

Action Plans for Cleaning The Ganga : An Overview

PRELUDE



24th April, 2024. The clock struck midnight. Dr. Himuja Buchsi was having the 20th cup of coffee of the day on the balcony of her apartment. Her apartment is just beside the river Hooghly. She was enjoying the cool breeze of river Hooghly. Dr. Buchsi is a Ph.D holder in Quantum Physics. For the last 60 days, she is working restlessly on her latest project regarding time travel. No proper sleep schedule, no proper diet for last 60 days. But tomorrow is a memorable day. Tomorrow is her husband's happy birthday. So, she decided to wrap up her work for the day and go to sleep, as the next day was going to be a busy day to celebrate Mr. Buchsi's birthday.

The alarm was ringing loud. Dr. Buchsi woke up and turned off the alarm and found that her husband is not there beside her. The room's interior is changed. And the wind was blowing strongly across the apartment. She approached the balcony and felt a strong bad smell coming from the riverside. The colour of the water is so pale and black, like never before. Suddenly, her concentration was broken by a voice from behind— "Who are you, madam?" Dr. Buchsi turned around and noticed a young boy in a security uniform standing outside the main door of the apartment. "What are you doing here madam?" – he asked again. Dr. Buchsi replied firmly, "This is my apartment. I stay here. Who are you? I have never seen you before."

"Madam, this apartment is abandoned for the last 15 years due to the toxic environment spread by the highly polluted river water. It is so dangerous, if you put your hand in the river water for a few seconds, your flesh will be dissolved. Even the soil below this apartment is eroding. This is dangerous to be here in this apartment madam. Why did you come here?" –replied the young boy.

"15 years? FIFTEEN YEARS? How is this possible? I literally had a coffee last night here at my favourite balco-..." – she stopped all of a sudden. "Wait wait wait... Which year is this?"

"This is 2050. Which year are you expecting madam?"

"It worked. OH MY GOD! It worked." – she screamed in joy. "I am sooo... HELP! H-E-L-PPP!!!!!"

Dr. Buchsi's cry of anguish faded into the air as that portion of the room collapsed immediately. Dr. Buchsi fell from the 3rd floor of the apartment and struck her head at the ground floor. That alarm clock was still in her hand, the only thing time travelled with her. The security boy fled for his life, screaming for help. The toxicity of the river water destroyed the entire population besides the river.

This may be a scene from some sci-fi movie, but it is high time to rethink about the cleanliness of river water.

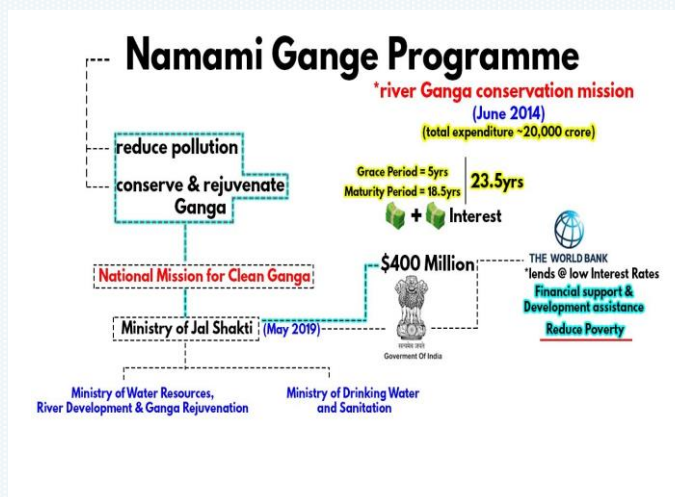
NAMAMI GANGE PROGRAMME : A COMPREHENSIVE APPROACH TO RESTORE THE SACRED RIVER

The river Ganga, also known as the Ganges, is one of the most revered and significant rivers in India. Its origins lie in the snow-capped Himalayas, from where it flows over 2,500 km through the northern plains of India, touching the lives of millions of people along its course. For thousands of years, the river Ganga has been regarded as a symbol of purity, spirituality, and divinity, with its waters believed to have the power to cleanse the soul of all sins. The river is considered sacred by Hindus, who regard it as the embodiment of the goddess Ganga, and its banks are lined with numerous shrines, temples, and ashrams. The river Ganga has been a source of inspiration for poets, artists, and musicians for centuries, who have extolled its beauty, power, and majesty. The river has played a significant role in shaping the cultural, religious, and social fabric of India, and its importance transcends geographical and cultural boundaries. However, in recent years, the river Ganga has come under severe threat due to pollution, industrialization, and unsustainable development practices. The pollution in the river has reached an alarming level, posing a significant threat to the health of millions of people who depend on the river for their livelihoods.



To address these challenges and restore the glory of the river Ganga, the government of India launched the Namami Gange Programme, a comprehensive initiative aimed at cleaning and rejuvenating the river. The programme has made significant progress in achieving its targets, and its efforts offer hope that the river Ganga will once again regain its pristine beauty and sanctity.

ORIGIN STORY



The pollution of the Ganga River has been a long-standing issue, with the river being subjected to industrial, agricultural, and domestic waste for several decades. The situation reached alarming proportions in the 1980s and 1990s, leading to the formation of the Ganga Action Plan (GAP) in 1985. However, despite the implementation of GAP, the river continued to deteriorate, leading to the launch of the National Ganga River Basin Authority (NGRBA) in 2009. Despite the efforts of NGRBA, the situation remained grim, leading to the launch of Namami Gange Programme in 2014.

The Namami Gange Programme is a flagship programme of the Indian government aimed at cleaning and rejuvenating the river. The programme was launched in 2014 with an initial budget of ₹ 20,000 crores (\$2.7 billion) for a period of 5 years. The programme has since been extended until 2026. The objective of the programme is to ensure that the Ganges river is clean and rejuvenated by reducing pollution, conserving biodiversity, and maintaining the ecological integrity of the river. The programme aims to address the various environmental and socio-economic issues affecting the river and its surrounding areas by implementing a range of measures, including infrastructure development, pollution control, and riverfront development.

MAIN OBJECTIVES

According to the Central Pollution Control Board (CPCB), around 3.3 billion liters of wastewater are discharged into the river Ganga daily, with only 30% of the wastewater being treated before discharge. This has led to severe pollution in the river, with the level of fecal coliform bacteria far exceeding the permissible limits. Furthermore, the river's water quality is also affected by the discharge of industrial effluents, agricultural runoff, and religious practices. According to a study conducted by the Indian Institute of Technology (IIT) Delhi, the river's water quality is so poor that it poses a significant threat to human health.



The main objectives of the Namami Gange Programme are to reduce the pollution load on the river, improve its water quality, and ensure sustainable management of the river basin. The programme also aims to promote public awareness and participation in the conservation of the river and its surrounding areas. To achieve these goals, the programme has identified four main components, namely, wastewater management, solid waste management, riverfront development, and biodiversity conservation.

a) Wastewater Management:

One of the major sources of pollution in the Ganga is the discharge of untreated sewage into the river. The Namami Gange Programme aims to address this issue by setting up sewage treatment plants (STPs) in the towns and cities along the river. The programme has identified 118 towns and cities, which are responsible for 80% of the pollution load in the river. So far, 121 STPs have been completed in major state/UTs till 2020-21 financial year, with a total capacity of 5,294 million liters per day (MLD). In addition, 17 new STPs are under construction, with a total capacity of 1,111 MLD.

Table 1: Status of Sewage Treatment Infrastructure in 2020-21

State/UT	No. of Towns	STPs	Capacity (MLD)	Commissioned	Under Construction
Uttar Pradesh	32	72	3,479	65	7
Bihar	10	33	1,478	29	4
West Bengal	8	24	1,119	20	4
Jharkhand	3	7	252	5	2
Delhi	1	1	50	1	0
Uttarakhand	1	1	27	1	0
Total	55	138	6,405	121	17

(Source: National Mission for Clean Ganga)

Table 2: Trend in number of STPs along the Ganga River

Year	Number of STPs
2015	76
2016	95
2017	104
2018	137
2019	160
2020	174

(Source: Ministry of Jal Shakti, Government of India)

b) Solid Waste Management:

The programme also aims to address the issue of solid waste management, which is another major source of pollution in the river. The programme has identified 11 cities along the river, which are responsible for generating 1,420 tonnes of solid waste per day. The programme aims to set up solid waste management facilities in these cities, which will include waste segregation, collection, transportation, and disposal. So far, 8 solid waste management projects have been completed, and 3 are under construction.

Table 3: Change in Dissolved Oxygen (DO) levels in the Ganga River

Year	DO (mg/l)
2016	3.3
2017	3.7
2018	4.2
2019	4.7
2020	5.1

(Source: Central Pollution Control Board)

This table provides insight into the progress made under the Namami Gange Programme in terms of improving the water quality of the Ganga River through measures such as increasing the dissolved oxygen levels.

c) Riverfront Development and River Surface Cleaning:

The programme aims to develop the riverfront and its associated infrastructure to enhance the livelihood of people dependent on the river and also to promote tourism and to create job opportunities for the local people. The programme aims to develop ghats, crematoriums, riverfront parks, and other facilities to promote tourism and improve the river's aesthetic value. A total of 966 ghats and 20 crematoria have been developed as of March 2023. This is an increase of 90.1% and 83.3%, respectively, from the target set by the programme. The programme aims to develop 1077 ghats (riverfronts) and 24 crematoria.

River surface cleaning: The programme aims to remove floating and submerged solid waste from the river surface to enhance the river's water quality and ecosystem. The programme has deployed trash skimmers, trash booms, and other advanced technologies for the purpose.

d) Biodiversity Conservation and Restoration of the ecological integrity of the river:

The programme also aims to conserve the biodiversity of the river and its surrounding areas. The programme has identified 23 aquatic species, 3 mammal species, and 9 bird species for conservation. The programme aims to undertake habitat improvement and restoration activities, such as

afforestation, wetland development, and riverbank protection. So far, 103 projects have been completed, and 60 are under implementation.

The restoration of the ecological integrity of the river component of the Namami Gange Programme aims to restore the natural flow of the river and to prevent soil erosion and landslides. Under this component, the programme is implementing various measures such as the construction of check dams and revetments, riverfront development, and the restoration of the riverine ecosystem.

IS NAMAMI GANGE PROGRAMME SUCCESSFUL?

The Namami Gange Programme has made significant progress in achieving its targets since its launch in 2014, and has had a positive impact on the pollution levels, water quality, and ecological health of the river Ganga. However, it is a long-term programme that requires sustained efforts, and there are still challenges to be addressed. While there have been improvements in the pollution levels, water quality, and biodiversity of the river at various locations, some areas still face significant pollution issues. Additionally, there is a need for better enforcement of regulations and increased public participation to sustain the gains made so far. Overall, while the programme has made significant progress, continued efforts are required to achieve the ultimate goal of cleaning and rejuvenating the river Ganga.



The Namami Gange Programme has taken a holistic and integrated approach to address the pollution and ecological challenges faced by the river Ganga. The programme has adopted a multi-sectoral and collaborative approach, involving various stakeholders such as central and state governments, local communities, NGOs, academic institutions, and industry. The programme has been implemented in a phased manner, with a focus on the following areas:

- a. Construction of wastewater treatment plants and sewage infrastructure: The programme has focused on improving the sewage infrastructure and constructing new wastewater treatment plants (WWTPs) to reduce the discharge of untreated sewage and industrial effluents into the river Ganga. As of 2021, over 200 WWTPs have been constructed, with a capacity of treating over 5,000 million litres of sewage per day.
- b. Solid waste management: The programme has also focused on solid waste management, including the collection, transportation, and disposal of solid waste generated in the riverine areas. The programme has encouraged the use of biodegradable bags and composting to reduce the amount of waste generated.
- c. River surface cleaning: The programme has also focused on cleaning the surface of the river Ganga to remove the floating debris, which includes flowers, plastics, and other waste materials.
- d. Afforestation and biodiversity conservation: The programme has emphasized the importance of afforestation and biodiversity conservation in the riverine areas. The programme has undertaken massive plantation drives and established nurseries to support the plantation of trees and other vegetation along the river Ganga. The programme has also created several biodiversity conservation centres and hatcheries to conserve the flora and fauna of the river Ganga.

- e. Public participation: The programme has emphasized the importance of public participation in achieving the goal of cleaning and rejuvenating the river Ganga. The programme has created awareness and encouraged people to take ownership of the river Ganga and participate in the cleaning and conservation efforts.

The Namami Gange Programme has been successful in achieving its targets in several areas. As of 2021, the programme has achieved the following milestones:

- a. Construction of 234 wastewater treatment plants, with a capacity of treating 7,164 million litres per day (MLD) of sewage.
- b. Construction of 12 river surface cleaning projects, including in Varanasi, Kanpur, and Patna.
- c. Setting up of 63 ghats and crematoria, and improvement of 8,100 existing ghats.
- d. Establishment of 9 biodiversity conservation centres and 2 hatcheries.
- e. Afforestation on 75,800 hectares of land, with the plantation of 20 crore trees.
- f. Reduction of pollution levels in the river Ganga, with the biochemical oxygen demand (BOD) levels decreasing from 3.4 mg/L in 2014 to 2.6 mg/L in 2021.

Despite the achievements, there are still challenges to be addressed in the cleaning and rejuvenation of the river Ganga. These include:

- a. Industrial pollution: There are still several industries along the river Ganga that discharge untreated or partially treated effluents, which contribute significantly to the pollution of the river.
- b. Agricultural pollution: The use of fertilizers and pesticides in agriculture is a significant contributor to the pollution of the river Ganga.
- c. Non-point source pollution: Non-point source pollution, which includes runoff from agricultural fields, open defecation, and littering, is also a significant contributor to the pollution of the river Ganga.
- d. Enforcement of regulations: There is a need for better enforcement of regulations and stricter penalties for violators to prevent pollution and ensure compliance with environmental standards.
- e. Public participation: While public participation has increased, there is still a need for greater involvement of local communities and increased awareness of the importance of the river Ganga.

To address these challenges, the Namami Gange Programme has taken several initiatives, including the following:

- a. Zero Liquid Discharge (ZLD) policy: The programme has introduced a ZLD policy for industries, which requires them to treat their effluents and achieve zero liquid discharge. This policy has been implemented in several industrial clusters along the river Ganga.
- b. Use of organic farming: The programme has promoted organic farming practices to reduce the use of chemical fertilizers and pesticides in agriculture, which is a significant source of pollution.
- c. Riverfront development: The programme has focused on developing the riverfront areas of the river Ganga to promote tourism and increase public participation in cleaning and rejuvenating the river.

- d. Mass awareness campaigns: The programme has conducted several mass awareness campaigns to create awareness about the importance of the river Ganga and encourage public participation in the cleaning and rejuvenation efforts.
- e. Involvement of local communities: The programme has involved local communities in the cleaning and rejuvenation efforts, by creating awareness and encouraging them to take ownership of the river Ganga.

A CASE STUDY

Varanasi, a city located on the banks of the Ganga River, is one of the most ancient and sacred cities in India. However, it was also infamous for its polluted river waters. The city has been a part of the Namami Gange Programme since its inception in 2014, and significant progress has been made in cleaning up the Ganga River in the city.



The programme's interventions have included the construction of sewage treatment plants (STPs), cleaning of ghats (riverbanks), and installation of trash skimmers. The STPs have played a vital role in treating the sewage generated in the city, which was previously directly discharged into the river. As a result, the water quality of the Ganga River in Varanasi has significantly improved.

According to the National Mission for Clean Ganga, as of August 2021, seven STPs with a total capacity of 276 MLD (million liters per day) have been commissioned in Varanasi. Additionally, 84 ghats have been cleaned and developed, and six trash skimmers have been installed to remove floating garbage.

The improvements in the water quality of the Ganga River in Varanasi have not gone unnoticed. In 2019, the Ganga River in Varanasi was classified as "B" grade, indicating that it is suitable for bathing and propagation of wildlife. This was a significant improvement from its previous classification of "D" grade, indicating that it was unfit for human use.

FUTURE PLANS FOR NAMAMI GANGE PROGRAMME

The Namami Gange Programme has a number of future plans to continue its efforts towards the cleaning and rejuvenation of the river Ganga. Some of these plans include:

- a. Expanding the coverage area: The programme plans to expand its coverage area to cover the entire river Ganga and its tributaries, which would require the involvement of several states and local bodies.
- b. Setting up more STPs: The programme plans to set up more STPs to treat sewage and industrial effluents and achieve the target of zero discharge of untreated wastewater into the river.
- c. Strengthening the monitoring system: The programme plans to strengthen its monitoring system to track the progress of its initiatives and identify areas that require further attention.
- d. Promoting eco-tourism: The programme plans to promote eco-tourism along the river Ganga by developing riverfront areas and promoting responsible tourism practices that do not harm the river ecosystem.

- e. Increasing public participation: The programme plans to increase public participation in the cleaning and rejuvenation efforts by creating more awareness, involving local communities, and encouraging citizen-led initiatives.
- f. Focusing on non-point source pollution: The programme plans to focus on addressing non-point source pollution, which includes pollution from agricultural run-off, urban runoff, and solid waste, by promoting sustainable agriculture practices, improving municipal solid waste management, and promoting rainwater harvesting and groundwater recharge.
- g. Strengthening institutional arrangements: The programme plans to strengthen institutional arrangements, including capacity building and technical assistance, to enable effective implementation of its initiatives and better coordination among various stakeholders.

Overall, the future plans of the Namami Gange Programme are focused on taking a more integrated and holistic approach to address the challenges faced by the river Ganga and achieve the ultimate goal of cleaning and rejuvenating the river. These plans require sustained efforts and the involvement of all stakeholders to achieve the desired outcomes.

CONCLUSION

The Namami Gange Programme has made significant progress in improving the health of the Ganga River. Some of the major achievements of the programme include:

- a. Increase in STPs:
The programme has led to a significant increase in the number of STPs along the river, which has resulted in a reduction in the amount of untreated sewage entering the river. As a result, the quality of water in the river has improved significantly.
- b. Reduction in Industrial Pollution:
The programme has also led to a reduction in industrial pollution, with the establishment of CETPs (Common Effluent Treatment Plants) in various industrial clusters. This has resulted in a reduction in the amount of toxic effluent entering the river.
- c. Improvement in Biodiversity:
The programme has also had a positive impact on the biodiversity of the river and its surrounding areas. The release of fish fingerlings and the plantation of trees has led to an increase in the population of fish and other aquatic species, and has also contributed to the restoration of the river's natural habitat.
- d. Awareness Generation:
The programme has also been successful in generating awareness among the local communities about the importance of keeping the river clean. This has led to a change in attitude towards the river, with many people now actively participating in clean-up drives and other initiatives aimed at improving the health of the river.

However, there is still a long way to go before the river can be considered clean and healthy. The success of the Namami Gange Programme will depend on sustained efforts and continued investment in river rejuvenation initiatives. It is the responsibility of all stakeholders, including the government, non-governmental organizations, academia, and local communities, to work together towards the common goal of keeping the Ganga River clean and healthy for generations to come.

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