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EVALUATION OF PHYSICO-CHEMICAL CHARACTERISTICS OF KOTEPALLY LAKE WATER IN VIKARABAD DISTRICT OF TELANGANA STATE

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ABSTRACT

Water resources are equally important for natural ecosystem and human development. It is essential for agriculture, industry and human existence. Present work was designed to study the physicochemical parameters of kotepally lake, Vikarabad. The water samples from the surface were collected from the three sampling stations every month in polythene cans for a period of two years from June 2016 to May 2018. Water analysis carried out to know the physicochemical parameters like water temperature, pH, Carbonates, Bicarbonates, Chlorides, Dissolved oxygen, Total Hardness, Sulphates, Calcium, Phosphates, Magnesium, Nitrates, Total Dissolved Solids, Total Suspended Solids, Biological Oxygen Demand and Chemical Oxygen Demand. The values of physico chemical parameters were within permissible limits of WHO and BIS. The results indicate that the Kotepally lake is Non- polluted and can be used for domestic purpose, irrigation and fish culture.

Keywords: Water quality; Kotepally Lake; study of environment; physic-chemical parameters.

1. INTRODUCTION

Water is a vital natural resource and an absolute necessity for sustaining life. Fresh water is essential for the survival of mankind and it is for drinking, agriculture, fish culture and irrigation purpose. Day to day water bodies are being mostly contaminated and are become biological descents in future. At the same time the quality of standing water is becoming more and unfit for human use due to improper use, negligence and mismanagement.

The pollution of water is increased due to human population, industrialization, the use of fertilizers in agriculture and man-made activity. Parameters such as temperature, turbidity, nutrients, hardness, alkalinity, dissolved oxygen, etc. are some of the important factors that determines the growth of living

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organisms in the water body [1]. Water quality assessment involves the analysis of physico-chemical, biological and microbiological parameters that reflect the biotic and abiotic status of the aquatic ecosystem [2].

Water quality monitoring is critical for analysing the water environment, ecosystem, hydrochemistry, and ecology, as well as restoring water quality [3]. Surface water quality has suffered as a result of a combination of uncontrolled industrial growth, dense infrastructure, urban migration, ineffective enforcement of environmental rules, and ambiguous institutional responsibility for water quality management.

Pollution is a major issue in developing countries such as India. In India, all water sources are polluted in various ways, resulting in a steady drop in water quality and underground water levels [4]. In comparison to moving water bodies, stagnant water bodies have a more complicated and fragile environment because they lack self-cleaning and regulating capabilities and hence rapidly acquire bigger quantities of pollutants. An increase in anthropogenic activity in and around water bodies harms to biological aquatic systems and, as a result, waters physico-chemical qualities [5].

Because aquatic life tolerates a wide variety of temperatures, water temperature may not be as crucial in clean water. Water temperature, on the other hand, can have a significant impact on DO in polluted water [6].

Assessment of quality of river water using various parameters (physico-chemical and biological) and the different ways and techniques to protect the river water [7, 8, 9]. Aquatic organisms need a healthy environment to live and adequate nutrients require for their growth, the productivity depends on the physicochemical characteristics of the water body [10,2].

Water is the most vital abiotic component is unique in many respects. Without the knowledge of water chemistry, it is difficult to understand the biological phenomenon fully, because the chemical components of water reveals much about metabolism and fertility of the ecosystem and explains the general hydro biological inter relationship [11, 12].

Aquatic environmental changes (e.g, water quality, such as pH, colour, odour and taste, etc,) for their short life cycle, and are therefore used as bio indicators of overall health or condition of their habitats [13]. A change in the abiotic components viz. the physio-chemical conditions of a water body brings about a corresponding change in the relative composition and diversity of the zooplankton [14].

Aquatic biodiversity is threatened primly by human activities and mismanagement of living resources. Most of the lakes and ponds are getting polluted due to domestic waste, sewage, industrial and agricultural effluents [15].

Freshwater environments worldwide face serious threats to biodiversity and stability of the ecosystems [16]. Stress caused by anthropogenic environmental degradation in recent decades due to extreme urbanization, industrialization and various pollutants had many negative impacts on freshwater. The present study attempted and the results indicate the wealth of the Kotepally lake ecosystem which would be helpful for the aquaculture management practices.

2. MATERIALS AND METHODS

2.1 Study Area and Morphometry of Lake

Kotepally lake project, is an ongoing medium irrigation project in Vikarabad district situated at about 3KM. south of Kotepally village in Peddemul mandal of Vikarabad district. It is constructed in Acres Kotepally lake, a tributary to river Kagna, which is again a tributary to Bheema River in Krishna basin.

Estimate of the Project was originally sanctioned for Rs.50.06 Lakhs administratively vide G.O.Ms.No.1095, dated 1-5-1964, and Technical sanction for Rs.50.94 Lakhs was accorded vide Chief Engineer, Major Irrigation, CR.No.124/64-65, dated 21-11-1974 Revised Estimate amounting to Rs.148.65 Lakhs has been submitted to the Chief Engineer, Medium Irrigation vide Superintending Engineer, I&CADD, Irrigation Circle, Hyderabad Letter No.TSI/KVP/LF/RF/4490/3, dated 10-7-1985.

This district central part of the Deccan plateau and lies in between17^0 20' and 18^0 20' of North latitudes and 77^0 54' and 79^0 30' of East longitudes at Mean sea level 625.67mts. Draining area-119 Sq. Miles, Dependable monsoon rainfall-30.85 Inches, Total dependable yield- 2464 Mcft, Maximum flood discharge- 51200 C/s.

Standards of the bund: - Sill: +1665.00, F.R.L:+1689.00, M.W.L:+1694.00, T.R.L:+1697.00, T.B.L:1700.00, Gross capacity at F.R.L: 1572.92Mcft, Dead capacity at 1665.00: 270.00Mcft, Type of dam: Earthen Bund, Total length of dam: 5900Ft, Top width: 12Ft, Command area: 1 2,928 Acres.

The chief sources of irrigation in the district are tanks, wells and canals. The major irrigation projects are nil and three medium irrigation projects have been completed (Kotepally vagu, Jutepally and Lakhapur projects) creating registered Ayacut of 13927 acres, while 11797 acres has been utilized. The lake serves irrigation for agriculture sector about 18 villages of Peddemul and Dharur Mandals of Vikarabad District in Telangana State.

Fig. 1. Kotepally reservoir (Google map)

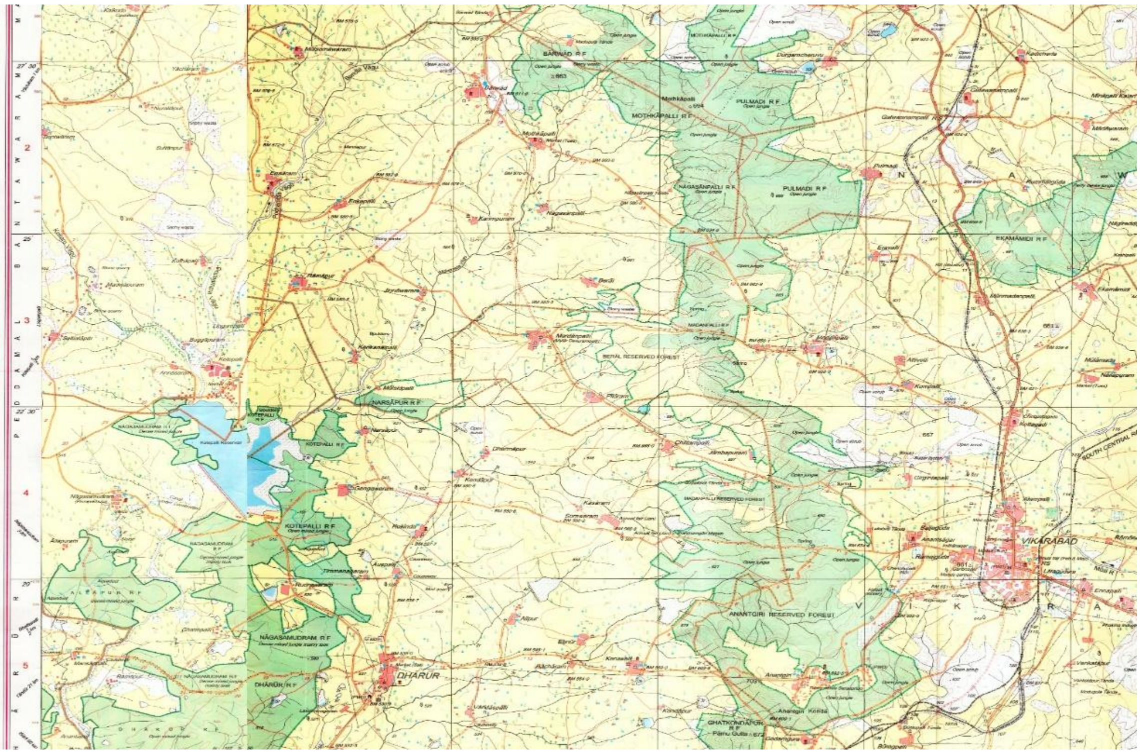

Plate 1. Topo sheet of Kotepally reservoir (survey of India)

2.2 Selection of Sites and Collection of Sample

Three sampling stations, Station I is located at the right side of the lake, Station II is situated at the left side of the lake, and Station III is located 500 meter after station II were identified at Kotepally Lake, Vikarabad. The water samples from the surface were collected from the three sampling stations every months in polythene cans for a period of two years from June 2016 to May 2018. From all the stations surface water samples were collected and analyzed the various physico-chemical parameters by following standard procedures [17].

Water temperature, **pH** - Electrometric method, **Carbonates** - Acid-Base Titration method [17], **Bicarbonates-**Acid-Base Titration method [17], **Chlorides-**Argentometric method [17], **Dissolved oxygen**- Idometric method – APHA Method 4500-OB (2012), **Total Hardness**- EDTA Titrimetric method (APHA method No. 2340 C, 2012), **Sulphates-** APHA, 2012, **Calcium-**EDTA Titrimetric method (APHA method No. 3500-Ca B, 2012), **Phosphates-** Stannous chloride method [17], **Magnesium**- EDTA Titrimetric method (APHA method No. 3500-Mg B, 2012), **Nitrates**- Brucine method [17], **Total Dissolved Solids**- APHA method No. 2540 (2012), **Total Suspended Solids** - APHA 2012, **Biological Oxygen Demand**- EDTA method APHA [17], **Chemical Oxygen Demand**- Open reflex method [17]

2.3 Statistical Analysis

The data was analyzed using the statistical package for social science programme (S.P.S.S.11). The results were expressed as Mean ± S.D (standard deviation of mean). For comparison between different experimental groups, one way analysis of variation (ANOVA) was used followed by post hoc tests.

3. RESULTS AND DISCUSSION

The data on water quality of the study area in the all sampling station on different physico- chemical parameters are depicted in the table.

3.1 Water Temperature

The mean temperature value during 2016-17 and 2017-18 respectively with overall mean of 22.875 and 23.408 in station I, 23.48 and 23.6 in station II and 23.35 and 23.283in station III. Seasonally, the water temperature has altered (Tables 1 and 2).

The difference between the mean values during 2016-17 and 2017-18 at station-I were found significant (T=-1.2336, Df=11 and P=0.030357), station-II were found significant (T=-0.2770, Df =11 and P=0.043576) and station-III were found significant (T=0.1574, Df =11 and P=0.00635).

Seasonal changes observed in the water temperature may be correlated with similar behaviour of atmospheric temperature and it has profound effects on DO and BOD contents (Singh *et al*, 2010) [18,19,20].

3.2 pH

The mean pH value during 2016-17 and 2017-18 respectively with overall mean of 7.958 and 7.791in station I, 7.808 and 7.741 in station II and 7.908 and 7.825 in station III (Tables 1 and 2).

The difference between the mean values during 2016-17 and 2017-18 at station-I were found significant (T=1.2066, Df =11 and P=0.024038), station-II were found significant (T=0.4530, Df = 11 and P=0.049544) and station-III were found significant (T=0.9614, Df =11 and P=0.03467).

Water chemistry has an impact on heavy metal absorption and toxicity. Biological processes, pH activities of organic and inorganic chelators, and scavenging processes all play a role in metal ion concentration [21,22].

3.3 Carbonates (CO_3^{2-})

The permissible carbonate value is upto 200ppm (Indian standards specifications for drinking water IS: 10500, 1992 Reaffirmed).

The mean carbonate value during 2016-17 and 2017-18 respectively with overall mean of 22.913and 21.714 in station I, 33.255 and 34.045 in station II and 23.21 and 23.588 in station III (Tables 1 and 2).

The difference between the mean values during 2016-17 and 2017-18 at station-I were found significant (T=1.5088, Df =11 and P=0.045576), station-II were found significant (T=-0.4113, Df = 11 and P=0.0476420) and station-III were found significant (T=-0.3110, Df =11 and P=0.012321).

The alkaline pH of Liberty Bayou could be due to industrial waste dumping and delocalization, home waste water contamination, the presence of chemical detergent, bicarbonate and carbonate ions discharge, and limestone bed rocks [23,24].

3.4 Bicarbonates (HCO_3^-)

The mean Bicarbonates value during 2016-17 and 2017-18 respectively with overall mean of 246.37 and

248.5758 in station I, 249.2625 and 249.0575 in station II and 255.4675 and 255.6175 in station III (Tables 1 and 2).

The difference between the mean values during 2016-17 and 2017-18 at station-I were found significant (T=-1.2066 , Df =11 and P=0.024037), station-II were found significant (T=0.1129, Df =11 and P=0.0110636) and station-III were found significant (T=-0.0603 ,Df = 11 and P=0.024529).

The alkaline pH of Liberty Bayou could be due to industrial waste dumping and delocalization, home waste water contamination, the presence of chemical detergent, bicarbonate and carbonate ions discharge, and limestone bed rocks [25, 26].

3.5 Chlorides (Cl^-)

The permissible chloride value is less than 250ppm. Chlorides are one of the major inorganic ions in the natural water and waste water. High content of chloride likely to originate from pollution source such as domestic effluents, fertilizers and human activities.

The mean Chloride value during 2016-17 and 2017-18 respectively with overall mean of 123.78 and 130.89 in station I, 130.037 and 132.235 in station II and 141.27 and 134.83 in station III (Tables 1 and 2).

The difference between the mean values during 2016-17 and 2017-18 at station-I were found significant (T= -3.0681, Df =11 and P=0.00562), station-II were found significant (T=-1.1517, Df =11 and P=0.02617) and station-III were found significant (T= 3.8073, Df =11 and P=0.000963).

Chloride exists in all natural waters, the concentrations varying very widely and reaching a maximum in sea water (up to 35,000 mg/l Cl). In fresh waters the sources include soil and rock formations, sea spray and waste discharges. Sewage contains large amounts of chloride. It may be found in surface water from road, salt fertilizers, domestic and industrial wastes or sewage [27]. Domestic sewage discharge is responsible for the higher Cl ion concentration [28].

3.6 Dissolved Oxygen (DO)

The mean dissolved oxygen value during 2016-17 and 2017-18 respectively with overall mean of 8.05 and 8.4 in station I, 9.41 and 9.76 in station II and 8.98 and 9.34 in station III (Tables 1 and 2).

The difference between the mean values during 2016-17 and 2017-18 at station-I were found significant (T=-1.3427, Df =11 and P=0.019302), station-II were found significant (T=-0.9133, Df = 11 and P=0.03709) and station-III were found significant (T=-1.325, Df = 11 and P=0.01985).

The impact of mass lava-making - Brahmsarovor and Kurukshetra was studied by Rajagopal et al. [29] in a consecrated water tank, and their findings revealed possible microbial deterioration, natural household squandering of expansion in absolute solids, chloride, and DO decline. In rainy period the DO was high due to the flow of excess ampunt of highly oxygenated water entry from the outside area.

3.7 Biological Oxygen Demand (BOD)

The mean BOD value during 2016-17 and 2017-18 respectively with overall mean of 22.05 and 23.30 in station I, 21.75 and 23.25 in station II and 23.58 and 23.75 in station III (Tables 1 and 2).

The difference between the mean values during 2016-17 and 2017-18 at station-I were found significant (T=-0.9318, Df =11 and P=0.036152), station-II were found significant (T=-1.2110, Df =11 and P=0.023872) and station-III were found significant (T=-0.0891, Df =11 and P=0.02975).

The biological oxygen demand is the rate of removal of oxygen by microorganism in aerobic degradation of dissolved particulate matter in water. Chemical or biological approaches can be used to analyse the water quality of a body of water, but both have drawbacks. Primary producers consume organic compounds and nutrients that enter water bodies, or they accumulate in bottom sediments [30,31].

3.8 Chemical Oxygen Demand (COD)

The COD permissible value is less than 30ppm. The COD is depend enable factor of assessing the water quality and to find out the state of pollution in the water body. The increasing COD values evident of anthropogenic activities in the water body.

The mean COD value during 2016-17 and 2017-18 respectively with overall mean of 31.21 and 31.39 in station I, 22.76 and 22.53 in station II and 22.69 and 22.17 in station III (Tables 1 and 2).

The difference between the mean values during 2016-17 and 2017-18 at station-I were found significant (T=-0.1306, Df =11 and P=0.0248215), station-II were found significant (T=0.1660, Df = 11 and P=0.0496671) and station-III were found significant (T=0.4343, Df =11 and P=0.0286664).

Groundwater pollution by microbiological and chemical contaminants emitted from medical clinic wastewater [32]. Ramirez *et al*, [33] investigated the source of microbiological and chemical pollution of groundwater in Mexico's Cuautla-Yautepec spring, looking for an angle for broken down materials as indicated by height. Groundwater tests at the syphoning level were collected by Alnos Easa and Ashraf Abou [34], Waste water has been shown to have negative effects.

3.9 Total Hardness (TH)

The mean total hardness value during 2016-17 and 2017-18 respectively with overall mean of 69.68 and 71.62 in station I, 76.87 and 76.05 in station II and 70.63 and 68.65 in station III (Tables 1 and 2).

The difference between the mean values during 2016-17 and 2017-18 at station-I were found significant (T=-1.1535, Df =11 and P=0.026105), station-II were found significant (T=0.4255, Df =11 and P=0.0458626) and station-III were found significant (T=0.9523, Df =11 and P=0.0351252).

Hardness, alkalinity, dissolved oxygen, and other elements all play a important role in determining the growth of living organisms in a water body [35,1].

3.10 Calcium (Ca^{+2})

The mean Calcium value during 2016-17 and 2017-18 respectively with overall mean of 47.005and 45.552 in station I, 43.456 and 46.354 in station II and 42.243 and 41.263 in station III (Tables 1 and 2).

The difference between the mean values during 2016-17 and 2017-18 at station-I were found significant (T=0.6716,Df =11 and P=0.048777), station-II were found significant (T=-1.6024, Df =11 and 0.023319) and station-III were found significant (T=0.5164,Df =11 and P=0.010707).

Calcium is a micronutrient and is necessarily required for the development of skeletal and bony structure of the aquatic organisms in habituating the water body. The permissible value of calcium is up to 75ppm (BIS, drinking water standards, IS- 10500- Revised 2003).

3.11 Magnesium (Mg^{+2})

Magnesium is an important contributor to the hardness of water. The concentrations higher than 125ppm have cathartic and diuretic effect. The excess of Mg^{+2} can be reduced by chemical methods such as reverse osmosis, chemical softening and electro dialysis or ion exchange.

The mean Magnesium value during 2016-17 and 2017-18 respectively with overall mean of 22.42 and 22.15 in station I, 30.33 and 31.7 in station II and 27.80 and 27.72 in station III (Tables 1 and 2).

The difference between the mean values during 2016-17 and 2017-18 at station-I were found significant (T=0.2233 ,Df =11 and P=0.025325), station-II were found significant (T=-0.9851 ,Df =11 and P=0.03352) and station-III were found significant (T=0.0662 ,Df =11 and P=0.047741).

Stephen Makali Musyoka, [36], investigated the bacteriological and chemical analysis of Kenyan drinking water. It was determined that the estimations of Ca, Mg, and Cl in two cases exceeded the prescribed thresholds among drinking water tests collected from different regions of Kenya locales.

3.12 Sulphate (SO_4^{-2})

The mean Sulphate value during 2016-17 and 2017-18 respectively with overall mean of 33.08 and 33.58 in station I, 33.75 and 38.75 in station II and 36.16 and 32.91 in station III (Tables 1 and 2).

The difference between the mean values during 2016-17 and 2017-18 at station-I were found significant (T=-0.3497, Df =11 and P=0.0298812), station-II were found significant (T=-3.5456, Df =11 and P=0.0181404) and station-III were found significant (T=1.6789, Df =11 and P=0.0300916).

Sulphate is especially significant for the aquatic environment since it can be used to manage algae and kill slugs and snails in irrigation and municipal water treatment systems, as well as in medicinal chemicals for ectoparasitic and bacterial illnesses [37, 38, 39].

3.13 Phosphorus (PO_4^{3})

The mean Phosphate value during 2016-17 and 2017-18 respectively with overall mean of 0.68 and 0.72 in station I, 0.77 and 0.77 in station II and 0.74 and 0.82 in station III (Tables 1 and 2).

The difference between the mean values during 2016-17 and 2017-18 at station-I were found significant (T=-0.9185, Df =11 and P=0.0368307), station-II were found significant (T=-0.1544, Df =11 and P=0.047027) and station-III were found significant (T=-2.1491, Df =11 and P=0.0428869).

More species in aquatic communities take advantage of niche possibilities and thereby capture a greater proportion of biologically accessible nutrients, such as nitrogen or phosphorus; biodiversity has been proven to improve water quality through niche partitioning

[40]. Li and Chen [41] investigated zooplankton abundance in Lake Yelahanka, Bengaluru, Karnataka, India, in conjunction to a high peak of phosphates and nitrate concentrates.

3.14 Nitrate (NO_3^-)

The mean nitrate value during 2016-17 and 2017-18 respectively with overall mean of 0.698 and 0.713 in station I, 0.763 and 0.753 in station II and 0.738 and 0.754 in station III (Tables 1 and 2).

The difference between the mean values during 2016-17 and 2017-18 at station-I were found significant (T=0.0584, Df =11 and P=0.0388379), station-II were found significant (T=-0.3528, Df =11 and P=0.0275481) and station-III were found significant (T=-0.4871, Df =11 and P=0.0309907).

Mithani et al. [19] reported the maximum value of Nitrate during monsoon and minimum during summer season at river Wardha. The nitrate concentration varies seasonally and generally it is observed that nitrate concentrations of the surface water sources are more in the wet season because of nitrate-rich runoff.

3.15 Total Solids (TS)

The mean TS value during 2016-17 and 2017-18 respectively with overall mean of 160.5 and 161.75 in station I, 169.5 and 167.9 in station II and 167.8 and 173.08 in station III (Tables 1 and 2).

The difference between the mean values during 2016-17 and 2017-18 at station-I were found significant (T=-0.1526, Df =11 and P=0.0479697), station-II were found significant (T=0.196, Df =11 and P=0.0384293) and station-III were found significant (T=-0.7136, Df =11 and P=0.0482973).

The higher values of TDS during rainy and autumn seasons may be due to surface runoff containing organic and inorganic impurities [42, 43, 44]. Both urban solid waste and industrial effluents have had a significant negative impact on the water quality of Bangladesh's rivers [45, 31, 30].

3.16 Total Dissolved Solids (TDS)

The mean Total Dissolved Solids value during 2016-17 and 2017-18 respectively with overall mean of 101.82 and 103.21 in station I, 106.63 and 109.00 in station II and 105.64 and 102.82 in station III (Tables 1 and 2).

The difference between the mean values during 2016-17 and 2017-18 at station-I were found significant (T=-0.5812, Df =11 and P=0.02953746), station-II were found significant (T=-1.2574, Df =11 and P=0.02178455) and station-III were found significant (T=1.5204, Df =11 and P=0.042631519).

Agarwal (2009) investigated the quality of groundwater in Dudu, Rajasthan, and discovered conductivity and TDS levels that were as high as feasible. Total dissolved solids (TDS) are a measure, in milligrams per liter (mg/L), of the amount of dissolved materials in the water. Ions such as potassium, sodium, chloride, carbonate, sulfate, calcium, and magnesium all contribute to the dissolved solids in the water. In natural water dissolved solids are mainly contains minerals [46].

Table 1. The results of mean values of physico-chemical parameters in Kotepally lake, Vikarabad (2016 – 2017)

S. No	Physico - chemical parameters	Station-I	Station-II	Station-III
1.	Temperature	22.875±1.283	23.488±0.856	23.3583±1.1365
2.	pH	7.958±0.302	7.8083±0.3449	7.9083±0.202
3.	Carbonates	22.913±2.434	33.255±4.863	23.21±3.3024
4.	Bicarbonates	246.37±4.32	249.2625±4.255	255.4675±6.3
5.	Chlorides	123.786±5.852	130.037±5.604	141.276±4.26
6.	Dissolved oxygen	8.05±0.624	9.4166±0.9475	8.983±0.714
7.	Biological Oxygen Demand	22.0583±2.967	21.75±2.7675	23.583±3.941
8.	Chemical Oxygen Demand	31.212±3.561	22.766±3.68	22.696±3.2567
9.	Total Hardness	69.680±4.41	76.8708±4.6348	70.635±5.004
10.	Calcium	47.005±5.236	43.456±4.539	42.243±3.552
11.	Magnesium	22.425±3.08	30.3308±3.639	27.8083±3.16
12.	Sulphates	33.083±3.4761	33.75±3.4673	36.1666±4.38
13.	Phosphates	0.6891±0.08	0.77±0.1228	0.74±0.1102
14.	Nitrates	0.698±0.076	0.7633±0.0822	0.7383±0.086
15.	Total Solids	160.5±19.70	169.5±18.88	167.833±17.77
16.	Total Dissolved Solids	101.82±4.71	106.630±4.86	105.646±4.36

Table 2. The results of mean values of physico-chemical parameters in Kotepally lake, Vikarabad (2017– 2018)

S.No	Physico - chemical parameters	Station-I	Station-II	Station-III
1.	Temperature	23.408±0.771	23.6±1.1028	23.2833±1.1968
2.	pH	7.7916±0.370	7.7416±0.375	7.825±0.222
3.	Carbonates	21.714±1.976	34.045±4.538	23.588±2.617
4.	Bicarbonates	248.5758±4.6	249.0575±4.6	255.6175±5.87
5.	Chlorides	130.893±.488	132.235±5.85	134.83±4.022
6.	Dissolved oxygen	8.4±0.459	9.766±0.929	9.3416±0.605
7.	Biological Oxygen Demand	23.3025±3.54	23.25±3.278	23.75±5.136
8.	Chemical Oxygen Demand	31.395±3.276	22.539±2.991	22.173±2.6108
9.	Total Hardness	71.623±3.817	76.054±4.766	68.6508±5.200
10.	Calcium	45.552±5.36	46.354±4.315	41.263±5.531
11.	Magnesium	22.1541±2.85	31.7±3.1519	27.7208±3.295
12.	Sulphates	33.5833±3.52	38.75±3.44	32.9166±5.07
13.	Phosphates	0.7216±0.088	0.7766±0.085	0.8266±0.085
14.	Nitrates	0.7133±0.062	0.7533±0.059	0.7541±0.072
15.	Total Solids	161.75±20.41	167.916±20.54	173.083±18.26
16.	Total Dissolved Solids	103.214±6.84	109.0008±4.35	102.825±4.72

4. CONCLUSION

The present study assessed the water quality in Kotepally lake, Vikarabad. The physico-chemical parameters such as pH, Carbonates, Bicarbonates, Chlorides, Dissolved oxygen, Total Hardness, Calcium, Magnesium, Sulphates, Phosphates, Nitrates, Total Solids and Total Dissolved Solids recorded in the lake were within the permissible limits for domestic and irrigation purposes (BIS and WHO).

The Kotepally lake water was found to be slightly alkaline, pH varied from 7.74 to 7.95. Fluctuations in pH values mostly depends upon ingredients input water bodies. DO is determine the nature of an entire aquatic ecosystem to a great extent. Concentration of DO also depends on surface agitation due to temperature, respiration rate of living organisms and decomposition rate of dead organic matter. In the present study DO value varied from 8.54 to 9.76 mg/L.

The nitrate and phosphate is contributed from fertilizers in used agricultural fields near the lake which seeps into the water body. The values of nitrate and phosphates were recorded during study period could be mainly due to the entering of agricultural drain which contains higher levels of nutrients. Chloride has been heavily depending on as an indicator of pollution, sudden increase of chloride is an indication of possible sewage introduction into the water body.

The lower BOD in the months of may be September is deuce to dilution and faster flow rate. TSS and TDS is an indication of varying contribution of allocanthonous and autocanthonous inputs to the lake. The chemical oxygen demand decreases with increase in water volume. This is attributed to dilution, which could have left less ions in water. The results revealed that the lake water is Non- polluted according to BIS and WHO and water can be used for domestic purpose, irrigation and fish culture. Lake water quality extremely influenced by the relative abundance of nutrients. A moderate amount of nutrients enhances the lake ecosystem by providing a food source for aquatic organisms.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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