RIVER CITIES ALLIANCE

Updates about the Alliance activities

"Rivers have always occupied a central place in India's heritage and ethos, and have traditionally been sources of spiritual inspiration, cleansing and penance... We are striving to introduce a new thinking on river cities. The establishment of 'River Cities Alliance' (RCA) connecting river cities across the country is one such step in this direction" - Shri Narendra Modi, Hon'ble Prime Minister of India



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TECHNOLOGY CORNER; Nano-bubble Technology for Wastewater Treatment









WEBINAR

ALPHAMERS; ADVANCED FLOATING TRASH BARRIER TO CLEANUP THE RIVERS

A previous webinar, "Restoring India's River Systems: Innovations in Waste Management," had flagged the pressing challenge of plastic pollution in India's river systems. These rivers are a source of livelihood for millions and sustain 18% of the world's unique aquatic species. Yet, a report by the Central Pollution Control Board in 2022 revealed that more than half of the country's 605 rivers are polluted. Adding to the gravity of the situation, a study by the International Institute for Applied Systems Analysis (IIASA) found that in 2020, municipal solid waste from India contributed to 10% of global waste leakage into rivers, exacerbating the environmental crisis.

This webinar on 30 August 2024 introduced AlphaMERS, a company leading the charge in innovative solutions for river pollution through floating trash barriers. These barriers have been instrumental in preventing waste from entering rivers, with over 22,000 tonnes of waste being intercepted since the technology's initial deployment in Bengaluru and Chennai in 2015-2016. The technology has since expanded to nine Indian cities, including Hyderabad, Mysore, Coimbatore, and Puducherry, with nearly 3,500 meters of barriers installed. AlphaMERS is working towards restoring rivers to their natural state, and their efforts represent a significant step toward reversing the damage caused by urban waste.

The webinar also saw active participation from more than 30 Alliance member cities, who expressed a keen interest in the floating trash barrier technology. These cities engaged in discussions with the technology provider about the cost and long-term sustainability of implementing such solutions. This dialogue highlighted the importance of scaling affordable, sustainable technologies to tackle the widespread issue of river pollution, with cities eager to explore the integration of these systems into their local waste management strategies.



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STAKEHOLDER CONSULTATION MEETING FOR DEVELOPING A STANDARD OPERATING PROCEDURE (SOP) FOR RIVER-SENSITIVE GATHERINGS

Rivers have been integral to human communities for centuries, offering food, transportation, and economic benefits, as well as spaces for cultural and recreational activities. In India, rivers hold a sacred status and are worshipped as goddesses. This cultural reverence leads to regular gatherings along riverbanks for religious ceremonies and festivals. Events like the Magh Mela, Kumbh Mela, and Maha Kumbh Mela draw millions of people, highlighting the importance of rivers in social and spiritual life. Despite the cultural and spiritual significance of these events, the management of large gatherings along riverbanks is primarily focused on crowd control and maintaining law and order. Little attention is given to critical issues such as sanitation, solid waste management, riverine biodiversity and floodplain management.

To address this critical issue, the RCA Secretariat developed a draft Standard Operating Procedure (SOP) for organising river-sensitive gatherings. The draft SOP is designed to assist administrative officials in managing gatherings along riverbanks, with a focus on minimising environmental impact. The SOP covers aspects like floodplain management, river water quality, and biodiversity protection, detailing specific actions to be taken **before**, **during**, and **after** events to safeguard the riverine ecosystem.

A stakeholder consultation meeting was organised on 01 July to invite feedback from the following stakeholders on the draft SOP

- World Wide Fund (WWF) and Wildlife Institute of India (to cover biodiversity and ecology-related aspects)
- Delhi Development Authority (to cover aspects related to planning and regulations)
- National Green Tribunal-associated professionals (to cover legal aspects and stipulations)
- Prayagraj Mela Authority (to talk about practical aspects related to organising large events)
- Academic and Research Institutes (to highlight new and contemporary practices)
- National River Conservation Directorate, NRCD (to discuss institutionalisation of the SOP)



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THEMATIC REPORT ON "LEVERAGING THE ECONOMIC POTENTIAL OF RIVERS IN CITIES"

In July 2024, the RCA Secretariat initiated the development of a thematic report on "Leveraging the economic potential of rivers". During this reporting period, the team visited RCA member city Jabalpur, Madhya Pradesh, along the Narmada River. The purpose was to document the key economic activities centred around the river, specifically in Jabalpur City and Bhedghat. During the visit, the team had the opportunity to meet with Smt. Preeti Yadav, Commissioner of Jabalpur Municipal Corporation, and other important stakeholders from Bhedaghat, Nagar Parishad, and Jabalpur Smart City. The data collected from these meetings will be crucial in preparing the Thematic Report.

Several innovative activities, including religious tourism at Gwarighat and Tilwara Ghat, adventure sports, boating, and tourism at Bhedaghat and Bargi Dam, Narmada Ropeway, and nature-based tourism at Dumna Nature Reserve were documented. The officials were extremely supportive and provided the team with relevant data and information.







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Nashik, Maharashtra

The team also visited RCA city Nashik in Maharashtra to secure content for the thematic report. This involved mapping out the critical economic activities ongoing along the Godavari River, including religious, cultural, wine tourism, eco-tourism, farming, and land value capture. The team met with the Additional Commissioner of Nashik Municipal Corporation, Senior Town Planner, Municipal Tax Services officer, Nashik Smart City Corporation General Manager, and key local stakeholders to collect crucial data that will assist in preparing the Thematic Report.

Many innovative activities, such as a waterfront boat club, eco-tourism resorts along the Gangapur dam, riverfront development by smart cities, and land value capture along the Godavari river were documented as a part of the visit.



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SCALING UP URBAN RIVER MANAGEMENT THROUGH PREPARATION OF URBAN RIVER MANAGEMENT PLANS (URMP)

NMCG and NIUA are jointly working to propel the agenda for river-sensitive urban development in India. The core focus of this engagement is to create an enabling environment for and facilitate the implementation of, practices, regulations, and projects that seek to harmonize the city-river relationship.

One of the key instruments in achieving this agenda was the development of a first-of-its-kind framework called "**Urban River Management Plan (URMP)**" for helping cities to manage the river stretches within their administrative boundaries. Based on the framework, URMPs were developed for river cities like Kanpur, Ayodhya, Chhatrapati Sambhaji Nagar, Bareilly and Moradabad, while it is under preparation for the city of Prayagraj. While it is good to have some reference projects for other cities to emulate, for a meaningful impact on the ground it is imperative that all cities on the main stem of Ganga and its tributaries prepare their URMPs to have impact at scale.

NMCG-NIUA with support from the World Bank has taken a significant step ahead in this regard and will be preparing URMPs for 60 river cities across the Ganga Basin states of Uttar Pradesh, Uttarakhand, West Bengal, Bihar and Jharkhand over the next two years. The phase I of this initiative involves preparation of 25 URMPs for the cities as mentioned below:

S.No	State	River Cities for which URMPs will be prepared
1	Uttar Pradesh	Bijnor, Mathur-Vrindavan, Gorakhpur, Mirzapur, Shahjahanpur
2	Uttarakhand	Gangotri, Haridwar, Rishikesh, Ramnagar, Haldwani-Kathgodam
3	West Bengal	Asansol, Durgapur, Howrah, Nabadwip, Siliguri
4	Bihar	Bhagalpur, Buxar, Gaya, Munger, Chhapra
5	Jharkhand	Adityapur, Chaas, Dhanbad, Ranchi, Sahibganj-Rajmahal

A dedicated Project Management Unit (PMU) has been constituted at NIUA to oversee the process of preparation of the URMPs. The PMU with support from NMCG and the World Bank is in the process of identifying and onboarding external organisations who would be tasked with the preparation of the URMPs for the river cities as mentioned in the Table above

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MULTI-STAKEHOLDER MEETING ON STRATEGIES AND SYNERGIES FOR DEVELOPING AND IMPLEMENTING URBAN RIVER MANAGEMENT PLANS

As NMCG and NIUA proceed with the preparation of the URMPs for 60 cities, there is a unique opportunity to synergise efforts with like-minded partners working in a similar space and engage with a wider group of stakeholders to make this an inclusive endeavour.

To address this aspect, a multi-stakeholder meeting on 'Strategies and Synergies for Developing and Implementing Urban River Management Plans' was organized on 4th September 2024. The session gathered 23 experts working on different aspects of river management who shared insights on effective models for URMP implementation. Participants included:

- 1. Advanced Centre for Water Resources Development and Management (ACWADAM)
- 2. Biome Environmental Solutions
- 3. Centre for Energy Environment and Water 9CEEW)
- 4. Centre for Policy Research (CPR)
- 5. Embassy of Israel
- 6. Embassy of the Netherlands
- 7.GIZ
- 8. Indian Institute of Public Administration (IIPA)
- 9. Indian National Trust for Art and Heritage (INTACH)
- 10. International Water Management Institute (IWMI)
- 11. National River Conservation Directorate
- 12. School of Planning and Architecture, Delhi
- 13. The Rainwater Project
- 14.TERI
- 15. World Wide Fund (WWF)



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FINALE OF THE STUDENT THESIS COMPETITION ON REIMAGINING URBAN RIVERS

The finale of Season 4 of the student thesis competition on "Re-Imagining Urban Rivers" was held at the Tata Institute of Social Science (TISS) Mumbai on 07 August 2024. The competition is an annual event organised by NMCG and NIUA to encourage next-generation professionals to take up their academic research work on river-related topics. This year (Season 4), the 17 finalists showcased innovative ideas on aspects like riverfront development, machine learning for pollution management, city-scale strategies for river management, rejuvenation of degraded drains, community engagement in river management, among others. The presentations were rigorously evaluated on their content, originality, and feasibility and the top three students from Bachelors and Master's students were awarded by Sh. Rajeev Kumar Mital, DG, NMCG, Sh. Rajiv Ranjan Mishra, Advisor, NIUA and Dr. Debolina Kundu, Director (AC), NIUA.



The event also featured three workshops for students and faculty from Mumbai and the vicinity

• Water Body Diagnostic Tool to assess the water quality of Water Body; This workshop provided participants with an in-depth exploration of the challenges associated with urban water bodies. The workshop emphasized how the diagnostic tool can serve as a decision support system for city planners and administrators in managing water bodies within their jurisdictions. Participants gained insights into the tool's structure, which evaluates water bodies through several dimensions, such as physical quality, water quality, water quantity, and management. These dimensions are assessed using 10 indicators, each quantified on a scale from 0 to 5. The cumulative quantification of these indicators provides an overall assessment of the urban water body.

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- Create a city-wide reuse action plan for Treated Used Water; The second workshop focused on creating a City-Wide Reuse Action Plan for Treated Used Water, covering critical topics such as the distribution and treatment processes of sewage treatment plants (STPs), regulatory challenges, and the social aspects of water reuse. The workshop underscored the importance of robust governance frameworks and the necessity of overcoming the societal stigma associated with treated water reuse.
- Create a city climate action plan (CAP); The third workshop delved on the development of a comprehensive City Climate Action Plan, integrating climate resilience strategies into urban development. It began with participants being divided into six groups, each focusing on different themes such as mobility and solid waste management. The primary objective was for each group to identify the most pertinent topics within their theme that could be integrated into the city's climate action plan. Following the group discussions, a conference was held where the leaders of the six teams presented the selected topics and provided justifications for their choices. Ultimately, a Climate Action Plan was developed through collective voting, incorporating the inputs from all teams.



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Glimpse of the STC 4 finale at TISS Mumbai













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INSTITUTE LEVEL STUDENT WORKSHOP ON "RIVER SENSITIVE URBAN DEVELOPMENT" AT SPA BHOPAL

NIUA and NMCG conducted a two-day Institute-level Student Workshop from 18 - 19 July 2024, on 'River Sensitive Urban Development: From Planning to Practice' at the School of Planning and Architecture, Bhopal.

More than 80 students from Bachelor's and Master's programs in Urban Planning, Regional Planning, Environmental Planning, and Landscape Architecture attended the workshop. The workshop introduced the students to the issues and challenges for urban rivers in India and sensitised them to the 'solution space' that is currently needed. Through interactive exercises, students designed solutions for addressing some of the most pressing challenges for urban rivers in India today.

The workshop also delved into the Urban River Management Plan (URMP) principles and the fundamentals of River Sensitive Master Planning with interactive exercises and indepth case study discussions. The students were also able to break down the objectives of URMP and add their perspectives and insights for urban river management. The workshop ended on a collaborative note as SPA Bhopal is keen on scaling up the training and conducting more such workshops for faculty members and researchers.

Dr Kailasa Rao, Director - SPA Bhopal, expressed his gratitude to NMCG and NIUA for extending this opportunity to the students and faculty members.



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FACULTY TRAINING PROGRAM ON RIVER-SENSITIVE URBAN DEVELOPMENT

Academia plays a vital role in enhancing and disseminating the knowledge on urban development. To leverage the rich research potential of academic institutions and explore the possibility of adding a river sensitivity component, NMCG and NIUA organised a two-day residential training Program on 11-12 July 2024 on 'Riversensitive urban development' in collaboration with the Department of Architecture and Regional Planning at IIT Kharagpur Campus.

This training program was attended by twenty selected mid to senior-level academicians and researchers from 14 different institutes/universities across the nation. The training program led to intense discussions and brainstorming on the need for urban river management and the role of academia in strengthening it. It also aimed to amplify the initiatives of NMCG and NIUA by developing a new cadre of professionals to improve the health of our rivers, orienting academicians on river-sensitive planning, and creating a dedicated framework for Urban River Management.

Sh. Nalin Shrivastava, Deputy Director General of NMCG, joined the opening session and provided an overview of the goals of this faculty development program to the trainees, emphasising how academia can play a crustal role in urban river management. Dr Debolina Kundu, Director of NIUA, in her motivational address, emphasised the significance of collaboration with academia for action research around riverine aspects. Prof. Tarak Nath Mazumder, HOD of the Dept. of Architecture and Regional Planning, highlighted the role of river-sensitive planning in academia.

The faculty members also highlighted the challenges and aspirations of different sections of society and discussed how academia can ensure river-centric urban development through action research and pedagogy.



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Glimpses of the workshop









EXPOSURE VISIT FOR RCA MEMBERS TO INDORE

The RCA Secretariat organised an exposure visit for RCA member cities to Indore from 4-5 July 2024. The visit brought together 15 officials from six cities: Jodhpur, Jaipur, Dhanbad, Midnapore, Panihati, and Chhatrapati Sambhajinagar. The purpose of the visit was to provide these officials with a hands-on learning experience by showcasing Indore's best practices and innovations in river management. Additionally, it aimed to facilitate the exchange of knowledge and experiences among the officials from their respective cities.

Some of the sites covered during the visit are:

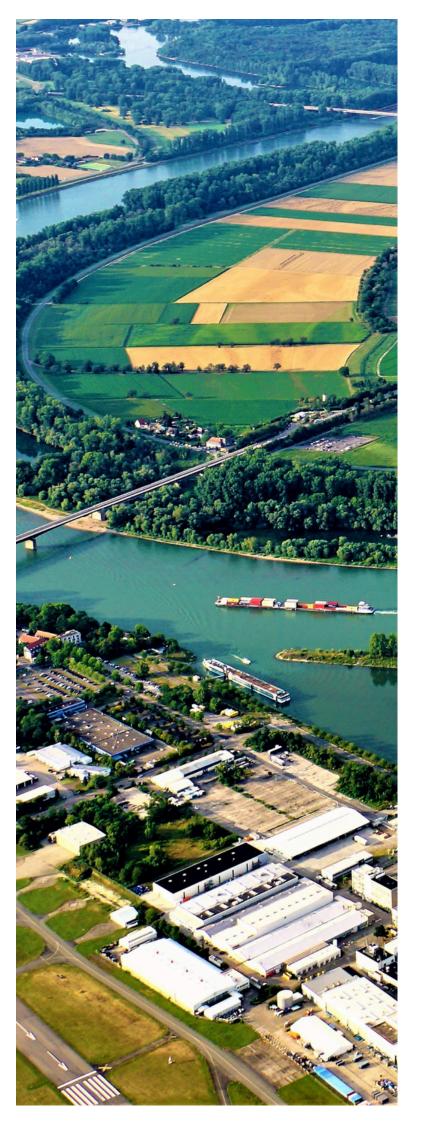
- India's second Sludge Hygienization plant converts dry sludge into bio-fertilizer. 180KW mega solar panel set up at the treatment plant to reduce power consumption by 40-50%.
- Hydrants (55 No.) installed in the city connected to the STP that provides treated wastewater to be used for road cleaning, cleaning of public toilets, etc.
- Gobardhan Bio-CNG Plant is Asia's largest municipal solid waste-based Bio-CNG plant, which processes 550 tonnes of municipal organic waste daily, producing nearly 17,000 kg of bio-CNG gas and 100 tonnes of high-quality compost
- Groundwater Recharge Structure is created using the recharge shaft method. So far, 100 units have been established.
- Channel Clearance amplify the inflow of water into the water bodies in urban areas. A total of 15 such channels with a total length of 24 km cleared
- Kahn Riverfront Development (C P Shekhar Park) is a 3.9 km stretch passing through the Rajwada area in the city that is being rejuvenated.

The exposure visit concluded on a collaborative note, with city officials engaging in fruitful discussions. They explored opportunities to implement river-sensitive initiatives and strategies to overcome the challenges that may arise in their implementation. This collective spirit bodes well for the future, setting the stage for ongoing shared learning and cooperation among the participating cities.



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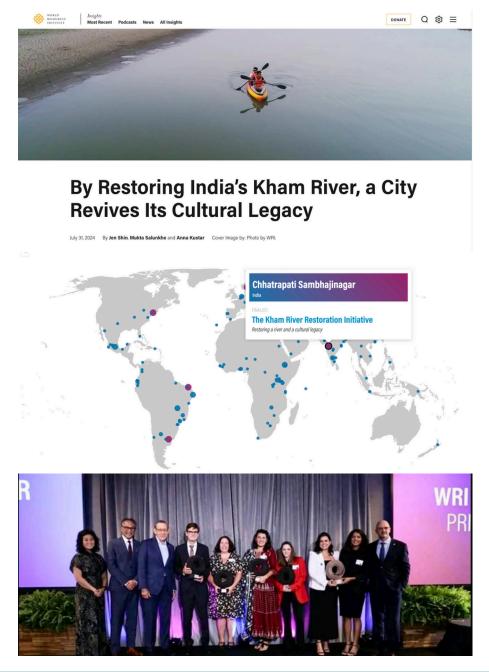


CITY CORNER

2023-2024 WRI ROSS CENTER PRIZE FOR CITIES FINALIST CHHATRAPATI SAMBHAJI NAGAR

The 2023-2024 WRI Ross Center Prize for Cities celebrates innovative projects that are building momentum for climate-resilient communities. Kham River Restoration Initiative by Chhatrapati Sambhaji Nagar City (one of the RCA members), was among the 5 finalists from more than 100 entries received globally. The city was recognized for its efforts in restoring a vital waterway and creating sustainable urban change.

The Kham River Restoration Initiative demonstrates how a social-ecological approach to waterway management can transform cities and improve lives. As the first river in India not connected to the glacier-fed perennial Ganges River to have an Urban River Management Plan, the Kham is setting a precedent for smaller-scale and seasonal rivers to create formal management frameworks.



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*BASIRHAT, WEST BENGAL

Basirhat Town is located on the Ichhamati-Raimangal Plain, located in the lower Gangetic Delta, within the state of West Bengal. It contains soil of mature black or brownish loam to recent alluvium. The Icchamoti River along with six creeks and twenty-six canals form a dense network of marine life surrounding the soft loamy soil which is extremely fertile and has been the site of one of the earliest human habitations of India that goes back to the 3rd Century BC. However, climate change precipitated by global warming has made the region extremely vulnerable to the ravages of weather that have become a regular feature of the coastal areas adjoining the Bay of Bengal. As a result Basirhat Town experiences:-

- River bank erosion and destruction of life and property settled on the banks of the Icchamoti River.
- Heavy siltation of the Icchamoti River and the associated network of six creeks and twenty-six canals which is adversely affecting their navigation and quantum of marine life in the entire region.
- Destruction of vegetation and topsoil due to repeated cyclonic circulation, heavy rainfall and other weather-related calamities, not to speak of the wanton destruction of the widely prevalent aquaculture which contributes substantially to the town's economy.
- Large Scale displacement of human habitation and their main source of employment like agriculture, horticulture, animal husbandry, weaving, carpentry, masonry, petty shop-keeping and so on.

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The Basirhat Municipality has so far dealt or is trying to deal with these problems in the following ways:

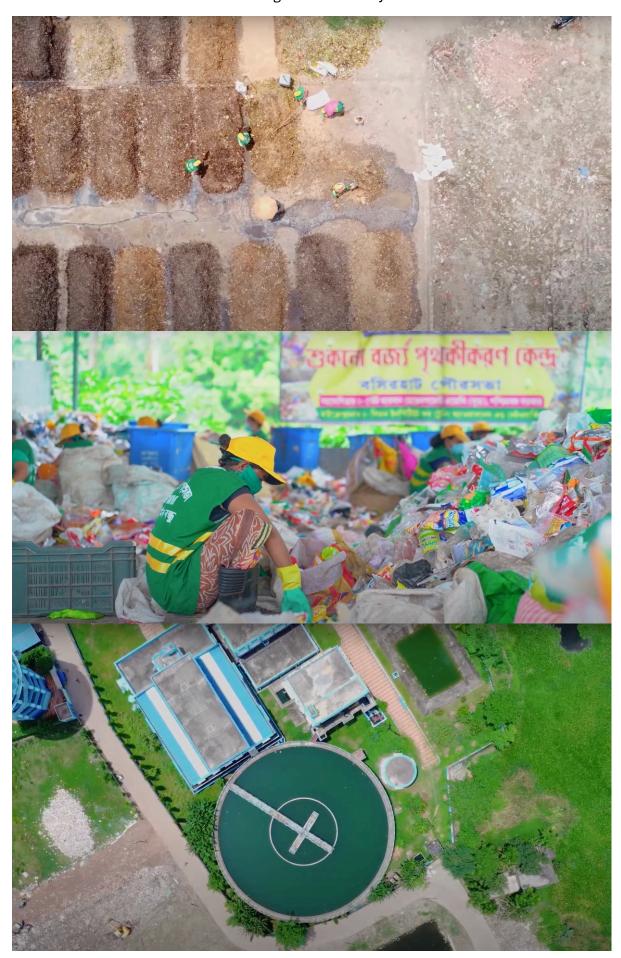
- The mangroves form a very common forest cover in the Bengal deltaic regions, the Basirhat Municipality has already initiated Large Scale Plantation of Mangroves along the banks of the river and creeks. For this purpose, a private mangrove plantation agency, run by a Self-Help Group, has also been appointed to carry on the task on an appropriate scale.
- Basirhat Municipality which has been declared an ODF and Unsanitary Latrine Free township in 2020-21, has also been able to set up an organized Solid Waste Management (SWM) system. Now to take its SWM to a new level of sophistication and wealth generation for the local populace, Basirhat Municipality has associated itself with one of the most wellknown SWM consultants in India, M/S Garbage Clinic Pvt. Ltd. The target is to create wealth by manufacturing and marketing organic manure from biodegradable waste, plastic containers from non-biodegradable ones and incense sticks from waste puja flowers collected from the daily door-to-door waste collection.
- SWM has not only enabled Basirhat Municipality to keep its
 otherwise rudimentary drainage network free from getting
 choked or clogged with plastic and other non-biodegradable
 waste but has also been able to prevent the residents of this
 town from contributing to the degradation of the already
 silted river and its network of creeks and canals.
- With the long-term goal of generating wealth from waste, the Basirhat Municipality intends to create new avenues of sustainable development that will at the same time take care of the town's vulnerabilities precipitated by climate change or the menace of global warming and at the same time generate employment for the densely populated region.

Basirhat Town has slightly less than fifty thousand households and a population of over two lakh which is expanding at a pace commensurate with the national average. The residents are also being involved with constant emphasis on generating mass awareness through IEC activities.



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Glimpses of the initiatives undertaken by Basirhat Municipality for waste management in the city



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NANOBUBBLES TECHNOLOGY FOR WASTEWATER TREATMENT

Nanobubble Generators, also known as Yogic Pranayam Yantra, offer innovative solutions for treating sewage from ponds, and lakes. These generators utilize advanced electrochemical and ultrasound techniques to produce nanobubbles, taking into account crucial factors such as efficiency, scalability, and cost-effectiveness. By integrating nanobubble technology into existing wastewater treatment infrastructure, we can significantly enhance the removal of contaminants and elevate the quality of treated wastewater. However, to ensure the efficacy and safety of this treatment method, diligent monitoring and regulation protocols must be implemented. The Nano Bubble Generator machines are equipped with precision-controlled pumps, motors, and PLC-based controllers, facilitating high-tech features for module-level monitoring. This technology proves invaluable for treating wastewater in non-compliant sewage treatment plants (STPs), addressing the treatment needs of open drains of any volume, and improving water quality in lakes and ponds.

Implemented Projects

- IIT Ropar: A 6-fold increase in the DO level and a slight increase in the conductivity denotes the formation of radicals to kill the bacteria and germs in the water bodies.
- Indian Agricultural Research Institute (IARI), Delhi: BOD value between 58-98 ppm brought down to 30-60 ppm in about 3 days and further reduced to about 20-38 ppm in about 20 days.
- **STP at Chatamali, Morinda:** Complete removal of algal blooms and eutrophication. BOD was reduced from 311mg/l to 16mg/l and COD was also reduced from 626mg/l to 144mg/l.
- STP at Fazilka, Punjab: The COD was seen to change from 148 mg/l to 69 mg/l and the BOD changed from 31 mg/l to 20 mg/l within a month.

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- Fish Farm at Chamkaur Sahib, Punjab: The COD and BOD levels of the pond decreased by more than 30% suggesting rapid chemical and biological degradation of the pollutants. Also, the size and weight of fish increased 2-3 folds.
- **Poultry Farm, Samara, Punjab:** Drinking water with nanobubbles enhanced DO content which was supplied to the birds. Under poultry trials increase in egg production and decrease in mortality is about 10%.
- ICRISAT Patancheru Campus, Hyderabad: COD concentration gradually decreased from 90 ppm to 20 ppm and turbidity decreased from 14.5 NTU to 5.72 NTU over a period of 12 days. No significant influence was observed on phosphate concentration.





Nanobubles Technology at the STP at Fazilka, Punjab





Nanobubles Technology at the STP at Chatamali, Dorinda

COSTING

Project Specific



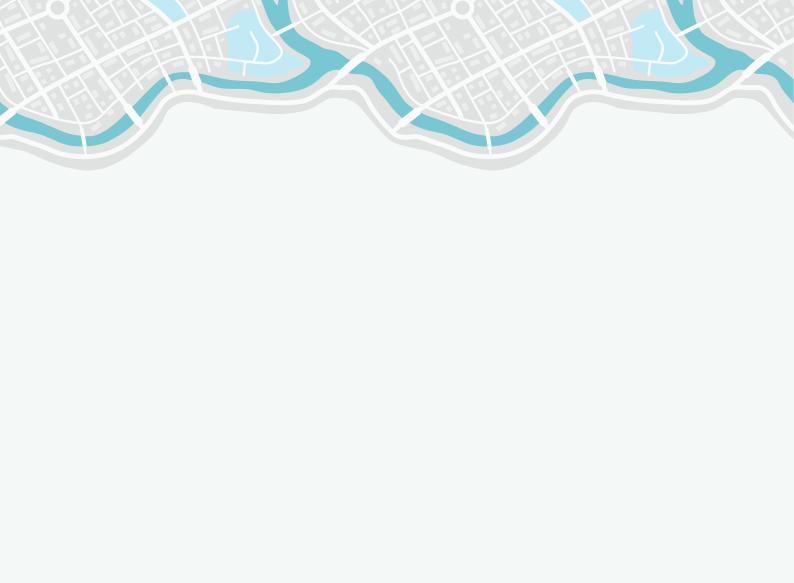
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