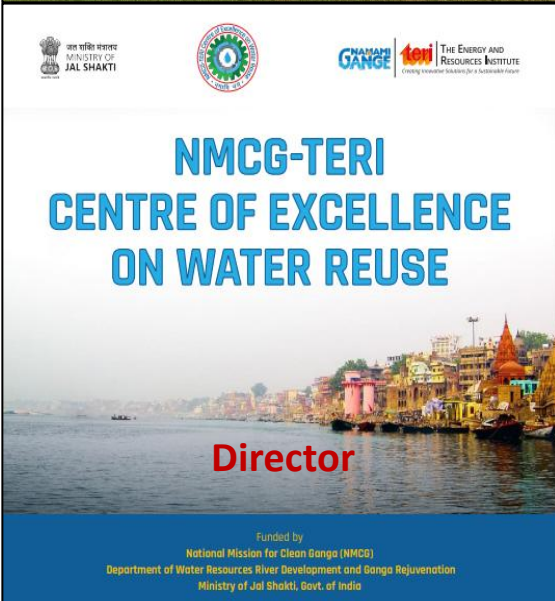


Ph.D. Chemistry in UV-TiO₂ Photocatalysis
@ IIT Roorkee (2000-2005)



Dr. Nupur Bahadur

**26 Years of Work Experience
from a
Researcher to a Technopreneur**



10 Indian Water Sheroes

Invited Talk @ UN Geneva



**Fellow of IWA &
Chair, IWA-India**

Decade long Journey @ Ideation to Technology Commercialization

10,000 LPD Pond Rejuvenation, Alwar, Rajasthan (TRL 7)

20,000 LPD Textile CETP, Kanpur, UP (TRL 7)



2025-26

2024

2023-2024

2017-2020

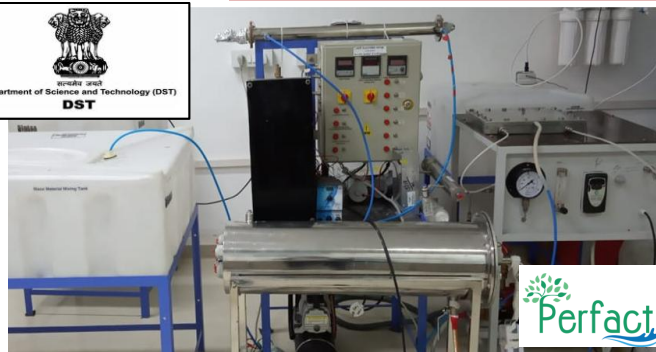
Dr. Nupur Bahadur is Inventor of
UV-TiO₂ AOP Technology

2015



1 L @ Lab (TRL 1-3)

100 L Prototype (TRL 4-6) @
DST-Water Mission (WTI), Gol



1000 LPD Sewage, Pragati Maidan, Delhi (TRL 7)



RECOGNITION
All the Way

1st Prize, FICCI Water Award, 2022

Tech. Commercialization, 2023



2024

2023

2022

2019

2015

**'Design & Manufacturing Technologies for 'Make in India'
1st Prize IISF-2015@ IIT Delhi**

**International Water Association (IWA)
Project Innovation Silver Award, Toronto 2024**

(From 108 entries from 34 Countries)



PROJECT PORTFOLIO (27 Projects) & WORK EXPERIENCE OF DR. NUPUR BAHADUR





NMCG-TERI CENTRE OF EXCELLENCE ON WATER REUSE



Funded by
National Mission for Clean Ganga (NMCG)
Department of Water Resources, River Development and Ganga Rejuvenation
Ministry of Jal Shakti, Govt. of India





Online Training And Capacity Building (OTCB) Certificate Programme

DEVELOPING TREATED WASTEWATER REUSE FACILITIES

ONLINE

20th February, National Training On Water Reuse, Ministry of Jal Shakti, Govt. of India, New Delhi. 07th Feb, 2021 to 28th Feb, 2021. 10:00 AM to 1:00 PM.

PROGRAMME DATES
20th FEB - 22nd MARCH 2021
10:00 AM - 1:00 PM

PROGRAMME FEES
No fee for participants. A fee of ₹ 1000 for the certificate. A fee of ₹ 2000 for the certificate and a fee of ₹ 500 for the certificate and a fee of ₹ 500 for the certificate.

REGISTRATION DETAILS
1. Registration fee: ₹ 1000
2. Certificate fee: ₹ 2000
3. Certificate and fee: ₹ 2500

PROGRAMME FEES
1. Certificate fee: ₹ 2000
2. Certificate and fee: ₹ 2500
3. Certificate and fee: ₹ 2500

CERTIFICATE
Certificate of Participation for all participants. Certificate of Completion for all participants. Certificate of Completion for all participants.

Target Audience
This course is designed to be useful and informative for policy and decision makers in the Central and State Ministries involved with Water and Wastewater Departments, Pollution Control Boards, Mayors, standing and water works committees, Municipal Commissioners, Town Planners, Urban Local Bodies (ULBs), Oil Refineries, Wastewater Treatment Plants (WWTPs) including Effluent Treatment Plants (ETPs) and Sewage Treatment Plants (STPs), and other professionals in the water and wastewater sector. The course will also be useful for fresh graduates or students of the engineering, environment, water policy and planning disciplines.

Banking details: India PPP Capacity Building Trust, A/c No. 05881450000079, IFSC: ICIC0000001, Plot No. 8, Sector A, R.R. Puram, Capital City Capital Building, New Delhi - 110022.

Registration link: <https://www.pppcapacitybuildingtrust.org/ocb/>

Early Bird Incentive: 10% discount on registration fee till 1-3-2021

Partners






Final Report

Adequate & Sustainable Treatment of Bandhwari Landfill Leachate

Submitted to
MCG & Haryana State Pollution Control Board (HSPCB)




Project Report

Options for Advanced Treatment and Resource Recovery for Decarbonization of Wastewater Utilities in the Bengaluru Metropolitan Area

Submitted to
The World Bank Group
World Bank Consultant No. 2002-06






Final Project Report

Wastewater Inventorisation and Review of National Practice for reporting GHG emissions from wastewater

Submitted to
TETRA TECH







Study on Microplastics in River Yamuna and Groundwater in Delhi





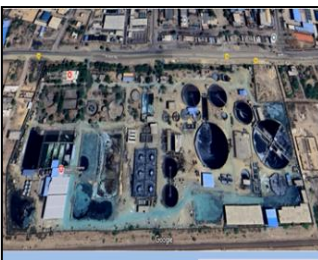


Final Report

Study on Yamuna Frothing in Delhi







Final Project Report

Comprehensive Assessment 18 MLD ZLD Plant at Balotra

Submitted to
Balotra Water Pollution Control and Research Foundation Trust







Project Report

Strategies to Manage Treated Water at Industrial Model Township (IMT) in Bawal, Haryana

Submitted to
The Chairperson
Haryana Water Resources Authority
HSVP, Sector-6, Panchkula, Haryana 134109





Status of Used Water Management and Water Reuse Policies in India

Report

Industrial Use Agricultural Use Urban Use

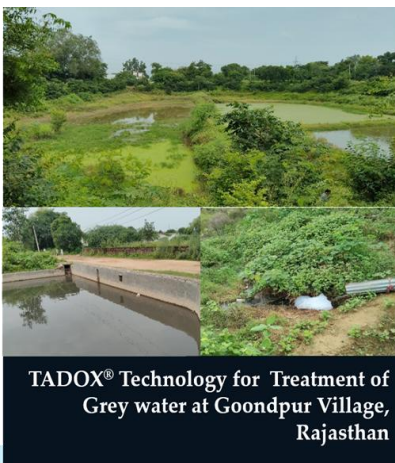
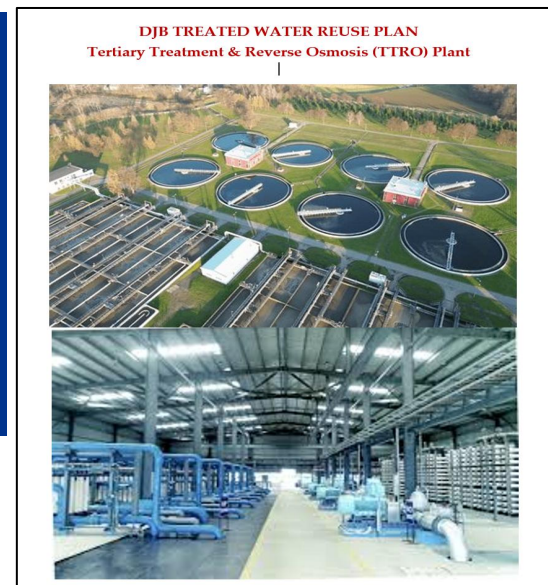
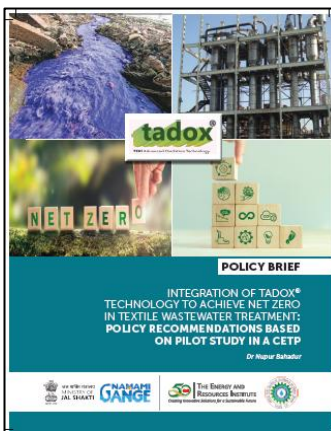
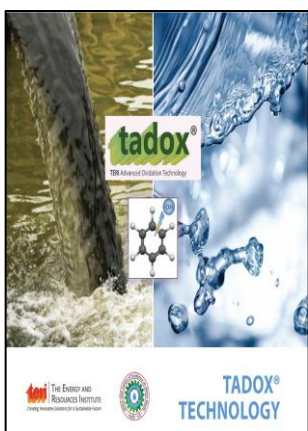




Compendium on Best Practices of Treated Water Reuse in India

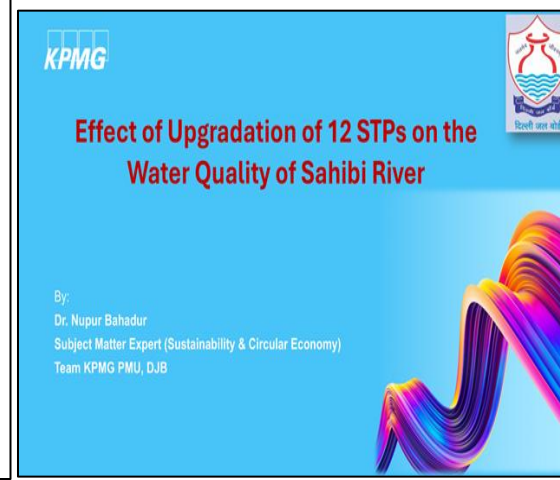
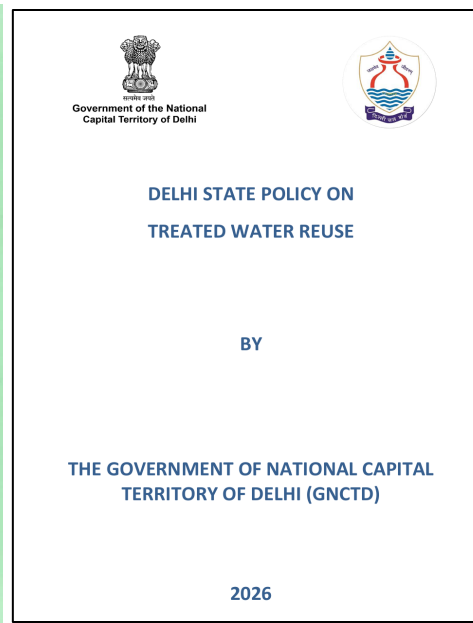
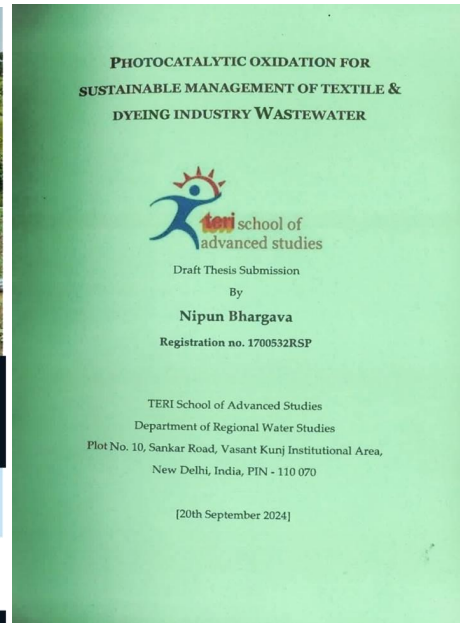






Submitted to:
Diageo India

DIAGEO
India



S. No.	SUB-CATEGORY	CATEGORY / PROJECT TITLE	FUNDER
		1. CONSULTANCY	
1	1. Water Quality Monitoring & River Rejuvenation	Effect of Upgradation of 12 STPs of DJB and their effect on Water Quality of Sahibi River	DJB, Delhi Govt.
2	2. Sustainability & Circular Economy	Options for Advanced Treatment and Resource Recovery for Decarbonization of Wastewater Utilities in the Bengaluru Metropolitan Area	The World Bank
3	3. Review & Analysis	Wastewater Inventorization and Review of National Practice for reporting GHG Emissions from Domestic Wastewater in India	Tetra Tech and USEPA
4	4. Pollution Abatement Plan	Water Quality Monitoring & Landfill Leachate Treatment & Management Plan	MCG & HSPCB
5	5. Addressing Enviro-Legal & NGT Matters	Strategies to manage Treated Water at Industrial Model Township (IMT) in Bawal, Haryana	Haryana Water Resources Authority (HWRA), govt. of Haryana
6	6. Preparing City Sanitation Plan	Development of City Sanitation Plan for six major cities of Kerala with focus on Liquid Waste Management	Department of Local Self Government, Kerala
		2. TECHNICAL ADVISORY	
7	1. Treated Water Reuse Project Formulation	DJB Treated Water Reuse Plan with Tertiary Treatment & Reverse Osmosis (TTRO) Facility	DJB, Delhi Govt.
8	2. Technology Assessment	Comparison of Sludge Treatment Technologies & Roadmap for Sludge Management at DJB STPs	DJB, Delhi Govt.
9	3. Technology Innovation	Invention of TERI Advanced Oxidation Technology (TADOX)	WTI, DST, MoS&T, GoI

10	4. Technology Development	Pilot trails and development of TADOX Technology for Industrial & Municipal Wastewater Treatment	Multi Client
11	5. Technology Piloted in National Mission Project	TADOX Technology Piloted in National Mission Project in a CETP in Textile Cluster in Kanpur under Namami Gange Program	National Mission for Clean Ganaga (NMCG), MoJS, GoI
12	6. Technology Commercialization	TADOX® Technology and Trademark License Agreement signed	Ion Exchange India Ltd. (IEI) Mumbai
13	7. Technology Commercialization	TADOX® Technology and Trademark License Agreement signed	Dew Projects & Chemicals Pvt. Ltd. Noida
14	8. Adequacy Assessment of CETP & ZLD Plant	Comprehensive Assessment of Balotra Textile Common Effluent Treatment Plant to achieve Zero Liquid Discharge (ZLD)	Balotra Water Pollution Control Treatment and RO Pvt. Ltd
15	9. CSR Project	CSR Project from for Implementation of TADOX Technology Plant to treat grey water across ponds in Goondpur Village in Alwar Dist. of Rajasthan	DIAGIO, United Spirits Ltd. Bengaluru

		3. R&D ON ENVIRONMENTAL ISSUES	
16	1. Research based Policy Interventions	Study of Froth in River Yamuna	Dept. of Environment, Delhi Govt.
17	2. Research based Policy Interventions	Study of Microplastics in River Yamuna and Ground Water in Delhi	Dept. of Environment, Delhi Govt.
18	3. R&D	Study of Physico-Chemical Properties of Metal & Metal Oxide Nanoparticles	DST-SERB Young Scientist, DST, MoS&T, GoI

		4. ADVOCACY	
19	1. National Status Review	Status of Used Water Management & Water Reuse Policies in all 28 States and 8 UTs of India	NMCG-TERI CoE on Water Reuse
20	2. Water Reuse Policy Drafting	Water Reuse Policy for Delhi	DJB, Delhi Govt.
21	3. Compendium	Compendium of best case studies of Treated Water Reuse in India	NMCG-TERI CoE on Water Reuse
22	4. Policy Brief	Policy Brief on TADOX Technology Integration in Textile Clusters	NMCG-TERI CoE on Water Reuse
		5. KNOWLEDGE CREATION & CAPACITY BUILDING	
23	1. Institution Building	NMCG-TERI CoE on Water Reuse at TERI	National Mission for Clean Ganaga (NMCG), MoJS, GoI
24	2. Training & Capacity Building	Online Training & Capacity Building Certificate Program on Developing Treated Water Reuse Facilities	National Mission for Clean Ganaga (NMCG), MoJS, GoI
25	3. Ph.D. Guidance	26 Research Papers with 1670 Citations with average Impact Factor 9+ in Google Scholar and guided 3 Ph.D.s & 20 Dissertations, published 9 Newspaper & 9 magazine articles.	Multi Client
26	4. Research Publications		
27	5. Media Articles		

Category 1:
CONSULTANCY

Effect of Upgradation of 12 STPs on the Water Quality of Sahibi River

By:

Dr. Nupur Bahadur

Subject Matter Expert (Sustainability & Circular Economy)

Team KPMG PMU, DJB



2. Sustainability & Circular Economy

EXECUTIVE SUMMARY

Options for Advanced Treatment and Resource Recovery for Decarbonization of Wastewater Utilities in the Bengaluru Metropolitan Area

SUBMITTED TO
The World Bank Group
World Bank Contract no. 7206788



THE WORLD BANK
IBRD • IDA | WORLD BANK GROUP

Project Completion Certificate

Name, Designation: Mr. Kristoffer Welsien, Senior Water Supply and Sanitation Specialist
Office Address of the Issuing Officer-The World Bank
Name of Contractor / Agency: The Energy and Resources Institute (TERI), Darbari Seth Block, Core 6C, India Habitat Centre, Lodhi Road, New Delhi - 110 003, India

1	Title of the Project	Options for Advanced Treatment and Resource Recovery for Decarbonization of Wastewater Utilities in the Bengaluru Metropolitan Area
2	Team Lead & PI	Dr. Nupur Bahadur
3	Work order	Contract 7206788
4	Date of commencement of work	November 01, 2022
5	Actual Date of completion	June 30, 2023
6	Details of compensation levied for delay, if any	None
7	Value of Project	USD 64,558
8	Brief Scope of Work	The primary objective of this project is to identify and assess large scale options for advanced treatment of wastewater and recovery and utilization of resources, such as biogas, bio solids and reusable water in the expanded BBMP area including the 110 villages, and to develop a regional strategy and plan for efficient and sustainable wastewater treatment and reuse.
9	(i) Work sub-contractor (ii) Amount shared with the vendor	(i) Infrastructure Development and Corporation (Karnataka) Limited (ii) INR Rs. 24 lakhs including taxes
10	Remarks on the executed work	Aspects from the report are being incorporated in nine new STPs in Bengaluru through projects worth 1,000 Crore

Impact
Created

It is certified that the Project is successfully completed.



Mr. Kristoffer Welsien
Task Team Leader and Senior Water Supply and Sanitation Specialist
Date: June 4, 2025

3. Review & Analysis



Final Project Report

Wastewater Inventorisation and Review of National Practice for reporting GHG emissions from wastewater

Submitted to
TETRA TECH



Tetra Tech & USEPA

Impact
Created



2024 Global Methane Forum

Mobilizing Methane Action

18-21 March 2024, Geneva, Switzerland

The Importance of
Data Collection and
Monitoring,
Reporting, and
Verification (MRV)
to Finance Projects
in the Biogas Sector

Inventorization of GHG emissions from the Domestic Wastewater Sector in India

Dr Nupur Bahadur

Senior Fellow & Associate Director

NMCG-TERI CoE on Water Reuse

Circular Economy & Waste Management Division
The Energy and Resources Institute (TERI), INDIA

Vice Chairman

International Water Association - India



4. Pollution Abatement



Final Report

Adequate & Sustainable Treatment of Bandhwari Landfill Leachate

Submitted to

MCG & Haryana State Pollution Control Board (HSPCB)



**THE ENERGY AND
RESOURCES INSTITUTE**

Creating Innovative Solutions for a Sustainable Future



On-Site complete solution to treat Bandhwari Landfill Leachate



KEY RECOMMENDATIONS

- ✓ Direct leachate treatment using DTRO should be avoided as it is highly resource & energy intensive and does not provide sustainable solution to permeate and reject management.
- ✓ DTRO Permeate sent to Sewage Treatment Plant (STP) for further treatment will make STP dysfunctional and non-compliant.
- ✓ LTP should be operational all the time and its biological process needs to be improved.
- ✓ TADOX® is required to remove color & organics while DTRO is required to remove TDS, so therefore both TADOX® & DTRO should be integrated suitably as per requirement to provide adequate treatment.
- ✓ Based on preliminary study, the proposed On-Site Solution is integrated, adequate, resource & energy efficient, affordable and sustainable.

Background:

550 registered industries in IMT Bawal are equipped with 22.5 MLD (up to 30 MLD) CETP, which is functional to treat the pre-treated effluent generated from these industrial units. A 3rd party evaluation done earlier indicated that the treated water of the CETP meets the norms of inland discharge set by CPCB and HPCB, but due to lack of infrastructure for disposal of treated water approximately 132 acres of land in the surrounding areas has become waterlogged, creating both aesthetic and environmental challenges for the authorities and this called for NGT intervention.

Objectives:

- 1) To visit IMT Bawal area, collect water samples for testing & analysis and assess the quality of treated water from CETP and stagnant water around the CETP.
- 2) To carry out detailed evaluation of the process and operations of the CETP in order to assess quality of the discharged treated water whether meeting prescribed norms set by CPCB/HSPCB.
- 3) To assess water quality of the stagnant water, reuse potential of treated as well as stagnant water and how well the overall situation be managed for long term sustainability.
- 4) To develop action plan and provide necessary advice to add

Impact
Created

IMPACT CREATED:

Report helped Haryana Water Resource Authority (HWRA) to find sustainable solution to existing environmental problem and helped **solved NGT case** related to this matter.



Project Report

Strategies to Manage Treated Water at Industrial Model Township (IMT) in Bawal, Haryana

Submitted to:
The Chairperson
Haryana Water Resources Authority
HSVP, Sector-6, Panchkula, Haryana 134109

Category 2:
TECHNOLOGY
INVENTION TO
COMMERCIALIZATION

Advanced Oxidation Photocatalysis Technology

8

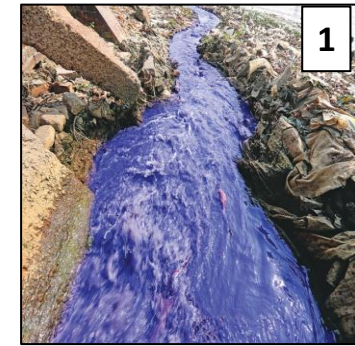


PROBLEM

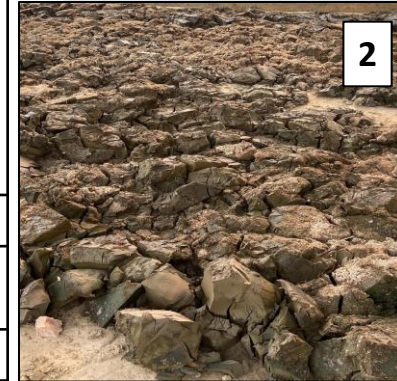
1. Industrial & Municipal Wastewater Treatment 2. Reuse of Treated Water

Existing Problems	Impact on Environment
Use of conventional Biological Treatment Technologies , involving microbes.	1. Unable to remove color & odour 2. Uses large amount of Chemicals, generating sludge, which is toxic & has problem of disposal 3. Treatment time 24-36 hours & Unable to bear shock load hence fail 4. Unable to treat Ammonia & Phosphates in Municipal Sewage, which when passes through drains, causes frothing in rivers. 5. Require large land, which makes them unsuitable for smaller areas, buildings & difficult terrains.
Large no of chemical use	6. Lead to choking & bio-fouling of membranes & raises costs
Tertiary treatment for reject management from RO	7. Involves highly resource & energy intensive processes, which raises cost & hence Industry is not willing to adopt
Inadequate treatment	8. Leads to treated water unfit for reuse.

1



2



3



4



5



6



7



Ministry of Science & Technology, Govt. of India Press Release on the successful outcome of DST Project for Technology development

TECHNOLOGICAL INNOVATION



Results published on DST Website

Ministry of Science & Technology

75
Azadi Ka
Amrit Mahotsav

<https://pib.gov.in/PressReleasePage.aspx?PRID=1748888>

New advanced oxidation technology can enhance waste water reuse at lower cost

Posted On: 25 AUG 2021 3:59PM by PIB Delhi

A new technology may soon enhance the reuse of waste water in an affordable and sustainable manner. The technology which uses UV-Photocatalysis can treat municipal sewage and highly polluting industrial wastewater streams and increase its reuse as a technological option in industrial as well as municipal wastewater treatments.

With ever-increasing water crisis, it becomes imperative for industries & utilities to reuse 'treated water'. However, the current treatment practices are inefficient because of high dependence on biological treatment processes like Activated Sludge Process (ASP) and Membrane Bioreactors (MBR). These systems require high energy consumption and high operating expenses (OPEX). These systems also generate a large amount of sludge. Therefore, researchers have felt the need to develop a sustainable and efficient technology for wastewater treatment.

The Energy and Resources Institute (ERI) has developed a new technology for wastewater treatment. This technology uses UV-Photocatalysis to treat wastewater. This technology can treat municipal sewage and highly polluting industrial wastewater streams and increase its reuse as a technological option in industrial as well as municipal wastewater treatments. This technology can reduce the operating expense by 30-40% for wastewater treatment.

भारत सरकार
GOVERNMENT OF INDIA

विज्ञान और प्रौद्योगिकी मंत्रालय
MINISTRY OF SCIENCE AND TECHNOLOGY

Screen Reader Access

Language

<https://dst.gov.in/new-advanced-oxidation-technology-can-enhance-waste-water-reuse-lower-cost>

DST@1971-2021

विज्ञान एवं प्रौद्योगिकी विभाग
DEPARTMENT OF SCIENCE & TECHNOLOGY

स्वच्छ भारत
एक कदम स्वच्छता की ओर

Home / About DST / Scientific Programmes / S&T Policies / Administration & Finance / Autonomous S&T & Attached Institutions / What's New / DST Dashboard

Home >> New advanced oxidation technology can enhance waste water reuse at lower cost

New advanced oxidation technology can enhance waste water reuse at lower cost



NEWSLETTER

(May 2022)

CKIC-DRIIV

City Knowledge Innovation Cluster - Delhi Research Implementation and Innovation

TADOX[®]: a sustainable ecofriendly wastewater treatment enhancing water reuse

DRIIV is delighted to showcase the TADOX technology (https://youtu.be/fgpBal_Atyc) of its partner institute TERI (The Energy Research Institute) which offers a comprehensive wastewater treatment. TADOX has been developed in tie-up with ONGC Energy Centre, under the support of Water Technology Initiative (WTI) of the Department of Science and Technology, Govt. of India. The uniqueness of the treatment lies in integrating nanotechnology with Advanced Oxidation Processes (AOPs) at the secondary treatment stage leading to degradation and mineralization of targeted pollutants.

Industrial Wastewater Treatment

WASTEWATER TREATMENT

(Uttar Pradesh & Uttarakhand)

Textile CETP, Kanpur, 20KLD Plant

Tannery ETP, Kanpur

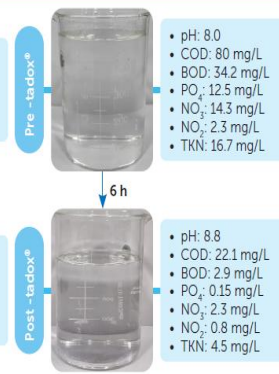
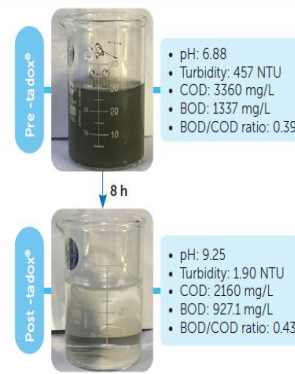
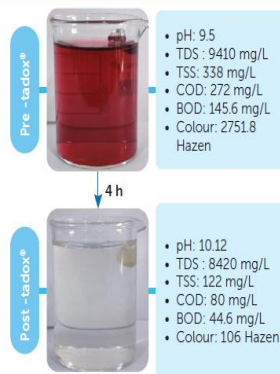
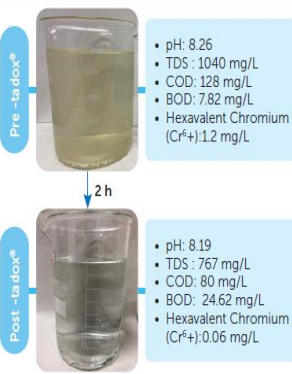
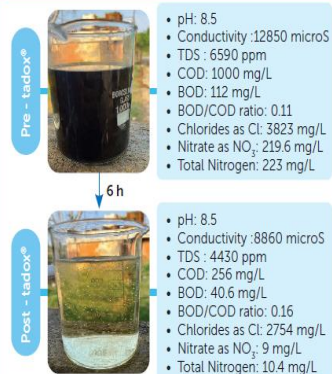
Textile ETP, Ludhiana

Petrochemical Industry, Panipat 10KLD Plant

Maharashtra, Tamil Nadu & Gujarat

Chemical Manufacturing, Raigad

Electronics Manufacturing, Hosur



Same Technology-Wide Application Areas-Tested Across Geographies

Slaughter House, Agra

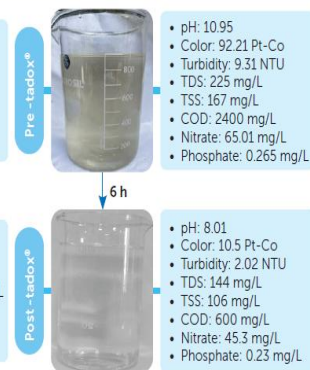
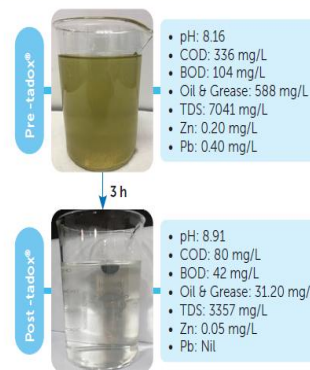
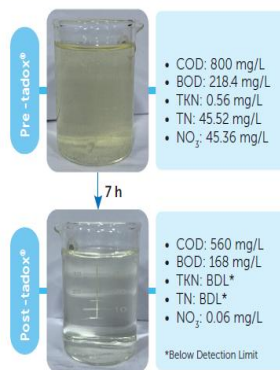
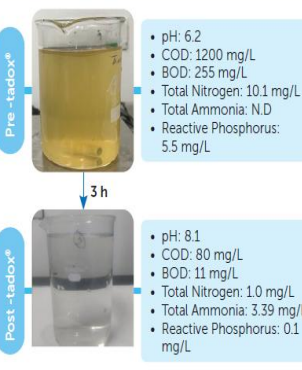
Pharmaceutical Industry, Rishikesh

Chemical Manufacturing ETP, Nellore

Chemical Manufacturing ETP, Kochi

Oil & Gas Industry, Ahmedabad

MEE Condensate, Bharuch



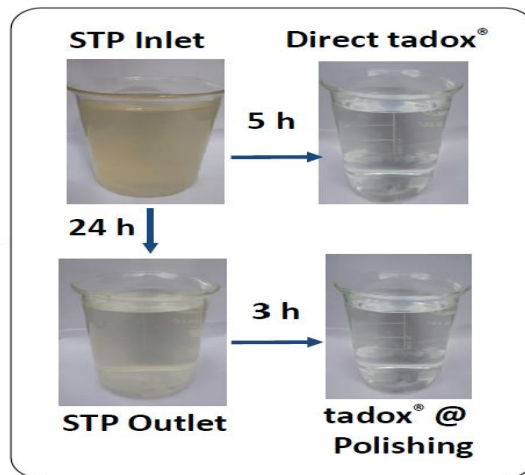
Municipal Wastewater, Sewage and Open Drain Treatment

Delhi & Haryana

Current Conventional Treatment

Parameters	STP Inlet	STP Outlet
pH	7.2	7.2
Colour, (Pt-CO) (CU)	292.4	116.4
TDS, mg/L	342	368.0
COD, mg/L	352.00	88.00
BOD, mg/L	115.00	32.00
PO ₄ , mg/L	4.45	0.50
NO ₂ , mg/L	0.11	0.19
NH ₄ , mg/L	7.20	3.20
E Coli, MPN/100ml	1.32x10 ⁴	6.0x10 ²
Total Coli, MPN/100ml	8.9x10 ⁴	2.3x10 ³

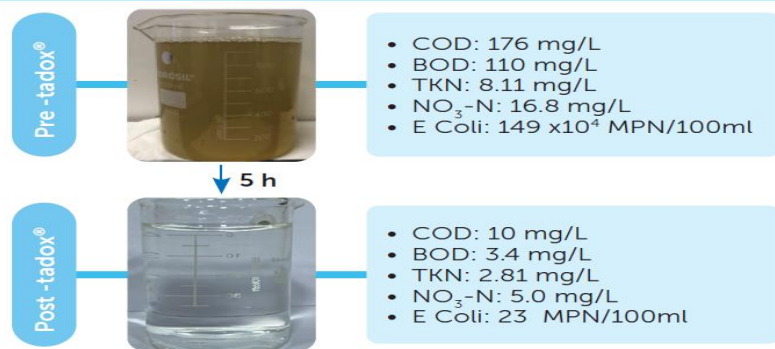
Municipal STP, Delhi



tadox® Treatment

Parameters	Direct TADOX	TADOX @ Polishing
pH	8.0	8.8
Colour, (Pt-CO) (CU)	1.4	<1
TDS, mg/L	91.3	119.0
COD, mg/L	21.50	24.0
BOD, mg/L	<2	<2
PO ₄ , mg/L	0.08	0.03
NO ₂ , mg/L	0.75	0.11
NH ₄ , mg/L	3.40	2.10
E Coli, MPN/100ml	ND	ND
Total Coli, MPN/100ml	3	1

Standalone STP, Gurugram



Gochi Drain, Faridabad





1. For ETPs TADOX® treated water could be used for various in-house applications.
2. In a CETP, TADOX® treated water will go to existing Biological Treatment.



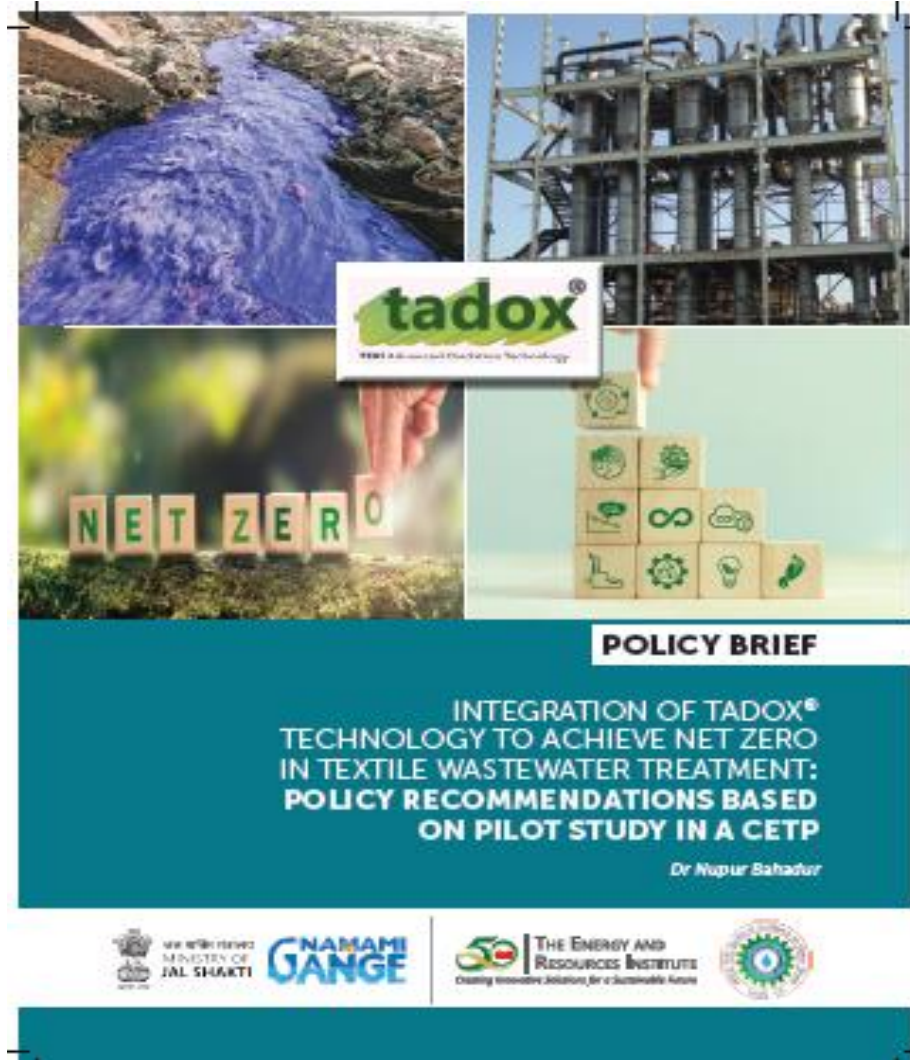
Raw Effluent TADOX® Treated

Parameters	Unit	CSIR – Indian Institute of Toxicology Research Lab, Lucknow		
		Raw water	TADOX Treated water	% Change
Colour	Hazen	1249.00	22.33	98
pH Value	-	8.66	7.79	-
TSS	mg/l	270.0	6.0	98
Ammoniacal Nitrogen	mg/l	3.81	<0.11	97
Oil and Grease	mg/l	31.2	2.4	92
COD	mg/l	990.0	54.4	94.5
BOD	mg/l	312.50	11.00	96.5
Odor	-	Objectionable	Un-Objectionable	

Impact Created

Achievements

1. $\text{COD} \leq 50 \text{ mg/l}$, $\text{BOD} \leq 10 \text{ mg/l}$ and $\text{Color} \leq 10 \text{ Hz}$
2. 85-90% Water Reuse
3. 50% CAPEX & 40% OPEX Reduction
4. GHG emission reductions up to 32%.
5. With Solar integration, Net Zero Target is achievable.
6. 1st of its kind demonstration in the World of Advanced Oxidation Photocatalytic (AOP) treatment in a Textile CETP.
7. 75% Less use of chemicals.
8. Sludge reduction from 30 to 0.5 Kg/m^3
9. Non-toxic sludge
10. Evidence based Policy recommendations.



CLIENTS



SÜD-CHEMIE
CREATING PERFORMANCE TECHNOLOGY



DIAGEO





Inlet

Outlet



TADOX® Technology for Treatment of Grey water at Goondpur Village, Rajasthan

Submitted to:
Diageo India

Site: Alwar, Rajasthan	Sample Collection Date: 15/01/2026
	Sample Received in Lab: 16/01/2026
	Analysis Date: 16 to 22/01/2026
	Sampled By: Mr. Shubham Yadav
	Sample: Three Water Sample Received

S. No.	Parameters	Units	STP Inlet	STP Outlet
1.	pH	-	7.47	7.15
2.	TDS	mg/L	864	955
3.	Conductivity	μS/cm	1330	1471
4.	Turbidity	NTU	14.81	0.18
5.	TSS	mg/L	17	2.0
6.	COD	mg/L	88	25
7.	BOD	mg/L	26	7

Category 3:
TECHNICAL
ADVISORY

DJB TREATED WATER REUSE PLAN
Tertiary Treatment & Reverse Osmosis (TTRO) Plant



1. Treated Water Reuse Plan for Delhi

- i. The initiative supports the broader objective of **limiting the use of piped potable water to essential domestic needs**, while progressively shifting commercial and industrial demand to treated reuse water. In addition, the project establishes a **replicable and scalable reuse model** that can be extended across Delhi, significantly reducing environmental discharge into the Yamuna River and positioning Delhi as a **national model for circular economy practices in urban water management**.
- ii. TTRO should therefore be viewed **not as a cost, but as a long-term investment** in water security, environmental sustainability, and economic growth. With timely implementation and continued guidance from Delhi Jal Board, the proposed TTRO projects can play a transformative role in improving water use efficiency, supporting industrial development, and advancing Delhi's vision for a resilient and sustainable urban water future, including implementation under a structured PPP framework where appropriate.

2. Adequacy Assessment of CETP & ZLD Plant



Final Project Report

Comprehensive Assessment 18 MLD ZLD Plant at Balotra

Submitted to
Balotra Water Pollution Control and Research Foundation Trust

OBJECTIVE:

To perform adequacy assessment of the CETP along with the status check of ZLD Plant.

DELIVERABLES:

- (i) Conducted technical adequacy assessment of CETP and ZLD systems, reviewing design, capacity, and operational efficiency.
- (ii) Performed gap analysis to identify discrepancies between procurement specifications and actual implementation affecting performance.
- (iii) Recommended process optimization measures for RO recovery, reject management, and energy efficiency to achieve ZLD compliance.
- (iv) Coordinated with SPV management, technology vendors, and regulators, delivering a detailed technical report and proposed sustainability strategy focusing on resource recovery and water reuse.

IMPACT CREATED: Report helped the SPV to find **difference in the procurement document vs real implementation** impacting performance and take corrective actions.

Impact
Created



Delhi Jal Board

Comparison of Sludge Treatment Technologies & Roadmap for Sludge Management at DJB STPs

By:

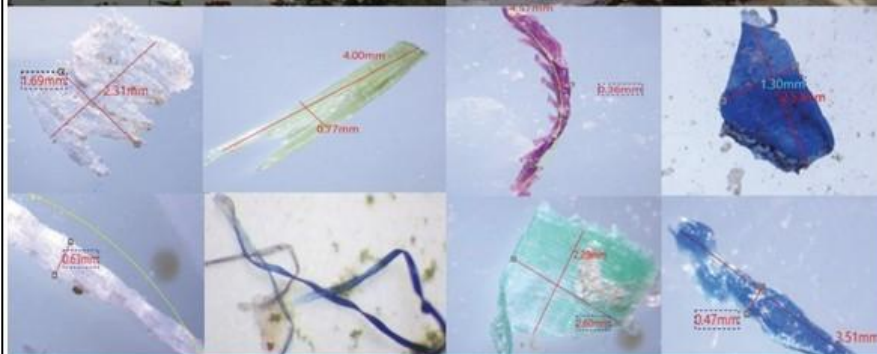
- Dr. Nupur Bahadur, Subject Matter Expert (Sustainability & Circular Economy), KPMG PMU, DJB

Category 4:

R&D

ON ENVIRONMENTAL ISSUES

1. Research based Policy Interventions



Study on Microplastics in River Yamuna and Groundwater in Delhi



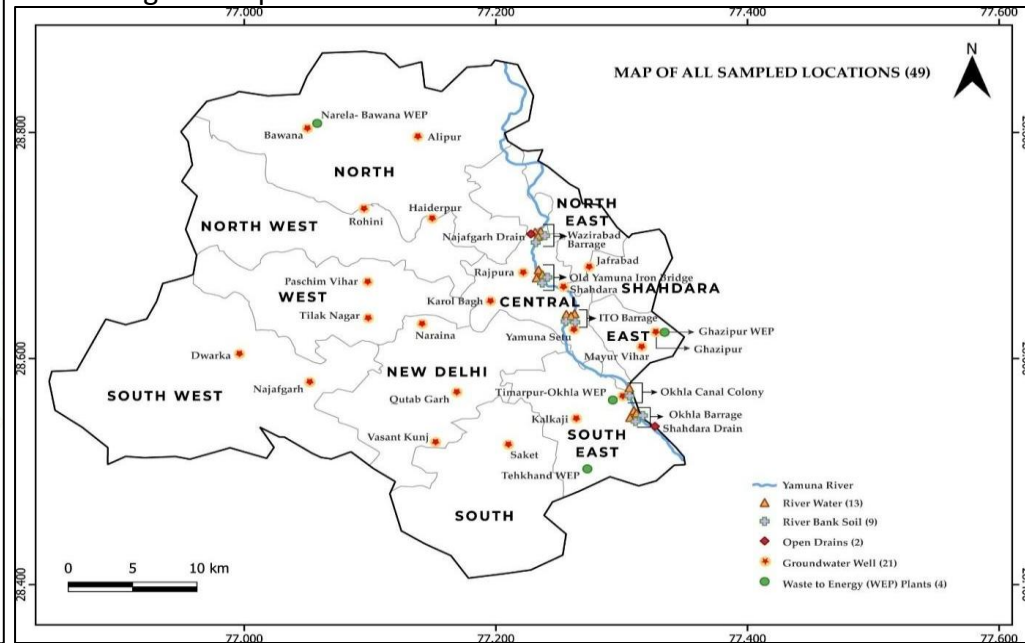
Department of Environment
Government of NCT of Delhi



teri | THE ENERGY AND
RESOURCES INSTITUTE
Creating Innovative Solutions for a Sustainable Future

Objectives:

- (1) To assess the water quality of the River Yamuna and groundwater in Delhi with a special focus on the presence of microplastics (MPs).
- (2) To identify potential sources of MP contamination across Delhi's districts and along the River Yamuna.
- (3) To understand leaching impacts of MPs along banks of the river.
- (4) To map major hotspots in both river and groundwater systems.
- (5) To propose a time-bound action plan with enforceable strategies to mitigate MP pollution.



2. Research based Policy Interventions

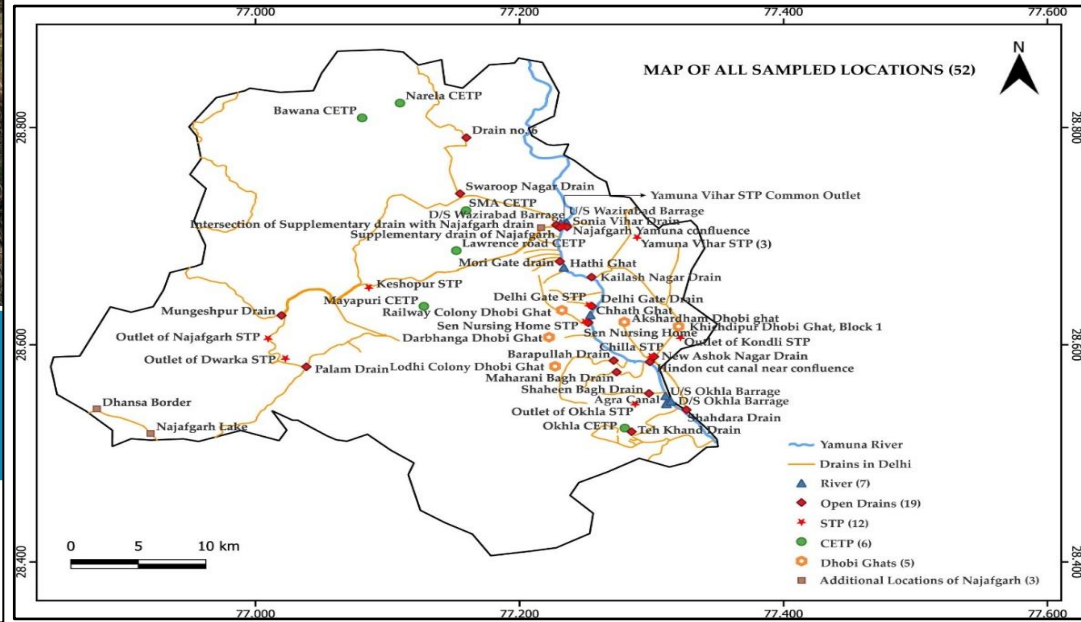


Final Report

Study on Yamuna Frothing in Delhi

Objectives:

- (1) To find reasons behind the frothing in River Yamuna and correlate it with the outflow of different drains.
- (2) To identify sources of frothing in Najafgarh and Supplementary drains.
- (3) To identify major drains accounting for maximum pollution load responsible for froth and finding out parameters exceeding the standard/permissible limits.
- (4) To identify area sources such as colonies, industrial areas, etc., contributing to the pollution load responsible for frothing in Yamuna.
- (5) To develop short-term, medium-term and long-term action plan including clear enforcement strategies for minimizing frothing/foaming in the river Yamuna.



Department of Environment
Government of NCT of Delhi



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Yamuna Froth: Blame It On Detergents And Dirty Water

Study Offers Several Suggestions To Curb Pollution In River

Kushagra Dixit
@timesofindia.com

New Delhi: Acting on the Delhi govt's recommendation, The Energy and Resources Institute (Teri) has prepared a comprehensive strategic plan to tackle frothing in the Yamuna, identifying major pollution sources and department-specific measures to address the issue.

The study, commissioned to develop a roadmap for the river's rejuvenation, notes that froth forms when poor water quality, high levels of surfactants from detergents and turbulence combine—particularly when barrage gates at Okhla are opened, which stirs up sludge and causes foaming.

Shared with Delhi govt and a copy of which is with TOI, the study calls for a coordinated approach across departments, starting with strengthening a centralised mechanism like the State Mission for Clean Yamuna (SMCY) to ensure inter-agency coordination.

It recommends that the Department of Environment revisit the 1994 Yamuna water-sharing agreement to ensure minimum environmental flow and present Teri's findings in the upcoming winter session of the Delhi Assembly as part of a broader public awareness campaign.

For pollution monitoring, the Delhi Pollution Control Committee (DPCC) has been advised to expand water testing to include ammonia and phosphate—key contributors to detergent-induced froth—beyond the existing parameters. The report also calls for regular inspections of Dhoobi Ghats, installation of micro sewage treatment

TERI'S FINDINGS AND RECOMMENDATIONS

File Photo



CAUSE: Froth forms due to a mix of detergent surfactants, pollution load and high turbulence near barrages

Environment Dept:

Strengthen Clean Yamuna Mission; ensure minimum environmental flow

DPCC & BIS: Monitor ammonia and phosphate; promote eco-friendly zeolite & enzyme against phosphate & sulphate based detergents

Irrigation and flood control: Install aerators and webcams

at barrages; clear water hyacinth; conduct regular desilting

DJB: Upgrade STPs with tech like bio-nutrient removal and advanced oxidation photocatalyst; enforce compliance; adopt IoT monitoring

MCD: Monitor drains online;

tap illegal outfalls; curb untreated sewage

DSIIDC: Audit CETPs; act against illegal dyeing units; enforce zero liquid discharge

DDA: Install decentralised STPs in JJ clusters using compact oxidation tech



plants (SMCY) at laundry clusters, and stricter enforcement of eco-friendly detergent standards. DPCC is urged to collaborate with the Bureau of Indian Standards to promote zeolite- and enzyme-based detergents over phosphate-heavy alternatives.

The Irrigation and Flood Control Department (IFCD) has been tasked with installing aerators in low-flow areas, particularly upstream of Okhla barrage, to maintain dissolved oxygen levels and reduce froth. The study also proposes webcams at barrage gates for real-time monitoring and regular removal of water hyacinth, which contributes to foam formation.

Delhi Jal Board (DJB) has been advised to expand STP ca-

capacity, improve compliance—12 STPs were found non-compliant—and adopt advanced treatment technologies such as Biological Nutrient Removal and Advanced Oxidation Processes.

Other directives include online water quality monitoring at drains, flow meter installation, and curbing illegal discharges by the Municipal Corporation of Delhi; strict performance checks and new CETPs by the Delhi State Industrial and Infrastructure Development Corporation; and decentralised or micro-STPs for unauthorised colonies and JJ clusters by Delhi Development Authority.

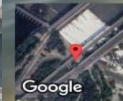
"The study was commissioned by the Delhi govt, and after a year of research, we

have developed concrete recommendations," said Nupur Bahadur, director of Teri's NMCG Centre of Excellence on Water Reuse. "If each department acts promptly and in coordination, frothing can be controlled, pollution in the Yamuna reduced, and the river's rejuvenation achieved within a set timeframe."

Echoing Teri's findings, environment minister Manjinder Singh Sirsa said the study highlights critical gaps that need to be addressed. "The recommendations made by the study are very helpful and pave the way for cleaning the river," he said. "We will use the results and suggestions, and plug the gaps highlighted to ensure effective action," he added.



Research led to Clean Yamuna



New Delhi,
G8v6+qch, Madanpur,
India
Lat 28.544658° Long 77.3
Sunday, 26/10/2025 11:4

GPS Map Camera

Impact
Created

It was Froth
Free Yamuna &
Froth Free Chatt
Festival in
2025!!

GPS Map Camera

Noida, Uttar Pradesh, India

Kalindi Kunj Brg, Noida, Uttar Pradesh 201313, India
Lat 28.546671° Long 77.316147°
Sunday, 26/10/2025 01:09 PM GMT +05:30

Google



National Television @ Prime-Time Show by
Mr. Rajdeep Sardesai at **INDIA TODAY** on 28th Nov 2025



THE TIMES OF INDIA



Yamuna covered in pink froth, raising concerns over pollution

Paras Singh

paras@hindustantimes.com

NEW DELHI: The Kalindi Kunj to Okhla barrage section of Yamuna in southeast Delhi is covered with iceberg-like pink coloured floating froth, which, experts say, indicates fusion of untreated dyes and waste from neighbouring illegal industries.

Yamuna froth, a common sight indicating very high pollution levels as the river leaves Delhi, turned pink over the last three days, raising alarm about the river's chemical pollution load.

Yamuna activist Pankaj Kumar from the NGO Earthwarrior said that pink froth blanketing the Yamuna downstream of Okhla barrage is a glaring sign of untreated industrial waste and toxic effluents being dumped into it. "This isn't snow—it's chemical foam laced with dyes, phosphates, surfactants, and other pollutants from industries and untreated sewage. It harms aquatic life, poses health risks, and shows how decades of unchecked dumping continues to choke the river," he said.

Kumar added that what was once mostly foam bubbles now has turned bubblegum pink from industrial waste. "It's dangerous pollution that's been poisoning Delhi's lifeline for years. Billions spent on 'clean Yamuna' plans, yet here we are in 2026."

Officials explained that the froth is caused by soap-like surfactant molecules in polluted water. When water falls from a



Yamuna froth has turned pink over the last three day.

ARVIND YADAV/HT PHOTO

height at the Okhla barrage, the churning action raises the frothing. Lower temperatures make these bubbles more stable, intensifying the visible foam.

Sources of surfactants include detergents from untreated domestic sewage, industrial pollutants, wastewater from dhobi ghats, and organic material released by decomposing water hyacinth trapped near barrage.

Activists and experts urged the government to probe the pink froth and sources of dyes. Bhim Singh Rawat, a Yamuna activist, and member of the South Asia Network on Dams, Rivers and People said though there's no conclusive study for the situation

so far, untreated effluents from dye, textile or colouring industrial units could be a reason behind pink tints. "In Yamuna, it's probably due to untreated effluents from dyeing or colouring industrial units operating illegally. In the Delhi stretch of Yamuna, similar froth incidents were reported in March 2023 and 2016 downstream of Wazirabad barrage."

Rawat said similar phenomenon was seen in the Upper Odai river water in Tamil Nadu in January 2023. It was found that the pink froth in the river was due to untreated waste from seafood processing units.

Last year, The Energy and Resources Institute (TERI) study

commissioned by Delhi government to identify reasons and sources behind high froth formation, also flagged poor working of the city's STPs and common effluent treatment plants. It flagged hotspots at Akshardham, Khichdipur, and the Railway Colony dhobi ghats – which were found, discharging white, turbid and untreated wastewater directly into Yamuna via Ganesh Nagar drain, Shahdara drain, and 12A drain, respectively.

A DJB spokesperson did not respond. However, a DJB official said DPCC may be able to ascertain the reason behind pink froth. "Some dye or iron rich pollutant can cause it," the official said

Minister Shri. Parvesh Verma Visit ed Kalindi Kunj Barrage on 17th March 2026



Category 5:
ADVOCACY

1. Review of Water Reuse Policy at National Level

Status of Used Water Management and Water Reuse Policies in India

Report

Industrial Use

Agricultural Use

Urban Use



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2. Drafting of Water Reuse Policy for Delhi



Government of the National
Capital Territory of Delhi



DELHI STATE POLICY ON TREATED WATER REUSE

BY

THE GOVERNMENT OF NATIONAL CAPITAL
TERRITORY OF DELHI (GNCTD)

2026

3. Compendium

Compendium on Best Practices of Treated Water Reuse in India



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4. Policy Brief

tadox®
WASTE & WATER TREATMENT TECHNOLOGY

NET ZERO

POLICY BRIEF

**INTEGRATION OF TADOX®
TECHNOLOGY TO ACHIEVE NET ZERO
IN TEXTILE WASTEWATER TREATMENT:
POLICY RECOMMENDATIONS BASED
ON PILOT STUDY IN A CETP**

Dr. Nupur Bahadur

श्री मंत्रि विभाग
MINISTRY OF
JAL SHAKTI

**NAMAMI
GANGE**

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Category 6:
KNOWLEDGE CREATION
&
CAPACITY BUILDING

1. Team Building & Institution Strengthening

VISION



जल शक्ति मंत्रालय
MINISTRY OF
JAL SHAKTI



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NMCG-TERI CENTRE OF EXCELLENCE ON WATER REUSE



Funded by

National Mission for Clean Ganga (NMCG)

Department of Water Resources River Development and Ganga Rejuvenation

Ministry of Jal Shakti, Govt. of India



National Mission for Clean Ganga

Developing integrated technological solutions to achieve "Nirmal Dhara" (Unpolluted Flow) objective through point source pollution abatement strategies.



Swachh Bharat Mission-Urban 2.0

To work on water reuse policies with States. Organize training and capacity building programs for ULBs on solid and liquid waste management.



Atal Mission For Rejuvenation And Urban Transformation

To contribute in Technology Sub-Mission to encourage newer technology options to augment capacities and enhance recycle/ reuse of treated water.



Smart City Missions

Encourage decentralized wastewater treatment and reuse using micro-STPs across Construction and Housing sectors.



Water Vision @ 2047

Industries to be encouraged to adopt integrated, sustainable and affordable technological solutions to achieve Zero Liquid Discharge (ZLD).



ARTH Ganga

To encourage Circular Economy through reuse of sludge and wastewater for irrigation, industries and work with ULBs to explore revenue generation.



Self Reliant India

To encourage 'Make In India' technologies for achieving Water Security and UN SDG 6.

This was **1st of its kind CoE in the Country on Water Reuse** established by Ministry of Jal Shakti, Govt. of India under the Namami Gange Mission and **Dr. Nupur** conceptualized, established and successfully ran this CoE as its **Founder & Director**.

Activities performed:

- Overall coordination, supervision and review of the project activities.
- Conceptualized and operationalized the CoE framework, including governance structure, technical roadmap and stakeholder engagement plan.
- Secured multi-year funding and institutional partnerships to ensure sustainability and scalability.
- Developed national guidelines and best practices for water reuse in alignment with SDG 6 and India's water security goals.
- Engaged with government agencies, industry bodies, and international organizations to influence policy and regulatory frameworks.
- Directed research programs on water reuse technologies, policy frameworks, and circular economy models.
- Supervised pilot projects and technology demonstrations for municipal and industrial wastewater reuse.
- Established KPIs and performance metrics to evaluate the Centre's impact on water reuse adoption and policy integration.
- Delivered annual progress reports and strategic recommendations to NMCG and MoJS, GoI.

2. Training & Capacity Building



Building Capacities
Enabling Infrastructure
ICAP-Trust



IDeCK



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RESOURCES INSTITUTE

Online Training And Capacity Building (OTCB) Certificate Programme

DEVELOPING TREATED WASTEWATER REUSE FACILITIES



ONLINE

Image Courtesy: National Mission for Clean Ganga, Ministry of Jal Shakti, Govt. of India. Dinapur STP 140 MLD at Varanasi, Uttar Pradesh.

PROGRAMME DATES

8TH – 22ND MARCH 2021

TIMING :
2:00 PM - 5:30 PM

REGISTRATION DETAILS

Instructions:

1. Payment acceptable through online link or demand draft only
2. Payment Gateway Link and Bank account details are given below

PROGRAMME FEES

Categories & Participation Fees (INR)

Government Official and Working Professionals : 7500/-

Members of partnering organisation: 5000/-

Academia and Teaching fraternity : 3500/-

Researchers, Students and Retired professionals : 2000/- + GST 18%

e-CERTIFICATE

(i) 'Certificate of Participation' for all who registers

(ii) 'Certificate of Merit' for all those who have 90% attendance and 75% marks in online exam

Target Audience

This course is designed to be useful and informative for policy and decision makers like Central and State Ministries involved with Water and Wastewater Departments, Pollution Control Boards, Mayors, standing and water works committees, Municipal Commissioners, Town Planners, Urban Local Bodies (ULBs), Jal Boards, Wastewater Treatment Companies, Wastewater Treatment Plant (WTPs) including Effluent Treatment (ETPs) and Sewage Treatment Plants (STPs) Associations, Operations & Maintenance and Service providers, Academicians, R&D Experts, Technology Developers and Providers etc.. This course would also help mid-career professionals who are involved with the water and waste water reuse facility creation in government and private organizations to gain knowledge on new technologies, current practices, field experience, etc. The course would also be helpful for fresh graduates or students of the engineering, environment, water policy and planning disciplines.

Banking details: India PPP Capacity Building Trust, A/c No. 05881450000075, IFSC-HDFC0000588, Plot No 8, Sector 4, R.K Puram, Opposite Capital Court Building, New Delhi - 110022.

Registration link : <https://trainingprograms.icaptrust.in/s/store/courses/description/OTCB-Water-Reuse>

Bulk/Group Registration facilities available @discounted rate.

Last Date To Apply: 07-03-2021

Early Bird Incentive:
10% early bird discount on payment up to 1-3-2021

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Industrial  	Knowledge 	Media  
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Amrit Mahotsav



**NMCG-TERI
Centre of Excellence
on Water Reuse**

PROCEEDINGS

**1st Annual Meet and International
Conference on Advancing Circular
Economy and Water Reuse**

27th July 2023 | Silver Oak Hall, India Habitat Centre, Lodhi Road, New Delhi

Event Sponsored and Supported by














PHOTOCATALYTIC OXIDATION FOR
SUSTAINABLE MANAGEMENT OF TEXTILE &
DYEING INDUSTRY WASTEWATER



Draft Thesis Submission

By

Nipun Bhargava

Registration no. 1700532RSP

TERI School of Advanced Studies

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Plot No. 10, Sankar Road, Vasant Kunj Institutional Area,

New Delhi, India, PIN - 110 070

[20th September 2024]

Water Practice & Technology



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TERI advanced oxidation technology (TADOX®) for treatment and rejuvenation of
open drains and surface water bodies: making habitats sustainable

Nupur Bahadur^{a,b,*}, Nipun Bhargava^{a,b}, Shyamal Kumar Sarkar^{a,b} and Vibha Dhawan^{a,b}

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10.2166/wpt.2023.087

ABSTRACT

Water Practice & Technology

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Water Practice & Technology Vol 17 No 8, 1692 doi: 10.2166/wpt.2022.065

TERI Advanced Oxidation Technology (TADOX®) to treat industrial wastewater
with integration at pre- and post-biological stage: case studies from India

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J. Inst. Eng. India Ser. A
<https://doi.org/10.1007/s40030-023-00738-5>



ORIGINAL CONTRIBUTION

Breakthrough in Treatment of Sewage Using TADOX®,
By-Passing Biological Treatment with removal of Micropollutants
to enable high end Water Reuse

Nupur Bahadur^{1,2} · Nipun Bhargava^{1,2} ·
Shyamal Kumar Sarkar¹ · Vibha Dhawan²

Received: 18 September 2022 / Accepted: 2 May 2023
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5. Media Articles

Bleeding Rivers

TADOX® Removing Colour at Point Source

As the demand for freshwater continues to surge and its availability diminishes, the need for effective wastewater treatment and reuse becomes increasingly urgent. Authored by **Dr Nupur Bahadur, Dr Metali Sarkar, and Dr Nimisha Singh**, the article talks about a cutting-edge technology—TADOX®—indigenously developed by TERI and its efficacy in wastewater treatment.

India's textile and dyeing sector stands as a vital pillar of the nation's economy, contributing 4% to the GDP, representing 12% of the nation's export earnings, and offering employment to around 45 million individuals. However, this industry is characterized by its extensive water usage, leading to substantial wastewater generation. This wastewater is laden with harmful chemicals, dyes, and pollutants and poses a severe threat to water bodies, soil quality, and aquatic ecosystems. The discharge of inadequately treated

textile and dyeing units' wastewater has adversely impacted water bodies across the country, notably in revered rivers such as the Ganga and Yamuna. The consequences of this environmental challenge extend to many local rivers like the Hindon River, the Coom River in Chennai, the coloured Bandi River in Rajasthan, and the severely polluted Sabarmati River in Gujarat, among others. This distressing and alarming situation underlines the urgent need to address the highly coloured and polluting wastewater, adversely affecting the

freshwater resources. As the demand for freshwater continues to surge and its availability diminishes, the need for effective wastewater treatment and reuse becomes increasingly urgent. The current scenario of wastewater treatment in India faces multifaceted challenges, ranging from the excessive use of chemicals, toxic sludge generation, and improper treatment methods to the unsustainable discharge of inadequately treated water into natural water bodies. The prevalent reliance on biological treatment systems exacerbates the problem, involving large land footprint and vulnerability to shock loads, especially in the context of industrial effluent treatment. The inadequately treated coloured water, when fed into tertiary systems such as RO/MEE/MVR, leads to membrane fouling and biofouling, creating additional problems that escalate capital and operational expenditures. Furthermore, the treatment methods currently employed fall short of meeting the stringent quality requirements for water reuse imposed by national missions like Namami Gange, SBM 2.0, and AMRUT 2.0.

Addressing the intricate challenges of the quality of surface water necessitates collaborative efforts across all levels. TERI, a renowned and multi-dimensional organization, is actively engaged in addressing wastewater treatment and water reuse issues. TERI's researchers have developed a cutting-edge technology known as TERI Advanced

water reuse initiatives. Utilising treated wastewater, Bengaluru can enhance water security, diversify sources, and combat future crises. Stakeholders must prioritise reuse initiatives to pave the path for a sustainable future and inspire other cities.

Leachate treatment plan for the Bandhwari Landfill

About 2100 metric tonnes per day (MTD) of waste from the adjoining populated cities of Gurugram and Faridabad, is added to an existing 35,00,000 tonnes of untreated legacy waste. This results into generation of 350 kilo litres per day (KLD) of leachate.

Written by **Guest**

December 22, 2023 10:56 IST

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The former practice of discharging leachate in open to nearby village and covered forest area poses severe environment, health and occupational hazard, including potential groundwater contamination together with an unbearable stink to the surrounding area leading to air pollution. (Image: pixabay)

FROM CRISIS TO CONSERVATION

Reuse treated wastewater

Innovative policies could provide the lifeline Bengaluru needs for a sustainable future.

NUPUR BAHADUR

Bengaluru, once known as the 'City of Lakes,' is now grappling with a severe water crisis. Rapid urbanisation, coupled with climate change and the depletion of natural water sources, has pushed the city to the brink of severe water scarcity. With its burgeoning population and expanding geographical boundaries, finding long-term and sustainable solutions to meet the ever-increasing water demand has become imperative.

Genesis of the Water Crisis

We have to understand the geographical location of Bengaluru, which is a challenge in efficient water management. Bengaluru is situated at a height of 920 m above sea level in a valley between the Western and Eastern Ghats, down south of India, and relies on freshwater transported from four major reservoirs like Krishnaraja Sagar (KRS), Kabini, Harangi, and Hemavathi, covering over 100 km. Although the supply from these reservoirs is an assured source, the supply to an elevated location is highly resource and energy intensive, which adds to the operational, maintenance, and financial woes of the Bangalore Water Supply and Sewage Board (BWSSB).

Further, the addition of 110 villages to the BBMP area in 2008 has seen extensive growth in construction activities, road expansion, and infrastructure development, leading to disruption of natural water systems. Mahadevapura, R.R. Nagar, Roomanahalli, and Dasarahalli are among the most affected areas lying on the periphery of the core Bengaluru area.

The Current Water Scenario

To understand the severity of Bengaluru's water crisis, let's look at the numbers. The city's daily water demand stands at a massive 2,100 million litres per day (MLD). However, the supply from the Cauvery basin is 1,450 MLD, leaving a deficit of around 650 MLD. Erratic rainfall, exemplified by Southwest Monsoon shortfall of 271 mm in 2023 compared to the normal 369 mm, exacerbates Bengaluru's water scarcity. Four major dams' storage levels stood at just 49% in November 2023. Additionally, desilting efforts have left lakes like Bellandur and Varthur dry, further depleting the groundwater reserves. The situation is compounded by rapid

urbanisation and the disappearance of lakes, with Bengaluru losing nearly 80% of its lakes and 90% of its green cover in the last decades. This rapid urbanisation has led to an overreliance on borewells. With over 10,995 government borewells in the city, water levels have decreased in 3,700 borewells, and 1,214 borewells have completely dried up. The groundwater levels have dropped by more than 1,000 feet in many areas, further aggravating the water crisis.

The Role of Used Water

In the face of this looming water crisis in metropolitan cities like Bengaluru, the reuse of treated wastewater or used

portion of treated water, totalling 419 MLD, has been allocated for lake rejuvenation by BWSSB to revive iconic water bodies such as Bellandur Lake, Vengalwakkare Lake, and Yelamallappa Chetti Lake, etc., the delayed process of desilting has limited the percolation process.

Commercial Utilisation of Treated Wastewater: BWSSB currently supplies treated water for industrial and commercial use, amounting to 18 MLD. Also, BWSSB is promoting the sale of treated water from 24 Secondary Sewage Treatment Plants (STPs) and four Tertiary Sewage Treatment Plants (TTPs), as advertised on its website. However, more detailed information should be provided by BWSSB on the quality of treated water available and on possible utilisation. This transparency will enable end-users, particularly industries in water-scarce regions with high water demand, to swiftly access nearby STPs' treated water, enhancing its accessibility and acceptability.

Policy Framework: Despite BWSSB Sewage Treatment Plants meeting discharge and reuse standards, neglect persists among end-users, particularly in the industrial sector. Maintaining a significant price difference between freshwater and treated water can boost its economic viability and encourage greater reuse. Also, encouraging Public-Private Partnerships (PPPs) in wastewater and water reuse projects can further enhance efficiency and effectiveness by leveraging private sector expertise and resources.

Capacity Building and Public Perception: Building technical capacity and expertise in wastewater treatment and management is essential to ensuring the efficient operation and maintenance of treatment plants and distribution networks. Overcoming social stigmas and misconceptions surrounding the use of treated wastewater is crucial to garnering public acceptance and support for wastewater reuse initiatives.

Utilising treated wastewater, Bengaluru can enhance water security, diversify sources, and combat future crises. Stakeholders must prioritise reuse initiatives to pave the path for a sustainable future and inspire other cities.

Mandating treated wastewater use and reviving surface water bodies in Integrated Water Management (IWM) Plans can bridge supply-demand gaps. Pricing, policies, enforcement, awareness, and partnerships offer solutions for Indian cities' water crises. The writer is an associated research director at TERI. She is leading a project with BWSSB on circular economy in wastewater treatment and treated water reuse for Bengaluru.



Coming together is the beginning.
Keeping together is progress.
Working together is success.

HENRY FORD



HANK



OU!