

Discharges from Gross Polluting Industries into Ganga River Basin: An update of Critical Development

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Gross Pollution Industries (GPIs) are the industries that discharge a pollution load of more than 100 kg per day. These pollutants are even sometimes much more toxic and lethal to environment. Water flows like River Ganga, Yamuna are being affected much, thereby affecting human lives, aquatic lives, and flora and fauna. Their characteristic evaluation and spread determination are essential before estimation and application of any technology. Its chemical nature fixes its reaction with the environment, specifically with Ganga River Environment. In the present work, an attempt has been made for the characterization of all spread, released from GPIs. Satellite images from INSAT 1C are being analyzed using Arc GIS software for this purpose. The model of the spread predicts its impact on the environment. In this publication, all the development that happened during the last five-year plan has been critically analyzed to understand the application of modern India's indigenous plan.

Development and modernization are the keys to civilization as they promote industrialization. Population and habitat are found closer to any development. Thus not only industries but civilizations also discharge various kinds and magnitude of environmental pollution, affecting the health of water bodies. This problem is augmented by the release of toxic compounds, metals and heavy metals by the Gross Polluting Industries (GPIs). In India, civilizations have been started at the bank of rivers, like Ganga and Yamuna due to easy transportation and availability of life supporting commodities for thousands of years. This converts the River Ganga and Yamuna into a place of worship for all Indians. Since the spread of River Ganga and Yamuna covers a wide area of the country and flows from upper Himalayas to Sagar at Bay of Bengal, they get almost all types of waste materials, generated in all related parts of civilization. Thus regulatory agencies, including various governmental organizations, start to work to control this problem. New technologies are coming up with the development of various magnitude of problem of waste accumulation in these river bodies.

In the present work, an attempt has been made to analyze the recent development, specifically during the last five-year plan, to control the waste generation in River Ganga and Yamuna to maintain its cleanest flow.

Brief Introduction of River Ganga and Yamuna Basin

Water is one of the most essential resources to keep life on Earth alive, and River Ganga is India's most important river system. The growth of Indian civilization and the economy have significantly benefited from the availability of water that is accessible year-round. The river has a basin size of 861,404 km² and is the world's thirtieth-longest river. 25% of India's water resources come from this river network. With an average population density of 520 people per km², the Ganga basin is one of the world's densely inhabited regions. The basin supports over 300 million people in Bangladesh, Nepal, and India, with a vibrant history, culture, and religion. At an elevation of around 3800 meters above mean sea level in the Garhwal Himalaya, in the Uttar Kashi district of the Indian province of Uttarakhand, the Gangotri glacier is where the Ganga river system begins.

The primary river channel extends for roughly 2550 km from its original source. Following its passage through the Sivalik Hills, the river enters the plains at Haridwar and continues its southerly course through the plains of Uttar Pradesh. The river enters Bihar in the Rohtas district after leaving Uttar Pradesh. It flows towards West Bengal province from Bihar. It is split into two arms around 40 kilometers below Farakka. The right branch, known as Bhagirathi, continues to flow south through West Bengal while the left arm flows eastward into Bangladesh. Hooghly is the name of the branch of the Bhagirathi that flows west and southwest of Kolkata. It turns towards the south after passing Diamond Harbour and splits into two streams before arriving in the Bay of Bengal. There are several tributaries of the Ganga River, many of which originate in the Himalayas and have abundant water resources. Despite being a river that flows into the Ganga, the Yamuna is a separate river. The Yamuna River spans around 1376 km. In Prayagraj (Allahabad), Uttar Pradesh, it joins the Ganga River after traversing Uttarakhand, Delhi, Haryana, and Uttar Pradesh.

Present Work

In the present work, a portion of specific sorts of GPIs that follow the distilleries and pulp and paper industries has been considered. These are Food, Dairies and Beverage in-

dustries. All the flows from these industries have been analyzed into the River Ganga and Yamuna. Its carrying capacity which are affected by these GPIs discharges, has been evaluated to understand the impact so that technical design and solution can be suggested. Clear flow in these rivers can be maintained to restore their Holy Worship; ultimately, this will help humankind.

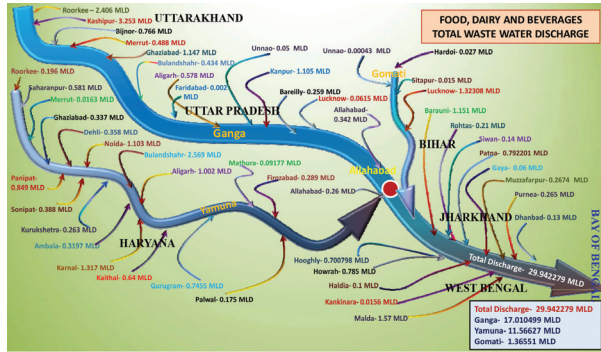


Fig. 1. Total industrial wastewater discharge

Map represents the location of 162 GPI inspection sites of Food, Dairy, and Beverage sector in seven states of India namely Delhi, Haryana, Uttar Pradesh, Jharkhand, West Bengal, Bihar and Uttar Pradesh.

Effluent Treatment Plant (ETP)

Effluent treatment plants or ETP for food industries/food processing and beverage industries is the best way to overcome water pollution. Its main objective is to produce

a product that can be safely discharged into a water-course or sewer in compliance with the recommended limits for discharge.

Overall Findings

- There are 162 Food & Beverages grossly polluting industries discharging wastewater to the main stem of rivers Ganga and Yamuna, and Gomati in Haryana, Uttar Pradesh, Uttarakhand, and Delhi.
- Out of 162 GPIs, 142 industries are in Food & Dairy Sector and 20 in Beverages sector.
- Of 162 GPIs, 43 were in Haryana, 78 in Uttar Pradesh, 6 in Uttarakhand, 23 in Bihar, 1 in Jharkhand, 8 in West Bengal, respectively, and 3 in Delhi.
- The total water consumed by these grossly polluting industries is 78119.14 KLD.
- The total wastewater generated by these gross polluting industries is 21734.86 KLD which is 27.82 % of the total water consumed.
- It is observed that GPIs in Uttar Pradesh generate maximum waste-water and Jharkhand generates minimum waste-water, whereas GPI in Haryana discharges maximum waste-water and GPIs in Delhi discharges minimum.
- In the River basin, River Ganga carries the maximum Industrial wastewater of 17.010499 MLD followed by the mainstream of the river Yamuna (11.56627 MLD) and Gomati (1.36551 MLD).
- Finally, the total waste-water discharge of 29.942279 MLD is discharged into Bay of Bengal through river Ganga, Yamuna and Gomati

