

## Blackwater treatment technologies

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### Anaerobic digestion with electrically conductive biofilter

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How can we treat polluted wastewater in a **simple, robust, and sustainable way?**

Learn more







## The challenge



### Reducing surface and groundwater pollution

This Indian region faces significant water quality challenges, leading to pollution and health problems due to:

- **Reliance on heavily polluted groundwater;**
- **Inadequate sanitary infrastructure with septic tanks and environmental discharges.**

There is an urgent need for a cost-effective, decentralized treatment solution to mitigate pollution and safeguard public health.

## The solution



### Anaerobic digestion with electrically conductive biofilter

This technology combines an electroconductive biofilter, which uses special bacteria that feed on and generate electricity while cleaning the water, with a UASB reactor and an additional sand filtration followed by a UV disinfection system.

- **Step 1:** Electroactive bacteria and conductive materials efficiently treat wastewater;
- **Step 2:** Sand filtration reduces suspended solids (SS), achieving 30–50% turbidity reduction and E. coli removal;
- **Step 3:** Compare UV lamps and electrochemical methods (on-site hypochlorite production) to identify the most effective disinfection approach.

More detailed information

## Pilot location

IIT Kharagpur campus

### Capacity

95 KLD of treated wastewater

### Source

Effluent from an existing UASB reactor (0.5 MLD)






**Technology**  
readiness level  
**7 | End of the project**






# Benefits

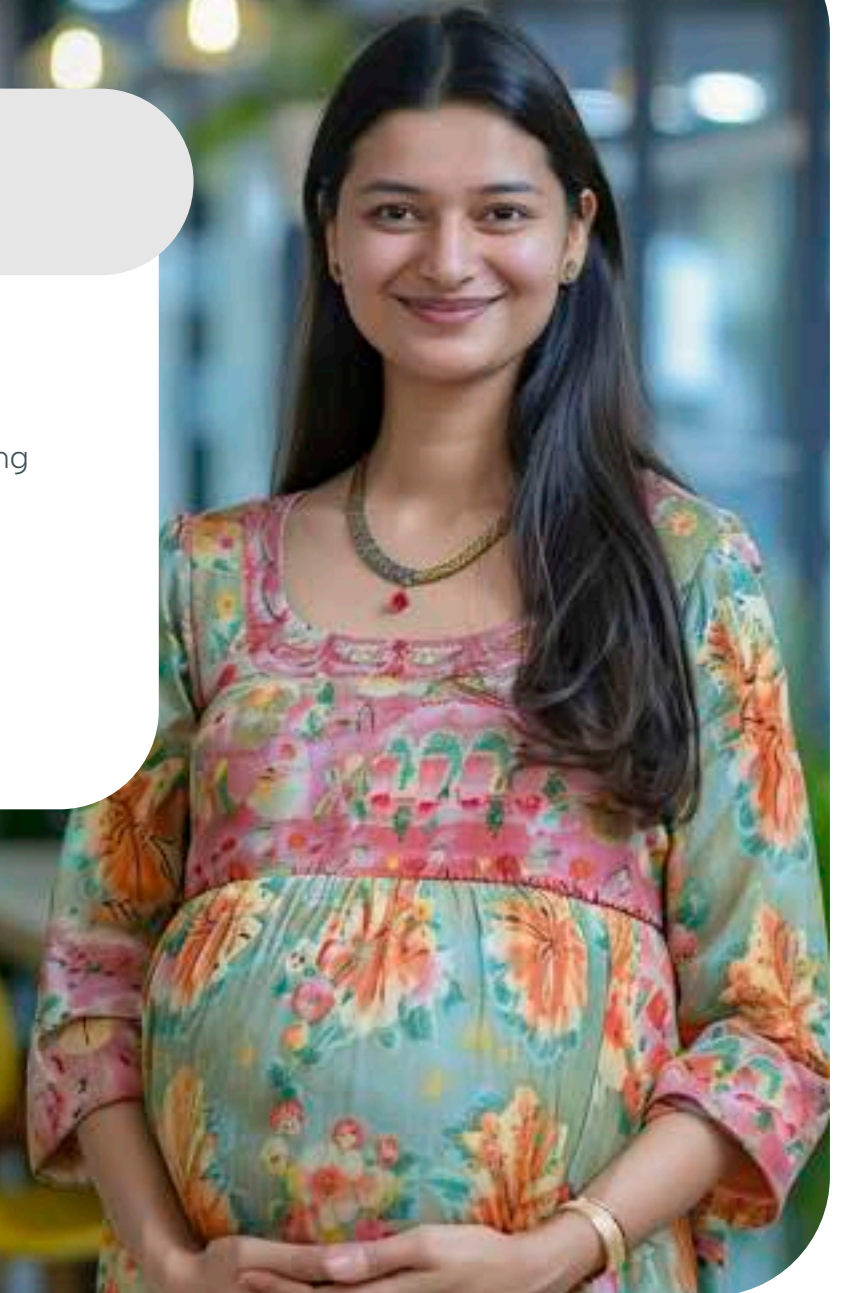


## Efficiency and safety


-  The system is designed to be **easy to operate, durable, and reliable**;
-  Achieves 90% removal of BOD, 90% removal of ammonia, and 95% removal of suspended solids (SS);
-  Treated effluent can be safely **reused for irrigation and other purposes**, which addresses water scarcity and protects public health.

## Cost & management reduction

-  Requires **significantly less space** compared to conventional systems;
-  **Eliminates sludge production**, reducing disposal costs;
-  **Employs UV and electrochemical disinfection with low energy**, and on-site hypochlorite production minimizes chemical storage and trihalomethane formation.



## Long-Term Sustainability

-  **Recovers biogas** and nutrient-rich biomass, contributing to a circular economy.

# Potential & scaling

 HIGH

More detailed information 



**Can serve as secondary or tertiary treatment**, either as an add-on to existing plants or combined with an UASB reactor for **complete blackwater treatment**.



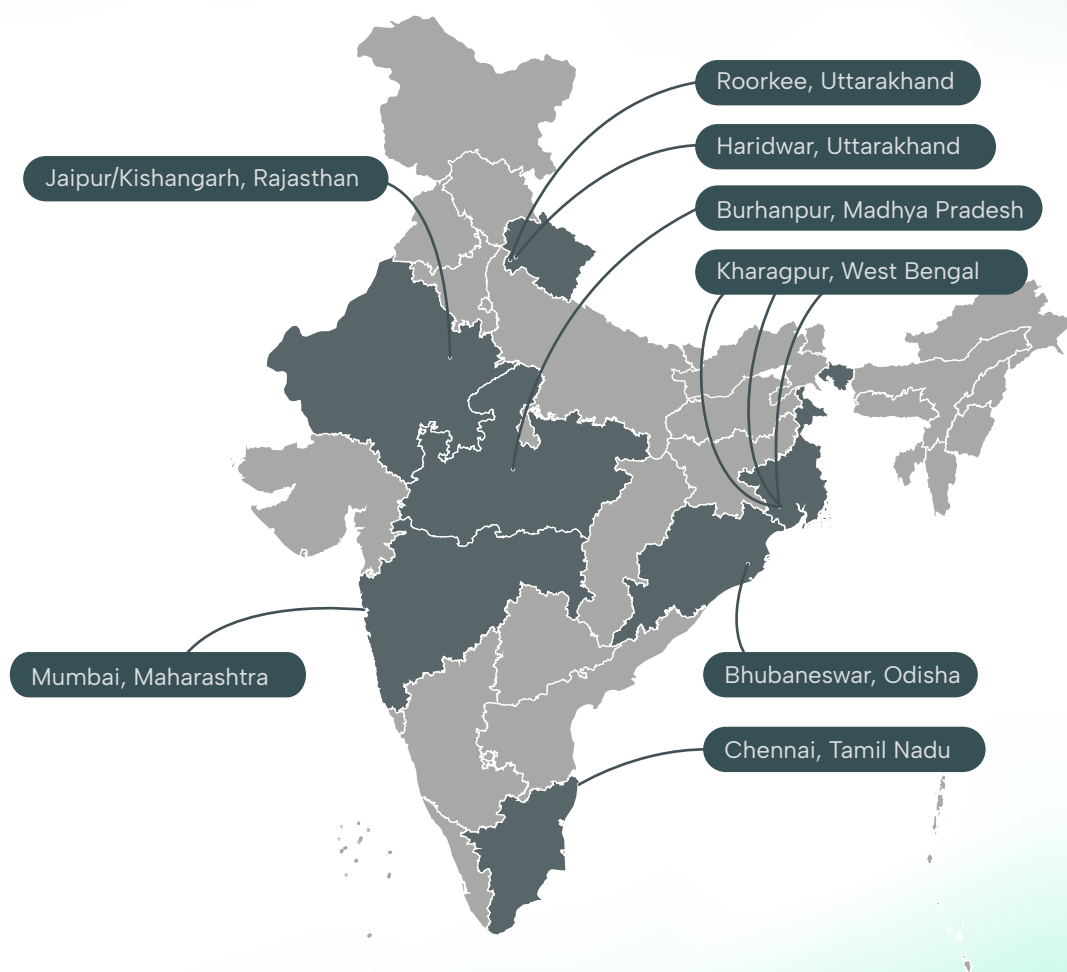
**Built locally**, facilitating easy replication and scaling.



# Saraswati 2.0

## About Saraswati

The Saraswati Project aims to improve wastewater treatment and reuse technologies in India. The first phase documented around 1,500 decentralized treatment plants, revealing many inefficiencies, health risks, and high costs. Saraswati 2.0 promotes a flexible approach to Best Available Technologies (BAT), focusing on efficiency, costs, and local context. Four BATs identified from EU technologies include decentralized wastewater treatment, sludge treatment, post-treatment, and black-water treatment. **This second phase seeks to enhance existing plants, reduce pollution, and increase confidence in water reuse through better standards, tailored to diverse regional needs in India.**



## Project Partners



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COORDINATOR



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