



HUMAN INTERLUDE TO THE RIVERS' HEALTH IN NORTH BENGAL: A COLOSSAL QUESTION TO THE SUSTAINABILITY OF THE CIVILIZATION

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INTRODUCTION :

Civilization is the gift of river but now rivers are realized what types of feedback are coming from that civilization. Every civilization and cultural hearths were developed along the rivers. River is the source of water and water is the source of life. River is the heart of civilization and for this planet's major and minor historical-cultural hearths were developed along river-sites. Rivers has its own health like civilization. But due to uncontrolled population growth and the unplanned civilization the health of the river is being deteriorating. For these reason once the 7 major cultural hearths and civilization were developed but after a time-span those have destroyed and became ruined.



Plate : This is our reality that we are buying 1 meal for 1 person and getting all the items in different plastics. Just think how we can save our nature? What will be the future?

River is giving resources but we are greedy and want to be rich in a small time. We are over-using the resources of the river and parallel polluting them. We have the geographical spaces to settle own selves but we are taking the arena and bed of rivers. Just think you have invited a guest in your house and giving him the foods but after sometime that guest is occupying your bed permanently and polluting your rooms and bathrooms. What will you do?

In most of the Indian river- beds are partially occupied by the refugees or the other dwellers. Moreover polluting the rivers in different ways. Modern people may think that rivers are their own property and they can do anything with her. Due to lack of scientific knowledge, consciousness and negligence civilization has moved to the causes of the illness of the rivers. They have made rivers as the waste container or dumping arena. All the solid wastes, industrials effluents, municipality garbage, sewages, hospital disposals, wastes from households' etc. are throwing and dumping at the site or along the rivers. Even rural folks are also polluting the health of river with the using of pesticides, insecticides in their agricultural fields and when these chemicals are mixing with river (by runoff) it creates more illness for rivers. Another thing i.e. Transport revolution is the causes of deteriorating of the status of rivers. How? We are constructing lots of roads, highways, rail lines i.e. there are large numbers of artificial ridges have made on different portions

of river basin areas. Thus before the construction of these barriers the total runoff was very swift to meet the river. But when we have planted the high roads like ridges and the rain is happening the natural rill and gullies are not flowing up to the main river bed i.e. high roads like ridges are making obstructed permanently. For this reason the river bed becomes dry in most time.

To conscious the people about the water conservation for future Dr. A P J ABDUL KALAM had written a letter in name of 'YEAR 2070' when due to lack of water what type of situation may be raised. He wrote "This is the year 2070, I have just turned 50, but I my appearance is of somebody of 85, I suffer from serous Kidney problem, because I do not drink enough water...Before, women had beautiful hair. Now, we have to shave our heads to keep them clean without the use of water...Now, all rivers, are either dry or contaminated...Now I am only allowed half a glass..."¹So the increasing rate of pollution in rivers will give you a drastic future for your son and moreover you don't need to wait for your grandson. So you have to alert about the sustainability of the civilization. If a civilization is the gift of river then the death of the river will be the cause of ruined civilization.

CASE STUDIES IN NORTH BENGAL:

RIVER KULIK IN UTTAR DINAJPUR DISTRICT

Kulik River has started her journey from a wetland that is situated in Bangladesh. Kulik enters in Uttar Dinajpur district at side of north-eastern part of Paharpur village in Hemtabad block. Then it flow through Bahin, Balia, and Raiganj in direction of north-east to south-west and finally meets with Nagorat the place of West Bengal-Bihar Border.



Plate 1: The zone of sewages is found in Kulik River due to lack of sufficient water flow. Here the photography has been taken from the place of Subhasganj near Raiganj town.



Plate 2: Buried land at site (at Bahin village) of River Kulik is the source of pollution because huge amount of burned ashes and the leaving materials of deal bodies are directly mixed with water. Different specific burning Chulli have been made at side of river but local people are not following those.

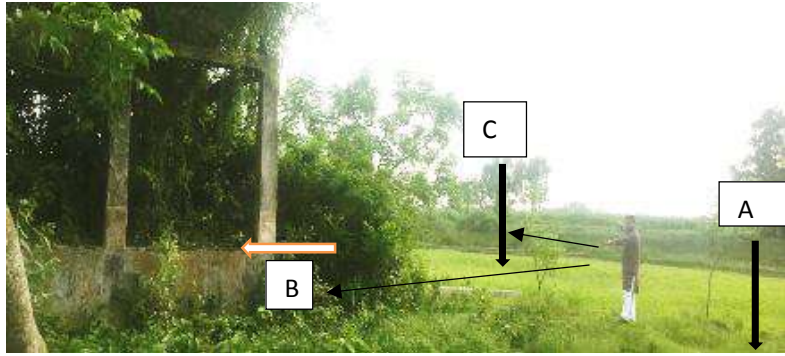


Plate 3: The course of River is changed naturally. It's the nature of river. River Kulik also follows it. In picture at side of Kulik bridge of Bahin village) Researcher is trying to demarcate the 20 years before position (B) of Kulik , the recent flowing site (A) and the age-old room for the mourning team of dead bodies. So it is proved that at one side of Kulik deposition is being continued and the other side is being breaching.



Plate 4: At side of Bahin village the breaching is found in Kulik River.



Plate 5: Just showing the urban (Raiganj town) toxics and wastes are mixing in Kulik day by day.



Plate 6: Researcher has indicating the source of point pollution in River Kulik at Subhasganj. Through this point the waste materials and toxic water are going towards the Kulik River. To prove the level of bacteria in Kulik River at Raiganj town comparison to River Dhahuk at Chopra Researcher and his student goes to collect the sample water and sent it in laboratory. Dahuk River has originated from Bangladesh enters India towards north-eastern side of Uttar Athakhai village. It flows to the Uttar Dinajpur district in direction of north-east to south-west and declined in Mahananda River at Bihar. In laboratory the spread plate method was used. Ten-fold serial dilution of each water sample was prepared aseptically in physiological saline of 10^{-1} up to 10^{-4} and 0.1 ml aliquot of each dilution was plated on Nutrient agar plates in triplicate. All incubations were conducted at 37°C for 24 hours under aerobic conditions and plates containing 30 to 300 colonies were selected and counted. The number of colony-forming units per ml (cfu/ml) was calculated by multiplying the number of colonies by the dilution factor.

Table 1: Mean total heterotrophic counts of the water samples

Sample No.	River name	Location	CFU/mL
1.	Kulik	Raiganj	3×10^6
2.	Dhahuk	Chopra (26°21'48"N. / 88°18'49"E)	13×10^5



Plate 7: Another source of pollution in River Kulik i.e. Idol Immersion. The environmental effects of idol immersion in the Kulik River and the ecology of surrounding areas are worsening with each passing festivals. This pollution, along with industrial waste, accumulates in our water bodies, poisoning our water sources. The religious followers are not aware about the high levels of zinc; calcium and strontium

found in the water are probably caused by the multi colors idols which are immersed in the water, not just sewerage. Plaster of Paris, which is used to make most idols, is not soluble, and ends up clogging the earth and being consumed by fish. Other materials such as clothes, iron rods, varnish and paints made from harmful chemicals that are used for decorate idols also harm the environment. It contained heavy metals, especially nickel, lead and mercury, which probably came from idols. These pollutants are likely to find their way into the digestive tracts of the fishes and birds inhabiting the area, and so invariably make their way to the humans who consume them. During my survey I asked to the fish trappers that "are they satisfied to catch the number of fishes right now". All have told me that "No".



Plate 8: At site of River Kulik near Kanchanpalli of Raiganj such type of Poultry firm is found and it is highly risky to pollute the river during the rainy season.



Plate 9: Researcher is busy to getting the information from GopalCandragiri about the Kulik at Kantanagar. He told that sometime they collect the fishes, and take the bath. But



Plate 10: Researcher indicating the solid wastes at side of RiverKulik near Kantanagar. Moreover the local age-old people are not aware about the polluted water of Kulik.



Plate 11: The gate through which urban sewages come to meet with river Kulik. Moreover the slums have built up along the embankment of Kulik River and all the waste materials, polluted waters and sewages are moving towards Kulik.



Plate 12: Researcher has visited to find out the distance between Kulik river and the solid waste dumping ground. The distance is only 1 meter i.e. by the blowing of air or during the rainy season all the wastes moves into river. Just imagine what will be the level of pollution on that time in river.



Plate 13: The site of solid waste dumping area of Raiganj town. Unfortunately it is situated at site of River Kulik near Bandar Buried ground. This is an example of mismanagement by Raiganj Municipality that the open air dumping zone has prepared and there are no protections to stop the flow of these toxic matters into river.



Plate 14: Researcher has indicated the source of point pollution of River Kulik. When Kulik enters the Raiganj town the rate of pollution has increased drastically because all the urban sewages are mixing at four points with Kulik. In picture this is the point of Subhashganj. Just you can see how the urban wastes materials and toxic water are directly mixed with river Kulik. For this Kulik is being polluted and the water ecosystem is being deteriorated. Moreover the fishes those are found far away from this toxic points they may be affected as well as when these fishes are being sold at local bazar they might be the causes of health problem.



Plate 14.1.: Another cause of River pollution has been detected by the researcher i.e. pollution due to waste thermocol which is throwing / dumping directly from the trucks (coming from Andra Pradesh) at the side of

river kulik and it has after unloading the boxes of fishes to local business man. Non-biodegradable thermocol (Styrofoam) can pollute the river and other water bodies. This disturbs the oxygen cycle process and adversely affects aquatic flora and fauna.



Plate 15: Recently the sand collection by the Contractors /traders has been stopped at some specific places along Kulik River by the order of District Administration. Tree plantation has also recorded at site of Kulik Bridge near Raiganj town.



Plate 16: To rejuvenate the Kulik River a Govt. level seminar was organized by Uttar Dinajpur District Administration on 13th July, 2017 at RabindraBhavana, Raiganj town. Lots of renowned persons like Dr. KolyanRudra, District Magistrate Subradeep Gupta, and DM Ayasha Rani, different political leaders, school-college-University teachers and students were participated on that occasion.



Plate 17: The historical Kulik River rejuvenation seminar in RabindraBhavan hall, Raiganj town; where local Municipality Chairman, DM Ayasha Rani, Mr. Subradip Gupta, Dr. KalyanRudra, Mr. Bablu Pradhan etc.



Plate 18: Different project works like National Rural Employment Guarantee Act, 2005 (NREGA) have started to dredge the Kulik River and lots of activities like pond excavation, tree plantation, dragging the sands from river bed to easy the flow etc.



Plate 19: Various NGOs are taking part in awareness program to reduce the pollution of River Kulik like:Himalayan Mountaineers and Trekkers Associationhas organized 4 days Kulik River pollution awareness walking from 19th-22nd April, 2018 and given the caption “ Kuliktumikemonacho/ Kulik: How are you?”



Plate 20: News Media are also trying to discuss the matter for public. Uttar Banga News Paper had already given the focus on the status of Kulik on the 26th June, 2018

RIVER MAHANANDA AT MALDA TOWN

The Mahananda originates in the Himalayas: Paglajhora Falls on Mahaldiram Hill near Chimli, east of [Kurseong](#) in Darjeeling district at an elevation of 2,100 metres (6,900 ft.). It flows through Mahananda Wildlife Sanctuary and descends to the plains near Siliguri. It touches Jalpaiguri district. After flowing through Uttar Dinajpur district in West Bengal and Kishanganj and Katihar districts in Bihar, it enters Malda district in West Bengal.



Plate 21: Solid wastes are dumping at side of Mahananda Bridge within the town. The materials are being directly contacted with river water.



Plate 22: Settlement on Mahananda River bed is the matter of human encroachment on river. The river morphology is very much affected by this and all the waste material including sewages are mixed with river. River becomes more pollutants. Mahananda is under threat. Human settlements, cattle sheds on the river bed, human and cattle excrements, remains of funeral pyres, carcasses, sewage of towns are serious threat to the rain fed river. A large amount of the sewage of the burgeoning Siliguri Corporation is emptied into the River.

BEHULA RIVER IN MALDA

Behula river of Malda is being polluted nearby paper mills of Narayanpur industrial belt. The lifeline of villages like Jalangi and Molpur, Behula has been dying a slow, poisonous death due to the paper mills at its banks. The waters are so polluted, that the river has no fish anymore due to huge hyacinths. The river is polluted by the waste-water of the paper mill which does not have proper infrastructure to purify the wastewater. Several toxic chemicals are used in the production process, especially toxic solvents and chlorine compounds used to bleach and pulp which is mixed in River. The waste water also contains solids, nutrients and dissolved organic matter such as lignin as well as transition metal compounds such as lead. The farms fed by this polluted river water kill the crops, leaving farmers helpless as their crops don't sell in the

market at the market rates. The residents can't use the water for any purpose, like cooking, bathing, or catching fish, the region's staple diet.



Plate 23: Sewage from the paper mill which is flowing in the river directly.



Plate 24: Farmers are pumping water from the River Behula for agriculture in their land.

RIVER PUNARBHABA AT GANGARAMPUR TOWN, SOUTH DINAJPUR

The Punarbhaba is a river of Bangladesh and West Bengal, of total length about 160 kilometres (99 mi) and a width of 3 to 8 kilometres and a mean depth of 1.96 metres. It originates from the lowlands of Thakurgaon District of Bangladesh. It flows through Gangarampur and Tapan blocks of DakshinDinajpur district of West Bengal. After flowing to the south, this river meets with the Dhepa River. Ultimately it flows into the Ganges. To reduce the water logging problems in this small town recently four high drains from the east side and two high drains from the west side have been connected with the river Punarbhaba through modern sluice gates, which will be serving the people of Gangarampur for the next 50 years. But the question is with these drains all the sewages from the town will be mixed with River Punarbhaba and it becomes polluted.



Plate 25: Recently it has observed that Municipality waste and sewages are mixing with the Punarbhaba River directly.



Plate 26: Local people are not aware about the chemical pollution due to the idol immersion in the river.

RIVER SAPTANA, MUJHNAI AND JAMPUI AT FALAKATA TOWN

The condition of River Saptana is very poor now. River has lost its own live channel due to lack of water flow. Moreover people are filling the dry channel with garbage and solid wastes of town. During my field visit I got some photos and mentioned here to describe the present status.



Plate 27: Presence of garbage on river bed. Due to the non-presence of the dumping ground in Falakata, the pollution related to garbage is increasing every day. Along with this, illegal rearing of pigs in the town alongside the river Mujhnai, river Saptana and River Jampui has also led to river pollution. Not only this due to the continuous dumping of waste materials in those rivers, the river base is also raising creating blockage

in the river flow. The most dangerous output is that the rivers are getting dried up due to the pollution creating vacant land. These lands are then illegally sold by the land Dalas. Local people are now seeing big houses built on river these beds. If the condition is continuing then someday the dead fishes will be floating in these rivers. During research I observed there are no proper sanitation and drainage systems to wean away the daily garbage of the town. Moreover, the most affected is the Saptana River, which is facing its bank theft. Now concrete houses are built adjacent to the river blocking its natural flow. The non-systematic dumping policy is giving rise to the various viral fevers in the town.



Plate 28: Dry channel of River Saptana indicates the lack of water flows. The town is growing but is lacking of any systematic progression. Once the fishermen used to earn their living from fishing in Saptana River but now it's unthinkable. Instead of water, the waste water is growing in the river

RIVER SRIMATI AT KALIYAGANJ MUNICIPAL AREA

Srimoti River is situated in Kaliyaganj of Uttar Dinajpur district and has originated from Bangladesh. Srimoti enters India toward north-eastern part of West Bengal at Bhurkutpara village and declined in Nagor River.



Plate 29: Researcher observed the dumping of sewages and solid wastes in Srimoti River at Shanti colony (25°63'56"N. / 88°32'88"E.), Kaliaganj. On the basis of my field observation it has cleared that when we will move to observe the river's health in any urban area the condition will be poor.

To find out the Bacteriological Analysis between River Srimati and River Buriganga sample of waters have been collected and was sent to the microbiological laboratory of Raiganj University under the supervision of Prof. KritiGhatani. The river water samples were collected from two different sites namely: Site 1 - Srimoti River, Kaliaganj and Site 2 - Burimahanda River, Dalkhola. The water samples were collected in sterile bottles and labeled appropriately and transported to the laboratory for bacteriological analysis. The Isolation and Enumeration of bacteria by the pour plate method was used and Ten-fold serial dilution of each water sample was prepared aseptically in physiological saline (0.85% NaCl) of 10^{-1} up to 10^{-8} . Every time the serial dilution was made the tubes were vortexed and 1 ml of inoculum was added to the labeled plates, heat tolerable Nutrient agar medium was poured into each labeled plates and rotated carefully. The plates were allowed to solidify. Then the plates were incubated at 37°C for 24 - 48 h under aerobic conditions. The number of colony-forming units per ml (CFU/ml) was calculated by the following formula:

$$\text{CFU/ml} = \text{No. of colonies} \times \text{dilution factor} \times \text{volume of sample used (ml)}$$

Table 1: Mean total heterotrophic counts of the water samples

Serial No.	River name	Location	CFU/mL
1.	Srimoti River	Kaliaganj	3.1×10^4
2.	Burimahanda River	Dalkhola	6.42×10^5

The results of heterotrophic bacterial count show that the bacterial load of Burimahanda River is more (6.42×10^5) compared to the Srimoti River (3.1×10^4).

RIVER BURIMAHANANDA AT DALKHOLA MUNICIPAL AREA

Burimahananda River is situated at Dalkhola of Uttar Dinajpur District. Its river bed almost during day to day except middle portion of this channel is wet and has been declined at Fulahar River in Bihar. That means this river is facing the problem of lack of water.

RECOMMENDATION:

1. Need specific waste dumping zone and keep the distance from River
2. Electronic disposal treatment
3. Not allow to human-settle on river bed.
4. Water treatment
5. Stop to mix the urban wastes.
6. Afforestation at river site
7. Digging the pond along river
8. Public awareness
9. Stop to build the toxic industry along river.
10. Fine to industry
11. Reduce the birth of waste from grassroots level
12. Restrict the use of non-bio-degradable materials

ACKNOWLEDGEMENT :

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REFERENCE:

- ¹Letter written on the year 2070 by A.P.J. Abdul Kalam from <https://www.slideshare.net/guest7e7534/year-2070-a-presentation-by-abdul-kalam>
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