



# ***Sustainable Stormwater & Lake Rejuvenation***

Jakkur Lake Restoration Project - A Model for Urban Lake Conservation in  
India

by BBMP & BWSSB  
Bengaluru, Karnataka

# Jakkur Lake: From Pollution to Restoration

## Project Background

Jakkur Lake (160 acres) in North Bengaluru was heavily polluted due to sewage inflow, solid waste dumping, and rapid urbanization. The restoration project completed between 2008-2015 is now considered one of India's most successful lake rejuvenation models.



## Water Quality

Achieved Class B water quality safe for fish culture and biodiversity



## Ecosystem Restoration

Comprehensive biodiversity revival with native species and habitat creation



# Multi-Disciplinary Design Team



## Engineering Team

- Civil Engineers: Bund strengthening, inlet-outlet redesign
- Environmental Engineers: Wetland creation, water quality improvement
- BWSSB Engineers: Sewage diversion, STP integration



## Specialist Team

- Urban Planners: Lake zone planning, public space creation
- Ecologists: Biodiversity restoration and habitat design
- NGOs: Community mobilization and stakeholder engagement



## Community Team

- Fishermen Community: Input for livelihood-based design
- Local Residents: Public consultation and feedback
- Contractors: Execution and maintenance planning

# Team Development Journey

## **Storming Phase**

Initial clash between civil engineers supporting concrete drains versus ecologists advocating for natural wetlands



## **Performing Phase**

Smooth coordination of STP operations, wetland design, pathway creation, and regular stakeholder consultations



## **Norming Phase**

Decision to combine both approaches - concrete diversion channels plus constructed wetlands for natural treatment



## **Cohesion Achievement**

Strong team cohesion through regular stakeholder meetings and shared vision for sustainable lake restoration



# Project Goals & Scope Definition

## Design Goals

Achieve Class B water quality, restore biodiversity, eliminate sewage entry, integrate community spaces, build low-energy systems



## Included Scope

STP construction (10 MLD), constructed wetlands, desilting, bund reconstruction, walking paths, stormwater channels

## Innovation Focus

Natural treatment systems, community integration, biodiversity enhancement, sustainable maintenance models



## Excluded Scope

Major road works around lake, groundwater supply network, commercial developments

# Design Problem & Solution Pathway

## Problem Definition

Rejuvenate Jakkur Lake using sustainable, eco-friendly integrated design preventing sewage inflow and restoring biodiversity

1

## Integrated Solution

STP treatment → constructed wetland → natural polishing  
→ community spaces and biodiversity restoration

2

3

4

## Sub-Task Allocation

Sewage diversion to BWSSB, wetland creation to environmental engineers, civil works to BBMP, landscape to urban planners

## Community Integration

NGOs mobilize community input, fishermen provide livelihood-based design recommendations

# Value Stream Analysis

Comprehensive analysis identified value-added steps and eliminated non-value activities, achieving 70% reduction in chemical treatment costs through natural wetland systems.

Process Step	Type	Cost Impact	Environmental Benefit
Sewage Diversion	Value-Added	Medium	Eliminates pollution source
Wetland Polishing	Value-Added	Low	Natural water treatment
Lake Aeration	Value-Added	Low	Ecosystem health
Chemical Treatment	Non-Value	High (Eliminated)	Replaced by wetlands
Concrete Lining	Non-Value	High (Eliminated)	Replaced by natural slopes

# Sustainability Framework

## **Social Integration**

Provide safe public access, maintain fishing activities, ensure community participation in design

## **Economic Viability**

Government budget compliance, community-manageable O&M costs, sustainable financing models

## **Environmental Core**

Protect bird species, maintain natural recharge zones, avoid toxic chemicals, preserve ecosystem integrity



# Triple Bottom Line Performance

95%

**Community Satisfaction**

## **People (Social)**

Recreational space creation, improved public health, enhanced community pride and ownership

- Safe walking paths and seating areas
- Improved air quality and health outcomes
- Active community participation in maintenance

85%

**Biodiversity Recovery**

## **Planet (Environmental)**

Clean water restoration, biodiversity revival, groundwater recharge improvement

- Class B water quality achievement
- Native species reintroduction success
- Ecosystem services restoration

70%

**Cost Reduction**

## **Prosperity (Economic)**

Income generation from fisheries, tourism growth, reduced treatment costs

- Sustainable fishing livelihoods
- Tourism and recreation revenue
- Lower long-term maintenance costs

300%

**Tourism Increase**

# Stakeholder Ecosystem

## Government Agencies

BBMP, BWSSB, and Karnataka Lake Development Authority provided technical expertise, funding, and regulatory oversight for the restoration project



## Community & NGOs

MAPSAS, Jalaposhan, local residents, and fishermen communities ensured community participation and sustainable maintenance models

## Research & Expertise

IISc researchers documented biodiversity changes, ecology experts provided technical guidance, and private contractors executed specialized works



# ***Integrated Design Synthesis***



## ***Technical Integration***

Combined STP treatment, constructed wetlands, and natural lake polishing into one seamless system



## ***Solution Evaluation***

Evaluated three alternatives - chemical treatment, STP-only, and integrated wetland approach



## ***Risk Mitigation***

Addressed STP performance, invasive species, mosquito breeding, and community misuse through R&D and design