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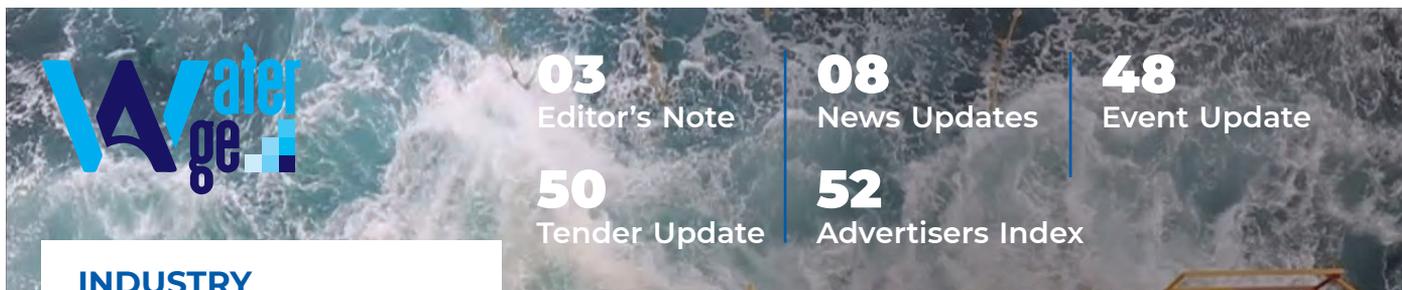
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**PRINTER**

**Fine Art:** D-7 /3, Okhla Industrial Area, Phase 2, New Delhi 110 020

**PRINTED AT**

**Fine Art:**  
D-7 /3, Okhla Industrial Area, Phase 2, New Delhi 110 020

**PUBLISHER**

**WaterAge**  
**Initiative of SHUDH JAL FOUNDATION**  
605, Bhikaji Cama Bhawan, Bhikaji Cama Place, New Delhi – 110 066

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**R E N U T O M A R**  
*(Editor-in-Chief)*

### **REJUVENATING RIVERS IN INDIA**

India now is in serious need of solutions to its water issue. Improving the efficiency of drinking fresh water is a major problem the nation faces. Without guaranteeing a constant supply of high-quality drinking water, neither socioeconomic progress nor even political stability can ever be feasible. Therefore, it is obvious that river rejuvenation efforts must be spread out across the nation. In other words, in order to secure local water supplies and replenish every well, we will need to collect rainwater where it falls throughout a sizable portion of the nation.

As part of its development strategy, the Indian government has been prioritizing water governance more and more. To achieve this, it has adopted an integrated approach to managing water resources that addresses problems that affect many different sectors and authorities. As a direct result of these efforts, the consequences of climate catastrophe are being lessened. Initiatives are being done in the areas of cleanliness, pollution reduction, river rejuvenation, water usage efficiency, and, most critically, source sustainability.

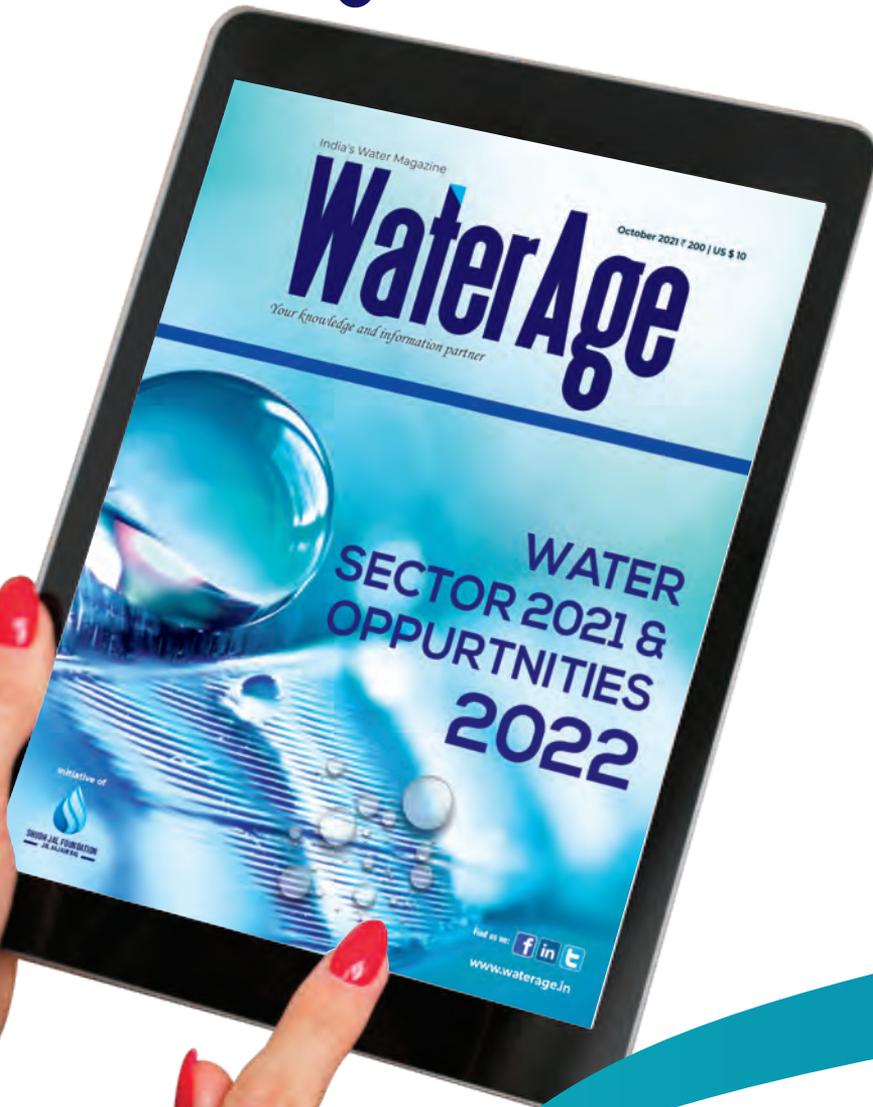
The reuse of this purified water for non-potable uses, such as agriculture, which uses more than 80% of India's freshwater resources, surely be advantageous for the efficient and long-term management of freshwater resources.

The actions made in the water sector over the past several years are a reflection of the growing awareness of the role that water management plays in decreasing vulnerability and increasing climate resilience.

The government is dedicated to bringing about radical changes in the water sector by protecting, maintaining, and caring for this priceless natural resource that directly impacts each and every one of our lives.



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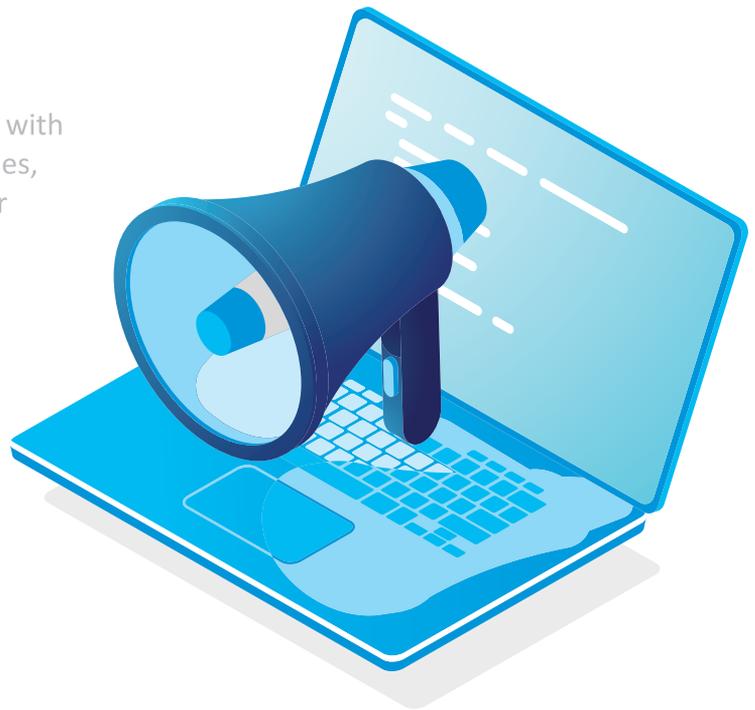
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## STL Becomes the World's First Optical Manufacturer to be 'Zero Liquid Discharge' Certified



STL – one of the industry's leading integrators of digital networks today announced that 100% of its Indian manufacturing facilities are now Zero Liquid Discharge (ZLD) certified by Deutsch Quality Systems (DQS India). This is a great milestone for STL in its UN SDG goal of attaining 'Water Positivity by 2030'.

While India only has 4% of the world's freshwater reserves at present, the demand will rise by over 70% by 2025, stressing water supply chains like never before. For STL, water management is a top priority in its materiality matrix. This has led STL to develop water-resilient communities and undertake rainwater harvesting and technology interventions to optimize water demand and adherence to stringent ZLD protocols.

At STL, the water management process is carried out through Sewage (STP), Effluent Treatment (ETP), and Multi-effective Evaporator (MEE) plants. The ZLD process involves an in-depth understanding of the liquid waste profiles and in-plant modifications to minimize water usage. The wastewater is chemically treated to remove chlorine and solid particles. It then undergoes three-tiered centrifugation to remove salt and suspended particles, making it fit for reuse in boilers and scrubbers. The entire process is digitally monitored using a Supervisory Control and Data Acquisition (SCADA) architecture and shift dashboards.

STL has replicated this ZLD framework successfully for all six manufacturing plants across Aurangabad and Silvassa, in Maharashtra, India.

All these combined initiatives have helped STL recycle 145,000+ cubic meters of wastewater from manufacturing in FY22 across its manufacturing facilities.

Commenting on the achievement, Akanksha Sharma, Global ESG Head, STL, said, "Water conservation and re-usage is top of the agendas of

the companies committing to sustainable business practices. The ZLD certification for all our manufacturing locations in India depicts our conviction that with the right technical innovation, intent, and ecological foresight, it is possible to conserve water and put it to re-usage while operating sustainably. "

## L&T Receives Order for its Water and Effluent Treatment Division



The Water Resources Department of the Government of Odisha has issued repeat orders to L&T Construction's Water & Effluent Treatment Business to carry out Cluster XIX and Cluster XX Mega Lift Irrigation Projects.

In order to irrigate a culturable command area of 29,914 hectares in the districts of Keonjhar, Jajpur, and Kendrapada on a turnkey basis, the overall scope of work includes the execution of 23 Lift Irrigation Schemes consisting of intake points spread across the Anandapur Left Main Canal, Bidyaharpur Barrage, Hadagarh Reservoir, Anandapur Barrage, and Kharsua, Kani, and

The order reaffirms L&T's track record in the irrigation industry and grows consumer confidence in our capacity to support the growth of agriculture in the state.

## Global Leader DuPont Showcases New-age Water Solutions and Tech Innovation at IFAT



Advancing new-age, industrial technologies to address wastewater management and foster clean water solutions for a sustainable tomorrow, DuPont Water Solutions (DWS), a global leader in water purification and separation technologies, featured its range of water solutions and technologies at IFAT.

Laying emphasis on pressing environmental concerns such as sewage systems management, adequate waste-water treatment, and sustainable ways for water supply, holistic solid waste management and recycling, amongst others, the three-day event provided a platform to expand DuPont's network with industry experts, innovators, business partners, government officials and consumers. IFAT is India's leading trade fair for Water, sewage, solid waste and recycling.

"In a world where the compounding effects of the climate crisis are looming large, the availability of freshwater is under major threat as industries continue to release untreated effluents into water bodies. We are simmering a tech revolution of sorts to create a future with clean, healthier water by bringing in enhanced tech solutions like reverse osmosis, ultrafiltration, and many more," said Chrys Fernandes, Business Head- India subcontinent, DuPont Water Solutions

Over the last few decades, DWS has partnered with industry players and consumers to contribute to the United Nations 2030 Sustainable Goals. "We are not far from the deadline and to achieve the 2030 goals, we are putting the best brains and talent together for solving the most pressing water issues that are further stressing the environmental concerns," Chrys, added.

### India and Denmark Signs MoU in the Field of Water Resources Development and Management



The Memorandum of Understanding (MoU) between India and Denmark on cooperation in the development and management of water resources was informed to the Union Cabinet. The MoU focuses on, among other things, integrated and smart water resource development and management, as well as digitalization and information accessibility.

Aquifer mapping, groundwater modelling, monitoring, and recharge are

a few of the areas of cooperation listed in the MoU. Other areas include efficient and sustainable water supply at the household level, which includes reducing non-revenue water and energy consumption, and river and water body rejuvenation to improve livability, resilience, and economic development.

Additionally, the MoU calls for cooperation in the following areas: monitoring and management of water quality; sewage and wastewater treatment, including circular economies for wastewater reuse and recycling; maximizing the use of renewable energy in the fields of water supply and sanitation; mitigation and adaptation of climate change, including the use of nature-based solutions; river-centric urban planning, including urban flood management; and nature-based liquid waste abatement.

Through direct cooperation between authorities, academics, water sectors, and industry in the areas under the scope of cooperation, the MoU will improve cooperation in the fields of water resources development and management, rural water delivery, and sewage/wastewater treatment.

### The Problems with India's Urban Wastewater Highlighted in a White Paper by NITI Aayog



A whitepaper titled "Urban Wastewater Scenario in India" was recently released by India and Denmark in conjunction with the World Water Congress and Exhibition 2022 in Copenhagen. In order to create the whitepaper, an interdisciplinary team was assembled with collaborators from government knowledge organizations like the Indian Institute of Technology Bombay (IITB), NITI Aayog, Ministry of Jal Shakti, and National Mission for Clean Ganga (NMCG). The whitepaper discusses, among other things, India's current wastewater generation situation, future capacity, the need for wastewater treatment, the potential for enhancing and extending the use of current infrastructure and technologies, methods for public participation in decision-making, and financing and co-financing options.

Water shortage is a result of the exceptional rate of population growth in metropolitan areas in most places. The ever-increasing demand for water in metropolitan areas puts further strain on freshwater resources. Alternative water sources must be found in order to meet the growing demand. Wastewater is one such non-traditional source of water. Due to the increasing water use and better residential sewage and water supply coverage brought on by the growth of urban populations, there is an increase in the volume of wastewater that can be treated and used, which has a huge potential to close supply-demand gaps in these places.

## 14 Projects Totaling INR 1145 crores Approved by the NMCG Executive Committee



G. Asok Kumar, Director General of the National Mission for Clean Ganga (NMCG), presided over the 45th meeting of the Executive Committee of the NMCG. 14 projects, with a combined estimated cost of over INR 1145 crores, related to decentralized wastewater treatment, biodiversity conservation, afforestation, river front development, and sewage management were authorized at the meeting. These comprise eight sewage management projects across the five states that make up the main stem of the Ganges River: Uttarakhand, Uttar Pradesh, Bihar, Jharkhand, and West Bengal.

For sewerage management, four projects in Uttar Pradesh were approved including tapping of Assi drain in Varanasi by constructing a 55 MLD Sewage Treatment Plant (STP) and other works costing INR 308.09 crore.

The project was approved with the goal of eliminating all untreated effluent from the Assi, Sanme ghat, and Nakhha drains. Other projects include the construction of a 13 MLD STP, renovation of existing buildings, etc. in Vrindavan City for INR 77.70 crore, a 12 MLD STP, interception and diversion (I&D) network installation, etc. in Kosi Kalan town in the Mathura district for INR 66.59 crore, and a 6 MLD STP, I&D network installation, etc. in Chhata town in the Mathura district. Through the aforementioned initiatives in Mathura and Vrindavan, 2, 1, and 11 drains that flow into the Kosi drain, which eventually empties into the Yamuna River in Mathura, will be intercepted and diverted, correspondingly. All of the aforementioned initiatives include 15 years of asset operation and maintenance.

Sewage management projects have also been approved for Uttarakhand, Uttar Pradesh, Bihar, and Jharkhand. These projects include the construction of two STPs (17 MLD and 23 MLD) in Ramgarh town, Jharkhand, costing INR 284.80 crore, and a 50 MLD STP in Keorapukur, West Bengal, costing INR 67.06 crore. They also include the renovation of existing structures, SCADA systems, and other necessary ancillary infrastructure. The project in Bihar includes 2 STPs (2.5 MLD on the River Harbora and 4.5 MLD on the Belwa Sathi canal), I&D networks, intake wells, etc. with an estimated cost of 47.39 crore. In Sapera Basti, Dehradun, Uttarakhand, a project for the building of a 13 MLD STP and other works was also authorised, costing INR 74.38 crore. Through this initiative, the discharge of untreated sewage into the River Sushwa will be stopped.

## L&T Construction Wins Orders for its Water & Effluent Treatment Business



The Narmada Water Resources, Water Supply, and Kalpsar Department, Government, have placed repeat orders with L&T Construction's water and effluent treatment business. of Gujarat to complete pipeline and pumping system construction from Tappar Dam to Nirona Dam (Northern Link). The business in Gujarat has thus far received its single-largest order.

Design, supply, construction, and commissioning of pump buildings and pipelines, as well as related electrical and automation work, are all included in the scope of work. By filling existing reservoirs, the turnkey project would bolster water supplies in Gujarat's Kachchh district and irrigate 36,392 Ha of land.

The order reinforces the customer's trust in L&T's capability to undertake projects of social importance in seismically sensitive areas with the larger goal of agricultural development and water conservation.



### JMC Wins New Orders for its Water Segment

JMC has won contracts for INR 1,497 crore rupees in water projects and INR 780 crore rupees in buildings and factories (B&F) projects.

We are thrilled with the new order wins in our Water and B&F business, S. K. Tripathi, managing director & CEO, said in response to the acquisition of new orders.

We will be able to improve our leadership and skills in the Water market with the support of these new orders. Our B&F company keeps expanding

its clientele by bringing on well-known and notable clients.

Together with the orders that were already announced for the year, these orders give us hope that we will soon reach the desired growth.

As a division of Kalpataru Power Transmission, JMC Projects (India) (JMC) is one of the top civil construction and infrastructure EPC firms.

In the construction of buildings and factories (B&F), water, urban infrastructure, and heavy civil, JMC has become the market leader.

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**Dr. Mohit Sharma**

Communication Specialist, NMCG

**Mohit Sharma** is employed with National Mission for Clean Ganga, Department of Water Resources, River Development and Ganga Rejuvenation, Ministry of Jal Shakti as Communication Specialist. Dr. Mohit academically specializes in federal studies and holds a Ph.D. in International Studies from Jamia Millia Islamia. He also holds over 12 years of experience in journalism during which he worked for reputed national newspapers. From the past 5 years, he has been writing on water-related issues and has been a part of several campaigns being run for Ganga Rejuvenation and Jal Shakti Abhiyan. He is on the Editorial Boards of monthly magazines of Department of Water Resources, River Development and Ganga Rejuvenation (Jal Charcha) and National Mission for Clean Ganga, Ministry of Jal Shakti (Namami Gange).

## ARTH GANGA: PEOPLE– RIVER CONNECT THROUGH THE “BRIDGE OF ECONOMICS”

At the first meeting of the National Ganga Council in December 2019 in Kanpur, the Hon'ble Prime Minister Shri Narendra Modi espoused the term 'Arth Ganga' which primarily means linking people and Ganga through the “bridge of economics”. Arth Ganga strives to consciously demonstrate the interdependence between people and River Ganga. Arth Ganga looks to facilitate economic activities along the river that not only strengthens the existing relationship people share with Ganga but also view the river as the natural giver of life as well as livelihood. Arth Ganga aims to establish an economic association that behaviorally revolutionizes the way Ganga is treated. Hence, the slogan – “Banking on River Ganga”.

Presently, under Arth Ganga, six verticals, interconnected in many ways, are being worked upon: a) Zero Budget Natural Farming that includes chemical-free farming for 10 kms on either side of the river, generating “more Net income, per drop”, 'Gobar Dhan' for farmers, b) Monetization and Reuse of Sludge & Wastewater that envisages reuse of treated water for irrigation and industrial purposes and revenue generation for ULBs, c) Livelihood Generation Opportunities such as 'Ghat Mein Haat', promotion of local products,

Ayurveda, medicinal plants, capacity building of volunteers like Ganga Praharis, d) Public Participation to ensure increased synergies between stakeholders, e) Cultural Heritage & Tourism that looks to introduce boat tourism through community jettis, promotion of yoga, adventure tourism, etc. and Ganga Artis and f) Institutional Building by enhancing the local capacities for better-decentralized water governance.

Jalaj Kendras were virtually launched at 26 locations under Arth Ganga by the Hon. Union Minister for Jal Shakti Shri Gajendra Singh Shekhawat. Jalaj is proposed at a total of 75 locations in the Ganga Basin. Jalaj is being implemented in association with the Wildlife Institute of India. Jalaj is an initiative to create livelihood opportunities for those living on the banks of the river by setting up facilities and handholding the local people for economic

These equipment divisions account for approximately 80% of the total market.



### Cultural Heritage and Tourism

This is one of the most important components under Arth Ganga that aims to enhance the people–river connection by leveraging the cultural heritage of River Ganga and promoting tourism on a war footing. In a new initiative,

activities such as homestay, safari, river walk, health, wellness center, biodiversity watch, religious tourism, and village tours, etc. A trained cadre of Ganga Praharis have also been created from among the local people by WII for biodiversity conservation and Ganga



rejuvenation. Jalaj, an innovative mobile livelihood centre, is aimed at aligning skill enhancement activities with Ganga conservation. Jalaj is also visualized as a model for livelihood diversification, through the promotion of local produce and facilitates stakeholders' participation in ecological and economic spheres for river conservation in line with "Arth Ganga" objectives.

A tourism-related portal ImAvatar has also been launched under Arth Ganga to promote livelihood opportunities along the Ganga basin by promoting the Arth Ganga initiative through tourism, marketing of local products, both agriculture and handicrafts, sustainability of ghats and other assets created by NMCG. Both NMCG and ImAvatar would work together in the areas of public participation through religious and spiritual tourism and creating market linkages. Digitalizing NMCG touch points and assets is also part of the collaboration. Focusing on religion tourism and facilitating visits of older citizens to religious pilgrims through Ganga 'Sewaks' trained by the Mission is also part of the initiative. The training will also be imparted to people for Responsible Tourism and conservation of the ecosystem. Tourism guides will be readied for traditional trek routes on the Ganga Basin.

NMCG has collaborated with Indian National Trust for Art and Cultural Heritage (INTACH) for two projects. In the first one titled 'Documentation of Cultural Mapping of River Ganga from Gaumukh to Ganga Sagar',

mapping of various locations in 51 districts along River Ganga has been done and reports have been shared with NMCG on important destinations which are potentially tourist-attracting sites. On the basis of this project, 75 locations are being identified to promote tourism in the Ganga Basin. There are also plans to develop Ramayana and Mahabharata circuits to promote religious tourism.

### Zero Budget Natural Farming

Zero Budget Natural Farming primarily means no cost of production of crops grown without any fertilizers and pesticides. A number of steps are being taken under Namami Gange Programme to promote natural farming in the Ganga Basin. In a novel initiative, National Mission for Clean Ganga (NMCG) has signed a Memorandum of Understanding (MoU) with Sahakar Bharti to establish at least 75 'Sahakar Ganga Grams' in the Ganga Basin. The primary objective of 'Sahakar Ganga Grams' is to set up Cooperatives/FPOs for undertaking Natural Farming in the Ganga Basin and create a mechanism through which the farmers' produce is marketed to achieve the target of 'More net income per crop' and, in turn, promote people-river connect through the "bridge of economics". Hence, the MoU envisages to achieve the vision of sustainable and viable economic development through public participation and the creation and strengthening of local cooperatives to realize the mandate of Arth Ganga.

Taking significant steps in this direction, NMCG facilitated exposure visits



of hundreds of farmers and held workshops in Shirdi, Bulandshahar, Sonipat and Haridwar in the past few weeks to nudge the farmers to shift to natural farming.

### Livelihood Generation

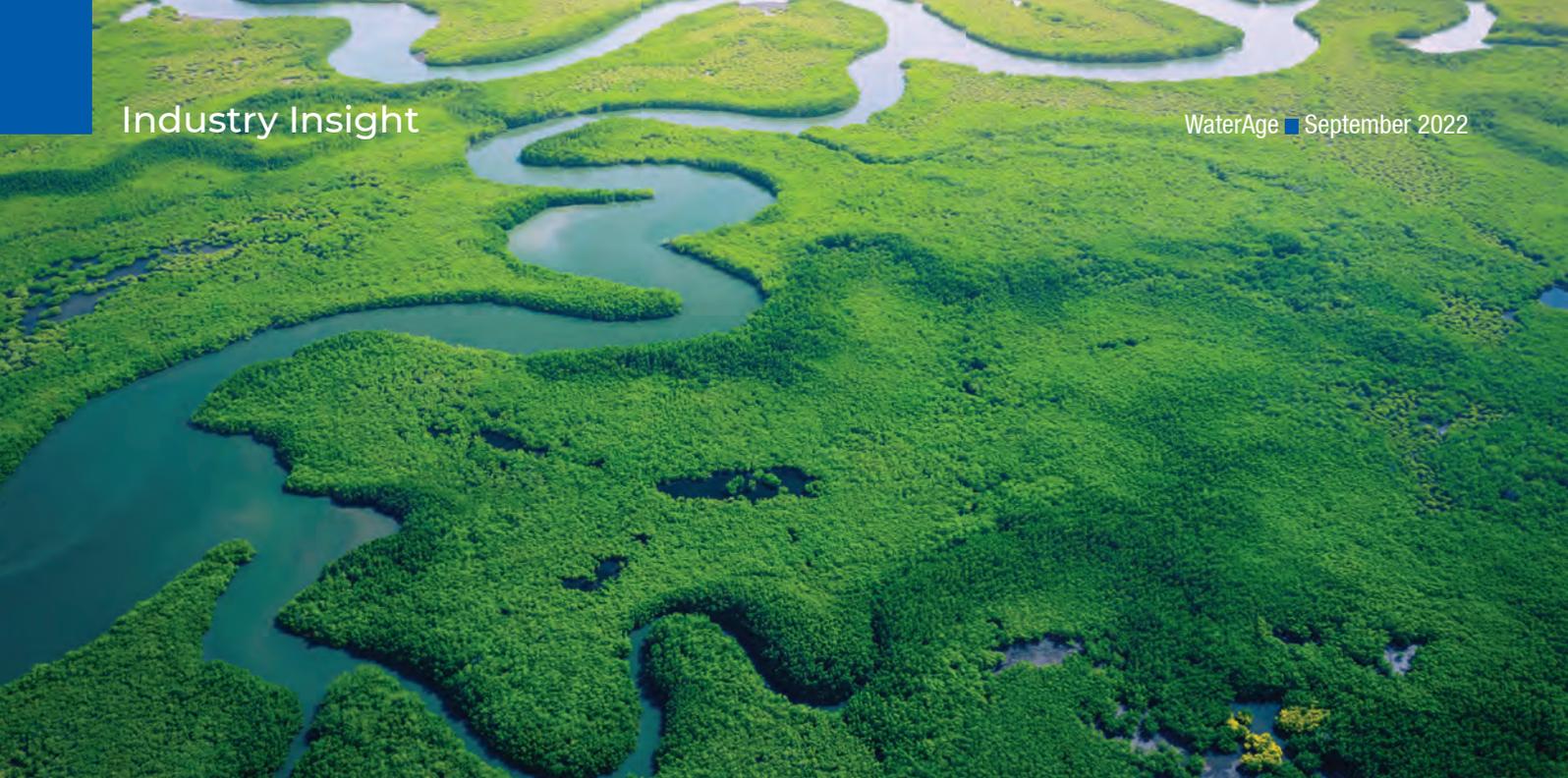
Ghat Mein Haat is an impactful initiative under Arth Ganga for marketing of local produce. Haats are being set up at ghats along River Ganga with the support of District Ganga Committees. Local products are promoted and sold at these Haats. Under the Azadi ka Amrit Mahotsav, several Ghat Mein Haat has been organized in the Ganga Basin in the past few days. On the occasion of the International Day of Yoga, the 'Ghat Par Yoga' initiative was launched on all major ghats in the Ganga Basin.

The event saw inspiring participation at 100+ locations and the District Ganga Committees swung into action to make 'Ghat Par Yog' a grand success. Estimatedly, more than 10 lakh people took part in the event across Ganga basin.

To augment livelihood generation through biodiversity conservation, in 2017–19, 42 lakhs Indian Major Carp (IMC) fingerlings were ranched. IMC includes 3 native Ganga fish species – Rehu, Katla and Mrigal. The ranching helps increase the number of fish in the River, which, in turn, generates more livelihood for fishermen. In the second phase in 2021, the ranching projects have been integrated with the Arth Ganga. So far, 20 lakh IMC fingerlings have been ranched in 2022. Besides, over 48,700 Hilsa were ranched in the Ganga River out of which 2,257 Hilsa were tagged. This is being done to achieve the twin objectives of Hilsa conservation and Livelihood Generation for fishermen.

In conclusion, unlike previous attempts to clean Ganga, Namami Gange Programme adopts a 360-degree approach to not only rid the river of pollution but also reiterate and use its tremendous cultural and economic significance to strengthen people–river connect and bring about a fundamental behavioral change based on the relationship guided by eternal interdependence between the river and the people.





**Rucha Vinayak Vaidya**

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**Rucha Vaidya** is an Environmental Engineer and Researcher. She has over four years of research experience in varied fields like water, wastewater, nanotechnology and microbiology. She aspires to continue her research journey to explore strategy and policy in the field of water conservation and water circular economy.



**Sayan Mondal**

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**Sayan Mondal** has a Master’s degree in Economics with a specialisation in Development Studies. He is deeply interested in the WASH sector, especially solid and liquid waste management. As a Research Associate at ASCI, he works closely with MoHUA, providing managerial and technical support for their start-up programme under the AMRUT mission. He also leads the Innovation vertical for WASH Innovation Hub, a joint initiative by ASCI & Govt. of Telangana to promote innovations in India’s water, sanitation & hygiene sectors to support the achievement of SDG6.



**Professor V Srinivas Chary**

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**V. Srinivas Chary** is an urban environmental planner and public health engineer. He specialises in water and environmental sanitation (WASH) services in urban areas. His portfolio includes policy programmes, capacity development and knowledge management for national, state and city governments. As the director of the Centre for Urban Governance, Environment, Energy and Infrastructure Development at ASCI, he provides strategic direction to the centre and leads its advisory, consulting, research and capacity-building programme. As the CEO of Wash Innovation Hub, he promotes innovators, facilitates partnerships and encourages governments to embrace innovations for achieving SDGs.

# INNOVATIONS TO SUPPORT THE REJUVENATION OF WATER BODIES

By Rucha Vaidya, Sayan Mondal, V Srinivas Chary

**Abstract:** The National Mission for Clean Ganga has set a precedence for using innovative technologies in the rejuvenation process to tackle hindrances like lack of reliable data. The innovation in this space is ever-evolving. This article presents an overview of leading innovations pertinent to rejuvenating water bodies.

**Article:** The inception of the Namami Gange programme has opened the floodgates to much-needed rejuvenation initiatives. India contains only 4% of the world's freshwater resources, which cater to one-fifth of the world's population. The available freshwater resources require diligent management, even without the threat of contamination and degradation. However, rapid urbanisation, indiscriminate pollution, lagging treatment infrastructure and unmonitored withdrawals have left our freshwater resources polluted and depleted. Rejuvenating depleted and polluted water bodies is crucial for conserving the water and surrounding land ecosystems. It is equally essential for providing a sustainable water supply and economic growth to urban and rural India.

The blooming start-up ecosystem in India has risen to the challenge. A variety of innovative, novel and creative solutions for rejuvenating freshwater bodies are being developed and piloted all across India. The innovations range from supportive data aggregation and modelling to on-site cleaning and treatment of water bodies for rejuvenation. The WASH Innovation Hub founded at the Administrative Staff College of India (ASCI) is incubating and mentoring these solutions. This article summarises leading innovations pertinent to the revival of water bodies.

**Innovations for on-site rejuvenation of surface water bodies:** The endeavours essential for the revival of surface water bodies can be classified into two categories: surface rejuvenation and water column rejuvenation. Both of these endeavours are equally essential to restore and maintaining a healthy water ecosystem. However, they require different approaches to achieve the required results.

Most of the used single-use plastic ends up in aquatic ecosystems like lakes and rivers. India is currently the twelfth largest source of

aquatic litter. This floating plastic debris degrades water quality and aquatic life in the water body. Plastic bags and other floating forms are a choking hazard for aquatic animals and can suffocate them. Due to long retention times in the waterbodies, plastics are converted into microplastic. Microplastics leech into the water, deteriorating its quality and simultaneously accumulating harmful pollutants from surroundings and acting as transport vectors as they can easily enter the food chain<sup>1</sup>. Floating plastic debris is not the only hindrance to the health of a surface water body. Excessive growth of invasive plant species on the water surface has an adverse effect on aquatic environments. A dense cover of free-floating plants on the surface prevents sunlight penetration, reduces oxygen concentration in the water column creating anoxic conditions at the bottom, releases excessive organic content and harmful gases such as carbon-di-oxide, hydrogen sulphide and methane into the water and causes excessive loss of water through evaporation. As such, the presence of free-floating plants harms aquatic life and the overall health of the water ecosystem. Furthermore, the dense cover interferes with water flow, extraction and navigation.

Therefore, Surface rejuvenation activities which tackle floating plastic and organic debris and mainly require physical interventions are crucial for restoring the water ecosystem's health. Following are some start-ups with unique innovations that focus on surface rejuvenation.

## 1) Eunoia Innovations private limited: Aqua Skimmer

Innovators at Eunoia Innovations private limited are dedicated to making surface bodies in India free of floating plastic debris. Their solar energy-powered device, 'Aqua skimmer' with its split hull design, onboard camera, and two operation platforms (radio and artificial intelligence), is a game changer for removing floating debris. The lean design enables the Aqua skimmer to reach and clean narrow channels efficiently. Despite its slender design, it can accommodate 350 litres of trash onboard. The use of artificial intelligence and IoT for the operation of the device makes it possible for a user to operate it remotely and further allows Aqua skimmer to monitor and maintain a database of pollution levels of water bodies. Implementation of the Aqua skimmer devices has

been initiated for cleaning the Kapra lake in Hyderabad.



Figure 1: Diagrammatic representation of Aqua Skimmer

### 2) Omnipresent Robot Tech: Ro-Boat

Innovators at Omnipresent Robot Tech have developed the Ro-Boat, an autonomous intelligent device for river cleaning. The Ro-Boat has a stable mechanical system with air and water propulsion for efficient navigation in the river bodies. It has the unique ability to track and detect debris on the water surface. The onboard two-axis gimbal camera and novel artificial intelligence system are used to track different pollutants. An attached robotic arm is used to remove the waste from the water. The Ro-Boat can not only clean the water surface but also pull-out pollutants from river beds by completely submerging itself. The Ro-Boat is fitted with antifog lights and a panoramic zoom camera, allowing it to operate 24/7 in all weather conditions. With a 12-hour operation cycle, the Ro-Boat can clean 600 kgs of waste daily. The Ro-Boat has been successfully tested in the Yamuna River and has received recognition from USAID and the Massachusetts Institute of Technology. Hence, the Ro-Boat is a promising device for the rejuvenation of rivers and other surface water bodies.



Figure 2: Ro-Boat

### 3) Kumbhi Kagaz

Innovators at Kambhi Kagaz have figured out a way to turn the bane of free-floating plants into a boon. Kumbhi Kagaz had developed a process

to make blot-free, printer-friendly, eco-friendly premium quality paper from water hyacinth, a prevalent aquatic weed which otherwise has no practical use. The fibrous hyacinth is harvested to make natural pulp and used as an alternative to wood pulp used in paper making. Research shows that a single drastic harvest of floating plants can induce a permanent shift in the state of the aquatic ecosystem<sup>2</sup>. Therefore, this innovation by Kumbhi Kagaz is very relevant to the rejuvenation of the aquatic ecosystem. At the same time, it has the potential to provide alternative livelihood to the communities dependent on the water body and teaches the communities the skill of harvesting water hyacinth. The innovators at Kumbhi Kagaz have achieved a triple threat that rejuvenates water bodies while creating a social and economic impact on the surrounding communities.



Figure 3: Kumbhi Kagaz: From Harvested Water Hyacinth to Paper products

The efforts to rejuvenate a surface water body do not end with the removal and management of surface rejuvenation activities. Focusing on the restoration of the water column below the surface is equally important. Contamination due to untreated wastewater and fertiliser runoffs causes eutrophication of the water column. The presence of excessive nutrients in the water column leads to a reduction in clarity, increased incidences of low-oxygen events and increased primary production, which includes the excessive growth of free-floating plants and algae on the surface of the water and all associated concerns<sup>3</sup>. In general, nutrient enrichment causes ecological changes that decrease the biodiversity of the aquatic ecosystem<sup>3</sup>. Furthermore, nutrient enrichment due to sources like wastewater and fertilisers compromises water quality for domestic and drinking purposes. Therefore, water column rejuvenation activities, which tackle chemical and microbial contamination requiring chemical and biological interventions, are equally essential. Following are some of the leading start-ups focusing on Water-column rejuvenation:

### 4) JK Nanosolutions

Innovators at JK Nanosolutions have developed a cutting-edge nanotechnology-based product for rapid single-step treatment of polluted water bodies. The treatment mechanism includes coagulation and flocculation using nano polymers followed by precipitation. For treatment, nanoparticle solution is released into contaminated water bodies. The nanoparticles combine with excess nutrients (coagulation and flocculation), forming micro and macro-sized particles. These particles then settle as sludge. No aeration is required for the removal of nutrients. The sludge formed can be pumped out and used as manure for gardening and farming. JK Nanosolutions have already piloted this technology to successfully clean up lakes in Hyderabad and Bengaluru. The estimated cost for treating 100 m<sup>3</sup> is Rs 350. Thus, innovators at JK Nanosolutions have found an economical and quick solution for



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rejuvenating contaminated water bodies.



Figure 4: JK Nanosolutions: Rejuvenation of Shivapura Lake (Bengaluru) using nanoparticle solution

### 5) Nualgi

Innovators at Nualgi have developed a method to promote the growth of diatom algae in any water substrate, to harness its potential in reducing BOD and COD due to excessive nutrients and pollutants and prevent the growth of aquatic weeds like water hyacinth, green and blue-green algae. It is estimated that 1litre of Nualgi lakes solution can treat 2–5 million litres of water. Adding Nualgi Lakes to a waterbody initiates immediate growth of diatom algae which produce oxygen by photosynthesis. Aerobic organisms in the water body utilise released oxygen to break down organic substances reducing the COD and BOD of the water column and preventing the growth of aquatic weeds at the surface. Further, diatoms trigger the growth of zooplanktons that filter feed on bacteria, mosquito larvae and organic particles. Zooplanktons are food for fishes promoting growth up the food chain and recycling excessive nutrients into fish biomass. Thus, the solution developed by Nualgi cost-effectively rejuvenates waterbodies by restoring the ecosystems without any sludge formation.

### 6) Ossus Bio – Ob HydraCel

Innovators at Ossus bio have figured out a way to generate fuel while cleaning water by selectively targeting organic content through designed intelligent electroactive microbial communities. The bio-intervention is delivered in the form of a retrofittable device called 'Ob HydraCel'. The Ob HydraCel consumes contaminants from water and produces hydrogen gas for use as fuel. The design process for Ob HydraCel includes analysing the water quality of the targeted system, selecting a microbial community for effectively treating the targeted water body, and encapsulating the selected microbial community in a device for

treatment. The Ob HydraCel device is self-powered with minimum power, space and downtime. Though the device is designed to attach to an effluent pipeline directly, it is possible to create an assembly for the using Ob HydraCel for the rejuvenation of water bodies while producing clean energy and reducing dependence on fossil fuels. Especially in the context of global warming and climate change, Ob HydraCel can be a fitting solution for the rejuvenation of water bodies.

Innovations for data aggregation and modelling of surface waterbodies: The biggest challenge in planning and monitoring rejuvenation projects is a lack of reliable data. The lack of robust data and real-time information makes diagnosing water health difficult. Furthermore, lack of data leads to a lack of scientific understanding of the rejuvenation projects. Lack of scientific understanding makes the rejuvenation process ineffective, long and exorbitantly expensive. Therefore, it is important to focus on generating robust water system data to support the design and execution of efficient rejuvenation projects. Following is a start-up with a comprehensive creative solution focused on creating robust water system data:

### 7) Nature Dots

Innovators at Nature Dots have developed a product-service hybrid system, AquaNurch, to collect important data about critical water ecosystems. AquaNurch combines nature intelligence and artificial intelligence to create a digital twin of water bodies. A hardware installation on-site acts as a nodal point for real-time data collection. Supported by artificial intelligence, the AquaNurch system can map up to 37 location-specific ecological, physical and chemical parameters capturing ecological and anthropogenic disturbances in the waterscape. The AquaNurch AI engine further has the ability to assess current data points and forecast risks and variability for a body of water, giving communities sufficient time to take corrective measures to maintain the health of their water resources. AquaNurch also provides location-specific solutions to address water deterioration based on the assessment of collected data and makes the insights and evidence readily available to the stakeholders through web and mobile platforms. AquaNurch has been deployed across various states in India, including Maharashtra, Goa, Chhattisgarh and Haryana. AquaNurch is first of its kind high-frequency data repository in India. With an aim to 2.5 million hectares of waterscapes in the next 10 years, AquaNurch is all set to overcome the gap in reliable data availability.

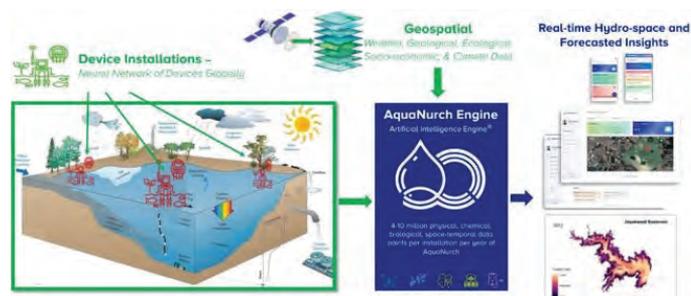


Figure 5: Nature Dots: Schematic representation of AquaNurch system

Innovations for the rejuvenation of groundwater sources: Groundwater accounts for nearly 50% total urban and 85% of the total rural water supply in India. This heavy demand is depleting the groundwater reserves at a rapid rate. Furthermore, most groundwater aquifers in India are contaminated with heavy metals, fluorides and nitrates above limits permissible for human consumption. Therefore, groundwater cannot be ignored in the rejuvenation movement. Acquiring reliable data and augmenting aquifers are focal points in the rejuvenation of groundwater sources. Following are start-ups working on rejuvenating groundwater sources by focusing on developing reliable data and augmenting aquifers.

### 8) Urdhvam Environmental Technologies Pvt Ltd: Bore Charger technology

Innovators at Urdhvam Environmental Technologies have developed a technology to augment/ recharge groundwater sources using rainwater. The process begins with rigorous geological scanning of existing or new borewells. Proprietary knowledge in the hydrogeological domain is then used to cater to the need of the groundwater site. A proprietary robotic device, BoreCharger, is attached to an existing borewell, which perforates the casing of the borewell from inside, creating a channel to transfer large volumes of rainwater from unconfined aquifers to confined aquifers during and after the monsoon season. A single BoreCharger device can potentially recharge anywhere between 4–80 lakh litres of rainwater, increasing groundwater depth between 2–10 m. The augmentation with rainwater further improves groundwater quality by reducing the salt content. The BoreCharger has been successfully deployed in several states in India, including Maharashtra, Telangana, Andhra Pradesh, Karnataka, Rajasthan etc., as well as West Africa. The device has replenished and rejuvenated completely dry and low-yielding groundwater reserves with a 90% success rate. Therefore, technology developed by Urdhvam Environmental Technologies provides a critical service for the rejuvenation of groundwater resources.

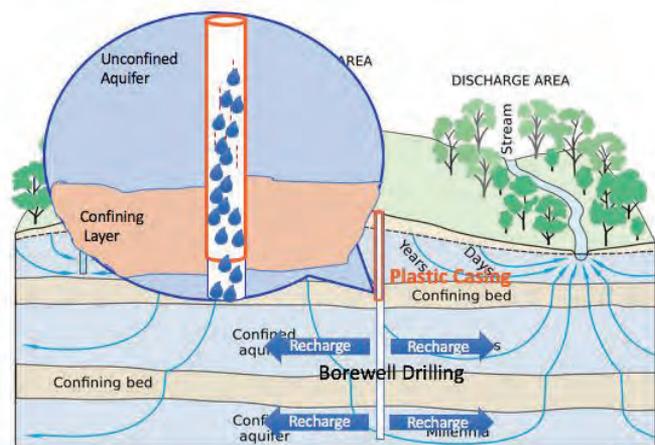


Figure 6: Conceptual pictorial representation of BoreCharger technology

### 9) Samaha Geosolutions LLP

Consultants at Samaha Geosolutions have developed a methodology for

real-time Spatio-temporal mapping of groundwater quality and quantity. The methodology aims to create spatial distribution and water quality index maps for groundwater resources using spatial and non-spatial data. This data is collected and analysed to identify suitable locations for ground recharge and rainwater harvesting pits. The methodology has been implemented in Lakshadweep Islands to identify appropriate locations for radial wells or infiltration galleries for replenishing groundwater. The methods developed by Samaha Geosolutions promise to provide a good database of groundwater conditions which can act as the basis for planning and implementing efficient groundwater rejuvenation programs.

### 10) Aumsat Technologies:

Innovators at Aumsat Technologies are developing methods to use UAV-mounted and ground-penetrating radar for detecting and monitoring groundwater reserves. This method provides precision-driven, satellite-based AI-enabled hydrological data and analysis for detecting and forecasting groundwater resources. Use of technologies and techniques such as Synthetic Aperture Radar (SAR) with a penetration depth of 30 m, UAV-based passive microwave radiometer, and Radar interferometry, Aumsat's technology is able to detect groundwater in subsurface fissures and cavities as well as detect ground-level displacement due to overexploitation of groundwater resources. The hydrological information generated through Aumsat's technology provides valuable data for evidence-based planning and implementation of groundwater rejuvenation efforts.

Encouragement and support from the government have flourished the start-up ecosystem catering to rejuvenation initiatives. Many innovative, creative and adaptive solutions for different rejuvenation requirements are being developed and implemented across India. Though solutions to previously overlooked issues, advancements in current technologies and scaled-up on-field implementation of developed products and services are required to achieve substantial progress in the rejuvenation of water bodies, the current start-up landscape shows promise and hope for tomorrow. The WASH Innovation Hub at ASCI is creating an enabling environment for start-ups and innovators to achieve scale.

### References:

1. Issac, M. N. & Kandasubramanian, B. Effect of microplastics in water and aquatic systems. *Environ. Sci. Pollut. Res.* 2021 2816 28, 19544–19562 (2021).
2. Scheffer, M. et al. Floating plant dominance as a stable state. *Proc. Natl. Acad. Sci. U. S. A.* 100, 4040 (2003).
3. Council, N. R. *Clean Coastal Waters: Understanding and Reducing the Effects of Nutrient Pollution.* Clean Coastal Waters (National Academies Press, 2000). doi:10.17226/9812.

Open urinal on the river bank and a wastewater stream entering the river

# STORY OF KAMANDALU RIVER REJUVENATION



## Dr. Prasanna Jogdeo

Co-Founder, Lemnion Green Solutions Pvt. Ltd.

**Dr. Prasanna Jogdeo** did his schooling from Jnana Prabodhini Prashala, Pune. He pursued B.Sc. in Microbiology from Fergusson college Pune and M.Sc. in Biotechnology from the University of East Anglia, Norwich. After postgraduation, he worked at Fergusson college as a lecturer, and with Gangotri Ecotechnology as a research associate. In 2018, he co-founded the company 'Lemnion Green Solutions private limited' to promote and provide low-cost, low-maintenance, eco-friendly solutions and services to environmental problems. This involves providing expertise on the duckweed-based system, wetland development, and ecological floating beds for water treatment, aesthetic improvement and ecological restoration. Lemnion recently won the cityfixlabs grant organized by the World Resource Institute for the theme of Nature-based solutions.



is located in the village called Kavathe Mahankal.

A few hundred years ago, in a small village near Sangli, Maharashtra, a shepherd was walking his sheep on the banks of a river. The river was peaceful and teeming with life. Thick riparian vegetation on the sides, and stable banks with ghats made for access to the villagers. Although a summer afternoon, the river provided a cold breeze. The shepherd enjoyed his meal there, relaxed for a bit on the banks of the river, and went for a swim. While swimming, he found a beautiful idol of a Goddess. Mesmerized by the idol and considering it as good fortune, he kept the idol to himself and brought it home with him. A few months later after a series of unfortunate events, he came back to the same village and gave the idol to the priests in the village since then Goddess Mahankali's temple

This river, where the idol was found, is called Kamandalu River. This river was the lifeline of Kavathe Mahankal. For many years this river provided many things to the residents nearby, water for irrigation and drinking, Fish and other aquatic life forms, acted as a

temperature sink, and sand from its basin. The river banks had thick riparian vegetation which prevented flooding. The interface with the town had ghats that provided residents with access to the river. Residents used to spend their time on the river banks enjoying the cool breeze, even on a hot summer day.

But in the last few years, in the process of development land assumed prime position

of the existence of this river, leaving aside the importance of such a river. The river was in a dire need of help.

In March 2022, a young politician of Maharashtra, Rohit Patil, took note of this degraded state of the river and decided to help the river get back to its glorious days. A company from Pune, Lemnion Green Solutions, was approached to scientifically study and

A local supervisor was also appointed to ensure better communication with the locals.



**Neglected and polluted river, filled with dumped solid waste**

and encroachment on the river bed followed. Roads were built almost in the river bed, Temples and even houses cropped up in the river bed, trees were cut down on the river bank, sand was over-extracted from the river basin, wastewater started being discharged into the river, and solid waste dumped into the river. The river started losing its charm and slowly it functions. Eventually, the river was polluted and neglected by the citizens of the town. Many young people were not even aware

rejuvenate the river. A team of experts from Lemnion started working extensively, to gather information on the river and found out its religious and historical importance. They interviewed residents, temple officials, and government officials, did surveys and identified the problems.

To rejuvenate this river from its current state was certainly not an easy task. They knew they had to bring all the stakeholders on board,

Fish breeding had started and as the river was full of water people could observe fish in the river, Birds came to the river to hunt for the fish, and small children came to the river to catch fish.



Stakeholder involvement, planning, and involvement of local labor in the work

convince them, and tell them the importance of this work. Meetings were planned with direct stakeholders like residents, officials of the temples on the river bank, and government officials, and the required help was acquired. Temple authorities were urged to provide infrastructure for solid waste disposal to the devotees to avoid dumping of religious waste in the river.

The project was presented also to indirect stakeholders like NGOs, funding agencies, tourists/ visitors, and politicians. With all the stakeholders on the same page, a plan was made. A plan that would have a holistic approach to rejuvenating the river. A plan that will keep the interests of the stakeholders, and be beneficial to the river and its associated biodiversity. A plan with detailed scientific know-how and required adaptations. NGOs like Agrani rural development foundation and R.R. Patil Dnyan Prabodhini provided the funds required for the project. NAAM foundation provided the machinery and the fuel required for the project. With all the support received, the work began.

To involve residents actively during the project, volunteering drives were planned for residents and college students. Presentations were made in temples to create awareness and inform the residents about the project and also to get their feedback. The story of the river was told to convey its importance. Some visualizations were made to give an idea of how the river will look after the work was completed. A team of supervisors from Lemnion stayed and worked with the local team over a period of 4 months. Employment opportunity was generated for local labor. A local supervisor was also appointed to ensure better communication with the locals. This inculcated a sense of ownership and responsibility for the project among them.

Following the routine and rigorous work for four months, phase one of the project was completed. This work started with the removal of excess and wild growth of vegetation in the river bed. This happened due to excessive nutrients in the river added through wastewater discharge.



This wild vegetation created stagnant water spots which resulted in mosquito breeding and foul smell. It was removed manually and with machines. The biomass removed was separated into three parts; roots, stems, and shoots. The medicinal properties of shoots and roots are being explored. Parallely, the excavation of deposited sludge and silt from the river bed. This helped in increasing the capacity of the river to carry water. This sludge was highly fertile and was used on the banks to



Excavation and creation of in-stream structures

plant trees. To avoid the erosion of the top layer of soil from the banks, jute linings, and coir mats were laid on the slopes, they were secured using bamboo pegs and plantation was done. Over time, these plants will develop a complex root structure that will help in holding the soil. At meanders and at vulnerable areas of the banks, stone pitching was done for stabilization.

To regulate the flow of water in the excavated river bed, loose boulder structures were made. These structures helped in the filtration of water, provided landing spots for birds, and the areas where water was retained acted as breeding spots for fish. As the water passed through and above these structures, dissolved oxygen in the water increased. To address the wastewater being discharged from the town into the river, sources were identified and decentralized biological systems were designed, to partially treat the water entering the river.

With these interventions done by August 2022, Lemnion’s team had

made the river ready to receive the monsoon rains. This year, during heavy rains, the water did not gush into the surrounding town area, as it happened for past years, damaging property. Fish breeding had started and as the river was full of water people could observe fish in the river, Birds came to the river to hunt for the fish, and small children came to the river to catch fish. As the plants on the banks started growing, they gave a beautiful appearance to the river bank. People started coming to the river for morning and evening walks.

In a welcome change, there was this new relationship that was seen developing between the river and the residents. They started calling the nullah, a River again.

Now Lemnion’s team waits for the monsoon to get over and begin with phase two. In this phase the focus will be on the associated landscaping, to further improve the bond between the river and the residents, for better land use of the areas along the river.



Current state of the river

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### Sanjay Bahl

Founder, Superweld Eco-Solutions

**Sanjay Bahl** is the Founder of Superweld Eco-Solutions, they create innovative products to treat wastewater, malodors, solid waste, algae treatment, lake and pond remediation. He has helped clients like paper mills, pharma companies, the hospitality industry, food, and beverage industries to meet stringent wastewater discharge parameters. They help companies like CETPS, dairy, and companies improve their biological wastewater treatment, he strongly believes Indian biotechnology is among the best in the world.

## INDIA NEEDS BREAKTHROUGH IN WASTEWATER TREATMENT FOR REJUVENATING RIVERS

River pollution is a huge problem not only in India but for the entire world and it is high time we start taking action on it. River water has to be treated well before it is supplied for domestic, industrial, and agricultural usage. When the river pollution loads increase beyond a certain limit the present-day technologies and infrastructure succumb to this pressure and cannot supply the same amount of water as supplied earlier, which creates a water scarcity.

This water scarcity is becoming real and is going to increase till untreated waters keep making our rivers polluted. It is such that nobody will understand the water crisis until their taps run dry. Remember the last time when your overhead tanks became empty and you had no water in your taps even to go for daily ablutions?

Among the sources of water, pollution is the uncontrolled discharge of human wastes and industrial and agricultural runoffs. While our country has made a massive investment in water supply projects there has been an overall under-investment of appropriate treatment systems, which has resulted in harmful contamination of water resources.

These equipment divisions account for approximately 80% of the total market.

Finding a solution for wastewater treatment and safe discharge is a difficult challenge because it involves an integrated process in which technical, economic, and financial considerations come into play. The uniqueness of each situation makes it difficult to define a universal method for selecting the most adequate type of waste treatment plant. However, it is important to ensure that appropriate treatment standards are selected

clean water.

With this article, we wish to bring to the larger public, these issues and possible solutions to them. These solutions can become Breakthroughs we need to save our rivers

**More Focus on Biological Wastewater Treatment**

Water is traditionally treated first with



**EXPECTATION**



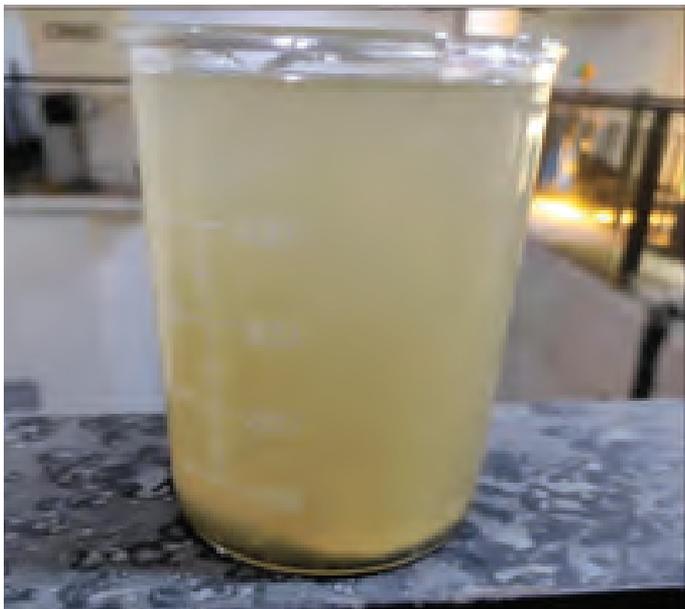
**REALITY**

to meet local conditions, for which unique, made In Indian innovations for treating wastewater are the need of the hour.

We at Superweld Technologies have a range of microbial and biotechnology-powered products to treat wastewater and we deal with wastewater treatment challenges on a daily basis. We keep listening to various wastewater issues and do problem-solving for customers like wastewater treatment companies, Industry Owners, Residential and corporate builders, and Government agencies. As a result of this exposure, we see some common issues and factors which are the present roadblocks to

chemicals; this treated water is then fed to tanks where microbes are developed to further digest the impurities, microbes form flocs and settle down cleaning the water above, this water is then polished with filtration systems before it is put to use. The Biological part where microbes and enzymes treat water is one most cost-effective yet underrated technology. Today, microbes can remove color, TDS, ammonia, odors, and dyes, microbes can work in low dissolved oxygen conditions, and certain kinds of algal strains can work in the most toxic and high TDS environments.

For instance, we are working with various



Before



After

paper mills, textile units where biotechnology has significantly improved their wastewater treatment without alteration of their existing plant infrastructure, in almost all cases the customer was unaware of the tremendous improvements just microbes could do.

### Upliftment of ETP/ STP Human Resources

A well-qualified and knowledgeable ETP or STP operator is the biggest asset an organization can have. The work done by personnel operating a wastewater plant is quite challenging, he/ she must be a multi-skilled, engineering mindset person, who has to be a plumber, engineer, microbiologist, and chemist all at the same time. Yet most organizations have low-skilled, underpaid staff, and almost no one invests in their continuing training with the latest technologies. Operators, Supervisors, and ETP heads must be upskilled regularly. Their salaries must be given in accordance with the complexity of wastewater they treat. By complexity, I mean parameters like BOD, COD, Odor, TDS, TSS, etc.

We also need organizations that can provide certifications to wastewater personnel just like we have in the Financial and Software industry.

### Awareness among the Decision makers Industry owners/ Board of directors

Nothing beats a well-designed wastewater treatment plant, a plant that can handle shock loads, and future expansions and has the lowest cost of operation.

We have seen various organizations that have invested heavily in production machinery but miserably in effluent treatment machinery.

A mindset that understands that a well-designed plant will require more CAPEX initially but will give a lesser cost of water treatment over the

years is needed.

We had a customer case where a ZLD plant was not working because the RO and UF membranes were clogged and needed urgent replacement, but when our team visited the plant we found out that it was a case of poor design where there was almost no retention time given to primary and biological treatment and all the pollutant load was coming directly onto the membranes.

### Government Support

Although it is easier to put the onus about everything on the government there is always scope for improvement in this part.

We keep hearing that CPCB norms are getting stricter or NGT officials are increasing their surprise visits and sealing defaulting /polluting industries, which is very good. This really works and has increased compliance so far. However, what we are asking for is that the government must also acknowledge the good work being done by organizations.

The NGT, CPCB, or state Pollution boards must also reward, and highlight exemplary case studies of the good work or water saving by industries, this will motivate others to follow paths.

### Keeping Water away from the Political Agenda

If governments are really serious about giving low-cost water to everyone then they should give allocate more budget to the technology, infrastructure, drainage network, and manpower, however, it hurts to see when water is just given away because it features in the political agenda of some parties. We must understand that water treatment is very expensive. If you provide it free to everyone, no one will make judicious use of it.



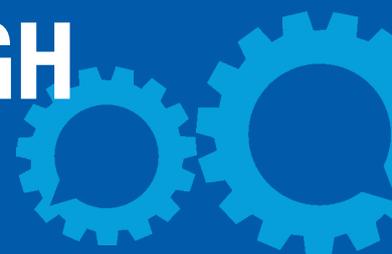
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THE SOLUTION TO FIGHT CLIMATE  
CHANGE THROUGH EFFECTIVE ADAPTATION –

# WATER SECURITY THROUGH BORE WELL RECHARGE



**Dr. Sarika Kulkarni**  
Chief Executive Director, Raah Foundation

## About Raah Foundation

**Raah Foundation** takes an integrated approach to development and has a large program on water security. Through multiple iterations and experiments, we have created a model of bore well recharge that can be easily replicated across areas and geographies. Our solution is also hydrogeology agnostic and works with most of the existing structures. Our efforts in the past years using water harvesting/conservation structures such as check dams, open wells, rechargeable borewells, and farm ponds have resulted in creating a rainwater harvesting capacity of over 749 million liters annually directly impacting over 45,000 people.





India is one of the highest guzzlers of groundwater in the world. It uses an estimated 230 cubic kilometers of groundwater per year – over a quarter of the global total. Roughly 80 percent of India's 1.35 billion residents depend on groundwater for both drinking and irrigation. More than 60% of irrigated agriculture and 85% of drinking water supplies are dependent on groundwater. Groundwater acts as a critical buffer against the variability of monsoon rains.

Bore wells first arrived in India in 1970, when UNICEF brought the technology to India to address the water shortage. Over the years bore well drilling technology became cheaper and more accessible spurring its widespread spread. And now India has around 33 million borewells making her the highest extractor in the world.

What bore wells do is create a culture of groundwater exploitation. What cannot be seen, cannot be controlled. Bore wells use up the groundwater table that cannot be seen resulting in its exploitation. Bore wells also only extract and do not replenish depleting and subsequently drying up the groundwater completely. India also has a distinct distinction of being one of the highest dried-up borewells in the world. The strategy unfortunately used has been to dig another bore well once the existing one dries up. When actually it should be all about reviving and recharging the dried-up borewell. If we do not take up borewell recharge on a large scale, given our excessive dependency on groundwater and the increased vagaries of monsoons because of climate change, India is staring at a serious water crisis.

This article explains the recharge methodology and argues for its mass adaptation not only for all existing ones but specifically for the new ones to be built. Borewell recharge is a technique that uses the same tube (pipe) that extracts water to replenish rainwater during the monsoon. This ensures that the aquifers get filled up during the rainy season making the bore wells perennial.

Borewell recharge is a two-step process. In the first step, a pit is dug around the bore well casing which is then filled with layers of sand, stones, and gravel and in the second step, the pipe is perforated and covered with a wire mesh to channelize the flow of rainwater from the pit into the aquifer through

the casing.

### The Pit

A 10x10 feet percolation pit is dug around the casing pipe. This casing pipe is then perforated with a drill machine and the holes are covered by a nylon mesh. The mesh ensures nothing, but the water goes across the borewell. Now the pre-casted RCC (Cement) rings are placed around the borewell casing through which the harvested water would seep to reach the nylon mesh of the casing pipe and proliferates into it through its holes. The empty area between the walls of the well and rings is then filled with filtering materials like sand, gravel, crushed stone, jelly, and such others.

### Diverting Water into the Pit

There are two methods of doing this:

#### Method 1

If the bore well is in the village near a hut – rainwater that falls on the roof is collected through gutters put around the house which is, then diverted into the pit through another pipe. If the bore well is outside the village and there is no hut around it, a shallow catchment pond is built near the body based on hydrogeological considerations on a discharge region and this water is then diverted into the bore well through narrow channels. The rainwater then gets filtered and seeps into the casing pipe, thus refilling the aquifer supporting the bore well.

#### Method 2

If the bore well that needs a recharge is located middle of nowhere, the pit dug around the existing bore is bigger in size to ensure that maximum water gets diverted in.

Both methods are equally effective and can be of enormous help to replenish our aquifers and support creating a water-secure world.

Challenges: The process of perforating the casing is a skilled job and getting this expertise can be a challenge. While the above two methods are foolproof and work effectively in most cases, situations like inadequate rainfall or droughts can prove to be challenging.



### Importance of Community Involvement

It is extremely critical to involve the community and look at the demand side to ensure judicious usage of water through the borewell. It is important to understand and appreciate that water is and will always be scarce and will need to be used very carefully. And for this, it is important to involve the community or the end users. Encouraging them to put in place the usage rules. Creating awareness about water shortages and the criticality of catching every drop as it falls and using every drop carefully is very important.

### Maintenance of Recharge Structures

Periodic maintenance of the pits around the casing and cleaning of the mesh covering the perforation must be undertaken. A simple process can prolong the life of the recharge borewell structure. Every water structure is important and must be taken care of.

Climate change and borewell recharge: One of the biggest impacts of climate change is the vagaries of rainfall. Oscillating between droughts and extremely heavy rains, adaptation to climate change is becoming critical by the day. Water is a basic human need, and its absence or scarcity can create a calamity of the highest order. From hunger and food insecurity to human, and cattle health to hygiene and humongous challenges for livelihoods – humans will be doomed if water becomes rare. The time is still ripe for us to become proactive and take positive strides to save ourselves from near extinction. While the problem is big, the solution really lies in taking small multiple steps on a large scale. Borewell recharge is one such solution that needs a mass adaptation.

### References

- Central Ground Water Board : <http://cgwb.gov.in/>
- India Water Portal : [indiawaterportal.org](http://indiawaterportal.org)
- Urban Waters Bengaluru : <http://bengaluru.urbanwaters.in/>

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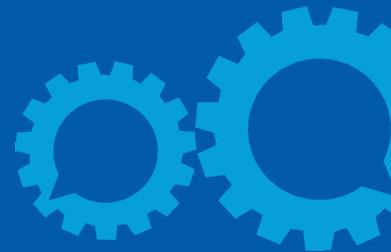
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# MARKET FORCES COULD PLAY A ROLE IN INDIA'S WATER SECURITY



*We should guide demand for water-efficient products in ways that serve a larger public purpose.*



**Siddharth Desai & Omkar Sathe**

**Siddharth K. Desai** is heading Kishor Pumps Pvt. Ltd. as the Jt. Managing Director. He has introduced new technologies for improving energy efficiency, reliability & remote monitoring of pumps at municipal sewage pumping stations and at sewage treatment plants. He has worked with ministries and several nodal agencies including the Ministry of Jal Shakti, the National Mission for Clean Ganga (NMCG), Jal Boards, Sewerage Boards, and other technical consultants to introduce modern concepts related to the pumping of sewage and sludge, including novel multi-story pumping station to save on ground space in urban areas. He is on the advisory board of the Indian Biogas Association (IBA) for the task force on biogas from the liquid feedstock.

**Omkar Sathe** is a partner at CPC Analytics, a data-driven consulting firm with offices in Pune and Berlin.

Water and sanitation have been important areas of focus in recent years for the central and state governments in India. Notable work has been done in providing water tap connections and improved sanitation facilities. One area of rising importance is water security. Around 600 million Indians face high to extreme water stress, as per a Niti Aayog report. With increasing population pressure and industrialization as well as urbanization, our water consumption is bound to rise. By 2025, water demand for irrigation is expected to grow by 14%, for domestic needs by 40%, and for industrial use, it is projected to double in comparison with 2015.

One area where India needs to act is achieving higher efficiency in water usage. A Global Water Intelligence (GWI) study showed that water loss in India is almost at 50%, which means that one litre of water saved at the consumption point eliminates the need to supply several litres from the main storage, as distribution losses are high. Water preservation is, therefore, important for conserving water.

Increasing water usage efficiency has been tried by other water-stressed countries as well. Countries like Singapore and Australia have created a market for water-efficient goods. Australia adopted the Water Efficiency Labelling and Standards Scheme (WELS) in 2005 with the aim of reducing water consumption by promoting the use of products and technologies that save water. Products are given a 'water efficiency rating', which enables customers to use water efficiency as a criterion in their purchases.

This rating system has been used for appliances and water-using products such as showers, certain tap equipment, flow controllers, urinals, dishwashers, and washing machines.

Over the years, sales of higher star-rating machines in Australia have increased. This scheme is estimated to have saved 70,000 million litres of water in 2013 and is projected to save 204,000 million litres per annum – equivalent to more than three-quarters of Melbourne's total annual residential water use – by 2030. In turn, reduced water usage has also decreased electricity or gas used by Australians. Combined, these are predicted to lead to Australian households saving a whopping USD 26.3 billion by 2030.



Singapore introduced its Mandatory Water Efficiency Management Practices (MWEMP) in 2015 for commercial markets. Large water users are required to submit details of their water consumption, business activity indicators, and water efficiency plan to the Public Utilities Board (PUB). With this data, water efficiency benchmarks for different sectors are developed. The PUB then develops good case studies for designing, maintaining, and operating water-efficient buildings and plants. Internationally, increasing water usage efficiency is gaining traction, with the International Standard for Organizations creating the Water Efficiency Labelling Programmes in 2022 and Water Efficiency Management Systems in 2019.

One Indian example to learn from is our market for energy-efficient goods where product 'star ratings' has been successfully deployed. Research shows that Indian customers are aware of these energy-efficiency ratings and largely prefer air-conditioners with higher star ratings. These work thanks to awareness around eco-friendliness, and a clear quantifiable monetary benefit. A 5-star AC can help save up to INR 900 in electricity charges a month as compared to a 1-star AC.

Thus, there is a good scope and a dire need for the national and state governments to design initiatives to raise water-usage efficiency by using market methods to influence demand and supply. A water rating system can be adapted to measure the flow rate, litres per flush, or litres per wash.

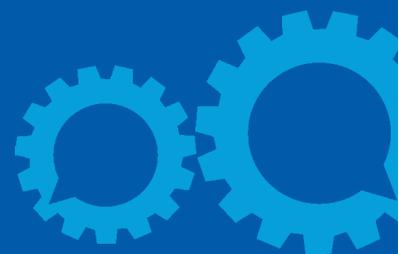
These ratings need to be simple for businesses to implement and clear enough for customers to understand. Technologies that reduce water flow and wastage without inconveniencing the consumer, like aerated nozzles on taps, can be encouraged through mandatory rating labels.

However, water rating systems are not enough. To create a market for water-efficient goods, we require demand at the individual level to be measured and linked to a sufficient economic cost. This means that existing initiatives around installing water meters would need to be fast-tracked, along with mandates to pay for one's own water consumption. Prices can be higher in water-stressed areas to increase the incentive for saving water. When consumers realize that water-efficient goods save them money, such goods would naturally see demand rise. This will nudge manufacturers to produce more water-efficient goods. However, metering and charging for water are deeply contested issues of water policy. Creating the political will to take action on sustainable water usage is an uphill task that might require both community and political engagement.

Creating a market for water-efficient goods would be difficult but highly beneficial in achieving water security. While we have seen some intent with the formation of a National Bureau of Water Use Efficiency being proposed in 2020, there is a long road ahead. Apart from navigating the political nature of water usage, a multi-year coordinated effort across customers, governments, and businesses are required to create a successful market. While major reforms in the Indian economy were implemented in face of a financial crisis, can we afford to wait for a water crisis to begin the water reforms?



# INDIAN INDUSTRIES MUST MANAGE WATER RESOURCES



**Dharmendra Pratap Singh**

Head of Infrastructure Solutions & Senior Vice President,  
Voltas Limited

**Dharmendra Pratap Singh** took over as the Head of Infrastructure Solutions and Senior Vice President at Voltas Limited in January 2019. Under his leadership, the company has strategically increased its focus on Government funded projects emphasizing inclusive growth. Prior to Voltas, he has been associated with Repono Warehousing Private Limited for two years as a Managing Partner. He has also been a Chief Executive Officer at Eway Consultancy LLP.

Every business uses water, which is one of the most commonly exploited natural resources. Worldwide water shortage is a result of this resource's expanding and unchecked consumption. Increased consumption of water resources is a result of industrialization as well as population growth and fast urbanization. To make items or to cool down machinery used in the manufacturing process, water is employed in the manufacturing industry along with production operations in other industries. When creating, processing, cleaning, diluting, cooling, or transporting a product, industrial water is used. Industrial water and wastewater are the two terms used to describe the water produced by commercial or industrial operations.

Whether it is the food we eat, the machinery we use, or the goods we purchase, almost every stage of manufacturing in a number of industries involves the usage of water. These operations produce wastewater, which needs to be properly managed. The country's industrial zones use roughly 40 billion cubic meters of water annually, or about 6% of the total amount of water available, according to the Ministry of Water Resources. The Central Pollution Control Board (CPCB) of India estimates that the amount of freshwater used by industry annually is about 500 billion cubic meters.



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## Techniques for Managing Water

Water reclamation can be defined as the processing or treatment of the wastewater generated by the industries to make it reusable with definable treatment reliability and meeting appropriate quality of water. On the other hand, water reuse refers to the use of reclaimed water for beneficial purposes. Furthermore, the terms “water reclamation” and “water reuse” typically imply the presence of a pipe or other water conveyance facility for transporting the reclaimed water. In addition, an increasing population necessitates the acquisition of alternative water resources. Water reuse is conducted with due regard to sanitation, public health, and environmental protection in cities and regions where there are industries and where wastewater collection and treatment is a normal practice. Reusing cleaned wastewater saves both money and benefits the environment. There is enough reclaimed water available to meet human needs if it is adequately treated. Agricultural irrigation, groundwater recharge, and industrial processes are just a few of the applications for reclaimed water.

## Challenges

India is home to a variety of industries and some of them are water-intensive industries including tanneries, paper, and pulp industries, textile industries, dairy and dairy products, breweries and soft drinks production, and steel mills. The amount of wastewater released by Indian tanneries is approximately between 3008 and 3324 liters per 100 kg of hides treated. Although it does not show in the end product, water is one of the most important raw resources used in the production of pulp and paper. The amount of water required per ton of paper produced is estimated to be between 273 and 455 M3, with nearly all of it returning as effluent requiring treatment. Sizing, de-sizing, bleaching, mercerizing, fancy dyeing, screen printing, khaki dyeing, yarn dyeing, and finishing are only some of the techniques used in textiles that require intensive use of water. The factory’s combined wastewater is vast in volume and has a wide range of color, pH, total dissolved solids, and other characteristics. This has necessitated that water is recycled and reused, instead of over-utilization of groundwater, which will lead to water scarcity in the near future.

Even though there are several benefits of water reclamation and reuse, companies are faced with certain challenges during the water reclamation process. Technology advancements have begun to streamline these operations more than ever before. However, these advancements do not

negate the fact that there are still obstacles to solve in terms of managing the water reclamation process. One of the major challenges faced by a water reclamation plant is the use of energy. The filtration process of the wastewater can consume energy of 3% to 15% of electricity annually. Secondly, finding skilled plant operators has become a challenge. There is a huge requirement for employees who are skilled and effectively trained in the water reclamation and treatment process but there is a shortage in the supply of such workers.

Another facet of this problem is that administration of treatment facilities can account for a significant portion of annual operating expenditures. The next challenge is the disposal of sludge which is the residue that is generated during the treatment of wastewater. Although wastewater treatment plants are designed to filter water and make it environmentally viable, the treatment process can leave an environmental footprint. The organic debris that is taken from the water must be disposed of. There have been significant advancements in green technology that have improved the treatment of water. These advancements aid in reducing the environmental impact of water treatment facilities and their disposal of wastewater after clean water has been discharged.

## Solutions available

A corporate should be careful in choosing a partner to help with their water management project. The partner should understand the numerous challenges that local governments and industries face when it comes to wastewater management. Rapid urbanization increased consumer demand, and developing digital technologies have resulted in high-class water management technologies developed by engineering companies.



The rate of technological adoption in wastewater service management has sped up. ULBs are introducing advanced treatment technologies for water and waste treatment, as well as automation and control tools for operating and monitoring facilities, and offering online municipal



services. The government is also taking several initiatives to ensure that private companies have easy access to land acquisition and permissions. Furthermore, big-budget allocations and on-the-ground project execution are optimistic for the construction industry.

We at Voltas continue to innovate and contribute to nation-building through our expertise in water and wastewater treatment solutions across various industrial, infrastructure, and built environment segments, covering both government and private sectors, as one of the leading providers of integrated end-to-end solutions for projects. Satellite remote sensing-based irrigation monitoring and decision-making platforms for governments are some of the technologies that will rule in the next era of the Water Environment. Water and wastewater utilities will benefit from operational information to reduce losses, assess network health, and increase income. Satellite images, in-situ sensors, and predictive analytics are already being used to create a water management and forecasting platform for state government agencies.

Decentralized wastewater treatment systems have recently acquired popularity due to their lower energy requirements, allowing for off-grid operations using alternate energy sources. Furthermore, these plants can be tailored to fit specific needs. Membrane bioreactors are another technology that is gaining popularity (MBR). MBR effluent is ideal for the reuse of treated wastewater, and it can be used for urban landscaping and toilet flushing without further treatment. Companies use everything from MBBR (Moving Bed Biofilm Reactor), SBR (Sequencing Batch Reactor), and ZLD (Zero Liquid Discharge) to additional industrial wastewater treatment technologies including UF (Ultrafiltration), and RO (Reverse Osmosis).

By applying the signature smart engineering solutions, we can address the challenges faced during the water reclamation process. Many efficient water treatment plants minimize waste and maximize reuse. We have conceptualized and commissioned a raw water treatment plant for industrial use, which meets all the latest international standards and is capable of handling 60 ML of water per day. The purified water from ultrafiltration can be used for low-end industrial purposes such as cooling. Nanofiltration, on the other hand, is mostly used in steps of the drinking water purification process, such as water softening, decoloring, and micro-pollutant removal.

### Perspectives for the Future

India's wastewater treatment sector is starting to reach its full potential. This expansion is being aided by several causes. Private companies are taking considerable measures that will provide significant potential for various stakeholders. Indian companies can establish and ensure water sustainability through simple adjustments such as implementing efficient water management methods and systems within properties that assure water sustainability throughout the project's lifespan. Recognizing their environmental responsibilities, it is past time for individuals and businesses to step up their efforts to conserve water and leave a greener tomorrow for future generations.

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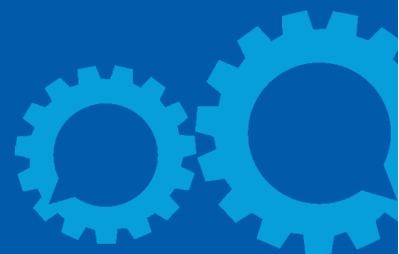


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# ALL ABOUT A NON-STANDARD WOUND POLYPROPYLENE CARTRIDGE FILTER



*By Himanshu Budhia*  
*Director, GSE Filter Pvt Ltd*

**Himanshu Budhia** demonstrated a history of working in the environmental services industry. He has strong professional skills in Water Treatment, Business Development, Industrial Water Treatment, Industrial Engineering, and Air Filtration.



## Introduction –to Wound Polypropylene Filter Cartridge

These are filter cartridges used to filter out sediments, which are a type of impurity found in liquids. In order to make them, a continuous polypropylene yarn strand is wound around a perforated support core. This core is also normally made of polypropylene. The criss–cross winding creates a multi diamond–shaped pattern across the length of the filter. The closeness of the winding pattern can be varied to produce filters of different porosities. A very close pattern would mean that only very fine particles can pass through it. This would mean that its porosity is low. A more spaced winding would mean that particles of a larger size can pass through it. For example, a low porosity 1 Micron Rated cartridge would have a close pattern. This filter would only allow particles of size smaller than 1 micron to pass through it. A higher porosity 10 Micron–rated cartridge would have a more spaced pattern. This would allow particles of less than 10 microns to pass through it.

Polypropylene (PP) is the popular choice for these filters because it is insoluble and inert to a wide range of liquids. In applications involving drinking water, food and beverages, dairy, and pharmaceuticals – a virgin grade PP must be used. Recycled PP can have detrimental health effects.

## They work on the “Depth Filtration Technology”

The sediments are trapped within a bed of depth of fibers by adsorption or absorption. The irregular pores in the bed cause a torturous path to trap fine particles. The filtration happens due to direct interception, inertial impaction, diffusion, and electro–kinetic effect. There is a gradual increase in pressure drop across the cartridges until such time that the cartridges are fully choked. In these filters, the trapped particles are more difficult to remove. This can be done by backwashing and chemical treatment. These are NOT recommended as such procedures severely affect the micron rating of the filters.

## International Standard Dimensions of the Wound PP Cartridge Filter

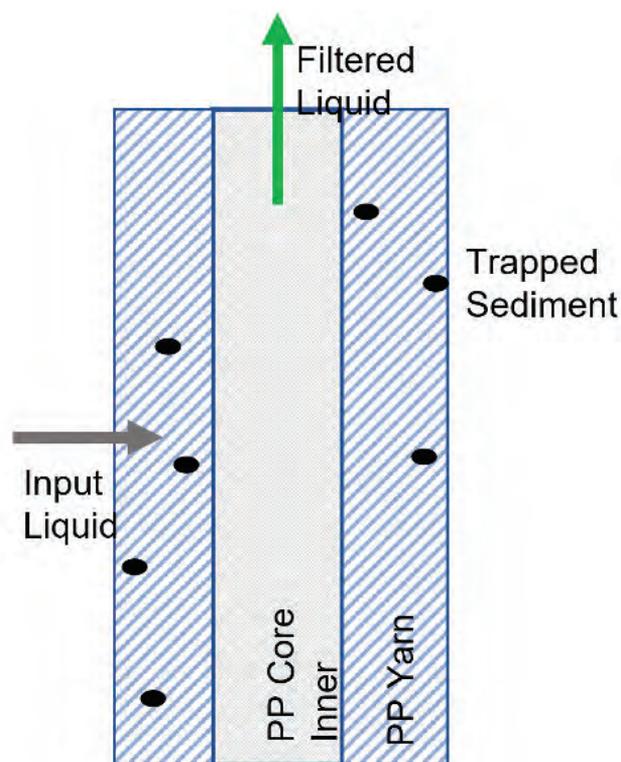
The Wound PP Filter product is a popular choice across the world. There are millions of installations of housings around the world that have these filters fitted inside them. The housings are deployed for the following international standard dimensions of the filters.

- Outer Diameter: 63mm (2.5")
- Inner Diameter: 27mm / 28mm (1.1")
- Lengths: 254mm (10") / 508mm (20") / 762mm (30") / 1016mm (40")

A Wound PP 10" cartridge of 5 Micron Porosity would have a weight of around 165gms

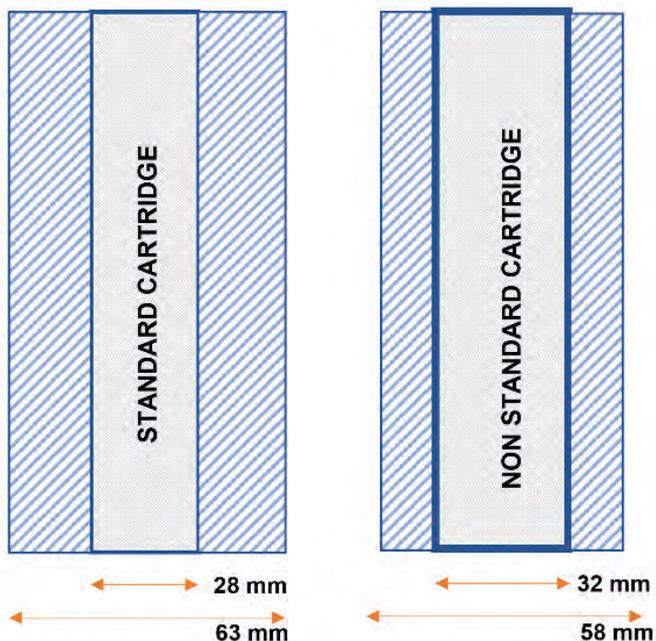
## Non–Standard/Low–Quality Cartridge in Terms of Dimensions

Many times, a small change in dimensions of the outer diameter and inner diameter of the cartridge can go undetected to the naked eye. The schematic drawing shows a classic example. It compares a standard cartridge (OD: 63mm / ID: 28mm) vs a non–standard cartridge (OD: 58mm / ID: 32mm). The change is a small one, but when you analyze it, the non–standard cartridge has approximately 27% less yarn in terms of volume and 15% less yarn in terms of weight. This would be a significant cost saving for a company that is mass–producing such filters.



Schematic Drawing of Filtration through a Wound PP Cartridge Filter

This small change in dimensions could go undetected by an innocent buyer. They fall prey to a lower–cost cartridge while comparing it with the ideal cost of a standard cartridge. However, this lower–cost cartridge would significantly change the performance parameters of the cartridge. The “flow rate” through the cartridge and its “dirt holding capacity” would be drastically reduced. The life of the cartridge would be reduced. This would thereby increase the spare cartridge cost and the down–time cost of changing the



PARAMETER	STANDARD	NON STANDARD
Outer Diameter	63mm	58mm
Inner Diameter	28mm	32mm
Yarn Volume (10")	61 cc	44 cc
Yarn Weight (10")	134 gms	115 gms

cartridges in a big way. The cost-saving enjoyed while procuring the non-standard cartridges is nullified and reversed in the long run.

### Non-Standard/Low-Quality Cartridge in Terms of Weight

The PP yarn is the media that provides filtration. The inner core is just a support to the yarn. Therefore, it is quite logical that it is the weight of the PP yarn which is of importance while ascertaining the quality of a cartridge and pegging it against a price.

Refer to the below table.

PARAMETER	STANDARD	NON STANDARD	
Outer Diameter	63mm	58mm	
Inner Diameter	28mm	32mm	
Yarn Volume (10")	61 cc	44 cc	
Yarn Weight (10")	134 gms	115 gms	← Yarn wt reduced
Core Weight (10")	31 gms	50 gms	← Core wt increased
Cartridge Weight (10")	165 gms	165 gms	← Cartridge wt is same

The non-standard cartridge has been produced using lesser pp yarn. This is compensated by using a heavier supporting core. The weight of the finished

cartridge is thus maintained to manipulate the sale. The non-standard cartridge is offered in the market at a lower price than a standard cartridge whilst confirming that the weight of the cartridge is the same as the standard cartridge. As explained earlier the flow rate and the dirt holding capacity of such cartridges will be lower. It would reach its change overpressure drop levels much faster.

### Non-Standard/Low-Quality Cartridge in Terms of Micron Rating

A user selects a cartridge of a certain porosity to address the needs of their application – drinking, product processing, machinery requirement, process requirement, etc. Ethics would demand that a supplier provides a cartridge, rated to the micron rating as required by the user. For example, if a user needs a cartridge rated to 1-micron porosity, the supplier needs to give a 1-micron cartridge and not a 5-micron cartridge. Using a higher porosity might affect the process greatly.

As explained earlier, the wound PP cartridge can be made in different porosities by machine settings. The lower porosity cartridge could have the yarn strand closer to each other and they would be "tighter" and slightly "heavier". For a user, it would be very difficult to identify and confirm the porosity of a cartridge by looking at it. The user would need to trust the word of the supplier, the marking on the label if any on the cartridge, or a test certificate given by the supplier.

It is quite unfortunate that in many cases, cartridges of the same porosity are labeled with different porosity ratings and made available for sale. The advantages to an unscrupulous manufacturer indulging in such practices would be:

- Mass production of a particular porosity would mean less machine downtime and cost-saving
- Selling a 10-micron cartridge with a label of 0.5 Mic / 1 Mic / 5 Mic would mean cost savings as the 10-micron cartridge would be slightly lighter in weight requiring a lower amount of PP yarn.
- Non-availability of accessible and economical testing rigs would mean that the chances of the customer verifying the porosity are very bleak.

Let us take a reverse osmosis plant as an application. The wound PP cartridges are popularly used as a pre-treatment of the input water to reduce the sediments going into the membrane. Normally a 1 Micron or a 5-micron cartridge is selected for this process. Using a higher porosity cartridge like a 10-micron one could allow that much more sediments to pass through it and reach the high-pressure pump and membrane. This would severely affect the life of the pump and also choke the membranes faster. The pump and membrane being expensive components, the cost to the user because of a non-standard cartridge could be very high.

### Non-Standard/Low-Quality Cartridge in the Material Grade of Polypropylene

Polypropylene can be recycled. This process would include different additives to bring back the PP in a raw material form suitable for a particular application. For example, recycled PP could be used to manufacture PP yarn. Recycled PP being cheaper, is a raw material option available to manufacture wound PP



cartridges. Such cartridges would be available at lower prices and pose a better proposition to the buyer.

Applications like drinking water, food, beverages, pharmaceuticals, dialysis, etc. require cartridges manufactured using virgin-grade PP only. Recycled PP could have additives that might cause cancer and other health hazards.

**Conclusion**

Filtration is an important process in any application. When it involves drinking water, the trade of supplying filters becomes a noble one. It is the moral responsibility of the manufacturer of the filter to provide standard products meeting necessary norms. At the same time, it is important for a customer to be educated and aware of the right product while having options to choose from.

**Wound PP Cartridges of Brand N-Zo from GSE Filter Pvt Ltd**

GSE Filter Pvt Ltd is a manufacturer of Wound PP Cartridge Filter, and these are popular under the brand name Nzo. These cartridges come with the below features:

- Manufactured using Virgin Grade PP Yarn and PP Core
- International Standard Dimensions
- Use of a selective absorption intelligent yarn to provide for higher efficiency and lower pressure drop
- Manufactured in different and authentic porosity levels
- Product tested and validated by IAPMO to achieve a 99% filtration efficiency in a 5 micron and 10-micron cartridge
- Product tested and validated by IAPMO to achieve a dirt holding capacity of 184.2 gms per 10", which is amongst the highest in the market.

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# SAVING WASTEWATER BY MAKING IT FIT FOR REUSE



**Vipul Chavda**  
Co-founder, Cleantech Water

Vipul Chavda is the co-founder of Cleantech Water. He is a Chemical Engineer Graduate from L.D College of Engineering, Ahmedabad, Gujarat. Running Cleantech Water since 2013, having experience of more than 8 years in wastewater treatment. The area of Interest is the Domestic Sewage Treatment Plant, De-centralised Treatment. Covering Business with Infrastructure, Industries, and Govt. Bodies, Hotel & Resort. My vision is to become a torchbearer in creating awareness of the three R's: Reduce, Reuse, and Recycle and the focus is to improve basic hygiene and sanitation, along with the conservation of water bodies.

## Social Challenge Addressed

Water Pollution is the biggest challenge for society. It leads to water scarcity because untreated water cannot be used or recycled back to domestic usage. We cannot use wastewater for irrigation or domestic use because it contains toxic chemicals and harmful elements from industries and houses. Since all major factories and industries need a large amount of water daily for various processes, it is best to recycle water as much as possible. After leaving the wastewater treatment plants, the water is fit for reuse. You can utilize this water in factories, for irrigation, domestic use, or even let out the purified water into natural reservoirs. It helps to maintain climate equilibrium. The wastewater treatment process effectively saves liters of water from getting wasted by using enhanced technological support.

## Need for the Innovation

The basic need for the innovation is to reduce the operating and maintenance cost. Our focus is to have de-centralized treatment plant which means a small capacity of the plant which is starting from 1 KLD (1 Family-members) to 250 KLD (400- 450 Family). In other words, we can install a plant for individual bungalows to small apartments, hotels, resorts, schools, and hospitals. Now a day, government policies, compliance, water pollution, and the Swatch Bharat mission requirement of treating at the individual level more. But following the same techniques for small plants is increasing recycle cost of water. Our motto is to reduce the recycling cost and provide fully automatic plants.

Cleantech Water provides sewage treatment systems that are fully automatic, efficient, and meet the treatment standards which are higher than the statutory requirements. The choice of the electro-mechanical equipment and the meticulous design set us ahead in high-quality sewage treatment systems.

We are wastewater specialists having the knowledge and resources to help our clients use water judiciously. We aim to offer innovative and sustainable sewage water treatment systems that meet varied needs. We offer Sewage Treatment Plants, Effluent Treatment plants, and Water Treatment plants. Our focus is a De-centralized small Treatment plant. We provide SBR (Sequential Batch Reactor) treatment plant. Our Advance SBR STPs can install in RCC underground tanks. This highly flexible technology is useful in a wide variety of applications. The SBR process is a widely used water treatment method in the developed countries for quite a long time.. When sewage is sent to the SBR Tank (also known as the Reaction tank) one batch at a time, an activated sludge process gets activated.. SBR Tank acts as the aeration tank in the reaction stage when activated sludge and influent water are mixed under aerated conditions. It also works as the secondary clarifier during two stages; the settling stage and decanting stage. Mixed liquor is again allowed to settle, and the overflow moves to the next stage of treatment. In the Sludge Return System, after settling in the SBR tank, the influent gets mixed with the sludge return system again.

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15–19 January, 2023  
**Venue:**  
 ITC Grand Chola, Chennai, India  
[www.iwa-network.org/events](http://www.iwa-network.org/events)

**Renewable Energy Expo 2023**

20–22 January, 2023  
**Venue:**  
 Chennai Trade Centre,  
 Nandambakkam, Chennai,  
 India  
[www.renewableenergyexpo.biz](http://www.renewableenergyexpo.biz)

**Water & Solid Waste Expo 2023**

16–18 February, 2023  
**Venue:**  
 Pragati Maidan, New Delhi  
[www.watersolidwaste.com](http://www.watersolidwaste.com)

**WAPTAG Water Expo 2023**

23–25 March, 2023  
**Venue:**  
 India Expo Center, Greater Noida, India  
[www.waptag.org](http://www.waptag.org)

**Smart Cities Expo 2023**

27–29 March, 2023  
**Venue:** Pragati Maidan, New Delhi  
[www.waterindia.com](http://www.waterindia.com)

**Convergence India Expo 2023**

27–29 March, 2023  
**Venue:** Pragati Maidan, New Delhi, India  
[www.convergenceindia.org/](http://www.convergenceindia.org/)

**SRW India Water Expo**

5–7 May, 2023  
**Venue:** Chennai Trade Centre, CHENNAI  
 TRADE CENTRE, Ramapuram, Tamil Nadu  
[www.waptag.org](http://www.waptag.org)

**Water & Plump Skills Expo 2023**

18–19 May, 2023  
**Venue:**  
 Pragati Maidan, New Delhi, India  
[www.plumbskillsexpo.com](http://www.plumbskillsexpo.com)

**Water Today's Water Expo 2023**

23–25  
 September, 2023  
**Venue:** Chennai Trade Centre, Chennai, India

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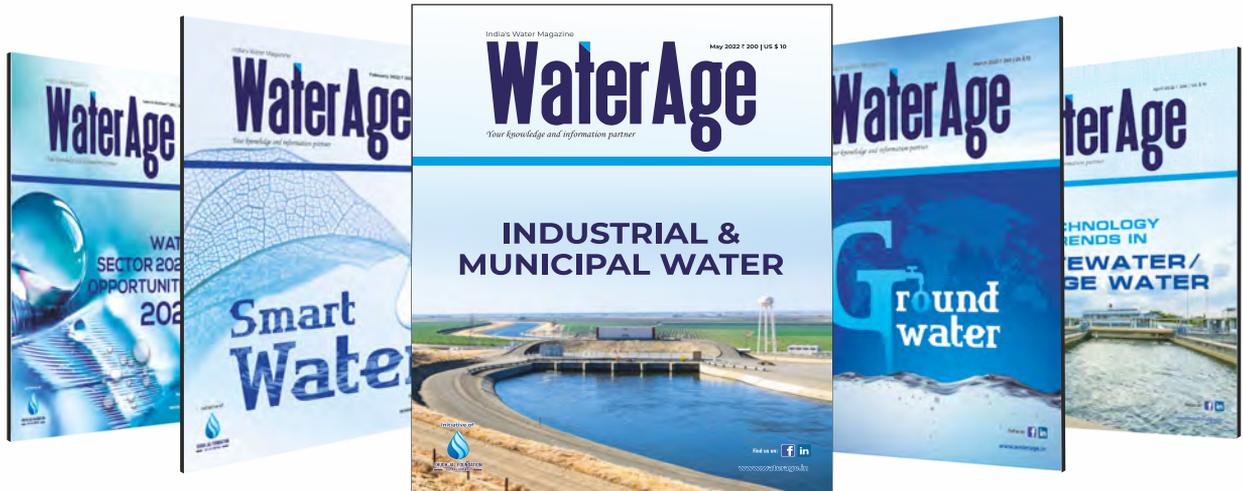
17–19 October, 2023  
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## WATER SUPPLY

### Buyer/Seller:

**Uttar Pradesh Jal Nigam**

**Ref. Number:** 54121935

**Tender Number:** 2022\_UPJNM\_741407\_1

**Requirement:** Performance based construction and maintenance contract for sikandra north and swami dayalbagh, pilot zone in agra city

**Tender Detail:** Performance based construction and maintenance contract for sikandra north and swami dayalbagh, pilot zone in agra city #\*. performance based construction and maintenance contract for sikandra north and swami dayalbagh, pilot zone in agra city

**Tender Estimated Cost:** 988,246,768

**Closing Date:** 14/11/2022

**Location:** Agra – Uttar Pradesh – India

**Contact Details:** U P Jal Nigam (Hq), Lucknow||Chief Engineer (Agra)||Gm Ganga Jal Project Unit||project Manager, Gangajal Project Unit, Agra

### Buyer/Seller:

**Public Health Engineering Department**

**Ref. Number:** 54012098

**Tender Number:** PHE2223WLOB08446

**Pre–Qualification:** Please refer PQ (File Name: 54012098\_TD\_293\_F4TH.pdf) attached with this tender for pre–qualification criteria.

**Requirement:** Work of wsp of 648 villg of dist chittor from chambel river under jjm pkg i const of intake well ph rw transmission main upto jaisinghpura wtp cwr cwph cwt main clstr ds for 243 villg of distt chittor under jjm with o and m for 10 yr after dlp of 1 y.

**Tender Estimated Cost:** INR 8,704,200,000

**Closing Date:** 23/11/2022

**Location:** Udaipur – Rajasthan – India

### Buyer/Seller:

**Public Health Engineering Department**

**Ref. Number:** 53680134

**Tender Number:** PHE2223WLOB07875

**Pre–Qualification:** Please refer PQ (file name: 53680134\_TD\_413\_Pod3.pdf) attached with this tender for pre–qualification criteria.

**Requirement:** Work of augmentation cum reorganisation of aapni yojana phase–i, water supply for 60 villages of sardarsahar and villages of churu–bisau project including 10–year o&m. Works and water supply.

**Tender Estimated Cost:** INR 6,993,403,078

**Closing Date:** 14/11/2022

**Location:** Churu – Rajasthan – India

### Buyer/Seller:

**Public Health Engineering Department**

**Ref. Number:** 54176262

**Tender Number:** 3743–3785

### Requirement:

Augmentation cum reorganisation of aapni yojana phase– water supply for 60 villages of sardarsahar and villages of churu–bisau project including 10–year o&m.

**Tender Estimated Cost:** INR 6,993,400,000

**Closing Date:** 14/11/2022

**Location:** Churu – Rajasthan – India

### Buyer/Seller:

**Public Health Engineering Department**

**Ref. Number:** 54321332

**Tender Number:** PHE2223WLOB08754

**Requirement:** Work of pkg–3 of chambal project (retrofitting) for providing fhtcs in villages and their ohs of roopbas, uchhain, (sewar) and kumher blocks of district under jjm with 1 year defect liability period and 10 year. Civil Works.

**Tender Estimated Cost:** INR 2,323,000,000

**Closing Date:** 05/12/2022

**Location:** Bharatpur – Rajasthan – India

**Contact Details:** Superintending Engineer Project Phed Bharatpur, Superintending

Engineer Project Phed Bharatpur, Bharatpur, (bharatpur), Pin:321001, Phone No.:5644297003

## WATER WASTE

### Buyer/Seller:

**Rural Development Department**

**Ref. Number:** 54207542

**Tender Number:** 2022\_NANDE\_846819\_6

**Requirement:** Constructing solid waste and waste water management at islapur tq. kinwat dist 1st call

**Tender Detail:** Constructing solid waste and waste water management at islapur tq. kinwat dist nanded 1st call #\*. constructing solid waste and waste water management at islapur tq. kinwat dist nanded 1st call

**Document Fees:** INR 4,300

**EMD:** INR 42,613

**Tender Estimated Cost:** INR 4,261,341

**Closing Date:** 11/11/2022

**Location:** Nanded – Maharashtra – India

### Contact Details:

Rdd–Ceo–Nanded||nanded–Rws at Islapur Tq. Kinwat

### Buyer/Seller:

**Rural Development Department**

**Ref. Number:** 53795831

**Tender Number:** 2022\_AHMED\_843139\_1

**Requirement:** Constructing solid waste and waste water management at kashti, taluka. shrigonda, dist.

**Tender Detail:** Constructing solid waste and waste water management at kashti, taluka. shrigonda, dist.ahmednagar #\*. constructing solid waste and waste water management at kashti, taluka. shrigonda, dist.ahmednagar

**Document Fees:** INR 5,600

**EMD:** INR 97,137

**Tender Estimated Cost:** INR 9,713,704

**Closing Date:** 07/11/2022

### Location:

Ahmednagar – Maharashtra – India

### Contact Details:

Rdd–Ceo–Ahmednagar||ahmednagar–Rws Ahmednagar

**Buyer/Seller:**  
**Rural Development Department**  
**Ref. Number:** 54255518  
**Tender Number:** 2022\_NANDE\_846819\_9  
**Requirement:** Constructing solid waste and waste water management at wadi tq. nanded dist nanded 1st call

**Tender Detail:** Constructing solid waste and waste water management at wadi tq. nanded dist nanded 1st call #\*. constructing solid waste and waste water management at wadi tq. nanded dist nanded 1st call

**Document Fees:** INR 9,700  
**EMD:** INR 96,182  
**Tender Estimated Cost:** INR 9,618,246  
**Closing Date:** 21/11/2022  
**Location:** Thane – Maharashtra – India

**Contact Details:** Rdd–Ceo–NandedInanded–Rws at Wadi Tq. Nanded

**Buyer/Seller:**  
**Rural Development Department**  
**Ref. Number:** 54201729  
**Tender Number:** 2022\_NANDE\_846819\_7  
**Requirement:** Constructing solid waste and waste water management at gokunda tq. kinwat dist 1st call

**Tender Detail:** Constructing solid waste and waste water management at gokunda tq. kinwat dist nanded 1st call #\*. constructing solid waste and waste water management at gokunda tq. kinwat dist nanded 1st call

**Document Fees:** INR 6,000  
**EMD:** INR 59,966  
**Tender Estimated Cost:** INR 5,996,562  
**Closing Date:** 21/11/2022  
**Location:** Nanded – Maharashtra – India

**Contact Details:** Rdd–Ceo–NandedInanded–Rws at Gokunda Tq. Kinwat

**Buyer/Seller:**  
**Rural Development Department**  
**Ref. Number:** 54210426  
**Tender Number:** 2022\_NANDE\_846819\_8  
**Requirement:** Constructing solid waste and waste water management at pethwadaj tq. kandhar dist nanded 1st call

**Tender Detail:** Constructing solid waste and waste water management at pethwadaj tq. kandhar dist nanded 1st call #\*. constructing solid waste and waste water management at pethwadaj tq. kandhar dist nanded 1st call

**Document Fees:** INR 5,700  
**EMD:** INR 56,068  
**Tender Estimated Cost:** INR 5,606,850  
**Closing Date:** 21/11/2022  
**Location:** Nanded – Maharashtra – India

**Contact Details:** Rdd–Ceo–NandedInanded–Rws at Pethwadaj Tq. Kandhar



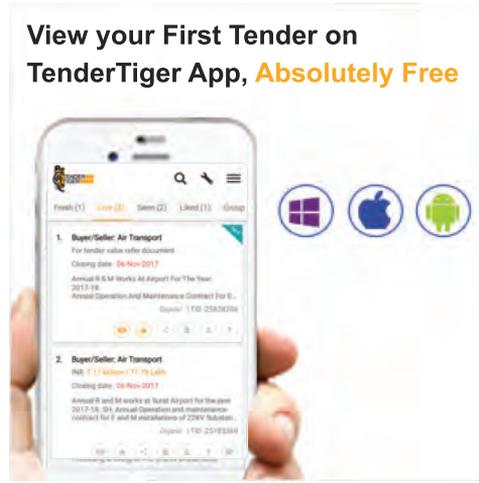
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# Indus Waterways

Water & Wastewater Solutions



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## SERVICES TO PROVIDED BY CONSULTANT

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- ▶ Preparation of sewer network showing GL/IL.
- ▶ Location type design of manholes, intermediate sump well/lift well.
- ▶ Calculation of sewage generation.
- ▶ Type of treatment of sewage.
- ▶ Specification of mechanical and electrical equipment of sewage network STP & ETP.
- ▶ Preparation of drawing.
- ▶ Preparation of bill of quantities, detailed estimates BOQ and estimate based on MES SSR – 2020 and market analysis for Non-SSR items for sewage network STP & ETP.

## FIELD OF EXPERTISE



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- Electro-mechanical utility services
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WATER DISTRIBUTION

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