



# SUGGESTIONS TO MAKE RIVER GANGA CLEAN: A CASE STUDY AT VARANASI

Kumkum Kumari  
Department of ECE  
IMS Engineering College  
Ghaziabad, UP  
India

Dr Rahul Dayal  
Department of ECE  
IMS Engineering College  
Ghaziabad, UP  
India

**Abstract—** River Ganga is considered as the Holiest among all rivers in India and its water is believed to have properties to cure diseases untreatable by conventional medicines. It is considered so sacred that people in India store this water to perform last rites of their loved ones. Ganga is a trans-boundary river which flows through India and Bangladesh. It traverses through more than 2,500Km from Gangotri to Ganga Sagar passing through 29 major cities, 23 small cities and 48 towns. However, as a result of industrial revolution and our traditional rituals on its bank, Ganga has become one of the world's most polluted river and more than 400 million people are affected by its water borne diseases. The challenging "Ganga Action Plan (GAP)" to clean the river was launched by late Prime Minister Rajiv Gandhi in 1986 without any success. Now Mr. Narendra Modi has taken a challenge to clean the Ganga with a budget of Rs 20,000 crores during the next five years under "Namami Gange Programme". This study will explore why GAP was unsuccessful, will Ganga be cleaned in this century or not? And what is the effect of Modi Govt's dream project plan and present situation of Ganga in Varanasi.

**Keywords—** River, Ganga, Ganges, the Ganga action plan, trans-boundary, pollution, Namami Gange Programme, Industrial revolution

## I. INTRODUCTION

The Ganga river basin has been called the "lifeline for millions" since it is a trans-boundary river with tributaries stretching through the Himalayas in Nepal and India and Bangladesh. This river is believed to have been brought on Earth by King Segar's great-great grandson, Bhagiratha in Treta Yuga (18000BC to 5000BC) to give Moksha to the 60,000 son's of king Sagar. Mother Ganga runs through approx 2525KM on our precious land, originating from Gangotri (Gomukh) to Ganga Sagar passing through 29 major cities, 23 small cities and 48 towns. The major cities through which Ganga passes are Haridwar, Allahabad, Kanpur, Varanasi, Patna etc.

The river is considered holy in India and was formally named as National River in 2008. The Hindus sprinkle its water for purification and worship and take bath in it in the belief, supported by scripture that it cleanses their sins. They arduously trek to its source in snow bound Himalayan glacier, Gangotri and downstream at Haridwar, float lighted oil lamps on its water after dusk in memory of their deceased elders. On the journey back home from the Ganges they carry small quantity of river water with them for use in rituals.

## II. SITUATION AT VARANASI

In Varanasi, Ganga flows in a crescent shape like "half-moon" from south to north. The 6.5km long riverfront of the river Ganga, forming the eastern edge of the city, possesses a unique history, presents a specific vision of a magnificent architectural row of lofty buildings and holy sites. In Varanasi the riverfront Ganga provides a site-series of 84 Ghats (stairways to the bank) as the special sacred chain of places. The first rays of sunrise reaching upon the water current of the Ganga and their reflection on the magnificent buildings along the Ghats remind the Hymn to the Dawn of the Rig Veda: "Arise; the breath of life comes back to us, the darkness is gone and the light is approaching".

Among the 84 Ghats the 5 described as the most merit-giving and sacred called Panchatirthis are Asi, Dashashvamedha, Manikarnika, Panchaganga, and Keshava. Taking a sacred bath at these five Ghats provides the same merit as bathing at all the Ghats. These five Ghats symbolize the microcosmic body of Vishnu, respectively as the head, chest, navel, thighs and feet. That's how the area along the Ghats is eulogized as Vishnu's body. Ganga Aarti is a ritual performed at every evening and morning at these famous Ghats in devotion to the goddess Ganga using fire as the offering. A diya is lit with a candle which is floated down the river along with some flowers. This powerful ritual is performed primarily in Varanasi as well as two more holy cities Haridwar and Rishikesh in India. In contrast to the beauty of Ganga Aarti, funeral practices result in the foul sight and odor of corpses and decomposed human parts found floating in the water.



Though the traditional practices such as dumping corpses and ashes of the deceased are minor compared to the industrial practices, in terms of pollution, they still need to be considered due to their detrimental effect on the river.

Varanasi is a industrial city on the bank of river Ganga having one million people and thousands of pilgrims visit it every-day to take the “holy dip “in Ganges, they release around 200 million liters of untreated human sewage into the river each day, leading to large concentrations of faecal coli form bacteria. Disposal of industrial waste material like plastic bags, plastic tubing, egg cartons etc has resulted in the heavy pollution of Ganga water and in majority of places, its water as become unfit for human and aquatic life. It is alarming to note that as against the specified standards of 500 faecal coliform per 100ml water in Ghats in Varanasi contains 120 times more faecal coliform bacteria per 100ml indicating the highly polluted content in the river.

The Ganga was ranked as fifth most polluted river of the world in 2007. Pollution threatens not only humans, but also more than 140 fish species, 90 amphibian species and the endangered Ganga river dolphin. The Ganga suffers from extreme pollution levels, which affect the 400 million people who live close to the river. Each day, more than 500 million liters of wastewater from industrial sources are dumped directly into Ganga. In many places, this wastewater entering the rivers is completely untreated. This industrial waste is making the Ganga dangerous for use as a source of drinking or bathing, with dangerous chemicals and heavy metals filling her waters at levels far exceeding any sort of safe or acceptable levels. For example, with expanding industrial growth, the city of Kanpur has not been able to cope with its industrial pollution. Kanpur is now listed as the most polluted city along Ganga, and each day the city produces nine million liters of industrial waste, mostly consisting of wastewater from tanneries, much of which is dumped illegally directly into Ganga without treatment.

The problem is exacerbated by the fact that many poorer people rely on the river on a daily basis for bathing, washing and cooking. The World Bank estimates that the health costs of water pollution in India equal three percent of India’s GDP. It has also been suggested that eighty percent of all illness in India and one third of death can be attributed to water born diseases. Ganga after passing through Varanasi and having received 32 streams of raw sewage from the city, drinking and bathing in its waters therefore carries high risk of infections.

### III. CHALLENGES

#### A. Industrial Pollution

764 industries lie along the banks in the main stream of the Ganga consuming 1123MLD water and at the same time discharging 500MLD of waste water.90% of this industrial pollution is only in Uttar Pradesh. Sector specific industries

like sugar, pulp, paper and distillery industries are responsible for more than 70% pollution.

#### B. Presence of Carcinogenic chemicals

A study by the environmental biology laboratory, Department of Zoology, Patna University had found the presence of high amount of carcinogenic metals like Mercury, Chromium and Arsenic in the water at Varanasi. Without affordable treatment technology, small scale industries continue to pollute the river Ganga with over a billion liters of toxic chemicals.

### IV. WILL GANGA BE CLEANED IN THIS CENTURY?

The Ganga Action Plan (GAP), an Environment initiative to clean up the river, has been a major failure of the Government due to corruption, lack of technical expertise, ineffective environmental planning and lack of support from religious authorities. Due to the failure of this project and after analyzing the polluted condition of Ganga, an important question arise in everyone mind: will Ganga be cleaned in this century? The Supreme court asked centre to furnish it’s stage-wise plan on cleaning of river Ganga, the “dream project” of Narendra Modi govt.

### V. GOVERNMENT ACTIONS TILL NOW

#### A. History of Various Projects Undertaken to Clean Ganga

##### i) THE Ganga Action Plan (GAP)

Way back in 1986, the then Prime Minister Rajiv Gandhi had launched Rs 462-crore project to clean the Ganga at Varanasi. Under this plan sewage treatment plants were set up, raw sewage was cut off and diverted, electric and wood crematoria were set up and low-cost sanitation facilities were provided. However, as this plan was not successful, it was so closed on 31 March 2000 but its phase II was approved and till Feb 2014, Rs 939 crores have been spent on the Ganga cleaning on 524 different schemes without achieving the desired results.

##### ii) The National Ganga River Basin Authority (NGRBA)

Former Prime Minister Manmohan Singh was the head of the National Ganga River Basin Authority (NRBA), a regulatory body formed in February 2009 with an objective to reduce pollution and to conserve the Ganga. But he along with two more members resigned from the post because of lack of accountability and commitment. NRBA had been granted fund of Rs 3,031 to operate 56 schemes in 44 towns. As per available data Rs 785 crores had been spent till September 2013. NRBA was supported by the National Ganga River Basin Project.



### iii) Intervention by Supreme Court of India

In India, though lots of environmental laws exist against pollution, however due to their poor implementation, it has not been possible to put effective control over river pollutions. It has been found that ultimately, it is the courts which have to intervene and pass strict orders to the different agencies and industries. In this case also, Supreme Court of India ordered the relocation and closure of polluting Industries. Stretch of the river between Gomukh and Uttarkashi has been termed as 'eco-sensitive zone' in 2010.

### iv) Save Ganga Movement

Gandhian non-violent movement involving and social science activist as its supporters has helped to save Ganga from further pollution. National Women's Organization (NWO), Ganga Calling-Save Ganga: a campaign supported by Indian Council for Enviro-Legal Action (ICELA) and many other such organizations are also taking interest to save this river.

### v) Namami Gange Project

Namami Gange Project or Namami Ganga Yojana is an ambitious Union Government project which was launched in May 2015, integrates the efforts to clean and protect the Ganga River in a comprehensive manner with a budget of Rs. 2037 Crores. The project is officially known as Integrated Ganga Conservation Mission project or 'Namami Ganga Yojana'. This project aims at Ganga Rejuvenation by combining the existing ongoing efforts and planning under it to create a concrete action plan for future with following salient features:

- Will cover 8 states, 47 towns & 12 rivers under the project.
- Over Rs. 20,000 crores has been sanctioned in 2014-2015 budget for the next 5 years.
- Prime focus will be on involving people living on the river's banks in this project.
- Development of rational agricultural practices & efficient irrigation methods.
- Setting Ganga Knowledge Centre.
- Enforcement of Ganga specific river regulatory zones

### VI. ACTION OF GOVT. TO ENSURE THE FACTORIES ARE NOT DISCHARGING THEIR EFFLUENTS IN THE GANGA

Out of a total of 187 industrial units identified for discharging their effluent in the river Ganga, 112 have provided effluent treatment plants, 31 are closed and 44 units have been declared defaulters. Out of 44 defaulting units, 43 lie in UP. The effluents emanating from industrial units such as tanneries, sugar, distilleries, pulp and papers and textiles etc. comprise of high Biological

Oxygen Demand (BOD), Chemical Oxygen Demand (COD) and suspended solids.

Industries Association of Uttarakhand has now formulated following NGT rules for Ganga cleaning:-

- There should be no effluent discharge into the Ganga after 27 October, 2015.
- The total number of severely polluting industries in the state are 298, which include sugar mills, distilleries, paper mills, textile mills and chemical industries and they should not discharge their effluents into the Ganga river and should also have effluent treatment plants,
- There were 684 hotels, restaurants and dharamshalas on the river banks from Gomukh to Haridwar and 873 ashrams. Of these, 1212 have septic tanks, 460 are linked to sewer lines and 7 are directly discharging their effluents into the Ganga River.
- All industries and ashrams must install their own sewage treatment plants or set up septic tanks failing which actions would be taken against them.
- Burning at the Ghats should be controlled, impose strict ban on plastics, glass bottles and eatables.

### VII. SOLUTIONS ALREADY IMPLEMENTED

Following solutions have been implemented but have not been fully successful:

#### i) Restoring 51% Ecological Flow

According to the CPCB, so much water is being extracted from the Ganga that "in absence of adequate flow, unabated discharge of treated sewage, even with 100% treatment, river water quality to bathing level cannot be achieved in lean season flow. Therefore, there is a need to restrict the outflow of River water.

#### ii) Forming Special Ganga Police Force

A Special Ganga Police Force should be immediately empowered to enforce the law through investigations, fines, detention and other actions against repeat corporate and industrial offenders.

#### iii) Implementation of Environmental Rights Act

A comprehensive National Ganga Rights Act must be implemented.

#### iv) Accountability

The industrial units may be asked to submit their action plan to achieve zero discharge within a maximum period of one year and State Pollution Control Boards may be asked not to



renew their consents after one year till they achieve zero discharge.

#### VIII. PROPOSED SOLUTIONS

1. Sanction research projects in premier institutes like IITs to find techniques for cost effective water treatment techniques.
2. Organizing river cleaning competitions where people in team will participate.
3. Create a research team and research river cleaning techniques across the world.
4. Create village level committee in all villages lying on banks of Ganga every committee will be responsible for cleaning of Ganga near their village.
5. Create a huge campaign on Social media, it will connect millions of people to this campaign and this will spread awareness to masses.
6. Create a movie which can inspire people to stop polluting river and inspire them to be volunteer
7. Create a documentary movie similar to "The Day After Tomorrow" which will show how Ganga is dying slowly...its past glory and consequences if we did not took timely action.
8. Collect water treatment cost form industries and municipal boards of cities which are draining their sewage water in Ganga.
9. Develop local transport in Ganga. So that people's movement in Ganga will be helpful in keeping vigil on culprits dumping of waste in Ganga.
10. Invite corporate houses to adopt and beautification of Ganga Ghats.
11. Big scale Advertisement along Ghats of Ganga on periodic basis to generate additional revenue
12. Create satellite imagery of Ganga; it will be helpful to detect pollution areas easily.
13. Create plastic free zones along bank of Ganga.
14. Chapter on Ganga in school\college textbooks
15. Promote religious\ adventures tourism in Ganga like create bird centuries along Ganga
16. Stop Illegal mining in the Ganges river bed for stones and sand.

17. In Australia a Sea-bin technology was recently invented for purifying the water, this technology can also be used for purifying Ganga water.

#### IX. CONCLUSION

River Ganga during the last 30 years not only has turned from pure to a dirty river now. Considering its holy nature as well as the source of life for millions of people living on its banks, it is of utmost importance that this holy river be restored to its earlier condition. Lot of work has already been done by various Governments as well Judiciary in India in this regards. A study was conducted at Varanasi to find the reasons for failures of these plans and to suggest some solutions for making Ganga clean.

#### X. REFERENCES

- [1] Ekin, B., & Sukanya, D. (2010). Estimating the value of improved wastewater treatment: The case of river ganga, India. *Journal of Environmental Management*, 91(11), 2163–2171.
- [2] Goel, P. K. (2006). *Water pollution: Causes, effects and control* (revised ed.) New Age International.
- [3]. [www.hindustantimes.com](http://www.hindustantimes.com).
- [4]. "Note on discharge of industrial effluents into the Ganga." Center Education and Sciences, GoI. 2006.
- [5]. <http://www.gits4u.com/water/ganga.htm#Pollution> in Ganga River.
- [6]. Gatga (Government Approved Tourist Guides Association)-Varanasi Magazine .
- [7]. International pollutions issues.
- [8]. Hammer, J. (2007, November 2007). A prayer for the Ganges. *Smithsonian Magazine*.
- [9]. [www.indiatvnews.com](http://www.indiatvnews.com).