

## Original Research Article

# A paradox of pollution and purity of river Ganga in India

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### ABSTRACT

The Ganga river is revered and considered to be goddess in India. The river's state is getting worse despite everyone's admiration for it, and we Indians are unable to keep it pure. A river of reverence, devotion, and faith is the Ganga. The water from this source is considered "holy" by the Indians and has "curative" qualities. Beyond these myths, the river serves as an important source of water and has provided Indians with a means of subsistence from prehistoric times. The Ganga River and its tributaries originate from pristine, uncontaminated, cool springs fed by Himalayan glaciers. However, the river encounters the densely populated cities as it runs downgradient before joining the Bay of Bengal. Its water turns from crystal clear to sewage- and trash-infested muck from its source to its fall. For millions of people living in the basin, the Ganga and its tributaries have provided significant, heavenly, and cultural sustenance for thousands of years. Over 40% of the world's population now lives in the Ganges basin due to increased urbanization. The Ganga river has become dangerously polluted as a result of the increasing population and fast industrialization along its banks.

## 1. Introduction

Since water is one of the most vital natural resources and is necessary for life, it is critical to manage it properly on a local and global scale. The Ganga (or Ganges) river, which rises from the Gangotri glacier near Gomukh and empties into the Bay of Bengal in eastern India, is regarded as the longest and holiest river in all of India. Over the course of its journey, it traverses roughly 2,525 kilometers, and its basin covers an area of about 86,1404 sq. km. [1]. The Ganges river, commonly referred to as the "blue gold," is the main water supply for northern India, but it is being overused due to the country's ongoing economic and population boom. The Ganges River holds a special place in Indian culture. The Vedas state that the river descended from heaven to earth as a result of King Bhagirathi's persistent and intense prayers for the salvation of his departed ancestors. The Ganga has long been considered India's river of reverence, devotion, and faith. It is considered a sacred river by millions of Hindus. Due to its "holy" status and reputation for "curative" qualities, Ganga water is still highly prized and carried by people both domestically and internationally.

The Ganga is a sacred and historic river in India, but the pollution in the river is rising because of the country's over 400 million densely populated area, unplanned urban growth, fast industrialization, deforestation caused by the need for urbanization, and increased use of water for various industrial and irrigation purposes. In 2007, [2], the Ganga was listed as one of the top five most polluted rivers in the world.

## 2. The pollution of Ganga River

The Ganga River is still polluted as a result of the massive industry and urbanization that has occurred throughout the basin. The Ganges is described as "a biological nightmare" due

to "the indiscriminate discharges of municipal sewage and industrial effluent generated from 48 cities and 66 large towns located on its banks," despite the fact that many Indians still believe the river's purity to be a reflection of its sacred powers.

The Ganga River is becoming less efficient as a result of the massive amount of untreated sewage and hazardous industrial influents that are dumped into it. The following are the main causes of the Ganga River's deterioration and pollution:

**City discharges of sewage and industrial effluents:** Direct disposal of sewage into the Ganga River or its tributaries (Figure 1c). The quantity of sewage generated from municipalities that exceeds the sewage treatment capacity of 12,000 MLD is 38,000 MLD, making these major sources of pollution [3].

**Cremation of dead bodies:** As the Ganga River is considered sacred, many bodies from various towns across the nation are disposed of in it (Figure 1b). It is believed that if the bodies are burnt and disposed of in the river, the deceased would attain Moksha [4].

**Runoff from agricultural practices:** The river is being contaminated by runoff from such agricultural fields as a result of the use of current farming techniques, which include the use of pesticides, herbicides, and fertilizers [5]. 40% of the nation is fed by the Indo Gangetic plain, which uses the most pesticides—60 000 MT—in India [6, 7].

**Biomedical and solid waste disposal:** Home and other solid waste that is disposed of either directly or indirectly into rivers; hospital and nursing home waste that ought to be properly treated but is disposed of untreated into rivers, resulting in contaminated water that can lead to a number of water-borne illnesses.



**Laundry:** A number of dhobis, or laundry workers, go from house to house gathering soiled clothing and washing it in rivers. River water becomes contaminated when chemicals and detergents used to clean clothes combine with it.

**Temple waste disposal:** After Hindu festivals such as Durga Pooja and Ganesh Pooja, large statues made of plaster of Paris, which is not easily soluble in water, are thrown into rivers, polluting them [8]. In Hinduism, God is worshipped with flowers, Roli, Chandan, and many colors, all of which are disposed of as waste (Figure 1a).

**Animal Bathing:** Cattle are allowed to graze freely in India, and their owners bathe them in river water, which is one of the main causes of pollution in the river.

**Industrial pollution:** As cities become more populated, there are more factories. As a result, garbage from these businesses is dumped into the rivers (Figure 1d) or into surrounding ponds or lakes, where it is carried by runoff and ends up in the river [8].

**A substantial amount of water is taken out of the river via lift canals:** The over-extraction of water from rivers is a consequence of the growing demand for water from the industrial and residential sectors, which is causing the river's water level to drop and its concentration to rise.

**Deforestation in the river's watershed and source:** As a result of an increase in runoff from deforestation, the river's pollutant level has risen.

**Building dams in the Himalayan region and doing further significant development inside the catchment area:** Moreover, dams and channels raise the river's pollutant concentration.



Figure 1c. Sewage disposal.



Figure 1d. Industrial liquid waste disposal.



Figure 1a. Disposed of flowers.



Figure 1b. Disposed of a dead body.

The Ganges River flow is maintained by the Ganga Tehri Dam in Uttarakhand on the Bhagirathi River, as well as numerous other hydroelectric projects built along its path. The river only receives dirty drains when it enters a plain because so much water is being drawn from it for industrial uses as soon as it does, which raises the river's pollution content [9].

While the Ganga has numerous sources of pollution, the Central Pollution Control Board reports that the primary sources are industrial and urban liquid waste, surface runoff from solid waste dumps and landfills, cattle bathing, body immersion in the river, and solid and liquid waste from these practices. Industrial activity accounts for around 30% of waste pollution overall, with municipal garbage accounting for the remaining 70%.

India is regarded as the most popular destination for pilgrims and tourists. As the epicenter of Lord Shiva's world and the starting and finishing point of human civilization, Banaras city enjoys great reverence throughout the nation. When compared to the source, where the water is pure and blue, the quality of the Ganges water in holy cities like Varanasi is noticeably different. The water is brown and dirty, literally bubbling at certain places with untreated sewage and effluents from surrounding tanneries.

As was previously reported in 1982, Varanasi, one of the oldest cities in India, is the holy city that observes the pollution of the Ganges due to an annual addition of roughly "3000 half-burnt human bodies, 6000 carcasses, 140-200 tons of flesh, and 200-300 tons ash (produced by burning 11000 tons of firewood)." In addition, the Ganges is contaminated by large

amounts of domestic and industrial waste. This extreme level of pollution is primarily linked to Varanasi, which is home to the magnificent Mahashmashana cremation ground. Here, the remains of revered Hindus who have passed away are burned and disposed of into the Ganges, with the belief that the

deceased may meet up with ancestors or achieve liberation (moksha) [10]. The pollution of the Ganges water is partly caused by this misguided religious notion.

### 3. Mitigation

The Ganges River is becoming more and more polluted in tandem with the population growth. As a result, one needs to give the issue careful thought and implement the necessary solutions in light of the contaminants' detrimental effects on the river and the people who use it. When the Ganga Action Plan (GAP), a comprehensive program of river conservation with the goal of improving the water quality, was introduced in 1985, it was a step towards the restoration of the nation's rivers, which were found to be in a severe state of degradation [11]. It was also envisaged that the program would eventually grow and encompass additional significant rivers across the nation. To discover a complete solution to Ganga pollution, three main problem areas must be addressed:

1. The river receives an inadequate amount of water due to the disposal of garbage into it.
2. A rise in the quantity of raw sewage being released by riverbank cities.
3. There is a lack of regulation against industries that release their waste into rivers as a point of contamination.

To re-establish the Ganga's status, the Indian government initiated the "Namami Gange Programme" and "Flagship Programme" in June 2014 as part of an Integrated Conservation Mission [12].

### 4. Solution

A major source of water in India is the nation's extensive network of rivers, which also serve as a big source of income for the vast majority of the population and supply us with transportation, agriculture, energy, and drinkable water. Therefore, it is evident that we rely on our rivers for a variety of water-related purposes; as such, protecting our rivers and ensuring their continued existence constitute a significant portion of our duty.

The government has been wasting enormous sums of money for the past few years in an attempt to prevent and reduce river pollution, but until significant steps are taken, there won't be any noticeable changes until then.

If quick, intensive environmental monitoring is implemented to ensure that they are adhering to environmental regulations, the Ganga River's water quality may be somewhat improved. Defensive and proactive methods may be used to preserve the Ganga River's water quality [5]. A defense strategy that should be implemented immediately includes strengthening sewage treatment capabilities, preventing pollution load from tributaries, and improving sewage networks. To lower the level of pollution in the Ganga, building a barrage on the main river and its tributaries appears to be a viable solution. It is necessary to educate the farmers in the catchment area of the Ganga river basin to refrain from using chemical pesticides and fertilizers carelessly.

Nowadays, almost all of the Ganga river's Ghats are used for cremation, and the deceased just dumps their ashes into the river. It is important to teach people about Vedic belief systems and customs, citing the texts appropriately. For instance, there is no puranic proof that half-burned or dead bodies should be thrown into rivers. Better wood-based crematoria must be built, and people must be trained to use electric crematoria. Due to religious convictions, individuals used to throw holy objects and puja offerings into the Ganga river, where they would float and cause an unsightly scene. The construction of a holy pond at a suitable location that might be filled with Ganga river water is one way to address this issue. The entire catchment region along the Ganga river banks needs to be replanted in order to reduce soil erosion and water pollution. It is recognized that a fast growing population has an impact on the Ganga River's water quality because new colonies are established without adequate sanitation and treatment facilities and begin to release their waste into the river. As a result, systems for monitoring and developing adequate sanitation and treatment facilities are required.

It is more frequently asserted that because we are citizens of the nation, we share equal responsibility for the conditions that the rivers suffer, even if collective duty is purely theoretical. It has also been asserted that we can encourage participation in local river and water body cleanup from various communities. Still, it isn't done correctly enough to observe any real progress. Therefore, it can be said that in order to restore the Ganga River, everyone must take an active role in its revitalization. This may be done through raising public awareness and educating people. We are still a long way from having clean rivers. Therefore, by setting up awareness campaigns, holding meetings, and disseminating information on river pollution and its hazards, we can educate the public on the causes and effects of river pollution.

The Ganga Action Plan (GAP), which was proposed as a comprehensive program of river conservation to improve the water quality, was launched in 1985 as a first step towards the restoration of the nation's rivers, which were found to be in a terrible state of degradation [10]. It was also envisaged that the program would eventually grow and encompass additional significant rivers across the nation. To discover a complete solution to Ganga pollution, three main problem areas must be addressed:

1. Waste dumped into the river results in insufficient water being disposed of there.
2. Cities near the river are releasing a growing volume of raw sewage.
3. The absence of regulations prohibiting industries from dumping their trash into rivers, which causes point-source contamination.

### 5. Conclusions

India has been aptly named the "Land of Rivers" due to the abundance of natural water sources found in its many rivers and lakes. Various people in the nation revere these rivers as deities. Still, the truth is that we never stop poisoning the environment with our self-serving actions.

Millions of tons of untreated household and industrial trash are dumped into the Ganga River, which appears to be steadily drying up. The issue of persistently increasing



pollution is quite concerning as it is having a direct and indirect impact on our nation. We are still unable to take any action in this area. The ongoing, unsustainable rate of water extraction from the river is having an adverse effect on the declining quality of the water. The environment of the river will be negatively impacted by overexploitation, and the local population will suffer from numerous water-borne illnesses brought on by the contaminated water.

The spiritual rites of the religious leaders dictate that it should not be combined with civic ethics. There are also concerns about how the Ganges, if there is no longer any water in her bed, will be considered "Ganga Ma" and live. India's inhabitants still regard the Ganges as pure and heavenly, even though it is currently one of the most polluted rivers in the country. However, pollution and over-exploitation of the river will undermine one of the cornerstones of Hindu culture. Therefore, it would appear that in order for the Ganges to become a sustainable resource, both India and the people who live there and use its water as a resource must learn from their past mistakes and take personal and collective action. But given that the nation's population has already surpassed one billion, cleaning the river is an enormous undertaking. It is our duty to preserve our ecosystem, which can only be done if we protect the rivers in our nation, which are the lifeblood of our ecosystem regardless of other religions or worldviews. In addition to the fact that the river is revered and treated like a goddess, we should protect it because it is wrong to harm the environment.

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