PROJECT SYNOPSIS

PROJECT PROPOSAL REFERENCE NUMBER: 42S_BE_0998

TITLE OF THE PROJECT: WATER CHARACTERIZATION AND SEDIMENT ANALYSIS OF KALKERE LAKE, BENGALURU

NAME OF THE COLLEGE & DEPARTMENT: DAYANANDA SAGAR COLLEGE OF ENGINEERING, DEPARTMENT OF CIVIL ENGINEERING

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NAME OF THE GUIDE: Mrs. JYOTHI C NAGAVI, Asst. Professor

KEY WORDS: Water Quality Assessment, Water Quality Index, Water Sampling, Sediment Sampling, Anaerobic Digestion, Water Quality Contour.

INTRODUCTION:

Water is one of the major factors for sustenance of life on earth. The quality of lake waters is getting degraded every day in Bengaluru which was once “The City of Lakes”. Rapid industrialization, urbanization and several non-point sources are releasing pollutant load on lakes. Environmental issues like fish death and frothing in lakes are evident and everyday events. Evaluating the quality of lake water in such cities is of greater importance. WQI gives the range of contamination of the water body. We have taken up the case of Kalkere Lake located on north-eastern part of Bengaluru. Our study intends to build water quality index for Kalkere Lake which was earlier a water source for people living in and around lake.

Rejuvenation of the lake has been done in the recent past by BBMP by removing weeds and desilting of lake bed. As part of rejuvenation BBMP has put fencing all around the lake in order to avoid the illegal dumping of garbage into the lake. Also the capacity of the sewers have been increased to avoid overflow of the sewage. BBMP also has proposed a wetland construction for the lake. Desilting has been done to increase the capacity of the lake and to remove the inorganic matter that was accumulated due to the release of sewage water into the lake.

A sewage treatment plant has been constructed in order to avoid direct disposal of sewage into lake water. The sewage from the surrounding areas has been diverted to STP and treated
before disposal. BBMP has conducted awareness programs in order to bring awareness in public keeping lake surroundings clean. Also as part of rejuvenation jogging track, boating, children’s park and development of small island has also been proposed.

**OBJECTIVES:**

Systematic study of the physical and chemical constituents of water in Kalkere Lake at Bangalore city were undertaken during the study period between January and April 2019 with following objectives:

1. To assess the water quality at different locations within Kalkere lake.
2. To assess the soil/sediment sample from lake-bed for presence of methane production.
3. To identify the cause for the frothing of the lake.
4. To develop water pollution contour maps for the lake.
5. To develop water quality index for the lake body.

**METHODOLOGY:**

Water samples were collected in light weighed chemically inert unbreakable Plastic bottles of 2 liters after rinsing the bottles with the water being sampled and the sample is securely corked and then transferred to Dayananda Sagar College of Engineering, Civil Department laboratory for analysis and were analyzed for various water quality parameters such as Total hardness, pH, Chlorides, Dissolved Oxygen, Total Dissolved Solids, Electrical Conductivity, Biochemical Oxygen Demand, Alkalinity, Acidity, Fluorides, Nitrate, and Sulphate.

**Water sampling locations:**

S1- Lake sample near culvert
S2- Lake sample near temple
S3- Near outlet
S4- Near STP disposal
S5- Near exit wing
S6- Lake sample at the center
S7- Bore water sample near lake.

**Sediment sampling location:**
Water Analysis: The water samples collected have been analyzed for above mentioned parameters according to BIS guidelines.

Sediment analysis: Grab samples of lake sediment were collected using a bucket container. Sampling of sediments was done in two phases, one in the month of March and another in the month of April. Three samples of sediments were collected from three different locations of lakebed and an integrated sample was prepared in each phase. Anaerobic digestion was carried out in two phases giving a residence time of 15 days in each phase. It was observed that the digestion of sediment under anaerobic conditions released no contaminant gases.

CONCLUSION:

- From the analysis of the water samples obtained it was found that pH, Electrical conductivity, TDS, Alkalinity, Nitrates, Sulphates and Turbidity are above the standard limits for drinking limits. (IS 10500: 2012)
- The acidity levels in the samples analyzed are low and Alkalinity levels are higher.
- Dissolved oxygen levels in the lake were at minimum level of 4 mg/l.
- From the water quality contour maps it is clear that ground water surrounding the lake is not affected by the pollution in the lake body.
- The analysis of various water samples of lake revealed that the lake water is not suitable for drinking or any other domestic use but can be used for agricultural purpose under restricted conditions.
- From the calculations it is seen that the Water Quality Index value is 131.73 and the water quality is “very poor”.

S1 – Near Culvert
S2 - Near outlet
S3 – Near exit wing
• The single stage anaerobic digestion of sediment from the lake bed didn’t show any methane production.
• The water quality parameters analyzed are in the limits for the aquatic life as per CPCB guidelines. The reason for fish death could be decreased DO levels due to sewage overflow during monsoon season.
• Higher levels of alkalinity in the lake could be the reason for frothing during monsoon season.

SCOPE FOR FUTURE WORK:

Water characterization and sediment analysis to be carried out in the monsoon season as the incidents of fish death and frothing have happened in Kalkere Lake during monsoon season.