SMART INDIA HACKATHON 2025

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- **Problem Statement ID -** SIH25259
- **Problem Statement Title -**

  Recovery and reuse of Fresh water resources
- **Theme –** Clean and Green Technology
- **PS Category -** Software
- **Team ID -** 62729
- **Team Name -** EduBotx

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IDEA TITLE

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Problem – India is losing millions of liters of fresh water daily due to inefficient industrial wastewater management — we aim to recover and reuse it through intelligent, data-driven treatment design.

Solution

- **AI Driven Process Designer** — Chooses the right treatment train for any reuse goal
- **Digital Twin Simulation Engine** — Predicts quality, cost & energy before real change
- **Smart Monitoring And Predictive Analytics** — Forecasts BOD/COD & detects faults in real time.
- **Blockchain Ledger** — Creates verifiable reuse certificates & water credits.
- **Adaptive Optimizer** — Reduces energy and chemical use via AI control.

What Makes It Unique	Why It Matters
AI + Digital Twin Integration	Predicts water quality & cost before real execution
Blockchain Reuse Ledger	Ensures verified, tamper-proof water reuse tracking
Adaptive Optimization Engine	Cuts energy & chemical use for higher efficiency

Prototype : https://re-water-edxj.vercel.app/

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TECHNICAL APPROACH

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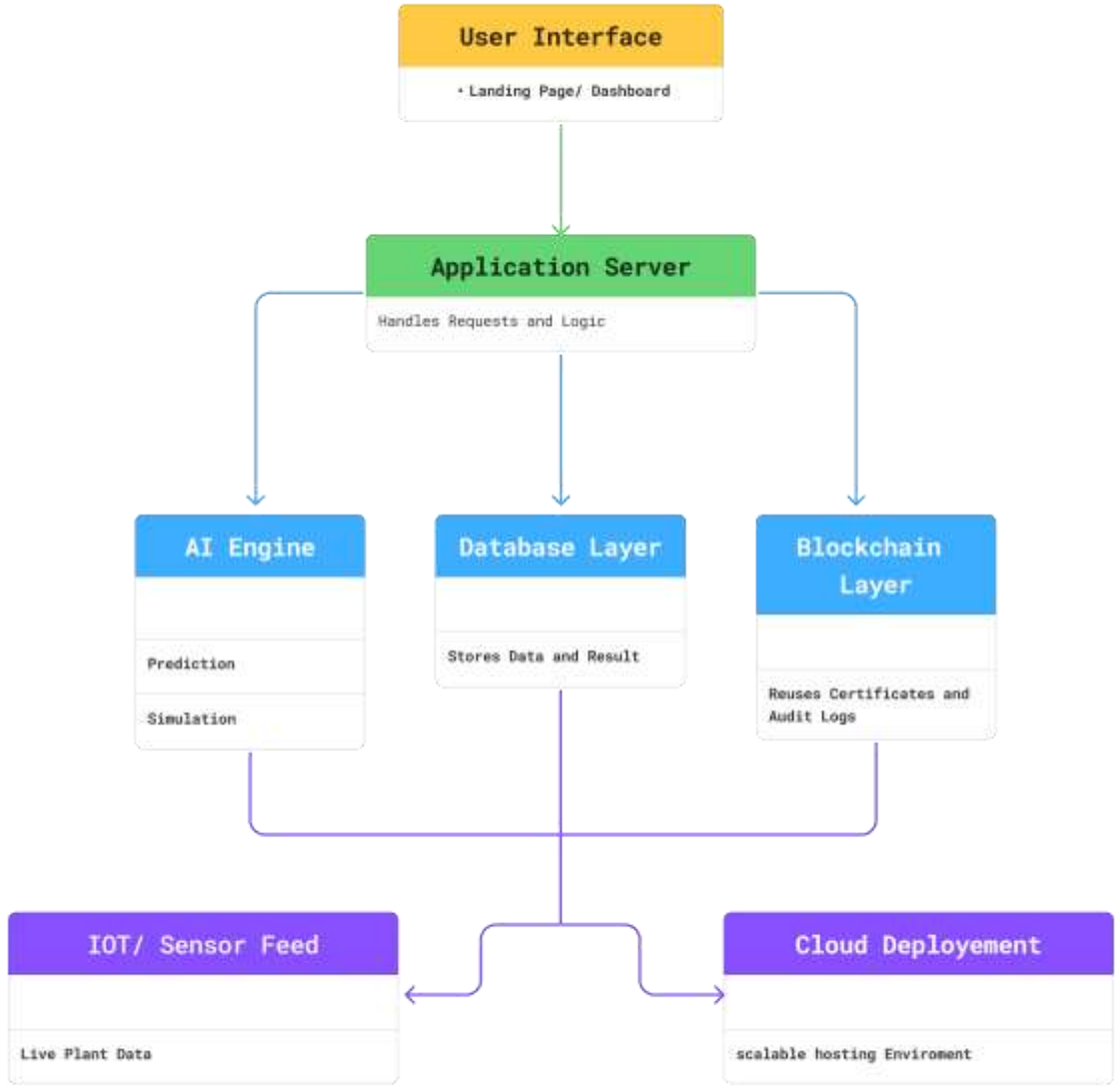
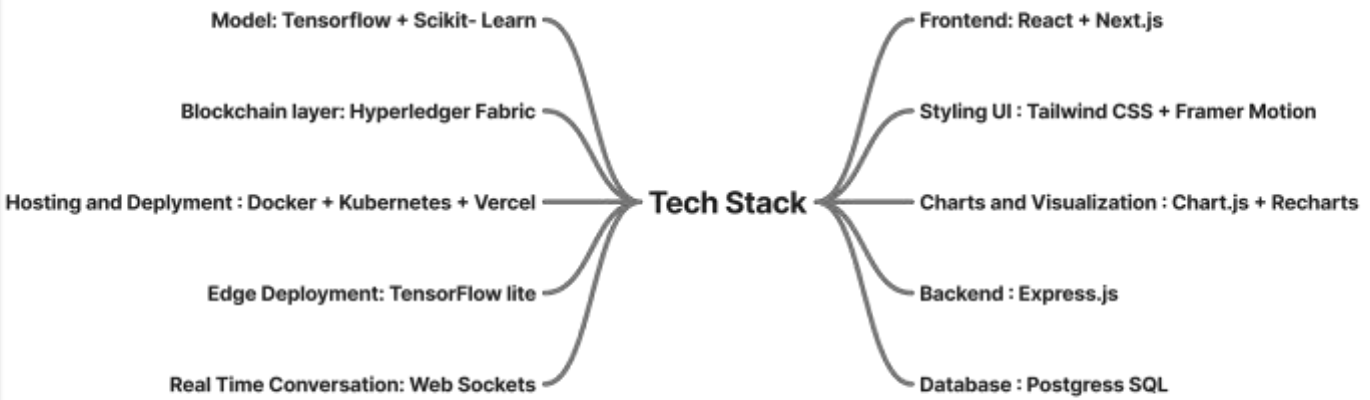
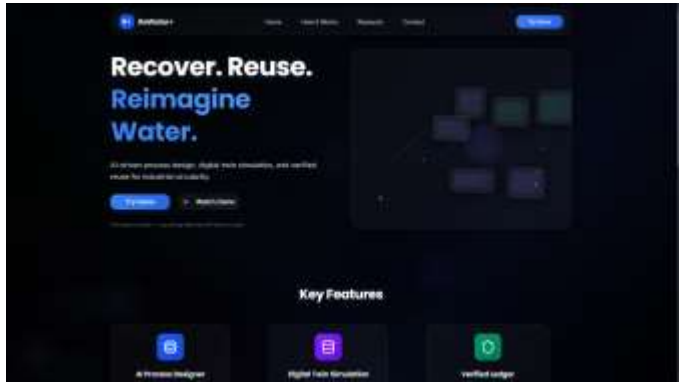




Prototype Screenshot



Track Our progress here: Repository Hyperlink **Preview our website:** Prototype

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FEASIBILITY AND VIABILITY

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Feasibility is about whether we can build it,
Viability is about whether it will sustain and create impact long term.

Feasibility	Viability
Market Demand & Adoption* – Growing water scarcity and strict industrial reuse norms drive immediate adoption potential.	High National Relevance* – Supports Jal Jeevan Mission & Smart City goals; aligns with India's water reuse and sustainability agenda.
Financial Feasibility* – Low setup cost using open-source stack; minimal infrastructure needed.	Economic Sustainability* – Reduces freshwater usage by 30–50% and operating costs by 15–25%, ensuring ROI within 1–2 years.
Implementation & Integration* – Integrates easily with existing plant systems; no disruption to ongoing operations.	Operational Continuity* – Continuous learning and adaptive control reduce downtime and maintenance costs.
Environmental Readiness* – Complies with CPCB discharge norms and promotes circular economy practices.	Long-Term Impact* – Conserves freshwater reserves and reduces environmental load in water-scarce regions.

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IMPACT AND BENEFITS

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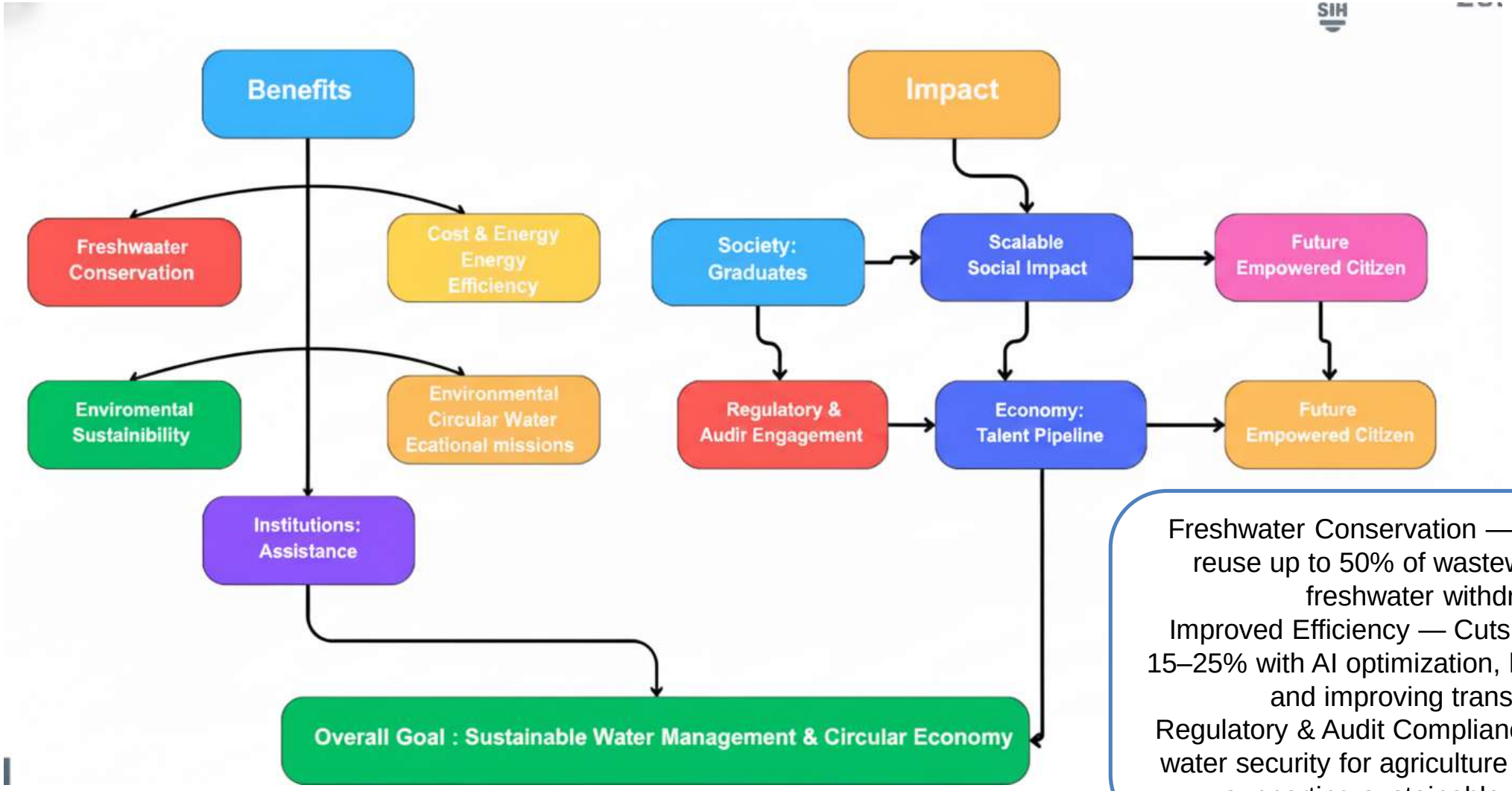

Freshwater Conservation — Helps industries reuse up to 50% of wastewater, reducing freshwater withdrawal.
Improved Efficiency — Cuts chemical use by 15–25% with AI optimization, lowering discharge and improving transparency.
Regulatory & Audit Compliance — Strengthens water security for agriculture and urban areas, supporting sustainable ecosystems.

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RESEARCH AND REFERENCES

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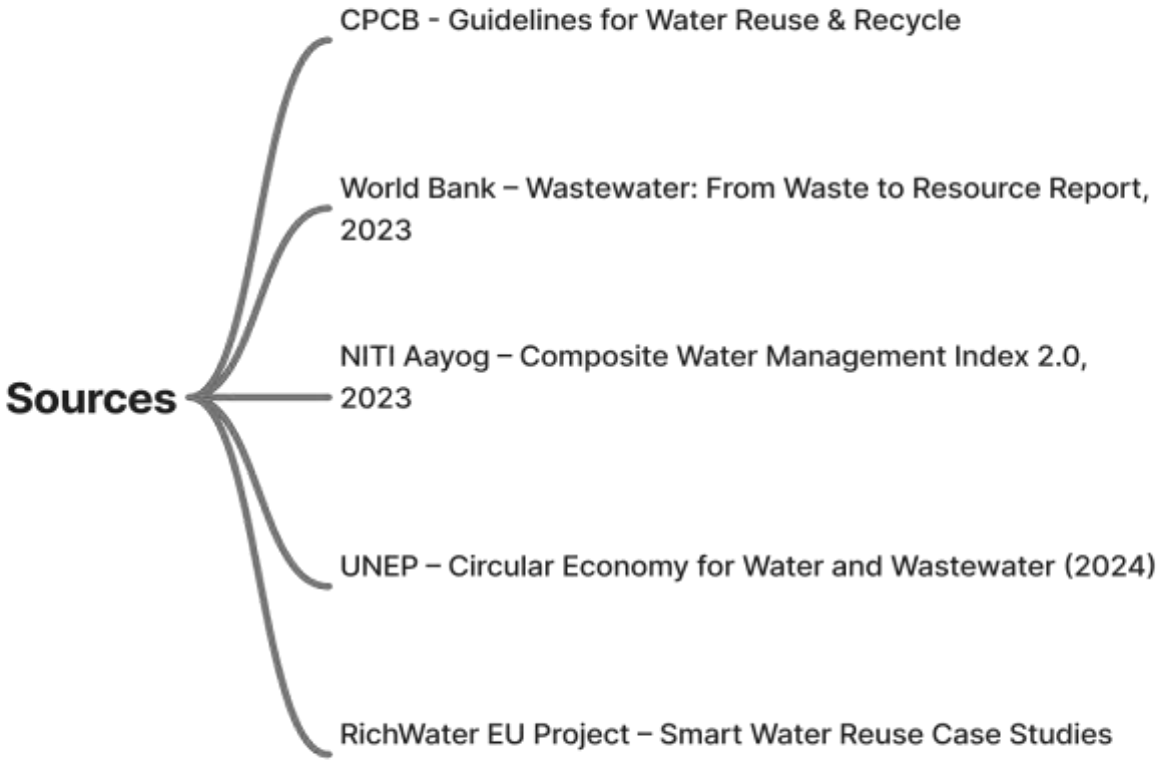
Research shows that integrating AI and automation in wastewater treatment can reduce freshwater demand by 30–50% and energy use by 15–25%.Our solution builds upon global case studies, open datasets, and national water-reuse initiatives to ensure scientific and practical validity.



Hyperlinks – [1] [2] [3] [4] [5]

Team

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