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GOVERNMENTAL ACTIONS THROUGH REGULATIONS TO REDUCE POLLUTION IN GANGA

Kiffi Aggarwal[1] and Dr. Arti Sharma[2]

1 **Research Scholar, Jagannath University, Haryana, India,** 2 **Academician, Jagannath University, Haryana, India**

Kiffiaggarwal26@gmail.com

Abstract: The Ganges River, revered as sacred by millions, faces severe environmental degradation due to industrial discharge, sewage disposal, and urbanization. This study examines governmental regulatory measures implemented to reduce Ganga pollution, evaluating their effectiveness and challenges. The research analyzes key initiatives including the Water Prevention and Control of Pollution Act 1974, Ganga Action Plan 1986, and the comprehensive Namami Gange Programme launched in 2014 with a budget exceeding INR 20,000 crore. Despite establishing robust regulatory frameworks through the Central Pollution Control Board, National Ganga River Basin Authority, and judicial interventions led by Supreme Court orders, significant challenges persist. The study reveals that bureaucratic inefficiency, inadequate enforcement, coordination gaps between central and state agencies, and conflicting economic interests hinder effective implementation. While technological innovations including bioremediation, advanced water treatment, and satellite monitoring show promise, sustained efforts combining stricter enforcement, decentralized waste management, public participation, and improved inter-agency coordination are essential for meaningful restoration of the river's ecological health.

Keywords: Ganga pollution, environmental regulations, Namami Gange Programme, water quality management, governmental initiatives, pollution control, river restoration, environmental governance, sewage treatment, industrial effluents

1. Introduction

The Ganges River, known as Ganga in India, holds profound religious, cultural, and economic significance for the country's population. It is a lifeline for over 400 million people who rely on it for drinking water, agriculture, industrial use, and religious practices.[1] Stretching across 2,525 kilometers, it is one of the longest rivers in the world, flowing through the northern plains of India, and is considered sacred by Hindus. However, despite its revered status, the Ganga has faced severe environmental degradation over the decades due to unchecked industrial discharge, sewage disposal, and religious activities. Pollution in the river has become one of India's most critical environmental challenges.

To address the issue, the Indian government has undertaken a variety of regulatory measures and initiatives aimed at reducing pollution in the Ganga. These efforts have been reinforced by a series of legislative actions, programs, and judicial interventions.[2] However, despite the regulatory framework in place, the Ganga continues to be polluted, and challenges persist in achieving significant improvements. This article examines the governmental actions and regulations that have been implemented to reduce pollution in the Ganga, evaluating their effectiveness, challenges, and future prospects.

1.1 Historical Context of Ganga Pollution

The Ganga has long been a source of life and spirituality for millions of people. However,

[1] Alley, K. D., (1994), "Ganga and Gandagi: Interpretations of Pollution and Waste in Benaras" ,Ethnology, Vol 33, Issue 2, pp 127- 45.

[2] UPADHYAY, V., (2009), "Ganga at Varanasi: Lessons from Environmental Abuse" ,Economic and Political Weekly, Vol 44, Issue 37, pp 64- 66.

since the 19th century, the river has faced increasing pollution due to rapid urbanization, industrialization, and population growth. In the early years, pollution mainly came from direct disposal of industrial waste and domestic sewage. As India's population grew and urban centers along the river expanded, the problem worsened. Industrial effluents, untreated sewage, religious offerings, and solid waste found their way into the river, causing severe contamination.[3]

In the post-independence period, India began acknowledging the environmental challenges facing its major rivers. The first significant step was the establishment of the Central Pollution Control Board (CPCB) in 1974 under the Water (Prevention and Control of Pollution) Act, 1974. Despite such regulatory frameworks, the river continued to face rising pollution levels due to inadequate enforcement and rapid urban expansion along its banks.[4]

2. Review of Literature

The literature on Ganga pollution and governmental interventions reveals a complex interplay of regulatory measures, implementation challenges, and environmental outcomes. The establishment of the Ganga Action Plan (GAP) in 1986 marked the first major governmental initiative specifically targeting Ganga pollution, aiming to reduce pollution by improving sewage treatment infrastructure and controlling industrial effluents. However, studies indicate that the program faced significant implementation issues, including poor coordination between government bodies, lack of effective monitoring mechanisms, and insufficient funds.[5]

The Environment Protection Act, 1986,[6] strengthened the legal framework for environmental protection, providing the government with powers to take corrective measures in cases of environmental degradation. Research on the National Ganga River Basin Authority (NGRBA),[7] established in 2009, shows its role in overseeing comprehensive management and preservation of the Ganga River through integrated approaches involving various stakeholders.

Legal scholarship highlights the pivotal role of judicial interventions, particularly the Supreme Court's involvement beginning with M.C. Mehta's public interest litigation in 1985. Studies on the Namami Gange Programme, launched in 2014, analyze its multi-tiered approach focusing on cleaning, conservation, and sustainable management with an allocated budget exceeding INR 20,000 crore.[8]

3. Research Design and Methodology

This study employs a comprehensive analytical approach examining governmental regulatory measures for Ganga pollution control. The research methodology includes:

- **Document Analysis:** Systematic review of legislative acts, government policies, court orders, and program documents
- **Policy Evaluation:** Assessment of regulatory frameworks from the Water

[3] Divan, S., (1995), "Cleaning the Ganga" ,Economic and Political Weekly, Vol 30, Issue 26, pp 1557- 58.
[4] Bhargava, D. S., (1987), "Nature and the Ganga" ,Environmental Conservation, Vol 14, Issue 4, pp 307- 28.
[5] Ahmed, S., (1990), "Cleaning the River Ganga: Rhetoric and Reality" ,Ambio, Vol 19, Issue 1, pp 42- 45.
[6] India. (1986). Environment Protection Act, No. 29 of 1986.
[7] India. (2009). National Ganga River Basin Authority (NGRBA) Act, No. 6 of 2009.
[8] Talib, J., (2005), "CONSTITUTIONALISING THE PROBLEM OF ENVIRONMENT" ,Journal of the Indian Law Institute, Vol 47, Issue 4, pp 522- 39.

Act 1974 to the Namami Gange Programme 2014[9]

- **Institutional Analysis:** Examination of roles and effectiveness of CPCB, NGRBA, NMCG, and state pollution control boards[10]
- **Case Study Approach:** Detailed analysis of key initiatives including GAP, NGRBA, and Namami Gange Programme[11]
- **Multi-stakeholder Perspective:** Evaluation of central government, state agencies, judiciary, and civil society roles[12]

The study relies on primary sources including legislative documents, court judgments, government reports, and secondary sources from academic research and policy analyses.

4. Results and Discussions

4.1 Regulatory Framework Analysis

The regulatory framework designed to address pollution in the Ganga comprises a series of laws, policies, and institutional structures at both national and state levels. The Water (Prevention and Control of Pollution) Act, 1974, set the foundation for water pollution control in India, establishing the Central Pollution Control Board (CPCB) and state-level pollution control boards to monitor and regulate industrial effluents, sewage, and other forms of contamination.[13]

The Environment Protection Act, 1986, further strengthened the legal and institutional framework, providing the government with powers to set environmental standards and issue directions to prevent environmental damage.[14] The National Ganga River Basin Authority (NGRBA), established in 2009, marked another significant step, tasked with overseeing comprehensive management and preservation of the Ganga River and its basin through integrated approaches.[15]

4.2 The Namami Gange Programme Implementation

Table 1 - Key Objectives and Components of Namami Gange Programme

Component	Objective	Budget Allocation (%)
Wastewater Treatment	Treat sewage from towns and cities	60%
Pollution Monitoring	Establish robust monitoring systems	15%
Riverfront Development	Create green spaces and improve banks	15%
Afforestation & Ecosystem Restoration	Enhance biodiversity and ecological health	10%

The Namami Gange Programme,[16] launched in 2014, represents the most ambitious

[9] Bhargava, D. S., (1987), "Nature and the Ganga" ,Environmental Conservation, Vol 14, Issue 4, pp 307- 28.
[10] Sinha, R. K., et al., (2007), "A Holistic Study on Mercury Pollution in the Ganga River System at Varanasi, India" ,Current Science, Vol 92, Issue 9, pp 1223- 28.
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[12] Menon, U., (1988), "Technology and Development Aid: The Case of Ganga Action Plan" ,Economic and Political Weekly, Vol 23, Issue 33, pp 1693- 701.
[13] Noorani, A. G., (1989), "Growing Ecology Law" ,Economic and Political Weekly, Vol 24, Issue 5, pp 225- 26.
[14] Narayanan, V., (2001), "Water, Wood, and Wisdom: Ecological Perspectives from the Hindu Traditions" ,Daedalus, Vol 130, Issue 4, pp 179- 206.
[15] M.C. Mehta v. Union of India, W.P. (C) No. 860 of 1991 (Supreme Court of India 1985).
[16] Government of India, Ministry of Jal Shakti, National Mission for Clean Ganga. (2014). Namami Gange Programme.

governmental effort with an allocated budget of over INR 20,000 crore. The program focuses on wastewater treatment through sewage treatment plants (STPs), pollution monitoring systems, riverfront development, and ecosystem restoration. Implementation is overseen by the National Mission for Clean Ganga (NMCG), coordinating efforts across state and national agencies.[17]

4.3 Judicial Interventions and Legal Framework

The Indian judiciary has played a critical role in addressing Ganga pollution, particularly through Supreme Court interventions. The landmark case of M.C. Mehta v. Union of India (1985)[18] established judicial oversight of environmental protection. In 2014, the Supreme Court ordered the establishment of the National Mission for Clean Ganga (NMCG) and emphasized cleaning the Ganga as a government priority.[19]

Subsequent Supreme Court orders in 2017 and 2018 mandated closure of polluting industries, set timelines for projects under the Namami Gange Program, and established court-appointed committees for supervision. State-level High Courts have also intervened, ordering closure of polluting industries and demanding municipal action on sewage treatment.[20]

4.4 Technological and Institutional Initiatives

Innovative technologies implemented include:

- **Bioremediation Techniques:** Using microorganisms to degrade pollutants in water
- **Phytoremediation:** Employing plants to absorb and filter pollutants
- **Advanced Water Treatment:** Membrane bioreactors and reverse osmosis systems
- **Satellite Monitoring:** Real-time data collection on water quality
- **Data Analytics and AI:** Monitoring pollution levels and predicting contamination events

Institutional collaboration through the NGRBA coordinates central, state, and local government efforts. Public-Private Partnerships (PPPs) leverage private sector expertise for sewage treatment plants and waste management systems. International collaboration with the World Bank and Asian Infrastructure Investment Bank (AIIB) provides financial support for large-scale projects.[21]

4.5 Challenges to Effective Regulation

Despite comprehensive regulatory efforts, several challenges hinder effectiveness:

Administrative and Bureaucratic Bottlenecks

- Slow project approval processes
- Delayed fund disbursement
- Lack of coordination between central and state agencies
- Bureaucratic inertia in addressing environmental issues

Political and Economic Interests

[17] Nirmal Singh v. Union of India, (2007) 2 SCC 100 (2007).
[18] M.C. Mehta v. Union of India, 1 S.C.C. 395 (1987).
[19] State of Uttar Pradesh v. U.P. Pollution Control Board, 1995 (3) SCC 529 (1995).
[20] Alley, K. D., (1996), "Urban Institutions At The Crossroads: Judicial Activism And Pollution Prevention In Kanpur" ,Urban Anthropology and Studies of Cultural Systems and World Economic Development, Vol 25, Issue 4, pp 351- 83.
[21] Sharma, M., (2009), "Passages from Nature to Nationalism: Sunderlal Bahuguna and Tehri Dam Opposition in Garhwal" ,Economic and Political Weekly, Vol 44, Issue 8, pp 35- 42.

- Conflicts between economic development and environmental goals
- Industrial lobby influence delaying pollution control measures
- Rapid urban growth straining sewage and waste management systems

Enforcement and Monitoring Gaps

- Weak enforcement of existing regulations
- Nominal fines insufficient to deter violations
- Inconsistent monitoring of sewage and industrial effluent discharges
- Lack of transparent, real-time monitoring systems

5. Conclusion

The pollution of the Ganga has emerged as one of India's most pressing environmental challenges. Governmental action through comprehensive regulatory frameworks, judicial interventions, and technological initiatives has been significant in addressing this issue. The evolution from the Water Act 1974 to the ambitious Namami Gange Programme 2014 demonstrates sustained governmental commitment with substantial financial investment exceeding INR 20,000 crore.[22]

However, the sheer scale of the problem and numerous challenges in enforcement, administration, and coordination have hindered progress. Key findings indicate that while robust regulatory frameworks exist, implementation gaps persist due to bureaucratic inefficiency, inadequate enforcement mechanisms, and conflicting economic interests. The study reveals that successful river restoration requires strengthened enforcement mechanisms, decentralized waste management, increased public participation, technological investment, and improved coordination between governmental agencies.

Continued efforts combining stricter enforcement, community engagement, technological innovation, and sustained political will are essential to ensure that the Ganga can once again become a clean and sacred river for future generations. The success of governmental regulations ultimately depends on their effective implementation, consistent monitoring, and adaptive management approaches that address emerging challenges in river conservation.

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Kiffi Aggarwal is a Research Scholar at Jagannath University, Haryana, specializing in environmental law and policy. Her research focuses on governmental regulatory mechanisms for environmental protection, particularly water pollution control in major Indian rivers. She has contributed to various academic publications on environmental governance and sustainable development. Her current research examines the effectiveness of regulatory frameworks in addressing industrial pollution and their implementation challenges. She can be reached at **Kiffiaggarwal26@gmail.com**.

Dr. Arti Sharma is an accomplished Academician at Jagannath University, Haryana, with extensive expertise in environmental studies and policy analysis. She has published numerous research papers on environmental governance, pollution control mechanisms, and sustainable development practices. Dr. Sharma serves as a mentor for research scholars working on environmental policy and has been actively involved in consultancy projects related to environmental impact assessment and regulatory compliance. Her research interests include environmental law, climate change policy, and institutional frameworks for environmental protection. She can be contacted at **arti.sharma@jagannathuniversityncr.ac.in.**