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The Legal Response To Climate Science: A Study Of India's Statutory And Constitutional Framework

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Abstract
Climate science has established with clarity the causes and consequences of anthropogenic climate change. While global temperatures rise and weather patterns destabilize, the law becomes a critical interface through which science is translated into regulation and rights-based protections. In the Indian context, this interface is marked by a combination of constitutional guarantees, environmental legislation, and judicial activism. This article undertakes a critical examination of India's legal response to climate science, analyzing whether the existing statutory and constitutional frameworks sufficiently reflect the urgency and complexity of the climate crisis.

1.INTRODUCTION

Scientific consensus around climate change has never been stronger. Empirical data confirm that average global temperatures are rising, glaciers are retreating, sea levels are increasing, and extreme weather events are becoming more frequent and intense.[3] India, given its geographic vulnerability and developmental asymmetries, is both a contributor to and a victim of these changes.[4] Yet, science alone cannot mitigate the crisis. Law, as an institutional and normative force, is essential to mediate human behaviour, enforce accountability, and translate policy into action.[5] In this context, the legal system's engagement with climate science becomes critical. While the Indian Constitution enshrines the right to life and environmental protection, and various statutes aim to regulate environmental degradation, there remains a significant gap in the legal articulation of climate change. This paper analyses the statutory and constitutional responses to climate science in India, highlighting the advances, gaps, and opportunities for reform.[6]

2. The Constitutional Framework: Environmental Protection as a Fundamental Right India's Constitution, though silent on the subject of climate change at the time of its framing, has over time developed into a significant legal platform for environmental protection through judicial interpretation. At the heart of this transformation lies Article 21[7], which guarantees the right to life and personal liberty. Courts have expanded its meaning far beyond mere survival to include conditions necessary for a life of dignity—clean air, safe water, and a balanced environment. These are now considered essential to the right to life, and by extension, have opened the door for recognizing environmental and even climate-related harms as constitutional violations.The recognition of environmental protection as a constitutional mandate is further supported by two other provisions: Article 48A and Article 51A(g). Article 48A, introduced through the 42nd Amendment in 1976, directs the State to protect and improve the environment and safeguard forests and wildlife. Although not enforceable in a court of law, it shapes policy and legislative intent, often serving as a touchstone for assessing the adequacy of government action. Complementing this is Article 51A(g), which places a moral obligation on every citizen to contribute to environmental preservation. While these duties are not justiciable, they reflect the Constitution's broader ethical vision and have been used by courts to inform decisions on environmental governance. A pivotal development in India's environmental constitutionalism has been the rise of Public Interest Litigation

[1] Intergovernmental Panel on Climate Change (IPCC), *Climate Change 2021: The Physical Science Basis*, Contribution of Working Group I to the Sixth Assessment Report of the IPCC (Cambridge University Press, 2021).
[2] Ministry of Environment, Forest and Climate Change, *India: Third Biennial Update Report to the UNFCCC* (New Delhi, 2021).
[3] *Ibid.*
[4] Shibani Ghosh, 'Climate Change and the Indian Legal Framework' (2020) 5 Indian J Envtl L 1.
[5] M.C. Mehta v. Union of India, AIR 1987 SC 1086.

(PIL). The Supreme Court, in the absence of adequate legislation or enforcement, has responded to petitions filed in the interest of the public at large, particularly those affected by pollution and ecological degradation. One of the earliest cases to link the environment with the Constitution was *Subhash Kumar v. State of Bihar*[8], where the Court ruled that the right to life includes the right to enjoy pollution-free water and air. This observation transformed environmental issues into matters of fundamental rights, making them eligible for constitutional remedies.These constitutional tools have not yet been applied extensively to climate change as a distinct legal category, but the framework exists for such a transition. The same principles that courts have used to respond to industrial pollution, deforestation, and hazardous waste can be extended to state inaction or negligence in addressing climate risks. Rising sea levels, erratic rainfall, increasing heatwaves, and air quality deterioration—when resulting from policy failures—could potentially be challenged under Article 21 as threats to health and life. Moreover, the ethical underpinnings of the Constitution, reflected in the Directive Principles and Fundamental Duties, offer moral and interpretive strength to environmental litigation. They create a legal culture where climate change, though not yet codified in a single statute, can be addressed
through constitutional principles. In doing so, India's constitutional order not only permits but encourages a climate-sensitive approach to governance and rights protection.

3. Statutory Framework: Fragmented Responses to an Integrated Crisis

India's environmental legislation has largely evolved in response to visible and immediate ecological threats such as industrial pollution, water contamination, and deforestation. The legal instruments currently in force were framed with the objective of addressing sector-specific environmental challenges rather than the broader and more complex phenomenon of climate change. While these statutes have played a significant role in shaping environmental governance, they do not constitute a unified legal response to the climate crisis.

The Environment (Protection) Act, 1986 stands as the cornerstone of India's environmental legal regime.[9] Enacted in the aftermath of the Bhopal Gas Tragedy, the Act grants the central government wide-ranging powers to regulate and control pollution and to take preventive action in the interest of environmental safety. Although broad in scope, the legislation does not specifically recognize or address climate change, nor does it incorporate mechanisms for integrating climate science into decision-making processes.Similarly, the Air (Prevention and Control of Pollution) Act, 1981 was designed to curb deteriorating air quality, with a focus on industrial and vehicular emissions. While air pollution remains one of the primary drivers of greenhouse gas emissions, the Act itself does not refer to carbon emissions or climate-related objectives. Its regulatory framework remains rooted in traditional pollution control rather than climate mitigation.[10] The Water (Prevention and Control of Pollution) Act, 1974 functions on comparable lines, aiming to preserve and enhance the quality of water bodies by regulating the discharge of pollutants. Although water systems are increasingly affected by climate variability—such as erratic rainfall patterns, floods, and droughts—the Act does not reflect this dynamic relationship.The establishment of the National Green Tribunal (NGT) through the National Green Tribunal Act, 2010 marked a significant procedural innovation in environmental jurisprudence. The Tribunal was constituted to provide speedy and specialized adjudication of environmental disputes, and has shown readiness to engage with a wide range of ecological issues. Nevertheless, its statutory mandate does not specifically identify climate change as a legal category, and its authority is tied to existing environmental laws that lack climate-specific provisions.[9] Other laws such as the Forest (Conservation) Act, 1980 and the Biological Diversity Act, 2002 contribute to climate action in an indirect manner. By conserving forest ecosystems and biodiversity, these laws support carbon sequestration and ecosystem resilience—both essential to climate mitigation and adaptation. However, their primary objectives remain conservationist rather than climate-oriented.[11]The Energy Conservation Act, 2001, administered by the Bureau of Energy Efficiency,

[6]Subhash Kumar v. State of Bihar, AIR 1991 SC 420.

[7]Environment (Protection) Act 1986, No. 29 of 1986.

[8]Air (Prevention and Control of Pollution) Act 1981, No. 14 of 1981. [9] National Green Tribunal Act 2010, No. 19 of 2010.

[9]Forest (Conservation) Act 1980, No. 69 of 1980; Biological Diversity Act 2002, No. 18 of 2003.

represents one of the few legislative instruments that align closely with India's climate mitigation strategies. The Act promotes energy efficiency and supports the transition to cleaner technologies. Despite this alignment, it too lacks a dedicated climate focus, and its implementation often suffers from weak enforcement and limited integration with broader environmental governance mechanisms.[12] Collectively, these laws reflect a fragmented legal architecture that has not yet evolved to meet the systemic challenges posed by climate change. There is no statutory requirement to incorporate climate risk assessments into project evaluations, environmental clearances, or urban planning frameworks. Regulatory decisions continue to be made without systematic reference to climate models, emission projections, or scientific data on vulnerability and resilience.In the absence of a comprehensive climate law, India's legal response remains reactive and sector-specific. This piecemeal approach is increasingly inadequate in light of the complex, cross-sectoral nature of climate change, which requires a legal regime capable of integrating science, risk, and long-term planning into governance and regulation.

4. Judicial Engagement: Filling Legislative Voids with Environmental Principles.While legislation forms the backbone of environmental governance, in India it is often the judiciary that has stepped in to give life, depth, and enforceability to environmental rights—especially in the face of legislative silence, inaction, or inadequacy. The absence of climate-specific statutory mandates has not deterred Indian courts from interpreting existing constitutional and environmental laws in a manner that promotes ecological protection and sustainability. In doing so, the judiciary has created a set of binding principles and legal doctrines that, although evolved in the context of broader environmental concerns, provide a foundational jurisprudence for potential climate litigation.[13]

4.1 Judicial Evolution of Environmental Principles One of the most influential decisions in this regard is *Vellore Citizens' Welfare Forum v. Union of India*[13], a case concerning industrial pollution caused by tanneries in Tamil Nadu. In this landmark judgment, the Supreme Court introduced two key principles into Indian environmental law: the Precautionary Principle and the Polluter Pays Principle. These principles were adopted from international environmental law but were given domestic enforceability through the Court's interpretation of Articles 21, 48A, and 51A(g) of the Constitution. The Precautionary Principle is particularly significant in the context of climate change, which is characterized by uncertain but potentially catastrophic outcomes. According to this principle, scientific uncertainty cannot be used as a justification for postponing measures to prevent environmental harm. The relevance of this principle to climate policy is clear: it calls for anticipatory governance, early warnings, and regulatory caution in activities with potential greenhouse gas emissions, even if exact causal pathways remain scientifically contested.[14] The Polluter Pays Principle, on the other hand, establishes a framework of accountability. It demands that those who cause environmental harm bear the financial cost of remedying that harm. While this principle was applied in the case of industrial waste and groundwater contamination, its logic is easily transferable to climate issues. Industrial actors, high-emission sectors, and governments that fail to implement effective mitigation policies could be held accountable under this doctrine. In a future legal framework for climate governance, this principle could inform the imposition of carbon taxes, compensation for climate-related loss and damage, or reparative funding mechanisms.[14]

4.2 Judicial Affirmation of Sustainable Development and Intergenerational Equity In *Lafarge Umiam Mining Pvt. Ltd. v. Union of India*[15], the Supreme Court was called upon to decide whether forest clearance should be granted for limestone mining operations. The Court upheld the clearance but not without reiterating the principle of sustainable development—a concept that seeks to reconcile economic growth with environmental preservation. The judgment stressed that environmental decisions must account for the needs of both present and future generations and must respect the ecological limits of the natural

[10]Energy Conservation Act 2001, No. 52 of 2001.

[11]Leelakrishnan P, 'Environmental Law and the Indian Judiciary' (1999) 41(4) *Journal of the Indian Law Institute* 482. [13] *Vellore Citizens' Welfare Forum v. Union of India*, AIR 1996 SC 2715. [14] Shibani Ghosh, 'Understanding the Precautionary Principle and Its Application in Indian Environmental Law' (2015) 3(1) *Indian Journal of Environmental Law*

[12]*Ibid.*

[13]*Lafarge Umiam Mining Pvt. Ltd. v. Union of India*, (2011) 7 SCC 338

environment. The Court also insisted on incorporating biodiversity considerations into decision-making, given the irreversible nature of damage to ecosystems. While the case did not directly involve climate change, the reasoning articulated by the Court resonates deeply with climate concerns. Climate change is, by nature, a long-term problem that implicates the rights of future generations. The idea of inter-generational equity, first introduced in Indian law through environmental litigation, becomes crucial when governments and corporations pursue policies that may yield immediate economic gain at the cost of irreversible climatic harm. The emphasis on long-term ecological thinking and cross-generational responsibility gives Indian courts a jurisprudential basis to adjudicate climate inaction as a constitutional wrong.[16]

4.3 Long-Term Judicial Monitoring: The Forest Conservation Precedent Few cases in Indian legal history demonstrate the enduring role of the judiciary in environmental governance as clearly as *T.N. Godavarman Thirumulpad v. Union of India*[18]. What began as a petition to prevent illegal deforestation in Tamil Nadu quickly evolved into a pan-India judicial inquiry into forest management, biodiversity conservation, and ecological security. Through continuous monitoring, reporting requirements, and wide-ranging orders, the Court created new mechanisms such as the Compensatory Afforestation Fund Management and Planning Authority (CAMPA) and expanded the definition of forests to include ecologically significant areas beyond notified reserves. While the case was not framed in the context of climate change, its outcomes have substantial implications for climate mitigation. Forests are not only biodiversity hotspots but also vital carbon sinks, absorbing atmospheric carbon dioxide and mitigating global warming. By intervening to protect and regulate forest use, the judiciary has indirectly contributed to India's carbon sequestration efforts.[17] Moreover, the procedural innovations developed in the *Godavarman* case—such as continuous mandamus, expert committees, and amicus curiae interventions—demonstrate how courts can play an ongoing, supervisory role in environmental governance.[18]

4.4 Climate Silence in Judicial Pronouncements Despite these proactive interventions, the Indian judiciary has not yet developed a fully articulated doctrine of climate justice. Most litigation continues to be framed under general environmental categories, with few petitions addressing climate change as a distinct legal wrong. This gap exists for multiple reasons.[19] First, India lacks a dedicated climate change law, which limits the ability of courts to ground climate decisions in statute. Second, there has been relatively little litigation explicitly focused on climate impacts, emissions regulation, or adaptation failures. Petitioners often rely on broader environmental harm narratives, which, while legitimate, do not always capture the systemic and inter-generational nature of climate risks.[22] Moreover, courts have been cautious about overstepping into areas seen as falling within the domain of policy or international diplomacy, particularly in the absence of specific domestic mandates. Issues such as carbon budgeting, emission targets, and adaptation finance remain largely outside the scope of judicial engagement in India, unlike in some other jurisdictions where courts have directly adjudicated the adequacy of national climate policies (e.g., *Urgenda Foundation v. The Netherlands*[20]).

4.5 The Road Ahead: Judicial Potential in a Climate-Conscious Era

Despite current limitations, the Indian judiciary is well-positioned to play a transformative role in climate governance. The foundational principles it has already recognized—precaution, polluter responsibility, sustainability, and equity—are entirely consistent with the demands of climate science and policy.[21] As awareness grows and as climate change produces more visible and severe impacts, it is likely that climate-

[14]Leelakrishnan P, *Environmental Law in India* (5th edn, LexisNexis 2019) 136; also see Edith Brown Weiss, 'Our Rights and Obligations to Future Generations for the Environment' (1990) 84(1) *American Journal of International Law* 198. [18] *T.N. Godavarman Thirumulpad v. Union of India*, (1997) 2 SCC 267.

[15]Rajamani L, 'The Right to Environmental Protection in India: An Overview' (2007) 1 *Indian Journal of Law and Technology* [24.]

[16]*Ibid.*

[17]Shibani Ghosh, 'Litigating Climate Claims in India: Possibilities and Challenges' (2019) 16(1) *Transnational Environmental Law* 37 [22] *Ibid.*

[18]*Urgenda Foundation v. State of the Netherlands*, C/09/456689/HA ZA 13-1396 (The Hague District Court, 24 June 2015).

[19] Shibani Ghosh, 'Litigating Climate Claims in India: Possibilities and Challenges' (2019) 16(1) *Transnational Environmental Law* 37.

related claims will increasingly find their way into the courts.[22]Future litigation may, for instance, challenge the failure of state governments to prepare climate-resilient infrastructure, the inadequacy of disaster response mechanisms, or the continued sanctioning of highemission projects without proper risk assessments. In each of these instances, the court's previous engagement with environmental principles offers a roadmap for judicial reasoning. It is also possible that international commitments under the Paris Agreement and India's own Nationally Determined Contributions (NDCs) may be used as interpretive tools in domestic litigation, adding a global dimension to constitutional and statutory duties.[26] In sum, while India's judiciary has not yet embraced climate change as a central legal issue, it has laid the jurisprudential groundwork for doing so. Its interventions in environmental protection, forest conservation, and sustainable development form the basis of a legal tradition that, if strategically invoked, can evolve into a robust framework for climate justice.

5. International Obligations and Domestic Incorporation **;** India's approach to climate governance is significantly shaped by its engagement with international environmental treaties and global climate negotiations. As a signatory to several multilateral agreements, India has committed itself to global objectives for emission reduction, climate resilience, and sustainable development. However, in the absence of a specific domestic statute on climate change, the translation of these international obligations into enforceable domestic law remains limited, inconsistent, and largely executive-driven.[23]

5.1 India's Participation in Global Climate Regimes ;India has long been an active participant in the evolution of the global climate regime. From the United Nations Framework Convention on Climate Change (UNFCCC), adopted in 1992, to the Kyoto Protocol and the more recent Paris Agreement of 2015, India has consistently advocated for the principles of equity**,** common but differentiated responsibilities (CBDR), and respective capabilities. These principles reflect India's historical stance that developed countries, as the primary historical emitters, should bear a greater share of responsibility in mitigating climate change.[24]

Under the Paris Agreement, India submitted its Nationally Determined Contributions (NDCs), which include commitments to reduce the emissions intensity of its GDP by 33–35% by 2030 from 2005 levels, increase nonfossil fuel energy capacity, and enhance forest carbon sinks.[25] Although these commitments are ambitious in scale, they remain non-binding in the legal sense and are largely implemented through executive policies and voluntary schemes rather than statutory mandates.[30]

5.2 Domestic Instruments Reflecting International Commitments: To implement its international obligations, India has adopted several domestic policy instruments. These include the National Action Plan on Climate Change (NAPCC), launched in 2008, which outlines eight national missions addressing key areas such as solar energy, energy efficiency, sustainable agriculture, and water conservation.[26] In addition, State Action Plans on Climate Change (SAPCCs) were introduced to localize national objectives and integrate climate concerns into state-level governance.[27] These instruments, however, are policy documents rather than laws. They do not carry the force of legislation, lack robust enforcement mechanisms, and often suffer from insufficient inter-ministerial coordination and funding constraints. Moreover, the absence of statutory backing means that violations of NDC-aligned policy goals cannot be challenged in courts, limiting the potential for public accountability.[28]

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[19]*Ibid.* [26] *Ibid.*

[20]Philippe Cullet, 'Environment and International Law: The Indian Perspective' (1995) 40(2) *International and Comparative Law Quarterly* 446.

[21] Lavanya Rajamani, 'Differentiation in the Emerging Climate Regime' (2013) 14(2) *Theoretical Inquiries in Law* 151.

[22]Government of India, 'India's Intended Nationally Determined Contribution: Working Towards Climate Justice' (2015), Ministry of Environment, Forest and Climate Change. [30] Navroz K Dubash and Ankit Bhardwaj, 'India and Climate Change: Evolving Ideas and Increasing Policy Engagement' (2019) 13(2) *WIREs Climate Change* e627

[23]Ministry of Environment, Forest and Climate Change, 'National Action Plan on Climate Change (NAPCC)' https://moef.gov.in accessed 4 July 2025.

[24] Neha Rai and others, *A Framework for Localizing the National Action Plan on Climate Change* (IIED 2012) 18.

[25] Sudhir K Sinha, 'Climate Governance in India: Exploring the Disjuncture between Policy and Law' (2017) 11(3) *Law, Environment and Development Journal* 186.

5.3 Challenges of Incorporation in Judicial Practice ;Although Indian courts have acknowledged international environmental principles in various judgments, they have done so selectively and without developing a consistent framework for the direct application of international climate obligations. The Supreme Court has, on occasion, invoked international customary principles, such as the Polluter Pays Principle and the Precautionary Principle, as part of domestic environmental jurisprudence.[29] However, specific commitments under climate treaties such as the Paris Agreement have yet to be judicially interpreted or enforced in Indian courts.[30] This judicial silence stems from two major legal barriers. First, international treaties are not self-executing in India; they require domestic legislation to be justiciable. Second, in the absence of a dedicated climate law, it is unclear whether India's NDCs or treaty-derived obligations can form the basis of enforceable legal rights or duties. Consequently, courts have remained cautious in drawing direct links between global climate goals and constitutional or statutory mandates.[31]

5.4 Toward Stronger Legal Internalisation of Climate Commitments ;Despite these limitations, India's international obligations have potential as interpretive tools within constitutional and environmental litigation. As jurisprudence evolves, courts may begin to treat climate change as a constitutional issue under Article 21 (right to life), especially when climaterelated events—such as extreme heat, floods, or air pollution—directly impact public health and livelihood.[32] Furthermore, integrating India's climate commitments into statutory frameworks could strengthen their enforceability. Future climate legislation must incorporate the country's NDCs and treaty obligations, enabling citizens and civil society to hold public and private actors accountable through legal mechanisms. This process of legal internalization would not only enhance India's international credibility but also ensure a more coherent and rights-based approach to climate governance.[33]

6. Challenges in Legal Engagement with Climate Science Despite the growing urgency of climate change and the constitutional and statutory frameworks that support environmental protection in India, several systemic challenges continue to hinder a coherent legal response to climate science. While Indian courts and agencies have demonstrated a willingness to act in the interest of environmental protection, the specificities of climate governance—such as scientific uncertainty, longterm impact modeling, and cross-sectoral policy coordination—are yet to be effectively incorporated into the legal process. These challenges are structural, institutional, and procedural in nature, and must be addressed if Indian law is to keep pace with evolving climate realities.[34]

6.1 Absence of Climate-Specific Legislation ;Unlike jurisdictions such as the United Kingdom, which enacted the Climate Change Act of 2008 as a dedicated legislative framework for national mitigation and adaptation strategies, India lacks a comprehensive climate statute.[35] Current environmental laws—including the Environment (Protection) Act, 1986, and the Air and Water Acts—were enacted in response to specific pollution concerns and not climate-related risks. While these laws serve as indirect vehicles for addressing climate concerns, their objectives, scope, and mechanisms are not tailored to the complex, cumulative, and long-term nature of climate change. The absence of a singular climate law results in fragmented institutional responses, lack of legally enforceable emission targets, and a vacuum in accountability mechanisms for both public and private actors. In the absence of legislative mandates, executive actions such as India's National Action Plan on Climate Change (NAPCC) and State Action Plans remain policy tools without direct legal enforceability. This undermines the coherence and binding effect of national climate commitments, including

India's Nationally Determined Contributions (NDCs) under the Paris

[27] Vellore Citizens' Welfare Forum v. Union of India, AIR 1996 SC 2715.

[28] Ridhima Pandey v. Union of India, WP (C) No. 682/2017 (SC), pending.

[29] Shibani Ghosh, 'Democratising Climate Governance in India: A Legal Perspective' (2020) 5(1) *Indian Law Review* 25.

[30]Subhash Kumar v. State of Bihar, AIR 1991 SC 420.

[31]Navroz K Dubash and Radhika Khosla, 'Institutionalising Climate Action in India: Towards a Common Framework' (2020) CPR Policy Brief.

[32]Shibani Ghosh, 'Climate Change and the Indian Environmental Legal System' in Lavanya Rajamani and M Ahmad (eds), *Climate Change Law and Policy in India* (OUP 2017) 136.

[33]*Ibid.* [41] *Ibid.*

Agreement.[41]

6.2 Limited Use of Climate Science in Legal and Regulatory Decision-Making A significant barrier to integrating climate science into legal frameworks is the minimal use of technical data and risk modeling in decision-making processes. Most environmental clearances and project assessments in India rely on outdated Environmental Impact Assessment (EIA) protocols that do not mandate climate vulnerability analysis, carbon footprint estimation, or assessment of resilience to extreme weather events.[36] As a result, development projects—particularly those in energy, infrastructure, and mining—are approved without fully accounting for their contribution to greenhouse gas emissions or their exposure to climate-induced hazards.[37] Climate models, satellite data, and scientific risk assessments—routinely used in international climate governance—are rarely utilized by regulatory authorities such as the Ministry of Environment, Forest and Climate Change (MoEFCC) or state-level agencies. The result is a disconnect between emerging climate science and regulatory practices, weakening the credibility and long-term sustainability of environmental decision-making.[44]

6.3 Weak Institutional and Technical Capacity Another structural limitation is the weak institutional capacity of the bodies responsible for environmental regulation and adjudication. Pollution Control Boards, which serve as the frontline regulators for air and water quality, often lack the technical staff and infrastructure necessary to monitor complex environmental indicators, let alone interpret climate science. Their functioning is frequently constrained by staffing shortages, political interference, and outdated equipment, leaving them ill-equipped to enforce standards or engage in long-term environmental planning.[38] Similarly, while the National Green Tribunal (NGT) has emerged as a specialized forum for environmental justice, it too faces challenges in accessing independent scientific expertise, especially on climate-specific issues such as emissions modeling, adaptation pathways, or ecosystem valuation.[39] The absence of dedicated climate panels, expert repositories, and inter-disciplinary inputs further limits the Tribunal's ability to adjudicate on emerging climate questions with the required scientific sophistication.[40]

6.4 Inadequate Public Participation in Climate Governance A further concern is the limited participation of local communities, civil society, and vulnerable groups in climate-related decision-making. Climate governance in India is often top-down and technocratic, driven by central ministries and advisory panels, with little engagement from those directly affected by climate risks—such as farmers, fisherfolk, forest dwellers, and urban poor.[41] While environmental clearance processes mandate public hearings, these are often poorly publicized, inaccessible, or perfunctory in nature.[42] Moreover, the procedural design of climate-related policies rarely creates avenues for democratic deliberation. There is a lack of legal mandates for prior informed consent in climate-vulnerable areas, and no formal role for local governments (such as Panchayats and Municipalities) in climate adaptation planning. This democratic deficit undermines both the legitimacy and effectiveness of climate action, particularly in a country as socially and ecologically diverse as India.[43]

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[34] Kanchi Kohli and Manju Menon, 'The EIA Process in India: A Primer' (Centre for Policy Research, 2016) https://cprindia.org accessed 2 July, 2025.

[35]Ritwick Dutta, 'Is Environmental Clearance Truly an Environmental Process?' (2019) 54(30) *Economic and Political Weekly* 17. [44] Radhika Khosla and others, 'Science and Policy in India's Climate Governance' (2021) 3(2) *Environmental Policy and Law* 142.

[36] Sunita Narain and Chandra Bhushan, *Challenge of the New Balance: A Study on India's Pollution Control Boards* (CSE Report 2012) 21.

[37] Gitanjali Nain Gill, 'Environmental Justice in India: The National Green Tribunal and Expert Members' (2016) 28(3) *Journal of Environmental Law* 417.

[38]Shibani Ghosh, 'Strengthening Environmental Adjudication in India: The Role of the NGT' (2020) 4(1) *Indian Journal of Environmental Law* 42.

[39]Anuj Bhuwania, 'Public Hearings and the Politics of Participation in Environmental Regulation' (2018) 53(26) *Economic and Political Weekly* 55.

[40] Centre for Science and Environment, *Public Hearings in Environmental Clearances: A Status Report* (CSE 2019) 6.

[41] Bharat H Desai, 'Local Governance and Climate Change: The Indian Context' (2015) 4(2) *Environmental Law and Practice Review* 12.

7. Recommendations for Reform: Towards a Climate-Conscious Legal Framework As climate change accelerates in both intensity and impact, it is imperative for India's legal system to transition from fragmented environmental management to a coherent, science-informed, and rightsbased climate governance model. The existing constitutional and statutory frameworks, while foundational, lack the specificity, institutional depth, and forward-looking orientation necessary to address the unique challenges posed by climate change. The following recommendations are proposed to recalibrate India's legal architecture to respond effectively to climate science and climate justice.[44]

7.1 Enactment of a Comprehensive Climate Change Law The first and most urgent reform is the enactment of dedicated climate legislation. This law should define the rights and obligations of various stakeholders—governments, corporations, and citizens—in relation to climate mitigation and adaptation.[45] It must lay down binding carbon budgets, specify sectoral emission targets, and create enforceable duties for public and private actors. A clear legal framework would also delineate institutional roles at the central, state, and local levels, enabling coordinated climate action across jurisdictions.[46]Such legislation must also incorporate procedural safeguards, including transparency in emissions accounting, public access to climate-related data, and grievance redressal mechanisms.[47] Drawing inspiration from models like the UK's Climate Change Act, the Indian statute should establish an independent Climate Commission tasked with monitoring progress, advising on policy, and ensuring legal compliance.[55]

7.2 Mandating Climate Risk Assessments in Project Planning A climate-conscious legal regime must ensure that every significant developmental activity accounts for its climate footprint and vulnerability. It is therefore essential to mandate climate risk assessments for all major infrastructure, industrial, mining, and urban development projects. These assessments should become an integral part of the Environmental Impact Assessment (EIA) process, with specific attention to greenhouse gas emissions, ecosystem resilience, disaster exposure, and long-term climate adaptation.[48] Further, such assessments must be grounded in up-to-date scientific models and should be reviewed by multidisciplinary expert panels. Decision-making authorities must be legally bound to consider climate findings before granting clearances, thereby ensuring that future development aligns with India's national and international climate obligations.[49]

7.3 Judicial Training and Scientific Capacity Building Given the growing importance of climate litigation and judicial oversight, it is critical that members of the judiciary and the legal profession are equipped to engage with scientific evidence and technical discourse. Judicial training academies must introduce specialized modules on climate science, environmental modeling, carbon accounting, and international climate law.[50] Capacity-building efforts should also extend to quasi-judicial bodies such as the National Green Tribunal and Pollution Control Boards. Regular workshops, fellowships, and partnerships with academic and research institutions would enable these bodies to make informed, data-driven decisions and judgments.[51]

7.4 Enhancing Public Legal Education and Access to Justice A robust legal framework is only meaningful when citizens are aware of their rights and remedies. Public legal education must therefore form a core

[42]Shibani Ghosh, 'Legal and Institutional Framework for Climate Governance in India' in Lavanya Rajamani and M Ahmad (eds), *Climate Change Law and Policy in India* (OUP 2017) 145.

[43] Sumudu Atapattu, *Emerging Principles of International Environmental Law* (Transnational Publishers 2006) 212.

[44] Hari Osofsky, 'Governance and Climate Change: The Role of Subnational Actors' (2010) 37(2) *Fordham Urban Law Journal* 401.

[45] Navroz K Dubash, Radhika Khosla and Ankit Bhardwaj, *India's Climate Action: Nationally Determined Contributions and Beyond* (Centre for Policy Research 2018) 8. [55] Climate Change Act 2008 (UK), c. 27.

[46] Shibani Ghosh, 'Strengthening Environmental Impact Assessment through Climate Risk Integration' (2021) 5(1) *Indian Journal of Environmental Law* 32.

[47] Centre for Policy Research, 'Climate-Proofing Infrastructure Projects in India' (Policy Brief 2023) https://cprindia.org accessed 3 July 2025.

[48] Justice Swatanter Kumar, 'Climate Change and the Role of the Judiciary' (2020) 62(3) *Journal of the Indian Law Institute* 193.

[49]Vidya Vencatesan, 'Scientific Expertise and Environmental Regulation in India' (2020) 10(1) *Law, Environment and Development Journal* 56.

component of climate governance. Community-based awareness campaigns, environmental law clinics in universities, and multilingual dissemination of legal rights related to climate and the environment are essential to democratise climate action.[52] Access to justice must also be strengthened by removing procedural barriers in environmental litigation. The cost of filing cases, difficulties in obtaining technical evidence, and delays in adjudication often deter affected communities from seeking legal remedies. Legal aid mechanisms and fasttrack procedures for climate-related disputes should be institutionalized.[53]

7.5 Institutionalising Scientific Expertise in Lawmaking and Regulation Finally, the integration of science and law must be institutionalized rather than ad hoc. Legislative committees, regulatory bodies, and policymaking authorities must be supported by independent scientific advisory panels comprising climatologists, environmental economists, ecologists, and disaster management experts. These panels should be involved not only in policymaking but also in the scrutiny of legislation, review of executive action, and the formulation of adaptive standards.[5455]Embedding science in the architecture of governance would ensure that laws and policies remain responsive to emerging risks, global scientific consensus, and India's evolvingenvironmental realities. This is particularly crucial in a country where diverse ecological zones face unique vulnerabilities and where policy inertia could lead to irreversible damage.[56]

8. CONCLUSION

India's legal system has, to an extent, internalized environmental concerns through a combination of constitutional interpretation and statutory regulation. However, the law has not kept pace with the rapid advancements in climate science. The disconnect between empirical climate data and legal mandates reflects a broader challenge of science-policy integration. To ensure environmental justice and inter-generational equity, India must evolve its legal framework in alignment with scientific understanding. Only then can law become a truly transformative force in addressing the climate crisis.

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