



Impact of Pollution and human activities on the riverine ecosystem

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Abstract: One of the most important resources for human life on Earth is water. The combined length of these rivers is 4272 km. However, there are issues with the chemical and physical characteristics of water i.e., the water quality of river. Most of the freshwater resources in India are declining because of the country's fast development and population increase, which has a rapid impact on the local people due to the existence of several pollutants, including pesticides, heavy metals, chemical and organic waste, and the direct release of sewage. There is hardly any water left suitable for human consumption, which raises the possibility of an epidemic of illnesses. These rivers flow through some of India's most populous cities, including Ahmedabad, Mumbai, Delhi, and the state of Uttar Pradesh. When people and other living forms come into direct contact with heavy metals and harmful compounds through contaminated river water, there is a threat of developing several fatal illnesses. This study aims to investigate the sources of water pollution in major Indian rivers and the possible health risks associated with them.

Keywords: Climate Change, Human activities, Industrial Sewage, Riverine Ecosystem, Water Pollution

Introduction

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including Ahmedabad, Mumbai, Delhi, and the state of Uttar Pradesh. When people and other living forms come into direct contact with heavy metals and harmful compounds through contaminated river water, there is a threat of developing several fatal illnesses. This study aims to investigate the sources of water pollution in major Indian rivers and the possible health risks associated with them.

The contaminants include sewage. There is hardly any water left suitable for human consumption, which raises the possibility of an epidemic of illnesses. These rivers flow through some of India's most populous cities, including Ahmedabad, Mumbai, Delhi, and the state of Uttar Pradesh. When people and other living forms come into direct contact with heavy metals and harmful compounds through contaminated river water, there is a threat of developing several fatal illnesses. This study aims to investigate the sources of water pollution in major Indian rivers and the possible health risks associated with them., and polymers. Many of these pollutants are difficult to degrade, and as a result, they pose significant pollution issues. The main impacts of industrial toxic discharges are fish kill incidents and ground water contamination. Untreated sewage and industrial effluent discharge has several noticeable negative impacts which inclines to the reduction in the purifying ability of the river itself. (Thomas and burgess, 2022).

Human activities

Human has a variety of effects on waterways. Human-produced emissions of often-harmful compounds are referred to as loads or emissions. As a result of land use and point loading within a drainage basin, solid matter, humus, specific metals, nutrients, and acidifying substances leach into watercourses. These substances alter the aquatic ecosystem in numerous ways, as well as the diversity and abundance of aquatic organisms. Moreover, the worth of a river frequently declines as a recreational resource. Human activities frequently alter the form or flow of rivers. For instance, when riverbeds are cleaned or the water movement is controlled, this befalls the capacity of river water for cleansing (Johnson et al., 2009).

(i) Illegal Mining

Mining can have a negative effect on the nearby surface and groundwater. The significant volumes of water required for mining activities such as aqueous extraction, mine cooling, drainage, and other mining operations raise the risk that these chemicals may pollute ground and surface water. Due to wastewater pollution, there are few options for disposal since mining generates a lot of waste water. These chemical-laden discharge has the indubitable potential to destroy the nearby flora. The worst-case scenario involves discharging the runoff into several forests or surface waterways. This makes disposing of submarine tailings a preferable choice. Chemical spills often lead to watershed contamination, which has an adverse



Fig.1 Dead bodies of those who died of COVID-19 float on the Ganga in Bihar's Chausa. Photo: Twitter

effect on the local population.

(ii) Climate Change

Climate change largely affects river flows by causing point effluents to dilute or diffuse pollutants to discharge into rivers. Heavy rainfall events affect the loads of sediment and nutrients in rivers, lakes, estuaries, and urban drainage systems. Temperature increases and shifting water quality influence freshwater ecosystems. The Ganga and Yamuna rivers were the most heavily contaminated river segments in the Indian River Basins. Pollution is rising quickly because of both human activity and climate change (Syed et al., 2021).

(iii) Untreated Sewage

In addition to water, untreated sewage may also contain nutrients (like phosphorus and nitrogen), solids (like organic matter), pathogens (like bacteria, viruses, and protozoa), helminths (intestinal worms and worm-like parasites), oils and greases, heavy metals (like copper, chromium, lead, and mercury), and a variety of toxic chemicals (like PCBs, PAHs, dioxins, furans, pesticides, phenols, and chlorinated organics). Runoff from streets, parking lots, and roofs can also contain these elements.

(iv) Body Dumping

i. *The Ganges, the holiest river in India, had been overflowing with corpses during covid-19*

There have been hundreds of bodies discovered buried in the sand along the river's banks or floating in it. In recent weeks, a catastrophic second wave of the epidemic has swept over India. Experts claim that although the number of illnesses and fatalities documented was

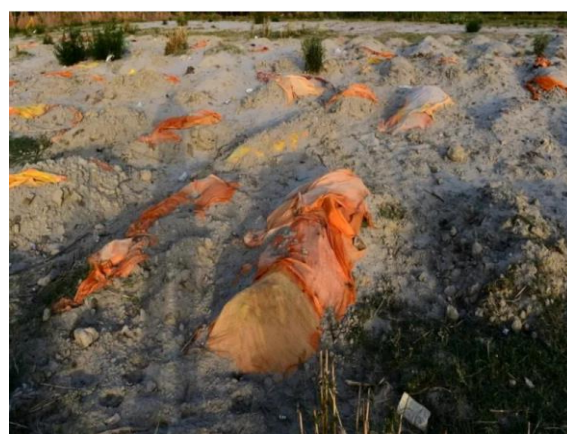


Fig.2 Hundred of corpses had been found floating in the river or buried in the sand of its banks. Photo: BCC news

over 25 million, the actual death toll was likely to be far greater. There were tales of individuals disposing of the remains of those who had died

from COVID-19 in the river as the epidemic grew earlier this year in India.

- The National Mission for Clean Ganga's current leader asserted in a recent book that dumping like this reverses the progress of the cleanup operations by five years. Yet, additional information and experience suggest that the river has become too contaminated for the corpses to have had an effect, and subsequent initiatives have also failed.

(v) *Industrial waste*

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Mineral oils and other lubricants are the major source of pollutants in the wastewater from the metal processing sector, contributing to the wastewater's high COD (Chemical Oxygen Demand) value. Active baths used in electroplating are heavily contaminated by heavy metals like zinc, nickel, copper, or cadmium.

Although there are many other kinds of water pollution, the following are the primary industrial wastes that cause it:

- **Petroleum products** are created during the production of plastics and are utilised as lubricant or fuel.
- **Heavy metals:** mostly extracted from mines, exhaust air systems, and automobile manufacturing, these elements include copper, lead, and selenium.
- Mostly originating from building and demolition sites, industry and trade, and waste treatment operations, **hazardous wastes** are extremely combustible and caustic (secondary wastes).
- **Sediments:** Non-degradable poisons slowly seep into groundwater or are agitated into the water during floods or dredging operations because of the discharge of contaminated industrial effluent. These toxins build up in aquatic sediments for years.
- Hard chrome plating, extinguishing agents, and the textile sector are the primary sources of **per- and polyfluorinated alkyl compounds** (PFAS). PFAS build up in the fatty tissue and mother's milk of mammals and are not entirely biodegradable in the environment.

The contaminants that these industrial ingredients and residues produce in wastewater can have significant effects on the environment, human health, and animal welfare.

Impact on the riverine ecosystem

(i) Human pathogenic microorganisms

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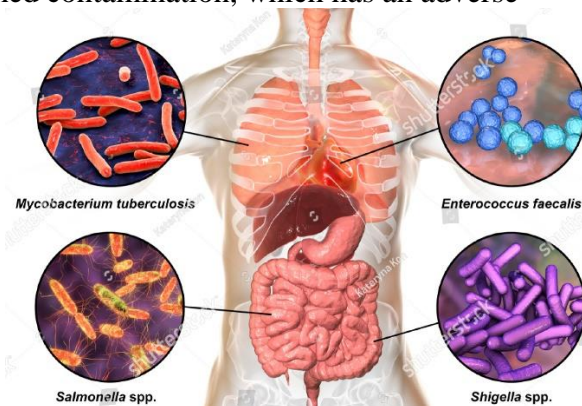


Fig.3 Human pathogenic microbes, bacteria causing respiratory and enteric infections, infective endocarditis, 3D illustration.

Conclusion

“Sooner or later, we will have to recognise that the Earth has rights, too, to live without pollution. What mankind must know is that human beings cannot live without Mother Earth, but the planet can live without humans”; a famous quote by Evo Morales could able to compel us to imagine the conditions of Humans without the planet Earth. This article, elaborate about human activities such as urbanization, farming and industrialization affect the Indian River and the health-related quality of life of residents living downstream. Pollutant effect varies in direction and intensity and has a complicated process. Hydro-chemical reactions and several ecological zones make up this system. the system with a heterotrophic type of metabolism and a high degree of substantive and energetic interaction between land and water. Polluting organic materials, heavy metals, and other inorganic materials can alter the pH of water, which can have a long-term harmful effect on the

many elements of water biocoenosis. The pollutant's influence is a shift in its effects on various trophic accumulations that are a component of the basic. Anthropogenic activities are affecting the aquatic system by means of hydro-technical irrigation and the disposal of pollutants. The natural condition of rivers is changing because of human activity. Abiotic elements such as temperature, light, and river flow, as well as changes in the hydro-food substance and substance cycle, all have a substantial impact.

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