Status of different Rivers of India in last One Decade: A Review

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ABSTRACT

Nature's three priceless gifts to humanity are air, water and soil. The most essential part on earth is water because it serves as the basic medium for the origin of life. At present due to rapid development, deforestation, and modern agricultural practices this life-giving component is under stress. River water is a pivotal natural resource for drinking. Over the last ten years, In the river water, remarkable changes have been introduced by human activity due to which many rivers in India are affected through poor quality of the water. The safe use of river water for drinking and for other purposes is still seriously questioned by the advancement of human civilization. This review article is an attempt to summarize the findings of earlier studies on river water pollution conducted by different researchers. It is concluded that some rivers are less polluted, some are moderately and some are heavily polluted. Social awareness should be raised and contamination levels in river water must be regularly observed in order to improve the quality of the river water.

KEY WORDS

Pollution, Human Activities, Water Quality, Rivers.

INTRODUCTION

One world wide issue is pollution. Pollution is the release of hazardous substances into the environment. These hazardous substances are known as the pollutants which damage the air, water and soil quality. Pollution is mainly caused by things that are useful for human beings. All life forms present on the surface of the earth require a supply of water to fulfill their daily needs.

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In the last ten years, activities that are responsible for creating pollution have immensely changed aquatic life. The most serious problem facing the world right now is keeping up a sufficient supply of clean drinking water. There is a noticeable shortage of clean water almost everywhere. To conserve water for various purposes like agriculture, industries, power plants, drinking water sources, fisheries, etc. India has obstructed a number of rivers, streams, brooks and springs (Jadhav et.al., 2017). The safe utilization of river water for drinking and for other uses has recently come under scrutiny. The river water is being contaminated due to a multitude of impurities. For the majority of developing countries, major cities, this is one of the primary concerns.

Rivers are essential in farming and the Nation's natural, cultural and economic features (Sharma et.al., 2020). India boasts an extensive river network. The majority of Indian rivers are contaminated because of the discharge of bacteria, viruses and other organic and inorganic contaminants. Another significant cause of river contamination is agricultural practices within watersheds (Gupta et.al., 2020). The multiplicity of uses of river water for business, agriculture and human consumption has led to recent surge in the importance of studying river water quality.

Rivers are the primary midland water resources which are used in industries, in homes, for irrigation in agricultural land, and also used for hydroelectricity generation (Rout et.al., 2016). River play an important role in both hydrological cycle and human ecology. Besides fisheries, industrial irrigation, giving life to all creatures, providing shelter for aquatic organisms, it is also an attraction center for tourists. The rivers are essential for the integration and carrying off factories and municipal wastewater discharge, which are a constant source of pollution in areas where surface runoff occurs often (Satya & Narayan 2018). The water coming from the drainage area affects the aquatic organisms life, disturb its habitat, quality of river water, and it's natural processes. Therefore it is important to prevent and control pollution in rivers and also have accurate information about river water quality for its efficient management. The goal of this write-up is to provide an overview of the results of previous investigations on river water contamination carried out by various investigators.

Researches in different Rivers of India

Water pollution in India is a critical issue where most surface water resources are contaminated with organic and inorganic pollutants. This poses a safety risk for human use and the ecosystem. A study assessing the quality of water in the *Ghaghara River* analyzed heavy metal and physico- chemical characteristics. The study focuses on evaluating water pollutants, their impact on aquatic animals and the purpose of irrigation. It also evaluates cost effective bio-absorbents to the public. Results showed that turbidity and iron levels exceed BIS and WHO's permissible limits. Turbidity during pre- monsoon was 2.69 NTU, while TDS levels were 227.09 PPM indicating man made solids. Other parameters were within safe limits but iron content was 0.77 PPM, while the post- monsoon level was 1.94 PPM, indicating the need for iron management (Diwakar et.al., 2022).

This study investigates water quality in Indian rivers, focusing on *Brahmaputra River*. It tests a monotonic trend in water parameters where eight water parameters are recorded for 17 years to analyze the water quality using indicators, and uses a new algorithm to determine regional and temporal trends. Water quality indexes (WQIs) are crucial for assessing water quality over time and making informed decisions on water management policies in water scarcity conditions. High WQI classes indicate low risk for the population consuming water. Regulations set allowable limits for water parameters and WQI use should be correlated with these values. Other indicators such as Na, Cl, bicarbonate ions, Mg, Mn, phosphates, and TDS concentration were used to estimate water use suitability for agriculture. Results showed a decrease in water quality after 2015 (Barbulescu et.al., 2021).

The *Gomti River*, originating from Pilibhit district, Uttar Pradesh, is a major source of pollution, posing health risks to human health. The research uses GIS interpolation to analyze water quality at different sampling points and identify pollution sources. The study found that Gaughat and Pipraghat locations possess average

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polluted water, while other sites possess highly polluted water and unsuitable water for human use. High WQI values are due to alkalinity, calcium, iron, sulfate, and chromium in groundwater, and leaching of waste from urban residents. The river receives sewage waste, runoff from agricultural land, pesticides, fertilizer, and street washouts, bringing heavy metals and other pollutants, which are harmful for its aquatic life (Pathak & Patel 2021).

The COVID-19 lockdown has partially improved the environment. It is examined through research with the *Damodar River* in India. The Damodar river runs through the two Indian states one is the Jharkhand and other is the West Bengal. Large scale mining and industrial activity are well known in the valley, which has abundant mineral resources. Damodar river is experiencing significant deterioration in water quality before lockdown. Data was collected during pre-lockdown, lockdown and unlock periods. Results show that 54.54% of samples Showed positive changes, with 27.27% of water quality being good. The lock down effects brought the river water to an oligotrophic/ meso eutrophic condition, indicating potential to upgrade river health (Chakraborty et.al., 2021).

The *Ganga River* is revered as a goddess in India. The river is getting worse despite everyone's admiration for it, and we Indians are powerless to keep it pure. The water of river Ganga is considered holy and has curative qualities. Beyond these myths, the river is the main source of water that has sustained life for ages.Millions of untreated household and industrial waste particles are dumped into the Ganga river, causing the river to appear to be steadily drying up. A very serious issue that is both directly and indirectly impacting our nation is the persistent increase in pollution. The river is being used to harvest water continuously at an unsustainable rate, which is causing the water quality to deteriorate. Overexploitation will have negative effects on the environment of the river and the health of the local people, who will be susceptible to several water borne illnesses brought on by the contaminated water (Jhariya and Tiwari, 2020).

Mishra (2020) told the story of lockdown impact on water bodies. The 68 days lockdown gave a magical impact on all rivers of Bihar. The quality of different rivers of Bihar such as *Ganga*, Sone, and Kosi improved considerably. All industries were closed during lockdown that failed to put their toxicity in the Ganga river. Dolphin is an indicator of the quality of water that appeared on different ghat of Patna. More and more dolphins were visible at the Vikramshila Dolphin Sanctuary due to clean and undisturbed water flow. Number of small fish, frogs and turtles also increased in water bodies during the lockdown. This paper concluded that cessation of anthropogenic activities cleaned the natural resource and increased the number of precious aquatic fauna.

The *Yamuna River's* water quality in Delhi is significantly deteriorating, with high value of contamination in Najafgarh and Shahdara drain intermixing zones. These sites are under category 'E' for the river Yamuna Delhi stretch in context of pH, BOD, electrical conductivity and total coliforms. The study also found seasonal variation in parameters like TDS, TDS, electrical conductivity, BOD, COD, suggesting a significant input from agricultural land through the runoff processes and increased influx of domestic and river site waste into the river water system. The study suggests that Delhi is the principal contributor to pollutant discharge into the Yamuna river, and adequate attempts are required to prevent further deterioration. This may include proper treatment of sewage and Industrial discharge, measures to avoid open defecation, and control of riverside waste and agricultural runoff (Bhardwaj et. al.,2018).

Sonrakh River of Gujarat, a major source of water originating in the Girnar Hills of Junagadh city, plays an important role in human life. The study analyzed nutrient parameters in the Sonrakh river focusing on human activity and sewage disposal. Results showed moderate pollution, with physico-chemical parameters within permissible limits. Hardness of the water focusing on calcium and magnesium are more prevalent due to their domestic utility. The principal cause of worst water quality was high anthropogenic activities (Vyas et.al., 2018).

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Gautam & Sharma (2018) investigated Physical and chemical properties of the *River Parvati*. It is a tributary of the River Chambal. All the physico-chemical parameters were analyzed during September to may. It was found that monitoring was satisfactory but during these months some parameters showed higher value due to increased suspended particles from runoff and higher temperature. It was concluded that the river was mildly polluted.

One of the researches carried out (Shah & Joshi, 2017), on river Sabarmati. The *River Sabarmati* is a well known river which flows in Gujarat. This investigation assessed the Sabarmati River's water quality using the water quality index (WQI). WQI is a most valuable and distinctive rating technique to depict water quality status. To detect WQI weighted arithmetic water quality indexes were applied because it needs fewer parameters and incorporates data from multiple parameters into a mathematical equation. Six parameters such as pH, DO, BOD, electrical conductivity, nitrate and total coliform were tested. The study found severe impacts from human activity and sewage disposal, with highly urban areas showing the worst water quality. The major cause of poor quality of the river water were increased human activities, untreated sewage discharge, lack of purity, exposed river sites and urban discharge.

Jadhav et.al*., (2017)* carried out research to assess the water quality of *Krishna River* in rural areas for safe drinking. One of India's longest rivers is the Krishna River. Collected samples were tested by standard methods and compared by WHO standards. The findings showed that excessive levels of hardness, chloride, and chemical oxygen demand were degrading the quality of the river's water. Due to human interruption, changes were observed in a number of other parameters.

The *Kolong River* in Nagaon district Assam, has been deteriorated due to human intervention including embankment. This flood control measure protected riparian areas, including Nagaon town. Due to its great traversability and rich biodiversity, the river is now static, contaminated and has little ecological and socioeconomic importance. In order to determine whether the water quality index (WQI) is appropriate for usage, the study looks at it. The findings indicated that nearly every sampling point had extremely low to inappropriate water quality. According to the results, efficient treatment methods are required to raise the quality of the river water (Bora & Goswami, 2017).

Arivoli Appavu et.al., (2016) Studied *Kaveri River* water quality. The study analyzes water samples from various sampling points to determine physico-chemical parameters. Result shows increased pollution concentration due to domestic sewage, Industrial effluents and waste disposal into the river at Erode district. Parameters included. pH, total solids, dissolved solid, suspended solids, hardness, chloride, dissolved oxygen (DO), chemical oxygen demand (COD), biochemical oxygen demand (BOD), phosphate and sulfate.The pH was noted nearly alkaline, Total solids, BOD, Phosphate, sulfate and COD were noted beyond the permissible limits. The study focuses on the need for immediate water quality management to fulfill world health organization standards. Data analysis revealed that Cauvery river water is polluted due to discharge from small scale industries, dumping of waste from markets and cities.

Rout et.al*., (2016)* assessed the physico-chemical properties of *Mahanadi River* water in Sambalpur, Odisha. The parameters included pH, DO, BOD, COD, chloride, TDS, nitrate, sulfate, total hardness, electrical conductivity and fluoride. Results showed that the water was within permissible limits except for nitrate and fluoride content. High COD Indicated pollution, indicating anthropogenic disturbances like industrialisation, construction and waste disposal. This physico-chemical study reveals that the water of River Mahanadi of Sambalpur City is in alarming condition due to rising organic and inorganic waste levels from human activity. This threatens water quality and ecosystems, posing health hazards to aquatic organisms and humans. To maintain river quality waste disposal and treatment of local drains are crucial.

The *Ramganga River*, a tributary of the Ganges river, is the most sacred and largest river basin in India. However, it lacks effective water quality assessment. The study evaluates the water quality of the river and its

tributaries. The Ramganga river and its tributaries water quality was evaluated, finding pollution limits at most sampling points, revealing high organic pollution and nutrients. The study found no significant variation was seen among water quality between the river and its tributaries. The most polluted stretches are from Moradabad to Farrukhabad via Bareilly, where phosphate exceeding 0.5 mg/L at extreme downstream from Moradabad to Bareilly, had higher organic and sulfate content (Khan et.al.,2016).

Hindon River is a tributary of Yamuna river flows in western part of UttarPradesh. The River Hindon in Uttar Pradesh, India, is severely polluted due to industrial and urban waste . A study assessed water quality using the comprehensive pollution index (CPI) and multivariate statistical analysis. The comprehensive pollution index was found to be 2.68 - 7.12, indicating the water is not fit for human use, irrigation, and other life supporting activities (Mishra, 2015).

CONCLUSION

The review article provides an overview of the river's contamination issue as of right now. We concluded that the amount of water pollution has reached an alarming level based on the aforementioned investigation. It is comprehensible from the above study that the major cause of river pollution is sewage waste water, organic waste from human and agricultural activities. The speed at which chemicals from industrial processes that release waste into the river's water are also contributing to river pollution. It is observed that the lockdown period proved to be an advantage for the rivers as the rivers became clean, and diversity increased during this time. It is concluded by the above study that even a single river is not unaffected by pollution. It is also recognised that there are three different levels of Pollution in rivers: light, moderate and heavy. It is a serious matter of concern that we people are damaging our own natural heritage. We have to accept that there are millions of generations and other living organisms will continue to thrive on this planet after us. We need to conserve water not only for the sake of our future generations but also to ensure that no one goes without it.

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