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A Study on Water Pollution along a Part of the Bhagirathi-Hugli River and Its Impact on Surrounding Environment

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Abstract

In recent years, water pollution is a burning problem all over India. Due to rapid industrialization and urbanization, this problem has become a major concern because water is a basic human need, especially pure drinking water. As it has great importance for living creatures, a life cannot be sustained with polluted water. River is a significant source of water which is used in different purposes. But now-a-days, river water is polluted in different ways. As a result, it adversely affects the human health as well as environment. The root cause of a number of diseases is polluted water. Proper measures by civic authorities and awareness of people would control these problems. The present study deals with the problems of river water pollution along a part of the Bhagirathi-Hugli river and its impact on surrounding environment and it also tries to suggest some effective measures of management.

Keywords: Water pollution, Industrialization, Urbanization, Human health, Environment.

Introduction:

Water is the main source of life on earth but only a small portion of this precious natural resource is fit for human consumption. Only 3% fresh water is stored in various sources like rivers, lakes, and underground aquifers. Riverbanks first hosted human civilizations in India as elsewhere in the world. Rivers also play important social and economic roles. This is the reason why Indians worship rivers as



goddesses. Our current life is totally dependent on rivers. The river systems provide irrigation, potable water, cheap transportation, electricity, as well as livelihoods for a large number of people. The present study deals with water pollution of a part of Bhagirathi-Hugli River which is an important distributary of the river Ganga. The river holds on an extraordinary religious importance as it is the most sacred river to the Hindus. It is a significant lifeline to millions of people who live along its bank and depend on it for their daily need. But in recent times, it is known for being much polluted. In 2007, it was considered among the five most polluted rivers in India.

Study Area:

The study area comprises of Budge Budge area as a whole which is located along the left bank of Bhagirathi-Hugli River. The area is greatly influenced by this river, directly and indirectly. Many industries and habitations are developed along its bank. It provides potable water to the local people as well as it is used for transportation. It helps in economic growth and rapid industrialization leading to urbanization in this area.

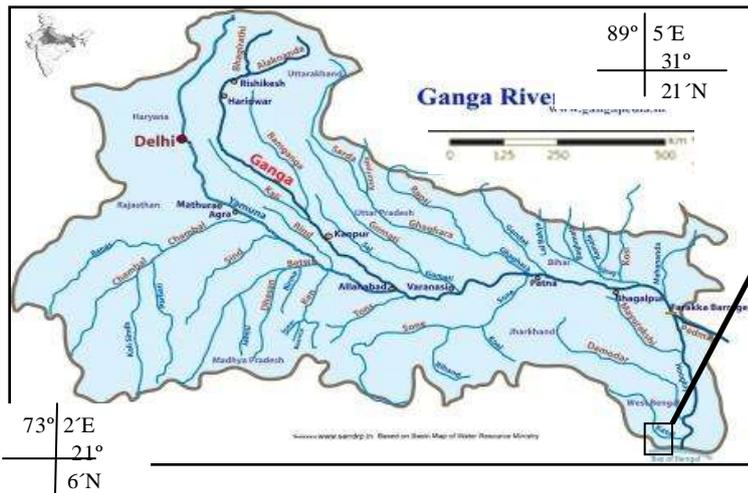


Fig. No. 1 Ganga River Basin



Fig. 2 Location of Budge Budge in South 4 Parganas

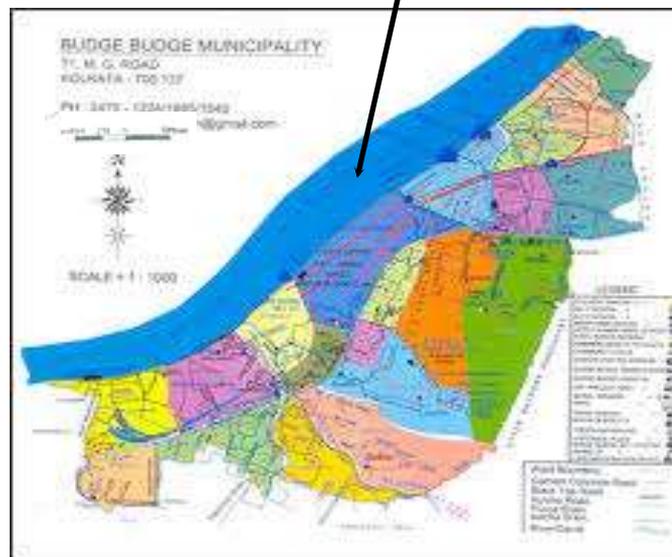


Fig. No. 3 Ward Map of Budge Budge Municipality

Objectives:

- To find out the factors responsible for river water pollution and deterioration of water quality of the river.
- To study the adverse effect of polluted water on human health and environment.
- To suggest some effective measures of management.

Methods:

The present work is based on a two phase study, viz. – database collection and analysis of data. Secondary data are collected from Budge Budge Municipal Office, West Bengal Central Pollution Control Board and primary data are collected from surveyed local people. Thereafter, these data are analysed and interpreted through various statistical techniques.

Discussion and Result:

Demographic Scenario:

- It is observed that ward no. 3, 6, 17, 18 and 19 under Budge Budge Municipality have the highest population density while ward no. 1, 2, 5, 8 and 12 have the lowest population

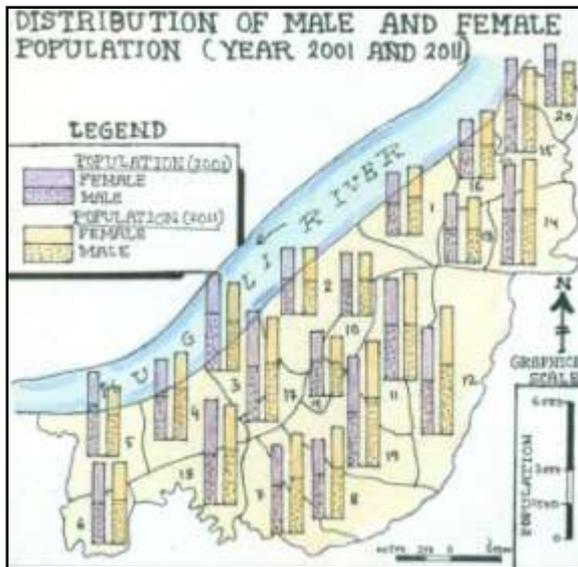


Fig. No. 5

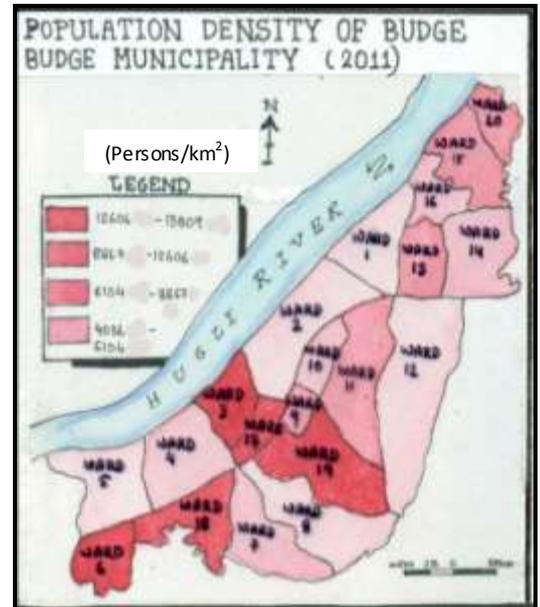


Fig. No. 4

density. The highest population density occurs probably due to availability of space for dwelling.

- The male and female population distribution of the year 2001 and 2011 give a comparative view of demographic profile of the Budge Budge

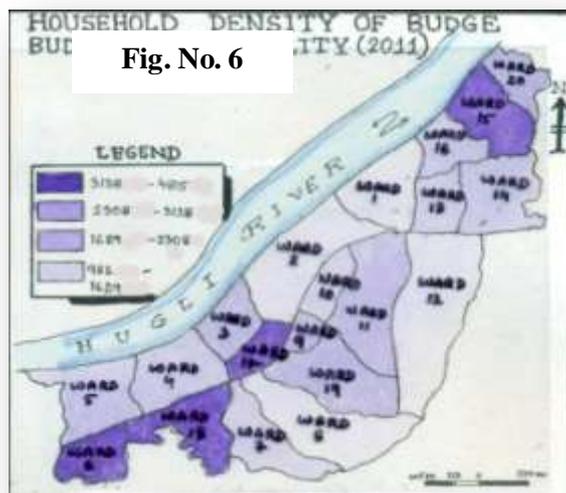


Fig. No. 6

Municipal area. The no. of male and female population increases in the ward no. 1, 7, 8, 11, 12, 14, 16 and 19 and decreases in ward no. 5, 3, 13, 15, 17 and 18. The female population increases in the ward no. 2, 8, 1, 14 and 16 and decreases in the ward no. 3, 5, 6, 9, 17, 18 and 20. The male population increases in ward no. 1, 4, 6, 7, 8, 12, 18 and 19 while it decreases in ward no. 3, 5, 2, 9 and 20

- It is observed that ward no. 6, 15, 17 and 18 have highest household density (3138-4815 household/ sq km.) while ward no. 1, 2, 8 and 12 have lowest household density.

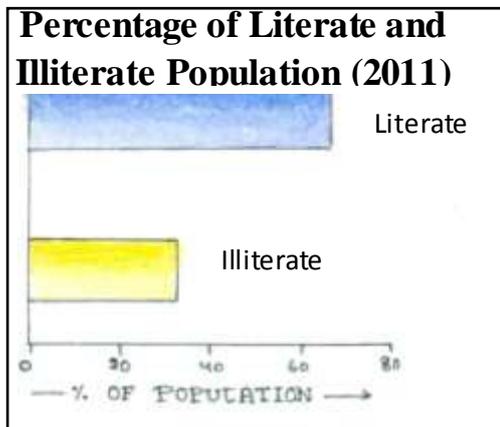


Fig No. 7

- It is noteworthy that due to urbanization and spread of education, the percentage of literate people is increasing in the study area. Fig no. 7 depicts the literate population in the area being more than 70%.

Factors of River-Water Pollution:

A number of factors control the extent of river-water pollution in the Hugli outlined as under:

- Due to the presence of petroleum storage such as Bharat Petroleum, Indian Oil; carbon and jute industries and manufacturing units along the river side, industrial wastes, highly toxic chemicals as well as effluents are disposed into the river.
- Rapid urbanization and industrialization in this area during the recent decades have given rise to a number of environmental problems including scarcity of water supply, wastewater generation and its poor collection, treatment and disposal. Engineering and masonry construction activities along the river bank further lead to water pollution.
- Domestic waste water is drained into the river. Nearly 80% of the water supplied for domestic use passes out as wastewater. In most cases, this wastewater is let out untreated and causes large scale pollution of the river water. In addition, use of soaps and detergents further pollute water.



Plate 1: Disposal of Garbages on river bank

- From Budge Budge thermal power plant huge amount of fly ash is generated which escalates pollution.
- Religious faith and social practices also add to pollution of river waters. Carcasses of cattle and other animals are disposed in the rivers. Dead bodies are cremated on the river banks. Burnt navel remains are immersed into the river from local crematorium. These practices pollute the river water to a great extent and adversely affect the water quality.



Plate 2: Holy Dip and Contaminated River-Water

- Mass bathing and immersing holy offerings in plastic bags in river Hugli during religious festivals are another environmentally unsound practices. Plastic bags are detrimental to aquatic life to the extent of even killing them which further add to the pollution load of the river.
- Immersion of idols during festive season into river further lead to pollution.
- Oil spill from various sources pollute river water and endanger organisms.
- Besides these, untreated wastes from health units, market places, domestic and commercial sources etc. also are consigned to river water. Carcass of animals and birds are no less in pollution.



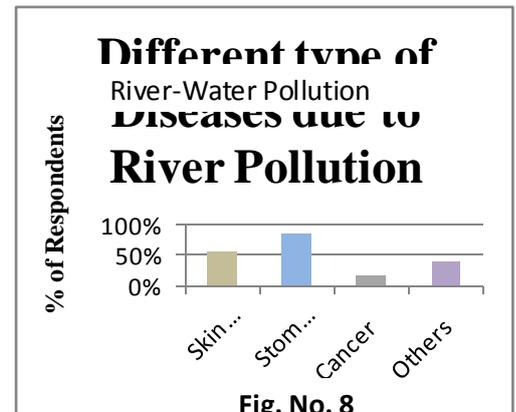
Plate 3: Oil Spills on the Hugli

Deterioration of Water Quality:

According to the report of Central Pollution Control Board, 2011, in the study area, the amount of BOD (Biological Oxygen Demand) and DO (Dissolved Oxygen) is 0.3 mg/l and 4.3 mg/l respectively in the water. The level of coliform bacteria was 17000 MPN/100ml. The sewage generation was 52.5 MLD while the treatment capacity was 3.9 MLD. Water pollution leads to contamination of river water and as a result, the water quality falls below normal safe level.

Adverse Effects of Polluted Water:

- **Environmental Degradation:** Aquatic ecosystems can be greatly changed or destroyed by water pollution with increasing amount of organic matter in river water and with increasing BOD. Fishes and aquatic lives in the River Hugli are adversely affected.



- **Frequency of Diseases:** Due to contamination in drinking water, residents suffer from epidermal

diseases, gallbladder cancer, prostate cancer, gastrointestinal, neurological disorders and cardiac ailments. Pregnant women and children are the worst affected. Cholera, typhoid, diarrhea are frequently spread due to river pollution. Swimming in and drinking contaminated water cause skin rashes and health problems like cancer, reproductive problems, typhoid, fever and stomach sickness in humans.

- **Disruption in Aquatic Food chain:** Polluted water of river kills life that depends on it such as fishes, crabs, Ganges Dolphins, birds and other animals. Carcasses are often found strewn over the bank. On other hand, pollutants such as lead and cadmium are eaten by tiny animals and subsequently these animals are consumed by other big fishes. That is why the entire food chain is disrupted at all higher levels. Oil spills on water causes animal to die when they ingest it or encounter it. Oil does not dissolve in water so it causes suffocation in fish and birds.
- **Problems of Drinking Water and Ground Water:** High level of coliform bacteria in the river makes its water unfit for drinking and bathing. Water that moves through the soil is, to some extent, purified naturally. However, this is not always true because soil cannot remove all pollutants. Many soils have the ability to remove certain types of pollutants, including phosphorus, heavy metals, bacteria and suspended solids. However, pollutants that dissolve in water, like nitrate and ammonia from fertilizers and animal wastes, can pass through soils into the groundwater. This may cause high concentrations of pollutants in local drinking water wells. Leaking from underground storage tanks, solid waste landfills, improperly stored

hazardous waste, careless disposal of solvents and hazardous chemicals on ground surface are other potential sources of river-water and groundwater pollution.

- **Damage to Assets:** Discharge of untreated industrial wastes in water leads to corrosion and damage of assets. Corrosion of steel objects such as ships and vessels, damage to concrete structures, corrosion of pipes, pumps, valves and other equipments in plants etc. are common. Moreover, when water is heavily loaded with solid wastes, it might cause flood due to the accumulation of such wastes and even soil erosion from river banks.

Recommendations to Control and Management:

- In the semi-urban areas, septic tank is a very useful device which is sufficient to hold the sewage for several days under anaerobic conditions. The effluent is dispersed into the soil. The sludge that settles at the bottom needs to be cleared periodically.
- Industries should install machineries to remove contaminants from their effluents and wastewater. One way to do so is installation of Effluent Treatment Plant (ETP). This way we can control pollution at the source itself.
- There should also have ample facilities to clean the sewage effluent. All towns and cities must have Sewage Treatment Plants (STPs) that clean up the sewage.
- We should be careful in our religious practices such that we do not pollute river water. We must use minimum amount of detergent and/or cleanser when we are washing clothes or dishes. Better if we make use of only phosphate free soaps and detergents.
- Proper drainage and sewage systems as per micro-relief should be adopted that would not allow accumulation of polluted water.
- Ban on Dhobi ghats along the river.
- Water quality cannot be sustained unless the standards are developed, the water quality is monitored and such standards are implemented. Taking into consideration the changing health and ecological requirements, these standards have to be fine-tuned.
- Promoting local community participation in river cleaning up drive is another positive way. Organizing awareness programs and community meetings on river pollution and its threats,



distribution of hand outs on the causes and ill effects of river pollution, speaking with our family members and friends on the said issue will further boost up the process of spreading awareness on the importance of maintaining good water quality and clean rivers.

- Environmental laws are there but their practice is lacking. Government alone cannot do it. It requires public participation. It needs strong political will, proper planning and management for disposal of sewage and other effluents as well as their treatment. Awareness of people for not throwing any article by way of religious offerings into the river will bear positive results.

Conclusion:

Water pollution is a major issue in India. That is why, clearance for urban projects should be given prioritizing establishment of sewage plants. The present study further stresses on the need to spread awareness of the causes and effects of water pollution. Govt. institutions, N.G.O.s and people should leave no stone unturned to aware people about the water pollution and its ill effects. It is our duty to protect our environment. An individual effort may not be as sufficient to cleanse our rivers, but when all of us contribute positively towards this goal it makes up a big effort.

Acknowledgement:

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