

# **Ganges Action for Negotiation of Gaining Environmental Stability (GANGES)**



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## TABLE OF CONTENTS

1. Mission statement.....	3
2. History/Background Information.....	3
3. Current Policies and Regulations.....	4
4. Problem 1: Water Diversion.....	6
5. Solution for Problem 1 .....	6
6. Problem 2: Anthropogenic Pollution.....	7
7. Solution for Problem 2.....	8
8. Problem 3: Endangered Species Protection.....	8
9. Solution for Problem 3.....	9
10. Summary of GANGES goals.....	9
11. References.....	10

## **Mission Statement**

The GANGES mission is to educate the public on the value of clean water in an attempt to reduce anthropogenic sources of pollution, to determine a more productive way to irrigate crops, and to protect the endangered species in India and Bangladesh, by 2028.

## **Historical Background**

The Ganges River Basin is a transboundary basin, meaning it crosses multiple political borders. The basin is primarily shared amongst India, Nepal, and Bangladesh, along with roughly a 4 percent catchment area in China. Due to the large acreage of the basin, our report focuses on the Ganges River in Northern India, between the highly polluted cities of Kanpur and Varanasi. The river flows about 2,700 km from the Himalaya mountains to the Bay of Bengal in northern India and Bangladesh. Due to the vastness of the Ganges River, it has played a huge role in India's culture, economy, and environment.

The climate of India is mainly tropical. The summer is very hot and lasts from April to October. October marks the start of the monsoon season, which includes heavy rains and floods. During this time, the volume of the Ganges increases. The Ganges is the longest river in India, stretching over 2,700 km. The Ganges has its headwaters in the Himalayan mountains. The water flows from the Himalayas to the North Indian River plain, which is a large, flat, and fertile land area.

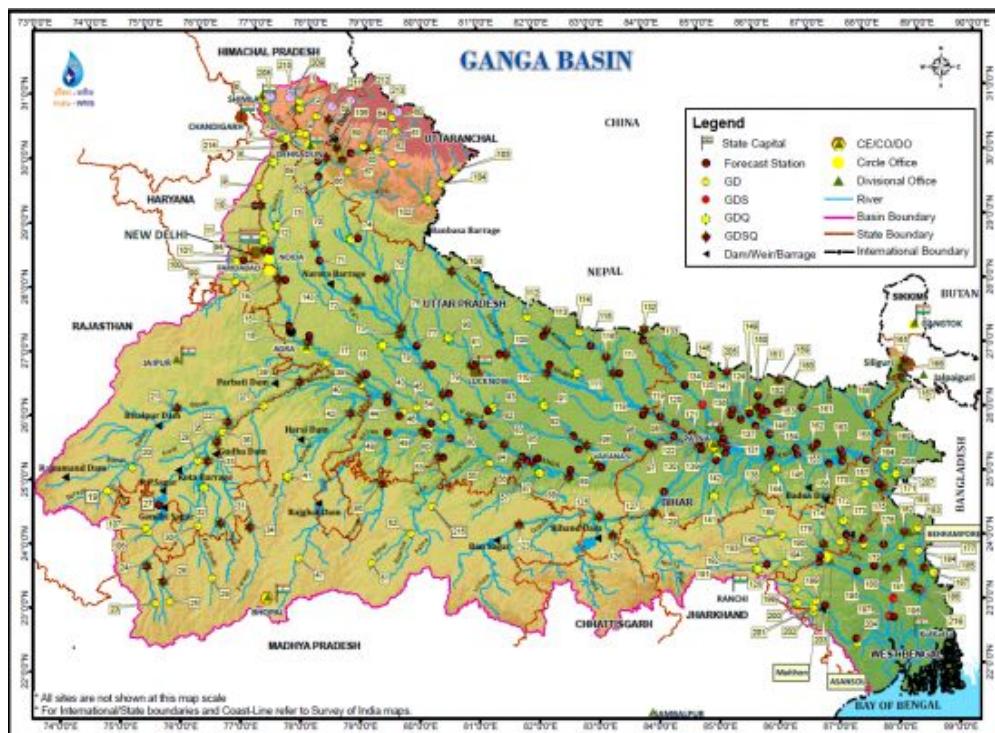
The Ganges River has been an integral part of Indian spirituality. According to Indian mythology, the Ganges River was created when the great mythological king Bhagiratha, guided the goddess Ganga across India, "where she split into many subsidiaries, and successfully washed the ashes of Sagara's ancestors in her sacred waters." The Ganges is known as a 'tirtha,' which means that it is a crossing point between heaven and earth. Since the river is a tirtha, it is believed that prayers and offerings will most likely reach the gods from the river. It is also believed that blessings from heaven can be descended from the river. Due to the large religious significance of the Ganges, to Hindus, the water is sacred and is capable of cleansing the soul and healing the body. Thus, there is much daily interaction with the river.

While the Ganges River is very sacred, industrialization and the development of the Indian economy has resulted in pollution of the river. India gained its independence from Great Britain on August 15, 1947. After gaining independence, India's first prime minister, Jawaharlal Nehru took office, in which he adopted the Nehru-Mahalanobian socialist model, in which it was his goal to transform the agricultural economy of India into an industrial one. Although there was a shift in the economic model, India's

economy was unimpressive from independence till the demise of the Nehru model in the 1980s. Afterwards, Congress adopted a policy of economic liberalization. After this shift the private sector expanded electricity generation, chemical, coal, oil, and mining industries. This shift towards modernization and industrialization resulted in the migration of the population from rural areas to cities. This industrialization has resulted in an increase of population growth, which both have contributed to higher demand for water and large quantities of wastewater discharge into surface waters and groundwater.

The United Nations held a conference on the human environment between June 5th and June 16th of 1972 in Stockholm, Sweden. This became known as the Stockholm Conference. It was the UN's first conference on international environmental issues and it marked a turning point in the development of international environmental politics. This prompted India's parliament to develop the Water (Prevention & Control of Pollution) Act of 1974, which was the first legislation in India to address water pollution. The purpose of the act is to provide for the prevention and control of water pollution, and for the maintaining or restoring the quality of water in the country. While this has been amended several times, the Water Act is still the only form of water pollution policy in India today.

## Current Policies and Regulations





The National Mission for Clean Ganga (NMCG) was formulated with a focus on sustainability. The main goal was to reduce pollution in the Ganges River by, "...adopting a river basin approach for comprehensive planning and management," (NMCG, 2009). The mission is led by the Prime Minister, with other high ranking ministers of the States as the rest of the committee. The main goal of the initiative was to revitalize the efforts for cleaning the river, (NMCG, 2009). In addition to a river basin management plan, the committee also had the power to promote water conservation practices, research programs surrounding the sources of pollution, and review of current practices.

In 1977, the United Nations signed an agreement regarding the sharing of the Ganges waters at Farakka and on augmenting its flows. It included a schedule for the plan. Representatives appointed by both India and Bangladesh formed the Joint Rivers Committee, which managed the research, implementation, and monitoring of the Ganges River at the Farakka Barrage. The UN agreement mandated that the Joint Rivers Committee submit an annual report to both governments, and should any issues arise the committee was to agree upon a solution, (UN, 1977).

More recently, Germany and India joined forces against pollution in the Ganges River. "The ultimate goal is to adopt successful river basin management strategies used for Rhine and Danube and replicate the same, wherever possible for attaining pristine status of river Ganga," (TheHindu, 2016). The agreement also stated that focus would be put on using strategic techniques, data collection and management systems, and

effective public engagement, (TheHindu, 2016). An important aspect of this relationship was the dedication to protecting the cultural significance of the river, and returning “Mother Ganga” to its pure condition.

## **Problem 1 and solution: Water Diversion**

Along the Ganges River, India has 30 water diversion practices which cause 60% of the water to be diverted from Bangladesh, which becomes an issue on many scopes. With India having the largest of the river at 79%, they control how much water reaches the remaining countries downstream including Bangladesh, China, and Nepal (ganges diversion book).

This becomes a major water problem for those who rely on water downstream of the diversions. While flow is decreased, the water quality is also affected by this major change in the water's natural path. According to the NIWA, “turbidity, temperature and oxygen levels can increase with reduced flows in rivers” (CITATION). As temperature and oxygen levels change in rivers, it changes the species that can live in the water which is an unintended drawback the Ganges is facing due to its water diversion. Another issue that comes from water diversion practices is that, “Algae respond to changes in temperature and nutrients which are likely to increase with reduction of flow especially during summer months” (niwa). Algae can create hypoxic zones that ruin water quality. The problem worsens when, “some 60 percent of water intended for farms does not reach the fields” (newscientist). When the water diverted from its natural flow does not reach its intended location, it hurts farmers and all downstream of the diversion who experience loss of flow. This is a problem because India has a vast influence over Bangladesh's water supply. According to WWF, “India controls the flow of the Ganges into Bangladesh with over 30 upstream water diversions. The largest, the Farakka Barrage, 18 Km from the border of Bangladesh, reduced the average monthly discharge of the Ganges from 2,213 m<sup>3</sup>/s to a low of 316m<sup>3</sup>/s. (1)” Areas downstream of the diversions experience issues such as increased salinity, changes in river structure and erosion, and reduced animal health. These are all problems that Bangladesh experiences due to the lack of regulation in the Ganges River Basin area.

## **Solution: Remove dams**

The most useful solution to the water diversion issue is to remove some of the diversion practices. In reality, this means removing dams. Removing some of these dams has the potential to increase the flow and rejuvenate the water quality. Another way to help farmers with irrigation is to educate farmers on rain catchment systems. Catching rainwater is a way to irrigate crops without diverting water from the river.

Implementing more stormwater management practices is another way to improve sustainable water resources without diverting water from the Ganges River.



## **Problem 2 and solution: Anthropogenic Pollution**

A large problem in the Ganges River is the improper disposal of domestic waste and raw sewage. Human caused pollutants fill the river. Untreated industrial effluent including toxic and heavy metals are often just dumped into river with no treatment or regulation. Another issue is the cultural practice of religion. Families cremate their loved ones, and the ashes are deposited into the river to follow sacred religious practices. These issues are so vast that, “Sanitation and water pollution issues cause 8% of the diseases that afflict rural Indians” (2). Because of the large quantity of water is being diverted, water flow is decreasing making water stagnant. Without cycling, pollutant levels build. People who reside along the ganges also dump their own organic and residential waste into the river. Exposure to Fecal matter leads to 600,000 deaths per year. This begins at just seventy miles from the source of the river in the town of Uttarkashi. The open dump site in the town allows any heavy rain to wash waste right into the river. (New Yorker) The Ganges river takes in an absurd amount of waste and pollutants caused by human ignorance. The river takes in, “more than a billion gallons of waste each day, three-quarters of it raw sewage and domestic waste and the rest industrial effluent, and is one of the ten most polluted rivers in the world” (new yorker).

### **Solution: Education**

The most useful solution to the problem of anthropogenic pollution is to develop a toxic waste collection system, as well as a residential plumbing system that allows less polluted water to be dumped into the river. Another critical solution to this issue is education.



### **Problem 3 and solution: Endangered Species**

As a result of all the water quality issues, the Ganges River struggles keeping their aquatic animals in good health. Due to its size alone, the Ganges river is one of the most biodiverse ecosystems in the world. The Ganges river is home to over 140 fish species, 90 amphibian species, and supports 5 bird species. The Brahmaputra and Ganges watershed contain 10 biomes and has the largest biodiversity of all large river basins (wwf). However, the water quality severely harms the health of some animals that can't be found anywhere else. For example, the Ganges river dolphin is on the endangered species list which is a problem for the health of the river. It's species is a good source of monitoring of the Ganges River health. Along with low water quality, endangered species are challenged by overfishing and invasive species. The diversion of water also poses as an issue for endangered species. "Over-extraction for agriculture in the Ganges has caused the reduction in surface water resources. This has increased dependence on ground water, the loss of water-based livelihoods, and the destruction of habitat for 109 fish species, and other aquatic and amphibian fauna" (wwf). All the current practices regarding the Ganges river have declined the health of the ecosystem.

### **Solution: Enforce fishing restrictions**

In the area, small fish is considered a delicacy. That being said, fisheries have their biggest harvest in October and November because it is right after spawning season. A way to protect the fish population is to enforce fishing restrictions. Setting a minimum fish length before being caught will help the population grow and reproduce. Along with the above solutions of improving water quality, this will stabilize the existing fish population and help it grow.



### **Goals**

The main goals of GANGES are to reduce water diversion, decrease anthropogenic pollution, and protect the in-stream habitat. Increasing the river flow by removing dams and educating the people of India, in particular the farmers, about sustainable water practices such as drip irrigation will help GANGES achieve goal number one. In order to reduce Anthropogenic Pollution, and achieve goal two, pathogenic inputs within the river basin must be decreased. Goal three will be met by promoting education on endangered species and preventing ecosystem degradation.

### **Summary of Goals**

By reaching the goals of reducing water diversion, pollution and helping endangered species, the Ganges River will see greater water quality. The overarching goal that will be accomplished by the achievement of our three target goals is to see the Ganges River reach a swimmable status.

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