Effect of Climate Change on the Water Quality of Chandpur Lake, District Bhandara, Maharashtra

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Abstract **- Climate change is an area of science that has been studied for many years Peoples are becoming more aware of the combined impact of climate change and limitations of resources. Climate change issue is more serious than global warming, the rise in average temperature is only one indicator of broader changes also translating into extreme temperature, drought, flooding, storms, impact on food production and infectious diseases. The purpose of this paper is to provide some education to the locality, identifying some of the current and future risk involved and the worldwide efforts that are being made to minimize these risks. This paper discussed clearly seasonal change in Temperature, pH, Dissolved Oxygen, CO_2, BOD, COD, Hardness, Chlorides, Nitrates and Phosphates of Chandpur Lake during the year January 2020 to December 2020. Progression of trophy was seen in pH, Chlorides, Nitrates and Phosphates. Steps must be taken to control further encroachment by dumping of untreated sewage into the lake. This may cause death or disappearance of aquatic organisms of this Lake.**

Index Terms **- Trophy, Encroachment, Drought, Seasonal, Sewage.**

INTRODUCTION

At first life exists in water that means water is the basic need of every living organism. Importance of water quality is developed now a days but early human judge quality of water through physical sense like taste, smell etc. water is used for various purposes by human and so pollution is increases due to industrialization, agricultural waste, increasing population and climate is one of the key factor that affects the life, growth and development of lakes. (Adewoye S.O., 2013). Climate change is the subject of how weather patterns change over decades or longer, it takes place due to natural and human interference. Since the industrial revolution takes place, humans have contributed a lot to climate change via the emissions and through changes in land use, resulting increase global temperature and other environmental issues. In today's world we are experiencing a change in the climate, the day temperatures are becoming hotter and night temperature warmer. Climate change is an emerging and ongoing environmental challenge, it having a significant impact on biodiversity. It happening on a global scale and is one of the defining issues of the 21st century. Lakes are the natural gifts to human beings. Lakes and reservoirs serve as major water resources in India, they are subjected to changes all over the world it has complex effects on water supply and demand. Due to changes in day by day environment can influence the lake water quality. The climate change alters the quality of the lakes. The changes in physic-chemical environment have direct impact on the biotic component of the water body.

Extensive research activities monitoring, are required to assess the extent and severity of sediment contamination, it is essential to evaluate the effects of contaminated sediments on freshwater ecosystem, and to prepare a plan for appropriate remedial action. Regular scientific study of various freshwater eco systems will help to implement compatible policies and program to increase the production rate of freshwater ecosystem and reduction of pollution. Singare Pravin *et.,al.* (2011).

The present study was taken on the Chandpur Lake of Bhandara District. The lake water was used for irrigation purpose in the surrounding agricultural fields and due to the regular dumping of domestic sewage, and climate change the water quality of this Lake decreases drastically.

MATERIAL AND METHODS

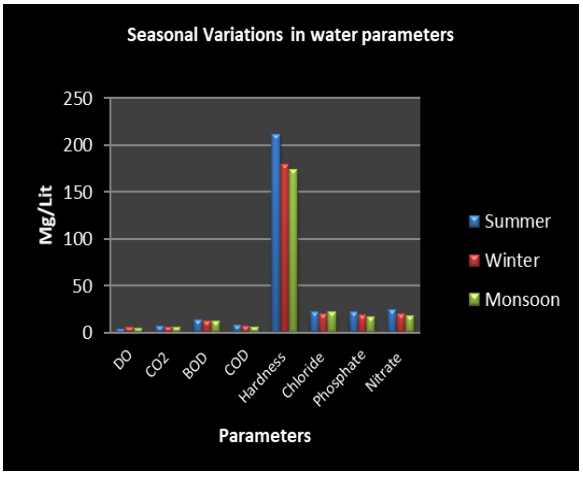
In the present study an attempt was made to assess degradation of the water of Chandpur Lake for checking the water quality due to climate change. During the present study, water samples collected in a

sampling bottle, to assess their physical and chemical qualities at monthly intervals. The samples collected in cleaned 10 liter inert plastic containers, which were rinsed with distilled water before collection. Water samples then were taken in a sampling bottles. The stoppers of the sample containers closed properly to prevent contamination from outside. In the present investigation, the water chemistry of Chandpur Lake has been studied for a period of 12 months i.e. from January 2020 to December 2020 and analyzed important chemical parameters. All the parameters like Temperature, pH, Turbidity, DO, CO_2, BOD, COD, Hardness, Chloride, Phosphate, Nitrate were analyzed according to the standard methods (APHA 2005 and Trivedi and Goel 1986).

OBSERVATION

Table 1. Showing Seasonal Variations of Physical and Chemical Parameters of Chandpur Lake, District Bhandara

Sr. No	Parameters	Summer	Winter	Monsoon
1.	Temperature	36^0C	32^0C	33^0C
2.	pH	7.9	7.8	7.2
3.	Turbidity (NTU)	159	125	220
4	DO (mg/lit.)	4.1	6.1	5.0
5.	CO_2 (mg/lit.)	7.1	6.4	5.7
6.	BOD (mg/lit.)	14.1	13.1	12.2
7.	COD(mg/lit.)	8.1	7.5	6.4
8.	Hardness (mg/lit.)	211	180	174
9.	Chloride (mg/lit.)	22	20	22
10.	Phosphate (mg/lit.)	22	19	17.1
11.	Nitrate (mg/lit.)	24.50	20	18.2



RESULTS AND DISSCUSSION

Temperature is the most important factor which effect on plants and animals, water has several unique properties which combine to minimized temperature change. The temperature fluctuate between 32^0C to 36^0C as expected, summer months such as March, April and May recorded high and winter with low temperature. Thirumala S. *et., al.* (2006) recorded the same. During monsoon season water was turbid; pH fluctuated between 7.2 to 7.9. The minimum pH was recorded in monsoon which was mainly attributed to rainwater after a long dry period, and maximum pH was recorded during summer, similar observation was done by Rajgopal *et al.*, (2010) recorded the pH value of two perennial lake fluctuates in between 7 to 8.8 in Tamilnadu. In the present investigation maximum values of turbidity 220NTU recorded in Monsoon, whereas minimum 125NTU reported in winter. Basavarrajappa et al., (2009) reported the same. Dissolve Oxygen enters in water by diffusion from the atmosphere and as a by- product of photosynthesis by algae and plants, in the present study Dissolved Oxygen ranged from 4.1 to 6.1 mg/l, it was maximum in winter and minimum in summer. Similar observations were made by Pal Amit *et al.*, (2013) recorded the Dissolved Oxygen ranged between 5.8 mg/lit to 8.4 mg/lit. Continuous introduction of effluents in water may support the growth of aquatic weeds formed on water surface and due to this reduction of Dissolve Oxygen takes place.

In the present study maximum CO_2 recorded in 7.1 mg/l in summer and minimum in monsoon 5.7 mg/l similar observation done by Kashyap Vinita (2014). Minimum BOD value 12.2 mg/l recorded in monsoon and maximum value 14.1 mg/l recorded in summer. The BOD attended its high peak during summer and low peak in monsoon. Similar observations done by Thorat and Sultana (2001).COD value ranges from 6.4 to 8.1 mg/l, the COD variations went on changing with seasons and also with release of chemical substances like sewage. The value of hardness ranges between 174 to 211 mg/l. It was maximum in summer 211mg/l and low during monsoon 174 mg/l Rai and Shrivastava (2006) observed the same. In the present investigation chlorides ranged between 20 to 22 mg/L. The minimum value recorded in the winter and the highest value seen in the summer and monsoon season, similar observation done by Patil Rahul Shivaji *et al.*, (2015).

Phosphate is an important element as it controls the growth of aquatic ecosystem but higher amount of phosphate may cause eutrophication in aquatic ecosystem in present investigation the minimum phosphate recorded in monsoon 17.1 mg/l. and maximum was 22 mg/l. in summer. Similar observation was done by Gupte and Shaikh (2013). Nitrates is most important plant nutrient, it is found in associated with fertilizers, human and animal waste and sludge discharge , higher concentration of Nitrogen may cause eutrophication. In present investigation It was minimum in monsoon 18.2 mg/l. and maximum in summer 24.50 mg/l, similar observations made by Belkhode Pranita P. *et al*., (2016).

CONCLUSION

Expected impacts of climate change are associated with large uncertainties, particularly at the local level. Adaptation scientists, practitioners and decisions makers will need to find the ways to cope with these uncertainties. From recent study on Chandpur Lake It may be concluded that the rivers, ponds, lakes are the host for the number of freshwater aquatic organisms, now a days aquatic organisms especially rare and moderate species is at high risk due to human interference such as Climate change is the current burning problem all over the world. The water sources are very important for human and other organisms. At present, the increase in population and climate change is having negative impact on the small water bodies such as Lakes, ponds etc... Human-induced eutrophication has heavily degraded freshwater ecosystems worldwide by reducing water quality and altering structure and function of aquatic ecosystem. Population growth, industrialization, and entering of untreated sewage have resulted in large amount of phosphorus and nitrate in lakes. Protection of such water bodies from human encroachment is important, therefore, solution on this problem to reduce the effects on water resources is important. If all these lakes are not protected within few years, these natural water resources may completely disappear. Chandpur lake of Bhandara District is encroached by human settlement i.e., housing and many more human interferences and dumping of untreated sewage causing the lake to become unfit even for recreational purpose. Lakes have been heating up around the world. Protecting streams, reducing pollution and creating sanctuaries for sensitive species could go a long way toward making lakes more resilient to climate change. Hence, advanced research is needed to protect such natural resources which are being exploited.

ACKNOWLEDGEMENT

I express my gratitude towards Principal J. M. Patel College, Bhandara for providing library and laboratory facilities.

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