NICO NANOBUBBLE INDIA CO.

Case Study

Application of Nanobubble Technology for Sustainable Rejuvenation of a Temple Water Body

Overview

Temple ponds in India hold significant cultural, religious, and ecological importance. The Krishna Matha Pushkarani, associated with the historic Sri Krishna Matha in Udupi, had experienced progressive deterioration in water quality due to the accumulation of organic matter, algal proliferation, reduced dissolved oxygen levels, and microbial contamination.

These conditions resulted in degraded water quality, foul odor, elevated organic load, and loss of ecological balance. A sustainable and non-invasive intervention was therefore required to restore the water body while preserving its cultural and environmental significance.

Project Details

- **Location:** Krishna Matha Pushkarani, Udupi, Karnataka
- **Application:** Temple Pond Rejuvenation
- **Technology:** NICO Nanobubble-Based Aeration System

Before installation

Pre-Installation Challenges

Prior to the deployment of nanobubble technology, the Krishna Matha Pushkarani exhibited several challenges typical of heritage temple water bodies:

- Accumulation of floating oil and organic debris, originating from ritual activities and surface runoff
- Excessive algal growth (algal blooms) due to nutrient enrichment and stagnant conditions
- Low dissolved oxygen levels, leading to anaerobic zones and poor aquatic health
- Elevated organic load (BOD and COD) caused by continuous organic matter deposition
- Presence of microbial contamination (E-Coli and pathogens) affecting water safety
- Foul odor and visual degradation, impacting the sanctity and usability of the pond
- Limited natural circulation and mixing, resulting in localized stagnation zones

Technology Implementation

NICO deployed an advanced nanobubble-based aeration and oxidation system, comprising:

- **Nanobubble Generator**
- **Oxygen Concentrator**
- **Ozone Generator**

The system generates ultra-fine gas bubbles (<200 nm), which remain suspended in water for extended durations, enabling enhanced gas transfer, in-situ oxidation, and uniform treatment across the entire water body.

After installation

Performance Outcomes

Parameter	Unit	Before Implementation	After Implementation
Dissolved Oxygen (DO)	mg/L	5	15
Biological Oxygen Demand (BOD)	mg/L	25	< 5
Chemical Oxygen Demand (COD)	mg/L	150	< 50
E. coli	MPN/100 mL	100	Absent

Impact Analysis

The implementation of NICO's nanobubble technology resulted in significant improvements across physical, chemical, and biological parameters of the pond ecosystem.

- **Enhanced Dissolved Oxygen Levels:** Uniform oxygenation across the water column eliminated anaerobic zones and improved overall aquatic health.
- **Reduction in Organic Load:** Substantial decrease in BOD and COD levels, indicating effective degradation of accumulated organic matter.
- **Algae and Odor Control:** Suppression of algal blooms and elimination of foul odor through improved oxygenation and oxidative mechanisms.
- **Microbial Reduction:** Significant reduction in pathogenic contamination, including E-Coli, enhancing water safety.
- Improved Water Clarity and Aesthetics: Visible transformation to clearer water, restoring the visual and cultural appeal of the pond.
- **Ecological Restoration:** Promotion of beneficial microbial activity and stabilization of the aquatic ecosystem.
- **Chemical-Free Operation:** Achieved water quality improvement without the use of external chemicals or additives.
- **Sustainable and Energy-Efficient Process:** Low energy consumption with modular deployment suitable for heritag and sensitive environments.

Conclusion

The deployment of NICO's nanobubble technology at Krishna Matha Pushkarani demonstrates its effectiveness as a sustainable and non-invasive solution for restoring degraded water bodies. The system successfully enhanced water quality, controlled biological and chemical contaminants, and restored ecological balance without the use of chemicals.

This case study highlights the strong potential of nanobubble technology for scalable application in the rejuvenation of temple ponds, lakes, and other sensitive water systems across India.