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The Physico-chemical assessment of pollution of surface water of ghats along the bank of river Ganga in Varanasi

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Abstract

Scarcity of water, pollution load, political issues and rising population has drawn a great attention for proper management of water resources such as surface water in 21st century. India is one of the developing country having prosperous fresh water resources in the form of rivers, Kunds, ponds and lakes etc. Varanasi is a religious city and is popularly known for its mythological Ghat on the bank of river Ganga. The developments, urbanization and load of the various pollutant sources lead to deterioration of the surface water of River Gnaga along the Ghat. In the present paper physico-chemical quality parameters of four major Ghat of river Ganga existing from ancient time at the Varanasi city studied in the February 2015. The important water quality parameters studied were temperature, pH, conductivity, total dissolved solid (TDS), acidity, chloride, total alkalinity, hardness, nitrate, phosphate, dissolve oxygen (DO), biochemical oxygen demand (BOD). All four ponds site have objectionable water quality especially with respect to human health, biotic life and entire ecosystem. The catchment area study to find out the major contributor of the deterioration in water quality of these ghats reveal various ritual activities, municipal waste water, washing discharge of temple effluents and animals waste.

Keywords: Ponds, BOD, TDS, nitrate, physico-chemical characteristics

Introduction

Water is the most important natural resource not only of a state or a country, but of the entire humanity. The prosperity of a nation depends primarily upon the judicious use of the resource. Thus, it can be stated that the primary wealth of a nation is water, which flows in rivers and streams and maintained the ground water level. Covering the vast geographical area of 329 million hectares, Indian rivers have been an important reason for the rural prosperity of India. Being of wider importance in cultural, economical, geographical as well as religious development, its numerous rivers are of great value to India. The Rivers Ganga in India are considered as Gods and Goddesses, and are even worshiped by the Hindus. They provide tourists a wonderful insight into the historical, cultural and traditional aspects of India. Among various types of inland fresh water bodies, the riverine system is a unique type of ecosystem. The size of the drainage basin, the amount of water moving through the system, the proportion of natural versus settled areas, and man's direct impacts are all key factors determining the quality and characteristics of each watershed. India with declining freshwater resources has an acute shortage of potable water of acceptable quality. The socio-economic growth of a region is severely constrained by non-availability of safe drinking water; Government of India had constituted a Water Technology Mission for drinking water in 1987. According to a world water development report by United Nations, India as one among the worst countries with poor quality of River Ganga water. Attributing this to "inertia at leadership level" the report entitled "Water for people, Water for life" observes that "the global water crisis will reach unprecedented levels in future with growing per capita scarcity of water in many parts of the developing world." The report was compiled on the eve of the Third World Water Forum (WWF) held at Kyoto, Japan, March 16, 2003, by 23 UN partners constituting the World Water Assessment programme (WWAP) under UNESCO (The Hindu, May 21, 2003). The surface water resources are steadily declining because of increase in population, industrial growth, pollution by various human, agricultural and industrial wastes and unexpected climate change. Need for study, The shortage of water in the country has started affecting the lives of people as well as the Environment around them. Some of the major issues that need urgent attention are:

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- As a result of excessive extraction of ground water to meet agriculture, industrial and domestic demands, drinking water is not available during the critical summer months in many parts of the country.
- About 10 per cent of the rural and urban populations do not have access to regular safe drinking water and many more are threatened. Most of them depend on unsafe water
- Ingress of seawater into coastal aquifers as a result of over extraction of ground water has made water supplies more saline, unsuitable for drinking and irrigation.
- Pollution of surface and groundwater from agro-chemicals (Fertilizers and Pesticides) and from industry poses a major environmental health hazard, with potentially significant costs to the country. Keeping the above criteria in mind, an attempt has been made in water quality assessment and prediction of religious ghats, in Varanasi, Uttar Pradesh, India.

Objectives of the present Study

- To study the dynamics water quality of Ghats along the bank of river Ganga in Varanasi City.
- To study the contribution of anthropogenic activity and their impact on Selected Ghats.
- To study the water related issues.
- To study the correlation between different Physico-chemical parameters of water.

Literature Review

This chapter reviews the literature relevant to the objective of the study, i.e., status of water quality. Significant amount of work has been reported on the quality of water. A discussion on the current thinking about the water quality has also been incorporated. The most common and wide spread threat associated with water is contamination, either directly or indirectly, by sewage, by other wastes or by human or animal excrement. If such contamination is recent, and if among the contributors, these are carriers of communicable enteric diseases, some of the living casual agents may be present.

Pollutional effects due to discharge of domestic sewage and industrial effluents into the Indian rivers have been studied by many workers *viz.*, Bhimachar and David (1946) [5] studied the effect of factory effluents on the Bhadra river fisheries at Bhadravati. Ganapati and Alikunhi (1950) studied factory effluents of Mettur chemical and Industrial Corporation Ltd, Mettur Dam, Madras (Chennai) alongwith their pollutional effects on the fisheries of Cauvery River. Ganapati and Chacko (1951) reported about the effects of pollution on Godavari River due to wastes of paper mills at Rajahmundry. Motwani *et al.* (1956) studied the pollution of river Sone by factory effluents of the Rohtas Industries at Dalmianagar. Bhaskaran (1959) studied the effect of industrial waste on river pollution in Bihar and Uttar Pradesh.

Narmada River. Verma and Khan (2016) reported that rapid urbanization and increased anthropogenic activities have been deteriorated the water quality parameter of Arpa river water of Bilaspur in Chattisgarh.

Verma and Saksena (2017) studied the water quality and the pollution status of river Kalpi at Gwalior (Madhya Pradesh) and concluded that the main cause of pollution is the organic pollution due to anthropogenic activities. Sujitha *et al.* (2011) studied the water quality of river Karamana at Trivendrum (Kerala) and concluded that the main causes of low DO and

High BOD in the river was due to organic detritus, weed growth and biomass degradation in the benthic layer.

Conclusion

Results of physico-chemical parameters of River Ganga water along the Ghats in Varanasi city as studied in the present investigation clearly shows that the water is not good for human consumption and also struggling for their existence. So there is an immediate need of restoration, improvement and proper management of these secret water bodies for the human and environment.

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