Effect of Climate Change on Water Quality of Khamb Talav, Bhandara District (Maharashtra) India

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Abstract:-

Peoples are becoming more aware about the combine effect 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 world wide efforts that are being made to minimize these risks. This paper discussed clearly the range, and average of pH, Dissolved Oxygen, Alkalinity, Hardness, Chlorides, Nitrates, Phosphates in Khamb Talav during the years January 2018 to June 2018. Progression of trophy was seen in pH, Chlorides, Nitrates and Phosphates. Steps must be taken to control further encroachment by housing colonies and dumping of untreated sewage in to the lake. This may cause death or disappearance of aquatic organisms of this Talav.

Key words: - Climate change, Global warming, Trophy, Encroachment.

Introduction:-

Climate is one of the key factors that affect the life, growth and development of lakes. 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, natural resources and society. Climate change is happening on a global scale and it 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. Man is constructing reservoirs and dams to store the water and use it for irrigation, recreation and domestic purpose etc. 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 physico-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. Therefore the present study carried out to understand the effect of climate change on physico- chemical properties of Khamb Talav. Regular scientific study of such various

freshwater ecosystems will help to implement now compatitable policies and programmes to increase the production rate of freshwater ecosystem and reduction of pollution. Singare Pravin *et.,al.* (2011). The present study was taken on the Khamb Talav of Bhandara District. The lake water was used for irrigation purpose in the surrounding agricultural fields before some years but now a day due to the regular dumping of domestic sewage and climate change the water quality of this Talav decreases drastically.

Material and Methods:-

In the present study an attempt was made to assess degradation of the water of Khamb Talav 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 thoroughly cleaned 5 liter inert plastic containers, which were rinsed with distilled water before collection. Water samples then were taken in sampling bottles. The stoppers of the sample containers closed properly to prevent contamination from outside. In the present investigation, the water chemistry of Khamb Talav has been studied for a period of 6 months i.e. from January 2018 to June 2018 and analyzed important chemical parameters. All the parameters like pH, Temperature, DO, Alkalinity, Hardness, Chloride, Phosphates, Nitrates were analyzed according to the standard methods (APHA 2005 and Trivedi and Goel 1986).

Observation:-

Table 1 Showing Range and Average of Physical and Chemical Parameters of Khamb Talav, District Bhandara, Maharashtra

S. No	Parameters	Range	Average
1.	pH	**8.1 - 9.9**	**8.68**
2.	Temperature	**32^0C - 35^0C**	**33.25**
3.	DO (mg/lit.)	**4 - 6.5**	**5.48**
4.	Alkalinity (mg/lit.)	**320 - 450**	**391.66**
5.	Hardness (mg/lit.)	**350 - 550**	**427.66**
6.	Chloride (mg/lit.)	**30 - 65.6**	**46.2**
7.	Phosphate (mg/lit.)	**27.5 - 34.7**	**30.35**
8.	Nitrate (mg/lit.)	**18.2 - 27.5**	**22.03**

Results and Discussion:-

The hydrogen ion concentration of natural water is an important environmental factor the variation of which is linked with species composition pH fluctuates in between 8.1 to 9.9 and the average was 8.68, 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. Temperature may affect the aquatic ecosystem or increase and decrease of water temperature is depending on the atmospheric temperature. From above table it is evident that the temperature showed fluctuation in between 32^OC to 35^OC during January to June 2018, Thirumala S. *et., al.*

(2006) recorded 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 the Dissolved Oxygen ranged from 4.0 to 6.5 mg/lit., and averaged to 5.48 mg/lit. Similar observations were made Pal Amit *et al.,* (2013) recorded the dissolved oxygen ranged between 5.8 mg/lit to 8.4 mg/lit. The Dissolved Oxygen values are declining. This may be due to the utilization of dissolved oxygen by the phytoplankton, aquatic organisms, zooplankton, and bacteria etc, which are present in the lake along with the untreated sewage entering into the lake.

Alkalinity is a measure of the buffering capacity of the water, and since pH has a direct effect on organisms as well as an indirect effect on the toxicity of certain other pollutants in the water, the buffering capacity is important to water quality, the value of Alkalinity fluctuates in between 320 – 450 mg/lit., and the average value was 391.66 mg/lit. Muley and Patil (2006) recorded high alkalinity 382.5 mg/lit., at station D of Pauna river, Pune. Hardness has great effect on biodiversity, it depends on the amount of Calcium and Magnesium salts dissolved in the water, the value of hardness ranges in between 350 to 550 mg/lit., and averaged 427.66 mg/lit., similar observations made by Bhadja and Vaghela (2013). In the present investigation Chlorides ranged between 30 to 65.6 mg/lit., and averaged to 46.2 mg/lit. Patil Rahul Shivaji *et al*., (2015) observed the chloride value ranges in between 26.40 mg/lit – 59.64 mg/lit.

Nitrogen and phosphorus compounds play a significant role in algal nutrition. Phosphate is most essential plant nutrient and is directly utilizable form of soluble inorganic phosphorus the most significant form of inorganic – phosphate is ortho-phosphate Phosphate ranged from 27.5 – 34.7 mg/lit., and averaged to 30.35 mg/lit., during the study period. In the present investigation nitrates ranged between 18.2 to 27.5 mg/lit., and averaged to 22.03 mg/lit. Similar observations made by Belkhode Pranita P. *et al*., (2016).

Conclusion:-

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 spread of urban colonies 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. Khamb Talav of Bhandara is encroached by human settlement i.e., housing colonies and complexes and dumping of untreated sewage causing the lake to become unfit even for recreational purpose. Hence, advanced research is needed to protect such natural resources which are being exploited by increasing population and urban encroachment.

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