DIGITAL ENVIRONMENTAL CONSTITUTIONALISM: REIMAGINING INDIA'S ECOLOGICAL GOVERNANCE @ 2047

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I. Introduction

By 2047 India's aspiration to become as a Viksit Bharat which represents one of the most important developmental pledges of the twenty- first century. However, this transformative ambition carries an issue that will determine the legitimacy of this revolutionary ambition: can accelerated economic growth remain ecologically sustainable? The solution is not merely environmental. It is constitutional[1].

India is under ecological constrain that are neither peripheral nor speculative. India continues to be one of the most ecologically sensitive countries in the world, suffering from deforestation, water scarcity, and air pollution all at once. Across North Indian cities temperatures exceeding over 45°C and over 60% of Indian districts at high to extremely high climate risk demonstrated by the summer 2025[2], the cost of governance failure is being paid in human lives, disproportionately by the marginalized and the poor[3]. Without an ecological vision, India's 2047 vision is not complete, and without a governance revolution ecological vision is meaningless.

The Environment Protection Act, 1986[4] possess India's extensive legislative framework and however country's regulatory architecture has not been able to translate ecological results from legislative intent. Implemented through structurally fragmented bodies like the Central Pollution Control Board, State Pollution Control Board, MoEFCC and a maze of clearing authorities. Institutional silos govern environmental governance. A dispute arising from contradictory jurisdictions between Forest Departments, Revenue Authorities, CPCB, SEIAA,

[1] *Indian Council for Enviro-Legal Action v Union of India* (1996) 3 SCC 212
[2] *Intergovernmental Panel on Climate Change, Sixth Assessment Report (IPCC, 2022) Chapter 10*
[3] Council on Energy, Environment and Water, District-Level Heat Risk Assessment (CEEW 2025); India Meteorological Department, Annual Climate Summary 2025 (IMD 2025).
[4] The Environment Protection Act 1986 (India), s 3.

and DEIAA was brought before the National Green Tribunal as recently as February 2026 , a live illustration of the fragmentation paralyzing India's regulatory architecture.[5] Regulatory intervention is still retroactive, dependent on periodic reporting rather than ongoing oversight, and only initiated after harm has occurred. The distance between the statutory mission and the reality of governance is still growing, with legislative intention surpassing institutional delivery. This is not a coincidental failure. It's architectural.[6]

There are significant constitutional consequences to this design flaw. The Supreme Court ruled in the historic case of **M.K. Ranjitsinh v. Union of India**, that protection from the adverse effects of climate change, and change is a necessary component of **Article 21** and that State inaction on climate adaptation constitutes a denial of both **Article 21** and **Article 14**[7]. However, judicial recognition cannot be alone substituted by governance architecture. As **Research Foundation for Science v. Union of India** demonstrated an institutional norm that does not avoid environmental harm but only complies with legal requirements cannot meet India's 2047 ecological objectives, therefore governmental indifference endured for years contrary to repeat judicial directives.[8]

Digital technologies and artificial intelligence present a truly revolutionary opportunity to transform governance from retroactive implementation to proactive regulation. An innovative approach for techno legal governance is already emerging, as evidenced by the EU, China , and the transparency framework outlined in the **Article 13 of the Paris Agreement**.[9]

This essay argues that India must move towards Predictive Environmental Constitutionalism, a form of government in which artificial intelligence (AI) improves ecological vision while staying rooted in democratic participation, environmental fairness, and constitutional morality. In order to operationalize the vision for @2047, it further proposes the National Environment Intelligence Framework (NEIF) as the institutional architecture. Technology without constitutional accountability is like efficiency without a sense of purpose. India has to develop both.

[5] Sunil Kumar v Union of India 2026 SCC OnLine NGT 95 (NGT Bhopal Bench, decided 6 February 2026).
[6] Vellore Citizens Welfare Forum v Union of India (1996) 5 SCC 647.
[7] Constitution of India, arts 14 and 21; MK Ranjitsinh v Union of India (2024) 19 SCC 139.
[8] Research Foundation for Science Technology and National Resource Policy v Union of India (2014) 16 SCC 589.
[9] UNFCCC, Paris Agreement (2015) art 13.

II. The Regulatory Crisis: Why Old Tools Cannot Build New India

On paper, India has a very remarkably progressive environmental legislation but in reality its enforcement remains weak in practice. A comprehensive legislative framework for ecological protection is established by **the Environment (Protection) Act, 1986**, **the Forest Rights Act, 2006, the Water (Prevention and Control of Pollution) Act, 1974**, **and the Air (Prevention and Control of Pollution) Act, 1981**. The failure to convert legislative aspirations into regulatory action is the crisis, not a lack of legislation[10].

In **Vellore Citizens Welfare Forum v. Union of India**, the Supreme Court acknowledged this shortcoming by treating with the Precautionary Principles and Polluter Pays from global norms into legally binding environmental laws in India[11] [12]. The regulation itself demonstrates the extent of regulatory agencies' shortcomings. The CPCB, State Pollution Control Boards, MoEFCC,

NGT, Forest Survey of India, and EIA function in institutional silos without data exchange or coordinated oversight, which continues to affect India's environmental governance. Because of this, environmental damage is typically only treated after it has already happened.

In consideration of India's 2047 development targets, this shortcoming has grown even more severe. The burden on land, air, water, and forests will increase due to a rapidly expanding economy, while certification institutions still rely mostly on paper-based procedures and inadequate oversight[13]. Predictive regulatory intelligence that recognizes and prevents harm before it becomes irreversible is the solution, not just more enforcement. AI can enable this change by substituting ongoing, sensor-driven oversight for delayed, information-driven compliance.

III. From Compliance to Intelligence: AI as Environmental Governance Architecture

The practical implementation of a predictive governance architecture is examined in Section 3. The main change is to focus on regulatory intelligence made possible by digital governance

[10] Environment (Protection) Act 1986; Air (Prevention and Control of Pollution) Act 1981; Water (Prevention and Control of Pollution) Act 1974; Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act 2006.
[11] Vellore Citizens Welfare Forum v Union of India (1996) 5 SCC 647.
[12] *MC Mehta v Union of India (Taj Trapezium Case)* (1997) 2 SCC 353
[13] Central Pollution Control Board, Annual Report 2023-24 (CPCB 2024).

technology and artificial intelligence rather than reactive environmental regulation. Although surveillance programs like the **Continuous Ambient Air Quality Monitoring System** are already established in India, in contrast to preventing ecological harm, their role is still primarily retrospective, recording infractions[14].

Delhi's ongoing AQI crisis, where severe winter pollution continues to trigger diverse and delayed reactions, is a clear example of this constraint[15]. AI based forecasting algorithms can promote proactive action and replace crisis driven regulation with anticipatory enforcement by utilizing stubble burning trends, industrial pollution, vehicular load and meteorological data[16].

Smart compliance permits connecting industries to real-time IoT surveillance platforms in addition to air quality, allowing regulators to get direct reports of pollutants and discharge. By doing this, ongoing, tamper-resistant monitoring would replace annual self-reporting in regulatory oversight, lowering inaccurate reporting and regulatory evasion[17]. By replicating the behavior of river basins, urban environments and ecosystem under various policy circumstances, environmental digital twins provide an additional layer of regulatory complexity[18], enabling authorities to test measures before environmental harm becomes irreversible[19].

By combining satellite data, biodiversity indexes, hydrological models, and environmental databases into an assessment procedure that is less alterable and more dependable, AI can also enhance environmental impact assessment[20]. Comparable changes are already evident in China and the European Union on a global scale[21] [22], and the public disclosure requirements under **Article 13 of the Paris Agreement** highlight the increasing significance of consistent and reliable environmental data[23].

[14] Central Pollution Control Board, 'Continuous Ambient Air Quality Monitoring System' (CPCB 2023) <https://cpcb.nic.in/caaqms> accessed 1 June 2026.
[15] *Commission for Air Quality Management in National Capital Region and Adjoining Areas Act, 2021*
[16] Central Pollution Control Board, National Air Quality Index Annual Report 2024 (CPCB 2024).
[17] Central Pollution Control Board, Annual Report 2023-24 (CPCB 2024).
[18] *National Action Plan on Climate Change (NAPCC, 2008), Mission 8*
[19] Smart Nation and Digital Government Office, 'Virtual Singapore' (Singapore Government 2023) <https://www.smartnation.gov.sg> accessed 1 June 2026.
[20] Ministry of Environment Forest and Climate Change, Draft EIA Notification 2020 (MoEFCC 2020).
[21] European Commission, 'The European Green Deal' COM (2019) 640 final.
[22] United Nations Environment Programme, Artificial Intelligence for Environmental Sustainability (UNEP 2022) 23.
[23] UNFCCC, Paris Agreement (2015) art 13.

IV. Rights, Accountability and the Limits of Algorithmic Governance

Technological efficiency alone cannot evaluate the promise of predictive environmental governance. Environmental governance in India is a constitutional obligation rather than just a statutory one. The Supreme Court made safeguarding the environment a constitutional requirement rather than just a policy goal, over the course of four decades of judicial growth. The Court ruled in **Subhash Kumar v. State of Bihar** that the right to a pollution free environment is sanctioned by **Article 21**, not as mere concession from the government but as a fundamental entitlement[24].

The State has an affirmative and non-exclusive obligation to enhance and safeguard the environment under **Article 48A**[25].Under **Article 51 A(g)** every citizen has a mirroring obligation[26]. Natural resources are held in trust by the state for the benefit of current and future generations, not for commercial gain, according to the **Public Trust Doctrine**, which was established authoritatively in **MC Mehta v. Kamal Nath**[27]. Together, these provisions collectively establish Environmental Constitutionalism as the framework that governs all technology interventions in ecological governance. The environmental rule of law must be strengthened by AI, not circumvent it.

Opacity is the greatest direct constitutional threat that algorithmic control poses. AI has irreversible ecological and legal impacts when they identify regulatory breaches, set enforcement priorities or reject environmental clearances. However, impacted parties, regulators and even the designers sometimes find it difficult to understand the logic incorporated decision in machine learning architecture. This type of government is known as "**black box governance**", because it is unconstitutional[28]. The non-arbitrariness provision that **EP Royappa v. State of Tamil Nadu** established as the constitutional essence of **Article 14** is violated when an industry penalized by an unambiguous algorithm has no meaningful opportunity to oppose, comprehend or seek review of the judgement[29]. The Supreme Court rules in justice **K.S. Puttaswamy v. Union of India** that the constitutional requirements of need, proportionality, and legality must all be met by state use of digital infrastructure[30].

[24] Subhash Kumar v State of Bihar (1991) 1 SCC 598.
[25] Constitution of India, art 48A.
[26] Constitution of India, art 51A(g).
[27] MC Mehta v Kamal Nath (1997) 1 SCC 388.
[28] *Maneka Gandhi v Union of India* (1978) 1 SCC 248.
[29] EP Royappa v State of Tamil Nadu (1974) 4 SCC 3.
[30] Justice KS Puttaswamy v Union of India (2017) 10 SCC 1.

Innovative governance is not algorithmic government in the absence of constitutional accountability. These needs are not met by regulatory authority granted to impenetrable algorithms in the absence of explainability norms, significant appeal recourse or monitoring procedures. Wearing a technological mask, it is arbitrary governance.

Environmental justice is a second, deeper systemic issue. Forest dwellers, tribal groups and subsistence farmers belong to the communities bearing the greatest ecological burden, they possess the least amount of digital infrastructure and institutional capacity to influence AI governance systems that were created without them. These communities are acknowledged under **the Forest Rights Act of 2006** as active legal custodians of forest ecosystems, whose voluntary previous approval and informed involvement are required by law rather than just being standard courtesies[3132]. Monitoring forests without their involvement are not just technically excluded by an AI surveillance architecture that monitors forests without their involvement, it also infringes the rights that Parliament has explicitly acknowledged. This worry is aggravated by the related issue of Algorithmic Environmental Federalism. A centralized AI regulatory framework, runs under the risk of displacing the constitutional allocations of environmental powers under **Section 17 and 18** of the state list, unaffected by cooperative federal design, undermining the ecological independence that India's federal structure guarantees to both local communities and States[33].

Third, blind institutional faith in AI makes the fundamental mistake of technology solutionism, which holds that computing sophistication can fix governance issues caused by democratic deficiency, political economics and institutional design. The regulation of the environment is fundamentally normative. No algorithm can make decisions about development agendas distributive justice and intergenerational responsibilities[34]. It is impossible to summarize centuries of accumulation of indigenous ecological knowledge, community permission into training datasets and democratic discussion. Technology is an effective tool for governance, but it cannot take the place of governance itself.

Lastly, two constitutional responsibilities are directly and unresolvedly at odds with massive amount of industrial, geographical and personal data generated by ongoing AI environmental

[31] Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act 2006.
[32] *Gram Sabha, Niyamgiri v State of Odisha* (2013) 6 SCC 476
[33] Constitution of India, Seventh Schedule, List II, Entries 17 and 18.
[34] *State of Karnataka v Union of India* (1977) 4 SCC 608

monitoring. The **Digital Personal Data Protection Act of 2023** emphasizes data minimization, purpose limitation and informed consent[35]. These responsibilities conflict with the requirements of thorough environmental monitoring. Both the citizen's right to informational privacy and right to environmental information are constitutionally guaranteed, India has not yet developed the specific legislative framework needed to reconcile these rights.

Therefore, the question is not whether India should adopt AI driven environmental governance, ecological requirements and the constitutional are obvious. The challenge make sure that such governance embodies **Predictive Environmental Constitutionalism**, in which algorithmic power is restrained by ecological justice, democratic involvement, constitutional morality and federal accountability is a challenge. Section 5 suggests the institutional framework that can be used to operationalize this goal.

V. National Environmental Intelligence Framework (NEIF): A Vision for India @2047

India does not require more environmental laws but, requires smarter environmental governance. The challenge this essay highlights is not lack of legal standards, but rather the lack of an institutional framework that can convert such values into predictive, accountable and real time governance. This essay proposes **National Environmental Intelligence Framework (NEIF)**, a techno legal governance approach that combines artificial intelligence with constitutional accountability across five interlinked pillars, as a way to operationalize the vision **of Predictive Environmental Constitutionalism.**

Pillar I- Integrated Environmental Intelligence System

The CPCB, SPCBs, Forest Survey of India, industrial sensor systems and satellite monitoring networks will all be connected to one centralized source if real time environment truth through an integrated digital form. **NEIF** transforms retrospective inspection to environmental governance which exercises into a future intelligence function by destroying the disjointed data architecture that has previously prevented coordinated ecological response.

Pillar II- Environmental Regulatory AI Sandbox

AI technologies must be tested in specific ecological zones where risk can be evaluated, failure

[35] Digital Personal Data Protection Act 2023.

can be limited and regulatory measures may be strengthened before nationwide deployment. In theory, technological implementation must never avoid regulatory control, but it must come before statutory regulation in order. The sandbox is more than just a standardized testing environment; it's a justice testing environment where algorithmic performance is assessed based on community and ecological impact rather than just computational metrics.

Pillar III- Mandatory Algorithmic Transparency

Any AI system that affects monitoring, authorization, or ecological compliance decisions needs to be auditable and explainable. Transparency is required by constitutional accountability when an algorithm uses governmental authority. Algorithmic assessment and public reporting would be supervised by a self-governing Environmental AI Audit Authority within the MoEFCC, guaranteeing that computational capacity supports rather than undermines constitutional responsibility[36].

Pillar IV- Environmental Data Rights for Citizens

In the digital era, access to real time pollution data, ecological health indicators and climate risk maps must be acknowledged as a legally binding modification of **Article 21**[37] [38]. Environmental intelligence generated by public institutions must continue to available in all scheduled languages. In addition to being informed, a citizen who is able to read the local air quality index in their mother tongue is an agent of environmental accountability with constitutional authority.

Pillar V - Community Integration

Participation of analysis and gathering data is required from tribal communities, forest dwellers and local stakeholders[39]. AI training datasets must formally incorporate traditional ecological knowledge, which has been acquired over generations with precision that no satellite sensor yet equals. The idea that communities whose ecosystems are the focus of environmental governance should be its co-authors rather than its objects is both scientific, improving model precision, and justice.

[36] Ministry of Environment, Forest and Climate Change.
[37] Constitution of India, art 21.
[38] *Reliance Petrochemicals Ltd v Proprietors of Indian Express Newspapers* (1988) 4 SCC 592.
[39] Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act 2006.

India declared in its constitution that by 2047, environmental governance shall be inclusive rather than exclusive, transparent rather than opaque, and predictive rather than reactive. NEIF is not a technological initiative. According to this concept, artificial intelligence enhances the constitutional fundamental principles of legitimate governance rather than replacing it.

VI. Conclusion

India us at inflection point for civilization. By **2047**, India will have to achieve all three objectives: ecological sustainability, economic success and constitutional governance, which have been structurally impossible to reconcile by traditional frameworks of regulation. This essay has made an effort to demonstrate how the **National Environmental Intelligence Framework,** which will employ predictive environmental constitutionalism, can be the way By 2047, India will need to accomplish all three goals economic prosperity, ecological sustainability, and constitutional governance all of which are intrinsically incompatible with conventional regulatory systems. in the direction of unifying all three objectives.

In addition to Viksit, **India@2047** must be ecologically **sovereign**, **Swachh**, and **Surakshit**. Only by drastically rebuilding our current system of government will this future be possible. Because without constitutional duty, technology is nothing more than soulless efficiency.