



Bioremediation of Radhe Shyam Kund, Mathura through Innovative Phyco Remediation Technology

I. Basic information

a. Name of the project/program	Quick Bioremediation of Radhe Shyam Kund, Mathura through Innovative Phyco Remediation Technology
b. Name of the organization executing the project	JS Water Energy Life Co. Pvt. Ltd.
c. Address: Street, P.O. Box, City/Town, State, PIN	143, Udyog Vihar Phase 4, Gurgaon, Haryana - 122015
a. Contact person (Name and surname)	Mr. Sunil Nanda
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c. E-mail	sunil.nanda@js-wel.com

II. Geographical area covered by the case study

Please indicate the geographical area where the CASE STUDY has been applied or has taken place:

State(s)	Uttar Pradesh
Location (City/Town/Village)	Govardhan, Mathura.
Community	Local Community.
Basin/sub basin	N/A
Other (please specify)	27° 32' 0" North, 77° 29' 0" East

Physical Attributes of Radhe–Shyam Kund	Radha Kund	Shyam Kund
Area	1.3 acres	1.6 acres
Average depth	10 m	10 m
Maximum Depth	20 m	20 m
Volume of Water	52 Million Liters	64 Million Liters



III. Scope of the project/program

- Improvement of Water Quality.
- Conservation of Natural Resources and protection of Environment.
- Increase in community understanding of the existing water situation, (causes and related challenges).
- Improvement of Health Conditions.
- Integrated Water Resources Management.

IV. Brief summary of the project/program

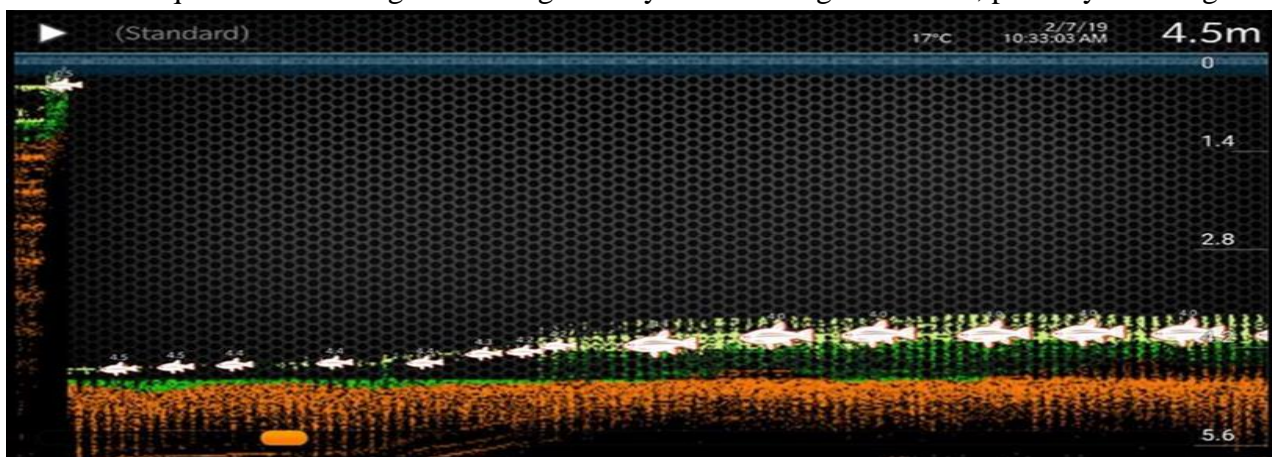
a. Project Objectives

Improve and sustain “Water Quality” to a very high level so that it is safe to bathe and carry out “*Aachman”.

- Bio Dredge the accumulated sludge at the bottom.
- Rejuvenation of Aquatic Life.
- Elimination of foul smell and mosquito larvae.
- Reducing Fecal Coliform to less than 500 MPN/100 ml.
- Decreasing BOD to less than 10mg/l and COD to 50 mg/l.
- Increasing DO to 5 mg/l and greater.

b. Project Impacts

- Algal mats seen on water surface of Kunds previously have been eliminated.
- Frothing and foaming of water surface seen previously has been eliminated.
- Dissolved Oxygen levels have improved from 0.5mg/l to above 5mg/l, an increase of 900 percent.
- Water Clarity has improved from 5cm to 40cm. 3-4 steps can now be seen in the water.
- No foul smell in water.
- No mosquitos or mosquito larvae seen on water surface.
- Sludge at the bottom reducing gradually.
- Water becoming fit for Bathing and “Aachman”
- Aquatic life thriving. Fish being seen by Sonar in larger numbers, possibly breeding.



Deeper Sonar Image showing the number of fishes, vegetation, bottom contour & hardness of Radha Kund

V. Project/program narrative:

a. Situation before the initiative began.

It was observed that the Kund was inundated with general waste. There were floating algal mats. Dead fishes and turtles were also present. The waste was putrefying and a strong foul smell emanated from the drain. Mosquitoes were breeding in the water and there was froth and foaming. People were finding it difficult to do 'Aachman'.



b. Priorities.

- Make water fit for 'Aachman' or bathing.
- Optimize parameters like Biological Oxygen Demand, Chemical Oxygen Demand, pH, Total Dissolved Solids and Dissolved Oxygen.
- Spread awareness regarding environmental protection among the local community and visiting pilgrims.
- Rejuvenate Aquatic Life and reduce foul order and mosquitos.

c. Target.

Since Radhe-Shyam Kund is a place of Spiritual importance, the number of visitors per day is 5000 to 10,000 and during festive occasions, the number goes up to 100000. These pilgrims throw flowers, milk etc. into the Kund which in turn pollutes the Kund and interferes with the smooth running of the Bio Remediation Project.

d. Strategies.

- Preoperational Works:
 - Manual removal of Solid Waste.
 - Installation of Bio fence to reduce Water Turbidity.
- Dosing of Phyco Nutrients:

Aquaritin (Phyco-nutrient) was dosed along with bacteria at all the dosing stations. Spray Pumps and manual labour were used for this purpose.



Installation of Bio-fence



Dosing at Radha-Shyam Kund

e. Mobilisation of resources.

With the funding from Mathura Vrindavan Development Authority, JS Water Energy Life Co Pvt Ltd has been successfully implementing the Quick Bioremediation Project at Radha-Shyam Kund. Bio-fences using Moringa seeds and Nano nutrient product ‘Aquaritin’ are self-manufactured by the company. Bactacult, a supplementary microbial product is purchased from another company called Amalgam Engineering. Two labourers are employed by JS WEL for dosing purposes and two JS WEL employees act as on site supervisors for the project.

f. Implementation.

Since Radha-Shyam Kund is a place of spiritual importance, the number of visitors per day is 5000 to 10,000 and during festive occasions, the number goes up to 100000. These pilgrims throw flowers, milk etc. into the Kund which in turn pollutes the Kund and interferes with the smooth running of the Bio Remediation Project.

g. Results achieved.

- A striking improvement in the water quality has been observed .The DO level of the kunds which were just 0.7mg/l and 1.0 mg/l at Shyam Kund and Radha Kund respectively has now increased to 6 mg/l. pH, BOD, COD and other characteristics are slowly reaching the optimum. Foul odour, Mosquito larvae have decreased and the fish population is flourishing.
- Visually, the kunds show good water clarity and are aesthetically pleasing. This project, in addition to cleaning up the river has also helped in spreading awareness regarding environmental protection among the inquisitive tourists visiting the place.
- The devotees are enjoying their engagement with the water. They are seen doing “Aachman” taking up the water from the Kunds without any hesitation. Previous hesitation of the pilgrims on fitness of water for bathing is also gone. The number of pilgrims has seen a large increase by as much as three times. Foreign tourists are also seen visiting the Kund in large numbers.





Comparison of Water Quality Parameters in Radha Kund – Before and After Treatment:

S.no	Parameters	Preferential Output as per CPCB	Pre-treatment Results	1 st Month Post treatment Results	2 nd Month Post Treatment Results	% change achieved
1	BOD (mg/l)	<=30 mg/l	27.9	25.2	4.9	82.43%
2	COD (mg/l)	<=100mg/l	114.0	100.67	19.4	82.98%
3	TSS (mg/l)	<=100mg/l	780	78	46	94.1%
4	FC (MPN/100ML)	Absent	1240	890	360	70.96%
5	pH	6.5 – 8.9	7.85	7.2	7.8	0.63%
6	DO		0.6	2.9	5.0	733.33%

Comparison of Water Quality Parameters in Shyam Kund – Before and After Treatment:

S.no	Parameters	Preferential Output as per CPCB	Pre-treatment Results	1 st Month Post treatment Results	2 nd Month Post Treatment Results	% change achieved
1	BOD (mg/l)	<=30 mg/l	69	23.2	4.8	93.04%
2	COD (mg/l)	<=100mg/l	122.0	92.92	19.2	89.78%
3	TSS (mg/l)	<=100mg/l	810	70	18	93.28%
4	FC (MPN/100ML)	Absent	1290	845	290	93.02%
5	pH	6.5 – 8.9	7.9	7.27	7.49	5.18%
6	DO		0.5	2.8	5.1	920%

h. Lessons learnt

Periodic treatment is necessary to keep the Kund in optimum conditions. We also learnt the extent of the effect of climatic conditions on the working of our products. In addition to this, we realized the importance of community participation in the success of any project.

i. Replicability.

Using the same technology, the project can be replicated in any water body. Currently, similar large scale projects are being successfully handled by the company in several areas across the world.

j. Scalability

There is scope for scalability of this project in other areas having similar water bodies.