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Sustainable Regional Development and Environmental Governance

Abhisek Khan

Department of Political Science, Bankura University, Bankura, West Bengal, India
Email: abhisekchem912@gmail.com
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Abstract: *The relationship between sustainable regional development and environmental governance has emerged as one of the most analytically rich and practically urgent fields in contemporary political science and public policy. As the global community struggles to translate the ambitious architecture of the 2030 Agenda for Sustainable Development into tangible outcomes at sub-national scales, the governance frameworks mediating between macro-level sustainability commitments and ground-level ecological and socio-economic realities have come under growing scholarly and policy scrutiny. This paper undertakes a comprehensive examination of the theoretical foundations, institutional architectures, and empirical challenges of sustainable regional development governance, with particular attention to the Indian context. It argues that effective environmental governance at the regional level cannot be reduced to a single optimal model - whether centralized regulatory regimes, market-based mechanisms, or decentralized community management - but demands the deliberate construction of polycentric, multi-level governance systems that combine regulatory quality, fiscal adequacy, community participation, and evidence-based monitoring. Drawing exclusively on peer-reviewed scholarship and credible institutional sources available online, the paper develops three core arguments: that the SDG framework, while ambitious at global and national levels, has been inadequately localized to regions and sub-national territories; that India's environmental governance architecture contains genuine institutional innovations alongside structural weaknesses that systematically undermine implementation; and that a place-based, polycentric approach - integrating the technical capacity of the state with the ecological knowledge and democratic accountability of local communities - offers the most promising theoretical and practical pathway toward sustainable regional development in the twenty-first century.*

Keywords: *sustainable regional development, environmental governance, polycentric governance, SDG localization, India, decentralization, multi-level governance, climate adaptation, Panchayati*

1. Introduction

There is a tension at the heart of contemporary sustainability governance that no amount of diplomatic ingenuity has yet fully resolved. On one hand, the planetary problems demanding governance - climate change, biodiversity collapse, freshwater depletion, soil degradation - are irreducibly global in their physical dynamics and irreducibly local in their human consequences. On the other hand, the institutional machinery through which governance actually occurs - legal systems, fiscal transfers, administrative hierarchies, political accountability structures - is overwhelmingly organized at the national level, with the regional tier occupying an often ambiguous middle space between national ambition and local reality.

This mismatch between the geography of ecological problems and the geography of governance capacity is not a new observation. It animated the foundational work of Elinor Ostrom on common-pool resource governance, shaped the 1992 Rio Declaration's principle of subsidiarity in environmental decision-making, and has driven two decades of scholarship on multilevel and polycentric environmental governance. What has given it renewed urgency is the 2030 Agenda for Sustainable Development and its seventeen Sustainable Development Goals - an ambitious normative framework that, as the UN Secretary-General's 2023 progress report acknowledged, is now in acute crisis. The SDG Governance research team at Cambridge has documented that at the midpoint of the 2030 Agenda's timeline, the vast majority of the global goals show limited progress, with several targets actively regressing (Cambridge Core). The reasons for this governance failure are multiple and well-documented: geopolitical disruptions, the economic aftershocks of the COVID-19 pandemic, fiscal constraints, and - critically - the inadequate translation of national commitments into sub-national and regional governance action.

It is at the regional and sub-national level that SDG commitments must ultimately be implemented. As the UN inter-agency policy brief on SDG localization notes, local and regional governments are the tier of governance closest to communities, best positioned to design people-centered policies, and first responders to conflict, displacement, and disasters linked to climate change and natural hazards (SDG Localization). Yet local and regional governments are also frequently the weakest link in the governance chain - chronically underfunded, technically understaffed, and often excluded from the national decision-making processes that determine the fiscal and regulatory frameworks within which they must operate.

Against this background, the present paper examines sustainable regional development and environmental governance as interconnected challenges requiring integrated analytical and policy frameworks. Section 2 establishes the conceptual foundations of sustainable regional development. Section 3 reviews the theoretical architecture of environmental governance, contrasting centralized, decentralized, market-based, polycentric, and collaborative models. Section 4 analyzes multi-level and polycentric governance as the dominant emerging framework for regional environmental governance. Section 5 addresses the critical challenge of SDG localization at the regional scale, supported by a comparative table. Section 6 examines India as a detailed case study, drawing on the country's rich but contradictory governance experience across environmental federalism, Panchayati Raj institutions, and statutory environmental regulation. Section 7 maps the structural challenges facing sustainable regional

development in a comparative framework, with a focus on India. Section 8 develops regional case illustrations. Section 9 offers recommendations, and Section 10 concludes.

2. Conceptual Framework: Sustainable Regional Development

The concept of sustainable development, formally introduced into international discourse through the Brundtland Commission's 1987 definition - development that meets the needs of the present without compromising the ability of future generations to meet their own needs - carries within it an inherent spatial tension. 'Development' is simultaneously a process that occurs everywhere and a process whose distribution is profoundly uneven. Regions - understood here as sub-national territorial units defined by their ecological characteristics, socio-economic structures, institutional histories, and political identities - are not merely passive sites on which national development strategies play out. They are active governance arenas in which the interactions among economic activity, environmental systems, and social relationships are most concretely experienced and most directly contested.

Sustainable regional development, as a conceptual framework, thus extends the classical three-pillar model of sustainability - economic, environmental, and social - to incorporate a fourth, increasingly recognized dimension: institutional quality and governance capacity. The Tandfonline (2025) editorial on rethinking regional development under sustainability imperatives argues that competitiveness and sustainability are not antithetical but must be pursued jointly through challenge-oriented, experimental, and place-based governance frameworks that balance directionality and subsidiarity. Smart Specialisation for the Sustainable Development Goals (S3+) and Partnerships for Regional Innovation (PRI) represent the European Union's most recent attempt to operationalize this insight through place-sensitive regional innovation policy - recognizing that sustainable transitions cannot be templated from Brussels but must be tailored to the specific technological capabilities, ecological endowments, and social structures of individual regions.

The MDPI special issue on sustainable regional development (2024) further identifies the spatial dimension as a fifth pillar - one that addresses the geography of inequality within nations, the relationship between urban centers and rural peripheries, and the distribution of environmental burdens and benefits across territorial space. This is particularly pertinent in large, regionally diverse countries like India, where a country with 10 biogeographic and 15 agro-climatic zones (TERI) cannot be governed as if ecological and socio-economic contexts were uniform across its territory. Table 1 maps the five dimensions of sustainable regional development, the governance mechanisms associated with each, and the key indicators through which progress is measured.

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Table 1: **Dimensions, Governance Mechanisms, and Indicators of Sustainable Regional Development**

Pillar	Core Objectives	Governance Mechanisms	Key Indicators
Economic	Green growth; equitable income distribution; circular economy; employment generation in clean sectors	Smart Specialisation Strategy (S3+); regional innovation platforms; public-private investment frameworks	GDP per capita; employment rate; share of renewable energy in regional energy mix; green patent filings
Environmental	Ecosystem conservation; pollution reduction; biodiversity protection; climate adaptation and mitigation	Environmental Impact Assessment; polycentric governance; Local Agenda 21; community-based natural resource management	CO2 emissions per region; forest cover change; water quality index; Environmental Performance Index (EPI) score
Social	Poverty reduction; inclusive access to education, health, and sanitation; gender equity; indigenous rights protection	Panchayati Raj Institutions (India); participatory budgeting; community-led monitoring; gram sabha consultations	Human Development Index (HDI); multidimensional poverty index; access to safe water; gender development index
Institutional / Governance	Rule of law; regulatory quality; transparency; accountability; anti-corruption; public participation in decision-making	Multilevel governance frameworks; inter-ministerial coordination; SDG localization; independent environmental tribunals	World Governance Indicators; SDG Index scores; regulatory enforcement rates; citizen participation indices
Spatial / Territorial	Balanced regional growth; rural-urban connectivity; reduction of spatial inequalities; place-based policy design	Metropolitan planning committees; regional development authorities; integrated district planning; corridor development	Regional GDP disparity index; urban-rural connectivity scores; land-use change data; infrastructure density

Note. Compiled from Tandfonline (2025), MDPI Special Issue (2024), Cambridge Core (2024), SDG Localization Policy Brief (2024), and TERI (n.d.).

Two theoretical tensions are worth foregrounding at this stage. First, there is the persistent tension between regional competitiveness and ecological sustainability - the concern that regions competing in global markets for investment and employment will systematically externalize environmental costs unless regulatory frameworks prevent them from doing so. The Tandfonline (2025) analysis addresses this directly, arguing that the most productive contemporary scholarship does not accept this as an iron trade-off but investigates the conditions under which ecological investments - in green infrastructure, circular economy clusters, nature-based solutions, and renewable energy - can simultaneously enhance regional economic resilience and environmental sustainability.

Second, there is a tension between the need for regional specificity and the demands of scalar integration. Sustainable regional development cannot be achieved by regions in isolation; it depends on coherent vertical linkages with national governance frameworks (for regulatory standards, fiscal transfers, and legal authority) and horizontal linkages with neighboring regions (for watershed management, air shed governance, and biodiversity corridor protection). The MDPI (2024) sustainable regional development framework emphasizes exactly this point: sustainable development at the regional scale involves combining horizontal and vertical linkages within appropriate multi-level governance structures.

3. Environmental Governance: Theoretical Underpinnings

Environmental governance is a broad field that encompasses the rules, institutions, norms, and practices through which human societies regulate their relationship with the natural environment. Its theoretical development has moved through at least three broad phases. The first, dominant from the 1960s through the 1980s, was characterized by faith in centralized state regulation - the view that only a strong national state wielding comprehensive legal authority could impose the discipline necessary to prevent market actors from externalizing environmental costs. This produced the great wave of national environmental legislation - clean air acts, water pollution statutes, environmental impact assessment requirements - that defined environmental governance in industrialized democracies.

The second phase, beginning in the 1980s and accelerating through the 1990s, reflected neo-liberal skepticism about state regulatory capacity and championed market-based instruments - carbon trading schemes, pollution taxes, payments for ecosystem services - as more efficient and flexible alternatives. The ScienceDirect (2025) study on governance, development, and the environment offers a sophisticated empirical assessment of this phase, finding that effective governance - measured through regulatory quality and rule of law - does drive economic development by attracting investment and fostering institutional stability, but that this economic progress does not automatically translate into environmental improvement without explicit environmental policy integration. The same study documents the Kuznets Curve dynamic: environmental degradation tends to rise in early stages of development but declines at higher income levels - a finding that has been used both to justify patience with developing country emissions and to argue for accelerating the governance transitions that make cleaner growth possible.

The third phase - ongoing and still contested - has been characterized by a growing appreciation for the complexity and diversity of effective environmental governance. ScienceDirect (2024) documents how institutional quality, regulatory enforcement, corruption, political polarization, and community participation all interact to shape environmental outcomes in ways that no single theoretical model fully captures. Global CO2 emissions reached a staggering 36.3 billion metric tons in 2021, with emerging economies accounting for the largest share due to rapid industrialization and - critically - weak institutional frameworks that failed to channel growth along lower-carbon trajectories (ScienceDirect, 2024). This suggests that the governance deficit is as important as the investment deficit in explaining sustainability failures.

Table 2: **Comparative Environmental Governance Models: Features, Strengths, and Limitations**

Governance Model	Core Features	Strengths	Limitations and Risks
Centralised / Command-and-Control	Single regulatory authority; top-down standard setting; uniform enforcement; punitive compliance mechanisms	Clear accountability; uniform standards; strong enforcement capacity in capable states	Inflexible to local contexts; ignores ecological diversity; prone to capture by industrial interests; alienates communities
Decentralised / Local Governance	Authority devolved to local bodies; community participation; local knowledge integration; panchayat-level resource management	Context-sensitive; builds community ownership; responsive to local ecological needs; promotes democratic accountability	Risks of elite capture; technical capacity gaps at local level; fiscal dependence on higher tiers; inconsistent enforcement quality
Market-Based / Incentive Governance	Carbon trading; green credit programmes; payments for ecosystem services; environmental taxation; green bonds	Cost-efficiency; innovation incentives; scalable finance mobilization; private sector engagement	Distributional inequity; regulatory escape hatches; risk of greenwashing; market failures in public good provision
Polycentric Governance	Multiple overlapping governance centres at local, regional, national, and transnational levels; redundancy by design	Resilient to single-point failure; enables experimentation; inclusive of non-state actors; adaptive to ecological complexity	Coordination costs; risk of governance gaps; accountability diffusion across multiple actors; contested jurisdictions
Collaborative / Participatory Governance	Multi-stakeholder platforms; co-management of natural resources; deliberative environmental planning; civil society integration	High legitimacy; integrates traditional ecological knowledge; builds social capital; enhances policy compliance	Time-intensive; power asymmetries among stakeholders can persist; risk of co-optation; requires strong facilitation capacity

Note. Compiled from ScienceDirect (2024, 2025), Semantic Scholar (2022), MIT Press (2024), Ecology India (n.d.), MDPI Forests (2022), and IISD (2020).

Table 2 maps the five principal environmental governance models in the contemporary literature - centralized, decentralized, market-based, polycentric, and collaborative - against their core features, strengths, and limitations. No single model is presented as uniformly superior; the theoretical consensus in the contemporary literature is that effective

environmental governance demands the intelligent combination of elements from multiple models, calibrated to the specific ecological, institutional, and socio-political context of each region.

4. Multi-Level and Polycentric Environmental Governance

Among the theoretical developments that have most significantly advanced the field of environmental governance in the past two decades, the polycentric governance framework - associated above all with Ostrom's work on common-pool resource management and more recently developed by Kellner, Huitema, and others in the climate governance literature - deserves particular attention. Polycentric governance, in Ostrom's formulation, refers to a system of governance characterized by multiple overlapping decision-making centers at different scales, each with semi-autonomous authority, but operating within a shared normative and institutional framework. The key insight is that polycentric systems are more resilient than monocentric ones - more capable of adapting to ecological surprises, correcting governance failures, and integrating the local knowledge necessary for effective resource management - precisely because their redundancy creates multiple points of institutional capacity and innovation.

The MIT Press (2024) systematic review of polycentric climate governance literature across 23 democracies identifies the state as an indispensable actor in polycentric systems - not as the sole governance authority, but as the architect of the institutional framework within which local initiatives, private actors, civil society organizations, and transnational networks all operate. When the state withdraws from this framework-setting role, polycentric systems are vulnerable to greenwashing and to actors operating outside planetary boundaries. What makes polycentric governance effective is not the absence of state authority but the intelligent deployment of state capacity to set standards, provide fiscal support, build technical capacity at lower governance tiers, and enforce accountability across the system.

The MDPI Forests (2022) study on polycentric environmental governance in Southeast Asia and Eastern Africa provides particularly valuable empirical evidence. Examining forest governance in Vietnam, watershed management in Indonesia, and transboundary conservation between Kenya and Somalia, the study identifies four elements consistently associated with polycentric governance success: political will at higher governance levels, a supportive legal framework that recognizes community governance rights, meaningful capacity building for local governance actors, and financial support flowing from higher to lower governance tiers. Where any of these four elements is missing, polycentric governance arrangements struggle to deliver on their theoretical promise.

The critical implication for sustainable regional development is this: regional governance actors - whether Indian state governments, European regional development authorities, or African provincial administrations - can neither operate as fully autonomous environmental governors nor remain passive recipients of national policy. They must actively construct their position within multi-level governance systems: upward, engaging national and international frameworks that shape the legal, fiscal, and normative environment; laterally, cooperating with

neighboring regions on cross-boundary ecological challenges; and downward, devolving meaningful authority and resources to local bodies and community governance institutions. The inter-agency SDG Localization policy brief captures this through the concept of vertical and horizontal integration - arguing that governments at all levels must embrace multilevel governance principles that prioritize both top-down and bottom-up communication to improve coherence of strategies and policies across global, national, and local levels (SDG Localization).

5. SDG Localization and Regional Sustainable Development

The adoption of the 2030 Agenda for Sustainable Development in 2015 represented the most ambitious attempt in human history to organize global collective action around a shared sustainability vision. The 17 SDGs and their 169 targets constituted a comprehensive framework spanning economic, social, and environmental dimensions of human development - and explicitly committed signatory nations to leaving no one behind. Yet the architecture of the 2030 Agenda is primarily national: it establishes obligations for states, monitors progress through national reporting mechanisms, and holds governments accountable through voluntary national reviews at the UN High-level Political Forum.

This national architecture has created what scholars are increasingly calling the SDG localization deficit. Cambridge Core (2024) documents, on the basis of extensive cross-national evidence, that the vast majority of the SDGs show limited progress at the midpoint of the agenda, and that the UN Secretary-General's 2023 report was sufficiently alarmed to call for a 'Rescue Plan for People and Planet.' Part of the explanation lies in geopolitical disruptions; part lies in the fiscal consequences of the COVID-19 pandemic. But a third element is the persistent failure to translate national SDG commitments into sub-national governance action - to embed the goals in the planning, budgeting, regulatory, and monitoring systems of the regional and local bodies that actually deliver most public services and manage most of the natural resources on which the SDGs depend.

The SDG Localization inter-agency policy brief (2024) identifies several specific mechanisms through which local and regional governments can contribute to SDG implementation: integrating the SDGs into cities' and regions' sustainable development strategies; adopting multilevel governance frameworks that promote vertical and horizontal integration; leveraging digital technologies to improve data collection and monitoring; and facilitating participatory planning processes that ensure community voices shape local SDG priorities (SDG Localization). The Tandfonline (2024) study of SDG implementation in Italian regions adds an important empirical dimension: it demonstrates, using survey data from 2,303 residents across Italy's four macro-regions, that residents' perceptions of SDG relevance vary substantially by region, and that policy effectiveness depends on tailoring SDG implementation strategies to the specific values, concerns, and priorities of regional communities rather than imposing a uniform national template.

In the Indian context, the SDG India Index 2023-24 provides the most comprehensive available snapshot of sub-national SDG progress, showing a composite national score of 71 out of 100

but masking enormous regional variation. India's poverty rate declined from 45.5% in 2015-16 to 21.9% in 2019-20, and sanitation coverage rose from 49% in 2014 to 99% in 2019 - impressive aggregate figures that conceal sharp regional disparities across states (2030 Ka Bharat). Yet the same index reveals that environmental sustainability remains one of the weakest SDG performance areas, and that gender inequality (India ranking 127th out of 146 countries in the 2023 World Economic Forum Gender Gap Index) and chronic hunger continue to undermine progress toward a comprehensive sustainability transition at regional levels.

6. India's Environmental Governance: Federal Structures, Legal Architecture, and Institutional Challenges

6.1 Constitutional and Institutional Framework

India's environmental governance architecture is shaped by the constitutional structure of cooperative federalism - a structure that, as the Indian Institute of Ecology and Environment (Ecology India) notes, creates scope for a degree of environmental federalism where governance and regulation are decentralized across multiple levels. The Constitution of India places forests, wildlife, and water resources on the Concurrent List, making both the central government and state governments constitutionally competent to legislate in these domains - a feature that simultaneously allows for policy innovation at the state level and creates coordination problems when central and state priorities diverge. Article 21's right to life has been interpreted by the Supreme Court to include the right to a clean environment, while Articles 48A and 51A(g) impose explicit constitutional duties on the state and citizens to protect and improve the natural environment.

The central legislative pillars of India's environmental governance framework include the Environment Protection Act (1986), the Forest Conservation Act (1980), the Water (Prevention and Control of Pollution) Act (1974), the Biological Diversity Act (2002), and the National Green Tribunal Act (2010), which established a specialized environmental judiciary. TERI's assessment of India's environmental governance identifies this as a sophisticated formal architecture - but one whose implementation suffers from endemic weaknesses: environmental impact assessments conducted mechanically to obtain clearances rather than as genuine integrative planning tools; coordination failures across inter-sectoral boundaries; and inadequate decentralization of natural resource management through the institutions of self-government mandated by the 73rd and 74th Amendment Acts (TERI).

6.2 Panchayati Raj and Decentralised Environmental Governance

The 73rd and 74th Constitutional Amendment Acts of 1992 mandated the establishment of Panchayati Raj Institutions (PRIs) in rural areas and Urban Local Bodies (ULBs) across India - a formal devolution of governance authority to the sub-district level that represents, in principle, the most significant structural reform of India's subnational governance architecture since independence. As of 2023, there are 2.46 lakh Panchayats in India, representing the institutional infrastructure through which a vast range of development functions - including environmental management, watershed development, afforestation, and sanitation - are

supposed to be delivered (Dalvoy). Yet the gap between formal devolution and practical empowerment remains wide.

Sage Journals (2024) documents this gap in its analysis of decentralized governance of natural resources in India, noting that while the post-1990s period brought renewed attention to participatory decentralized governance, the policy design has been constrained by conceptual binaries - community versus state, local versus scientific knowledge, conservation versus development - that restrict the space for genuinely adaptive, context-sensitive governance. The Central Accountability Gap: only 8 out of 16 states reported active ward committees in a 2023 study; Gram Sabhas lack power under recent amendments; and overlapping jurisdictions between bodies like Delhi's Development Authority and Municipal Corporation create institutional confusion that delays projects and dilutes environmental accountability (Superkalam).

Kerala's decentralised planning model - the People's Planning Campaign - stands as a significant counter-example within India, demonstrating that meaningful fiscal devolution combined with local planning authority and technical support can produce genuine improvements in service delivery, participatory governance, and local environmental management. The Kudumbashree Mission, which empowers women through self-help groups and local governance, similarly illustrates how institutional design can convert constitutional mandates into substantive community agency (Dalvoy).

6.3 India's Sustainability Push: Schemes, Gaps, and Governance Failures

Table 3 maps India's key environmental governance challenges across five domains - air quality, forest conservation, water governance, climate finance, and SDG localization - against current status data and institutional responses as of 2023-25. The table illustrates a recurring pattern: ambitious national schemes with measurable targets frequently fall short at the implementation stage, due to the interlocking failures of fiscal inadequacy, technical capacity gaps, inter-ministerial coordination failures, and insufficient community participation.

The Centre for Financial Accountability's (2025) comprehensive assessment of India's environmental governance in 2024-25 identifies a particularly troubling pattern of legislative regression: the Forest Conservation (Amendment) Act 2023 exempted border security and infrastructure projects within 100 km of international boundaries from forest clearances, putting extensive forest-rich territories in north-eastern India - where states like Mizoram (85% forest cover), Arunachal Pradesh (79%), Meghalaya (76%), Manipur (74%), and Nagaland (74%) contain India's densest forests - into existential ecological risk. The CAG report (2023) found that less than 60% of climate-related projects met their stated milestones due to delays in fund release, tendering failures, and lack of inter-ministerial synergy (Earth5R). These are not incidental implementation difficulties; they reflect structural tensions between the developmental imperatives of a rapidly growing large economy and the ecological imperatives of a mega-diverse country hosting 7-8% of all recorded species and four global biodiversity hotspots (TERI).

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Table 3: **India's Key Environmental Governance Challenges and Institutional Responses (2023-2025)**

Governance Domain	Core Challenge	Current Status / Data	Policy Response / Institutional Mechanism
Air Quality Management	Chronic air pollution in industrial and urban regions; inadequate monitoring infrastructure; delayed NCAP targets	96% of NCAP cities exceeded PM10 limits in 2023; only 541 continuous monitoring stations nationally (Centre for Financial Accountability)	National Clean Air Programme (NCAP) with 40% PM10/PM2.5 reduction target by 2026; Delhi Air Pollution Mitigation Plan 2025
Forest Conservation	Forest Conservation Amendment Act 2023 exempts border infrastructure from clearances; gram sabha consent bypassed	North-eastern states (Mizoram 85%, Arunachal Pradesh 79% forest cover) put at risk by 100 km border exemption clause (Centre for Financial Accountability)	Supreme Court oversight; Forest Rights Act 2006 protections; community-based forest management (JFM) programmes
Water Governance	River pollution persists despite massive investment; Namami Gange Mission progress falls short of targets	India generates 62 MT waste annually including 5.6 MT plastic waste; agricultural and industrial effluents continue untreated (TERI)	Jal Shakti Ministry integration; Jal Jeevan Mission targeting piped water to all rural households by 2024; Namami Gange Mission 2.0 at Rs 21,400 crore
Climate Finance	National Adaptation Fund chronically underfunded; climate adaptation expenditure below assessed need	NAFCC received only Rs 160 crore in 2024-25 for state adaptation; climate adaptation expenditure 5.6% of GDP in 2021-22 (Drishti IAS)	Green Credit Programme; Perform-Achieve-Trade (PAT) scheme; PM KUSUM renewable energy scheme (Maharashtra received Rs 1,154 crore in 2024-25)
SDG Localization	Gap between national SDG commitments and sub-national implementation; fiscal capacity deficits in local bodies	SDG India Index 2023-24 composite score: 71/100; only 38% of urban local bodies had full-time environmental engineers (World Bank, 2024) (Earth5R)	NITI Aayog SDG India Index; Kerala decentralised planning model; Kudumbashree Mission; Smart Cities Mission

Note. Compiled from Centre for Financial Accountability (2025), Drishti IAS (n.d.), TERI (n.d.), Earth5R (2025), 2030 Ka Bharat (2023), and Superkalam (2025).

Drishti IAS's analysis of strengthening India's environmental governance identifies several systemic deficiencies that compound these specific failures: the Environmental Impact

Assessment process is routinely conducted as a compliance exercise rather than a genuine planning tool; public consultations are superficial or bypassed; marginalized communities - particularly tribal populations - face displacement without adequate compensation; and market mechanisms like the Green Credit Programme create regulatory escape hatches that allow carbon-intensive business models to continue under a sustainability veneer while climate adaptation financing remains chronically underfunded (Drishti IAS).

7. Regional Development and Environmental Governance: Comparative Perspectives

7.1 European Smart Specialisation and Green Transition

The European experience with regional development governance offers important comparative reference points. The Tandfonline (2025) editorial situates the Smart Specialisation Strategy (S3+) - the European Union's place-based innovation policy framework - within the broader challenge of environmental and social sustainability transitions, arguing that the most productive regions in Europe's green transition are those that have developed co-evolutionary processes between their innovation ecosystems, governance frameworks, and sustainability trajectories. The European Green Deal (2025), as the most comprehensive regional sustainability governance initiative currently operational, represents an attempt to create exactly the kind of challenge-oriented, place-based governance architecture that the theoretical literature identifies as necessary for sustainable regional development - combining binding regulatory standards, substantial fiscal support, multi-level governance mechanisms, and explicit attention to the just transition concerns of regions most dependent on fossil fuel industries.

Crucially, the European experience also illustrates the limits of top-down sustainability governance. The Draghi Report (2024), referenced in the Tandfonline (2025) analysis, identifies the EU's competitiveness challenge and warns that the green transition risks exacerbating regional inequalities unless governance frameworks actively compensate for the differential distributional impacts of decarbonization policies across regions. Coal regions in Poland, automotive regions in Germany, and energy-dependent regions in Southern Europe face very different transition challenges that cannot be managed through uniform EU-level instruments.

7.2 Southeast Asia and the Polycentric Experience

The MDPI Forests (2022) case studies from Vietnam, Indonesia, and the Kenya-Somalia transboundary region provide some of the most granular available evidence on polycentric environmental governance in practice. In Vietnam, watershed governance arrangements that combined state regulatory authority with community water user associations and private sector participants demonstrated significantly better environmental outcomes than either purely state-managed or purely market-managed alternatives - but only where state support for community governance institutions was sustained over time. In Indonesia, the East Lombok case illustrated both the potential and the limits of polycentric governance: forest landscape goals remained unachieved where governance institutions lacked integration with adjacent actors, and where

civil society engagement was insufficient to reconcile power asymmetries between local communities and commercial logging interests (MDPI Forests).

These findings align with the broader theoretical claim of the MIT Press (2024) polycentric governance review: that local democratic preferences are not simply inputs into polycentric governance systems but are constitutive of their effectiveness. Where communities have genuine voice in governance decisions - where their ecological knowledge is respected, their participation is structured and protected, and their grievances have institutional channels for resolution - polycentric systems tend to produce better environmental outcomes than either top-down command structures or unregulated markets.

7.3 Africa and the Limits of Institutional Fragmentation

The ScienceDirect (2024) cross-regional governance analysis includes evidence from Eastern, Central, and Western Africa that complicates optimistic readings of decentralization. In the ECA (Eastern and Central Africa) region, the finding that improved governance enhances economic stability but drives CO2 emissions upward - because industrial reliance, natural resource processing, and partial exploitation mean that improved governance fosters economic activity without adequate environmental safeguards - illustrates the Kuznets dynamic at work in practice. Where governance improvement is narrowly concentrated in fiscal and economic management without commensurate investment in environmental regulatory capacity, the early stages of governance improvement may actually worsen environmental outcomes, even as they improve economic and social ones.

This finding has important implications for the sequencing of governance reform in developing regions. It argues for simultaneous investment in economic governance capacity and environmental governance capacity - rather than treating environmental governance as a luxury reserved for higher income levels. The IISD's polycentric sustainable energy governance analysis makes a parallel argument in the energy sector: that the polycentric, non-hierarchical governance model that has emerged in the global energy transition is a source of strength precisely because it distributes authority, experimentation, and learning across multiple governance centres rather than concentrating risk in a single institutional hierarchy (IISD).

8. Structural Challenges in Sustainable Regional Development Governance

Across the comparative evidence reviewed in this paper, several structural challenges recur with sufficient frequency to warrant identification as systemic features rather than context-specific anomalies.

The first and most pervasive is the fiscal gap between environmental governance mandates and financial resources. At the local and regional levels, environmental governance responsibilities consistently outpace financial capacity - a pattern documented in India (where only 38% of urban local bodies had full-time environmental engineers in 2024), in European regions (where the Draghi Report identifies green transition financing needs that far exceed available public resources), and in developing country regional governments globally (where climate adaptation remains chronically underfunded relative to assessed vulnerability). The UN inter-agency SDG Localization brief is explicit on this point: financial deficiencies represent one of the primary

barriers to SDG implementation at local and regional levels, requiring the strategic deployment of financial resources, transparent governance systems, and participatory monitoring to overcome (SDG Localization).

The second structural challenge is technical capacity deficit. Environmental governance at the regional and local level requires sophisticated technical skills - in ecological assessment, environmental impact modeling, climate risk analysis, data management, and regulatory enforcement - that are in chronically short supply in most sub-national governance systems. India's CAG finding that less than 60% of climate-related projects met their milestones is partly a story of technical failure - of projects insufficiently designed, inadequately monitored, and poorly integrated with the ecosystems and communities they are supposed to serve. The green credit and carbon market mechanisms introduced as alternatives to direct regulation are particularly vulnerable to this capacity gap: designing and operating credible carbon accounting systems requires technical expertise that most regional governance actors in developing countries lack.

The third challenge is political economy: the persistent influence of extractive and polluting industries in shaping the regulatory frameworks ostensibly designed to constrain them. The Centre for Financial Accountability's (2025) documentation of India's progressive dismantling of environmental protections - the Forest Conservation Amendment Act 2023, the continuation of ex-post facto clearances (subsequently struck down by the Supreme Court), the exemption of border infrastructure projects from environmental scrutiny - illustrates how development imperatives, national security rhetoric, and industrial lobbying can systematically erode the legal architecture of environmental governance from within.

The fourth challenge is the participation and representation deficit. Effective environmental governance requires not only the technical capacity to assess and manage ecological systems but the democratic legitimacy that comes from genuine community participation in governance decisions. The Atlantis Press (2025) analysis of green governance in India notes the paradox that many environmental governance initiatives - ostensibly designed to serve local communities - lack the participatory foundations that would make them genuinely responsive to local needs and conditions. When tribal communities' gram sabha consent is bypassed in forest land diversion decisions, when public consultations on EIA processes are superficial or pre-decided, and when indigenous ecological knowledge is ignored in favor of standardized technical assessments, the governance outcomes are both democratically illegitimate and practically worse - because the local knowledge that would have improved them was excluded.

9. Toward Effective Sustainable Regional Development Governance: Policy Recommendations

The analytical conclusions of this paper support a set of specific policy recommendations for governments, civil society organizations, and international development partners engaged with sustainable regional development governance.

First, fiscal architecture must be reformed to match financial resources with governance responsibilities. Sustainable regional development governance cannot be achieved on the

cheap. The principle of fiscal federalism - that governance functions should be assigned to the level of government most capable of performing them effectively, and funded accordingly - demands that regional and local environmental governance institutions receive the financial resources necessary to fulfil their mandates. This means more than incremental increases in block grants; it requires dedicated environmental governance budgets, green municipal bond markets, performance-based fiscal transfers linked to SDG progress, and access to international climate finance for the most climate-vulnerable regional authorities.

Second, technical capacity building for regional and local environmental governance must be treated as a development priority, not an optional supplement. The World Bank's finding that only 38% of India's urban local bodies had full-time environmental engineers in 2024 (cited in Earth5R) represents a governance capacity deficit that no amount of policy ambition can overcome without sustained investment in professional training, institutional capacity building, and technical knowledge transfer to sub-national governance actors.

Third, polycentric governance frameworks should be designed and resourced deliberately, not left to emerge ad hoc from the interaction of disconnected institutional fragments. The evidence from Southeast Asia and Eastern Africa (MDPI Forests) and from European regional development policy (Tandfonline) consistently points to the same conclusion: polycentric governance works when it is supported by clear legal frameworks that recognize multi-actor governance rights, by state actors willing to devolve genuine authority while providing framework support, and by community governance institutions with the capacity and resources to participate meaningfully.

Fourth, environmental impact assessment must be reformed from a compliance ritual into a genuine integrative planning instrument. India's EIA process - and analogous processes in many other developing countries - has been progressively weakened by regulatory rollback and institutional informalism. A credible EIA framework requires transparent procedures, mandatory public consultations with genuine veto power for directly affected communities, independent technical review, and post-approval monitoring with effective enforcement capacity.

Fifth, the SDG localization agenda requires dedicated institutional architecture at the regional level. Cambridge Core's (2024) analysis of SDG governance failures identifies the absence of effective sub-national implementation frameworks as a critical factor. National governments should establish regional SDG localization platforms that integrate local and regional governments into national SDG monitoring systems, provide disaggregated SDG data at the district and regional levels, and create fiscal incentive structures that reward sub-national governance actors for progress against SDG targets.

Conclusion

The challenge of sustainable regional development and environmental governance is, at its core, a challenge of institutional design under conditions of deep uncertainty, profound inequality, and competing interests. No single governance model - centralized regulatory regimes, market mechanisms, decentralized community management, or polycentric networks

- is adequate to the complexity of ecological and socio-economic systems at the regional scale. What the evidence reviewed in this paper supports, rather, is the need for governance frameworks that deliberately combine the regulatory authority of the state, the market efficiency of economic instruments, the contextual knowledge of communities, and the resilience of polycentric coordination - calibrated carefully to the specific ecological, institutional, and political context of each region.

India's experience crystallizes both the promise and the difficulty of this challenge. The constitutional architecture of environmental federalism, the Panchayati Raj framework, the National Green Tribunal, and the ambitious array of sustainability schemes from Jal Jeevan Mission to PM KUSUM represent genuine governance innovations that other large developing federations have reason to study carefully. Yet the systemic weaknesses documented in this paper - the legislative rollback of forest protections, the chronic underfunding of climate adaptation, the EIA compliance culture, the participation deficit in environmental decision-making - demonstrate that formal governance architecture and substantive governance practice remain separated by a gap that no technocratic fix can bridge without political commitment to the deeper values of ecological integrity, distributive justice, and democratic accountability.

The 2030 Agenda is in crisis not because its goals were wrong but because the governance systems designed to pursue them were insufficiently rooted in regional and local realities. Sustainable regional development will be achieved - or not - at the scale of the river basin, the forest landscape, the metropolitan region, and the rural district. It will require governance actors at all levels to look past their immediate institutional interests toward the long view that genuine sustainability demands. Whether that transition happens within the remaining years of the 2030 Agenda's timeline, or is deferred to an even more urgently constructed successor framework, depends on choices being made now - in legislatures, in planning offices, in community meetings, and in the spaces where ecological knowledge and political authority meet.

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