

The Study of Water Parameter of khandarani Lake and Ketki Lake, Belpahari, Jhargram, West Bengal India

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ABSTRACT

Water is essential to life as we know it, villages have long used lake water as a source of drinking water since ancient times. The current study evaluates the lake water quality in khandarani lake, West Bengal. The quality of water body is identified by its physico-chemical properties. The current study examined and graphically depicted Physiochemical properties and climatic change. The range for parameters that were obtained was as follows; water temperature: 30-20 degrees Celsius; soil pH: 5.7-6.6; dissolve CO₂: 6-11 mg/L; dissolve O₂: 10-15 mg/L. Physiochemical parameters exhibit fluctuations during the monsoon season. As a result, in order to eradicate water pollution, water bodies require greater conservation in terms of quality control.

INTRODUCTION

Since we all know that smaller things have greater significance in our lives, it is inaccurate to characterize small bodies of water as trivial and insignificant. Still, it is evident that small aquatic ecosystems are disregarded in almost all internationally significant perspectives and activities, including carbon processing and transportation, and are viewed as unrelated to global issues. The biosphere and the worldwide network of metabolically active sites are inherently accompanied by small bodies of water (Downing *et al.*, 2009). These small aquatic habitats exhibit abnormally high levels of activity for many biological processes and cycles. Knowledge of the nutrient pattern in pond water bodies, as well as additional issues like metal distributions, fluxes, and conversions of significant gases (like N₂O and NH_x), enhances knowledge of the roles that small bodies of water perform in world economy with regard to nutrient, gas, and toxin levels. Because of this changing aspect, which is distinctive to pond limnology, knowledge of their operation, succession, and origins is essential. Lake has significant environmental and spatial significance despite being modest wetland habitats. At the landscape level, lakes are a vital freshwater habitat that contributes significantly to biodiversity preservation. But they are also susceptible to deterioration (Keeble *et al.*). Ponds can have significant positive effects on nature, pollution reduction, flood prevention, and global warming mitigation with careful planning. On a small scale, they are incredibly inexpensive and simple to create, maintain, and safeguard. Additionally, the environment of the pond has a direct relationship with the local population. Lakes have become a more endangered form of freshwater environment, preserving cultural and economic benefits (EPCN 2008). In addition to providing water for enjoyment, agriculture, and cattle watering, effective management of pond water can also, restore the aquifer, collect high rainfall events, and lessen the effects of warming temperatures. Inorganic elements of water bodies include the supply of energy required to sustain any living thing, the physical elements (rain, temperature, and weather) that affect it, and the availability of molecules (carbon, oxygen, etc.) needed for its survival. In order to clarify the current situation of ponds in India, we have attempted to gather the disparate findings on lakes parameters can be used in various ways in local villageagers of Belpahari, West Bengal. The purpose of this study is to determine the parameters of the ponds in Belpahari, West Bengal during the monsoon season.

REVIEW OF LITERATURE

Lake water quality evaluation of the impacts of aeration wetdetertion in lake water Florida (south west area) - (July 2023 Tim J. Denison 1, Michael L. Lohrl, David W. Ceilley 2 and Edwin M. Evernham III2)

Ventilated and non- ventilated wet retention ponds of different depths were used in this study to evaluate oxygen concentrations and other quality of water data. Out of a number of wet detention pond at Bonita Springs, Florida's The Brooks home complex, four ponds were chosen. With transportable multi-parameters, submerged data of lake water, and conventional sampling methods for laboratory examination, a range of information on water quality was gathered from the ponds in autumn of 2004.

Water quality parameters assessment of Ras El-Ain natural ponds, Tyr, Lebanon. (2023, Milad K, M. Daoud, Araiwo Wahib, Mari. Saba and H. Mortada)

The primary factor influencing human wellness, vegetation, and wildlife is the quality of water. However, exposure to either ecological (like soil erosion and change in the climate) or artificial (like unregulated waste from industry and sewage discharges) elements and actions frequently results in changes to the quality of water (Barbieri *et al.* 2021). The amount as well as quality of lake surface water, groundwater will vary the result all these factors. Changes in the amount and quality of lake surface water (snow, surface waters, and groundwater) provide essential data for assessing regional resource shortages (Andrew *et al.* 2017). These findings suggest that in order to ensure exceptional water quality, a analysis of the chemical factor primarily different ions, minerals for each of the two impacted areas is necessary.

To lessen some of the pollutants in the freshwater ponds, it is also suggested that an in-depth Investigation be carried out that links each trait and pollutant to its origin. The administration of Lebanon's water resources are impacted by the study. To improve the quality of the water, the authors suggest treating sewage at the source. It is recommended that locals become more knowledgeable and aware of water pollution. It is also necessary to establish surveillance systems and implement purification devices. Additionally, overuse of more fertilizer would be prevented, and land area of filled building should be located far from the lake water sources.

Lake water quality parameters of coastal mariculture pond water multispectral uav based. (2023, Yumeng Zhang, Wenlong Jing, Yingbin Deng, Wenneng Zhou)

1) The findings of the developed model demonstrated the obtaining model of SS, NO₃, chl-b were more accurate than those for other factors. 2) The best forecasting framework was developed by applying the testing data, which produced a coefficient of 0.92. observed a expected values and an overall 4.66 mg L⁻². In contrast the other models, which have corrosion coefficients of 0.87, 0.86, and 0.81, respectively, the findings of validation show that corrosion coefficients is chl-b, and NO₃ are more than 0.9. This study offers a guide for satellite-based assessment of water quality in rainy and overcast regions for fish farming. In 2020, the aquaculture and fishing sectors combined to produce 215 million tons worldwide, comprising 36 million of algae and 178 million of aquatic organisms.

Multivariate analysis to assess the physico-chemical parameters and phytoplankton blooms in a eutrophic pond. (2023, Raju Potharaju and M. Aruna)

Between March 2022 and February 2023, the water biochemistry of an annual mud pond and the characteristics of phytoplankton generation in a chosen pond were examined. The present study concentrated on the physical, chemical factors like, transparency, pH, dissolved oxygen (DO), biochemical oxygen demand (BOD), ammonia, dissolved iron, and chlorophyll a—that influence the expansion of phytoplankton in the pond.

The biomass of phytoplankton was calculated using chlorophyll a. The pond hosted submerged Phytoplankton growth of *C. vulgaris*, *dinoflagellates.*, *L. globulus*, and *cyanobacteria*. Surface layer of cyanobacteria and *L. globulus* were also observed in March 2023. A major component assessment was conducted. The new study uncovered finding disclosed the degree of environmental impurity. The experiment's lake water that led growth of Cyanobacteria.

Nitrogen is released as ammonia when leaf litter decomposes organically. It was shown that the presence of iron that dissolved increased the dominance of *Cyanobacteria and Lepocinclisglobulus*. It was found that biological decay and natural eutrophication were the main causes of the pond's algae bloom generation. Preserve these important regional sources of fresh water.

STUDY AREA

- 1) **Khandari Lake (KI)** (also known as Khandarani Dam) is located near Belpahari in the Jhargram District of West Bengal, India. It is approximately at 22.67 N, 86.71 E. The total area of the lake is approximately 6 acres and the average depth is 2-4 m.
- 2) **Ketki Lake (KII)** is a tourist destination of jangalmahal circuit in West Bengal, India. It is situated in the tropical, hilly forestlands of Jhargram district. It comprises 9000 hectares of hardwood forest. It is approximately at 23.68 N, 89.72 E. The total area of the lake is approximately 4 acres and the average depth 2-3m.

MATERIALS METHODS AND COLLECTION OF LAKE WATER SAMPLES

Two Lake Water samples were collected fortnightly in a 600ml. Glass stopper sterilized bottle at a depth of 5 cm. from March 2023 to February 2024 from two selected sampling sites for analyzing different physico-chemical parameters of water. Preservation of water samples were done at 5 C temperatures.

Water: water sample was collected from Khandarani Lake S 15 cm under water surface. Sample was collected in a 1.5 L water bottle.

Identification of Species Around the Site

1. Khandarani Lake: - Here are some regular animal species found in the surrounding water & land area on initial naked eye observation.

- 1) Little Grabe
- 2) Pila Globosa
- 3) Lesser Whistling Duck
- 4) Sympetrum Fonscolombii
- 5) Harpape Haydeniana

2. Ketki Lake: -

- 1) Red – crested Pochard
- 2) Brahminy Kite
- 3) Checkered Keelback
- 4) Lasius sp.
- 5) Water Properties

Dissolved O₂ measure in water sample - Dissolved O₂ in fresh water lake estimated by Winkler Iodometric Method. Dissolve CO₂ measure in water sample – phenolphthalein indicator 4 drops is added in sample than titrated against NaOH solution (0.0227N). Thermometer throughout the months in various weather conditions.

Soil PH (with PH Meter)

This method gives direct reading and because of its accuracy and rapidity it is considered the best. 6.5 to 7.5 PH value neutral, over 7.5 ius considered alkaline, less than 6.5 is acidic. The samples of Lake are alkaline in nature.

Winkler Iodometric Method - 1 ml of manganous sulphate and 1 ml of alkaline iodide reagent added into sample, then a precipitation is formed. 1ml of conc.H2SO4 is added. 0.025N sodium thiosulphate is added till colour turned into pale yellow and 1% starch solution is added to give a blue colour and the titration is terminated by turning the solution into colour less one.

0	5.0	6.5	9.5	12
All fishes are deceased	Not many fish can live	Most big fish can live, But small fish can't	All fish can live	

The dissolved oxygen in the sample ponds are suitable for fishes to live.

Free Co2

100 ml water sample is taken and 4 drop of phenolphthalein indicator added. Sample remains colourless and free CO₂ is present. Titiation with 0.0227N NAOH solution and a faint pink colour appeared. The titration was repeated three times and means value was taken. The dissolved CO₂ in the sample ponds are good for pisciculture & cultivation.

Water Temperature

It was measured with thermometer. The water bodies were 4 to 6 higer than environmental temperature. Khandarani Lake site was little cooler than Ketki Lake site.

Result and Discussion

Table 1: (Soil ph)

Study Area	Month				
	June	July	August	September	October
Khandarani Lake	5.9	5.7	5.6	6.1	5.2
Ketki Lake	6.2	5.5	6.3	5.7	5.9

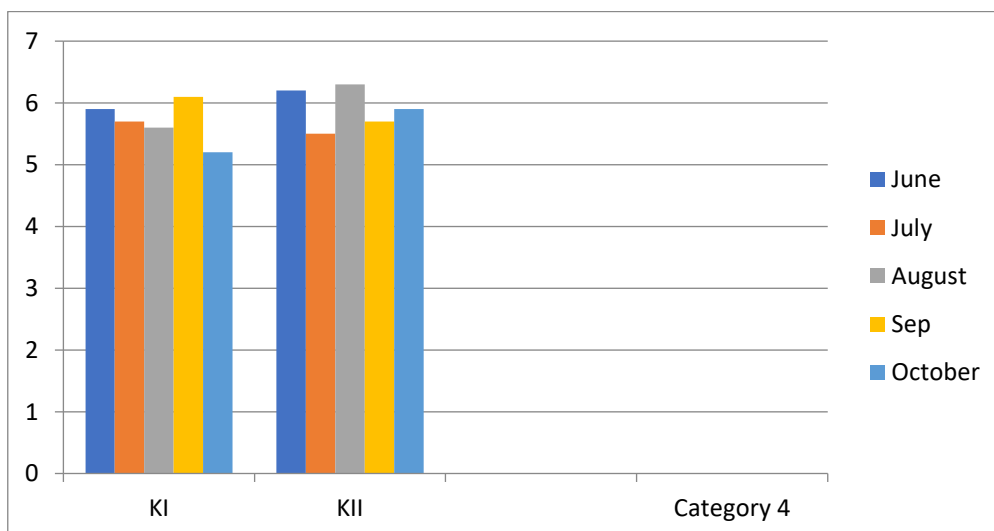


Table 2: (Dissolve O2 in Water)

Study Site	Month				
	March	April	May	June	July
Khandarani Lake site	12	11	10	9	15
Ketki Lake site	10	12	14	16	18

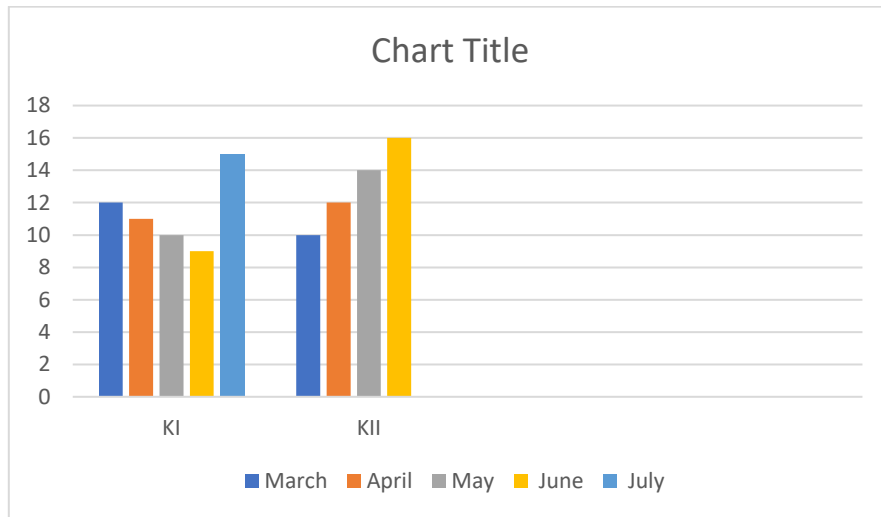


Table 3: (Dissolved CO2 in Water)

Study Site	Month				
	March	April	May	June	July
Khandarani Lake	9	6	8	7	8.5
Ketki Lake	6	7	5	5.5	6.5

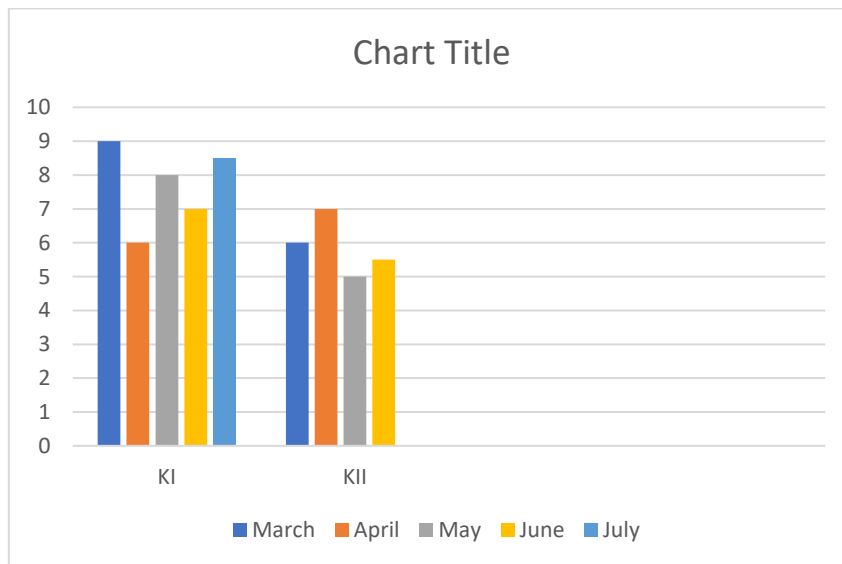
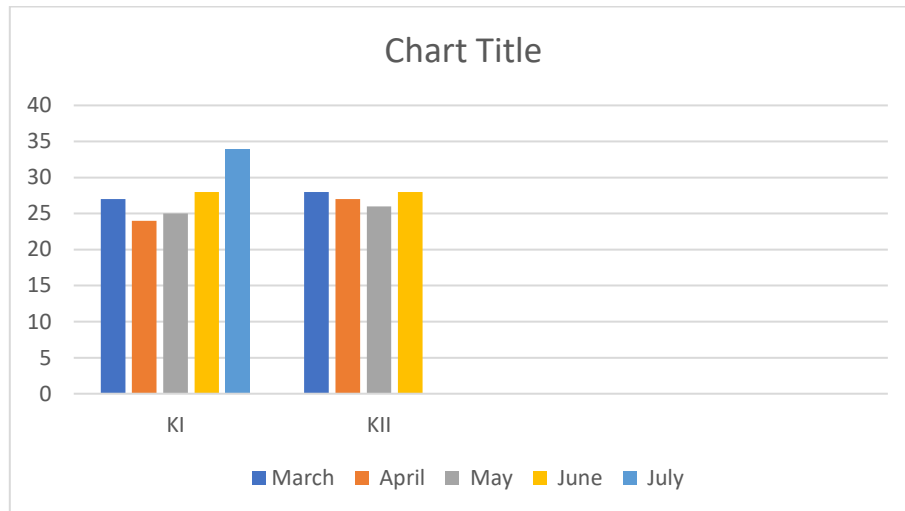


Table 4: (Water Temperature)

Study Area	Month				
	June	July	August	September	October
Khandarani Lake	27	24	25	28	34
Ketki Lake	28	27	26	28	37



Comparison Between Two Sites

The growth of millipedes is much higher than the other species in Khandarani Lake. The growth of ants and other Hymenoptera are much higher than other species in Ketki Lake. From the following data Khandarani Lake's water is colder than Ketki lake water. Khandarani Lake water needs more restoration than Ketki Lake water. Khandarani Lake water use as a devotion place, primarily serves as a crucial irrigation reservoir for local agriculture in the Bhulaveda gram Panchayat area.

It is used to sustain late Kharif and Rabi Crops nearby villages and acts as a significant water source for domestic use.

The determination of soil PH is important for plant and animal life. Soil can be acidic, neutral, alkaline in nature. Slightly acidic soil (5.6 -6.0) found in Khandarani Lake and Ketki Lake. Most Plants grow with in a PH range of 4.0- 9.5.

CONCLUSION

This article is about the study of physico- chemical parameters like dissolve CO₂, dissolve O₂, Soil Ph, water temperature of two fresh water lake water Khandarani Lake water and Ketki Lake Water. Although the data are limited, the current study clearly show close relatedness between two sites. To conclude, these two ponds have ideal condition for plant and animal habitation & fish culture. It is important to conserve.

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