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STUDIES OF METALS DISTRIBUTION IN GOMATI PATHWAY AND SAI RIVER WATER IN JAUNPUR DISTRICT

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ABSTRACT

The Sai River is considered to be a sacred river in the Indian state of Uttar Pradesh. The purpose of this research is to determine the purity of the river's water. River Sai is a significant river in Uttar Pradesh. Its beginnings may be traced back to a pond in the Jaunpur district, and it ultimately flows into the Gomati River in Rajepur, also in the Jaunpur region. In the state of Uttar Pradesh (UP), the Sai is revered as a sacred river. Total of six water samples from each district were collected, and then 18 physicochemical parameters were analyzed and used for the calculation for the water quality index of the samples and categories water in the rating of 0-100. The results showed that the water quality at districts, is good, and the districts Unnao and Lucknow are in excellent rating, while the other three districts Raebareli, Pratapgarh, and Jaunpur were in moderately polluted categories, and the maximum water quality was found in.

Keywords: *Drinking water, Physicochemical parameter, Water Quality Index*

INTRODUCTION

The majority of ancient civilizations were established on or around riverbanks. Even in modern times, millions of people all over the globe continue to make their homes on the banks of rivers and are dependent on those rivers for their continued existence. A significant river in Uttar Pradesh, the Sai begins as a pond in the hamlet of Bijgawan, which is located near Pihani in the district of Hardoi. After travelling for around 600 kilometers, it forms the district border between Lucknow and Unnao. It ultimately meets up with the Gomati River in Rajepur, which is located in the Jaunpur district, after travelling through the districts of Hardoi, Raebareli, and Jaunpur. Locals in Hardoi refer to this section as "Jhabar," which is also the location where the Bhainsta River originates. The river is known by its more common name, Sai, once it has flowed for at least ten kilometers. The length of the river as it winds through the Raebareli region totals close to one hundred kilometers. The Gomati River has a length of 940 kilometers, and it drains a total land area of 30,437 square kilometers. The Ghaghara catchment may be found to the north of the Sai watershed, while the Ganga catchment can be found to the south.

The Sai River travels over alluvial terrain for the majority of its course, and it delivers silt that originates from the Himalayan region. During the course of its lengthy voyage, the river collects water from a number of different streams, including the Bhainsta, Loni, Sakarni, and Bakulahi rivers. The quality of drinking water has emerged as a pressing problem in a number of nations, particularly as a result of the growing fear that fresh water may become a limited resource in the foreseeable future; hence, a water quality monitoring program is essential for the preservation of fresh water supplies. Water is a natural resource that is absolutely necessary for agriculture, industrial production, transportation, and a whole host of other manmade pursuits. It is necessary

for all forms of life and accounts for between 50 and 97% of the weight of plants and animals, as well as around 70% of the weight of the human body. According to figures provided by the WHO, more than 20% of the world's population does not have access to clean water for drinking, and more than 40% of the world's population does not have basic sanitation. There are still numerous regions around the globe that struggle with serious issues related to water quality. In many circumstances, it may restrict the use of the essential resource, and in the most severe instances, it can cause damage to both humans and other forms of life. Pollution in water may be caused by compounds that dissolve in the water, as well as by solid particles and insoluble liquid droplets that get suspended in the water.

Sadly, the majority of the world's most important rivers are severely impacted by pollution. It is believed that waste from human activities in communities accounts for four times as much wastewater as effluents from industrial processes do. It is estimated that community trash from human activities amounts for four times as much wastewater as industrial effluents, the majority of which is released untreated or partly treated into the river. This is due to the fact that community garbage comes from human activities. The presence of organic contamination in the River Gomati was attributed by Gupta and Pankaj to human activity. It was discovered that the majority of the River Gomati's water characteristics in Sultanpur (Uttar Pradesh) exceeded the allowed limits as a result of the discharge of sewage, which created difficulties for the continued existence of both human people and aquatic life. In addition, sewage, home wastewater, municipal wastewater, and industrial wastewater are continually and daily discharged into the river from the city. Pollution was discovered by Shyamala and colleagues near the banks of the Cauvery River and the Kalingarayan Canal in and around Erode town, which is located in Tamilnadu.

According to the findings of the research, the amount of pollution load at river Cauvery has grown as a result of the movement of fertilizers, agricultural ashes, industrial effluents, and anthropogenic wastes. The researchers Tripathi and colleagues detected a decline in the quality of the water in the River Rapti near Balrampur in Uttar Pradesh. The Water Quality Index (WQI) is an extremely practical and effective approach for determining whether or not water quality is suitable for a certain purpose. In addition to this, it is a very helpful instrument for transmitting the information on the overall quality of water to concerned individuals as well as policy makers. The Water Quality Index (WQI) is a number without dimensions that is calculated by normalizing water quality factor values to subjective grading curves in order to aggregate several water quality variables into a single rating. The factors that are going to be incorporated in the WQI model might change based on the specified uses of the water and the preferences of the locals. In order to incorporate the many aspects of water quality, water quality indices, or WQIs, have been established. A Water Quality Index (WQI) condenses extensive quantities of data on water quality into simple categories (such as "excellent," "good," and "bad") so that management and the general public may get consistent information.

OBJECTIVES

1. The Study Metals Distribution in Gomati Pathway.

2. The Study Sai is an important river of Uttar Pradesh, originate from a pond in Jaunpur District.

When designing the final network of sample stations along the river's path, the sites of industrial effluent discharges, sewage overflows, and garbage dumps were taken into careful consideration. The whole course of the rivers from upstream (origin) Hardoi district all the way downstream (destination) Jaunpur district was

covered for the research of the physico-chemical characteristics of the various parameters at different locations. This included the cities of Unnao, Lucknow, and Pratapgarh.Figure 1 provides a visual representation of the geological conditions and sample sites below.

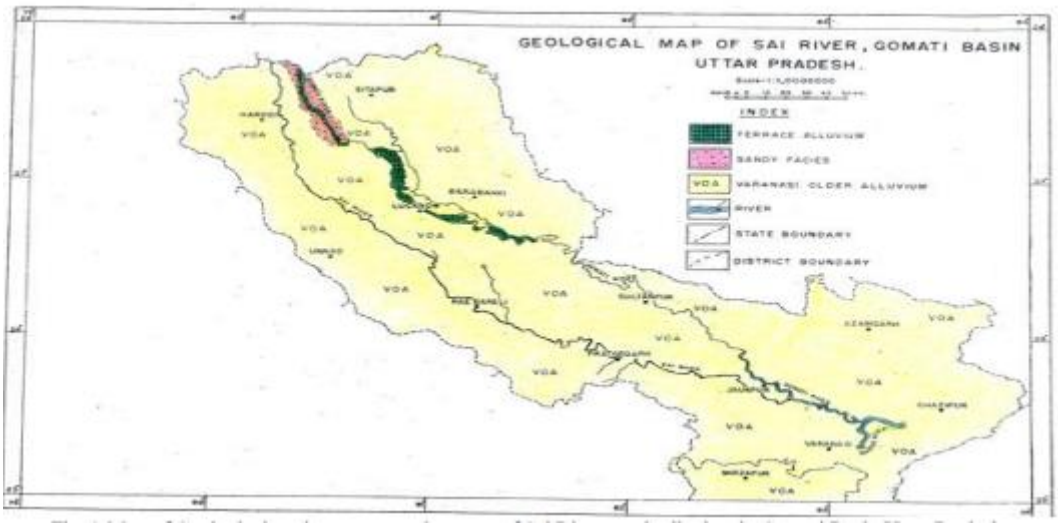

Fig: 1 Map of Geological setting covers entire route of Sai River, at six districts in Gomati Basin Uttar-Pradesh

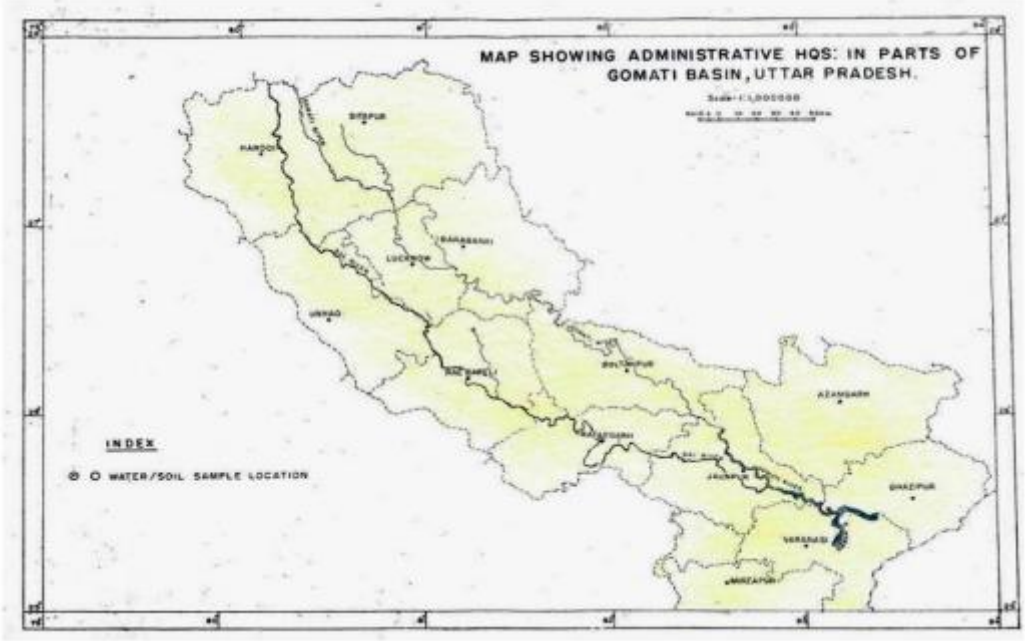

Fig.: 2 Map showing Sampling Locations from upstream to downstream of Sai River at Six districts in Parts of Gomati Basin, Uttar Pradesh

The need for water in food production, residential activities, and industrial activities is growing day by day in tandem with the growth of the world's population. As is common knowledge, water is the one resource that all living things must have in order to survive. However, more than 97 percent of the water on earth is held by the seas in a salty form, and another 3 percent is found in a frozen state. Only the remaining quantity, which is roughly close to around 1 percent, is acceptable for living creatures on earth. Water is without a doubt necessary

for life, but a vast proportion of the water in the world is contaminated owing to excessive pollution and inputs of untreated industrial effluents, unclean water from households and sewage water, along with agricultural waste and decomposing materials from humans, animals, and plants. Although water is necessary for life, the majority of the water in the world is polluted. Due to the limited quantity of water that is available for use, proper management and prevention are very necessary in order to fulfill the long-term requirements and needs of the vast population for daily household use and requirements such as agriculture. The quality of the water is a vital concern for mankind because it is directly linked with human welfare. In addition, due to the limited quantity of water that is available for use, proper management and prevention are very necessary.

The Gomati River is a well-known tributary of the Ganga River and is considered to be one of the most significant rivers in the state of Uttar Pradesh. The Gomati River is sometimes referred to by the name Adi-Ganga. It supplies around 15 percent of the total water flow to the Ganga River, and like many other rivers in India, the Gomati River is experiencing many different kinds of pollution issues as a result of a high degree of commercialization and colonization.

One of the rivers in India that is regarded to have the greatest length is the Ganga. The River Gomati is considered to be one of its numerous branches that flow into it. The beginning of the Gomati River may be located around 50 kilometers south of the Himalayan highlands and approximately 3 kilometers east of Pilibhit in the Indian state of Uttar Pradesh. It winds its way across Uttar Pradesh for 900 kilometers until merging into the Ganges River close to Saidpur Kaithi. 27 kilometers or 17 miles away from the district of Varanasi. At a distance of twenty kilometers (twelve miles) from its beginning, it reaches a little river called the Gaihaaee. The Gomati River flows along a narrow stream until it reaches Mohammadi Kheri, which is located in the district of Lakhimpur. There, it is joined by a large number of tributaries, including the Sukheta, Andhra Choha, and Choha. The river has taken on its current form as a result of the confluence of a number of other tributaries, such as the Kathina in the Mailani district and the Sarayan in the Sitapur district. In the vicinity of Jaunpur, a significant tributary called the Sai River connects with the Gomati River.

Fig 3. Route map of Gomati River

I was able to identify a number of the causes of pollution in the river water when I was out for my morning walks. I noted the extremely filthy condition of the river water. Because the Gomati River runs through an area that is practically exactly in the centre of the city, the pollution it carries poses a significant risk to the residents' health. These hazardous waters are used for bathing, and the fish that live in the river are consumed by people. The issue is a result of human activity, yet it would seem that no action is being taken to address the matter. In this essay, I explore different efforts that have been made in the past to fix the issue and recommend methods to improve the general situation. I also provide an account of my observations, provide an overview of the scientific work that has been done on this topic, and discuss various scientific work that has been done on this subject. This unattractive scene of the River Gomati in Jaunpur City may be seen in a video on You Tube.

The rain-fed Gomati River is a tributary of the Ganga River that begins its journey south of the Himalayan foot hills at Madho Tanda village in Pilibhit district in northern Uttar Pradesh. Gomath Tal, which was originally known as Fulhaar Jheel, is the source of this river. It travels over 940 kilometers to the southeast through nine districts of Uttar Pradesh, which are Shahjahanpur, Lakhimpur Kheri, Hardoi, Sitapur, Lucknow, Barabanki, Sultanpur, and Jaunpur, until reaching the Ganga at Saidpur in the Varanasi district. These districts are listed in order of their distance from the river's beginning. As it travels through densely populated areas of Uttar Pradesh, this river is subjected to massive levels of pollution from a variety of sources, including agriculture, industry, and human activity. Major towns such as Lakhimpur Kheri, Lucknow, Sultanpur, and Jaunpur are situated along this river. These cities are a major contributor to the pollution that is found in this river since they produce a significant amount of municipal and residential trash as well as sewage water. Between Jaunpur and Kerakat, in the Jaunpur district, the Sai River flows into the Gomati, making it one of the Gomati's most important feeder rivers.

The basin that the Gomati River drains is about 18,750 square kilometers in size, presented what is considered to be one of the first investigations on the contamination of the Gomati River in the area of Lucknow. There have been several articles written on the Gomati River's geology, and one of those articles was written by the author to provide a summary of the studies. The following is a concise summary of environmental studies conducted on the water of the Gomati River. This is broken down into two categories: the chemical studies, which include research on the physicochemical analyses of water, sediment, and a variety of biological entities; and the biological studies, which include research on microbes, phytoplankton, macrofauna, and fishes. The summary that has been provided here contains condensed summaries of the pertinent aspects, the majority of which were drawn from the abstracts and conclusions of the publications.

Chemical Studies

Along its whole length of 940 kilometers, the River Gomati flows through alluvial plains that are home to a variety of agricultural regions as well as various small and big metropolitan centers. These areas contribute significant amounts of sewage that has not been treated, agricultural runoff that contains a wide variety of pesticides and other chemical fertilizers, as well as oil, asphalt, silt, and heavy metals. Industries such as tannery, sugar, drinks, paints, chemicals, fertilizers, batteries, autos, manufacturers, food processing units, cement, thermal power plants, petroleum refineries, and sewage disposal water are the primary sources of heavy metals. Heavy metals are carcinogenic and poisonous; they are a worldwide concern that has a negative influence on agricultural yields, soil biomass, and fertility. They also contribute to the bioaccumulation and biomagnification of heavy metals in the food chain of aquatic and terrestrial ecosystems. Heavy metals like as chromium, copper, nickel, lead, and zinc were identified in high amounts in the Gomati water in Lucknow. Other heavy metals

included lead and zinc. Drains, which transport industrial effluents, municipal and residential trash, sewage, and medical waste, etc., are the principal source of pollution inside the city borders. Drains convey these types of garbage. This is also true for the water of the Gomati that is found inside the municipal boundaries of Jaunpur.

Environmental studies on Gomati River in Jaunpur

Scientists mostly working in the colleges of Jaunpur district and Varanasi have carried out a number of environmental research in the Gomati River inside the city boundaries and effectively proved how municipal and residential garbage as well as sewage water from the city drains damage the river. The investigations were carried out in the city limits of Jaunpur district and Varanasi. They conducted research on a variety of microbiological, physical, and chemical proxies in order to reveal the varying degrees of pollution found in the water of the Gomati. In a groundbreaking effort for the Gomati River, researchers in Jaunpur,UP, India, conducted in-depth research on the ecological analysis of the Gomati River when it was being impacted by the city's municipal trash. Investigation of algal phytoplankton from four locations along the Gomati River in Jaunpur City and discovered 44 species belonging to Cyanophyceae, Chlorophyceae, Euglenophyceae, and Bacillariophyceae carried conducted a detailed study of the phytoplanktonic community in the contaminated ponds of Jaunpur.

They discovered a positive association with pH, dissolved oxygen (DO), alkalinity, phosphate, and nitrate; however, they found a negative correlation with temperature and chloride. They proved that the populations of algae phytoplankton species exhibited a direct link with the physical and chemical features of the water. They also recognized algal phytoplankton Aulosira, Microcystis, Oscillatoria, Chlamydomonas, Chlorella, Pediastrum, Euglena, Cyelotella, Nevicula, and Nitzschia as pollution indicators and concluded that this river has become polluted because of various human activities at Jaunpur such as discharges from municipal and industrial sources, human excreta, agricultural run-off and burning of corpses.

Promise of beautification and de-silting of Gomati in Jaunpur in 2016

A plan to beautify the Gomati River front was initiated by the district administration of Jaunpur on April 21, 2016, according to a television report. The plan included desilting and widening of the river, tree plantation on the river banks, and treatment of sewage and polluted water before it entered the Gomati River. Additionally, the plan included tree plantation on the river banks. Additionally, desilting work was seen to be under progress in the press. The video contains this report, which you may see right now. Regrettably, I was unable to see any evidence of the promised beautifying or cleaning of unkempt drains in the administrative commitment remained nothing more than an empty promise, and in point of fact, Gomati got more dirtier as was detailed and demonstrated above.

CONCLUSION

In the current research, we draw some conclusions on the water quality of the Gomati River throughout the summer and winter seasons at three distinct locations: Sitapur, Lucknow, and Sultanpur. During the spring, summer, and fall seasons, the water's quality according to its many measurable characteristics is evaluated in three distinct locations. Analyses were performed on the parameters including temperature, pH, DO (Dissolved Oxygen), BOD (Biological Oxygen Demand), COD (Chemical Oxygen Demand), Hardness, Alkalinity, and Total Dissolved Solids (TDS). The results of this investigation reveal some highly useful facts. The river serves

as the foundation for agriculture, industry, and the well-known necessity for drinking water. The water quality index is a useful decision-making tool that provides basic information on the quality of the water in rivers, which is beneficial for the water managers as well as policy makers and other entities associated to environmental conservation so that they may plan successfully. The Sai River was found to have levels of pollution that were rated as excellent or good in the districts of Unnao, Lucknow, and Hardoi, respectively, while the other locations were rated as having levels of pollution that were rated as moderate.

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