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A Review Paper on Eutrophication in Urban Lakes

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ABSTRACT
The rapid increase of populace alongside urbanization has resulted in the deterioration of lake water ecosystems particularly in developing city like Bengaluru and human beings are blamable for choking numerous lakes to death. Excess nutrients, specifically phosphorus and nitrogen are the primary pollutants that contribute to the cultural eutrophication of lakes. In addition to eutrophication, warming in the past half century has also extensively influenced harmful algal blooms communities in lake ecosystems. a large quantity of sewage from the households is regularly discharged into the water bodies. Several limiting factors namely, level, temperature, PH, light, and dissolved oxygen are known to affect eutrophic water bodies. The runoff brings down fertilizers and other chemicals from agricultural fields. The phosphorus contained in these effluents is known to promote excessive growth of plants. Therefore, powerful control and management strategies like community perceptions and priorities are needed relating to lake water management. The rapid climb of population along with urbanization has resulted in the deterioration of water resources particularly lakes are deteriorating due to serious pollution stresses inflicting the scarceness of water resources. Nitrogen has also been reported to affect the phytoplankton production in eutrophic waters in temperate regions. Several environmental factors have also been found to add to the problem of eutrophication in addition to nutrients.

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I. INTRODUCTION

Eutrophication is known as (dystrophication or hypertrophication,) when a body of water becomes overly enriched with minerals and nutrients which induce excessive growth of algae. This process may result in oxygen depletion of the water body after the bacterial degradation of the algae. One example is an "algal bloom" or great increase of phytoplankton in a pond, lake, river or coastal zone as a response to increased levels of nutrients.

Lakes age naturally and this evolution normally occurs over hundreds or thousands of years. This phenomenon called eutrophication is the gradual process of nutrient enrichment of a lake, as it changes from an oligotrophic state (nutrient- poor) to a eutrophic state (nutrient-rich).

This enrichment enhances biological productivity, resulting in increased abundance of microscopic algae (phytoplankton) and aquatic plants. Lake eutrophication has become a global problem of water pollution. Chlorophyll-a, total nitrogen, total phosphorus, biological or chemical oxygen demand and secchi depth are the main indicators to evaluate Lake Eutrophication level. Eutrophication often induced by the discharge of nitrate or phosphate containing detergents, fertilizers, or sewage into an aquatic system. This increased productivity is associated with a change in lake characteristics such as a greater accumulation of sediments and organic matter, a reduction in dissolved oxygen, and the replacement of living organisms by species better adapted to the new conditions.

Eutrophication, or the promotion of the growth of plants, animals, and microorganisms in lakes and rivers, has been a very slow, natural process. If this is allowed to occur uninterrupted, it results in an excessive deficiency of oxygen in the water. Thus organisms that thrive under anaerobic conditions are favored more and more at the expense of aerobic organisms (Mengel & Kirkby, 1996).

In surface waters, phosphorus concentrations exceeding 0.05 mg L-' may cause eutrophic conditions (Hinesly & Jones, 1990). Eutrophication of drainage ditches by overfertilization with nitrogen and phosphorus causes a shift mainly from submerged aquatic vegetation to a dominance of floating duckweeds.

II. LITERATURE REVIEW

1) **Fareed A. Khan and Abid Ali Ansari, 2005 Eutrophication: An Ecological Vision**
The review covers the definition and concept of eutrophication and the adverse effects on quality and ecosystem functioning. The eutrophication of several

water bodies leads to significant changes in the structure and function of the aquatic eco.

2) Bliane Brownell, 2014
Recycled concrete could prevent eutrophication
In this paper the eutrophication is a Concrete is natural binder for phosphorous which is primary component in fertilizer.

3) M.T. Dokulil and K.Teubner, 2017
Eutrophication and Climate Change:
Present Situation and Future Scenario In this paper the successful story of eutrophication control in freshwaters involves reduction of P inputs primarily from external sources, such as sewage, and additionally the internal, recycling of phosphorus from sediments in lakes.

4) Veenashree, Nandini Kumar, 2018
Nutrients Load and Eutrophication: An Overview of Bengaluru Urban Lakes.
In this paper According to the U.S. Environmental Protection Agency excess nutrients load is the major reason for impaired water quality in the urban lakes.

5) Chen, M. Huang and X. Tang, 2019
Eutrophication assessments of seasonal urban lakes .
This paper reviews it is study, we have investigation an FUI-derived method to monitor to the TSI dynamics of three urban lakes in Yangtze River Basin from 2013-2018.

6) Act limnogica brasiliensa,2018
Eutrophication in aquatic ecosystems: A scientometric study
This paper reviews it study,Revel the direction for future studies about eutrophication, or even reveal the preoccupation among the scientific community about this environmental problem.

7) K Bheemappa and N Nandini, 2018
Seasonal variation of Water quality in the Urban lakes of Bengaluru Urban Area
This paper reviews the water quality is affected by a wide range of natural and human influences and quality of life is linked with quality of environment .

III. CONCLUSIONS

Water is an important resource of prime necessity in life-supporting systems. Rapid eutrophication in the past 25 years has led to significant changes in water quality. The eutrophication results in physical, chemical, biological, and ecological changes in water bodies. Studies on eutrophication have revealed that the nutrient inputs into shallower and warmer parts of lakes are more severely altered. Enrichment of nutrients in a water body accelerates its aging process and leads to faster succession.

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