

Water Pollution in Ganga and Ganga Action Plan by Prime Minister Modi

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ABSTRACT

Pollution of the Ganges, the largest river in India, poses significant threats to human health and the larger environment.[1] The river, which is severely polluted with human waste and industrial contaminants, provides water to about 40% of India's population across 11 states,[2] serving an estimated population of 500 million people, which is more than any other river in the world.[3][4]

Today, the Ganges is considered to be the fifth-most polluted river in the world.[5][6] Raghubir Singh, an Indian photographer, has noted that no one in India spoke of the Ganges as being polluted until the late 1970s.[7] However, pollution had been an old and continuous process in the river by the time people were finally acknowledging it. Stretches of over 600 km (370 mi) were essentially ecologically dead zones.[8]

A number of initiatives were undertaken to clean the river, but failed to deliver significant results.[9] After getting elected, India's Prime Minister Narendra Modi affirmed to work on cleaning the river and controlling pollution.[10] Subsequently, the Namami Ganga project was announced by the government in the June 2014 budget.[11] An estimated Rs 3,000 crores (US\$460 million) had been spent by July 2016 in various efforts to clean up the river.[12]

The main causes of water pollution in the Ganges river are the disposal of human sewage and animal waste, increasing population density, and disposal of industrial waste into the river. The river flows through 100 cities with populations over 100,000; 97 cities with population between 50,000 to 100,000, and about 48 towns.[13] A large proportion of the sewage water with higher organic load in the Ganges is from this population through domestic water usage.

KEYWORDS: *ganga, plan, Modi, water pollution, health, namami ganga, population, waste, sewage*

INTRODUCTION

Because of the establishment of a large number of industrial cities on the bank of the Ganges like Kanpur, Allahabad, Varanasi and Patna, countless tanneries, chemical plants, textile mills, distilleries, slaughterhouses, and hospitals prosper and grow along with this and actively play a role in polluting the Ganges by dumping untreated waste into it.^[14]

Onecoal-based power plant on the banks of the Pandu River, a Ganges tributary near the city of Kanpur, burns 600,000 tons of coal each year and produces 210,000 tons of fly ash. The ash is dumped into ponds from which a slurry is filtered, mixed with domestic

wastewater, and then released into the Pandu River. Fly ash contains toxic heavy metals such as lead and copper. The amount^[2] of parts per million of copper released in the Pandu before it even reaches the Ganga is a thousand times higher than in uncontaminated water. Industrial effluents are about 12% of the total volume of effluent reaching the Ganges. Although a relatively low proportion, they are a cause for major concern because they are often toxic and non-biodegradable.^[21] Plastic and industrial waste, such as wastewater from the Factories that sit on the banks of the Ganga, is another cause of

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pollution. The most worrying problem facing the river is its increasing lack of water. Water for irrigation is being removed faster than the rainy season can replenish it. During festival seasons, over 70 million people bathe in the Ganges^[15] to cleanse themselves of their past sins. Some materials like food, waste or leaves are left in the Ganges, which are also responsible for its pollution. Traditional beliefs hold that being cremated on its banks and floating down the Ganges will cleanse the sins of those who die and carry them directly to salvation. In Varanasi alone, an estimated forty thousand bodies are cremated every year and are deposited into the Ganga. Because many families cannot afford the high cost of sufficient quantities of cremation wood, many of the bodies deposited into the Ganges are only half-burnt.^[8]

Built in 1854 during the British colonization of India, the Haridwar dam has led to decay of the Ganges by greatly diminishing the flow of the river.^[16] The Farakka Barrage was built originally to divert fresh water into the Hooghly River but has since caused an increase of salinity in the downstream of the Ganges, having a damaging effect on the ground water and soil along the river.^[13] The barrage has caused major tension between Bangladesh and India. Bangladesh is actively considering to construct Ganges Barrage Project for mitigating the salinity problem.^[17] The government of India has planned about 300 dams on the Ganges and its tributaries in the near future despite a government-commissioned green panel report that has recommended scrapping 34 of the dams citing environmental concerns.^[18]

Three more barrages across the Ganges main river are existing at Bijnor, Narora and Kanpur.^[19] The barrages at Bijnor and Narora divert all the water including baseflows during dry season to the canals for irrigating vast area up to Allahabad city. Most of the water available at the upstream of the Kanpur barrage is used during dry season for the drinking water needs of cities.^[20] Downstream of Kanpur barrage, adequate water is not available from the barrage to dilute the polluted water reaching the main river during the dry seasons of year.^[21]

There are number of pumping stations located on the banks (right and left) of the Ganges downstream of Kanpur barrage serving the irrigation requirements of huge area.^[22] These large pump houses are located at Rukunpur 26°10'21"N 80°38'57"E, Kanjauli Kachhar 25°17'37"N 82°13'15"E, Hakanipur Kalan 25°12'57"N 83°01'15"E, Bhosawali 25°20'46"N 83°10'11"E, Shekpur 25°32'13"N 83°11'57"E, Chochakpur 25°28'55"N 83°25'11"E, Lamui 25°23'20"N 83°32'11"E, Chausa 25°31'11"N 83°54'04"E, etc. (Refer to Google Earth maps.) These

lift irrigation schemes are pumping out most of the base flows available in the main river downstream of Kanpur city.

To make the Ganges live/flowing and dilute the polluted water inflows from habitations and industries, at least 5000 cusecs flow is required from Narora to Farakka as minimum environmental flow during the eight months dry season.^[23] This is possible by constructing storage reservoirs of capacity 100 Tmcft across the Ganges tributaries located up stream of Narora city and reserving the stored water only for minimum environmental flows.^[24] In addition, a series of cascading barrage cum bridges are to be constructed across the river from Kanpur to Allahabad to increase the surface area of impounded polluted water in the river so that it serves as vast natural oxidation ponds. The accumulated sediments/sludge would get washed away during the annual monsoon floods. Already, a number of barrages are planned between Farakka and Allahabad to make the 1620 km length of the river navigable from Haldia to Allahabad under National Waterway 1 project which can be extended up the Kanpur.^[25]

A 2006 measurement of pollution in the Ganges revealed that river water monitoring over the previous 12 years had demonstrated fecal coliform counts up to 100,000,000 MPN (most probable number) per 100 ml^[citation needed] and biological oxygen demand levels averaging over 40 mg/l in the most polluted part of the river in Varanasi. The overall rate of water-borne/enteric disease incidence, including acute gastrointestinal disease, was estimated to be about 66%.^[26]

A systematic classification done by Uttarakhand Environment Protection and Pollution Control Board's (UEPPCB) on river waters into the categories A: safe for drinking, B: safe for bathing, C: safe for agriculture, and D: excessive pollution, put the Ganges in D. Coliform bacteria levels in the Ganges have also been tested to be at 5,500, a level too high to be safe for agricultural use let alone drinking and bathing.^[27]

The leather industry in Kanpur which employs around 50,000 people in more than 400 tanneries uses chemicals such as toxic chromium compounds. Effectively, chromium levels have not decreased in the Ganges even after a common treatment plant was established in 1995. It now stands at more than 70 times the recommended maximum level.^[28]

A study conducted by the National Cancer Registry Program (NCRP) under the Indian Council of Medical Research in 2012, suggested that "those living along its banks in Uttar Pradesh, Bihar and

Bengal are more prone to cancer than anywhere else in the country".^[29]

In 2020, a study showed that the level of cleanliness has significantly improved in the recent years in terms of toxic heavy metals. This study was supported by Indo-US Science and Technology Forum (IUSSTF).^[30]

Discussion

The results of mercury analysis in various specimens collected along the basin indicated that some fish muscles tended to accumulate high levels of mercury. Of it, approximately 50–84% was organic mercury. A strong positive correlation between mercury levels in muscle with food habit and fish length was found.^[31]

The Ganges river dolphin is one of few species of fresh water dolphins in the world. Listed as an endangered species, their population is believed to be less than 2000. Hydroelectric and irrigation dams along the Ganges that prevents the dolphins from travelling up and down river is the main reason for their reducing population.^[32] The Ganges softshell turtle (*Nilssoniana gangetica*) is found in the Ganges, Indus, and Mahanadi river systems of Pakistan, northern India, Bangladesh, and southern Nepal. This turtle inhabits deep rivers, streams, large canals, lakes and ponds, with a bed of mud or sand. According to the International Union for Conservation of Nature, freshwater turtle species are vulnerable.^[1] Due to their long lifespan and high trophic level in the aquatic food web, turtles are vulnerable to heavy metals pollution, a major kind of pollution in the Ganges. Some of the dams being constructed along the Ganges basin will submerge substantial areas of nearby forest. For example, the Kotli-Bhel dam at Devprayag will submerge 1200 hectares of forest, wiping out the forest area and eventually the wildlife.^[2] An analysis of the Ganges water in 2006 and 2007 showed significant associations between water-borne/enteric disease and the use of the river for bathing, laundry, washing, eating, cleaning utensils, and brushing teeth.^[26] Water in the Ganges has been correlated to contracting dysentery, cholera, hepatitis,^[14] as well as severe diarrhoea which continues to be one of the leading causes of death of children in India.^[34]

During the summer and monsoon, hospital wards teem with children who need treatment for waterborne diseases - but according to S.C. Singh, a paediatrician at Varanasi Shiv Prasad Gupta Hospital, their parents rarely mention that they have been swimming in the river. They don't appear to have made the connection, he says.^[35]

Ganga Mahasabha is an Indian organization dedicated to the Ganges, founded by Madan Mohan Malaviya in

1905. After a long struggle, British India agreed on 5 November 1914 that the uninterrupted flow of the Ganges is the rudimentary right of Hindus. The day is known as a 'Aviral Ganga Samjhauta Divas' (Uninterrupted Ganga flow agreement day) in the history of India and the agreement came into existence on 19 December 1916 which is known as Agreement of 1916. The sanctity of the agreement is not preserved by the state and central governments of India after independence though it is legally valid. More and more river water is diverted for irrigation use converting the river into a polluted sewer.

The Ganga Action Plan (GAP) was launched by Rajiv Gandhi, the then Prime Minister of India, on June 1986 with covering 25 Class I towns (6 in Uttar Pradesh, 4 in Bihar and 15 in West Bengal);^[36] Rs 862.59 crore were spent. Its main objective was to improve the water quality by the interception, diversion, and treatment of domestic sewage and to prevent toxic and industrial chemical wastes from identified polluting units from entering the river. The other objectives of the GAP are as follows:^[37]

- Control of non-point from human defecation, cattle wallowing, and the disposal of human remains in the river.
- Research and development to conserve the biotic diversity of the river to augment its productivity.
- Development of sewage treatment technology such as Up-flow Anaerobic Sludge Blanket (UASB) and sewage treatment through afforestation.
- Rehabilitation of soft-shelled turtles for pollution abatement.
- Resource recovery options such as methane production for energy generation and use of aquaculture for revenue generation.
- To act as a trendsetter for taking up similar action plans in other grossly polluted stretches in other rivers.
- The ultimate objective of the GAP is to have an approach of integrated river basin management considering the various dynamic interactions between abiotic and biotic eco-system.

Notwithstanding some delay in the completion of the first phase of the GAP, it has generated considerable interest and set the scene for evolving a national approach towards replicating this program for the other polluted rivers of the country. The Government of India proposed to extend this model with suitable modifications to the national level through a National River Action Plan (NRAP). The NRAP mainly draws upon the lessons learned and the experience gained

from the GAP besides seeking the views of the State Governments and the other concerned Departments/Agencies. Under the NRCP scheme, the CPCB had conducted river basin studies and had identified 19 gross polluted stretches and 14 less polluted stretches along 19 rivers, which include 11 stretches situated along 7 rivers of M.P. It was much more effective as compared to the previously launched programs. Phase II covered 59 towns in five states. More than Rs 5.053 Billion were spent. Rivers such as Yamuna, Gomti, Damodar, Mahananda had separate action plans.^[37]

NGRBA was established by the Central Government of India, on 20 February 2009 under Section 3 of the Environment Protection Act, 1986. It declared the Ganges as the "National River" of India.^[38] The chair includes the Prime Minister of India and chief ministers of states through which the Ganges flows.^[39] In 2011, the World Bank approved \$1 billion in funding for the National Ganges River Basin Authority.^[40]

In 2010, it was announced that "the Indian government has embarked on a \$4 billion campaign to ensure that by 2020 no untreated municipal sewage or industrial runoff enters the 1,560-mile river."^[41] A World Bank spokesman described the plan in 2011, saying:

Earlier efforts to clean the Ganges concentrated on a few highly polluting towns and centres and addressed 'end-of-the-pipe' wastewater treatment there; Mission Clean Ganga builds on lessons from the past, and will look at the entire Gangetic basin while planning and prioritising investment instead of the earlier town-centric approach.^[40]

Lobby group Sankat Mochan Foundation (SMF) "is working with GO2 Water Inc., a Berkeley, California, wastewater-technology company" to design a new Sewage treatment system for Varanasi.^[41]

The Supreme Court of India has been working on the closure and relocation of many of the industrial plants like Tulsī along the Ganges. In 2010 the government declared the stretch of river between Gaumukh and Uttarkashi an Eco-sensitive zone.^[27]

Results

In the budget tabled in Parliament on 10 July 2014, the Union Finance Minister Arun Jaitley announced an integrated Ganges development project titled 'Namami Gange' (meaning 'Obeisance to the Ganges river') and allocated ₹2,037 crore for this purpose.^[11] The objectives were effective abatement of pollution, conservation, and rejuvenation of the Ganges. Under the project, 8 states are covered. Ministry of Drinking Water Supply and Sanitation proposes to make 1,674

gram panchayats by the Ganges open defecation-free by 2022, at a cost of Rs 1,700 cr (central share). An estimated Rs 2,958 Crores (US\$460 million) have been spent till July 2016 in various efforts in cleaning up of the river.

As a part of the program, government of India ordered the shutdown of 48 industrial units around the Ganges.^[42]

The program has a budget outlay of Rs. 20,000 crore for the next five years. This is a significant five-fold increase over the expenditure in the past 30 years (Government of India incurred an overall expenditure of approximately Rs. 4000 crore on this task since 1985). The centre will now take over 100% funding of various activities/ projects under this program. Taking a leaf from the unsatisfactory results of the earlier Ganga Action Plans, the centre now plans to provide for operation and maintenance of the assets for a minimum 10-year period, and adopt a PPP/SPV approach for pollution hotspots.

In an attempt to bolster enforcement the centre also plans to establish a four-battalion Ganga Eco-Task Force. The program emphasises on improved co-ordination mechanisms between various ministries/agencies of central and state governments. Major infrastructure investments which fall under the original mandate of other ministries viz. Urban Development (UD), Drinking Water & Sanitation (DWS), Environment Forests & Climate Change (EF&CC) etc., will be undertaken in addition.

'Namami Gange' will focus on pollution abatement interventions namely interception, diversion and treatment of waste water flowing through the open drains through bio-remediation / appropriate in-situ treatment / use of innovative technologies / sewage treatment plants (STPs) / effluent treatment plant (ETPs); rehabilitation and augmentation of existing STPs and immediate short term measures for arresting pollution at exit points on river front to prevent inflow of sewage etc.

Significantly the approach is underpinned by socio-economic benefits that the program is expected to deliver in terms of job creation, improved livelihoods and health benefits to the vast population that is dependent on the river.^[43]

The main pillars of Namami Gange Programme are:

1. Sewerage Treatment Infrastructure
2. River-Front Development
3. River-Surface Cleaning
4. Bio-Diversity
5. Afforestation
6. Public Awareness
7. Industrial Effluent Monitoring

8. Ganga Gram

Its implementation has been divided into entry-level activities (for immediate visible impact), medium-term activities (to be implemented within five years of time frame) and long-term activities (to be implemented within ten years).^[44]

Ganga Manthan was a national conference held to discuss issues and possible solutions for cleaning the river.^{[45][46]}

The conference aimed to take feedback from stakeholders and prepare a road map for rejuvenating the Ganges. The event was organised by the National Mission for Clean Ganga (NMCG) on 7 July 2014 at Vigyan Bhawan in New Delhi.^{[47][48]}

Nepal has constructed many barrages (excluding joint projects with India) or pump houses to divert the lean season river flows for irrigation purpose.^[49] These water diversion projects are located near 28°25'29"N 81°22'49"E, 28°02'24"N 81°57'12"E, 27°52'51"N 82°30'13"E, 27°40'00"N 83°06'49"E, 27°42'17"N 84°25'57"E, 27°08'11"N 85°29'01"E, 26°53'09"N 86°08'13"E, 26°50'13"N 87°09'01"E, 26°41'05"N 87°52'43"E, etc. India being lower riparian state has right to claim share out of the river water flows from Nepal similar to India entered into river water sharing agreement with Bangladesh recognising it as lower riparian state.^[50] Till now there is no bilateral agreement between India and Nepal adhering to equitable sharing of river waters during the lean season. When Nepal releases water into India during the lean flow period, it would help in cleaning / diluting the polluted waters of downstream Ganges river up to Farakka barrage. For restoring the minimum environmental flows, it is difficult to identify nearly 100 Tmcft storage reservoirs in the hilly region of Ganges basin in India as the river is flowing through steep valleys. Already big storage reservoirs like Tehri and Ramganga are constructed at feasible locations. However the water of Manasarovar Lake located in China can be diverted to the upstream of Kanpur barrage (117 m msl) via Girijapur Barrage (129 m msl) located at 28°16'21"N 81°05'09"E across the Ghaghara/Karnali river which is a tributary of Ganges river flowing from Tibet/China and Nepal.^[51]

Manasarovar Lake's surface area is 320 square kilometres (120 sq mi), and its maximum depth is 90 m (300 ft). It holds more than 100 tmcft water in its top 13 metres depth. At present it is overflowing into nearby Lake Rakshastal which is a landlocked saltwater endorheic lake. The annual water inflows from the catchment area of Manasarovar lake located at 4,590 metres (15,060 ft) above msl, can be diverted

by gravity to the Karnali River basin of China through a 15-kilometre long tunnel.^[51]

The diverted water available continuously can be used in China for hydroelectric power generation where the head drop available is in excess of 800 metres over a 40 km long stretch. This would be a joint project of China, Nepal and India for controlling river water pollution and making the Ganges river live and flowing throughout the year. With the diversion of Manasarovar lake water to Ganges basin, Lake Rakshastal would turn into a soda lake with further increase in water salinity which is useful in abstracting the water-soluble chemicals on a commercial scale.^[51]

The fresh water inflows into Manasarovar lake can be augmented further substantially by gravity diversion of the inflows available from the major catchment area of Rakshastal lake to Manasarovar lake by constructing an earth dam isolating northern tip of Rakshastal lake where it is fed by its substantial catchment area and also connected to the Manasarovar lake.^[51]

A fresh water coastal reservoir with massive storage capacity can be established on the shallow sea area adjoining West Bengal, Odisha and Bangladesh coast by constructing sea dikes / bunds/ causeway up to the depth of 20 metres.^{[52][53][54][55]} Water can be pumped from this artificial fresh water lagoon throughout the year with abundant hydro, wind and solar power resources of India to many river basins in India for meeting needs of agriculture, maintaining environmental flows, salt export requirements, etc. Nearly 360 billion cubic metres (bcm) storage capacity fresh water coastal reservoir/lagoon can be located on the sea area which stretches from coast of south eastern Bangladesh (near 29°21'43"N 91°52'09"E) to the mouth of Brahmani River (near 20°49'37"N 86°57'57"E).^[citation needed] The dike would be envisaged with gated barrages to pass to the sea the excess flood waters (total mean annual flow 1200 bcm) received from the Ganges, Brahmaputra, etc. rivers for limiting the maximum reservoir level (FRL) to nearly 2.0 m above MSL (below local high tide level).^[56]

From this coastal reservoir, water is pumped to the Brahmani river basin for further transfer to basins of Damodar River, Subarnarekha River, Brahmani River, Mahanadi River in Jharkhand, Odisha, Chhattisgarh and West Bengal states. The Hasdeo Bango reservoir (near 22°36'47"N 82°37'27"E) would receive the Ganges water via Hirakud reservoir and further pumped into the Narmada, Sone, Tapti, Yamuna, Chambal, Ghaggar, Ganges, etc. river basins for using in Maharashtra, Madhya Pradesh,

Chhattisgarh, Uttar Pradesh, Bihar, Rajasthan, Gujarat, Haryana and Delhi states. See Google earth maps for more geographical information. Further, water can be pumped into the Bagh reservoir and Upper Indravati reservoir located in Godavari River basin to transfer Ganges water into Godavari and Krishna river basins.

The advantage of this scheme is that Ganges and Brahmaputra river waters can be stored on Bay of Bengal sea area and nearly 1050 bcm water is transferred throughout the year to other river basins including Ganges basin at optimum pumping head.^[57]

Implications

Nearly 1000 million tons (500 million cubic metres) of sediment annually from Ganges and Brahmaputra rivers is settling in the sea coast of Bangladesh and India, and the sea area is shallow (up to 20 m depth) for 60 km wide on average. Bangladesh, plagued with high population density, can reclaim nearly 7,500 km² (5% of its total land) area of sea by excavating/dredging sediment from the fresh water lagoon bed without any effect on the water storage of the coastal reservoir.^[58]

The presence of the protective sea dike makes subsea soil dredging easier and economical through protection from rough sea waves. This reclaimed area from the sea can be utilised for locating a megacity to cater to the modern needs of Bangladesh. This coastal dike would protect the Bangladesh from the wave and tidal activity during the frequent cyclones preventing human and property losses drastically and also from sea level rise due to global warming. Thus Bangladesh would also benefit immensely with this coastal reservoir project.

The sea dike top level at 8 m above the mean sea level and 50 m wide at the top surface, would be nearly 600 km long connecting Indian mainland to South east of Bangladesh forming transnational high way and rail route from the Indian subcontinent to East Asia up to Singapore and China. Also this dike can be used as access way connecting deep sea ports located close to this dike. The proposed dike would be similar to the land reclamation of North Sea area called Delta Works in Netherlands. The experience of the Saemangeum Seawall already constructed in South Korea which is 33 km long and with 36 metres average depth, can be utilised for this project which is a lesser challenging project. Locks arrangement (similar to Panama canal) would be provided for the movement of ships from the open sea to harbours located in Bangladesh and India.

The off shore earth dam extending up to +8 m msl height, is in the form of two parallel dikes separated

by 1000 metres gap. The main purpose of the twin dikes is to prevent any sea water seepage into coastal reservoir as its water level is below the sea level. The water level between the dikes is always maintained 2 to 3 m above the sea level by pumping fresh water from the coastal reservoir into the 1000 m gap between the dikes. The higher level water barrier between the two dikes fully eliminate any sea water seepage in to the coastal reservoir by establishing fresh water seepage to the sea. The 600 km long, 1000 m gap between the two dikes is also used as deep water mega harbor for shipping, ship breaking, ship building, etc. For shipping purpose, the breakwater outer dike facing the sea is envisaged with few locks fitted with twin gates for access to the open sea. The top surface of inner dike would serve as access to the main land from the mega harbor with rail and road links. The coastal reservoir whose full reservoir water level (FRL) is at 0.0 m msl, would also reduce drastically the cyclone damage and flooding in adjacent coastal areas.

The cost of the total project including coastal reservoir, contour canals, water pumping stations, solar/wind/hydro power plants, canal drop hydro power stations, main canals, tunnels, aqueducts, barrages and distribution canals is estimated nearly ₹ 125 trillion (lakh crores INR) at year 2021 prices.^[59] The irrigation potential of the project alone is 300 million acres with water supply throughout the year. It is a gigantic multi purpose project where cleaning of many major rivers of India by providing adequate base flows and minimum environmental flows (not Ganges river alone) from the water pollution is one of its purpose.^[60]

The Union Cabinet gave its approval for setting up of Clean Ganga Fund in September 2014 with the aim of using the collection for various activities under the Namami Gange programme for cleaning the Ganges.

Utilisation of funds:^[61]

- Cleaning up of the Ganges
- Setting up of waste treatment plants
- Conservation of biotic diversity of the river
- Development of public amenities
- Activities such as ghat redevelopment, research and development, and innovative projects^[62]

The National Mission for Clean Ganga (NMCG) is the implementation wing of National Ganga Council which was set up in October 2016 under the River Ganga (Rejuvenation, Protection and Management) Authorities order 2016. The order dissolved National Ganga River Basin Authority. The aim is to clean the Ganges and its tributaries in a comprehensive manner.^[63] Gajendra Singh Shekhawat is the present Union Cabinet Minister in Ministry of Jal Shakti.^[64]

Under National Mission for Clean Ganga, Namami Gange Programme was launched in 2014. This is a Flagship program under Union Government. A budget of 20,000 crore was given with the twin objective of effective abatement of pollution, conservation and rejuvenation of National River Ganga.^[65] Unlike previous projects for cleaning Ganga, Namami Gange is most comprehensive river conservation program.^[66]

Conclusions

In early 2011, a Hindu monk named Swami Nigamananda Saraswati fasted to death, protesting against pollutive river bed quarrying of the Ganges happening in the district of Haridwar, Uttarakhand^[67] Following his death in June 2011, his ashram leader Swami Shivananda fasted for 11 days starting on 25 November 2011, taking his movement forward. On 5 December 2011, the Government of Uttarakhand released an order to ban river bed mining in the Bhogpur and Bishanpur ghats.^[68] According to administration officials, quarrying in the Ganges would now be studied by a special committee which would assess its environmental impacts on the river and its nearby areas.

G. D. Agrawal was a environment activist and patron of Ganga Mahasabha, an organisation founded by Madan Mohan Malviya in 1905, demanding removal of dams on Ganges.^[69] Because of support from other social activists like Anna Hazare, the then-Prime Minister of India, Manmohan Singh agreed to Agrawal's demands. Accordingly, he called for a National River Ganga Basin Authority (NRGBA) meeting and urged the authorities to utilise the ₹26 billion (US\$520M) sanctioned "for creating sewer networks, sewage treatment plants, sewage pumping stations, electric crematoria, community toilets and development of river fronts".^[2] Agrawal died on 11 October 2018, after being on an indefinite fast since 22 June 2018, demanding the government act on its promises to clean and save the Ganges.^[70]

References

- [1] Conaway, Cameron (23 September 2015). "The Ganges River is Dying Under the Weight of Modern India". *Newsweek*. Retrieved 11 April 2017.
- [2] "Ganga receives 2,900 million ltrs [sic] of sewage daily". www.hindustantimes.com. Archived from the original on 9 September 2015. Retrieved 14 May 2015.
- [3] "The WaterHub". Retrieved 14 May 2015.
- [4] Emily Wax (17 June 2007). "A Sacred River Endangered by Global Warming". *Washington Post*. Retrieved 25 June 2017.
- [5] Robert Flynn (15 September 2016). *Holy Literary License: The Almighty Chooses Fallible Mortals to Write, Edit, and Translate GodStory*. Wings Press. p. 96. ISBN 9781609404666. Retrieved 13 July 2017.
- [6] "Most Polluted Rivers in the World: These Are the Worst 11 - TakePart". *TakePart*. 27 February 2012. Archived from the original on 7 March 2015. Retrieved 27 September 2020.
- [7] "The race to save the river Ganges". Retrieved 22 February 2021.
- [8] Wohl, Ellen E. 2012. *A world of rivers: environmental change on ten of the world's great rivers*. Chicago: University of Chicago Press.
- [9] Ganga, Yamuna banks cleaned 12 November 2013
- [10] "How Modi government went horribly wrong on Ganga rejuvenation". 16 October 2018. Retrieved 17 October 2018.
- [11] "Namami Ganga development Project gets 2037 crores". *IANS. news.biharprabha.com*. Retrieved 10 July 2014.
- [12] Mohit Dubey (2 August 2016). "RTI revelation: Rs 3000 crore spent on Ganga 'clean-up' without visible results". *The Economic Times*. Retrieved 25 June 2017.
- [13] "The Water Page - River Ganga". *African water.org*. 12 December 1996. Retrieved 9 July 2012.
- [14] "Sacred Ganga Carries Toxic Pollution". Archived from the original on 14 April 2015. Retrieved 14 May 2015.
- [15] "Hindus pilgrims bathe in Ganga - World news - South and Central Asia - NBC News". *NBC News*. Retrieved 14 May 2015.
- [16] "Remove dams & encroachments to clean Ganga". *The Times of India*. Retrieved 14 May 2015.
- [17] "Bangladesh seeks Indian cooperation to build \$4 billion Ganges barrage". 3 December 2015. Retrieved 14 February 2016.
- [18] "300 dams on the Ganga: A bane or a boon?". *IBNLive*. Archived from the original on 22 April 2012. Retrieved 14 May 2015.
- [19] "CPCB says there is need to regulate withdrawal of water from Ganga". 23 December 2015. Retrieved 24 December 2015.

- [20] "Contaminated water a curse for people". The Times of India. 6 May 2013. Archived from the original on 21 July 2014.
- [21] "Centre notifies minimum environmental flows for River Ganga". Retrieved 11 October 2018.
- [22] "List of head works (Dams, Barrages, Weirs, Anicuts, Lifts) on Ganga river". Archived from the original on 21 September 2017. Retrieved 14 May 2015.
- [23] "942 dams, barrages in Ganga basin preventing rejuvenation: Environmentalists". Retrieved 25 November 2018.
- [24] "Cleaning the Ganga". Economic and Political Weekly. 54 (39): 7–8. 5 June 2015. Retrieved 25 September 2019.
- [25] "Ganga Waterways Project Raises Hopes and Fears". Retrieved 14 April 2016.
- [26] Hamner S, Tripathi A, Mishra RK, Bouskill N, Broadaway SC, Pyle BH, Ford TE. "The role of water use patterns and sewage pollution in incidence of water-borne/enteric diseases along the Ganga river in Varanasi, India.", International Journal of Environmental Health Research, Montana, USA, 2006 Apr 16.
- [27] Daftuar, Swati (25 July 2011). "Polluted flows the Ganga". The Hindu. Chennai, India.
- [28] "Indians keep faith with Ganga despite pollution". Archived from the original on 27 January 2010. Retrieved 27 January 2010.
- [29] Anirban Ghosh (17 October 2012). "Ganga is now a deadly source of cancer, study says". The Times of India. Archived from the original on 23 May 2013. Retrieved 25 June 2017.
- [30] "Ganga river much cleaner than its tarnished image: Study".
- [31] Moumita Pal, Santinath Ghosh, Madhumita Mukhopadhyay, Mahau Ghosh. Ganga and Yamuna. "Methyl mercury in fish—a case study on various samples collected from Ganga river at West Bengal.", Environmental Monitoring and Assessment, 8 June 2011.
- [32] "Ganga River Dolphin". World Wildlife Fund. Retrieved 14 May 2015.
- [33] Malik, R. N., Ghaffar, B., & Hashmi, M. Z. (2013). Trace metals in Ganges softshell turtle (*Trionyx gangeticus*) from two barrage: Baloki and Rasul, Pakistan. Environmental Science and Pollution Research International, 20(11), 8263-73. doi:10.1007/s11356-013-1805-8
- [34] "Problems and Solutions for the Ganga River". Retrieved 14 May 2015.
- [35] Naskar, Sudhiti (1 July 2014). "The river where swimming lessons can be a health hazard". BBC News. Retrieved 4 July 2014.
- [36] "Namami Gange Programme". nmcg.nic.in. Retrieved 1 May 2017.
- [37] PTI. "Govt to extend Ganga action plan to major rivers". The Hindu. Retrieved 1 May 2017.
- [38] "National River Ganga Basin Authority". Archived from the original on 7 October 2011. Retrieved 18 April 2012.
- [39] "Composition of NGRBA". Archived from the original on 10 July 2012. Retrieved 18 April 2012.
- [40] McDermott, Matt (1 June 2011). "World Bank Approves \$1 Billion For Ganga River Cleanup". TreeHugger. Retrieved 4 July 2014.
- [41] Pokharel, Krishna (13 February 2010). "India's Holy Ganges Gets a Cleanup: Government Embarks on \$4 Billion Campaign to Treat Heavily Polluted Waters; Devout Hindus Revere River as 'Goddess'". Wall Street Journal. Retrieved 4 July 2014.
- [42] "48 industrial units polluting Ganga asked to close down". Patrika Group. 15 July 2014. Retrieved 15 July 2014.
- [43] "Approval to Namami Gange - Integrated Ganga Conservation Mission / Programme under National Ganga River Basin Authority".
- [44] "NMCG".
- [45] Ganga Manthan
- [46] "Ganga Manthan tomorrow: National meet to debate over river cleaning". The Indian Express. 6 July 2014. Retrieved 14 May 2015.
- [47] "National meet on Ganga cleaning to be held tomorrow". dna. 6 July 2014. Retrieved 14 May 2015.
- [48] "Pollution in holy river to be discussed in 'Ganga Manthan'". The Times of India. Retrieved 14 May 2015.
- [49] "Existing and planned hydro dams in Nepal". Retrieved 14 March 2016.
- [50] "River water sharing treaty between India and Bangladesh (pages 116 to 120)" (PDF). Retrieved 4 August 2020.

- [51] "Catchment area map of lakes Manasarovar and Rakshastal". International Centre for Integrated Mountain Development(ICIMOD). Retrieved 12 August 2015.
- [52] "Efficacy of coastal reservoirs to address India's water shortage by impounding excess river flood waters near the coast (page 49)". Archived from the original on 26 July 2018. Retrieved 9 July 2018.
- [53] "International Association for Coastal Reservoir Research". Retrieved 9 July 2018.
- [54] "Coastal reservoirs strategy for water resource development-a review of future trend". Retrieved 9 March 2018.
- [55] "Reservoir in sea to end Bengaluru's drinking water problems?". The Times of India. Retrieved 9 March 2018.
- [56] IWMI Research Report 83. "Spatial variation in water supply and demand across river basins of India" (PDF). Retrieved 23 June 2015.
- [57] "Ganga & Brahmaputra river's water flow data, India". Retrieved 26 May 2015.
- [58] "Bangladesh, a physically growing country". 18 October 2009. Retrieved 14 May 2015.
- [59] "India is not running out of water, water is running out of India". 26 March 2017. Retrieved 9 July 2018.
- [60] "Water Quality Database of Indian rivers, MoEF". Retrieved 17 April 2021.
- [61] "Meri Ganga | National Ganga Portal". meriganga.com. Retrieved 1 May 2017.
- [62] PTI. "Clean Ganga Fund: Rs. 66 crore and counting". The Hindu. Retrieved 1 May 2017.
- [63] "About National Mission for Clean Ganga". NMCG. 12 August 2011. Retrieved 13 October 2016.
- [64] "Modi Cabinet news: Meet Modi's formidable force in run-up to 2019 general elections India News - Times of India". The Times of India. TNN. 4 September 2017. Retrieved 29 October 2020.
- [65] India, National Mission for Clean Ganga(NMCG),Ministry of Jal Shakti, Department of Water Resources, River Development & Ganga Rejuvenation, Government of. "नमामि गंगे". National Mission for Clean Ganga(NMCG),Ministry of Jal Shakti, Department of Water Resources, River Development & Ganga Rejuvenation, Government of India. Retrieved 31 October 2020.
- [66] Desk, India com News (29 September 2020). "Namami Gange Mission Most Comprehensive River Conservation Program, Says PM Modi". India News, Breaking News, Entertainment News | India.com. Retrieved 31 October 2020.
- [67] Dube, Priyanka (14 June 2011). "Sadhu dies after a 73-day fast to save Ganga". ibnlive.in.com. CNN-IBN. Archived from the original on 16 June 2011. Retrieved 14 June 2011. Swami Nigamanand
- [68] "Shivanand breaks fast after forcing curb on Ganga bed quarrying". The Pioneer. CMYK Printech. Archived from the original on 16 May 2012.
- [69] "'The govt doesn't care for the issue Prof GD Agrawal is fasting for". [Tehelka.com](http://tehelka.com). Retrieved 14 May 2015.
- [70] Slater, Joanna. "Environmental activist fasts to death over fate of India's Ganges River". Washington Post. Retrieved 20 June 2020.