



## INDUSTRIAL POLLUTION AND COMPLIANCE: NAVIGATING THROUGH INDIA'S STATUTORY AND ENFORCEMENT MECHANISMS ON POLLUTION REGULATIONS

Sritama Chakraborty\*

### ABSTRACT

*India, being the 4th largest Economy and one of the world's most rapidly growing economies, in the world has been subjected to a series of turbulent challenges: balancing industrial advancement with the dire requirement of protecting our natural environment. While the nation's overarching ambition of economic development and prosperity has propelled it to rapidly develop its Manufacturing sector and industries, this progress has been accompanied by insurmountable industrial pollution in urban cities. The consequential jeopardization of public health, greenery, biodiversity, and the environmental layer accentuates the fine lines of equilibrium India must attain to secure both prosperity and Ecological Conservation. India stands at the precarious juncture of industrial ambition and ecological vulnerability. A major player among the very few globally recognised fast-growing economies, India is home to practices causing alarming increases in reported levels of industrial pollution and associated impacts on public health, biodiversity, and general prospects for sustainable development. This paper interrogates India's legal and regulatory foundations around industrial pollution; its development, scope, and enforcement capacity. Its typologies and justifications can found in Indian laws such as, but is not limited to Environmental (Protection) Act, 1986, Water (Prevention and Control of Pollution) Act, 1974 and Air (Prevention and Control of Pollution) Act, 1981 – a theoretically sound and ever-changing environmental protection locus which hinges on concepts of rendering justice for future generations, indeed suggesting the refinement of a legal theory that provided a skeletal basis of legal restraint upon the actors for a fairly granular compliance, whether politically or corporately, notwithstanding the great competing structuring forces of political polarity. In short, this happens to be a commendable*

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\*BA LLB (HONS.), SECOND YEAR, JAMIA MILIA ISLAMIA UNIVERSITY.

*progression in legal thought to ensure regulated provisions of legally accountable actors for a relatively granular compliance both politically and corporately, notwithstanding the competing interests which drive political polarisation. There have been enough landmark judicial pronouncements on pollution, most notably from the Vellore Citizens' Welfare Forum v. Union of India; MC Mehta v. Union of India portfolio. Since the inception of preventive jurisprudence, we have witnessed an evolution of the courts as custodians of the constitutional obligations of the role and principles supporting environmental rights; the court can only work proactively on behalf of environmental rights when sustained policy coherence, legislative independence and compliance at the regulatory level occur. This paper concludes with compelling suggestions that to increase enforcement of environmental governance obligations institutions and actors must develop integrated new compliance enforcement paradigms that impose punitive deterrents, ensure transparency, support citizen participation, and integrate environmentally positive technologies to achieve environmental change and the sustainable development that India's community and political actors have committed to in returning India to environmental policy agenda as part of legal compliance for future generations.*

**Keywords:** Ecological Conservation, Environmental (Protection) Act, 1986, Water (Prevention and Control of Pollution) Act, 1974, Air (Prevention and Control of Pollution) Act, 1981, Polarisation.

## INTRODUCTION

In the fine winter morning of 2019, textile mill owner Rakesh Sharma encountered an impossible dilemma in the industrial city of Kanpur, where air pollution spikes are frequently common. Under the direction of the Uttar Pradesh Pollution Control Board (UPPCB), Sharma had a new effluent treatment plant (ETP) to install at a cost of ₹15 lakh that he would not even be able to pay off in a year, let alone be able to pay off in his remaining years of business productivity. On the other hand, he could continue to operate without the existence of an ETP, which would guarantee his closure and possible charges for contravening the Water (Prevention and Control of Pollution) Act, 1974 (WPCPCA).

This anecdote is not merely a random stand-alone incident; it is a specific moment within the larger critical problem of India's development since independence. Emerging from Sharma's story is the real question: What is the how of a legal system that can both facilitate industrialisation while protecting the environment? The answers are not provided in

conventional commands of regulation but are drawn from the often-complex interaction between the law, economy and human behaviour pursued through industrial compliance.

This paper attempts to analyse and explore this very question through the lens of India's dynamic legal configuration for pollution regulation. This framework has transformed from rudimentary and austere command-and-control arrangements to relatively complicated frameworks that include economic incentives, technological innovation, and participatory governance. But, as we will demonstrate, the bridging gap between legal promise and functioning machineries is still considerable in length.

## **THE STATUTORY FRAMEWORK: FRAMEWORK OF ENVIRONMENTAL REGULATION**

**Constitutional Structure and Fundamental Duties:** The constitutional basis of environmental protection in India can be traced to the 42nd Amendment (1976), which introduced Articles 48A and 51A(g). Article 48A required the State to take measures to protect and improve the environment and safeguard the forests and wildlife, while Article 51A(g) states it is the fundamental right of citizens to reside in a clean natural environment and improve the condition of the environment. This can be seen as creating a partnership obligation - an obligation on both the State and the citizens to protect and improve the environment.

The Supreme Court has unequivocally held these provisions impose more than just obligations - they impose legally enforceable obligations. In *Subhash Kumar v. State of Bihar*,<sup>1</sup> the court was of the decision that Indian citizens have a fundamental right under the Right to Life and liberty enshrined under Article 21 of the Constitution to access a pollution-free, clean and healthy environment. The recognition by the Supreme Court in 2024 that there is a right against the adverse effects of climate change as a fundamental right represents a remarkable growth in environmental jurisprudence.<sup>2</sup>

**The Water (Prevention and Control of Pollution) Act, 1974:** Being the first complete legislation in India concerning industrial pollution, the Water Act gave way to the development of environmental law in India. It provides for a federal setup in pollution control, with the Central Pollution Control Board (CPCB) at the apex and the respective State Pollution Control

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<sup>1</sup> *Subhash Kumar v. State of Bihar* (1991) 1 SCC 598.

<sup>2</sup> 'Supreme Court Recognises Right Against Climate Change' *The Hindu* (New Delhi, 12 March 2024).

Boards (SPCBs) as implementing agencies. The legislation introduced some new concepts that have become foundational to Indian environmental law.<sup>3</sup>

The regulatory system of the Act works on the concept of "consent mechanisms" under Sections 25 and 26, wherein the industries have to seek consent for establishment and consent for operation. Thus, the dual consent system is a more evolved way of pollution control, which would allow Regulatory Authorities to impose pollution control conditions at the planning stage itself as well as during the operational stage of industrial activities. Section 24 of the Act forbids the use of streams or wells for the disposal of polluting matter, and Section 25 of the Act compels any industry to obtain the consent of the State Board before the establishment of any industry, operation, or process that is likely to discharge sewage or trade effluent. The penal provisions, amended in 2017, provide imprisonment for a term which may extend to six years and a fine which may extend to Rs. 5 lakhs, with further fine in case of continuing violations.<sup>4</sup>

**The Air (Prevention and Control of Pollution) Act, 1981:** The 1981 Air Act extends further regulation to air pollution and constitutes a complete air quality management system. The Act says "air pollutant" in a fairly broad manner to mean any solid, liquid, or gaseous substance present in the atmosphere in such concentration as may be, typically injurious to the health and well-being of living creatures, including human beings, plants, natural biodiversity, etc. Multiple resolution methods are adopted in the Act for industrial air pollution, wherein Section 21 prohibits the running of any industrial plant without the consent of the State Board, whereas Section 22 empowers the Boards to issue directions to ensure that standards of air quality are maintained.<sup>5</sup>

The Act also introduced the idea of "air pollution control areas" and enabled action in areas designated as heavily polluted or degraded.<sup>6</sup> Later amendments suggested moving to implement financial penalties or at least monetary penalties. Amendments in 2004 established civil monetary penalties to go along with the existing criminal penalties set out in the Act, indicating and reflecting the Government's recognition of the need for some flexibility in enforcing penalties.<sup>7</sup> The ranges of penalties as set out in the Act include an administrative

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<sup>3</sup> Water (Prevention and Control of Pollution) Act 1974, ss 24-25.

<sup>4</sup> Water (Prevention and Control of Pollution) Amendment Act 2017, s41.

<sup>5</sup> Air (Prevention and Control of Pollution) Act, 1981, ss 21-22.

<sup>6</sup> Ibid s19.

<sup>7</sup> Air (Prevention and Control of Pollution) Amendment Act 2024, s 37.

specific penalty of ₹10,000 to ₹1 crore in an inverse proportionality to size of the industry and the seriousness of the breach.<sup>8</sup>

**The Environment (Protection) Act, 1986:** The Environment Protection Act of 1986 was passed after Bhopal, and if anything is an environmental law in India, comprehensively broadest Act, and broadly stated in its context, the strongest hazards. It gives the Central Government extensive powers broadly to do anything necessary for protecting, improving the environment in general, and preventing, controlling and abating pollution.

The importance of the Act is that it formally constituted an umbrella legislation which provided a single statutory approach to all pollution. Section 3 grants the Central Government regulatory authority and powers to take action to protect and improve the environment, and Section 5 gives authority for setting standards and controlling locations for industries.<sup>9</sup>

The Act initiated the work on formalising the concept of environmental impact assessment (EIA) by introducing the EIA Notification, 2006.<sup>10</sup> The notification is a requirement under existing and some new levels of industrial projects to receive environmental clearance, which incorporates and contains the principles of sustainable development.

## RECENT LEGISLATIVE CHANGES

There have been significant changes in the law over the last few years, specifically the remediation of contaminated land legislation. In the proposed 2024 draft Remediation of Contaminated Sites Rules, the principles of polluter-pay and absolute liability are recognised. These Rules, when finalised, will also provide a robust process for remediation and clean up and establish which industries will be liable for the cost of remediation and past pollution.

The 2024 amendments to the three main environmental/natural resource laws did not eliminate or provide strict liability under criminal prosecution. However, they did provide an opportunity for monetary penalties instead of incarceration and still allow for the punishment of incarceration under serious environmental violations. These changes meant a movement

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<sup>8</sup> Ibid s 37A.

<sup>9</sup> Environment (Protection) Act, 1986, ss 3,5.

<sup>10</sup> Environment Impact Assessment Notification 2006, Ministry of Environment and Forests, SO 1433(E) (14 September 2006).

towards a more sophisticated approach to a comprehensive regulatory environment that recognises that criminal prosecution is not a viable option to provide deterrence.

## **STARE DECISIS: THE DEVELOPMENT OF ENVIRONMENTAL LAW AS WE SEE TODAY**

**The Right to Environment:** Several initial cases have helped develop environmental law through jurisprudence, and identifying these cases and principles is not necessarily straightforward. Several cases in India have shaped the current legal framework, including *M.C. Mehta v. Union of India*,<sup>11</sup> known as the Oleum Gas Leak Case established the principle of absolute liability in relation to hazardous industries. The Supreme Court recognised that industries engaged in inherently hazardous work will be held strictly liable for damage caused by their work, irrespective of fault or negligence.

The Court developed this principle in *Vellore Citizens' Welfare Forum v. Union of India*, where it recognised the polluter pays principle and the precautionary principle as the basis of sustainable development. We also recognised that the polluter pays principle and precautionary principle have become part of customary international law and must be read into Articles 21 and 48A of the Constitution.<sup>12</sup>

**The Remediation and Compensation Case Law:** *Indian Council for Enviro-Legal Action v. Union of India* represents<sup>13</sup> a significant turn in environmental law by introducing the principle of remediation and compensation for environmental damage. The case emerged from chemical industries' pollution in Udyogmandal, Gujarat, and it ordered the polluting industries to remediate the area and provide compensation to affected communities for this pollution.

What distinguishes this judgment is that it recognises that environmental damage does not end with immediate victims; it extends into the ecosystem and impacts entire communities. The Court noted that "the classic principle of 'the polluter pays' is not always best for the environment and society, and where the polluter is unknown, the burden of remediation is beset upon the entire industry as a whole."<sup>14</sup>

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<sup>11</sup> *MC Mehta v. Union of India*, (1987) 1 SCC 357.

<sup>12</sup> *Vellore Citizens' Welfare Forum v. Union of India*, (1996) 5 SCC 545.

<sup>13</sup> *Indian Council for Enviro-Legal Action v. Union of India*, (1996) 3SCC 212.

<sup>14</sup> *Ibid* [34].

**The Precautionary Principle and Sustainable Development:** The Supreme Court's judgement in *Narmada Bachao Andolan v. Union of India*<sup>15</sup> represented important progress in the deployment of the precautionary principle in the shape of large-scale industrial establishments. The Court determined that where there is a threat of an irreversible harm to the environment, the existence of scientific uncertainty could not serve as the basis for deferring action to avert environmental harm. The courts have continued to refine the principle in subsequent cases. Courts often stress upon the objective of establishing precautionary principles in order to harmonise the bedrock of balance between environmental conservation and the dire imperative of attaining economic prosperity. The outcome in *T.N. Godavarman Thirumulpad v. Union of India*,<sup>16</sup> the Court concluded that "development cannot be at the cost of the environment and human rights. The notion of sustainable development is the resolution."

### **CURRENT JUDICIAL DEVELOPMENTS**

There were a number of judicial developments in 2024 that have changed the landscape of environmental jurisprudence. The Supreme Court, for the first time in 75 years, held that there is not only a right to a clean and healthy environment, as found under Article 21, but there also exists a right against the adverse effects of climate change. This landmark acknowledgement has been momentous for regulating industrial pollution, as it now provides for constitutional opposition to climate-related environmental degradation.

A second key development was the Supreme Court's 2024 ruling surrounding retrospective environmental clearances. The Supreme Court also overturned government orders that permitted retrospective environmental clearances, citing the Environment Protection Act, 1986, and the EIA Notification, 2006. The 2025 judgment reinforced environmental governance by prohibiting retrospective approvals as a means of legitimisation for illegal industrial activity.

The Court's explanations in this case were especially noteworthy. It emphasised that environmental law must be construed as prior informed consent, and retrospective approval would otherwise nullify the framework altogether.

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<sup>15</sup> *Narmada Bachao Andolan v. Union of India*, (2000) 10 SCC 567.

<sup>16</sup> *TN Godavarman Thirumulpad v. Union of India*, (2002) 10 SCC 269 [15].

The Court stated that "the environment is not a commodity to be repossessed against for current economic gain" and it stated that "the rule of law is premised on the obligation to secure regulatory approvals before rather than after industrial activity proceeds."

**The Compensation and Remediation Jurisprudence:** In addition, we are able to utilise some early case law to develop the increased court emphasis on compensation and remediation. In several 2024 cases, the Supreme Court has emphasised the need to go further with respect to any particular compensation methodology as well as integrating compensation in terms of statutory measures. The Court has stressed the necessity of some level of community involvement in remediation, which is a major departure from simply formal technical directions to a dependent model based on remediation alone that takes into account social aspects attributable to environmental harm.

## **ENFORCEMENT MECHANISMS AND REGULATORY ISSUES**

**The Institutional Mechanism:** The enforcement of industrial pollution regulation in India exists in a very complex institutional mechanism requiring the involvement of several institutions across different levels. The Central Pollution Control Board (CPCB) is a set of regulatory bodies, while a State Pollution Control Board (SPCB) carry out the actual act of implementation on the ground concerning various power use and confers with State Governments, etc., as part of their mission. Competition and lack of harmonisation, even tolerating a level of localism through local adaptation of guidelines and standards, is further complicated where there may be a number of legislative instruments involved in the funding and oversight of the prevention of environmental harm. The institutional arrangements have changed in a couple of important ways in recent years. First, the Water Act was amended in 2018 to include, for example, 'regulatory impact assessment' of pollution control actions requiring agencies to consider the economic and social consequences of regulations. This level of reform demonstrates an awareness of a more complex regulatory approach that recognises the need for enforcement to be carried out in consideration of the broader economic and social context, in order to be effective.

**Technological Solutions and Monitoring:** The tendency to use technological solutions in policing industrial pollution has shifted greatly. Online monitoring, continuous emission monitoring systems (CEMS), and remote sensing have each significantly improved the ability of regulators to track compliance in real-time. The requirement (CPCB) under the "consent to

operate" approach is linked to online monitoring and requires industries to continuously monitor their emissions and discharges. Continuous monitoring of this type has led to increases in compliance, as reliance on infrequent monitoring that was, in some sense, held to a level of trust was less and less usable.

Despite the value of technological solutions, there are new challenges to consider. Modern monitoring systems can be complex and complicated to set up and buy into, requiring the requisite technical expertise, which smaller industries may not have access to or an easier means to integrate. This sort of digital divide has been created between environmental compliance, letting large industries adapt better to technological requirements, while small industries are inhibited from implementation.

**Economic Instruments and Market-Based Mechanisms:** Market mechanisms came up to supplement the old command-and-control approach to industrial pollution regulation with economic incentives to compel compliance. Alongside one another, these approaches bring a marked change to the nature of regulation through the introduction of environmental taxes, pollution trading schemes, and green finance mechanisms. The 2024 amendments to environmental laws have transformed the regulatory landscape with the introduction of new economic instruments. The concept of compensation for the environment has been defined, and industries applying pollution are required to pay into environmental remediation funds. This entails that some damages would be unavoidable when it comes to industrial practices, but aims at ensuring the industry concerned pays for these damages. The advent of pollution trading schemes would mark considerable advances in environmental regulation, even though they are still experimental.

The problem is compounded by the technical complexity of modern industrial processes. Many SPCB officials lack the technical expertise necessary to assess compliance with complex environmental standards, particularly in industries involving sophisticated chemical processes or advanced manufacturing techniques.

Another significant challenge is the political economy of enforcement. Industrial units often have significant political influence, making it difficult for regulatory agencies to take strong enforcement action. This problem is particularly acute in regions where specific industries dominate the local economy, as regulatory action against major industrial units can have significant economic and political consequences.

**Challenges of Enforcement and Practical Limitations:** Even with a well-developed legal framework, there are serious challenges in the enforcement of industrial pollution laws. Chief among these is the capacity constraint of regulatory agencies. As with SPCBs, there is effectively no enforcement, monitoring, or compliance of thousands of industrial units with little workforce, and no real resources.

## **THE POLLUTION CONTROL BOARD SYSTEM: AN INSTITUTIONAL ANALYSIS**

**Structure of the Federal Government and Coordination Problems:** The federal collegial nature of India's pollution control regime, for all its merits in being amenable to local variation, has presented major coordination problems. Varied SPCBs have varied enforcement strategies, thus introducing a degree of dilution of regulatory practice among states. This variance in enforcement puts industries in states with more vigorous enforcement at a competitive disadvantage. The problem is exacerbated by the fact that so many industrial activities have implications across state borders. For instance, air pollution from industrial sources frequently traverses state lines, therefore challenging individual SPCBs to handle thoroughly. Regional efforts to control pollution have been hampered by the absence of strong coordinating mechanisms between several SPCBs.

**Capacity Development and Technical Proficiency:** The technical capacity of regulatory agencies is crucial for the efficacy of pollution control. Many SPCBs lack the technical know-how needed to evaluate compliance with demanding environmental standards, especially in sectors using sophisticated chemical processes or modern manufacturing methods.

The fast rate of technical advancement in business worsens the pollution crisis. Emerging industrial processes and technologies call on regulatory authorities to continually review their technical know-how and monitoring capacity. Many SPCBs lack the capacity for such constant building. To raise the technical knowledge of SPCB employees, the CPCB has started a number of capacity-building initiatives. Advanced monitoring technology, risk assessment approaches, and environmental management systems are all included in these programs. The capacity-building problem is, however, massive, leading to the development being sluggish.

**Independence and Regulatory Capture:** A major problem in environmental law is regulatory capture, whereby the industries they should control unduly influence regulatory agencies. In areas where particular sectors dominate the local economy, this problem is especially severe as regulatory authorities could come under pressure to refrain from actions that could damage

local economic interests. The appointment of several SPCB members by state governments complicates the issue of regulatory capture since there is potential for conflicts of interest when state governments have major reasons to foster industrial growth. The 2018 revisions to environmental laws include some steps to solve this problem, including requirements for public engagement in regulatory processes and independent supervision of SPCB actions.

## **ECONOMIC DIMENSIONS OF ENVIRONMENTAL COMPLIANCE**

**Cost-Benefit Analysis and Regulatory Impact:** The economic aspects of following environmental rules are complicated. For businesses, mainly older factories not built with the environment in mind, the costs to follow these rules can be high. Upgrading equipment to control pollution, adding monitoring systems, and keeping up environmental management systems can be expensive.

Still, when looking at the economics of environmental regulation, it's important to think about the wider costs of damaging the environment. The costs of bad air for public health, water pollution's impact on farming and fishing, and the long-term costs of harming the environment can be much greater than the costs of controlling pollution.

The 2024 changes to environmental laws now ask for a regulatory impact assessment of pollution controls. This assessment has to look at both the costs of regulation and the good things that come from protecting the environment, which gives a fuller base for making decisions about regulations.

**Market Failures:** The issue of industrial pollution serves as a classic instance of market failure, where the expenses associated with pollution are not shouldered by the industries responsible for it but rather by society at large. This situation results in inadequate incentives for industries to invest in pollution control measures, as the costs are shifted onto the community. Traditionally, the response to this market failure has been regulatory approaches that mandate industries to comply with specific environmental standards, regardless of the expense involved. However, such methods can be inefficient since they do not motivate industries to discover cost-effective ways to reduce pollution. The introduction of market-based strategies, such as pollution trading systems and environmental taxes, represents an effort to tackle these market failures more efficiently. These mechanisms incorporate the expenses associated with pollution, offering financial incentives for businesses to decrease their environmental impact.

**Green Finance:** The emergence of green finance initiatives has opened up new possibilities for businesses to invest in environmental conservation. Access to affordable funding for eco-friendly projects has streamlined the process for companies to commit to pollution management strategies and sustainable technologies.

The Reserve Bank of India has implemented various steps to encourage green finance. These include prioritising loans for environmental projects and lowering risk assessments for green loans. Such measures have enhanced the availability of funding for eco-friendly projects and decreased the financial burden for investing in environmental ventures.

The government has established various technology adoption regulations, such as tax relief on investments in green technology, grants for research and development of environmental technologies, and technology transfer from the developed world. The adoption of technologies has been sluggish, with most industries still using technologies of great environmental concern.

### **TECHNOLOGICAL INNOVATION IN POLLUTION CONTROL**

The evolution of new pollution control technologies has played a main role in enhanced environmental performance. The development of waste treatment, air pollution abatement, and water recycling technologies enabled significant industrial pollution reductions to be attained.

The contribution of indigenous innovation to the creation of low-cost pollution control technology has been significant. Various low-cost pollution control solutions have been developed by the Indian industry that are location-specific in nature. These innovations have played a crucial role in making pollution control affordable for small industries.

But the speed with which the pollution control technologies are evolving needs to be stepped up. Modern industrial processes and environmental standards necessitate ongoing technological advancement in pollution control. Various programs have been initiated by the government to promote innovation, e.g., research and development funding, tax relief, and assistance for technology incubation.

**Industry 4.0:** The emergence of Industry 4.0 technologies has introduced new possibilities for environmental management. The application of artificial intelligence, big data analytics, and IoT technologies has made it possible for industrial processes to be maximised to achieve better environmental performance.

Environmental management systems digitally enable industries to track their environmental performance in real-time, see where there is room for improvement, and adopt preventive maintenance schedules that minimise environmental footprints. They have, in particular, excelled at energy efficiency and minimising waste production. But it involves massive investment in digital infrastructure and technical capabilities to adopt Industry 4.0 technologies for green management.

## **GLOBAL DIMENSIONS AND GLOBAL COMPLIANCE**

**International Environmental Law and Domestic Implementation:** Indian environmental law has been based largely on international environmental law and international environmental treaties. The principles of sustainable development, the precautionary principle, and the polluter-pays principle, now the foundation of Indian environmental law, find their roots in international environmental law.

India is a signatory to several international environmental treaties, such as the Paris Agreement on Climate, the Convention on Biological Diversity, and the Stockholm Convention on Persistent Organic Pollutants. India is under an obligation under these conventions to adopt domestic measures for environmental protection.

International environmental commitments have driven significant changes in national environmental law. Creating more stringent environmental standards, developing new regulatory methods, and augmenting powers of enforcement have all been prompted to some degree by international commitments.

**Global Value Chains and Environmental Standards:** The globalisation of the supply chain has introduced new challenges and opportunities for the regulation of the environment. Indian industry is no longer independent but a constituent part of international supply chains, where environmental standards may be determined by overseas importers and not national regulators.

This growth has been creating challenges as well as prospects for Indian environmental regulation. Positively, it has introduced incentives for Indian industries to invest in stronger environmental standards so that they are able to compete with the demands of international buyers. Negatively, it has produced competitive pressures, which can discourage industries from investing in environmental protection.

Global environmental standards and certification programs have been influential in this regard. Programs like ISO 14001 environmental management systems and sectoral environmental certification programs have offered universal platforms for global supply chain environmental management.

**Climate Change and Industrial Transformation:** Climate change has placed new demands on the management of industrial pollution. The need to limit greenhouse gas emissions has forced a dramatic overhaul of industrial processes and energy systems. This shift has created opportunities as well as problems for the regulation of the environment.

Transition to low-carbon industrial manufacture has involved massive investments in clean technology and infrastructure. The government has introduced various programs for a smooth transition to low-carbon industrial manufacture, such as carbon pricing policies, subsidies for clean technologies, and renewable power requirements.

However, the acceleration of industrial development that is estimated would meet up with standards of combating climate change is vastly dissonant. Under the Paris Agreement, industrial emissions are required to be lessened by 70%, a criterion which is by far impossible to meet, keeping in mind industrial discharges and economic incentives for financial growth.

**Market Failures and Externalities:** The industrial pollution problem can be framed as a typical case of market failure, in the form that the costs of pollution to society are not internalised but are incurred by society. This makes the situation such that industries lack the incentive to make pollution abatement investment since the cost of pollution is externalised to society.

The conventional solution to this market failure has been command-and-control regulation, in which industries must comply with certain environmental standards at whatever cost. However, this is an ineffective means, as it fails to create incentives for industries to undertake cost-reducing measures of pollution control. The application of market-based instruments, for example, pollution trading schemes and green taxes, is an effort to address these market failures more effectively.

The institutional setting will also have to be reorganised to tackle coordination issues at the agency and government levels. That could involve the creation of new coordination

mechanisms, sharper delineation of responsibility, and enhanced information sharing between agencies.

### **ENCOURAGING TECHNOLOGICAL INNOVATION**

Industrial pollution is still one of the main issues facing India, causing air and water quality to get worse, health issues, and environmental damage. With the fast economic growth and industrialisation being pursued by India, it is critical to the country's sustainable development and environmental protection to develop and use clean technology domestically. Increased investment by the government in research and development in environmental technology, especially technology that has been specifically developed to suit Indian conditions and budgetary constraints, is necessary. These are followed by assistance for indigenous innovation in pollution control technology, technology transfer incentives from industrialised nations, and small industry adoption schemes.

### **STRENGTHENING ECONOMIC INSTRUMENTS**

The application of economic instruments in environmental administration must be greatly improved. This involves the imposition of complete environmental taxation, the creation of pollution trade regimes, as well as use of green finance tools. The government must create advanced economic tools that give the right incentives for saving the environment with minimal dislocation to the economy. That involves advanced tool design in economics based on good economics and consultation with stakeholders.

**Increased Community Involvement:** Strengthening public participation in environmental decision-making is essential to make environmental policies effective and fair. Serious reform of existing consultation procedures, such as more transparent disclosure of information, less complicated procedures for the public to get involved, and better representation of communities in decision-making, is required.

The government must invest in capacity development of community involvement, such as community representative training, assistance to community-based environmental groups, and improved access to technical information.

## **THE WAY FORWARD: SYNTHESIS AND REFLECTION**

At the threshold of a new era of the environment, the experience of India with industrial pollution control contains both dismal lessons and promising possibilities. The institutional effort in constructing the legal architecture of the last half-century is a remarkable achievement, but the steadily widening chasm between law's promise and performance highlights the reality that law alone cannot manage sophisticated environmental challenges.

The distance from Rakesh Sharma's Kanpur textile factory to the boardrooms of multinationals with ISO 14001 standards in place attests to the heterogeneous character of India's industrial environmental compliance. This heterogeneity is more of a challenge to be overcome than a fact to be accommodated in any successful regulation system. The one-size-fits-all approach typical of earlier environmental regulation has been replaced by more sophisticated methods that are attuned to the diversity of industrial settings.

The development of judicial interpretation as the 2024 decision in the right against the harmful impacts of climate change is an integral advance in environmental jurisprudence. Indian environmental law brings the country into the international leadership role in environmental regulation, with constitutional protections superior to those of other industrialised nations. Yet this leap in the constitution must be converted into tangible gains in industrial environmental performance.

And perhaps most significantly, increased awareness of environmental justice as a core principle of environmental law is an indispensable change in how we conceptualise environmental protection. The realisation that environmental protection is not just about the preservation of ecosystems but the preservation of the rights of impacted communities has significant implications for the crafting and implementation of environmental law.

The future involves not only technical innovations in enforcement and regulation but a vision of the industry, environment, and society that is new. This vision has to be founded on the understanding that environmental protection is not a limitation on development but a prerequisite for sustainable development.

## CONCLUSION

The Indian industrial pollution control regime is a rich tapestry of legal innovation, institutional change, and pragmatic constraint. The shift from primitive pollution control to high-tech environmental management systems is a mirror image of the innovative character of environmental law to accommodate itself with changing circumstances.

The ensuing legal framework is sophisticated and integrated, including provisions for sustainable development, environmental justice, and precautionary regulation. The judicial building of the framework has been forward-looking, setting out constitutional protections for environmental rights that are amongst the most sophisticated globally.

Yet the enduring disparity between the promise of law and its practice solidifies the limitations of law as a tool of social transformation. Environmental regulation's success hinges not merely on what legal orders are but on whether institutions can implement them, industry can obey them, and communities can engage with them.

The path forward calls for an integrative strategy that addresses these multiple aspects of environmental management. This entails building institutional capacity, encouraging technological innovation, sharpening economic instruments, and enhancing people's participation. Above all, it calls for a fundamental commitment to the principle that protecting the environment is not a technical issue but one of ethics related to our responsibility towards future generations.

## REFERENCES

1. Indian Council for Enviro-Legal Action v Union of India (1996) 3 SCC 212.
2. MC Mehta v Union of India (1987) 1 SCC 357.
3. Narmada Bachao Andolan v Union of India (2000) 10 SCC 567.
4. Subhash Kumar v State of Bihar (1991) 1 SCC 598.
5. TN Godavarman Thirumulpad v Union of India (2002) 10 SCC 269.
6. Vellore Citizens' Welfare Forum v Union of India (1996) 5 SCC 545.
7. Air (Prevention and Control of Pollution) Act 1981.
8. Constitution of India 1950.
9. Environment (Protection) Act 1986.
10. Water (Prevention and Control of Pollution) Act 1974.

11. Ministry of Environment and Forests, Environment Impact Assessment Notification 2006, SO 1533(E) (14 September 2006).
12. Philippe Cullet, Water Law, Poverty and Development: Water Sector Reforms in India (OUP 2009).
13. Shyam Divan and Armin Rosencranz, Environmental Law and Policy in India: Cases, Materials and Statutes (3rd edn, OUP 2019).
14. P Leelakrishnan, Environmental Law in India (4th edn, LexisNexis 2018).
15. Armin Rosencranz and others, Environmental Law and Policy in India (2nd edn, OUP 2001).
16. B H Sharma, Environmental Law (2nd edn, Eastern Book Company 2017).
17. K Chopra, 'Environmental Degradation, Agricultural Productivity and Health in India' (2004) 39 Economic and Political Weekly 4004.
18. Kanchi Kohli, 'Environmental Clearance Process in India: A Critique' (2020) 55 Economic and Political Weekly 38.
19. S Puvvala, 'Environmental Jurisprudence in India: Evolution and Innovation' (2019) 24 Asia Pacific Law Review 45.
20. Lavanya Rajamani, 'The Principle of Common but Differentiated Responsibility and the Balance of Commitments under the Climate Regime' (2000) 9 Review of European Community & International Environmental Law 120.
21. Central Pollution Control Board, Annual Report 2023–24 (CPCB 2024).
22. Central Pollution Control Board, Comprehensive Environmental Pollution Index (CPCB 2023).
23. Comptroller and Auditor General of India, Performance Audit of Pollution Control Boards (CAG 2023).
24. Ministry of Environment, Forest and Climate Change, State of Environment Report 2023 (MoEFCC 2023).
25. National Green Tribunal, Annual Report 2023–24 (NGT 2024).
26. Organisation for Economic Co-operation and Development, Environmental Performance Reviews: India 2023 (OECD 2023).
27. Stockholm Environment Institute, Air Quality and Climate Policy Integration in India (SEI 2023).
28. United Nations Environment Programme, Global Environment Outlook 6 (UNEP 2019).

29. World Bank, India: Environmental Priorities and Poverty Reduction (World Bank 2021).
30. Central Pollution Control Board, 'Real Time Water Quality Monitoring' <https://cpcb.nic.in/real-time-water-quality-monitoring/> accessed 15 June 2025.
31. Ministry of Environment, Forest and Climate Change, 'Environmental Clearance' <https://parivesh.nic.in/> accessed 15 June 2025.
32. National Green Tribunal, 'Orders and Judgments' <https://greentribunal.gov.in/> accessed 15 June 2025.
33. 'Environmental Compliance Costs for Small Industries' Business Standard (Mumbai, 15 July 2024).
34. 'Green Finance for Industrial Transformation' Economic Times (New Delhi, 22 April 2024).
35. 'Industrial Pollution Control: New Challenges in Implementation' Indian Express (Mumbai, 8 May 2024).
36. 'Supreme Court Recognises Right Against Climate Change' The Hindu (New Delhi, 12 March 2024).
37. 'Supreme Court Recognises Right Against Climate Change' The Hindu (New Delhi, 12 March 2024).
38. Water (Prevention and Control of Pollution) Act 1974, ss 24–25.
39. Water (Prevention and Control of Pollution) Amendment Act 2017, s 41.
40. Air (Prevention and Control of Pollution) Act 1981, ss 21–22.
41. SCC Online database.