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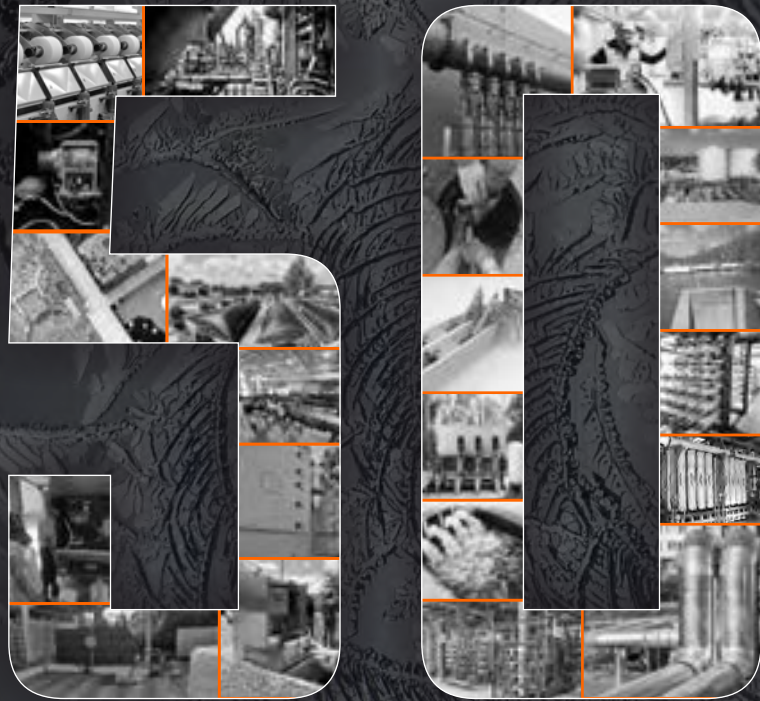
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SMART WATER & WASTE WORLD

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FINEST



GLOBAL CASE STUDIES ANNUAL DIGITAL EDITION



163-169

A SPIRITUAL JOURNEY OF KASHI'S RENAISSANCE: LAHARATARA LAKE REJUVENATION PROJECT

KEYWORDS: ECOLOGICAL RESTORATION, LAKE, MUNICIPAL PROJECT, WATER BODY



170-172

WASTEWATER FINE SCREENING TECHNOLOGY AS FRONT-LINE SAFEGUARD

KEYWORDS: MBR, SCREENING, WILDLIFE SANCTUARY, WWTP



173-177

AN EFFLUENT TREATMENT PLANT FOR COSMO SEAFOODS IN GHANA

KEYWORDS: EFFLUENT, ETP, FISH PROCESSING, FOOD INDUSTRY



178-180

ENABLING THRISSUR MUNICIPAL CORPORATION FOR WET (WATER EFFICIENT THRISSUR)

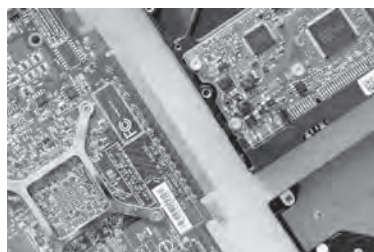
KEYWORDS: GIS, IoT, NRW, WATER LOSS, WATER SUPPLY



181-183

AS CITIES GROW, SO DOES THEIR WASTE - AND HIGHLY POTENT WATER LEACHATE

KEYWORDS: INDUSTRIAL PUMPS, LANDFILL, WATER LEACHATE



184-188

EVALUATION OF WATER RECYCLING OPTIONS AT A SEMICONDUCTOR FABRICATION PLANT USING PROCESS SIMULATION

KEYWORDS: INDUSTRIAL WASTEWATER, RECYCLING, SEMICONDUCTORS, SOFTWARE



189-193

WATER ON WHEELS

KEYWORDS: DRINKING WATER, IoT, WATER ATM



194-196

WATER AUTHORITY MONITORS ARSENIC AND CHROMIUM LEVELS WITH SMART WATER SOLUTIONS

KEYWORDS: DATA, WATER QUALITY, MONITORING, WATER TREATMENT



197-199

A NEW WATER PUMP STATION FOR CALGARY



KEYWORDS: DRINKING WATER SUPPLY, PUMP STATION, WTP



200-202

MAN NUREMBERG CLEANS INDUSTRIAL WASTEWATER 3 TIMES BETTER

KEYWORDS: INDUSTRIAL WASTEWATER, PROCESS WATER, VACUUM DISTILLATION

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“The finest steel has to go through the hottest fire.”
 - Richard M. Nixon



THE ANNUAL SMART WATER FINEST-50 CASE STUDY LIST

This gem of an issue - the Annual Digital Edition of Finest-50 Global Case Studies is in your hands.

This super-special edition celebrates the essentiality of case studies in the global water & wastewater market. It is a collector's issue for which we invited and then selected some of the best and leading case studies from across the globe.

Our editorial team has carefully chosen these Finest-50 Case Studies from an overwhelming 200+ entries - based on the overall quality of actual municipal/industrial plants and community projects. The scope of these case studies includes the problems arising in these plants and innovative solutions that were successfully implemented given the unique limitations of these plants or projects' environment and requirements.

These case studies give us an in-depth look at the practical application of the latest technologies being applied and products being used in a real-time environment. We hope you would like it as much as we enjoyed going through the entire process of selecting and preparing the final drafts of these pearls of wisdom.

I would like to personally thank the contributors of these case studies: Aditya Birla Group (Grasim Industries), Advanced Drainage Systems (ADS), Amalgam Engineering, Aquarius Spectrum, Aquatic Informatics, Banka BioLoo, Borouge, SM Chakrapani, CIPET, Vaidic Srijan LLP, CST Wastewater, Econo Services, Elmodis, Wrocław Sewage Treatment Facility, Polish Academy of Sciences, Esri India, EVOLVE, FloNergia, GKD, Gradient India, Grundfos, IDE Technologies, Intelligen, Ion Exchange India, JanaJal, KETOS, Kishor Pumps, KSB, Lakeside Equipment Corp, Landia A/S, LiquidSky, Mazzei Injector Co., Mueller Water Products, Nixie Engineers, Ovarro, Pani Energy, Pumpenfabrik Wangen, Qatium, Rochem, Roserve, Satish Chilekar, Satsense Solutions, SPML Infra, StormHarvester, TaKaDu, Tata Consulting Engineers (TCE), Toshiba Water Solutions (TWS), Dr. V.K. Seth, VAPAR, Watson-Marlow Fluid Technology Group (WMFTG), Wetlands International, and World of Water (WOW AF).

The prominent application segments which these case studies cover are Water Utilities, Urban Local Bodies (ULBs), Water Supply & Sewage Network Authorities, Desalination Authorities, Municipal Drinking Water Projects & Wastewater Treatment Plants; and various End-User Industries (Dyeing, Power Plants, Hospitals, Hotels & Resorts, Chemicals, Steel Mills, Wildlife Sanctuary, Fish Processing, Food & Beverages, Aquaculture, Textiles, Semiconductors, Automotive, Transportation Hub, Townships, and Treatment Plants for Industrial Clusters and Port Areas).

On this momentous occasion, I would like to reiterate the vision of this magazine for our readers. We promise that the editorial policy of SWWW will always be guided by the high standards of content quality and integrity, professional responsibility, industry awareness, and staying neutral to all stakeholders that constitute the global water sector. SWWW would be at the forefront to consistently highlight the issues crucial for the water industry. To become the most trusted source of information and help you make informed buying decisions, we will come up with the right blend of project news, products, market trends, and analysis. We will address a wide range of issues in diverse disciplines of water & wastewater from across the globe.

The theme of our next magazine issue (May-June 2022) is – “Innovations in Industrial Water & Waste Market”. Please keep sharing your editorial contributions (articles, case studies, and stories) with me.

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ECOLOGICAL
RESTORATION,
LAKE, MUNICIPAL
PROJECT, WATER
BODY

A SPIRITUAL JOURNEY OF KASHI'S RENAISSANCE: LAHARATARA LAKE REJUVENATION PROJECT

By Madhukar Swayambhu

Laharatarā – as the name suggests, “Lahar” means “waves” and “Tara” means “attained salvation”, the name itself explains the significance of the lake, where the saint, the poet, the epitome of religious harmony, the institution of spiritual correction – Sant Kabir was found, floating on a lotus flower as a newborn infant to Neeru and Neema, the couple who adopted him as foster parents.

After Kabir, his followers formed the Kabir Panth, to follow the principles and teachings of the great teacher and master, and the global headquarters of this sect is situated at the same age-old water body, which is believed to be the lake of appearance of Kabir. This is Laharatarā lake, the global headquarters of Ancient Kabir Math.

Unfortunately, like Kabir’s philosophy

of universal brotherhood, today even his lake of appearance was also in great peril due to Gross encroachments, massive urbanization, and excessive sewage dumping. Therefore, NOC Foundation along with NOC & Research took upon this seemingly impossible task for reviving and reinstating the lost glory of the water body as the start point of their campaign for “Resurgence of Kashi” with a program called “REWAMP - Reviving & Reinstating Waterbodies of Archeological Importance”. The idea was to resurrect, restore and rejuvenate the native ecology of this historic and spiritual lake of appearance of the Messiah, the legend, the Indian mystic poet and saint called Kabir.

THE SKEPTICISM

The Project team of NOC Foundation

along with NOC & Research contemplated with many prevailing technologies of the conventional approaches like physical cleaning with de-weeding, decantation, dredging, and refilling the water, but that had already been done many times in the past and the lake used to return back to its decaying process.

They explored many chemical treatments as well, but NOC & Research being dedicated to the environmental restoration domain, understood the overall negative environmental impact of the chemical treatments, thus left the ideas.

Then came the latest buzz words like bio-remediation, phytoremediation, floating islands, constructed wetland approach, decentralized wastewater treatment (DEWATS) techniques, nano-bubble technology, and so on. They did research on



Figure 1.1: Sludge Deposit can be Seen on the Surface

all these approaches but nothing seemed to be proving sustainable and ecologically viable, since all of them happened to be anthropogenic interventions to the limnology.

They wanted something that was ecological, nature-based, non-invasive as well as sustainable and, thus the research went on and on, searching for the most apt and suitable approach. Like always, a herculean task always receives its share of public wrath and skepticism.

There was a lot of dissuasion and caution warnings given by all the well-wishers around, but the determination of the core team of NOC Foundation, Delhi and NOC & Research, Kashi lead them to reach Vaidic Srijan LLP – the organization that invented the Cownomics™ Technology, based on Vaidic Science for “resurrection of native

ecology for wetlands/ water bodies”.

They studied this new emerging indigenous technology and their success stories across the country, interacted with the Vaidic Srijan team, took presentations, has brainstorming sessions, invited them for site survey, discussed the possibilities, and evaluated them from all angles for over two quarters. But then finally both the teams of NOC Foundation along with NOC & Research decided to go ahead with Cownomics™ technology.

THE PRE-TREATMENT CONDITIONS

A physical site survey was conducted jointly by teams of NOC Foundation, NOC & Research, and Vaidic Srijan before the launch of the project, wherein there was a lot of interaction done with

THE LAUNCH

On 18th November 2021, at the Old Kabir Math, Lahartara, Kashi, the inaugural symposium for the launch of the city-wide project on building water awareness and abundance in the city of Varanasi was organized. The project was divided in two parts called PAWS and REWAMP, wherein PAWS was “Public Awareness on Water through Symposiums”, and REWAMP stood for “Reviving and Reinstating Waterbodies of Archeological Importance”.

The organizers of the event were – NOC Foundation, Delhi and NOC & Research, Kashi, while the strategic alliance partners included - UP Pollution Control Board (UPPCB) - for laboratory testing parameters for pollution abatement, Environment Department, Banaras Hindu University (BHU) was an academic partner for carbon sequestration study, Vaidic Srijan LLP Delhi was the technology partner for Cownomics™ technology for the resurrection of native ecology of wetlands and water bodies, Central Ground Water Board (CGWB) was the groundwater impact study partner, Archaeological Survey of India, Uttar Pradesh division was an archaeology and heritage restoration partner since the Lahartara lake was under their jurisdiction, Centre for Ganga River Basin Management & Studies (cGanga) was our study partner for an impact assessment on in-situ rejuvenation, and Central Mine Planning & Design Institute (CMPDI) Ranchi was our strategic alliance partner for hydro-geological impact assessment.

The inaugural session was chaired by **Dr. Ram Boojh (CEO Mobius foundation, Stalwart Environmental Scientist and Ex-representative of India to UNESCO for over a decade)**, and our **Hon'ble Chief Guest was Gopal Arya, Sanyojak – Paryaavarana Sanrakshan Gatividhi, (Rashtriya Swayam Sewak Sangh)**, whereas **Dr. Tapan Chakravarty (Veteran Geologist)** was our special guest and **Padm Shri Anuradha Paudwal, the famous Bollywood playback singer and environmental enthusiast was the celebrity guest, who did the inaugural dosing treatment on 19th November 2021.**

Both the events (18th symposium & 19th inaugural dosing treatment) were widely covered by media, in spite of many other programs going on in the city. And a huge population of the vicinity of Lahartara and Madwadih, were quite hopeful of some positive changes in the lake, primarily because they were suffering the most. In spite of so many attempts in past, and even the ongoing beautification attempts from Varanasi Development Authority, the problem in the vicinity were intact - like the massive foul smell in the vicinity, and the enormous mosquito population in neighborhood.

local communities, administration, political leaders, industries, and other social associations. Data was captured from the site and a detailed study was

conducted. Following were some of the key observations of the site:

- Varanasi Development Authority was

getting beautification work done at the lake, by getting the stair and ghat made. Their contractor was also getting the hyacinths removed physically.



Figure 1.2: Black Water is Observed in the Water Body



Figure 1.3: De-weeding Being Done by the VDA Contractor for Hyacinth Removal

- Interacting with the contractor's representative, our team came to know that they had pumped out water too for their construction work.
- Massive sludge deposition was spotted.
- Water was black in color.

- Foul smell was observed, possibly due to the ongoing de-weeding and decantation work.
- Weeds: Hyacinth, Azolla (duckweeds) were observed.
- Insects: Aquatic insects were spotted

in the lake. Additionally, a lot of dragonflies were seen hovering over the lake, which means there was substantial feed for them too.

- Mosquitoes: There was a massive population of mosquitoes.
- Sewage: Domestic sewage was coming into the lake from both ends.

THE TREATMENT METHODOLOGY

As the satellite imagery shows in Figure 2, the present leftover remains of the lake is spread over 13.62 acres of area and is all surrounded by a dense population. The encroachment plan is executed to the extent that this remaining part of the lake has already been dissected at four places with the placement of walls in between the water.

And the rejuvenation is supposed to happen in situ conditions. Therefore, the treatment started with 10,000 liters of fresh water from the old Kabir math campus, being poured in the first open segment of five acres, as shown in Figure 2.



Figure 1.4: Azolla, FOG Layer, and Insects, etc can be Spotted in This Image



Figure 3 depicts the exact structure installed at the old Kabir Math, through which the regular dosing treatment is being done on a daily basis, since the inception of

the project in November 2021.

Vaidic Srijan team did the detailed site survey and their research team prepared the medicine, which they call the

“Cownomics™ Concentrate”, which is a liquid medicine made up of 100% botanical extracts.

This concentrate is amalgamated with



Figure 2: Complete Satellite View of Lahar Tara Lake

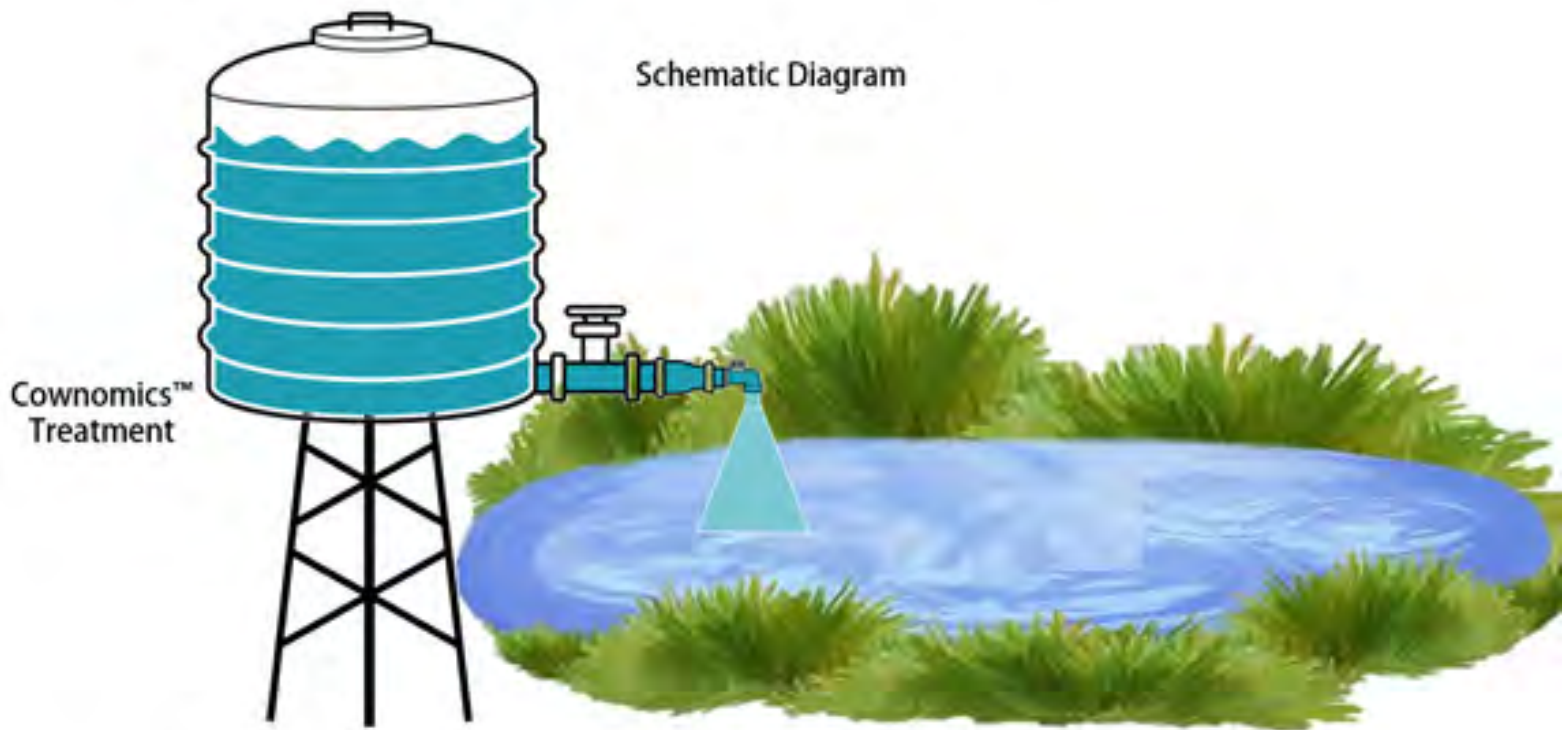


Figure 3: Basic Schematic Diagram for the Rejuvenation Treatment

fresh drinkable water from the same agro-climatic zone as the water body. This homogenous mix of concentrate diluted in fresh water is poured into the water body at the time of sunrise. In presence of sunlight, the medicine gets synthesized in the aqua-

ecology and the resurrection of limnology starts to happen. This is the treatment dosing process.

Dosing treatment is done every day for the first quarter (3 months, the resurrection phase). The testing for water,

sludge, and air quality monitoring is to be done on a regular basis throughout the project tenure of 12 months, by UPPCB regional office at Varanasi. IIT-BHU shall be conducting the study, after completion of the first quarter, for the amount of carbon



Present Day Rejuvenated Lake

being sequestered by the lake.

Every month the reports given by UPPCB shall be compared to arrive at the efficacy of the treatment.

THE RESULTS

Although the results started showing immediately after the treatment started, the major communication and press release was done for the first time on 18th December 2021, i.e., exactly one month after the launch of the program.

While that was for the complete media community in a holistic and channelized manner, our team's interaction with the local community on a day-to-day basis, in itself, was very gratifying.

Within the first week of the treatment itself, the following was experienced by the community around the lake:

- **Foul Smell Eradication:** Was observable from the third day of dosing.
- **Improvement in Water Viscosity:** The first waves were spotted in about 4-5 days.
- **Increased Transparency:** The water was able to show the bottom by end of

the week itself.

- **Mosquito Colonies Abolishment:** By the end of the second week, the mosquito population was substantially reduced.
- By third week, a remarkable improvement in aquatic life was, clearly evident.
- By approximately the 20th day of treatment, flocks of birds returned to the lake.
- In between (around the 15th ~ 20th day) there was a sudden influx of dragonflies around the lake, after which the mosquito population was observably negligible.
- The Water level started receding every day from the first week itself, and by end of the month, it was down almost by 2 feet.

The second event for monitoring the progress of the Laharatar lake rejuvenation project was held in Old Kabir Math, Laharatar on 18th December 2021.

The event was under the chairmanship of **Mr. Anupam, Regional Organizational Minister, Bhartiya Majdoor Sangh (UP,**

Uttaranchal, Delhi, and Nepal). The test reports for pre-treatment and post-treatment, measured and monitored by UP Pollution Control Board, Regional Office, Varanasi were made public during the meeting and the sea change difference in the water quality was reflected in the report. With over 100% improvement in the dissolved oxygen level, the lake water for the first time in recorded history exceeded the levels of river Ganga. A 90% drop in fecal Coliform denotes the improvement in sanitation.

About the Author

Madhukar Swayambhu is a TED speaker, awarded by Jal Shakti Mantralaya as Water Hero, having published many articles in various water and environment magazines and given many lectures in national and international institutes including IIPA, NIFTEM, FSM, NEERI, ADRI, etc. He, along with his colleagues in **Vaidic Srijan LLP** have developed an indigenous technology, based on Vaidic Sciences which they call **Cownomics® Technology** for the resurrection of native ecology of wetlands and water bodies.



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