

Study and Analysis of Changes in Water Quality of Gomti River at Different Locations: A Review

Ashutosh¹, Kamal Nabh Tripathi², Dr. Arif Siddique³

¹M. Tech Student, Department of Civil Engineering, Babu Banarsi Das University, Lucknow

²Assistant Professor, Department of Civil Engineering, Babu Banarsi Das University, Lucknow

³Associate Professor, Department of Civil Engineering, Babu Banarsi Das University, Lucknow

ABSTRACT:- According to the U.S. Geological Survey, there are over 332,519,000 cubic miles of water on the planet Earth among which 97% of all the water on Earth is held by the oceans and contains heavy composition of salt in it and most of the remaining 3% is frozen in the glaciers and icebergs. The atmosphere, rivers, lakes and underground stores hold less than 1% of all the fresh water and this small amount has to provide the fresh water needed to support the Earth's population. River plays a very important role in the life of human beings as well as the other living organisms like animals and plants on the earth. River used to be one of the most important source of clean water during earlier days but nowadays due to the heavy contamination the quality of water of river is decreasing day by day.

In this project work we are going to do analysis of physical and chemical parameters of water of Gomti River in different season at three different locations. The collected samples are analyzed for 8 Physiochemical parameters such as temperature, pH, BOD, DO, COD, Total Hardness, TDS and Alkalinity.

Keywords: Gomti River, water quality of River, pH, Physio-chemical parameters.

1. INTRODUCTION

As the population increasing day by day the demand of water for food production, domestic activities as well as industrial activities also increasing day by day. As we already know that the water is the most essential need for life and over 97% of the water on earth is holds by the oceans is salty and 3% is in frozen state and remaining amount which is approximately near about 1% is considered suitable for living beings on earth. Water is no doubt essential for life but the large quantity of water in the world is polluted due to the excessive contamination and inputs of untreated industrial effluents, household dirty water and sewage water along with farming wastes and decaying materials of human, animals and plants. The quality of water is vital concern for mankind since it is directly linked with human welfare and due to the limited quantity of available water for use, proper management and prevention is very necessary to fulfill the long term requirement and needs of the vast population for daily house hold use and requirements like agriculture etc.

The Gomti river is an important river of Uttar Pradesh and it is one of the much known tributary of Ganga river. Gomti river is also known as Adi- Ganga. It contributes about 15% total water flow of Ganga river and Like many other rivers in India Gomti river is also facing many kind of pollution problems due to large level of commercialization and colonization.

1.1 Origin

The river Ganga is considered as one of the longest river in India. It has many tributaries and river Gomti is also one among them. Origin of river Gomti takes place from about 50 Km south of the Himalayan hills and about 3 Km east of Pilibhit in Uttar Pradesh. It extends to 900 km through Uttar Pradesh and meets the Ganga River near Saidpur Kaithi. 27 kilometers (17 mi) from Varanasi district. From 20 kilometers (12 mi) its origin it meets a small river, the Gaihaae. Until it reaches Mohammadi Kheri (Lakhimpur district) the Gomti river is in a narrow stream, where it is joined by many tributaries such as the Sukheta, Andhra Chohaand Choha. With the joining of many other tributary like kathina in Mailani and Sarayan in Sitapur district the river is well defined.. Near Jaunpur one of the major tributary the Sai River also joins the Gomti river.

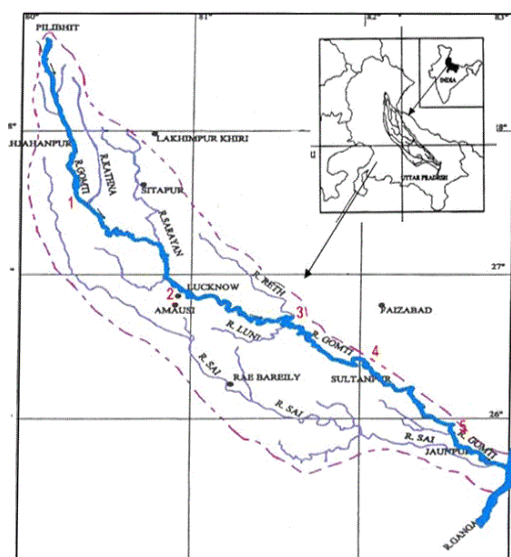


Fig 1. Route map of Gomti River

The river Gomti enters Lucknow after travelling approximately around 240 km. For about 12 km going through the city it supply its water to most of the places of the city. Situated on the northern western shore of Gomti river and surrounded by Barabanki from eastern side and Unnao from western side, Rae Bareilly by the southern side and Sitapur - Hardoi by northern side is the Lucknow city which has elevation of 404 ft. (123 m) above sea level. The city covers an area of 2,528 square kilometers. In addition to Lakhimpurkheri, Sultanpur and Jaunpur, Lucknow is also among 15 of the most prominent town of the river catchment basin.

2. LATEST RESEARCH TRENDS

Some existing literatures or research papers is discussed. These literatures are very useful to present the current work.

M.K. Singh et. al. [8] state in their paper that the water quality of the river is so bad that it has even let to the contamination of underlying ground water. As a result of which, women and children especially young girls have to cover a tiresome journey of 2-2.5 kms everyday to fetch clean drinking water for their families. Around 80 percent of ocean pollution enters our seas from the land. Virtually any human activity can have an effect on the quality of our water environment. When farmers fertilize the fields, the chemicals they use are gradually washed by rain into the groundwater or surface waters nearby. Sometimes the causes of water pollution are quite surprising. Chemicals released by smokestacks (chimneys) can enter the atmosphere and then fall back to earth as rain, entering seas, rivers, and lakes and causing water pollution.

Nuzhat Parveen and S.K.Singh [4] aimed to determine the current status of river Gomti along the Lucknow stretch in their study. Physico-chemical characteristics, level of organic matter, various heavy metals and sewage pollution and their variation has been studied from upstream to downstream of Lucknow. Gaughat is upstream region and Pipraghat is downstream of Lucknow. The samples are taken from upstream to downstream regions of the river. Water samples are subjected to analysis like Total Solids, Total Dissolved Solids, Total Suspended Solid, Conductivity, pH, COD, BOD and DO. Study concluded that large number of drains are responsible for pollution in river Gomti that enter directly into the river carrying untreated industrial and domestic waste. Some other causes are like removal of solid wastes at pumping stations is still manual, sometimes pumping station does not work, so the sewage waste is by passed directly to the river Gomti or when most of the branch and trunk sewers do not function properly. Study indicates that the water quality has been deteriorated from Gaughat to Pipraghat due to discharge of untreated waste water from about 26 major drains in its entire course. Water of the river Gomti at upstream of Lucknow i.e. Gaughat showed

minimum BOD and maximum dissolved oxygen. But due to the presence of 26 drains dissolved oxygen level decreases along its stretch and showed minimum DO at Pipraghat.

Tiwari et.al.[5] state that the water quality of rivers is an issue of serious concern today. Rivers are heavily impacted due to their use for carrying off the industrial, municipal, agricultural and domestic effluents. Water samples were collected for the present study from the Ganga River at Kanpur, Allahabad and Varanasi sites, during the period 2011-2012. The minimum temperature (17°C) was recorded in winter season. The pH, TDS, EC, sulphate, phosphate, nitrate, BOD and COD values exhibited their minimum at Allahabad site. The chloride and dissolved oxygen were recorded minimum at Kanpur site while alkalinity and total hardness had their lowest values at Varanasi site. The water quality of the Kanpur site was very poor compared to Varanasi and Allahabad sites. However, the Ganga river waters could host some tolerant fish species such as the exotic *Cyprinus carpio* and *Oreochromis niloticus* and also catfishes. All these species are very hardy, in respect of poor water quality, thus they (exotic species) have powerfully invaded in degraded systems worldwide.

4. CONCLUSIONS

In this present study we conclude some parameters of water quality of Gomti river in summer and winter seasons at three different locations i.e. Sitapur, Lucknow and Sultanpur. The different parameters of quality of water is analyzed at three different location in summer season and winter season. The parameters in terms of temperature, pH, DO (Dissolved Oxygen), BOD (Biological Oxygen Demand), COD (Chemical Oxygen Demand), Hardness, Alkalinity, Total Dissolved Solids (TDS) were analyzed. This analysis conclude some very valuable conclusions as mentioned below:

A. The DO, TDS, parameters at some of the sites were beyond acceptable limit, water was polluted and is not suitable for favorable uses without conventional treatments.

B. The river is highly polluted due to discharge of domestic and industrial waste through several drains.

E. The parameters like pH, Total Dissolved Solids, also confirm a severe deterioration in river water quality.

G. It is also found that, due to lack of sincere and serious approach towards the treatment and disposal of industrial waste water by industries the condition is worsening day by day.

It is realize that urgent steps are needed to restore the water quality and regenerate the aquatic ecosystem in the river.

REFERENCES

- [1] Srivastava S.C., Verma P. and Tripathi M. Comparative Analysis of the microbial load in cat fish (*Mystus aor*) And Carp fish (*Labio bata*) from Gomti River, Lucknow India, *Flora and Fauna* (20) pp.77-82,2014
- [2] UPPCB:<http://www.indiawaterportal.org/news/report-Uttar-Pradesh-pollution-control-board-uppcb-reveals-deteriorating-condition-Gomti-river>. 2013.
- [3] Kumar A. and Shukla M. Physico-chemical characteristic of Sai River at Raibareilly in relation to its population. *Journal of Eco-physiological Occupation Health*. pp.33-38. 2002.
- [4] Nuzhat Parveen and S.K.Singh," Physico-Chemical Characteristics of Gomti River at Lucknow Stretch,India." *International Journal of Advanced Research* (2016), Volume 4, Issue 7, 749-759 .
- [5] Tiwari A, Dwivedi AC, Mayank P (2016) Time Scale Changes in the Water Quality of the Ganga River, India and Estimation of Suitability for Exotic and Hardy Fishes. *Hydrological Current Res* 7: 254. doi:10.4172/2157-7587.1000254
- [6] Singh, K. P., Mohan, D. and Mallick, A. 'Studies on distribution and fractionation of heavy metals in Gomti river sediments—a tributary of the Ganges, India'. *Journal of Hydrology*, v. 312, pp. 14-27. 2005.
- [7] Singh V. K., Singh K. P. and Mohan D. 'Status of heavy metals in water and bed sediments of river Gomti- A Tributary of the Ganga River, India'. *Environmental Monitoring and Assessment*, v. 105, pp. 43-67 .2005.
- [8] M K Singh, Mukesh Ruhela , Vishal Kumar and V K Bhatnagar. To Study of Water Quality from River of Lucknow and Effect on Human Health. *Int. Arch. App. Sci. Technol*; Vol 8 [2] June 2017. 51-55.

BIOGRAPHIES



Mr. Ashutosh is pursuing M.Tech in Environmental Engineering from Babu Banarasi Das University, Lucknow. He also holds a B.tech degree in Civil Engineering.



Mr. Kamal Nabh Tripathi is currently working as an Assistant Professor in Department of Civil Engineering at Babu Banarasi Das University (BBDU), Lucknow. He holds a M.Tech degree in Environmental Engineering from Integral University, Lucknow. He has teaching experience for almost 4 years. His teachings areas are subjects related to Environmental engineering like Waste Water technology etc.

He has also published many research papers in many international as well as national journals.



Dr. Arif Siddiquie is currently working as an Associate Professor in Department of Civil Engineering at BBDNITM, Lucknow. He has been awarded PhD in Environmental Impact Assessment (EIA) in the year 2009 from Baba Saheb Bhimrao Ambedkar (A Central) University Lucknow and also holding a M.Tech. degree in Environmental engineering from Department of Civil Engineering Integral University, Lucknow. Besides teaching and research assignments he has also worked as a consultant to the Indian Minister of State Maneka Gandhi in the Ministry of culture and Ministry of Statistics & Programme Implementation Govt. of India, Shastri Bhawan, New Delhi, India where he developed a state-of-the art on foreign funding sources for non-profit sectors in India. He has also published various research papers in various reputed national and International journals.