
- **Growing water scarcity** - According to a 2019 report by the National Institution for Transforming India (NITI Aayog), India's water demand will exceed supply by a factor of two by 2030.

India has only 4% of the world's fresh water resources despite a population of over 1.4 billion people.

- **Increasing Population** – By 2050, 50% of the country's population will be in urban cities posing challenges for urban wastewater management.
- **Resource Utilization** - The failure to reuse treated wastewater also underutilises the substantial capital invested in sewage treatment plants.

What are the benefits of water reuse?

- **Ground Water Boost** – Treated water can be used to recharge groundwater to improve groundwater levels and quality.

National water quality standards on sewage treatment for discharge into surface water bodies are prescribed by CPCB.

- **Agricultural Growth** – Use of treated wastewater address irrigation needs of agriculture and improve productivity which results in increased farmers income.
- **Economic Growth** – Treated waste water can be used in livestock and fish production.
- **Boost Circular Economy** – Water recycling systems support a circular economy in the water sector.
- **Economic Potential** - Wastewater sector in India is developing at a rate of 10-12 % each year and is likely to exceed $4 billion.
- **Conserving water and Money** - Wastewater recycling in thermal power plants can yield a monetary benefit of on average Rs 300 million per year and water savings of nearly 10 million cubic metres a year.
- **Nutrient Recycling** - Nutrients found in wastewater like nitrogen, phosphorus and potassium if recovered can be used to reduce reliance on synthetic fertilisers.

Sewage generated from class I and II cities across India 6,400 million litres per day has a nutrient load of about 2,500 tonnes.

- **Local Body Financial Autonomy** – Local bodies can generate an additional annual revenue by selling treated water.

What are the challenges?

- **Inadequate Treatment** - only 28 % of the total sewage generated is effectively treated
- **Insufficient infrastructure** - There remains a gap of 22939 MLD (78.7%) between sewage generation and installed sewage treatment capacity.

All Class I cities and Class II towns together generate an estimated 29129 MLD

sewage (as per population in 2001 census) and the installed sewage treatment capacity is only 6190 MLD.

- **Low Reuse** - a mere 3 % of this treated wastewater is used beneficially and most of it discharged into water bodies or used for non-essential purposes such as irrigating public parks.
- **Absence of Guidelines** – Sector wise quality standards of treated water reuse have not been issued.
- Different sectors have distinct requirements of processed water quality ranging from biological treatment to reverse osmosis or ultrafiltration to meet quality standards.
- **Inadequate Research and Technologies** - R&D initiatives are deficient and require boosting of investment to foster innovation.
- **Lack of Private Participation** – Almost all of the sewage treatment plants are run by the government and public sector.
- **Inadequate Skilled Personnel** – There is huge requirement of human resources in operation, maintenance and research side of water treatment sector.
- **Socio-cultural Barriers** – Caste ,Class differences and public misconception often prevent the acceptance of reused water.
- **Financial Constraint** - The high capital costs of setting up wastewater treatment facilities and advanced technologies, such as zero liquid discharge, discourages industries and municipalities from embracing it.

What needs to be done to improve waste water reuse ?

- To encourage greater water reuse, India must prioritise infrastructure development, implement sound policies and allow private sector participation.
- Encourage states and local bodies to adopt National Framework on Safe Reuse of Treated Water.
- Encourage private sector participation through Public- Private Partnership (PPP) models to cover through technology selection, fund rotation, and execution.
- Setup water reuse benchmarks for industries to promote wastewater reuse and resources recovery, without compromising on product quality.
- Implement policies to incentivise industries, research institutions and universities to undertake R&D initiatives on innovative water treatment technologies, water efficiency practices.
- Higher tariffs for non-recycled water will encourage municipalities and housing societies to adopt recycled water for non-potable purposes.
- Similar to carbon credits, entities that use treated wastewater could receive water-use credits, which could be monetised or traded with other developers.

Quick Facts

Sewage Treatment Plants Technologies

- Activated Sludge Process (ASP)
- Sequencing Batch Reactors (SBR)

- Extended Aeration (EA)
- Up flow Anaerobic Sludge Blanket (UASB)
- Moving Bed Biofilm Reactor (MBBR)
- Fluidized Aerobic Bed Reactor (FAB)
- Waste Stabilization Pond (WSP)
- Oxidation Pond (OP)
- Zero Liquid Discharge
- Others (Aerated Lagoon (AL), Bio-Tower, Electro Coagulation (EC) etc.)

References

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