

Water Pollution in Dhaka City: An Evaluation of Legal Enforcement and Effectiveness



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Letter of Transmittal

To

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Subject: Prayer for Submission of Dissertation

Dear Sir,

The fact that I am even prepared to conduct research on "**Water Pollution in Dhaka City: An Evaluation of Legal Enforcement and Effectiveness**" is a great testament to the pressure I am under. Furthermore, I have done my best to make this research distinctive and significant at the end. Additionally, by gathering all pertinent data from many sources that will meet your expectations

Therefore, I sincerely hope and pray that you will find this study paper useful for your assessment. Lastly, I want to know if you have any insightful recommendations regarding this.

I'm always accessible if you need any additional clarity on this document.



Sincerely yours,

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Letter of Approval

This certifies that the work has been completed. Samia Islam Mitu, ID: 241-38-004, Department of Law, Daffodil International University, completed the actual work " **Water Pollution in Dhaka City: An Evaluation of Legal Enforcement and Effectiveness** " under my supervision as a partial fulfillment of the research project for



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Declaration

I officially certify that my thesis, "**Water Pollution in Dhaka City: An Evaluation of Legal Enforcement and Effectiveness**," partially satisfies the requirements needed to be awarded a master's degree in law from Daffodil International University's Department of Law.

I further affirm that the research described in this thesis is unique and has never before been submitted, in whole or in part, to another university for consideration for a degree, certificate, or academic distinction. No copyright is violated by the content I've shared.



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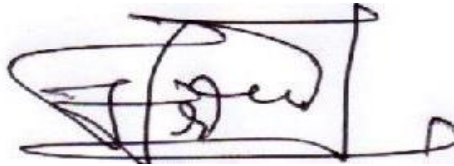
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Certification

This certifies that Samia Islam Mitu has written a thesis titled " **Water Pollution in Dhaka City: An Evaluation of Legal Enforcement and Effectiveness.**" It is ready to partially satisfy the requirements for the Master of Laws degree from the Department of Law, Daffodil International University. Under my direction, the research was conducted as part of a legitimate project that was completed successfully.



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Abstract

Water pollution is a major issue in Dhaka, Bangladesh's capital and largest city, due to a range of human activities, rapid unplanned urbanization, and inadequate waste management practices. This study aims to assess the effectiveness of Dhaka City's current legal system in controlling water pollution. The study examined existing documents and current legislative frameworks related to water contamination using content analysis. The results show that untreated sewage, solid waste dumping, industrial discharge, and agricultural runoff are some sources of water pollution in Dhaka City. Bangladesh has created laws and regulations to stop water pollution, but they are still not being properly implemented and enforced. This inefficiency is caused by a combination of political, institutional, and budgetary constraints as well as a lack of public awareness. The analysis identifies several potential areas for improvement. Resolving inconsistencies and inadequacies in current legislation is essential to strengthening the legal system. Achieving effective water pollution control in Dhaka City also requires enhancing monitoring and enforcement protocols, providing sufficient funding, promoting public involvement, and increasing awareness of the harmful impacts of water pollution. By carefully analyzing how well applicable laws and guidelines work to reduce water pollution in Dhaka City, this study contributes to the body of existing research. The results emphasize how important it is for citizens, non-governmental organizations, and government officials to coordinate to effectively tackle water contamination.

Keywords: Pollution, Waste management, Waterbodies, Environment, Legal framework

Abbreviations

ADB-Asian Development Bank

BECA-Bangladesh Environment Conservation Act

BELA-Bangladesh Environmental Lawyers Association

BUET-Bangladesh University of Engineering and Technology

BWDB-Bangladesh Water Development Board

CSR-Corporate Social Responsibility

DCC-Dhaka City Corporation

DG-Director General

DNCC-Dhaka North City Corporation

DO-Dissolved Oxygen

DoE- Department of Environment

DWASA-Dhaka Water Supply and Sewerage Authority

EC-Electrical Conductivity

ECA-Ecologically Critical Area

ETF-Effluent Treatment Facilities

EPMA-Environmental Protection and Management Act

GDP-Gross Domestic Product

HCD-High Court Division

IWRM-Integrated Water Resource Management

NEMA-National Environment Management Authority

NGT-National Green Tribunal

NGO-Non-Government Organization

NOC-No Objection Certificate

NRCC-National River Conservation Commission

NWPo-National Water Policy

NWMP-National Water Management Plan

PPP-Polluter Pays Principle

PUB-Public Utilities Board

PIL-Public Interest Litigation

RAJUK- Rajdhani Unnayan Kartripakkha

SDG-Sustainable Development Goals

TIB-Transparency International Bangladesh

WASA- Water Supply and Sewerage Authority

UN- United Nations

UNDP- United Nations Development Program

WARPO-Water Resource Planning Organization

WB-World Bank

WHO-World Health Organization

LEA- Law Enforcement Agency

Chapter One

Preliminary

1.1 Introduction

Although environmental contamination has become a concerning reality in the twenty-first century, in many respects, water pollution is the biggest threat to humanity. Bangladesh is one of the world's most polluted nations. With 169.4 million people, it is an overpopulated nation. As a result, there are 1265 persons per square kilometer.¹

Consumption of natural resources like land, air, water, and minerals, as well as waste products like air and water pollutants, hazardous materials, and greenhouse gases as a result of such consumption, are two major environmental effects of overpopulation.²

Air, water, and soil pollution are interconnected and happen in cycles. Bangladesh is a land of rivers, with water covering almost 10,000 square kilometers of the country. It has over 700 rivers, which are important to the country's economy but are sometimes disappearing.³

Rivers are essential to our transportation, agriculture, and drinking water. Two of the main causes of river contamination are rubbish disposal and river occupation. As a result of occupation, rivers are getting smaller, and excessive waste discharge has filled the river bottom. Consequently, rivers are becoming less navigable and will eventually dry up. The water quality in the rivers that surround Dhaka city has drastically declined as a result of the careless disposal of solid debris, untreated sewage, and industrial effluent. It is now a serious public health concern that requires attention. In a landmark resolution passed on July 28, 2010, the UN General Assembly acknowledged "the right to safe and clean drinking water and sanitation as a human right which is vital for the full enjoyment of life and other human rights." Bangladesh has created legislation to prevent water pollution to uphold this human right, but its execution and enforcement are insufficient.

1.2 Statement of the Problem

Water contamination is one of Dhaka's main environmental issues. Pollution has a major impact on the rivers, canals, lakes, and other bodies of water that surround this metropolis. Medical waste, household sewage, and industrial pollutants are the main sources of water contamination. The

¹ Bangladesh Population (Live)" (*Worldometer*) <<https://www.worldometers.info/world-population/bangladesh-population/>>

² Md. Khalid Hasan a MKH and others, 'Water Pollution in Bangladesh and Its Impact on Public Health' (*Heliyon*, August 2, 2019) <<https://www.sciencedirect.com/science/article/pii/S2405844019358050>> accessed 20 December 2024

³ Kaamil Ahmed, 'The River Is Our Home': Bangladeshi Boatmen Mourn Their Receding Waters' (*The Guardian*, January 20, 2020)

physical, chemical, and microbiological makeup of Dhaka's river water has changed from its initial state, making it unfit for any safe or advantageous use. The Shitalakhya, Buriganga, Turag, and Balu are the four rivers that encircle Dhaka. Due to uncontrolled urbanization and other domestic and industrial wastes, all of these waterways are severely contaminated.⁴

There are 43 major canals that make up the drainage and sewerage system of Dhaka. In 2004, a list of forty-three canals was created.⁵ Already, nearly half of the waterways are vanished. The final 26 are likewise struggling to survive due to persistent encroachments, negligent solid waste disposal, and flagrant negligence on the part of their legal guardians. Wastewater is frequently transported into the nearby rivers via these canals. Additionally, Dhaka is encircled by eight notable lakes, most of which are filthy and detract from the city's lovely atmosphere. The Dhanmondi, Gulshan, Banani, and Nikunj lakes are still in terrible condition despite the enormous sums of money that have been spent on lake improvement over the years.⁶ The water in Hatirjheel has become brownish due to its transformation into a sewage and trash dump.⁷ All of the waterbodies are maintained by Dhaka WASA, RAJUK, and the North and South City Corporations, depending on the area. However, water pollution remains a major issue in Dhaka city because of a lack of collaboration among many entities. Since the contaminated water in the waterbodies around Dhaka is unfit for human consumption, there are serious health risks to the general populace. There is no systematic waste management and Dhaka has been industrialized without a sustainable plan. The majority of the roughly 7,000 industries in the Dhaka metropolitan area are situated close to waterways.⁸

Waterways are most polluted by tanneries and dyeing factories out of all these sectors. Usually, the waste from these businesses is fed into the city's rivers through the sewer system. Rivers are consequently turning into disposal sites for a wide range of liquid, solid, and chemical waste.

1.3 Research Questions

The following research questions are pertinent to the subject under investigation:

1. What steps should be implemented to stop Dhaka's water from becoming contaminated?
2. How can the law and legal framework be effectively implemented in Dhaka city to improve the quality of the water?

⁴ Ibid

⁵ Alam H, 'Dhaka City Canals in Death Throes' (*The Daily Star* July 20, 2016)

⁶ Kamran Siddiqui & Md Jahidul Islam, 'Dhaka Lakes Now Sources of Miseries' (*The Business Standard*, August 8, 2021)

⁷ Bishakha Devnath, 'Why Hatirjheel Is Now a Sewage Pond' (*The Business Standard*, February 9, 2020)

⁸ Hasan MT, "Pollution of Rivers around Dhaka" (*The Daily Star*, September 9, 2011)

1.4 Research Objectives

The following are the main goals of this study proposal:

1. To investigate the main causes of the water contamination in Dhaka.
2. To conduct a critical analysis of Dhaka's waste management procedure.
3. To identify the flaws in environmental laws, regulations, and application processes that lead to water contamination.
4. To look into the difficulties government organizations, have in implementing environmental principles to end water pollution.
5. To offer suggestions for the efficient application of the current laws.

1.5 Literature Review

Water supplies become dangerous for swimming, washing, cooking, drinking, and other purposes when they are contaminated by contaminants. Chemicals, trash, microorganisms, and parasites are examples of pollutants. All types of pollutants eventually find their way into waterways. The detrimental impacts that water pollution has on both the environment and human health make it a serious problem in Dhaka. Runoff from agricultural areas, septic tank leaks, and untreated home and industrial wastewater are the primary causes of water pollution in Dhaka.⁹ The Turag River borders this quickly expanding city to the west, the Tongi Khal to the north, and the Balu River to the east. It is situated on the northern bank of the Buriganga River. The rivers that surround Dhaka are useful and significant because they offer drinking water, a drainage system, a range of fish, and transit routes. In addition to providing fish for local consumption, the Buriganga River is an essential source of drinking water for the people of Dhaka and the neighboring areas.¹⁰

However, research indicates that the Buriganga River, which flows through Dhaka, has significantly deteriorated water quality as a result of elevated levels of contaminants like heavy metals, organic debris, and pathogens.¹¹ The local community is experiencing a number of health issues as a result of the Buriganga River's declining water quality, including the spread of waterborne illnesses like cholera and diarrhea.¹² Furthermore, the fishing villages that rely on the river for their livelihoods have suffered large financial losses as a result of the loss of aquatic species in the river.¹³ In Bangladesh, river encroachment is a frequent occurrence. Due to unlawful

⁹ F.A. Samiul Islam, 'Solid Waste Management System in Dhaka City of Bangladesh'

<<https://zantworldpress.com/wp-content/uploads/2019/12/17.-Samiul.pdf>> accessed 20 December 2024

¹⁰ Akash Mamon Sarkar, 'Surface and Ground Water Pollution in Bangladesh: A Review' (2019)

<https://www.researchgate.net/publication/338825728_Surface_and_Ground_Water_Pollution_in_Bangladesh_A_Review> accessed 27 December 2024

¹¹ Ibid

¹² Ibid

¹³ Prosun Roy & other, 'Livelihood Dimensions of the Fishermen in Shibs River of Bangladesh'

<https://www.researchgate.net/publication/342747668_Livelihood_Dimensions_of_the_Fishermen_in_Shibs_River_of_Bangladesh> accessed 27 December 2024

encroachment, most of Dhaka City's natural drainage systems have disappeared or are leaving the city. It is challenging to drain the runoff and the pollutants that are continuously contaminating the environment because of the encroachment on the rivers brought about by illegal development and the illegal dumping of solid waste.¹⁴ The government and other non-governmental organizations have attempted to address Dhaka's water pollution issue, but the issue still exists since current rules and regulations are not being effectively implemented. Additionally, the city's and its industries' explosive growth has put further strain on the already overworked water treatment and disposal facilities.¹⁵

Over the past 20 years, Dhaka has seen significant industrialization, especially in the textile, washing, and dyeing sectors; most of these are located in three areas: Tejgaon, Hazaribagh, and the Dhaka-Narayanganj-Demra dam area. The major obstacles to putting environmental principles into practice are the uncontrolled industry and the fast population growth in Dhaka.

1.6 Research Methodology

The qualitative technique was used to write this research paper, and all of the data and material were gathered from secondary sources, including books, journals, newspapers, articles, research papers, scholarly blogs, and websites. The study will also perform a document analysis of the pertinent reports, policies, and legal provisions. To examine particular instances of human rights abuses in the jails, the research will also employ a case study methodology. To find trends and themes, the gathered data will be subjected to thematic analysis.

The legal framework, management system, and content analysis of the law form the basis of this study. Reports from the Department of Environment and other environmental non-governmental organizations are also included. This study's data collection method is content analysis. This covers pertinent legislation, rules, regulations, policy analysis, and case precedent. Tables, reports, and descriptive statistics have all been used in the analysis.

1.7 Data Processing and Analysis

Where appropriate and feasible, the qualitative analysis method will be applied in this study by preserving dependability and using directly observed data. To prevent unforeseen errors, every step of the data processing and analysis process will be handled with the utmost care and responsibility.

Care will be taken from the very beginning when collecting and analyzing the data for this planned study. When raw data is received, it is initially processed to fix any errors. This ensures that the

¹⁴ Hossain Ahmed Taufiq, 'Dhaka Water-Logging: Causes, Effects and Remedial Policy Options' <https://www.researchgate.net/publication/353510497_Dhaka_Water_logging_Causes_Effects_and_Remedial_Policy_Options> accessed 2 January 2025

¹⁵ Hossain MS and others, 'Recent Changes in Ecosystem Services and Human Well-Being in the Bangladesh Coastal Zone - Regional Environmental Change' (SpringerLink, January 21, 2015) <<https://link.springer.com/article/10.1007/s10113-014-0748-z>> accessed 3 January, 2025

data is comprehensive, readable, and free of inconsistencies. In this instance, the data analysis method will primarily be quantitative. In this case, information will be presented using tables and graphs, which will also explain the data. Several statistical methods, such as percentage and ratio, will be applied at this point.

1.8 Scope and Limitation of the Research

Utilization of secondary data: a few statistics and supporting data were gathered from internet sources. To gather the information, government websites, newspapers, articles, and journals are consulted. The Bangladesh Environmental Lawyers Association (BELA), Dhaka North City Corporation, Dhaka South City Corporation, and the National River Conservation Commission (NRCC) provided us with various data reports. Since this study relies on content analysis, no empirical data was gathered due to time constraints.

1.9 Expected Outcomes

- I. A thorough rundown of Bangladesh's pertinent water pollution legislation and regulations, with an emphasis on how they are implemented in Dhaka.
- II. Analysis of the degree of compliance among families, businesses, and other water pollution sources. Determine any holes or flaws in the law that prevent it from being enforced effectively.
- III. Evaluation of the function and output of organizations like the Department of Environment (DoE).
- IV. Assess the adequacy and uniformity of monitoring programs and sanctions for infractions.
- V. Information based on data about the present condition of the lakes and rivers in Dhaka.
- VI. Examination of the relationship between increased enforcement and better water quality.
- VII. Conclusions drawn from surveys or interviews with business leaders, public servants, and environmental NGOs.
- VIII. Recognizing the socioeconomic impacts of water pollution and the opinions of the local populations.

1.10 Significance

Waterborne illnesses including cholera, dysentery, and hepatitis are among the serious health dangers posed by Dhaka's water pollution. By assessing the efficacy and enforcement of the law, this study identifies areas where advancements can directly benefit public health outcomes, lowering the burden of disease and medical expenses.

1.11 Conclusion

Rapid development and poor infrastructure are contributing factors to Dhaka's water pollution problem, but the legal framework offers a starting point for reform. However, reducing water pollution requires bolstering enforcement, encouraging interagency cooperation, and involving the public and industry. Future studies should examine worldwide best practices that can be modified for the Dhaka environment and concentrate on case studies of effective interventions.

Chapter Two

An Overview of Dhaka City's Water Pollution

2.1 Dhaka's water contamination sources

Agricultural runoff, household sewage, and industrial discharges are the main causes of water pollution in Dhaka.

Industrial Sources: Water in Dhaka is seriously contaminated as a result of the city's quick industrialization. Untreated wastewater including heavy metals, dyes, and other hazardous materials is released into neighboring rivers, including the Buriganga, by industries like chemicals, tanneries, and textiles. Residents are at danger for health problems as a result of this pollution's substantial degradation of water quality.¹⁶

Domestic Sources: Water contamination is made worse by the city's poor sewage system. Since just 20% of Dhaka has a sewer system, a significant amount of untreated household wastewater is dumped into bodies of water. As a result, rivers and canals have significant amounts of organic pollutants and pathogens.

Agricultural Sources: Runoff comprising fertilizers, pesticides, and sediments from agricultural operations in the Dhaka area pollutes the water supply. The quality of surface and groundwater is impacted by this non-point source pollution, which introduces chemicals and nutrients that can be detrimental to aquatic ecosystems and human health.

Comprehensive approaches are needed to address these sources of pollution, such as implementing laws governing the disposal of industrial waste, developing and modernizing sewage treatment plants, and encouraging sustainable farming methods to safeguard Dhaka's water supplies.

2.2 Important water bodies that are impacted

The following list of important water bodies in Dhaka city that are impacted is accompanied by references:

The River Buriganga

One of the main rivers in Dhaka, the Buriganga, is severely contaminated by solid waste, untreated industrial waste, and domestic sewage.

The untreated runoff from Hazaribagh's tanneries and other businesses is a major source of pollution.¹⁷

¹⁶ Toriql Bashar and Ivan W.H. Fung. (2020, July 26). MDPI. Retrieved February 3, 2025, from MDPI: https://www.mdpi.com/2073-4441/12/8/2124?utm_source=chatgpt.com

¹⁷ Wikipedia,” *Buriganga River* “ https://en.wikipedia.org/wiki/Buriganga_River accessed on 02 February 25

The River Turag

Encroachment and untreated industrial effluents, especially from the dyeing and washing sectors, have a negative impact on the Turag River.

Additionally, untreated home sewage and the direct disposal of solid waste damage it.

The River Shitalakkhya

East of Dhaka, this important river is contaminated by paper mills, textile dyeing facilities, and washing plants. The water gets more and more unfit for human consumption during the dry season.

The River Balu

East of Dhaka, the Balu River suffers from pollution and encroachment from industrial trash and untreated sewage.

It has been determined to be among the most polluted rivers.

Gulshan Lake

This urban lake has been designated as an Ecologically Critical Area because of encroachment, solid waste, and sewage contamination.

Illegal sewage line connections have posed serious obstacles to efforts to protect the lake.

Hatirjheel Lake

The Hatirjheel Solid waste disposal and untreated sewage inflows pollute Lake Hatirjheel, a major destination for recreation and transportation.

Its state deteriorates when a sewage treatment system is not present.

The River Dhaleshwari

Relocated tanneries in Savar contribute significantly to the pollution of the Dhaleshwari River southwest of Dhaka. Even after going through effluent treatment facilities (ETPs), the effluents still damage the river.

These waterways are vital to Dhaka's ecosystem and economy, yet they are becoming more and more threatened by urbanization, industry,

2.3 Social, Economic, and Environmental impacts

Significant social, economic, and environmental effects of water pollution in Dhaka city include harm to the natural ecology, human health, and economic activity.

Social Effects

Health Risks: The rivers of Dhaka become seriously contaminated when untreated sewage and industrial effluents are released into them. Residents are exposed to contaminated waters during flooding, which raises their risk of contracting waterborne illnesses such skin infections and

diarrhea. Bangladesh's floods in 2024 claimed 71 lives and left around 5,000 people hospitalized for related ailments.

Reuters.com

Unfair Exposure: People in low-income areas, particularly those living in informal settlements, are frequently exposed to health risks because they use tainted river water for everyday tasks like cleaning and washing.¹⁸

Effects on the Economy

Healthcare Costs: Over 272,000 premature deaths and 5.2 billion days of disease occur in Bangladesh each year as a result of environmental pollution, which includes contaminated water. In 2019, the cost of these environmental problems amounted to 17.6% of Bangladesh's GDP.

Industrial Consequences: Because surface water is so heavily contaminated, it is not economically or technically possible to remediate it, which results in a significant reliance on groundwater. This reliance creates long-term sustainability issues by causing groundwater depletion.

Effects on the Environment:

Ecosystem Degradation: Toxic wastes from sewage systems and industrial sectors are leaking into the rivers surrounding Dhaka, making them more and more filthy. The natural environment is disturbed by this pollution, which causes decreased river flows in certain areas and waterlogging or flooding in others.

Biodiversity Loss: Because many species cannot survive in the contaminated environment, the deterioration of water quality in Dhaka's rivers endangers aquatic life and lowers biodiversity.

Enforcing rules on industrial discharges, enhancing sewage treatment facilities, and encouraging sustainable urban planning are only a few of the comprehensive tactics needed to address water pollution in Dhaka and lessen its negative consequences.

2.4 Statistical data and trends on water quality in Dhaka.

Rivers

During the dry season, the Buriganga River frequently reports a Biological Oxygen Demand (BOD) of over 10 mg/L, which is significantly higher than the 3 mg/L threshold advised for aquatic life.

During the dry season, the Buriganga's dissolved oxygen (DO) levels usually drop below 2 mg/L, making the water unfit for fish.

¹⁸ (Sonia Ferdous Hoque, 2021)

Concentrations of heavy metals like lead (Pb), cadmium (Cd), and chromium (Cr) are found to be higher than WHO recommendations, especially in the vicinity of industrial areas.¹⁹

Groundwater

With quantities in some places surpassing the WHO recommendation of 10 µg/L and the Bangladeshi limit of 50 µg/L, arsenic contamination is a serious problem.

Groundwater samples from Dhaka's peri-urban areas frequently have elevated amounts of manganese (Mn) and iron (Fe).²⁰

Lakes (such as Hatirjheel and Gulshan)

High dissolved solids are indicated by Gulshan Lake's electrical conductivity (EC) levels, which have been measured at 4,920 µS/cm.

Urban lakes frequently have fecal coliform rates of 1,000 MPN/100 mL, which is significantly more than what is considered acceptable for home or recreational use.²¹

Tap Water

Mercury (Hg) contents in Dhaka's tap water were found to be beyond safety levels in a recent study, with an average of 1.18 ± 0.15 µg/L.

Lead (Pb) and arsenic (As) poisoning of tap water also poses non-carcinogenic health concerns to children.²²

¹⁹ Islam, M. S., Ahmed, M. K., & Habibullah-Al-Mamun, M. (2015). Trace metals in surface water and sediment from the Buriganga River, Bangladesh: Environmental assessment and possible human health risks. *Environmental Science and Pollution Research*, 22(11), 8244–8258. <https://doi.org/10.1007/s11356-014-3920-z>

²⁰ Rahman, M. M., Hasan, M. T., & Karim, M. R. (2024). Assessment of heavy metals and health risk in tap water of Dhaka city. *Environmental Monitoring and Assessment*, 196(1), 30. <https://doi.org/10.1007/s10661-023-10743-6>

²¹ DoE (Department of Environment). (2022). Annual water quality report for rivers and urban water bodies in Dhaka. Dhaka: Ministry of Environment and Forests.

²² Uddin, M. J., Ahmed, T., & Mahmud, K. (2023). Urban lake water quality and heavy metal contamination in Dhaka City: A systematic review. *Journal of Environmental Management*, 336, 117718. <https://doi.org/10.1016/j.jenvman.2023.117718>

Chapter Three

Bangladesh's environmental regulations' function in controlling water pollution

The nation's first piece of controlling legislation of this kind was the East Pakistan Water Pollution Control Ordinance of 1970, which was superseded by the Environmental Pollution Control Ordinance of 1977. The Bangladesh Environment Conservation Act of 1995 was enacted by the government as an amendment to previous laws. Despite the passage of numerous laws addressing inland water pollution, its implementation remains uncertain due to a lack of institutional support and a lack of adequate legal protections.

The following laws either directly or indirectly address the prevention of pollution in inland waterways:

3.1 The Constitution of Bangladesh

There were no explicit environmental protection provisions in the original Constitution. "The state shall endeavor to protect and improve the environment and to preserve and safeguard the natural resources, bio-diversity, wetland, forests, and wild life for the present and future citizens," reads Article 18A, which was added in the 2011, 15th amendment.²³

However, this falls under fundamental principles of state policy, which are not subject to judicial enforcement, rather than fundamental rights. Although our Constitution does not specifically mention the right to a healthy environment, In the *Dr. M. Farooque v. Bangladesh* case, the Supreme Court, which has the authority to interpret the Constitution, took a liberal view of the fundamental "right to life," which is outlined in Articles 31 and 32. This "right to life" includes the right to a safe and healthy environment.²⁴

3.2 Water Resource Planning Act, 1992

The purpose of this Act was to guarantee the equitable use of water resources and to improve them. The Water Resource Planning Organization (WARPO) was created under section 3 of this Act with the power to draft national policies for the scientific use and protection of water resources as well as plans for their development. As a result, the National Water Management Plan (NWMP) was created in 2001 and adopted in 2004, and the National Water Policy (NWPo) was created in 1999. However, the National Water Management Plan (NWMP) has not been implemented as well as it may have been because of institutional limitations. Specifically, WARPO lacked the institutional

²³ The constitution of People's Republic of Bangladesh, 1972

²⁴ Md. Arifuzzaman & others, 'Laws Regulating Water Pollution in Bangladesh' (2019) <<http://pubs.sciepub.com/jsa/3/1/3/index.html>> accessed 3 February 2025

strength and positioning necessary to effectively oversee and coordinate the execution of the NWMP.

Implementing National Water Policy 1999 and adhering to NWMP's recommendations have not been carried out with the appropriate degree of collaboration. Because of this, only a small number of plans have been carried out successfully in the past, primarily as a result of institutional flaws, a lack of coordination, and often significant political leadership commitment.

3.3 Environment Conservation Act, 1995 (Amended Act of 2010)

The Environmental Conservation Act was passed in 1995 with the goals of protecting the environment, improving environmental standards, and reducing environmental pollution. The Director General was granted the power to order the closure, inhibition, or regulation of any business under this Act, which established the Department of the Environment (DoE) to handle environmental concerns comprehensively. Both substantive and procedural provisions pertaining to the issuance of Environmental Clearance Certificates and the designation of ecologically significant areas are included in this Act and its regulations.

This Act focused mostly on industrial pollution rather than water quality, safety, and pollution caused by other non-industrial entities. Climate change, a critical concern for water resource management, is not taken into account or included in the planning, management, or use of water resources. The Act and its regulations place a strong emphasis on the necessity of preventing environmental contamination and, in particular, the advancement of water management through the creation of various water standards. However, the Act makes no explicit mention of the involvement of the user community in environmental management.

The Ministry of Environment and Forests' Department of Environment (DoE) is in charge of upholding the law. But only 23 districts are home to the Department of Environment's offices.²⁴ And the DoE has too few employees. Furthermore, institutional cooperation between the DoE and WARPO or other water authorities is not covered by the Bangladesh Environment Conservation Act of 1995. In 2009, four rivers—the Buriganga, Turag, Sitalakhya, and Balu—were designated ecologically significant areas under section 5 of the Environment Conservation Act of 1995. Despite several purported safeguards, the government has not been able to preserve those ECAs thus far.

The Department of Environment's deputy director, Md. Ziaul Haque, who oversees ECAs, claimed that they had failed to manage pollution and attributed this to dishonest business owners, a lack of public knowledge, and a lack of coordination among other government agencies. He also asserted that their lack of resources and staff prevented them from managing them effectively. The government started a plan in 2003 to move all of the tanneries from Hazaribagh in Dhaka to Savar

in order to protect the River Buriganga. In 2017, all tanneries were finally moved to Hemayetpur, Savar. But the tannery is harming the Kaliganga and almost killed the Dhaleshwari.²⁵ The tannery estate continues to contaminate the rivers, according to Department of Environment authorities.

Due to inadequate facilities for treating the liquid waste generated by the tanners, the Ministry of Environment, Forests, and Climate Change's legislative standing committee suggested closing the Savar Tannery Industrial Estate in Hemayetpur by August 23, 2020. Therefore, it appears that every attempt to relocate the Hazaribagh Tannery to Savar, which is outside of Dhaka, was unsuccessful. Tannery Estate is currently murdering the Kaliganga after the Buriganga and the Dhaleshwari.

3.4 Environment Court Act, 2010

The Act of 2000 was repealed by the Environment Court Act of 2010. In addition to one or more Environment Courts in each district, the current Act seeks to establish an Environment Appellate Court. According to the Code of Criminal Procedure, the Department of Environment's Director General (DG) or a representative appointed by him may directly make a complaint or file a case with the police station. An inspector or any other officer who reports to the DG conducts an investigation.

The environment court can only take cognizance of an offense or receive a compensation suit based on the written report of an inspector or any other individual designated by the director general.

The Brick Kiln Control Act of 2013 and the Environment Conservation Act of 1995 are the only environmental laws that the environment court has jurisdiction over; all other environmental laws that are in effect in the nation are outside its purview.

According to Section 4 of the Environment Court Act of 2010, the government will designate a Joint District Judge to serve as the Environment Court's judge. This judge will try matters within the Environment Court's jurisdiction in addition to those under his general authority. Environmental issues are delayed because the Joint District Judge's court, which is often under general jurisdiction, is already overloaded with civil and criminal cases and rarely has time to consider any environmental matters.

While Section 17 of the Environment Conservation Act, 1995 states that if an individual, group of individuals, or the public suffers a loss due to a violation of any provision of this Act or the rules made thereunder, they, or the Director General acting on their behalf, may file a suit for compensation before the Environment Court, Section 7(4) of the Environment Court Act, 2010

²⁵ Rafiqul Islam & others, 'The Business Standard After Buriganga, tannery waste now pollutes Dhaleswari' The Business Standard (Dhaka, 16 January 2021)

explicitly states that no Environment Court will take cognizance of any offense or consider any complaint for compensation under the Environment Conservation Act, 1995 unless accompanied by a written report from a Department of Environment (DoE) Inspector.²⁶

According to a more complex exception to this provision, the Environment Court may, after giving the Inspector or the Director General a reasonable opportunity to hear the matter, take the claim or complaint into cognizance for the purpose of trial without the need for a written report, or it may, if it deems appropriate, order the said Inspector to look into the claim or offense. This is because the Court is convinced that a person submitted a written request to the said Inspector to accept a claim for compensation or a complaint, and that no action was taken within 60 (sixty) days of the request. It follows that regular people are not entitled to bring a direct lawsuit in the Environment Court. It makes people more reliant on the executive branch than the courts.

The Environment Court's actions, orders, verdicts, compensation decrees, and penalties cannot be contested in front of any court or other body. Appealing to higher courts, such as the High Court Division or Appellate Division, is not an option. Only the Environment Appellate Court may hear an appeal.

As a result of the dearth of environmental cases, the nation's only environmental appellate court, situated in Dhaka, is also "inactive." Only seven cases—two from the Dhaka Divisional Environment Court and five from the Chittagong Divisional Environment Court—remain for the appellate court to consider. The aforementioned statistics show that, among other reasons, snags and challenges in environmental legislation, perplexing legal processes, delayed case resolution, low conviction rates, and a lack of sufficient courts make impacted individuals reluctant to pursue justice.

3.5 Water Supply and Sewerage Authority Act, 1996

The Water Supply and Sewerage Authority Act of 1996 was passed in order to provide storm water drainage, sewerage, and water supply services, as well as to create a water supply and sanitation system. It establishes corporate structures for Water Supply and Sewerage Authorities (WASAs) that are self-governing. It seems that the authorities don't care about industrial effluents. The problem of ensuring water purity is not addressed by this act. Long-term planning for the sustainable use and management of water resources, data collection, database maintenance, and water table monitoring are all lacking.²⁷ The cooperation of WASAs with other water governance organizations is not even mentioned in the Act.

²⁶ *ibid*

²⁷ *ibid*

3.6 Brick Manufacture and Brick Kilns Establishment (Control) Act 2013

This Act was designed to establish regulations for brick manufacture and kiln installation in order to protect biodiversity and the environment. Brick kiln construction is prohibited by the Act in the Ecologically Critical Area (ECA) and its surrounding areas. The regulation states that no brick kiln may be constructed or maintained inside an ECA or within one kilometer of its borders. Four rivers that surround Dhaka were designated as ECA by the Department of Environment (DoE) in 2009. These rivers include the Buriganga, Turag, Sitalakhya, and Balu. Conversely, almost every brick kiln in Dhaka is situated alongside the banks of these rivers.²⁸

Brickmakers are only allowed to remove or collect dirt from dead ponds, canals, swamp land, creeks, deep tanks, rivers, haor-baor, char land, and fallow land with the consent of the appropriate authorities. However, neither the procedure nor the relevant authorities are mentioned in the Act.

3.7 National River Protection Commission (NRPC) Act 2013

In the case of Human Rights and Peace for Bangladesh and Others vs. Bangladesh, Writ Petition No. 3503 of 2009, the Hon'ble High Court Division directed the enactment of this Act.

There are no clear recommendations or signals on implementation tools for the National River Protection Commission Act of 2013 to carry out the Act. The Commission has no official authority and only makes recommendations; it is powerless to take any action if the government rejects any of its suggestions.²⁹

3.8 Water Act 2013

The Water Act of 2013 was passed with the intention of advancing the integrated development, management, extraction, distribution, use, conservation, and protection of Bangladesh's water resources. It was based on the National Water Policy. This Act created the National Water Resources Council. The Ministry of Water Resources has an Executive Committee that implements the Council's decisions. Without prior clearance from the Executive Committee, individuals or groups are not allowed to gather, distribute, use, develop, protect, or conserve water resources. They are also not allowed to build buildings that impede rivers' natural flow. However, this Act has many drawbacks.

1. The Environmental Conservation Act of 1995 is unclear since the government has not made a clear commitment to guarantee water quality for a variety of beneficial uses.
2. The Environment Conservation Act of 1995 is in conflict with this statute.
3. This Act does not provide for punishment for industrial discharges.

²⁸ Imtiaz Ahmed Sajal, 'Feasibility of Brick Kiln Control Act' The Daily Star (Dhaka, 17 May 2016)

²⁹ ibid

4. Neither the establishment of Effluent Treatment Plants (ETPs) nor Waste Water Treatment Plants (WWTPs) nor the establishment of discharge requirements are covered. Water management is its main area of focus.

5. Five years in prison and/or a fine of Tk. 10,000 are the maximum penalties for crimes. Many people might decide to pay the fee rather than follow the law because the financial penalty is so small. Adequate penalties for the deterioration of water quality brought on by industrial discharge and other causes of pollution are not covered under the Act.

6. The Water Act of 2013 does not regulate non-point water pollution sources like pesticides and fertilizers.

3.9 Role of Supreme Court in regulating Water Pollution

The Supreme Court has significantly reduced water pollution by its important decisions in Public Interest Litigation (PIL) cases that were filed by individuals or non-governmental organizations (NGOs).

In the case of Bangladesh v. Dr. M. Farooque, the Appellate Division decided that,³⁰

"Our constitution's Articles 31 and 32 protect the right to life as a fundamental right." Its purview includes environmental protection and preservation, ecological balance free from air and water pollution, and sanitation, all of which are essential for enjoying life. The right to life will be violated by any action or inaction that goes against this.

Bangladesh vs. Human Rights and Peace for Bangladesh and Others

With Writ Petition No. 3503 of 2009, Human Rights and Peace for Bangladesh filed a petition before the High Court Division, contesting land filling, pollution, illegal encroachment, and the removal of both temporary and permanent buildings on the Buriganga, Turag, Balu, and Shitalakkha rivers in and around Dhaka. In its ruling, the High Court Division instructed the government to do the following three things:

1. To establish a "National River Protection Commission" with the goal of cleaning up all of the nation's rivers and offering adequate management and protection.
2. To put the River Protection Commission's recommendations into practice while creating both immediate and long-term plans to develop the nation's rivers.
3. To restore the Buriganga, Turag, Balu, and Shitalakhya rivers' navigability by using the required, efficient, and prompt measures.

The Honorable Court further instructed the responders to:

1. To restore the aforementioned rivers to their original state by surveying their native regions using a CS or RS map.

³⁰ Farooque vs. Government of Bangladesh, [1994], CA 24 [1995] AD

2. To designate the relevant rivers as areas of ecological criticality
3. to clear the rivers of any obstacles of whatever type
4. To clear the waterfront of any unpermitted buildings and stores.
5. Dredge the Jamuna-Dhaleswari, Dhaleswari-Buriganga, Turag, Tongi, Old Brahmaputra-Bangshi-Turag, and Jamuna-Punglikhal canals within five years.

By passing the National River Protection Commission Act of 2013, the government created the National River Protection Commission in accordance with this directive. Additionally, in September 2009, Buriganga, Turag, Balu, and Shitalakhya were designated as ecologically sensitive areas.³¹

BIWTA regularly runs an evacuation campaign to clear the riverbank of both temporary and permanent structures. The unlawful intruder frequently impedes this campaign. The government started the five-year Buriganga River Restoration Project in 2010 with a Tk 944 crore investment to dredge a 162-kilometer river system that included the New Dhaleswari-Pungli-Bangshi-Turag-Buriganga River system. Even though the project's estimated duration has passed, no work has been finished.

Despite starting river dredging activities in 2012, the BWBD stopped after a year because they didn't have enough money or a dredger. Only about Tk 104 crore has been allocated by the government thus far for its implementation. Abul Kalam Azad, project director and chief engineer (central zone) for the Bangladesh Water Development Board, claims that the largest obstacles to project completion are a lack of funding, the haphazard construction of bridges and other infrastructure, and unauthorized encroachment on riverbanks. The Buriganga Restoration Project was started to increase river flow in order to revive the rivers surrounding Dhaka, but enough financing was not obtained to keep the project running, said former Water Resources Minister Anisul Islam Mahmud.

The High Court rejected Dhaka WASA's decision

While hearing a contempt of court ruling against the managing director of Dhaka WASA for giving false information regarding the Buriganga River's pollution and the legitimacy of mills and factories operating without ETPs, the High Court Division bench of Justices Gobinda Chandra Tagore and Muhammad Ullah noted on December 8, 2019, that the time has come to declare Dhaka an ecologically critical area due to widespread pollution. The Dhaka Water Supply and Sewerage Authority (WASA) was given a six-month deadline by the same court to remove all of its sewer connections that were connected to the Buriganga River.

³¹ Bss, '4 rivers around city declared ecologically critical area' The Daily Star (Dhaka, 24 November 2009)

The Department of Environment was directed by the court to close industrial farms that operate without an Environmental Clearance Certificate and that release garbage into the river. In addition, the Court mandated that BIWTA furnish a compliance report and take steps to prevent more sewer lines from being installed on either bank of the river. Due to a lack of an environmental clearance certificate, the High Court ruled on November 17, 2019, that the Department of Environment must close 27 establishments along the Buriganga within 15 days.

Bangladesh v. Human Rights and Peace for Bangladesh (HRPB) (Turag River Case):

Human Rights and Peace for Bangladesh (HRPB) filed Writ Petition No. 13989 of 2016, and the High Court Division ruled that the Turag River and all other rivers in the nation are "living entities" with the same rights as "legal persons." In this landmark ruling, the National River Conservation Commission is acknowledged as acting "in loco parentis" (legal guardian) for all of Bangladesh's rivers in order to preserve and safeguard them against pollution and encroachment.

The Commission will serve as a guardian for the rights of the rivers and riparian ecosystems. The decision also permits the enforcement of river rights against both public (government) and private businesses.³²

1. The Polluters' Pay Principle and the Precautionary Principle should be regarded as national legislation.
2. All relevant authorities, including the Planning Commission, LGED, Water Development Board, BIWTA, and BADC, must abide by the National River Conservation Commission's (NRCC) recommendations and obtain a No Objection Certificate (NOC) from the NRCC prior to starting any new project involving rivers, canals, or water bodies.
3. to take the required steps to alter the National River Conservation Commission Act of 2013 by adding stronger penalties and fines for criminal offenses involving river pollution and encroachment, as well as procedures for the institution of a case, its investigation, and trial.
4. Bangladesh Bank is required to send a circular to all Scheduled Banks in Bangladesh stating that any organization, business, or individual engaged in the encroachment or pollution of the environment, climate, water lands, sea, sea-beach, river, river foreshore, canal-bill, hawor-bawor, nala, jhil, and all open water bodies are Public Trust Property. This will make them ineligible for any loans.
5. All encroachers and polluting of the aforementioned properties are prohibited from participating in any election, including those for the National Parliament, Zila Parishad, Municipality, Union, or Upazila. This is the responsibility of the Election Commission.
6. To raise student awareness, the Secretary of the Ministry of Education is instructed to include lessons on river pollution and protection in the curricula of colleges, universities, and schools.

³² Human Rights and Peace for Bangladesh (HRPB) vs Bangladesh [2016] Writ Petition No. 13989 (HCD)

Additionally, the high court has made it plain that all of these directives would be incorporated into the existing legal framework. However, those instructions have not yet been followed.

3.10 Role of Water Governance Bodies in controlling pollution

According to the Bangladesh Environment Conservation Act of 1995, the Department of Environment's overall responsibility includes upholding environmental conservation, raising environmental standards, and controlling and mitigating environmental pollution. In addition, DoE has the authority to define ecologically significant areas, issue environmental clearance certificates, monitor environmental quality, and file environmental complaints. However, DoE is subject to the following functional limitations:³³

1. DOE lacks the necessary technological know-how and people.
2. The DoE has granted unrestricted authority to issue certificates of environmental clearance. It has complete authority to approve or disapprove any application that would encourage corruption.
3. DoE is only in charge of the duties specified in the 1995 Bangladesh Environment Conservation Act. It has neither the authority nor the accountability to carry out other environmental legislation.
4. The majority of DoE projects rely on outside funding.
5. DoE haphazardly fulfills their duty in ecologically crucial areas only by proclaiming. It doesn't even specify the steps that should be taken to ensure their true safety. In order to preserve Sonadia Island as an ECA, BELA requested protective measures in the matter of BELA v. Secretary, MoEF & others.

Following its consideration of the petition, the High Court Division issued a Rule Nisi, requiring the respondents to provide justification for their refusal to implement the protective actions mandated by Section 5 of the Environment Conservation Act of 1995 in order to maintain Sonadia Island as an ECA. It demonstrates that even though Sonadia Island was designated an ECA in 1999, the DoE did not take any protective action until the High Court's decision.

6. Although the Department of Environment creates and updates its strategic plans annually, relatively few of them are carried out within the allotted time frame. The majority of their projects are stalled for years or abandoned in the middle.

3.10.1 Bangladesh Water Development Board

The government agency in charge of managing surface and ground water is the Bangladesh Water Development Board (BWDB). Almost all water-related initiatives, including macroenvironmental protection measures like flood control, are primarily implemented by the BWDB. While some of these projects are seen as controversial, others are seen as having societal relevance. The absence of community participation in the planning process is the root of the issue. The Bangladesh Water

³³ Md Al- Ifran Hossain Mollah, 'Department of Environment (DOE) and its role in protecting the environment of Bangladesh' <https://www.academia.edu/3832861/Department_of_Environment_and_its_role_in_protecting_the_environment_of_Bangladesh> accessed 5 February 2025

Development Board does not have a framework to handle land use tradeoffs, according to the 2013 Master Plan for Agricultural Development in Coastal Region of Bangladesh. The Bangladesh Water Development Board (BWDB) does not yet have a viable institutional framework in place to carry out the aforementioned Master Plan.

3.10.2 National River Conservation Commission (NRCC)

The Apex Court of Bangladesh has designated the National River Conservation Commission (NRCC) as the legal custodian of all rivers. The Court also gave the NRCC responsibility for the development and protection of rivers. The government passed the National River Conservation Commission Act of 2013 in response to the court's order, and the Commission was established in September 2014. The Act's preamble states that it was passed "to establish a Commission to prevent illegal encroachment of rivers, water and environment pollution, river pollution caused by industries, illegal construction of structures, and various irregularities, and to ensure multi-dimensional use of rivers in socio-economic development, including recovery of natural flow of rivers, proper maintenance of rivers, and to make rivers navigable,"

The statute's wording does not align with the letter and spirit of the HCD's order, but the preamble does. Section 12 of the Act states that the NRCC's only responsibility is to advise the government on issues such as preventing pollution and illegal encroachment, evicting illegal structures, excavating dying or extinct rivers, maintaining ecological balance and sustainable river management, making the necessary changes to pertinent laws, and promoting the general development of rivers. The previous clause states that the NRCC has no legislative authority to carry out its recommendations. Furthermore, the Commission is powerless if the relevant authorities do not take its suggestions into consideration.

The NRCC is unable to enforce any penalties to stop pollution and river encroachment. Thus, it is evident that the NRCC is unable to act on its own. For this reason, in the Turag River Case in 2019, the High Court Division issued a new directive to the government to amend the National River Conservation Commission Act 2013 by adding provisions for criminal offenses involving pollution and river encroachment that carry harsher penalties and fines, along with procedures for the case's institution, investigation, and trial. The NRCC drafted "The National River Conservation Commission Act, 2020" in response to the Court's decision. Establishing the NRCC as a successful independent organization is one of the goals of the new legislation.

3.10.3 Water Supply and Sewerage Authority (WASA)

Metropolitan residents' access to storm water drainage, wastewater disposal, and water supply is provided by the Water Supply and Sewerage Authority (WASA), a service-oriented, independent commercial corporation in the public sector. In its 360 square kilometer service area, WASA has

more than 8,000 kilometers of supply lines, around 3,000 of which are abandoned 150-year-old pipes, serving about 3.9 lakh connections.³⁴

Every day, it generates 255 million liters of water. However, 91 percent of WASA customers had to boil the supplied water to make it drinkable, resulting in an annual gas consumption of Tk 332 crore, according to a Transparency International Bangladesh (TIB) report released on April 17, 2019.

Even though WASA is in charge of properly disposing of waste water, they are damaging the river by dumping it into it directly. Therefore, within six months, the High Court Division mandated that the Dhaka Water Supply and Sewerage Authority (WASA) remove all of its sewer connections that are connected to the Buriganga River. Since 1986, Dhaka WASA has been in charge of 26 canals totaling over 80 kilometers. These canals, which were used to transport drainage water, became increasingly contaminated over time. There were no practical steps done to return those canals to their former condition. In light of this challenge, WASA relinquished control of the 26 canals and drainage system to the two city corporations of Dhaka on December 31, 2020.

3.10.4 Water Resource Planning Organization (WARPO)

In the water industry, the Water Resources Planning Organization is the highest planning authority. It acts as a secretariat for the Executive Committee of the National Water Resources Council. WARPO is responsible for the creation of the National Water Management Plan, the upkeep of the National Water Resources Database, the evaluation and declaration of project proposals, the provision of technical assistance to the Planning Commission, and the tracking and assessment of the National Water Management Plan's implementation. The main agency responsible for carrying out the Water Act of 2013 is WARPO. However, the Water Act of 2013 does not specify the roles and responsibilities of WARPO officers.

The Water Act makes no mention of the institutional structure and funding sources of WARPO. All water-related projects will be coordinated at the national level by the Planning Commission with specialized assistance from WARPO, and at the local level by District Committees under Local Government with technical assistance from the Bangladesh Water Development Board, as per the National Water Management Plan (NWMP) 2001.

Nonetheless, WARPO is responsible for planning, designing, overseeing, and monitoring all water-related projects in Bangladesh in accordance with the Water Act of 2013. The correct application of the Act will be hampered by this significant legal discrepancy. Furthermore, WARPO lacks the authority to conduct an environmental impact assessment prior to the planning or execution of any project pertaining to water.

³⁴ Helemul Alam, 'Dhaka Wasa's Legacy: A decade of failure, inefficiency' The Daily Star (Dhaka, 29 July 2020)

3.11 Role of NGO in Bangladesh

NGOs run a variety of initiatives to guarantee clean drinking water, stop pollution, and have shown remarkable success with afforestation projects.

There are several national and international NGOs operating in Bangladesh. The sole goal of the global non-governmental organization WaterAid is to guarantee that everyone has access to clean water, restrooms, and hygiene instruction. WaterAid has been doing business in Bangladesh since 1986. Since their establishment, they have given 7,690,000 people access to sanitary facilities and 2,860,000 people safe drinking water. Their work in Bangladesh can be organized around five thematic target areas: equity and inclusion, climate change, peri-urban and small-town WASH, urban WASH, and rural WASH. WaterAid Bangladesh currently oversees 63 projects in 25 districts. Hundreds of clean water wells have been built by BASMAH, giving the underprivileged and destitute in Bangladesh's more remote areas access to free clean water.

Due to a lack of funds, they are unable to reach the enormous population. In order to avoid water pollution, certain well-known NGOs also filed a variety of public interest lawsuits.

Chapter Four

Effectiveness of Legal Measures in Addressing Water Pollution

4.1 Analysis of the impact of laws on pollution levels

The city's waterways are still contaminated as a result of the difficulties in enforcing environmental regulations in Dhaka, especially those pertaining to water pollution. An important piece of legislation designed to reduce pollution and preserve the environment was the Bangladesh Environment Conservation Act (BECA) of 1995. By creating the Department of Environment (DoE), this act gave it the power to control actions that endanger the health of the environment. Despite these regulations, there has been uneven enforcement, and environmental deterioration persists, mostly as a result of industrial activity and population pressure.³⁵

The government designated the Buriganga, Shitalakhya, Turag, and Balu rivers as Ecologically Critical Areas (ECAs) in 2009 in response to rising pollution levels. The goal of this designation was to provide these rivers more protection and enforce more stringent environmental regulations. Studies have revealed that these rivers are still very polluted, though. For example, a 2022 DoE assessment noted that the discharge of solid pollutants from industries, municipal sewage, and medical waste continues to seriously damage the waterways surrounding Dhaka. According to the paper, the Buriganga River's dissolved oxygen levels can fall to as low as 0.1 mg/l in specific locations during the dry season, which is much below the permitted range for aquatic life.³⁶

The National River Conservation Commission Act of 2013 created the National River Conservation Commission (NRCC), a regulatory agency tasked with safeguarding the nation's rivers. Notwithstanding its mandate, the NRCC has come under fire for its poor performance, which has been ascribed to a lack of funding and authority. Although difficulties still exist, the commission put out a draft act in 2020 to strengthen its independence and enforcement powers. For instance, there have been few significant actions taken against violators despite the identification of multiple cases of river pollution and encroachment.

The combined effect of these legislative actions has not been enough to reduce Dhaka's water pollution. The efficiency of current legislation has been weakened by elements including poor enforcement, a lack of interagency collaboration, and the quickening rate of urbanization. As a result, the waterways surrounding Dhaka are still heavily polluted, endangering both the environment and public health. Even though Dhaka has a thorough legal framework to manage water pollution, the city's rapid growth, bureaucratic inefficiencies, and lax enforcement all work

³⁵Wikipedia,” https://en.wikipedia.org/wiki/Bangladesh_Environment_Conservation_Act%2C_1995”

³⁶ (Roy, 2024)

against it. For noticeable improvements in water quality, more resource allocation, stringent monitoring, and community involvement are necessary.

4.2 Stakeholder perspectives: Government agencies, industries, NGOs, and the public

Government Agencies

Perspective:

- Although government organizations acknowledge the pressing need to combat water contamination, they frequently encounter difficulties with resource allocation and enforcement.
- Regulatory frameworks such as designating rivers like the Buriganga, Turag, and Sitalakhya as ecologically sensitive areas are among the initiatives.
- Organizations like the Dhaka Water Supply and Sewerage Authority (DWASA) and the Department of Environment (DoE) work on projects including industrial discharge monitoring and wastewater treatment plants.³⁷

Challenges:

- Insufficient departmental cooperation.
- Poor infrastructure: Only a small portion of Dhaka's sewage is cleaned up before being disposed of.
- Pollution problems are made worse by corruption and inadequate monitoring.

Industries

Perspective:

- In addition to being vital to the economy, industries—especially tanneries and textiles—also significantly contribute to water pollution.
- Due to cost-cutting strategies and lax enforcement, many industries disregard environmental standards.
- Although some larger businesses have begun to invest in effluent treatment facilities (ETPs), there is still uneven compliance.³⁸

Challenges:

- ETPs have high operating costs.
- Polluters are not given incentives or face severe consequences.

³⁷ Islam, M. S., et al. (2021). "Water Pollution in Dhaka: Legal Framework and Implementation Challenges." *Environmental Policy and Law*, Springer.

³⁸ Alam, M. Z., et al. (2020). "Industrial Pollution and Water Quality in Dhaka: A Policy Perspective." *Journal of Environmental Management*, Elsevier.

- Opposition to change as a result of financial pressures.

Non-Governmental Organizations (NGOs)

Perspective:

- NGOs engage in advocacy by influencing policy changes, conducting research, and increasing public awareness.
- They advocate for sustainable practices and draw attention to the costs of water contamination to both people and the environment.
- NGOs like WSUP and WaterAid have worked on community-level initiatives to raise public awareness and enhance water cleanliness.³⁹

Challenges:

- Insufficient funds for extensive initiatives.
- Reliance on government cooperation to achieve a wider effect.
- Without stringent regulations, it is challenging to alter public and industrial practices.

A multi-stakeholder strategy that strikes a balance between environmental sustainability and economic development is needed to address water pollution in Dhaka. Although the public, businesses, NGOs, and government agencies all have diverse viewpoints, genuine improvement requires cooperation and stricter implementation of environmental regulations.

4.3 Comparison with legal frameworks and enforcement in similar cities

Bangladesh's Dhaka: Present Frameworks

Legal Provisions:

- The foundation of Bangladesh's environmental laws is the Bangladesh Environment Conservation Act, 1995 (BECA). It gives the legal power to stop contamination of the environment, establish standards for environmental quality, and punish offenders.
- A more efficient way to handle pollution claims is provided by the Environment Court Act of 2010, which creates courts exclusively for environmental matters.
- The Factories Act of 1965, which handles industrial pollution, and the Water Act of 2013, which deals with water resource management, are pertinent laws.⁴⁰

³⁹ WaterAid Bangladesh (2021). "Clean Water for Dhaka: NGO Interventions in Urban Water Management." WaterAid.

⁴⁰ Bangladesh Environmental Conservation Act, 1995: Department of Environment.

Enforcement Challenges:

- Insufficient resources for monitoring and a lack of institutional competence.
- The tannery and clothing sectors are the biggest polluters, yet industrial compliance is still low.
- Effectiveness is hampered by a lack of public knowledge and inadequate agency coordination.

Singapore: A Model for Stringent Enforcement

Important laws and methods of enforcement:

- The Environmental Protection and Management Act (EPMA) requires the usage of treatment plants and restricts industrial discharge into water bodies.
- Strict sanctions that range from fines to jail time guarantee adherence.
- Using real-time technologies, the Public Utilities Board (PUB) keeps a close eye on water quality.⁴¹

Effective Methods:

- Use of cutting-edge water treatment technologies, including water reclamation and reverse osmosis (NEWater).
- Unambiguous accountability with regard to industries required to disclose discharges.
- Partnerships between the public and commercial sectors increase the effectiveness of infrastructure expenditures.

Pertinence to Dhaka: To properly handle industrial waste, Dhaka can use cutting-edge treatment technologies and follow Singapore's strict monitoring procedures.

New Delhi, India: Focus on Legal Interventions

Important Frameworks:

- Pollution control boards are established by the Water (Prevention and Control of Pollution) Act, 1974, and have the authority to monitor water quality, create guidelines, and impose sanctions.
- Addressing water pollution, especially with regard to the Yamuna River, has been made possible in large part by the National Green Tribunal (NGT).⁴²

⁴¹ Singapore's Environmental Laws: National Environment Agency.

⁴² India's National Green Tribunal: National Green Tribunal

Obstacles and Advancements:

- Excessive dependence on court orders as opposed to proactive agency enforcement.
- The goal of recent projects like the "Namami Gange" project is to clean key rivers by coordinating across agencies and centralizing funds.

Relevance to Dhaka: To ensure greater accountability and speed up disputes pertaining to pollution, Dhaka could profit from specialist environmental tribunals like India's NGT.

Jakarta, Indonesia: Public Involvement and Decentralized Action

Key Frameworks:

- The 2009 Environmental Protection and Management Act offers a thorough framework for reducing pollution.
- Decentralization laws give local governments the authority to implement environmental limits.⁴³

Creative Methods:

- Programs for community-based river monitoring encourage participation from the general people.
- To guarantee that industries cover the expenses of cleanup, "polluter-pays" policies are enforced.

Relevance to Dhaka: Involving local populations in pollution monitoring and reporting can boost openness and put pressure on businesses to adhere to environmental regulations.

Nairobi, Kenya: Tackling Pollution Through International Collaboration

Important Frameworks:

- Water pollution is governed by the Environmental Management and Coordination Act (1999), and the National Environment Management Authority (NEMA) is the main enforcement agency.
- Kenya works with foreign organizations to provide financial and technical assistance for pollution control initiatives.⁴⁴

⁴³ Jakarta's Community Monitoring: World Bank on Indonesia.

⁴⁴ Nairobi's Pollution Strategies: United Nations Environment Programme.

Methods of Enforcement:

- Campaigns for public awareness encourage pollution prevention and water conservation.
- Building capacity is strengthened by collaborations with overseas organizations and NGOs.

Relevance to Dhaka: International partnerships can give Dhaka the financial support and technical know-how it needs to deal with its problems with water pollution.

Important Suggestions for Dhaka:

Boost Regulatory Oversight: Create a separate regulatory agency with the means to successfully implement water pollution regulations.

Public-Private Partnerships: Use tax breaks and public-private projects to entice businesses to spend money on wastewater treatment.

Adopt Technological Solutions: Based on Singapore's expertise, implement cutting-edge treatment techniques and real-time water quality monitoring.

Community Engagement: Motivated by Jakarta's community-based initiatives, enable local communities and non-governmental organizations to monitor pollution and spread awareness.

Judicial and Institutional Reforms: To speed up environmental lawsuits, create specialized environmental courts and tribunals like to India's NGT.

4.4 Limitations in current legal and institutional approaches

A Disjointed Legal System

- Dhaka's water pollution regulations are dispersed over a number of statutes, including:
- Although it offers a framework, the Environment Conservation Act of 1995 lacks specific rules for pollution control.
- Although it focuses on managing water resources, the Water Act of 2013 causes confusion because it intersects with other legislation.
- Although it lacks specifics, the Penal Code of 1860 addresses pollution under general criminal laws.⁴⁵

These legislation' fragmented structure frequently results in gaps in enforcement and jurisdictional overlaps. Furthermore, there isn't a comprehensive water pollution regulation that addresses metropolitan problems like Dhaka exclusively.

⁴⁵ Faruque, A. (2020). *Environmental Laws of Bangladesh: Challenges and Prospects*. Dhaka: Academic Press.

Inadequate Enforcement Systems

Even with legislative measures, enforcement is still inadequate because:

Corruption: Political and financial pressures frequently cause regulatory agencies to do nothing.

Resource Limitations: Regular monitoring is hampered by a lack of staff, tools, and technical know-how.

Judicial Inefficiency: The deterrent effect of environmental infractions is diminished when cases concerning them are delayed in the courts.⁴⁶

Issues with Coordination and Institutional Overlaps

Water management is the responsibility of several organizations, such as the Department of Environment (DoE), the Dhaka Water Supply and Sewerage Authority (DWASA), and City Corporations. Because of their overlapping jurisdictions,

- Redundant work.
- Ineffective use of available resources.
- Stakeholders are not being held accountable.⁴⁷

Insufficient Monitoring and Standards for Pollution

The current environmental quality requirements are out of date or do not meet global standards. Additionally:

- Untreated sewage and industrial effluents are dumped into rivers without the necessary controls.
- The DoE is unable to adequately monitor pollution levels on a regular basis.⁴⁸

Insufficient Public Awareness and Participation

Public involvement in decision-making is not adequately included into the present legislative framework. The effects of water pollution and their rights are still unknown to many people.⁴⁹

Lack of Pollution Control Incentives

Industries have little to no motivation to implement cleaner technologies. Tax credits or subsidies for adopting green practices are either nonexistent or insufficient.⁵⁰

⁴⁶ World Bank. (2018). *Bangladesh Environmental Governance Assessment Report*.

⁴⁷ Alam, S. (2022). "Inter-agency coordination challenges in managing water pollution in Dhaka." *Journal of Environmental Policy and Law*, 15(3), 45–60.

⁴⁸ UNEP. (2021). *State of the Environment in South Asia: Bangladesh Chapter*.

⁴⁹ Hossain, M. (2019). "Public participation in environmental governance: The case of Dhaka." *South Asian Environmental Review*, 7(1), 12–25.

⁵⁰ Rahman, A., & Khan, T. (2020). "Industrial pollution control in Bangladesh: Policy gaps and opportunities." *Asian Journal of Environmental Studies*, 9(4), 123–139.

Insufficient Attention to Urban-Specific Issues

The majority of Bangladesh's water laws deal with more general concerns of managing water resources rather than the particular difficulties presented by cities like Dhaka, such as:

- High density of people.
- Inadequate facilities for modern sewage treatment.⁵¹

⁵¹ Ahmed, S., & Roy, P. (2021). *Urban Water Challenges in Dhaka: Policy and Practice*. Dhaka: Green Earth Press.

Chapter Five

Recommendations for Improving Legal Enforcement and Effectiveness

5.1 Strengthening existing legal frameworks

Strengthening Current Law

Review and Update Environmental Laws: To address particular issues like industrial discharge limitations and enforced fines, Bangladesh's main environmental law, the Bangladesh Environment Conservation Act, 1995 (BECA), has to be revised.⁵²

Include Sector-Specific Provisions: By implementing specific regulations for sectors like pharmaceuticals, tanneries, and textiles, pollution from primary sources can be greatly decreased.⁵³

Increasing the Power of Enforcement Mechanisms

Building Regulatory Agencies' Capacity: To properly enforce the law, organizations like the Department of Environment (DoE) need additional funding, expertise, and autonomy.⁵⁴

Improved Monitoring and Reporting: Enforcing compliance can be facilitated by requiring continuous monitoring technology for industrial effluents.⁵⁵

Increasing Involvement of Stakeholders

Public Participation: Accountability can be raised by enacting legislation allowing for public complaints and community involvement in water monitoring.⁵⁶

Collaboration in the Private Sector: Creating public-private partnerships to finance waste management and water treatment facilities can improve enforcement.⁵⁷

Conformity to International Standards

Adopt International Guidelines: Water quality can be enhanced by bringing local legislation into line with frameworks such as the UN Sustainable Development Goals (SDG 6) and the WHO Guidelines for Drinking-water Quality.⁵⁸

⁵² Rahman, M., et al. (2020). "Legal Framework for Environmental Protection in Bangladesh: A Critical Analysis." *Asian Journal of Law and Society*.

⁵³ Alam, S., & Karim, M. (2019). "Water Pollution Laws in Bangladesh: A Sectoral Approach." *Environmental Policy Review*.

⁵⁴ Hossain, M. (2021). "Challenges in Environmental Governance in Bangladesh: Institutional Weaknesses." *South Asia Journal*.

⁵⁵ Zafar, A. (2020). "Technological Interventions for Environmental Compliance in Bangladesh." *Journal of Sustainable Development*.

⁵⁶ Ahmed, F., & Rahman, A. (2018). "Public Participation in Environmental Management in Bangladesh." *Bangladesh Journal of Law*.

⁵⁷ Khan, N. (2020). "Corporate Social Responsibility in Pollution Control: A Case for Bangladesh." *Journal of Environmental Law*.

⁵⁸ WHO (2022). "Global Standards for Water Pollution Management." World Health Organization.

Regional Cooperation: Transboundary water contamination problems can be resolved by working with South Asian nations under SAARC environmental agreements.⁵⁹

Presenting Mechanisms Based on Incentive

Polluter Pays Principle (PPP): Encouraging businesses to adopt eco-friendly practices and imposing harsher fines on polluters can encourage compliance.⁶⁰

Green Technology Subsidies: Offering financial assistance for wastewater treatment technology can motivate businesses to make investments in environmentally friendly solutions.⁶¹

To reinforce the legal framework against water pollution in Dhaka, a multifaceted strategy that includes stakeholder involvement, enhanced enforcement, and legal change is necessary. These initiatives can be strengthened by incorporating global best practices and providing incentives for greener technologies.

5.2 Enhancing institutional capacity and inter-agency coordination

Increasing the Capacity of Institutions

Strengthening Regulatory Bodies: To properly monitor water pollution, regulatory organizations such as the Department of Environment (DoE) should be given the tools, training, and power they need. This covers both technological tools (data analytics and monitoring systems) and human resources (skilled workers). According to research by Bhuiyan et al. (2018), the DoE in Bangladesh has a difficult time properly monitoring and enforcing regulations.

Improving Technical Expertise: To manage the intricacies of environmental risk management, pollution control technology, and water quality monitoring, institutions must fund training initiatives for employees. Establishing a pool of professionals to assist in addressing water pollution can be greatly aided by academic institutions such as the Bangladesh University of Engineering and Technology (BUET).⁶²

Public knowledge Campaigns: To raise public knowledge of the effects of water contamination, government agencies must work with civil society groups. Data on water quality collected by government agencies can be used to increase the efficacy of such programs.

⁵⁹ Gupta, R., & Choudhury, R. (2019). "Regional Efforts for Water Pollution Control in South Asia." *Asian Environmental Review*.

⁶⁰ Hasan, M., & Islam, T. (2021). "Economic Tools for Environmental Protection in Bangladesh." *Policy Journal of Environmental Economics*.

⁶¹ Chowdhury, S. (2020). "Financing Green Technologies in Developing Countries: The Bangladesh Perspective." *Renewable Resource Management*.

⁶² Bhuiyan, M. S. H., et al. (2018). "Institutional framework for water management in Dhaka: A review of the legal and institutional challenges." *Environmental Management Journal*.

The Coordination of Agencies

Clearly Outlining duties and Responsibilities: It is crucial to clearly define the duties of various agencies, including the DoE, the Dhaka Water Supply and Sewerage Authority (DWASA), the City Corporation, and regional environmental non-governmental organizations. Effective water pollution control is hampered by inadequate interagency cooperation, according to research (Uddin et al., 2017). The roles and responsibilities of each agency should be spelled out in a formal coordination platform.

Data Sharing Mechanisms: Agencies could have access to real-time water quality data through a centralized data-sharing network. This can provide prompt responses and aid in the early identification of pollution sources. A multi-agency database system would increase efficiency and lessen effort duplication.

Collaborative Decision-Making: Regular communication and cooperative problem-solving might be facilitated by the creation of interagency task groups or committees devoted to water pollution. This strategy has been effectively used in a number of other nations dealing with comparable environmental issues.⁶³

PPPs, or public-private partnerships

Involving the Private Sector: Although the government is primarily responsible for controlling water pollution, private firms might greatly lower pollution levels, especially when it comes to infrastructure development, wastewater treatment, and sanitation. PPP concepts have been successfully applied to water management in numerous cases around the world.

Programs for Joint Monitoring and Enforcement: PPPs can also help with water body monitoring and regulation enforcement, offering a more decentralized method of pollution control. This might involve private businesses in Dhaka handling waste from homes and factories in order to help reduce pollution.⁶⁴

Reforming Legislation and Policy

Strengthening Environmental Laws: It is essential to review and reinforce environmental laws pertaining to water contamination. Clearer wastewater treatment standards, more effective licensing procedures for industrial water discharges, and harsher sanctions for offenders are a few examples of this.

⁶³ Uddin, M. A., et al. (2017). "Water Pollution and Institutional Challenges in Dhaka: A Case Study of Inter-agency Coordination." *Journal of Environmental Policy and Governance*.

⁶⁴ Rahman, M. S., et al. (2020). "Private sector involvement in water management: Lessons from Bangladesh." *Journal of Water Sustainability*.

Integrated Water Resource Management (IWRM): By taking into account all aspects of the water cycle, including pollution, treatment, and distribution, an integrated approach can improve agency collaboration and lessen fragmentation. IWRM frameworks could be modified for Dhaka and have been implemented in many cities worldwide.⁶⁵

Dhaka can handle its water pollution problems significantly by strengthening institutional capacity and boosting collaboration. The long-term viability of these programs will depend on incorporating lessons learned from other metropolitan areas and guaranteeing consistent political will and funding.

5.3 Promoting transparency and accountability in enforcement

Enhancing Regulatory and Legal Structures

Clear and Enforceable Standards: The legal foundation for controlling water pollution is provided by the Environment Conservation Rules (1997) and the Bangladesh Environment Conservation Act (1995). Stricter guidelines for the discharge of municipal garbage and industrial effluents must be added to this legislation, nevertheless. To discourage infractions, explicit rules and sanctions for noncompliance should be put in place.⁶⁶

Frequent Monitoring and Reporting: It should be mandatory for regulatory agencies, including the Department of Environment (DoE), to regularly check businesses and wastewater treatment plants. To guarantee transparency, reports on compliance and enforcement activities should be made available to the public.

Increasing the Capability of Institutions

Training and Resources: To properly monitor and enforce water pollution standards, the DoE and other pertinent agencies need sufficient training, technical know-how, and resources. Data collection and analysis can be enhanced by investing in cutting-edge monitoring equipment like real-time water quality sensors and remote sensing.⁶⁷

Interagency collaboration: To solve the disjointed enforcement system, more collaboration between the DoE, local governments, and other stakeholders is crucial. Improved accountability

⁶⁵ Chowdhury, A. R., et al. (2019). "Water Pollution Control in Dhaka: Challenges in Legislation and Implementation." *Environmental Science & Policy Journal*.

⁶⁶ Department of Environment (DoE), Government of the People's Republic of Bangladesh.

⁶⁷ World Bank. (2018). "Bangladesh: Enhancing Water Resource Management."

and decision-making can be facilitated by a consolidated database for information on water quality and enforcement activities.⁶⁸

Encouraging Public Awareness and Participation

Citizen Engagement: Accountability can be improved by promoting public involvement in water pollution monitoring and reporting. To enable citizens to report infractions and obtain information on water quality, mobile applications and web-based platforms might be created.⁶⁹

Awareness Campaigns: Public awareness campaigns can inform the public about the negative effects that water pollution has on human health and the environment, as well as their responsibility to hold polluters responsible. Information dissemination can be greatly aided by media outlets, community organizations, and educational institutions.⁷⁰

Using Transparency to Ensure Accountability

Public Disclosure of Violations: Businesses and establishments that are discovered to be in violation of water pollution regulations ought to be publicly identified and humiliated. This can promote compliance and serve as a deterrence.⁷¹

Independent Oversight: To guarantee accountability and lessen corruption, an independent oversight body should be established to examine the DoE's enforcement operations and look into complaints.⁷²

Making Use of Innovation and Technology

Real-Time Monitoring: Setting up real-time water quality monitoring systems in industrial areas and waterways can give authorities the information they need to take prompt enforcement action. Records of compliance and enforcement actions can be made tamper-proof with blockchain technology.⁷³

⁶⁸ Islam, M. S., & Tanaka, M. (2004). "Impacts of Pollution on Coastal and Marine Ecosystems Including Coastal and Marine Fisheries and Approach for Management: A Review and Synthesis." *Marine Pollution Bulletin*, 48(7-8), 624-649.

⁶⁹ Transparency International Bangladesh. (2020). "Governance Challenges in the Water Sector."

⁷⁰ UNICEF. (2019). "Water, Sanitation, and Hygiene (WASH) in Bangladesh."

⁷¹ Environmental Justice Foundation. (2021). "Pollution and Accountability in Bangladesh."

⁷² Khan, S. I., & Siddique, M. A. B. (2020). "Environmental Governance in Bangladesh: Challenges and Opportunities." *Journal of Environmental Management*, 261, 110235.

⁷³ Asian Development Bank. (2020). "Innovative Solutions for Water Security in Dhaka."

Data Transparency: By making enforcement records and water quality data publicly accessible via open data platforms, researchers, non-governmental organizations, and the general public can be empowered to hold authorities responsible.⁷⁴

5.4 Engaging stakeholders in policy-making and implementation

Governmental Organizations

Function: The government is in charge of formulating, implementing, and overseeing laws pertaining to pollution prevention and water quality.

Strategy for Engagement

Policy Development: To guarantee that policies are thorough and efficient, regular communication between the Department of Environment (DoE), the Ministry of Water Resources, the Dhaka City Corporation (DCC), and the Ministry of Environment, Forests, and Climate Change is required.

Enforcement: Proper enforcement of current water pollution management legislation will be made possible by increased cooperation between local authorities and enforcement organizations, such as the DoE.

Regulatory Measures: Government organizations ought to provide incentives for the use of environmentally friendly procedures, like treating wastewater in businesses and disposing of solid waste properly.⁷⁵

Private Sector

Role: Untreated wastewater discharge from industries, especially the textile, leather, and chemical sectors, is a major cause of water pollution in Dhaka.

Engagement Strategy: Regulation Compliance: By deploying pollution control systems (such as effluent treatment plants), industries can be encouraged to adhere to environmental regulations.

Corporate Social Responsibility (CSR): Encourage businesses to sponsor local environmental organizations or finance water treatment infrastructure as ways to help reduce pollution.

Partnerships with Environmental Agencies: Working together with NGOs and government organizations, we can monitor and lessen industrial pollution by implementing cleaner production methods and better waste management.⁷⁶

⁷⁴ Open Data Watch. (2021). "Open Data for Sustainable Development in Bangladesh."

⁷⁵ Rahman, M. M., & Islam, S. (2012). "Industrial Water Pollution Control in Bangladesh: Policies, Laws, and Their Implementation."

⁷⁶ Hossain, M. A., et al. (2016). "Industrial Effluent and its Impact on Water Pollution in Dhaka."

NGOs, or non-governmental organizations

NGOs are essential in promoting improved policies, increasing public awareness, and offering technical support for the control of water pollution.

Strategy for Engagement:

Campaigns for Awareness: To raise public knowledge of water contamination and encourage sustainable water use, NGOs should conduct awareness campaigns at the local level.

Advocacy and Legal Support: As demonstrated by the efforts of the Bangladesh Environmental Lawyers Association (BELA), NGOs can use lawsuits to hold the government responsible and push for stricter environmental regulations.

Community Monitoring: Nonprofits can work with local communities to keep an eye on the quality of the water and report infractions, giving decision-makers vital information.⁷⁷

Local Societies

Role: Because pollution directly affects communities around water bodies, it is important to include them in the creation and application of policies to guarantee that their needs are met.

Participatory Decision-Making as an Engagement Strategy: Consult local communities about water management policy to learn about their concerns and goals.

Community-Led Monitoring: Encourage local ownership of water pollution solutions by giving local communities the tools they need to keep an eye on the quality of the water and take part in cleanup and restoration initiatives.

Feedback Mechanisms: Provide avenues for neighborhood residents to offer input on how well water pollution prevention strategies are working.⁷⁸

Research and Academic Establishments

Role: Research institutes and universities can carry out investigations, provide cutting-edge technology, and offer scientific data for pollution control.

⁷⁷ Khan, M. (2011). "The Role of NGOs in Environmental Management in Bangladesh."

⁷⁸ Hossain, A. (2008). "Community-Based Resource Management in Bangladesh: Case Studies in Water Pollution."

Engagement Strategy: Evidence-Based Policy: Work with academic institutions to carry out studies on the causes, effects, and potential remedies of water pollution in order to provide information for policymakers.

Technological Innovation: Encourage the creation of innovative wastewater treatment systems, water purification technologies, and environmentally friendly industrial processes.

Training Programs: Take part in capacity-building and provide industry, government employees, and policymakers with training on best practices for managing water pollution.⁷⁹

Donors and International Organizations

Role: Global institutions such as the Asian Development Bank, World Bank, and UNDP can offer policy recommendations, technical aid, and financial support.

Engagement Plan: Funding and Developing Capabilities: Obtain funds for extensive water management projects, such as measures to restore rivers and wastewater treatment facilities.

worldwide Best Practices: Make use of worldwide experience to create and execute water pollution prevention strategies that have been effectively implemented in other cities across the world.

Policy Influence: By offering technical support and guaranteeing compliance with international environmental standards, multinational organizations can have an impact on policy reforms.

Coordinating and strategically involving these parties would assist guarantee that Dhaka's water pollution problem is successfully resolved. For the creation and execution of policies, close cooperation between governmental entities, businesses, non-governmental organizations, communities, educational institutions, and international organizations is crucial. A more sustainable strategy for managing water pollution can be developed in Dhaka by combining different viewpoints and areas of expertise.

⁷⁹ Amin, S. & Rahman, M. (2017). "Water Pollution in Dhaka: Causes and Management Strategies."

Chapter Six

Recommendations and Conclusion

6.1 Implications for Policy and Practice

Regulatory Framework Strengthening

Policy Implication: Because of inadequate law enforcement and a lack of cooperation between various government agencies, the current regulatory framework for managing water pollution is frequently inadequate.

Practice: In order to ensure severe punishments for infractions and promote interagency cooperation, authorities must improve the application of current legislation, such as the Water Supply and Sanitation Act (1996) and the Bangladesh Environment Conservation Act (1995).⁸⁰

Enhancing the Infrastructure for Wastewater Treatment

Implication for Policy: A large amount of wastewater from homes, businesses, and hospitals is not cleaned before being dumped into waterways, which exacerbates pollution.

Practice: Enforcing the need that enterprises establish wastewater treatment facilities is essential, as is investing in contemporary, effective wastewater treatment plants.⁸¹

Increasing Community Involvement and Public Awareness

Policy Implication: There is a lack of community involvement in pollution prevention due to a lack of public awareness regarding the causes and effects of water pollution.

Practice: Educational initiatives should be created to raise public knowledge of the value of appropriate trash disposal and water conservation. Programs for community-based water monitoring may also be successful.⁸²

Improving the Management of Solid Waste

Policy Implication: Water contamination is mostly caused by improper solid waste disposal, especially in cities like Dhaka.

⁸⁰ Rahman, M. M., & Mohiuddin, G. (2018). *Water Pollution in Dhaka City: Legal and Institutional Challenges*. Bangladesh Environmental Review.

⁸¹ Alam, K., & O'Neill, J. (2021). *Wastewater Management in Dhaka: Challenges and Opportunities*. International Journal of Environmental Sciences.

⁸² Hossain, M. A., & Sultana, R. (2017). *Public Awareness and Participation in Water Pollution Control: Case of Dhaka City*. Bangladesh Journal of Environmental Sciences.

Practice: Better waste segregation, more recycling, and more effective collection mechanisms are all need to enhance Dhaka's waste management system. It is crucial to reduce the usage of non-biodegradable materials and dispose of plastic trash properly.⁸³

Including Adaptation Measures for Climate Change

Policy Implication: As a result of increasing rainfall, flooding, and stormwater runoff brought on by climate change, water sources become contaminated.

Practice: To lessen the effect of extreme weather events on water quality, urban design should include climate change adaptation techniques. Examples of these include strengthening flood protection systems and building resilient infrastructure.⁸⁴

Working together with the private sector

Policy Implication: A large portion of Dhaka's water pollution is frequently caused by the private sector, particularly factories, yet many of these sectors lack adequate treatment systems because of financial constraints.

Practice: By offering tax breaks or subsidies, policies should encourage businesses to use cleaner production and treatment technology. Infrastructure upgrades can also be financed through public-private partnerships.⁸⁵

Urban Water Management That Is Sustainable

Policy Implication: Dhaka's water supply is under stress due to unplanned urbanization and excessive water resource extraction, which has also increased pollution.

Practice: The implementation of integrated water resources management (IWRM), which emphasizes resource conservation, pollution mitigation, and sustainable water use, is recommended. At the household and community levels, rainwater collection and treated water reuse can be promoted.⁸⁶

Enforcement, infrastructure spending, public involvement, and interagency cooperation should be the main focuses of policy improvements. Climate resilience, community engagement, and technology advancements should be prioritized in on-the-ground operations. By taking these steps, Dhaka may transition to safer and cleaner water systems, lowering hazards to the environment and human health.

⁸³ Khan, R. A., & Rahman, M. T. (2019). *Solid Waste Management and Water Pollution in Dhaka City*. Environmental Management Perspectives.

⁸⁴ Nahar, N., & Islam, M. S. (2020). *Impact of Climate Change on Water Quality in Dhaka: Policy Recommendations*. Journal of Environmental Studies.

⁸⁵ Uddin, S. M., & Rahman, A. M. (2022). *Role of Private Sector in Water Pollution Control in Dhaka*. Journal of Industrial Environmental Management.

⁸⁶ Mollah, M. M., & Rahman, M. (2019). *Sustainable Water Management Practices for Dhaka City*. Water Resources Development Journal.

6.2 Recommendations

1. Anaerobic digestion should be used as a waste-to-energy (WtE) conversion method. This method works well for turning organic waste into power. Similar to other developing countries, organic waste accounts for 68% to 81% of the rubbish generated in Bangladesh. About 60% of rubbish in Bangladesh is made up of water, 26% of it is made up of flammable materials, and 18% is made up of ash. Direct burning without the need for additional fuel³⁸ is possible for waste that contains less than 50% water, 25% or more combustible components, and less than 60% ash. Garbage in Bangladesh comprises more than 50% water, making it unfit for burning due to the prevalence of organic waste. For developing nations, anaerobic digestion is a practical substitute for handling wastes with a high-water content. Through this process, methane—which can then be used to produce heat and light—can be produced from wastewater, liquid wastes, digestate, and non-compostable items (such as metals and plastics). Since methane is the main component of natural gas, it can be used directly for residential purposes. Methane can also be transformed into power using a gas turbine generator set or chemical conversion. Anaerobic digestion is more economical than incineration or co-processing when comparing the costs of various conversion processes. For instance, the nation's first AD-based waste-to-energy facility opened for business in Jashore in 2019.⁸⁷ Therefore, Dhaka city can also adopt it.
2. The recycling jar ecosystem ought to be formalized. Water pollution can be significantly decreased by recycling glass and plastic debris.
3. Policymakers must address various waste management system levels in order to achieve sustainable waste management and energy creation. Reuse and waste minimization should be part of waste management, which calls for an integrated policy. Two elements must be included in this: waste-to-energy production and sustainable waste management. This kind of program should also focus on trash prevention, like avoiding the usage of environmentally hazardous and challenging-to-manage plastic shopping bags. The authorities should set goals and deadlines in order to implement this approach. If all of these steps are taken, a sustainable waste management system with maximal energy recovery can be created. In this situation, it is crucial to separate the trash at its source. Different types of waste should be gathered, transported, and recycled separately. Anaerobic You can use landfills with gas recovery processes, incineration, gasification, or digestion.
4. Every district should have an environmental court, and each division should have an appellate court. The Environmental Court's judge should be selected exclusively to hear environmental cases; he should not be given any other responsibilities.

⁸⁷ UNB, 'Treatment plant makes Jashore first waste-free town' Prothom Alo (Jashore, 2 January 2020)

5. Appropriate measures and provisions should be taken to enhance collaboration between the Department of Environment and other government agencies.
6. The Environment Department ought to be held responsible for its actions.
7. The mass media should be used to raise public knowledge of a variety of environmental challenges.
8. More university-level research should be done, and environmental conservation should be included in our academic program.
9. The National River Conservation Commission (NRCC) ought to be autonomous, and its recommendations ought to be legally obligatory. Additionally, a River Conservation Tribunal ought to be set up in order to stop pollution and criminal offenses against rivers.

6.3 Conclusion

In conclusion, Dhaka City's water pollution problem is serious and intricate, and it needs to be addressed right away. This study looked at how well the relevant legislation addressed this environmental problem, highlighting the advantages and disadvantages of the current legal system. The study's conclusions show that although Bangladesh has regulations to prevent water pollution, they are not being properly implemented or enforced. Water pollution so still poses a threat to ecosystems, human health, and Dhaka City's sustainability.

According to the inquiry, in order for current laws to be more effective, their shortcomings must be fixed. Legislation must be strengthened by include complete components such more severe penalties for violators, more effective monitoring techniques, and clear instructions for adhering to Supreme Court orders. Additionally, the government departments and agencies in charge of carrying out water pollution laws need to improve their cooperation and information exchange.

Additionally, avoiding water contamination requires active public participation and knowledge. The general public should be made aware of the negative effects of pollution, responsible behavior should be promoted, and community involvement in conservation efforts should be encouraged. Public interaction platforms, media outreach, and instructional initiatives can all help achieve this. The study also emphasizes how crucial it is to boost investments in technology and infrastructure in order to support pollution control efforts. Dhaka's pollution levels can be decreased by building wastewater treatment facilities, implementing a waste-to-energy conversation process, and coming up with innovative solutions.

In conclusion, a multifaceted strategy involving legislative changes, heightened enforcement, public education, and infrastructure investment is required to mitigate water pollution in Dhaka City.

By addressing the shortcomings of the current legislative framework and implementing comprehensive measures, it is possible to reduce water pollution, safeguard the health and well-being of city dwellers, and preserve the local ecosystem for future generations.

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