WATER REUSE: NECESSITY FOR A SUSTAINABLE FUTURE

By Abdul Rahman Momammed, CEO, Sahara Industry

India, with nearly 18% of global population and just 4% of water resources is experiencing severe water crisis driven by population growth, rapid urbanization, climate variability, increasing pollution, and declining freshwater resources. Over-extraction of groundwater, inefficient irrigation practices, and uneven rainfall further intensify the challenge, placing several regions of the country in high to extreme water-stress. The Niti Aayog, six years ago reported that over 600 million people facing severe water stress that must have been increased.

At the same time, India's expanding urban and industrial footprint is generating vast volumes of wastewater. Urban India produces over ~72,000 MLD (million litres per day) of municipal wastewater, but only about 30–35% is treated, while the remains further contaminates surface water bodies like rivers, lakes, and even the groundwater sources. The gap is even wider in peri-urban and rural areas. Untreated wastewater poses serious public-health risks, damages ecosystems, increases treatment costs for drinking water, and contributes to water scarcity by preventing reuse.

In the given scenario, sustainable water management demands a comprehensive approach, enhancing treatment capacity, improving sewerage networks, leveraging decentralised and smart treatment technologies, promoting reuse in agriculture and industry, and enforcing robust regulatory frameworks. Harnessing wastewater as a resource through recycling, circular water systems, and energy-efficient treatment solutions is essential to strengthening water security and supporting India's long-term socio-economic growth.

Water Reuse

Water reuse is no longer optional; it is an urgent necessity in India. Population growth, urbanization trends, industrial expansion, and climate vulnerability are putting unprecedented pressure on traditional water sources. To secure long-term water availability and environmental resilience, water reuse must become a core pillar of our water management strategy.

Today, over 40% of India's population faces water scarcity, and by 2050, more than half of the country's 1.7 billion people will live in urban areas. Reusing treated wastewater provides a reliable, climate-resilient alternative to water supply while reducing stress on rivers, lakes, and groundwater reserves.

Sahara Industry is delivering compact and efficient industrial wastewater treatment and reuse systems, enabling industries to recover high-quality water onsite and significantly cut freshwater consumption and discharge volumes, helping with cost and energy saving while supporting environmental sustainability.

Water reuse brings multiple benefits, it improves resource efficiency, protects ecosystems, reduces dependence on new water infrastructure, and provides industries and municipalities with cost-effective and consistent water supply. Governments are increasingly promoting wastewater recycling through policies, incentives, and standards.

Water Reuse is Critical for Augmenting Water Supply

1. **Water scarcity:** Many regions in India face severe water stress from droughts, groundwater over-exploitation and erratic rainfall. Reuse provides an alternative to relieve freshwater demand.

2. **Urbanisation & population growth:** With a rapidly growing population and increasing share of urban residents,

1. demand for domestic, industrial and agricultural water is soaring. Reuse offers a locally sustainable supply.
2. **Climate change impacts:** Changing precipitation patterns, extreme events (floods, droughts) and rising temperatures amplify water risk. Recycled water adds resilience by reducing dependence on weather-sensitive sources.

3. **Environmental conservation:** Treating and reusing wastewater cuts extraction from natural ecosystems, reduces pollution load, preserves water bodies and maintains ecological balance.

4. **Economic advantages:** Reuse can lower fresh-water procurement and infrastructural-investment costs, support industries with reliable supply, recover nutrients and energy, and enable circular economy models.

5. **Regulatory & policy momentum:** Governments increasingly recognise reuse, setting frameworks, incentives and technical standards for implementation.

Applications of Reclaimed Water

Recycled (or treated) wastewater finds uses across many sectors:

- Agricultural irrigation
- Industrial processes (cooling, cleaning, manufacturing)
- Toilet flushing and grey-water reuse in buildings
- Thermal power-plant cooling
- Wetland, pond or lake recharge
- Groundwater recharge
- Fire-fighting systems
- Vehicle washing, construction, and dust control
- Recreational uses (parks, landscaping), etc.

By deploying treated water into these non-potable uses, freshwater sources can be conserved for drinking purposes, ecosystems can be protected, and wastewater becomes a reliable resource rather than a liability.

Reuse Potential & Economic Value

According to the Council on Energy, Environment and Water (CEEW), 11 of India's 15 major river basins will experience water stress by 2025, with annual per-capita renewable water availability falling below 1,700 m^3. CEEW's estimate suggests that about 8,603 MCM of treated wastewater in 2021 could have been applied for irrigation, enough to irrigate 1.38 million hectares of land. That reuse could have generated production of ~28 million metric tonnes and revenue of ~INR 966 billion. Moreover, reuse reduces energy for groundwater pumping, cut fertiliser usage via nutrient recovery and lowers greenhouse-gas emissions. Projecting ahead, by 2050, the available treated wastewater for reuse could hit ~35,178 MCM, with significant potential across irrigation, industry and energy sectors.

> Wastewater treatment and reuse has become an urgent necessity in India to cater the growing demand and secure long-term water supply and environmental resilience; reuse must become a core pillar of our water management strategy.

Industrial, Compact & On-Site Wastewater Reuse

While municipal wastewater reuse commands much of the public debate, industrial wastewater reuse is equally important. Industries generate large volumes of effluent and require consistently reliable water supply. Compact on-site wastewater treatment and reuse systems, especially for industrial clusters and manufacturing units, can close the loop, recovering water and nutrients, reducing discharge, and easing pressure on public treatment systems.

Sahara Industry is delivering compact, efficient industrial wastewater treatment and reuse systems, enabling industries to recover high-quality water onsite and significantly cut freshwater consumption and discharge volumes. The company offers modular, compact industrial wastewater treatment solutions designed for water reuse. The system integrate multiple stages of treatment, enabling treated water to be reused within industrial processes or for landscaping, cooling, or utility functions. By providing these industrial-scale reuse systems, Sahara Industry helps industries meet stricter discharge norms, reduce freshwater intake, improve sustainability, and contribute to circular water economy models.

Key benefits of compact industrial wastewater reuse systems include:

- Reduced freshwater procurement costs, improving bottom-line for industries
- Minimized effluent volumes discharged, lowering treatment liability and environmental risk
- Ability to meet tighter regulatory norms related to discharge, water reuse and zero-liquid-discharge (ZLD) requirements
- Decentralised, modular systems that can be installed close to source, reducing conveyance costs
- Recovery of valuable by-products (e.g., nutrients, energy, heat) and enabling circularity
- Increased continuity of operations in water-scarce zones, boosting resilience

As industrial clusters grow and environmental norms tighten, such compact reuse-systems become a strategic utility for both industries and municipalities. They relieve the load on municipal treatment systems, conserve freshwater, and support sustainability goals.

Way Forward

India must adopt a strategic, technology-driven approach to unlock the full potential of wastewater reuse across municipal, industrial, and agricultural sectors. A key priority is changing public perception by promoting wastewater as a valuable resource and building trust in recycled water quality. Ambitious yet achievable national targets, such as reusing 50–60% of treated wastewater by 2035 should guide progress.

Scaling investments in sewerage networks, treatment capacity, and smart pumping infrastructure is essential, alongside encouraging modular and decentralised reuse systems for industries and peri-urban clusters. Policy alignment will be

critical, including sector-specific quality standards, tariffs, incentives, and clear allocation frameworks for treated water. Digital IoT- and AI-enabled pumping systems, remote monitoring, predictive maintenance, and energy-efficient networks must become mainstream. Public-private partnerships can accelerate innovation and operational excellence, while circular-economy models should prioritise water reuse, nutrient recovery, and energy capture. Continued monitoring, replication of successful pilots, and climate-resilient system design will ensure scalable, future-ready wastewater reuse frameworks for India.

The opportunity is immense; treat and reuse several million cubic metres of water, irrigate millions of hectares, power industries and cities with reclaimed water, reduce freshwater extraction, recover nutrients and energy, and build sustainable systems for the long term.

ABOUT THE AUTHOR

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As the Founder and CEO of Sahara Industry, Abdul Rahman Mohammed has a clear mission, to deliver cutting-edge, cost-effective, and superior water and wastewater treatment solutions. Armed with an MBA in marketing and finance, the dynamic entrepreneur, steers the organization with a keen focus on strategic growth. Under his visionary leadership, Sahara Industry has experienced remarkable success, with the group's annual revenue exceeding INR 1200 million. His ability to blend technological innovation with sound business acumen has positioned the company as a leader in the water treatment sector, addressing critical environmental challenges while ensuring sustainable growth.