



DETERIORATION OF THE PHYSICAL ENVIRONMENT DUE TO RIVER POLLUTION AND ANTHROPOGENIC FACTORS FROM RAMPURGHAT TO CHUNAR IN THE GANGA SECTION

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Abstract:

The study seeks an anthropogenic factor and river pollution along with the assessment of the Ganga Valley from Rampurghat to Chunar. Many crops are grown in the Ganga river basin fields. The rise of pollution in the Ganga River has become a socio-economic development in recent decades. It is maintained the water of the Ganges, which is also known as the 'blue gold', is the major source of water to northern India, but because of the continuous growth of India's population and its economy, it is being overexploited. This has been visible in the Ganga River that how the above-mentioned factors have led to the deterioration of the river from physical to its big animal loss. The River Ganga is highly contaminated with pollution today and has become very important due to problems of agricultural land use, on the other side due to increased sedimentation in the river valley. The methodology adopted for the present research work includes field observation, collection of the sample, laboratory work, investigations, and various Government departments. It has faced environmental problems caused by natural anthropogenic activities pollution in the last decades. Municipal and industrial effluents affect the sediment and water of the river", where "due to a change in the physic-chemical conditions, viz. pH, salinity, redox condition, etc., of the aquatic milieu, these metals from the sediments may pass into the water phase and thus may cause a health hazard which has affected the river channel also. It is due to the mining and related factors that have changed the entire water dynamics in the Ganga River. The roles of sediments and agricultural practices have increased the pollution of the Ganga River, along with other causes. Mirzapur finds due to rapid population growth, and agricultural and industrial developments, the quality of water in rivers is being degraded continuously making it unsuitable for various uses. According to the department of water resources rapidly increasing population, living standards, growing industrialization, and urbanization have exposed water resources to various forms of degradation. Water holding capacity in the crop fields is an important role in the upper part of Ganga valley, drawn from the tube well and pumping sets. Mirzapur and Vindhyachal Dham in every full moon and the new moon is celebrated and there is a large number of tributaries so that there are lives of the 'mahatmas' and shopkeepers. Here it also gives the sailors an economic advantage. The study area often has religious baths and rituals like flowers, polyethene, chunari, green leaves of trees, soil lamps, milk etc.) are cast in the Ganga river. In this article, there are understood and examined the practical side of our theoretical knowledge. Lots of Crores of devotees come to cremation today, especially due to the special religious significance of the Ganges River, especially among the Hindus.

Keywords: Anthropogenic factors, Sedimentation, River pollution, Water pollution, Religious activities, Fishery production, Sewage production, Throwing of dead bodies, Soil erosion, Chemical fertilizers, Ganga section.

Introduction:

The Ganga is popularly known as the holy river. It is the second-largest river in the Indian subcontinent and covers several states in India. The River Ganga also covers the major part of Uttar Pradesh. This sacred river originates from the Gangotri glacier, which is about 4,500 m above mean sea level in the Uttarakhand Himalayas and flows down towards the Bay of Bengal covering a distance of 2,525 km. The main township of Uttarakhand and Uttar Pradesh falling on the bank of the Ganges river are Rishikesh, Haridwar, Garhmukteshwar, Narora, Kanoj, Kanpur, Dalmou Allahabad, Mirzapur, Ghazipur, Ballia and go up to the Bay of Bengal in the Indian ocean. Every year the river faces the problem of the sedimentary load of millions of tons in the plain areas. The sedimentation problem in the Ganga is a natural phenomenon that takes place and affects several areas. The geological setup of the region significantly controls the potential for the occurrences of mineral deposits thus, growing the prospects of the socio-economic development of a particular region. The socioeconomic status of Mirzapur district in eastern Uttar Pradesh has taken into consideration the geological background and natural and mineral resources of the region (Bajrangi 1995).¹ The Ganga River plays an important role in maintaining the ecological balance in North India. Almost many crops are grown in the Ganga river basin fields. The special significance of the Ganga river in the socio-economic development of this



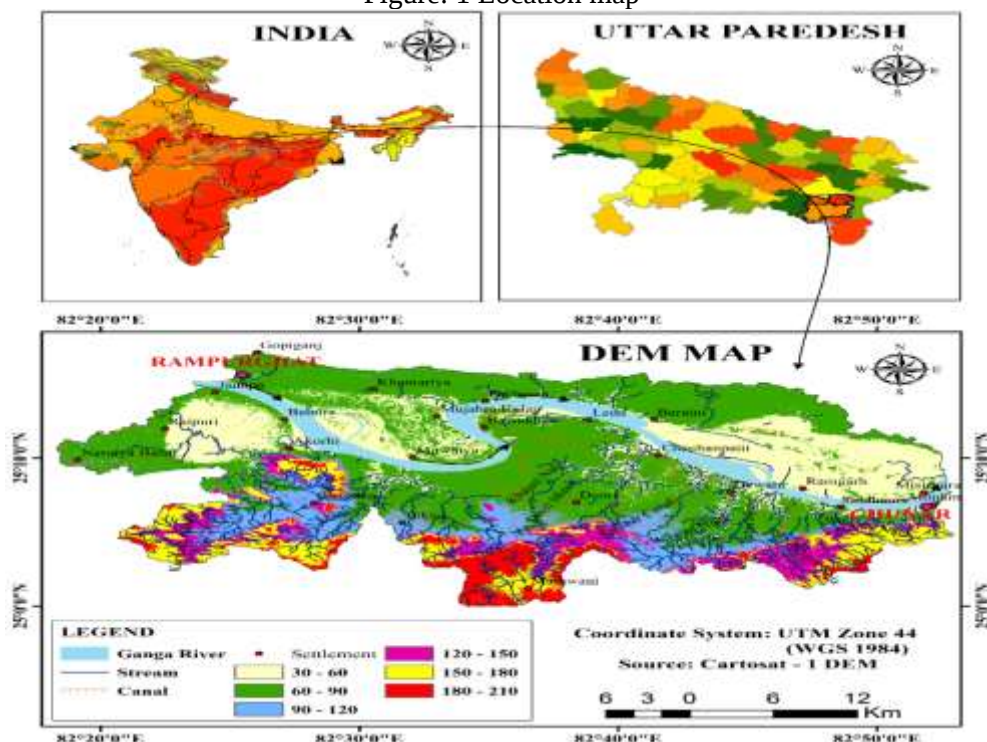
section is due to the importance of the Ganga in the present time and the large river of the country. While flowing, it connects several major urban cities of India as well. This inter-connected nature has presented challenges and concerns as their urbanization took up. The rise of pollution in the Ganga River has become a significant issue in recent decades.

In the study region of Mirzapur, the same effects could be observed. It is maintained that “the water of the Ganges, which is also known as the ‘blue gold’, is the major source of water to northern India, but because of the continuous growth of India’s population and its economy, it is being overexploited” (Jhariya and Tiwari 2020:2).ⁱⁱ This has been visible in the Ganga river that how the above-mentioned factors have led to the deterioration of the river from physical to its bio-animals loss. This is also seen that “when the river flows down downgradient, it meets the highly populated cities before merging into the Bay of Bengal. From its origin to its fall, its water changes from crystal clear to trash and sewage infested sludge” (Jhariya and Tiwari 2020, 1).ⁱⁱⁱ In this short, a direct study and survey of various sections related to the Ganga Valley from Rampurghat to Chunar have been conducted. Under which, practical and technical suggestions have been given to reduce the pollution including channel pattern, natural site form, human form, development of resources and suggestions on land use, social, religious activities and pollution reasons. This has increased the importance of the physical geography branch of the geography subject in practical life. This will enable the sustainable development of human society and nature.

The Study Area

The study region is a valley area of river Ganga between Rampurghat and Chunar. The area under study extends from 25°00' N to 25°2' N latitudes and from 82°30' E to 82°88' E longitudes. The actual length (channel length) of the river is 61km. long while the air length is only 45km. long. The width of the river course also is a major part right side and left side a small area covers the study region (on the left bank of the river in Sant Ravidas Nagar (Bhadohi), and the right bank of the river in Chunar, Mirzapur district. The rivers are the lifeline of living beings. Looking at the ecological, social, and economic importance of the Ganges River and the small research for the analysis and solutions of many problems related to Ganga valley, this has been selected from a small area of Ganga valley. The study region comprises the extreme southern part of Chhanbay block, Lalganj block, Marihan block, Rajgarh block, Chunar Tehsil, and Pahari block development block of Mirzapur district; Extreme northern part of Kan block, Manjhawa block, Sikhar block, and some part of Bhadohi and Varanasi.

Figure: 1 Location map





After covering a distance of about 61km. It leaves the study region near the junction with Ojhala Nala, Khauri Nala, Barahaiya Nala, and Durga Nala, Administratively, the study region covers three districts of Uttar Pradesh namely, the southernmost part of the Mirzapur and small areas of Bhadohi and Varanasi district. India's national river the Ganges is highly contaminated with pollution today and has become very important due to problems of agricultural land use, on the other side due to increased sedimentation in the river valley. Various types of Geo-environmental problems are emerging from the river's changing path. The importance of this increase is due to flooding problems in the river valley. In the present time, various physical Landscapes or physical patterns developed on the ground surface are rapidly transforming at a rapid pace, whose main reasons are the various economic and cultural processes of the developing and developing human. The development of any economy is based on water. Today, on one side river water is decreasing; on the other hand, water pollution is also a major problem.

Methodology

Research methodology is a process that helps researchers achieves their objectives. In this part, we firsts collect and analyse data from the area. The figure is such information that can be in both qualitative and quantitative forms. Hence the study would be based on both primary and secondary sources of data. This research can be described as given below. The methodology adopted for the present research work includes fieldwork, laboratory work and cartography. The present research work is divided into two parts :(1) The collection of essential data and (2) the analysis and interpretation of the data. The first-hand data are obtained by field observations, collection of samples, and laboratory investigations. The secondary data are obtained from various Government Departments. Through interviews of the concerned officials and from various reports, research papers, books and periodicals.

Identification of the problems – the main objective of the paper was to identify the geomorphological landscape and to access the present condition of the channel pattern of the morphology description. Then the aim was to identify how micro landscape affects the river Ganga and to change channel pattern, which is the main problem of the study area. Then secondary data were reviewed such as research papers, newspapers, articles, and magazines. A field survey was conducted to gather primary sources data with the help of personal interviews with the priest, boatman, shopkeeper, and devotees, who come here to take a holy dip in the river Ganga local people of the study area. Fieldwork enabled us to access the situation from a practical view. After suitable data were collected qualitative techniques have been adopted to assess to derive appropriate results and solutions.

Result and Discussion

The Ganges River provides livelihood to many people, and especially to many people living near the valley. The major resources found in the Ganga Valley are agricultural land, water, religious activities, tourism, and fish production. Rivers have been significant for people since the beginning. They provide water to drink as a necessary need for human beings to survive. This water though has been fresh until the emergence of industries and urbanization in the world. This development also affected the life scale of the rivers such as the Ganga in India. Historically, the holy river Ganga has been a place of worship for people as this provides several solutions to problems such as human diseases, etc. It is also a fact that it has faced environmental problems caused by natural anthropogenic activities pollution in the last decades. Pollution is a major problem seen in the world. It has become a common issue in countries as well.

Sedimentation: In the study section of Mirzapur, the same effects could be observed. The increasing pollution in the Ganga River alarms the states, such as Uttar Pradesh, to find ways to resolve this ecological misbalance. The Ganga valley is very fertile brought by the river every year, especially on which the problems of Zaid crops are successfully grown. During the survey, after interviewing the local farmers, it was found that agricultural work was done by the people of nearby villages in Ganga valley. No farmer has parental authority on the land here. Only the villages in front of the village cultivate fields distributed by the border chief every year. For this, they do not have to pay any land tax. Here the farmers mainly grow crops of Zaid, which the watermelon, melon, cucumber, gourd, pumpkin etc. are the main ones. Fertilizers are not often used because the land is fertile. Here the main livelihood of local people here is agricultural work. In the time of flood or monsoon, when the fields are submerged during the time of flood or monsoon, the farmers here run their livelihood by compulsion.

Ajai Srivastava et al (2007) find that “municipal and industrial effluents affect the sediment and water of the river”, where “due to a change in the physic-chemical conditions, viz. pH, salinity, redox condition, etc., of the aquatic milieu, these metals from the sediments may pass into the water phase and thus may cause a health hazard” (Srivastava et al 2007).^{iv} According to Chin Ted Yang (1977), “the rate of sediment transport is related to many variables such as water discharge, average flow



velocity, stream power, energy slope, shear stress, water depth, particle size, water temperature, and strength of turbulence” (p.39).^v These are the significant factors that affect the river’s sedimentation transport and change the channel as well as often seen in the Ganga River. To strengthen the study, the research will look into two major causes of it: natural and human. In the human cause, this will further deal with the mining and the agriculture elements.

Plate:1 Photographs of the sedimentation in the Ganga River. (A) Heavy silt deposition the form of Channel Islands upstream of the Bhatauli Bridge. (B) Silt deposition towards the left side downstream of the Ram Gaya Ghat.



Mining is one such human activity found in the study region, which has affected the river channel also. It is due to the mining and the related factors that have changed the entire water dynamics in the Ganga River. Scientists from the beginning have warned about the consequences of mining on the river Ganga and its natural flow, which in recent decades has witnessed a tectonic shift in its flow. Therefore, experts at the onset have raised this issue and demanded a strict law for such mining that could become a significant cause for the river’s course drifting, which is also causing pollution. The roles of sediments and agricultural practices have increased the pollution of the Ganga River, along with other causes. This process can be best understood as “when soils erode, sediments are washed into streams and rivers. Thus, human activities have played a significant role in the sedimentation process to change the river’s main course from natural to non-natural flow. In the human causes, mining and agricultural practices added a substantive negative impact on the Ganga River. To resolve it, all governments and non-governmental organizations need to come together with a single vision of cleaning up Ganga and restoring its ancient holy water.

River pollution: Shahid Khan and Satyendra Nath's (2014) study in their article, “Physiochemical analysis of river Ganges at Mirzapur in Uttar Pradesh, India”, the “qualitative change in water” at Mirzapur site, Uttar Pradesh. While collecting the data on change in the river’s direction in the Nagar block of Mirzapur they find that “due to rapid population growth, agricultural and industrial developments, the quality of water in rivers is being degraded continuously making it unsuitable for various uses” (Khan and Nath 2014:61).^{vi} It is said about the Ganga “the purity of such water, the belief in its known historical and unknown mythological origins, and the inaccessibility of remote sources, elevate its importance even further, in India the water of the river Ganga is treated with such reverence” (Sharma 1997).^{vii}

Plate: 2 Photographs of the pollution in the **Ganga River**. (A) & (B) Removing wastewater by man and the boy jumps over a drawn flowing with wastewater from the leather tanneries into the river Ganga in Mirzapur.





According to the Department of Water Resources, for the river Development and Ganga Rejuvenation, “rapidly increasing population, rising standards of living and exponential growth of industrialization and urbanization have exposed water resources, in general, and rivers, in particular, to various forms of degradation. The mighty Ganga is no exception.”^{viii} Smriti Chand (2006) finds five significant causes of water pollution in India: “urbanization, industries, agricultural runoff and improper agricultural practices, withdrawal of water, and religious and social practices.”^{ix} Among them, It is seen that industries contribute a significant volume of pollution in the Ganga river as underlined by a scholar that “the total wastewater generated from all major industrial sources is 83,048 mld which includes 66,700 mld of cooling water generated from thermal power plants” (Chand 2006).^x

Water pollution: The life of flora and fauna is not possible without water. There are play an important role in making ecological balance, water has a special contribution to human activities. The water is used in the Ganga valley in agricultural form. For irrigation of crops, people here make 6-7 feet deep ponds in the fields. There are removed from the sand field and used for crop irrigation. Water holding capacity is an important role but this area is low due to maintaining ground moisture for agricultural form. Therefore, in the crop fields located in the upper part of the valley, the water is drawn from the tube well and pumping sets.

- Drinking Water for Birds and Animals: many village and towns like Rampurghat, Ram Gaya Ghat, Vindhyachal Dham, Pakka Ghat, Baria Ghat, Nar Ghat, Bhogao Ghat, Sindhaura Ghat, Balu Ghat (Chunar) is situated on the bank of river Ganga, thousands of cow-buffalo and other animals graze in the Ganga valley and use water in drinking and bathing etc. It leaves the study area near the junction with Ojhala Nala, Khajuri Nala, Barahaiya Nala, and Durga Nala, etc.,

- There are settled in low-level lands and on both sides of the tributaries, Karnauti Nala and Ojhala Nala. The solid waste is dumped on both sides of the river Vindhyachal Dham. In especially the concentration of Nitrate, Chloride, and Faecal coliforms in the river water has a major effect on water-borne diseases like diarrhoea, viral hepatitis, dysentery, and typhoid, cholera and gastroenteritis.

- These days the traditional boats have a motor attached to them, which are used for tourism and transportation purposes along the river. This cause is a regular spillage of diesel into Ganga by the motorized bikes and the issue is still unable to grab the attention of the municipality. There is no proper arrangement for the disposal of solid waste which even includes garbage, unclaimed human dead bodies, half-burnt bodies, plastic bag and animal carcasses.

- River Ganga is sick in Mirzapur. The Ganga water is polluted in which about 90% of this pollution is caused by sewage flowing into the water. The river water at the end of the town is grey and stinks, with methane bubbles coming to the surface where the river along the Ghats of Mirzapur is used culturally and is used for sipping, and worship in the temples.

- The BOD (biochemical oxygen demand) of the Ganga River in Ojhala and Karnauti Nala is 4 mg/l and the FFC/100 ml (faecal coliform counts) is around 60,000. Safe drinking water here has become a challenge for the people. They do not have access to clean water for bathing which results in blinded eyes by trachoma.

- To prevent the erosion of Gully and Rill, make extensive arrangements in the Ganges River valley. The Polluted water released from the village, town, city etc should be researched in the first researched water purification plant and then put in the river after it. Hi-Tech should be developed to clean the polluted water and to separate the solid waste should be planted on all the drains. This awareness should be spread among the people so that they do not put polythene and flowers in the river.

Religious Activities: There are three mythological Ghats on the river Ganga in Vindhywasni Ghats, Pakka Ghats, and Bhogao Ghats. There are almost allergies and baths, every year. These are praying Maa Ganga Goddess. However, God's blessings are always the same for everyone. Maa Vindhywasni temple is really beautiful. Just their management should maintain its beauty. With the arrival of such a large number of devotees, there is the economic benefit of local cottages, industries, farmers, priests, Saint, Fair, and city administration. Mirzapur and Vindhyachal Dham in every full moon and the new moon is celebrated and there is a large number of tributaries so that there are lives of the ‘mahatmas’ and shopkeepers. Here it also gives the sailors an economic advantage. There are many magnets in the ropes of the children of the sailors here. They are dragging it into the river by taking it on the bathing Ghats so that the coins put in the river stick in the magnets in the river. After asking these children, it came to know that they earn about Rs. 50 per day. Lord Rama had crossed the Ganges River with the help of Nishadraj from Pakka Ghats.

- Worshipped by billion Hindus and a water source for 400 million, the government is bathing to ave “Mother Ganga”.

- The river and its tributaries are a vital water source for hundreds of millions of people, who rely on it to drink, bathe and irrigate the land.



■ In Hinduism, the Ganga River is personified as a goddess and holds an important place in the Hindu religion. In Hindu mythology, it is believed that bathing in the river causes all of your sins to disappear into the river and it also facilitates your salvation.

Rampurghat, Ram Gaya Ghat, Vindhywasni Ghats, Pakka Ghats, Bhogao Ghats, Sindhaura Ghats, and Chunar Ghats often have religious rituals and baths. Thousands of tons of religious rituals (flowers, polyethene, chunari, green leaves of trees, soil lamps, milk etc.) are cast in the river. On the confluence of about 5000 people every year, they are permanently patronizing one month so that solid waste and stool-urine are contained in heavy but unhealthy in the river. During the Dushahara festival, hundreds of idols of the soil on the Durga Pooja, Ganesh Chaturthi etc. are finally inserted into the Ganga River, and the river water is also polluted by the chemical colour used in colouring it. People should be made aware of the impact of pollution and its effect on the river Ganges, which makes pollution very little by itself. Providing the available water available for irrigation or re-planting it in the river.

Fishery production: Fishing in the river Ganges is also the main source of income for travellers. They catch fish from their boats or across the river. The land use or resources can be developed under the following points in the Ganga valley. (1) Development of advanced technology of irrigation. (2) Creating floods. (3) Promote tourism. There is no proper irrigation system in the valley; about 30 per cent of the land is vacant. So, if there is a proper system of modern irrigation systems like the drip and sprinkling method, then more production can be obtained by deepening the crops. As a result, most of the city and village needs can be fulfilled, and by increasing the income of the concerned farmers, their living standards can be increased. The ecologically appropriate water harvesting method should also be used. For this, by constructing the floodwater harvesting during the rainy season, the water will be blocked throughout the year. The promotion of tourism in Mirzapur District. There is massive potential for further development of tourism in the beautiful Ghats. They will facilitate devotees and tourists. Ghats should be beautiful, where Ghats can make sure where possible.

Sewage waste: The Ganges River was found to be the worst polluted area in Rampurghat, Ram Gaya Ghat, Vindhyachal Ghat, Pakka Ghats, and Bhogao Ghats and Sindhaura Ghats of the study area. All types of polluted water will be filled with small dozen drains from the area of villages, towns, and cities. There are most available making sewage water, solid waste, polythene, and perfumed substances, making thousands of tons of dirty water daily in the Ganga River toxic to clean water.

The major polluting industries on the Ganga are the leather industries, especially near Mirzapur, which uses a large amount of chromium and other chemicals, and much of finds its way into the major flow of the Ganga. However, the industry is not the only source of pollution. The sheer volume of waste estimated at nearly 1 billion litres per day of mostly unrelated raw sewage is a significant factor. Also, inadequate cremation procedures contribute to a large number of partially burnt or unburnt corpses. Floating down the Ganga, in addition to livestock corpses.

Plate: 3 Photographs of the Nala and its tributary in the **Ganga River**. (A) Modana nala near at Rampurghat. (B) Ojhala nala near at Mirzapur city. (C) Pahari Nala near Vindhyachal Ghat.



Throwing of dead bodies: Many bodies are thrown in the river, especially the River Ganga Ghats, cattle and especially the body of the dead by the followers of the Hindu religion, some people burn the dead bodies on the Ghats. It's after burning Chant and burnt a large number of burnt bodies, that are inserted in the Ganges River.



Plate: 4 Photographs of the customs and rituals in the Ganga River. (A) Throwing dead bodies on the banks of the Ganga River in Mirzapur. (B) Bodies burns on the left bank of the Ganga River at Rampurghat.



Soil erosion: Due to the destruction of forests due to the forest destruction in Ganga valley at Mirzapur, due to the increase in the amount of depression due to dust and erosion of the lane and angina erosion, the melting of the Ganga River water is increasing rapidly.

Chemical Fertilizers: In the Ganga valley, the river water is being polluted due to chemical fertilizers and fertilizers being manipulated. Chemical analysis of sewage water and waste materials by Ganga Pollution Control Unit, Allahabad. Mirzapur has a gross wastage of water from the cities of 110 million litres/day and the amount to be researched is approximately 60 million litres/day. Farmers should use organic manure instead of chemical fertilizer in the fields of the valley. The waste is going to the Ganga River, separating the wastes and installing the plants which produce electricity.

Conclusions:

The study received much important and knowledgeable information on the river channel pattern, the landscapes, resources and pollution in the Ganga valley. In this article, there are understood and examined the practical side of our theoretical knowledge. Lots of Crores of devotees come to cremation today, especially due to the special religious significance of the Ganges River, especially among the Hindus. Even today many people like to do cremation on the banks of the river. It was also seen how the children of poor households, like the sailors, tied dozens of magnets in the rope and dug the coins put by the devotees on the river. There are also several reasons for the pollution in the River Ganga. In the study area, there is also the knowledge of increasing interference in economic and technical human beings. The Ganga River becomes a dumping ground, for example, factories put hazardous chemicals and industrial by-products into the river polluting it. The combination of untreated chemicals and industrial waste has had a terrible effect on the health of Indians catching painful skin conditions, respiratory, diseases, and deadly waterborne illnesses such as typhoid, polio and jaundice. As a result of the Ganga River, many cities are extremely polluted such as the industrial city of Mirzapur. The Ganga River affected India by its being reliable water: when the river flooded it would make good fertile soil once the flood died down. The fertile soil is perfect for crops. Considered the most sacred river people bathe in it to be purified from their sins. A canal leading from the main river is used as an effective means of irrigation in the plains. As it is a perennial river, it provides water throughout the year long.

The government action plans in the form of the “Ganga Action Plan” have to some extent sought to achieve its objectives and the work is still going on. Also, this has been suggested by experts that now the attention should be shifted “from Namami Ganga to Arth Ganga, which would prop up a sustainable development model through economic activity” (Dutta 2019). The above-mentioned both anthropogenic and natural factors have increased the pollution level and caused a drift in the natural flow of the river Ganga. Still, efforts are being done to deal with these issues to purify and maintain sustainable uses of resources provided by the holy Ganga water.

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