

## **DESTRUCTION OF TOLLY NULLAH LEADING TO INCREASING VULNERABILITY OF THE SURROUNDING POPULATION**

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### **ABSTRACT**

India is marked by a dynamic plethora of riverine expanse. The Adi Ganga is of great significance from times of antiquity, with its narrative starting from mythological tales. Later, its importance is highlighted in the field of transportation that boomed during the colonial period. But as the tales of glorious past are narrated, a more dreadful image materializing shares a dilapidated narrative of a lost and disappearing stream.

A paleo distributary of the Bhagirathi, the Adi Ganga branches from Bhagirathi at the present day location of Bidhan Ghat. The geographical expanse of the channel is currently traceable upto 36km downstream from Kolkata near Surjyapur in South 24 Parganas (22°8'N, 88°28'E) before the wheels of urbanization ransack the scenario further.

Being the seventh most populous city in India, Kolkata has a tremendous population load on itself. With a population of 4,496,694 within its city limit, the city passes its human load and destruction to the helpless canal passing through it. The settlement density has increased tremendously along the Adi Ganga over the past few decades.

This led to an excessive demand for land, with the riverside being filled up with residents, especially refugees after the partition in 1947. The helpless river started being squeezed from both sides and is now just a black polluted strand across the city.

Studies reveal that maximum encroachers along the banks of Adi Ganga are illiterate, poor and below the poverty line income group. It is well understood that the stream is being turned into nothing more than a sewer carrying filth and dirt, the population inhabiting its banks are a group

of vulnerable people, be it economic or social vulnerability. Thus, this paper will explore how the stream affects the vulnerability of the population inhabiting its banks. The paper will also try to identify Government actions taken to address the problem.

**Keywords:** Tolly Nullah, pollution, vulnerability, population, degradation

## 1. INTRODUCTION

The earth is bestowed with a bounty of natural resources. With the increasing population, there is tremendous pressure on the limited stock of these resources. These essential resources are crucial for the livelihood of the marginalized and vulnerable population worldwide. With the advent of time, these resources are degrading and declining fast, creating a lot of problems. Taking the case of a river, it is observable that the degrading quality of the river, in turn, affects the population dependent on it for their livelihood and sustenance. Similar problems are observed in the case of groundwater degradation and depletion, degradation of forests etc. These instances are primarily prominent in developing countries. The overexploitation of the limited stock of resources by man increases the vulnerability of the affected population and jeopardizes the ecological equilibrium of the area. Such is the narrative of the degrading "Tolly Nullah" ( a part of the Adi Ganga channel).

With its complex network of rivers, tributaries and distributaries, the deltaic Ganga is most profound in the lower deltaic region traceable in Bengal. Due to the inherent laws of nature over hundreds of years, the river's course has shifted. The current observable channel is traceable upto 36km downstream of Kolkata in Surjayapur in South 24 Parganas (22°8'N, 88°28'E). (Bandyopadhyay, 1996, 3).<sup>1</sup> The stream is most prominent in Kolkata, flowing through distinctive locations of Kalighat, Tollygunge, Garia, Baruipur, Majilpur etc., to finally be exclusively traced to Surjayapur in South 24 Parganas.

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<sup>1</sup>Bandyopadhyay, S. (1996, June). Location of the Adi Ganga palaeochannel, South 24 Parganas, West Bengal: A review. *Geographical review of India*, 58(2), 93-109.

### **Tolly Nullah at Kalighat**



Source: Self clicked

Hundreds of years ago, what we see today as the Adi Ganga near Kalighat was the main flow of the Bhagirathi river in Kolkata. (Tabassum et al., 2020)<sup>2</sup> Before drying up and being squeezed by the claws of urbanization from both the banks, Adi Ganga was once an untamed, turbulent water mass flowing through the city. Not just a critical water resource for Kolkata, Adi Ganga (also known as Tolly Nullah in some parts) was an essential means of inland transportation.

From Betore to Garden Reach, the west-east stretch of this canal was used as a significant transportation channel by the Portuguese Traders in the 17th century. However, the river water started shrinking with time due to the anthropological tortures applied to this natural system. The colonial rule followed by the various land reforms and the post-independence adjustments affected the agricultural lands and resulted in the fragmentation of the river water. Post partition, the city

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<sup>2</sup>Tabassum, N., Das, S., & Ghosh, M. (2020, January). Scientific Study Of Dying Rivers For Societal Benefits: A Comparative Analysis Of Two Rivers In Two South Asian Countries. *INTERNATIONAL JOURNAL OF SCIENTIFIC & TECHNOLOGY RESEARCH*, 9(1), 3326-3331.

of Kolkata witnessed a massive rush of migrants and refugees who could not be accommodated well within the central city. These people started settling along the channel's banks where settlements were cheaper and dumping their wastes into the river channel. The rapid rate of urbanization left nothing of the earlier majestic watercourse, and the river started to dry out with remains of a sewer channel in the present days. (Tabassum et al., 2020)<sup>3</sup> Even today, the residents along the banks of this canal system near Kalighat claim to have witnessed this stream brimming with water some 30 to 40 years back. The water is now all stagnant and a breeding ground for mosquitoes and other such vectors almost throughout its course.

Since the population inhabiting the river banks are economically backward and mostly illiterate, displaced people living in informal settlements, the vulnerability of such a population is high in the face of any disaster affecting their lives. Although they are primarily illegal inhabitants and according to the Department of Irrigation and Waterways, Government of West Bengal, it is said that the custodians of the River Adi Ganga claimed that these settlements are encroachments and they hamper the proper drainage by polluting the river (Mandal, 2018)<sup>4</sup>, there exist another view of the scenario. Looking at the scenario from the opposite lens, it can be observed that the polluted water coming from various sources get discharged in the Adi Ganga, and the people living in the vicinity of the river are directly and indirectly affected by suffering from various water-borne diseases, unpleasant living conditions and several other health hazards thereby making them even more vulnerable to any crisis.

## **2. POLLUTION OF ADI GANGA OVER THE YEARS**

Over time, it has been prominently observed that the natural resources and environmental quality are rapidly degrading across the globe. With increasing population pressure, as had been

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<sup>3</sup> Tabassum, N., Das, S., & Ghosh, M. (2020, January). Scientific Study Of Dying Rivers For Societal Benefits: A Comparative Analysis Of Two Rivers In Two South Asian Countries. *INTERNATIONAL JOURNAL OF SCIENTIFIC & TECHNOLOGY RESEARCH*, 9(1), 3326-3331.

<sup>4</sup> Mandal, A. (2018). Use of river water by the encroachers and related problems: A case study of the Adi Ganga River, Kolkata, West Bengal, India. *American International Journal of Research in Humanities, Arts and Social Sciences*, 105-110. Google Scholar.

[https://www.researchgate.net/publication/328494900\\_USE\\_OF\\_RIVER\\_WATER\\_BY\\_THE\\_ENCROACHERS\\_AND\\_RELATED\\_PROBLEMS\\_A\\_CASE\\_STUDY\\_OF\\_THE\\_ADI\\_GANGA\\_RIVER\\_KOLKATA\\_WEST\\_BENGAL\\_INDIA](https://www.researchgate.net/publication/328494900_USE_OF_RIVER_WATER_BY_THE_ENCROACHERS_AND_RELATED_PROBLEMS_A_CASE_STUDY_OF_THE_ADI_GANGA_RIVER_KOLKATA_WEST_BENGAL_INDIA)

projected by Malthus (Hussen, 2018)<sup>5</sup>, the realm of natural resources is being overexploited to meet the needs of the growing population and the unending wants of humanity. The horizontal and vertical expansion of urbanized space directly results from increasing population pressure, which further degrades the natural resources. Several narratives can be poignantly summarised from across the globe, which indicates the sorry state of affairs. It has been recorded that the inland water resources, forest resources, etc are declining and degrading at a swift pace across the major continents. Across the globe, some spectacular natural wonders are fast disappearing, thus disbalancing the existing equilibrium.

### **2.1 Case Studies from across the globe**

Citing case studies across the globe, the point can be further ascertained. The Everglades National Park in Florida is a UNESCO recognized world heritage site and abodes a massive variety of fauna and flora. This natural beauty and storehouse of resources is endangered by the unchecked expansion of urban areas, increasing pollution, degrading water quality etc. Currently, the natural resources are severely strained, leading to loss of habitat, degradation of ecological quality, and declining natural resource cover. (Mascarenhas, 2015)<sup>6</sup>

Another case can be cited of the mighty Congo Basin. It is spread across several countries in Africa and is home to a massive plethora of natural resources, fauna and flora. But this natural abode is fast declining due to rampant illegal logging, mining, farming, wildlife trade activities etc, that threaten the existing ecological balance. It was reported by the UN Food and Agriculture Organisation around 700,000 hectares of forest land has been vanishing every year since 2000-2010. (Mascarenhas, 2015)<sup>7</sup>

A similar narrative is observed in developing countries like India. The great Yamuna river near Agra records severely poor water quality. The Yamuna river flowing through Delhi and Agra's

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<sup>5</sup> Hussen, A. (2018). Biophysical Limits to Economic Growth: The Malthusian Perspective. In *Principles of Environmental Economics and Sustainability- An Integrated Economic and Ecological Approach* (4th ed., pp. 201-202). Routledge.

<sup>6</sup> Mascarenhas, H. (2015, January 21). *7 Natural Wonders that humans could destroy within a generation*. The World. <https://www.pri.org/stories/2015-01-21/7-natural-wonders-humans-could-destroy-within-generation>

<sup>7</sup> Mascarenhas, H. (2015, January 21). *7 Natural Wonders that humans could destroy within a generation*. The World. <https://www.pri.org/stories/2015-01-21/7-natural-wonders-humans-could-destroy-within-generation>

fringes played a vital role in the past. (Singh, 2020)<sup>8</sup> Today the river channel is beyond recognition reduced to a meagre sewage tract, carrying all the pollutants discharged by the cities of Agra, Delhi, Ghaziabad etc. The present condition of unprecedented pollution is due to urbanization, industrialization, and agricultural waste discharge in the waterbody. Reports have suggested the river is highly polluted at stretches and often leads to impending eutrophication problems, among others. Today, the river stretch that once served the cities on its banks has been reduced to a degrading sewage channel. The population living on the banks are very vulnerable to the eternal problems associated with natural resource depletion. (Mandal, n.d.)<sup>9</sup>

The case study of Mallathahalli lake in the Bangalore district is another prominent example of degrading natural resource quality. Due to rapid urbanization, the lake quality is fast degrading, affecting the region's ecological balance. The continued use of the lake water for domestic purposes leads to increased levels of pollution. Furthermore, there is regular dumping of waste and garbage into the water body leading to degrading quality of the lake. Due to an increase in runoff due to declining vegetative cover, there is an increase in siltation of the lake, leading to the shrinking of the water body. The lake located in the "city of lakes", Bangalore is now a dilapidated narrative that has further aggravated the vulnerability of the surrounding population. (Bindiya et al., 2008)<sup>10</sup> Hence, it has been observed throughout the natural resources are fast declining and leading to several debacles of the vulnerable population.

## **2.2 Pollution of Tolly Nullah**

Like all the other natural resources, the Tolly Nullah, a significant part of the Adi Ganga in Kolkata, was also not saved from the detrimental effects of the growing population and urbanization. Since the early times, the banks of the rivers have always been considered the most favourable sites for the development of human settlements. As the city moves along the path of urbanization, various infrastructural facilities improve leading to an overall development.

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<sup>8</sup> Singh, B. (2020). Assessment of Yamuna River Water Quality at Agra: A Case Study. *International Journal of Engineering Research & Technology (IJERT)*, 8(10), 105-106

<sup>9</sup> Mandal, P. (n.d.). *The Yamuna River- Case Study of a Polluted River in India* [Article]. Your Article Library. <https://www.yourarticlelibrary.com/rivers/the-yamuna-river-case-study-of-a-polluted-river-in-india/31894>

<sup>10</sup> Bindiya, C., Hanjagi, A. D., Nandini, N., & Jumbe, A. S. (2008). Environmental Degradation of Mallathahalli Lake in Bangalore District, India- A Case Study. *Nature Environment and Pollution Technology*, 7(2), 189-196.

However, this urbanization in Kolkata has come at a cost to one of its significant water resources, i.e., the Adi Ganga. (Sarkar, 2017)<sup>11</sup>.

### **Pollution of Tolly Nullah**



Source: Self clicked

Over the years, this water resource has gone through many changes and transformations, but its ultimate effect has been highly negative. What has been a sacred channel of water adding to the aesthetic view of the city is now a sewer canal between the densely packed human settlements. A walk along its course has become sickening due to the unbearable foul smell from all the waste it carries with its flow. However, this riverine ecology was adequately maintained during the colonial period, and its condition started to decline mainly in the post-independence era. No significant efforts were made to restore or sustain this river channel, and it slowly turned into sewerage for a major part of the city. The Calcutta Metropolitan Water and Sanitation Authority (CMWSA) and the Calcutta Municipal Corporation (CMC) have a large number of sewerage drains that discharge huge quantities of untreated sewage wastes directly into the Tolly's Canal. With the passage of time and such continued degradation, the navigable channel of the old times

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<sup>11</sup> Sarkar, M. D. (2017, 6 3). An urban river on a gasping state: Dilemma on priority of science, conscience and policy. *XVI World Water Congress, International Water*

*Resource Association (IWRA)*. Retrieved 2021, from

[https://www.iwra.org/member/congress/resource/ABSID285\\_ABSID285\\_FINAL\\_PAPER\\_IWRA\\_MexicoConference\\_2017.pdf](https://www.iwra.org/member/congress/resource/ABSID285_ABSID285_FINAL_PAPER_IWRA_MexicoConference_2017.pdf)

transformed to just a mere 'nullah' in the present days. The construction of various ghats along the bank, such as the Keoratala Ghat, Kudghat, Rathtala Ghat, added to the pollution of the channel. (Mukherjee, 2016)<sup>12</sup>.

**Table showing water quality of Adi Ganga River at Kalighat:**

Water Quality of Adi Ganga River at Kalighat								
Date	Location	BOD (mg/l)	pH	Temperature (°C)	Use based Class	Colour and Intensity	Odour	Visible Effluent Discharge
10.5.21	Kalighat (high tide)	NIL	7.1	30	E	Dark ash	Septic	None
	Kalighat (low tide)	NIL	7.2	31	E	Dark ash	Odour free	None
15.2.21	Kalighat (high tide)	21	7.32	26	E	Blackish	Odour free	None
	Kalighat (low tide)	15.5	7.14	26	E	Blackish	Odour free	None
18.11.20	Kalighat (high tide)	21.75	7.15	24	E	Muddy	Odour free	Moderate
	Kalighat (low tide)	32.5	7.05	27	E	Muddy	Odour free	Moderate
12.8.20	Kalighat (high tide)	17	7.08	28	E	Blackish	Rotten eggs	Moderate, floating sludge
	Kalighat (low tide)	15	7.05	28	E	Blackish	Rotten eggs	Moderate, floating sludge
27.5.20	Kalighat (high tide)	18.33	6.98	32	E	Muddy, Blackish	Rotten eggs,	None

<sup>12</sup> Mukherjee, J. (2016, February 20). The Adi Ganga A Forgotten River in Bengal. *Economic and Political Weekly*, 51(8).



							fishy	
	Kalighat (low tide)	19.06	6.99	32	E	Muddy	Rotten eggs	None
12.2.20	Kalighat (high tide)	27.75	7.06	23	E	Dark ash	Odour free	None
	Kalighat (low tide)	25	7.17	23	E	Mod brown	Odour free	None

Source: West Bengal Pollution Control Board, Central Laboratory

The above table has been prepared from secondary data collected from the West Bengal Pollution Control Board, Central Laboratory. The particular monitoring station of Kalighat has been considered in this case to highlight the quality of water in the Adi Ganga river channel. Data has been computed for both high tide and low tide for the selected dates, and it projects the level of pollution in the water. The parameters of Biochemical Oxygen Demand (BOD mg/l), pH, Temperature (°C), use based class, Colour and Intensity, Odour, and Visible Effluent Discharge have been selected to analyze the water quality. It can be observed from the data the BOD here is quite high indicative of high levels of organic pollution in the water. It also highlights that the amount of dissolved oxygen available for use by marine life is quite low. Wastewater treatment is hence required to lower the amount of BOD. The parameter of pH indicates the water is mostly alkaline in nature. The temperature recorded is at par with the observed temperatures of tropical and subtropical rivers. If the temperature is warmer, it might lead to problems such as eutrophication. According to the classification of the class of water, it is of type 'E'. This water cannot be used for regular drinking or other household activities. It is somewhat suited for use in irrigation, controlled waste disposal, etc. (Bharadwaj, 2005). The colour of the water is dark blackish or muddy mostly, indicating a low rate of visibility and high levels of pollution. The odour recorded for the said dates gives a comprehensive picture, often showing the septic or pungent odour that is smelt at the location. The visible effluent discharge has been recorded for a few dates as moderate discharge at the given site. The overall analysis of the data collected shows the water quality is highly polluted and requires proper treatment and management.

A primary survey of this channel near Kalighat has revealed that the majority of the houses on the banks do not have any toilets, and they openly bathe, urinate and defecate, which eventually

flows into the Tolly Nullah. This has increased the water's Biological Oxygen Demand (BOD) to nearly eight times the tolerable levels, i.e., 3mg/l. (Bandyopadhyay & Niyogi, 2021)<sup>13</sup> The river is visibly polluted with all kinds of household waste, including vast quantities of plastic bags and bottles. Dogs and crows are seen to be feeding and scattering the waste materials all over the banks making the surrounding areas more and more unhygienic. Such a picture is not restricted only in the Kalighat region but can be found along the entire stretch of Tolly Nullah.

Untreated sewage and indiscriminate dumping of wastes are not the only problems, but vast trouble has also been caused due to the construction of the metro pillars, which have restricted the free flow of the water. The West Bengal Pollution Control Board (WBPCB) conducted several tests along the water channel but was unable to detect any dissolved oxygen throughout the entire stretch. This proves that the pollution levels have increased to such an extent that the Tolly Nullah can no longer support any form of aquatic life. (Bandyopadhyay & Niyogi, 2021)<sup>14</sup>

By analyzing the conditions along the banks, it can thus be said that the primary cause of degradation of the Tolly Nullah is the rapid and unplanned urban growth in the southern parts of Kolkata. Household garbage from the local residents is a massive cause for the derelict condition of the river. (*Pollution Abatement and Rehabilitation of Tolly's Nullah in Kolkata, West Bengal*)

### **3. VULNERABILITY OF THE SURROUNDING POPULATION**

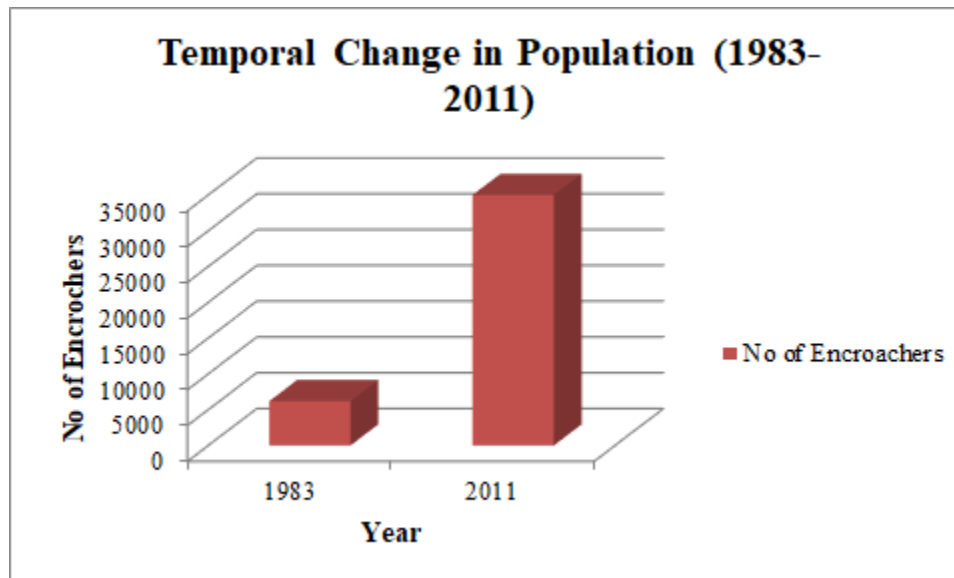
A pull effect from the city attracted several people from the surrounding rural areas, and they came and settled along the Tolly Nullah in squatter settlements. These people mainly got engaged in the informal sector as casual workers in transport, trade, conservancy, manufacturing, and the domestic sector. The stretch of the river channel between Karunamayee and Garia was the most densely populated one at the time of partition, owing to the huge influx of refugees. However, today, the whole stretch from Khidirpur to Garia is medium to highly populated by the encroachers. Surveys by various organizations show that the number of encroachers along the bank of the river increased from 6200 in 1983 to 35,000 in 2011 (Mondal, 2018).<sup>15</sup>

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<sup>13</sup> Bandyopadhyay, K., & Niyogi, S. (2021, June 15). Adi Ganga water hazardous for people living nearby. *Times of India*.

<sup>14</sup> Bandyopadhyay, K., & Niyogi, S. (2021, June 15). Adi Ganga water hazardous for people living nearby. *Times of India*.

<sup>15</sup> Mondal, A. (2018, January). Demographic characteristics of the encroachers along the Adi Ganga River, Kolkata, West Bengal, India. *National Journal of Multidisciplinary Research and Development*, 3(1).



Studies have shown that the education status of these people is relatively low, with high school dropout rates and unwillingness to attend schools as most of the children get involved in different activities due to financial backwardness. Studies also show that the percentage share of literate and illiterate population among these encroachers is 35% and 65%, respectively. A prominent problem here is the one of child labour. Due to the absence of social and educational awareness, people are engaged in crime and other anti-social activities, including drug abuse, juvenile delinquency, etc. (Mondal, 2018).<sup>16</sup> There seems to be an absence of social security and justice in this region. However, several NGOs are seen active in providing education to underprivileged people and raising awareness among them.

Along with a deficient level of education, the encroachers suffer from substantial economic insecurity. They fail to avail services given by the government, which is evident from the fact that a large proportion of the population does not have access to ration cards, which prohibits them from getting the free or subsidized ration provided by the government. Most of these populations fall in the below poverty line category but do not have access to BPL category ration cards and therefore are devoid of very many services provided by the governments for people in the BPL category. This primarily illiterate and poor population do not have any idea about any insurance and thus are not getting facilities provided by the government. However, recently the

<sup>16</sup> Mondal, A. (2018, January). Demographic characteristics of the encroachers along the Adi Ganga River, Kolkata, West Bengal, India. *National Journal of Multidisciplinary Research and Development*, 3(1).

state government has been providing them with the 'old age grants' and the 'unemployment allowance' (Mondal, 2018)<sup>17</sup> for the poor people.

Recent studies have shown that more than 35,000 people are directly attached to the Tolly Nullah, and a majority of them live in high-risk conditions due to different kinds of hazards (Mondal, 2018).<sup>18</sup> Apart from the vulnerabilities mentioned above, another critical aspect making the encroachers highly vulnerable to various health hazards is the use of the river water. The people use the water of this polluted, almost stagnant water body for several rituals and domestic purposes. They use this water for activities like bathing domestic animals and humans, for sanitation purposes, washing clothes and utensils, and even drinking (Mandal, 2018).<sup>19</sup> Along the river's course, there are more than a hundred deep tube wells constructed by the Kolkata Municipal Corporation from where the residents collect drinking water. Drinking water is also collected from various underground pipelines. The use of river water for sanitation is considered to be one of the primary causes of the spread of water-borne diseases. The Tolly Nullah passes by the Kalighat Temple, one of the most prominent locations in the state where people come to offer prayers, and before that, the ritual is to take a dip in the river water. The water is also collected by the residents in cans, bottles, etc. and sold to the devotees as the holy water, which is used for various rituals. Carcasses and piles of garbage are seen floating in the water, which is again used by these people residing along the stream (Mandal, 2018).<sup>20</sup>

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<sup>17</sup> Mondal, A. (2018, January). Demographic characteristics of the encroachers along the Adi Ganga River, Kolkata, West Bengal, India. *National Journal of Multidisciplinary Research and Development*, 3(1).

<sup>18</sup> Mondal, A. (2018, January). Demographic characteristics of the encroachers along the Adi Ganga River, Kolkata, West Bengal, India. *National Journal of Multidisciplinary Research and Development*, 3(1).

<sup>19</sup> Mandal, A. (2018). Use of river water by the encroachers and related problems: A case study of the Adi Ganga River, Kolkata, West Bengal, India. *American International Journal of Research in Humanities, Arts and Social Sciences*, 105-110. Google Scholar. [https://www.researchgate.net/publication/328494900\\_USE\\_OF\\_RIVER\\_WATER\\_BY\\_THE\\_ENCROACHERS\\_AND\\_RELATED\\_PROBLEMS\\_A\\_CASE\\_STUDY\\_OF\\_THE\\_ADI\\_GANGA\\_RIVER\\_KOLKATA\\_WEST\\_BENGAL\\_INDIA](https://www.researchgate.net/publication/328494900_USE_OF_RIVER_WATER_BY_THE_ENCROACHERS_AND_RELATED_PROBLEMS_A_CASE_STUDY_OF_THE_ADI_GANGA_RIVER_KOLKATA_WEST_BENGAL_INDIA)

<sup>20</sup> Mandal, A. (2018). Use of river water by the encroachers and related problems: A case study of the Adi Ganga River, Kolkata, West Bengal, India. *American International Journal of Research in Humanities, Arts and Social Sciences*, 105-110. Google Scholar. [https://www.researchgate.net/publication/328494900\\_USE\\_OF\\_RIVER\\_WATER\\_BY\\_THE\\_ENCROACHERS\\_AND\\_RELATED\\_PROBLEMS\\_A\\_CASE\\_STUDY\\_OF\\_THE\\_ADI\\_GANGA\\_RIVER\\_KOLKATA\\_WEST\\_BENGAL\\_INDIA](https://www.researchgate.net/publication/328494900_USE_OF_RIVER_WATER_BY_THE_ENCROACHERS_AND_RELATED_PROBLEMS_A_CASE_STUDY_OF_THE_ADI_GANGA_RIVER_KOLKATA_WEST_BENGAL_INDIA)

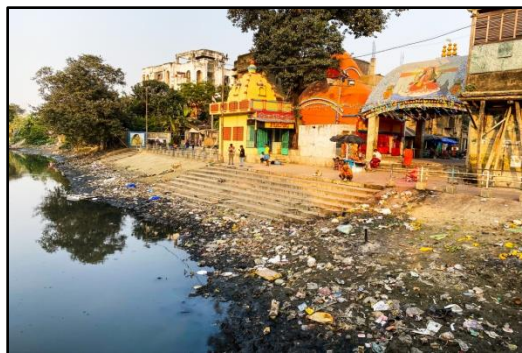
### **Canned Ganga Water and Soil Stored for Sale**



Source: Self Clicked

From the source of the Nullah upto the Kalighat section, this use of the river water is comparatively more than any other stretch. This is precisely why the people along this stretch suffer from various health hazards.

### **Religious Structure on the bank of Tolly Nullah**



Source: Self Clicked

The use of this polluted water leads to various water-borne diseases, and more than 50% (Mandal, 2018)<sup>21</sup> of the population of the wards along the channel have faced health-related

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<sup>21</sup> Mandal, A. (2018). Use of river water by the encroachers and related problems: A case study of the Adi Ganga River, Kolkata, West Bengal, India. *American International Journal of Research in Humanities, Arts and Social Sciences*, 105-110. Google Scholar. [https://www.researchgate.net/publication/328494900\\_USE\\_OF\\_RIVER\\_WATER\\_BY\\_THE\\_ENCROACHERS\\_A](https://www.researchgate.net/publication/328494900_USE_OF_RIVER_WATER_BY_THE_ENCROACHERS_A)

problems. Diseases like common cough and cold, scabies, diarrhoea, dysentery, asthma, encephalitis, malaria, dengue and various skin diseases (Mandal, 2018)<sup>22</sup> are shared among the population using the water. The stretch from Tollygunge to Garia, the river has become stagnant due to the construction of the Metro Railways. Thus, foul smells and unhygienic conditions have become a common scenario here. Due to anthropogenic activities like channelization, the river hydraulics has changed completely and thus, during monsoon (Mandal, 2018)<sup>23</sup> or high tides, the river is not able to hold the excess water, and this polluted water overflows, often leading to waterlogging and even entering the houses of the people residing along its course making their life miserable for days at a stretch.

Therefore, the population residing along the bank of the Tolly Nullah is already extremely vulnerable considering the social and economic insecurity of their lives. To top it, the direct contact with the river water is pushing this vulnerable population to a high-risk zone where they have to deal with the health hazards and other risks arising from the river water. These people are not in a social or economic position to relocate themselves and find a better lifestyle away from the polluted stream rather, they have learnt to live with the risks. Human activities have damaged the river, but at the same time, these people are living with the trouble caused by the river, and this is going on in an unending loop of polluting the water and getting affected by its pollution.

#### **4. GOVERNMENT INITIATIVES**

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ND\_RELATED\_PROBLEMS\_A\_CASE\_STUDY\_OF\_THE\_ADI\_GANGA\_RIVER\_KOLKATA\_WEST\_BENGAL\_INDIA

<sup>22</sup> Mandal, A. (2018). Use of river water by the encroachers and related problems: A case study of the Adi Ganga River, Kolkata, West Bengal, India. *American International Journal of Research in Humanities, Arts and Social Sciences*, 105-110. Google Scholar. [https://www.researchgate.net/publication/328494900\\_USE\\_OF\\_RIVER\\_WATER\\_BY\\_THE\\_ENCROACHERS\\_AND\\_RELATED\\_PROBLEMS\\_A\\_CASE\\_STUDY\\_OF\\_THE\\_ADI\\_GANGA\\_RIVER\\_KOLKATA\\_WEST\\_BENGAL\\_INDIA](https://www.researchgate.net/publication/328494900_USE_OF_RIVER_WATER_BY_THE_ENCROACHERS_AND_RELATED_PROBLEMS_A_CASE_STUDY_OF_THE_ADI_GANGA_RIVER_KOLKATA_WEST_BENGAL_INDIA)

<sup>23</sup> Mandal, A. (2018). Use of river water by the encroachers and related problems: A case study of the Adi Ganga River, Kolkata, West Bengal, India. *American International Journal of Research in Humanities, Arts and Social Sciences*, 105-110. Google Scholar. [https://www.researchgate.net/publication/328494900\\_USE\\_OF\\_RIVER\\_WATER\\_BY\\_THE\\_ENCROACHERS\\_AND\\_RELATED\\_PROBLEMS\\_A\\_CASE\\_STUDY\\_OF\\_THE\\_ADI\\_GANGA\\_RIVER\\_KOLKATA\\_WEST\\_BENGAL\\_INDIA](https://www.researchgate.net/publication/328494900_USE_OF_RIVER_WATER_BY_THE_ENCROACHERS_AND_RELATED_PROBLEMS_A_CASE_STUDY_OF_THE_ADI_GANGA_RIVER_KOLKATA_WEST_BENGAL_INDIA)

Looking at the pollution of the channel and the rapidly growing population along its banks, both the Central and the State Government have come up with various schemes and plans to rejuvenate the dying stream. Such initiatives started in 1925 with the *Master Plan* (Sarkar, 2017)<sup>24</sup>, which recommended constructing trunk drains and major drainage facilities in the Tollygunge area. The *Irrigation and Water Department* also came up with manual labour excavation, but this process faced several difficulties. The *Central Pollution Control Board*, too, had put in the effort, and the Tolly Nullah was included in Phase II of the Ganga Action Plan (GAP) launched by the *Ministry of Environment and Forest* in 1985 (Sarkar, 2017).<sup>25</sup>

The *Kolkata Municipality Development Authority* (KMDA), the nodal body of GAP in West Bengal (Sarkar, 2017), proposed several schemes to implement scientific innovative technological plans and encourage preventive actions generating public awareness lining of embankments and so on. International bodies like the *Asian development bank* helped the governments to implement developmental schemes by allocating a fund of around Rs 117.276 crore (Sarkar, 2017).<sup>26</sup> However, such a scheme did not work out properly as planned. The National River Conservation directorate also approved a fund of Rs 29 (Sarkar, 2017)<sup>27</sup> crore in 1996, but the plan never materialized.

The *State Irrigation Department*, *Calcutta Port Trust* and the *Kolkata Municipal Corporation* proposed a plan for rejuvenation and beautification of the channel under the scheme 'Mission

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<sup>24</sup> Sarkar, M. D. (2017, 6 3). An urban river on a gasping state: Dilemma on priority of science, conscience and policy. *XVI World Water Congress, International Water Resource Association (IWRA)*. Retrieved 2021, from [https://www.iwra.org/member/congress/resource/ABSID285\\_ABSID285\\_FINAL\\_PAPER\\_IWRA\\_MexicoConference\\_2017.pdf](https://www.iwra.org/member/congress/resource/ABSID285_ABSID285_FINAL_PAPER_IWRA_MexicoConference_2017.pdf)

<sup>25</sup> Sarkar, M. D. (2017, 6 3). An urban river on a gasping state: Dilemma on priority of science, conscience and policy. *XVI World Water Congress, International Water Resource Association (IWRA)*. Retrieved 2021, from [https://www.iwra.org/member/congress/resource/ABSID285\\_ABSID285\\_FINAL\\_PAPER\\_IWRA\\_MexicoConference\\_2017.pdf](https://www.iwra.org/member/congress/resource/ABSID285_ABSID285_FINAL_PAPER_IWRA_MexicoConference_2017.pdf)

<sup>26</sup> Sarkar, M. D. (2017, 6 3). An urban river on a gasping state: Dilemma on priority of science, conscience and policy. *XVI World Water Congress, International Water Resource Association (IWRA)*. Retrieved 2021, from [https://www.iwra.org/member/congress/resource/ABSID285\\_ABSID285\\_FINAL\\_PAPER\\_IWRA\\_MexicoConference\\_2017.pdf](https://www.iwra.org/member/congress/resource/ABSID285_ABSID285_FINAL_PAPER_IWRA_MexicoConference_2017.pdf)

<sup>27</sup> Sarkar, M. D. (2017, 6 3). An urban river on a gasping state: Dilemma on priority of science, conscience and policy. *XVI World Water Congress, International Water Resource Association (IWRA)*. Retrieved 2021, from [https://www.iwra.org/member/congress/resource/ABSID285\\_ABSID285\\_FINAL\\_PAPER\\_IWRA\\_MexicoConference\\_2017.pdf](https://www.iwra.org/member/congress/resource/ABSID285_ABSID285_FINAL_PAPER_IWRA_MexicoConference_2017.pdf)

Clean Ganga 2020' (Sarkar, 2017).<sup>28</sup> The City Environment Plan, Phases I and II from 2003-25 has a huge amount of money allocated for the drainage, sewage and sanitation of this area (Sarkar, 2017).<sup>29</sup>

Thus it is very evident that right from the 1920s, which is the pre-independence period, crores of money has been allocated by various agencies (international and national) for excavation, desiltation, rejuvenation and beautification of the stream, but all these have gone down the drain (Sarkar, 2017).<sup>30</sup> One of the main reasons for this is that the silt deposition on the Tolly Nullah backflows with water through sewers during high tides in areas where lock gates are kept open and looking at the geology of the city, the lock gates need to be opened during monsoon and high tides to avoid waterlogging.

#### **4.1 Steps against Government's Policies**

As discussed in the earlier sections, the government had adopted several noteworthy policies, steps etc, concerning the Adi Ganga channel. Despite the lucrative approach, several of them were sought to be detrimental to the health of the channel and the consequent negative impacts on the affected surrounding population. This paved the way for numerous litigations, legal processes, protests against the arbitrary policy adaptations of the government. The infamous yet necessary extension of the north-south corridor of the metro channel faced several backlashes from various sectors. It was of particular interest due to the resonating concerns from environmentalists, activists, NGOs, researchers who highlighted the ill effects of construction of the metro channel directly overboard the ancient Adi Ganga channel or the Tolly Nullah. In 2001, famous environmental conservationist petitioner Subhas Dutta filed a Public Interest

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<sup>28</sup> Sarkar, M. D. (2017, 6 3). An urban river on a gasping state: Dilemma on priority of science, conscience and policy. *XVI World Water Congress, International Water Resource Association (IWRA)*. Retrieved 2021, from [https://www.iwra.org/member/congress/resource/ABSID285\\_ABSID285\\_FINAL\\_PAPER\\_IWRA\\_MexicoConference\\_2017.pdf](https://www.iwra.org/member/congress/resource/ABSID285_ABSID285_FINAL_PAPER_IWRA_MexicoConference_2017.pdf)

<sup>29</sup> Sarkar, M. D. (2017, 6 3). An urban river on a gasping state: Dilemma on priority of science, conscience and policy. *XVI World Water Congress, International Water Resource Association (IWRA)*. Retrieved 2021, from [https://www.iwra.org/member/congress/resource/ABSID285\\_ABSID285\\_FINAL\\_PAPER\\_IWRA\\_MexicoConference\\_2017.pdf](https://www.iwra.org/member/congress/resource/ABSID285_ABSID285_FINAL_PAPER_IWRA_MexicoConference_2017.pdf)

<sup>30</sup> Sarkar, M. D. (2017, 6 3). An urban river on a gasping state: Dilemma on priority of science, conscience and policy. *XVI World Water Congress, International Water Resource Association (IWRA)*. Retrieved 2021, from [https://www.iwra.org/member/congress/resource/ABSID285\\_ABSID285\\_FINAL\\_PAPER\\_IWRA\\_MexicoConference\\_2017.pdf](https://www.iwra.org/member/congress/resource/ABSID285_ABSID285_FINAL_PAPER_IWRA_MexicoConference_2017.pdf)



Litigation (PIL) with the Kolkata High Court against the Union of India requesting a restraint of the ongoing extension project the north-south corridor of the metro railway over the Tolly Nullah channel. The case was registered under the prominent acts, like "The Environment (Protection) Act, 1986; Section 11 in The Railways Act, 1989; The Railways Act, 1989; The Judges (Protection) Act, 1985; The Forest Conservation Act, 1980". All these Acts had been cited for reinstating how the regulations have been flouted and are causing serious damage to the natural course of the channel and the environment at large. (Sarkar, 2017)<sup>31</sup>

The legal battles fought inside the courtrooms to conserve the environment resonated even in the streets in the form of protests to conserve the already dying channel. The construction of the metro channel indeed provided respite to thousands of commuters from the suburban areas travelling daily to the Central Business District of the metropolis. Despite its advantage, it proved severely detrimental to the health of the gasping channel from antiquity. The once continuous flow of the stream is now stagnant, leading to several health hazards, environmental quality degradation, increased nuances to the local population etc. The National Green Tribunal has directed the State Government to pay heed to unlawful constructions in the banks, illegal activities, obstructions in the flow of the channel, dumping of illegal sewerage etc. The National Green Tribunal further directed the Municipal Corporation to adopt measures to treat the solid wastes and stop the discharge of untreated waste water. (Sarkar, 2017)<sup>32</sup>

Hence from the existing literature review, a clear understanding can be developed on how several legal procedures and protests had materialized over the decades against the policy adaptations of the government that are deemed to be detrimental to the health of the dying channel, the unending nuances faced by the affected population and the degrading environmental quality at large.

## **5. CONCLUSION**

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<sup>31</sup> Sarkar, M. D. (2017, 6 3). An urban river on a gasping state: Dilemma on priority of science, conscience and policy. *XVI World Water Congress, International Water Resource Association (IWRA)*. Retrieved 2021, from [https://www.iwra.org/member/congress/resource/ABSID285\\_ABSID285\\_FINAL\\_PAPER\\_IWRA\\_MexicoConfere nce\\_2017.pdf](https://www.iwra.org/member/congress/resource/ABSID285_ABSID285_FINAL_PAPER_IWRA_MexicoConfere nce_2017.pdf)

<sup>32</sup> Sarkar, M. D. (2017, 6 3). An urban river on a gasping state: Dilemma on priority of science, conscience and policy. *XVI World Water Congress, International Water Resource Association (IWRA)*. [https://www.iwra.org/member/congress/resource/ABSID285\\_ABSID285\\_FINAL\\_PAPER\\_IWRA\\_MexicoConfere nce\\_2017.pdf](https://www.iwra.org/member/congress/resource/ABSID285_ABSID285_FINAL_PAPER_IWRA_MexicoConfere nce_2017.pdf)

Thus, we find that a brimming channel of clear water has turned into a black strip of sewerage canal clogged with all the garbage load of the human population. This paper reveals how the adjoining population is becoming more and more vulnerable to diseases and other insecurities as the population pressure and pollution of the Tolly Nullah continues. Even without consuming or directly using the water, staying close to such a polluted channel is a risk to people's health. From the intolerable foul smell to large numbers of mosquitoes and flies, the people along the Tolly Nullah are residing in one of the most unhealthy locations of Kolkata. Despite certain efforts to clean or restore this channel, the situation has not improved much. With each passing day, the people's exposure to various pollutants and disease causing germs are increasing and the residents of the city are being harmed over time, even if this is not noticed or recorded. From primary field visits to various areas, it has also been found that the people are not even slightly aware of the danger the unbearably dirty water course is posing to their lives.

### **Settlement Along the Water Channel**



Source: Self Clicked

Even though there have been certain efforts by the government and numerous research have been conducted to analyze the water quality and clean up the Tolly Nullah, it is still in a state of disaster. The only way the water body can be saved is through immediate and robust action without any further delay. With each passing day, the level of damage to the people and environment is shooting upwards. Intensive cleaning, restricting the use of the water, spreading awareness about the ill effects and the need for conservation, and reviving small boats' movement are some of the methods that can return the glory of this channel to some extent.

This negative effect on one of the most critical assets of the city is attributed to the rapidly growing population, and thus, all of us as the residents of this city are in some way responsible

for the degradation of this natural resource. Today, the river channel that has helped in the growth of the capital city of Kolkata can be heard weeping in the rhythm of Lord Tennyson,

"For men **have** come, and **went too far**,

I **couldn't** go on Forever....."

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